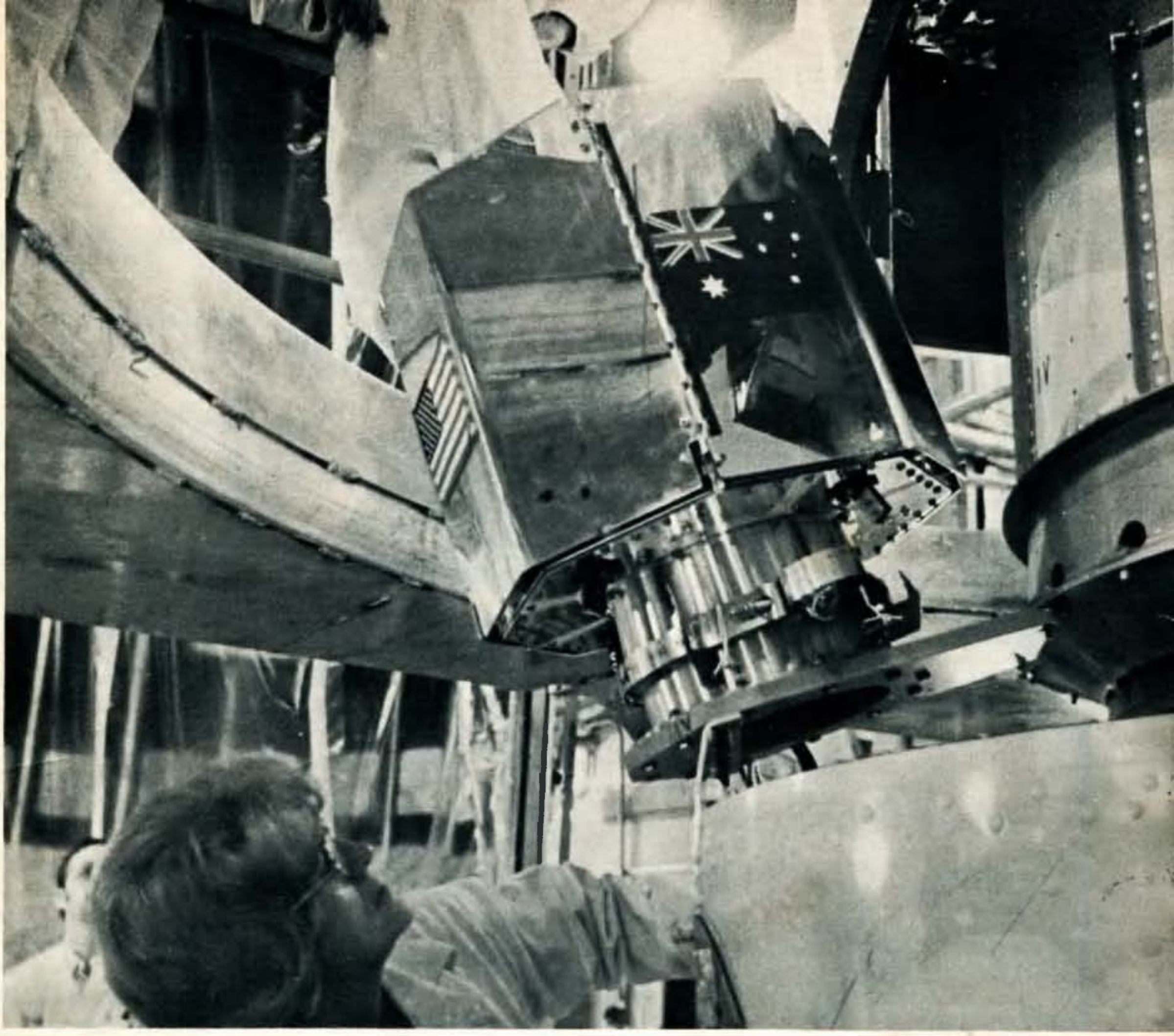
amateur radio



VOL. 43, No. 1 JANUARY 1975

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COVER PHOTO

Dick Daniels WA4DGU on the upper level observes as Marie Marr, the Spacecraft Technician who actually assembled most of the spacecraft, makes some last adjustments to Oscar 7. The spacecraft was launched into orbit on Nov. 15th and is working well (see page 3).

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

GRID DIP METER — Model TE-15

SPECIFICATION

Freq. Range: 440kHz-280MHz in 6 Coils
A Coil 0.44—1.3MHz
B Coil 1.3—4.3MHz
C Coil 4.14MHz
D Coil 14.40MHz
F Coil 120-280MHz
Transistor: 3 TR's & 1 Diode
Meter: 500uA Fs
Battery: 9V (BL-006P)
Dimensions: 180x80x40mm
Weight: 730g

Price $36.50
P & P $1.00

DELUXE AUDIO GENERATOR — Model HE-22D

Model TE-22D

SPECIFICATION

Freq. Range: Sin: 20Hz-200kHz
Square: 20Hz-25kHz
Output Voltage: Sine: 7 volt
Square 7 volt
Output Impedance: 1000 ohm
Freq. Accuracy +3% + 2Hz
Distortion: Les than 2%
Tube Complement: 6BM8 12 AT7, 6Z4
Power Source: 105-125, 220-240V AC, 50/60 cps 19W
With Attenuation Range
4 Ranges—1/1, 1/10, 1/100, 1/1K

Compact-Space Saving
Printed Circuit for uniform Characteristics
Low Distortion
Dimensions: 140 x 215 x 170mm
Weight: 2.8kg

Price $49.50
P & P $2.00

Disposal Specials — Richmond only

Crystals

1 MHz D style	ea. $8.00
100 kHz 7 pin glass enclosed	$10.00
Most popular D style for 2 m FM channels 1, 4, B, 50 etc.	$6.50
58 ohm new ⅛" diameter coax cable 12c/yd or 100 yd	$10.00
Tank whip antenna bases, new	$3.00
Selsyn motors, 50 volt, new	$5.00
PMG phone plug and socket, Ericcson type, per pair	95c
Phone curly cords, cream	30c
Rocking armature mic. Insert	30c
Key switches, various types, 50c &	75c
4/125a Ceramic valve socket	$2.00
7 pin PTFE valve socket with screw-on shield	98c
9 pin as above	98c
Polypak 100 mixed resistors ⅛W-2W all new	$1.90
Polypak 30 assorted capacitors, ceramic, electrolytic polyester, all new	$1.50
Switches, 11 position, 2 pole, 2 bank ceramic	$1.50
Switches, 4 position, 2 pole	$1.00
8 transistor radio cricuit board with all components and battery holder ready to go straight from production line	$3.00
6 transistor, as above	$2.00

LAFAYETTE HA-600A SOLID STATE

GENERAL COVERAGE

5 BANDS 150-400 kHz, 550-1600 kHz (Broadcast band), 1.6-4.8 MHz, 4.8-14.6 MHz, 10.5-30 MHz. **Operates from 12 Volts DC (negative ground) or 220-240 Volts 50 Hz.**

- Field Effect Transistors in RF Mixer and Oscillator Stages.
- Two Mechanical Filters for exceptional selectivity.
- Voltage Regulated with Zener Diodes
- Product Detector for SSB/CW
- Edge illuminated Slide Rule Dial with "S" Meter
- Continuous Electrical Bandspread Calibrated 80-100M Amateur Bands
- Variable BFO, Automatic Noise Limiter
- Speaker Impedance 4 to 16 ohms

Price $215.00
P & P $2.00

Also available — HA800B Amateur Band 6 Bands 3.5MHz to 29.7MHz and 50-54MHz as above features with 100kHz calibration **facility: $210.00. 100kHz Xtal Extra $10.75.** P & P $2.00

SOLID STATE WIDEBAND RF SIGNAL GENERATOR

MODEL SG-402

This is an all solid state, wideband RF Signal Generator which produces low impedance low distortion RF signals. It is highly dependable and easy to operate, and is a handy working instrument for service benches and electronic equipment production centres.

SPECIAL FEATURES

1. Generates wide range signals from 100kHz to 30MHz in six frequency ranges.
2. All solid state construction for instant waveforms, compact and lightweight portability.
3. Includes 400Hz signal source for modulation of output signal, which can be modulated by external sources.

Price $99.50. p & p $2.00

Disposal Specials — Richmond only

5BP1 CRO tubes, new	$3.00
Headphones, low impedance, ex-Army in sealed box, pair	$2.00
Tag strips, 7 lug plus 2 mounting lugs 10 for	50c
Egg Insulators, porcelain, new, ea.	12c
20 amp DC meter in wooden carrying case	$10.00
Telephone hand set with PTT switch, ex-Army	$1.50
Coil formers, 1¼" with octal plug, 40 cents each or 3 for	$1.00

No. 19 and 62 transceivers, partly wrecked, any reasonable offer accepted.
Personal shoppers only.

TRIO 3" OSCILLISCOPE DC — 1.5 MHz MODEL CO-1303A

SPECIAL FEATURES

1. Vertical sensitivity of 20 mV/cm, three step attenuation, AC DC operation & wideband frequency response from DC to 1.5MHz
2. DC vertical and horizontal amplifiers for wide versatility make possible external sweep speeds of less than 1Hz
3. All solid state construction for compact, lightweight portability
4. Smoked filter glass CRT face and exclusive designed graticule, graduated in dB for clear waveform comparisons
5. Direct input to 150MHz for SSB and AM transmission monitoring

Price $150. p & p $2.00

DISPOSAL SPECIALS

Coax. Cable, 58 ohm Ascand 15 P1/24. Brand new ⅛ outside diameter. 12c per yard. $10 per 100 yard reel.

AWA BEAT FREQUENCY OSCILLATOR from Zero Cycles to 13 kHz, 240 Volt AC $35.

PLESSEY TRANSCEIVERS in stock at present include B47, B48, C42, C45 with power supplies and accessories also available.

Brand new valves and semiconductors

2N3055	$1.00
OA91	15c
807	$2.00
IT4, 6C8, IR5	75c
6BA6-6AK5-6V6G-6J6	$1.00
2E26-QQEO4/7-QQEO4/10	
6SK7-ECH35-6K8G-5763	$3.00
6SJ7GT-12AT7	$1.50

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(Disposal Branch)

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323 ELIZABETH STREET, MELBOURNE, VIC., 3000

Phones: 67-7329, 67-4286 All Mail to be addressed to above address

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amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA, FOUNDED 1910

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QSP

OSCAR 7 LAUNCHED

David Hull VK3ZDH
Project Australis

After a couple of delays Oscar 7 was launched from the western test range in California at 1711 GMT on Nov. 15, 1974.

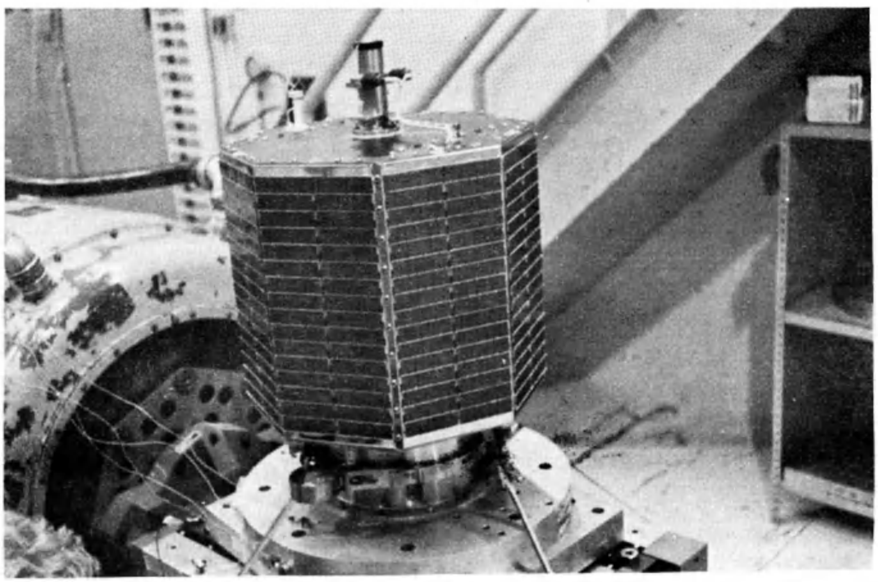
To cover the launch two international telephone circuits and a number of HF radio links were employed including an 80m net for within VK traffic. The spacecraft station conference telephone circuit linked VK3ZDH in Australia and VE3QB and VE2BYG in Canada with Perry Klein K3JTE and Jan King W3GEY at the Goddard Spaceflight Centre In Maryland. The Net telephone conference circuit linked W3ZM, the AMSAT Net control station, W1AW, the ARRL Net station, WA3NAN, the club station at the Goddard Spaceflight centre, W6AB, the club station at the western test range and WA4DGU at the Goddard Spaceflight centre. A number of W stations transmitted the launch proceedings on the 15, 20, 40 and 75 metre bands.

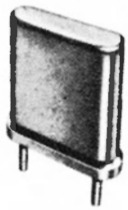
At 1711 GMT the voice of Dick Daniels WA4DGU echoed around the world "5, 4, 3, 2, 1, 0 . . . we have lift off" in the approved space age manner and the Delta rocket carrying Oscar 7, the Itos G weather satellite and the Spanish research satellite INTASAT, lifted off the launch pad and into Amateur Radio history.

The spacecraft was initialised with the 435.1 MHz beacon on FSK CW mode and signals at very high signal levels were heard in VK on the initial orbits. The CW was decoded and telemetry frames, showing all values as nominal, reported back to AMSAT. On later orbits the Australis RTTY telemetry was switched to the 435.1 MHz beacon and also performed as designed. Initial orbits with the translators switched on showed that many VK and ZLs were ready and many contacts were made. The power levels required to work through the 70 cm to 2m translator were much lower than AMSAT had predicted which is encouraging to VKs on lower power limits. Codestore messages were loaded from VK3ZDH for the first time on Orbit 172.

Thus the second long life Amateur satellite was born, and for the first time Radio amateurs have two operational satellites at once. **Amateur Radio is in space to stay.**

AMSAT-OSCAR 7 during vibration tests. The 2304 MHz quadrufilar antenna furnished by RCA and 10 metre deployable antenna from Ametek Hunter Spring are on the top.





QSP

IARU REGION 3

The IARU R3 Association Conference is due to be held **4th to 13th March 1975.** The Conference will be held in **THE LEE GARDENS HOTEL,** Hysan Avenue, Hong Kong.

A special IARU discounted rate at this hotel has been secured and applies as long as at least 20 people stay there. At this stage there are still a few vacancies so if any amateur with or without family wants a holiday why not consider taking it at this time to take advantage of discounted accommodation. You do not have to join in any of the amateur functions and you could spend all your time sight-seeing.

If you are likely to be in Hong Kong around that time why not write direct to Rudi Gmelin, VS6AX, c/- Jebsen & Co. Ltd., P.O. Box 97, Hong Kong, for more details and say you wish to support Region 3.

Readers will be well aware of the aims and objects of the IARU and the enormous value of this organisation to amateur radio on the international scene. Everyone ought to know also how the IARU delegation at the 1971 Space Conference worked wonders for the cause under some very adverse conditions. This followed in the footsteps of the very able IARU representation at the ITU's W.A.R.C. in Geneva in 1959.

In the earlier 1959 WARC the local amateur representation was sponsored and paid for by the WIA and the delegate was accredited as a member of the official Australian delegation. The IARU was represented by various Region 1 delegates. In the 1971 WARC the status of the IARU had improved and the IARU team included prominent amateurs from each of the three IARU regions. The delegate from Region 3 was in fact supported and financed by the IARU Region 3 organisation.

Why was it necessary to have a regional IARU body at all? This is very simply answered by saying that the IARU is our 'trade union' — "united we stand, divided we fall" and all that. Not only does a united body such as the IARU carry weight but it also serves to spread the financial and administrative loads much more evenly.

The 1959 W.A.R.C. cost the WIA a lot of money. The 1971 W.A.R.C. cost to the WIA was part of the Institute's subscription to the IARU Region 3 Association.

For ITU purposes the world is divided into three Regions: Region 1 being broadly Europe and Africa, Region 2 the Americas and Region 3 the rest of the world. If, as did actually occur, IARU regional organisations sprang up in Regions 1 and 2, the amateurs in Region 3 had to get together or remain out on a limb. Hence the birth in Sydney of the IARU Region 3 Association sponsored heavily by the three largest of the region's amateur societies in 1968/69.

The first formal conference of the Region 3 Association was held in Tokyo on the invitation of JARL from 17th to 22nd March 1971 and was occupied mainly with constitutional and procedural matters although some thought was given to the 1971 WARC and the need for more spectrum space for the amateur service.

The composition of the Region 3 Association is that the Conferences (every 3rd or 4th year) are the supreme authority of the Association and each member society is entitled to appoint one delegate who shall have one vote provided the society he represents is financial.

The day-to-day management of the affairs of the Association are carried out by four Directors acting in accordance with Conference directives and regulations and answerable to the Conference. The Directors and the Secretary have no vote but can of course speak at a Conference.

WIA DELEGATE

The 1974 WIA Federal Convention appointed Dr. David Wardlaw, the Federal President, to be the WIA delegate at the Hong Kong R3 Conference. It is believed that the other delegates to the Conference could be VS6DD or VS6FU or VS6AX of HARTS (the Hong Kong 'host' Society), ZL2IY or ZL2AMJ of NZART (the Kiwis), 9VIQG of SARTS (Singapore) and W1RU of ARRL. There are at present 9 member societies of the R3 Association — ARRL, ARSI (India), JARL (Japan), HARTS, NZART, PARA (Philippines), SARTS, RSSL (Sri Lanka), and WIA. As each Society has to defray all the costs of its own delegate(s) to attend the Conference it can be seen that this could bear heavily on the smaller societies but there is provision for proxy voting.

R3 DIRECTORS

The Region 3 organisation itself has to pay the costs of the Directors attending each conference as well as the Secretary. The Secretary is no less a person than our own David Rankin VK3QV/9VIRH and the present Directors serving through to 14th March 1975 are Michael Owen VK3KI, Kan Mizoguchi JA1BK, Tom Clarkson ZL2AZ and Bob Denniston W0DX. As all these people have to be flown to Hong Kong and return (which, in the case of W0DX is believed to be the Caribbean area) it can be seen that the transportation expenses will be considerable unless some of them can fit in a business trip to pay for most of their expenses.

R3 SUBSCRIPTIONS

The R3 Association must have access to funds and this is done through an annual subscription payable by each member Society. The annual dues are on a sliding scale beginning with 15 USA cents per transmitting member up to 5000 subject to a minimum sub. of $US25. The association's financial year ends on 31st May each year and as the dues are specified in U.S. currency a wide variation is likely to occur from year to year by reason of differences in exchange rates. The WIA in turn set aside a small amount (20 cents up to 1974 and 30 cents from 1975) from each member's subscription so as to form a fund not only to pay the Institute's dues to the Region 3 Association but also towards the costs of sending a delegate or delegates to R3 conferences.

THE 1975 CONFERENCE

No agenda has come to hand as yet for the 1975 Conference and it is not known what proposals are likely to be put forward except that the WIA are working on a VHF memorandum relative to Region 3 so that member societies may have some material to convey to their own administrations in the event of amateur VHF frequencies becoming diverted to other services as is already beginning to occur. IARUMS would certainly be another item under discussion. Basically, however, the various divisions of the WIA appear to have nothing to contribute or, if they have, nothing has been submitted.

One of the most important items which the Conference may elect to discuss in great depth is of course the impending 1979 WARC. This is because the 1975 R3 Conference could well be the last one which can be held before administrations crystallise their attitudes in advance. A R3 Conference in 1978 is likely to be much too late to have any effect on the 1979 attitudes of administrations.

It is not unlikely that the virus which affects amateurs as exemplified by their apparent inability to communicate amongst themselves is also a disease which spills over to the wider arena of Region 3. Very little has come out of the Region since 1971 but this is not due to any lack of thought by many who are involved. Perhaps the establishment of a regular column in AR may stimulate interest in this field not only by WIA members but by some of those in distant countries of the Region who receive this journal. If this can be the forum for Region 3 affairs at least something might be achieved which did not exist before.

The Executive.

QSP

QSL INFORMATION FROM KEN VK3AH

CR8AC — P.O. 59, Dili, Portuguese Timor.
8Q6AC — Oper. 4S7YL, 8 Quebec St., Marleigh, Rep. Maldive Isles.
8P6FU — C/- L.I.A.T. Airways, Barbados.
9Y4CR — Box 1036, Trinidad.
OA4BV — Box 538, Lima, Peru.
SV0WGL — QSL Mgr., K4EKJ.
FK8BB — QSL via DJ9ZB.
9Y4VV — QSL K9KXA.
FR7AK — Bert (can anyone supply this one?).
ET3USE — P.O. Box 191, Asmirrah.
ZM7AH — QSL via W5ZF, 11504 Golden Gate St., New Mexico, 87111.
S21JA — QSL via JA2KLT.

INTERFERENCE PROBLEMS

Radio Communication journal of the RSGB carries a box inviting members accused of causing interference or who suffer interference from external sources, to seek the assistance of RSGB Interference Committee in solving their problems. It would certainly be useful if the WIA Divisions had such Committees or access to a Central Committee.

RECIPROCAL LICENSING — UK

According to Radio Communications, Sept. '74, applications for reciprocal G licences should be sent to the Home Office, Radio Regulatory Division, Waterloo Bridge House, Waterloo Road, London SE1 8UA, England. Visitors who propose to take into the UK equipment capable of transmissions between 26.1 and 29.7 MHz must first obtain written authority from the Secretary of State, Home Dept.

TVI

Pat Hawker, writing in TT Radio Comms, Sept. '74, comments that there is plenty of evidence that UHF TV has brought far less relief to the amateur scene than expected, due largely to TV Rx design with susceptibility to pick-up on the outer braid of the aerial and extremely limited dynamic range. He adds that the forecasted improvement that UHF would bring appears to be cancelled out by transistor tuners and the lack of front end filtering.

MD108 MIXER

Spectrum International of the USA draws attention to the availability from them of an equivalent mixer weight 1½ oz. price $US8.50. This mixer was the one included in the SL600 Series SSB transceiver article on page 8 of August '74 AR in which SI's advertisement appeared on p.24.

AARTG

The new Secretary of the AARTG is Fred Hull, VK6FH, c/o Royal Flying Doctor Service of Australia, 187 Roberts Rd., Subiaco, WA 6008. The new Chairman is Don Graham VK6HK. In a circular, the Group say it will not be possible to continue publishing "Keybaud" for the time being and that affiliation with the VK6 Division should be sought. Interstate members are encouraged to form local groups to affiliate with local Divisions, but if this is not possible, individuals would still be welcomed as a present AARTG member.

LICENCE FEE INCREASE

As may have been expected, there was a very satisfactory response to the suggestion that members of Parliament be lobbied about the increase to $12 p.a. of the licence fee. In a letter dated 29th October, the PMG rejected the Institute's submissions mainly on the grounds that the Government could not continue to subsidise the administration of amateur radio stations to the extent that it had done over recent years. The parts played by amateurs in providing emergency communications and the study of the radio art as well as being a leisure time activity were all noted and praised but the new fee sticks.

SELF-HELP

"And I would then urge that they (the members) remember the fact that office-bearers of a voluntary organisation do NOT exist to serve the members; they exist to co-ordinate the efforts of the members in helping one another. I believe that the members and the Committee alike have forgotten this simple fact." John Martin in an editorial in the Sept./Dec. '74 issue of 'The Radio Bulletin' of the E. & M. Dist. Radio Club. (You can say that again—Ed.)

QUICK QUIZ

Submitted by:
IAIN MORRISON, VK4ZIG
33 Soule St., Hermit Park, Qld. 4812

In the past 6 months:—

1. Have you built or modified any of your gear?
2. Have you experimented on any of your gear?
3. Have you gainfully educated or instructed anybody on some aspect of A.R.?
4. Have you learnt anything **new** about A.R.?
5. Have you used most of your test gear?
6. Do you attempt to repair all your gear, if faulty?
7. Is your gear state of the art?
8. Is your test gear state of the art?
9. Do you attend your local Radio Club meetings? socials?
10. How many hours average per week do you devote to any aspect of A.R.?

ANSWERS:

Q 1.-9. — If you scored "No" — **why?**
Q 10. — Of course, the number of hours will vary from week to week, but did the question set you thinking?

This test was to stir up the silent amateurs, with a lot of **"No"** answers and **"No"** hours. For these I refer to the Handbook definitions — "Amateur Service", or Wireless Telegraphy regulations par. 55 (Page 36 of Sept. 1967 Revised Handbook).

Improved AM with the FT200

GEORGE FRANCIS, VK3ASV
31 Donald Street, Morwell, 3840

This article describes an attractive solution to the problem many VHF operators have experienced with their FT200 — how to receive AM signals as well as their old RX did.

Many VHFers and limited licencees are now using 6 and 2 metre converters, and transverters with the very popular Yaesu FT200 transceiver.

Excellent 2 m SSB operation is achieved, but for AM signals, especially ones that are poorly modulated or weak in signal strength, reception is poor. Little difference is noticed if the transceiver function switch is in the SSB or AM mode positions. To make matters worse, there are still many VHF AM transmitters in use using 8 MHz Command Transmitters, or similar, as a VFO multiplied up. These are quite acceptable on a wide-band AM receiver, but are unreadable on a modern SSB transceiver having only a narrow band filter fitted, such as in the FT200 — (1). Any hum, VFO or even Xtal warm-up drift, frequency warble or FM-ing shows up markedly, making these AM signals almost unreadable with the BFO switched in. In the AM position these signals suffer from loss of audio and very bassy response.

This is of course caused by the 9 MHz SSB crystal filter cutting all the highs above approximately 1250 Hz. That is, an audio response of 300-2700 Hz divided by two; remember in AM there are two sidebands.

RTTY readers appreciate this problem on HF when trying to use the FT200, as this same filter attenuates the 2975 Hertz (space) audio tone in wide shift (850 Hz). Either you design your FSK converter using another set of audio tones such as 1575 and 2425 Hz, and still maintaining the 850 Hz separation, or change the transceiver upper or lower sideband crystal(s) — (2) to increase the audio frequency response to cover the two standard tones, i.e. 2125 and 2975 Hz. By moving the carrier crystal frequencies further away from the centre frequency of the 9000 kHz SSB filter, then the lower audio frequencies would be attenuated, and the higher frequencies covering the 2975 Hz tone would **not** be attenuated. However, this is not so easy — (3) and is unsuitable for SSB reception as the pitch is too high. It is also no help in receiving AM signals.

To overcome the above problem with the FT200 is a simple matter. It can be made compatible to both SSB and AM. As you may have guessed, why not add a 9 MHz filter with the desired band width to receive AM signals so that it can be switched in in lieu of the sideband filter.

Initially, a simple LC filter was made up, but at this high IF frequency, it was difficult to get any sort of selectivity. Unless you want to hear the strong stations on the band all at once, this is not recommended. To overcome this deficiency, a filter would have to be used with 5 to 10 kHz selectivity. After many letters, it was discovered that except for some VHF FM transceivers, only crystal lattice filters are used at this frequency.

Two of the local manufacturers were contacted; one firm stated they do not make filters up to special orders and so could not help me, and the other placed a $90.00 tag on such an order! Looking through overseas ham magazines showed such a filter was readily available — (4). I chose a KVG filter, type XF-9D — (5) having a 5 kHz bandwidth 6 dB down and a shape factor of 1.8, which promised to do the trick nicely. Ordered from the USA, it took only thirteen days to arrive at a very reasonable — (6) cost. The filter is 1-7/16" wide and ¾" high. Incidentally, the KVG firm of Europe also offer other models suitable for home constructors in the 9 and 10.7 MHz intermediate frequency ranges, covering bandwidths designed especially for CW, SSB, narrow or wide AM and FM modes.

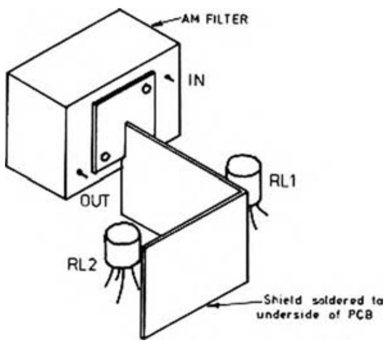


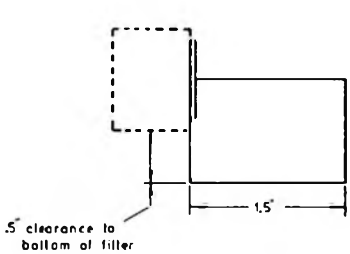
FIG. 1 [a] FILTER MOUNTING & SHIELD LAYOUT

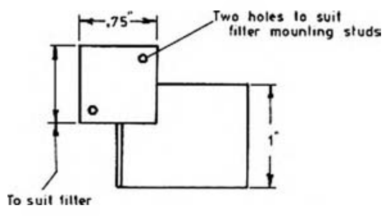
This miniaturised filter is of simlar dimensions to the existing Yaesu sideband filter. The KVG filter is mounted under the chassis against the printed board beneath the sideband filter. It is supported and mounted on a small braket made of sheet tin or brass plate. This bracket also acts as a shield and is soldered or bolted in place.

To carry out this modification when you have the filter and relays on hand, the chassis is removed from the cabinet as per transceiver instruction manual and placed on the bench upside down. **Remember to switch the power point (GPO) off and remove the power cable and power supply cable from the FT200,** and to place the five bottom screws aside where the, can be found again.

Fig. 1 shows the construction details of the bracket. The bracket is then fitted, and the filter bolted on using the filter mounting studs (3 mm nuts). It is mounted sideways so the input and output terminals line up adjacent to the connections of the sideband filter coming through the printed board.

So that the filter can be switched in and out of circuit, two sub-miniature relays are used. These are specials, and are approximately the size of a "K" style crystal can. These can be obtained in Melbourne — (8) or your Japanese ham friend in Japan. They are the same relays as supplied with the FTDX400 CW crystal filter kits — (9). Switching diodes could be used as is done in the FT101 series. These sub-miniature relays have the contact wiring connections printed on the outside of the relay and can be soldered directly in supported by the wires if short-





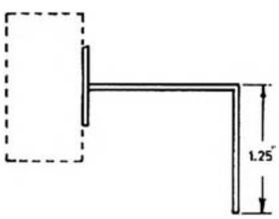


FIG 1[b] MOUNTING BRACKET & SHIELD DETAILS

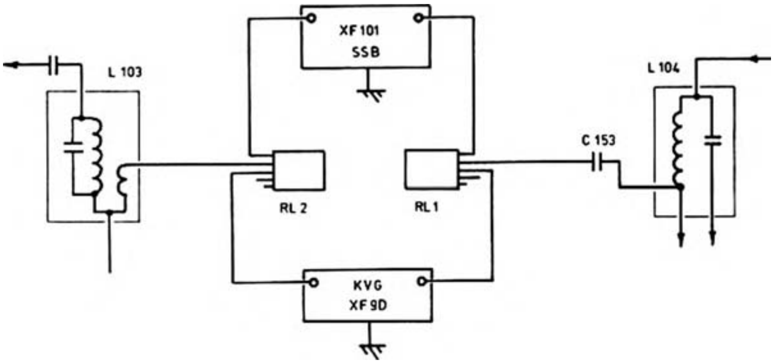


FIG. 2 RF WIRING

ened. I soldered them to the two filters as shown in Fig. 2. The capacitor C153 has to be lifted and wired to the common contact to one relay, and the wire from L103 wired to the other relay common leg. Remember to separate the relays and wiring as far apart as possible.

Fig. 3 shows the RF wiring. When the relays are un-energised (normal resting position) the sideband filter is switched in; the AM filter is switched in when the relays are energised.

No alignment whatsoever is required to L103 or L104, otherwise the shaping of the sideband filter band pass would be tilted or altered. RF lead lengths to the relays are to be kept as short as possible. 1 mm PVC sleeving should be slipped over the fine relay pigtails before soldering in, thus insulating the wires from one another.

Now wire up the DC Solenoid wiring to the relays as per Fig. 3.

Both relays are by-passed to earth by disc ceramic capacitors. The relay windings RL1, RL2, each require 24 volts and are wired in series. It doesn't matter which direction, but should there be a red dot painted on the relay, keep this one positive going. One side of the relay group goes direct to the 150v HT rail, and is soldered directly on to pin 11 at the power plug via an 8.2k 2 watt resistor (or two 15k in parallel).

The other wire is run to the unused switch contact on the function switch S3h, when switched to the AM position. The wiper blade on this wafer is already earthed. Therefore the circuit energises both relays, and changes over filters when the function switch is in the AM position.

Try and maintain good isolation between the filter input and output connections to minimise leakage, otherwise you will be destroying the steep slopes of the sideband filter band pass curve. Now, re-check all relay wiring with a multimeter on the resistance scale, and if satisfied all is correct, replace the chassis into the cabinet, re-connect cables and plugs, and switch on with the function switch in the SSB mode position.

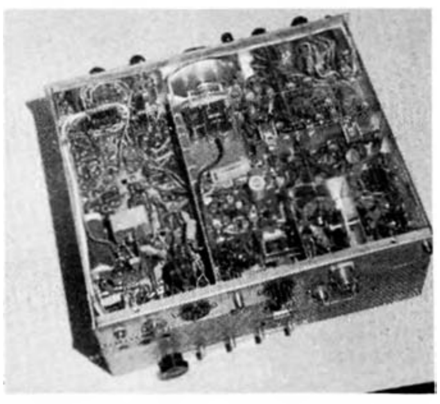
The FT200 should operate normally as before. Now tune in a 80 or 40 metre AM signal (which may prove to be the hardest task in the project, as AM HF signals are rare nowadays). Switch to the AM position, and the speech should sound clean and crisp, with some highs. If no luck hearing an AM amateur station, tune into a 41 metre international broadcast shortwave station above 7.1 MHz. It will be observed broadcasting stations will still suffer, as the high notes will still have some attenuation as these stations are 7 to 10 kHz wide.

As you tune across a steady strength 9 AM signal, the 'S' meter will show some filter ripple across the 5 kHz plateau, and the sides should be very sharp indeed.

This modification or addition will provide the user with a compatible receiver when used with a VHF 6 or 2 m converter or transverter, and many an old style of AM signal will still be enjoyed.

When you transmit now in the AM position, this wide band filter will allow two sidebands plus your re-inserted carrier to be transmitted. Tune up and operation on the AM mode is just the same as before.

So much for the AM operators, now what about the FSK boys. This addition also allows reception at the standard (wideband) — (12) RTTY tone frequencies, but to recover these tones the BFO is re-



The additional filter and relays can be seen beside the high wattage resistor on the left side of the FT200.

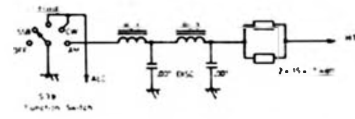


FIG. 3 RELAY WIRING

quired to be switched in, or in other words, when in the CW position, the wide band filter requires to be able to be switched in for FSK. This also is easily done by switching in a parallel set of spare contacts situated on the switch-pot VR1, with wafer switch Sh3. This switch pulls out for Noise Limiter which I find does not work properly. I suggest a noise blanker be wired in as kits are now available suitable for the FT200 — (8).

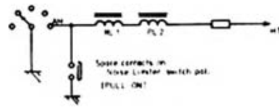


FIG. 4 USING THE 5kHz BANDWIDTH FILTER FOR WIDEBAND FSK

After the above NB wiring is added, the NL switch is spare and can be wired so that when the NL SW is pulled out, the 5 kHz filter is switched in. This makes it possible to copy the tones of a RTTY signal.

Incidentally, the FT200 is very readily modified to transmit FSK carrier by using the clarifier diode as the modulator (varactor) — (10). Of course two-tones (AFSK) can be fed directly into the microphone socket, but the success of this method depends on the efficiency of the filter.

A future article will show how to wire up an FT200 of the older model to use an FV200 External VFO. ●

NOTES AND REFERENCES

(1) FT200 9 MHz filter characteristics: Bandwidth 2.3 kHz at 6 dB down, 4 kHz at 60 dB down; Shape Factor 1.7.

(2) Change x 101 now 9001.5 to 9002.5 and x 102 now 8998.5 to 8997.5 Suitable relays could be fitted to change from SSB to FSK mode, but see article for better method.

(3) A later article to be written, will show how to add these two extra crystals in a FT200 for FSK reception using a standard RTTY converter. The trend is to use narrow shift on HF which is 170 Hz using a tone of 2295 kHz within range of the SSB filter.

(4) KVG made by Kristall-Verarbeitung Neckarbischofsheim GMBH West Germany.

(5) Attention: Mr. Henry Ingwersen, PAOAFN/WI, Spectrum International, P.O. Box 87, Topsfield, Massachusetts, U.S.A. 01983.

(6) Cost in 1970 was $32.45 U.S. plus 50 cents for bank clearance charge.

(7) See CQ, November 1970 "New Apparatus" — KVG Crystal lattice filters.

(8) Available on order from Ball Electronic Services, 60 Shannon St., Box Hill North, Vic. 3129.

(9) Sub-miniature relay, type SM24, 24 volt winding, Japanese manufacture may be available from Yaesu Agents, for $19.00 a pair.

(10) See "Amateur Radio" Page 11, September 1972 "Adding FSK to the FT200" by G. Francis VK3ASV (also reprinted in the ZL-FT200 club magazine edited by ZL1BBU).

(11) Radio Teletype Reception, by Eric Ferguson VK3KF, in "The Radio Bulletin", October 1973, Page 11.

(12) Hal RTTY Demodulator (2nd paragraph) Page 52, QST April 1973 and ASFK for RTTY, page 11 QST February 1969.

Bermuda: Key role in disaster net

ALAN SHAWSMITH, VK4SS

The Amateur Radio Caribbean Emergency Net claims to be as efficient as any Eastern USA Seaboard Emergency system. The Net is comprehensive and includes Florida, Mexico, West Indies, Bermuda, Yucatan, Honduras, Jamaica, Curacao, Grand Cayman etc., and covers several thousands of square miles of ocean.

Bermuda, particularly, plays a key role. The Island is just right 'skip' for optimum reception from all other areas. Every Net signal is 5 x 9 at the QTH of Ed. Kelly, VP9GE, who is Zone 1 Controller. Zone 1 also Includes SE USA.

Besides their own up-to-date rigs, all Net members have a full kit of emergency gear, i.e. auxiliary power and antennas and can remain in action in the event of any crisis, such as tornado, earthquake, flood, disaster at sea, succour for injured or ill, etc. So well organised is the Caribbean Net that within seconds the whole system can be fully operational and ready to deal with any emergency.

One of the Net's most recent operations was during the Managua earthquake disaster when the Nicaraguan capital was almost destroyed, including its communication system. Rescue workers set up a radio station, and thereafter it was up to the Amateur operators who handled the calls for food, medical and other supplies, and set up a 'health and welfare' link to help people trying to trace relatives.

In April this year, the USA was hit by a series of tornadoes. Several Bermudians, away from home, were caught in the effected areas and had miraculous escapes from death. Stateside Hams in the worst hit areas set up emergency communications and Ed, VP9GE, was able to calm the fears of many, by relaying messages to relatives and friends on the Island.

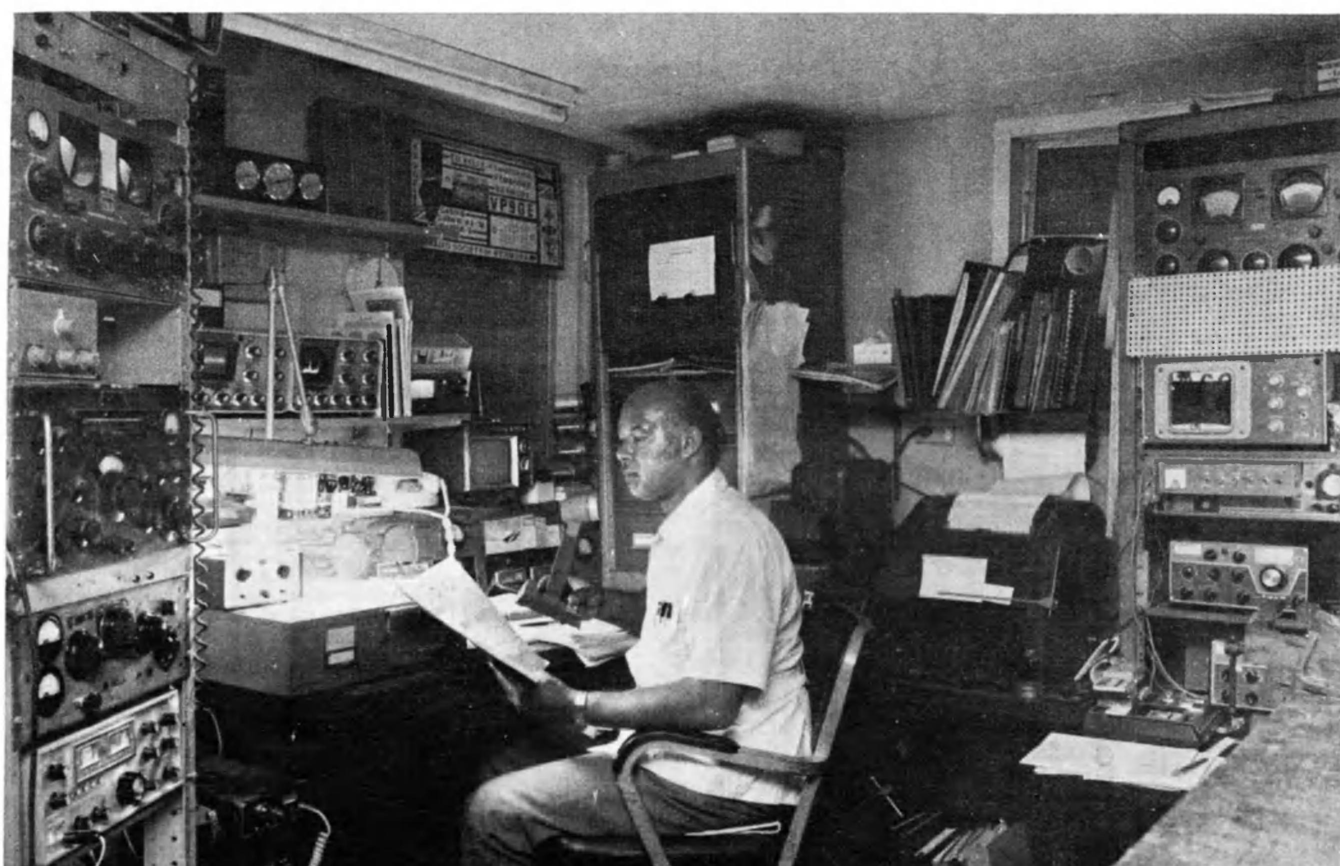
Ed Kelly's set-up is worth describing. The 'shack' is a brick building, specially designed and situated behind his house in the suburb of Pembroke. There are two towers with beams atop. He Is QRV all bands from 160 — 2 mx. Inside the 'shack' is a maze of units: many of them are homebrew. He has RTTY and is the only VP9 set up for SSTV.

The Island is not short of Hams. The hobby is thriving under the activity of the Radio Society of Bermuda. Those who can stand in for Ed, VP9GE in Zone 1 in the Net, are Frank VP9GR, Jim VP9GY, Peter VP9GO and Roy VP9HM.

It is estimated that one in five of the Island's vehicles has 2 metre two-way radio, Installed. Field sporting events such as rallies, powerboat racing and other out-of-the-line-of-sight activities are easily and adequately covered.

The AR Caribbean Emergency Net monitors the area twenty-four hours per day. Tuned ears and antennas provide an umbrella of watchfulness and assistance. In the event of a crisis in which any regular or commercial communication breaks down, or Is overtaxed, the Net Is ready to offer service. One of the many means of help that Hams can now provide on a global basis.

BELOW: Ed Kelly, VP9GE.



Radio Receiver R390A URR

PART 3

JOHN WEIR, VK3ZRV
221 St. Helena Road, Greensborough, 3088

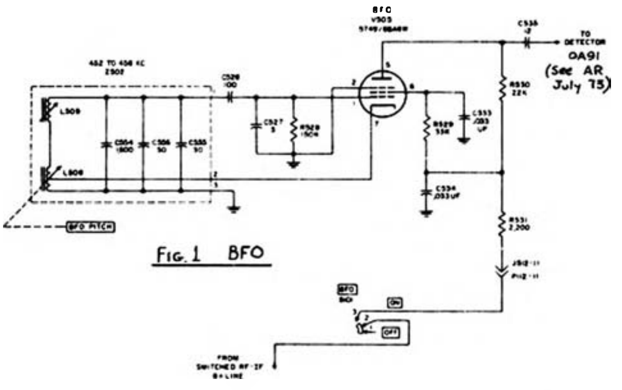


FIG. 1 BFO

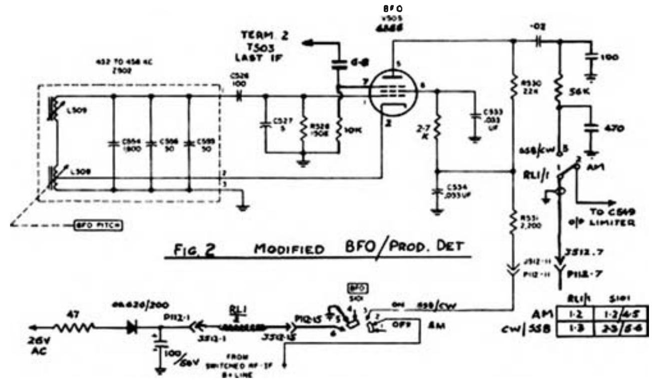


FIG. 2 MODIFIED BFO/PROD. DET

Following on from the previous two articles, the series will now be concluded with the fitment of a product detector and a modified AGC system.

The first product detector circuit tried was the one described in AR Feb. 74, page 26, which used OA91 diodes, together with the refinement of shorting out one diode for AM detection. It seemed to work well but not completely to my satisfaction. Together with the added shielding and shielded wires necessary the whole thing became a bit unwieldy and so was discarded.

The second circuit tried was originally described by W3JHR in 'CQ' Jan. 68. This requires the replacing of the original BFO tube V505 (5749/6BA6W) with a 6BE6. Fig. 1 shows the original circuit for the BFO, while Fig. 2 shows the results of the modifications I have made using the 6BE6. Detailed instructions are unnecessary as I think the circuit is self-explanatory; however, there are a couple of points worth mentioning.

The BFO off-on switch has to be changed to a 2 pole 2 position switch. The relay is a small 24V sealed type salvaged from sources unknown (600 ohm coil resistance), while the 26V AC is derived from the hot side of the heater off-on switch on the rear of the receiver. When working around the socket of V505 make sure that the new components are clear of the bellows used to drive the tuneable inductor Z502. The circuit itself works extremely well and requires a minimum amount of fuss.

One problem did arise, however. I tried to feed the recovered audio from the product detector to the input of the noise limiter (via relay contacts) but found that the loss in audio was too great. Hence the decision to use the circuit shown.

AGC

The next part of the modification programme involved the AGC circuit which is shown unmodified in Fig. 3, while Fig. 5 shows the original schematic of the overall AGC distribution in the receiver. The main cause for concern with the original circuit was that the attack time seemed to be too long. The first couple of syllables after a pause tended to thump through before the AGC gave sufficient control of the audio level.

After experimenting with a number of circuits that one finally decided upon was an adaptation of that found in the FRDX400. The schematic is as shown in Fig. 4. When this was originally tried a small problem

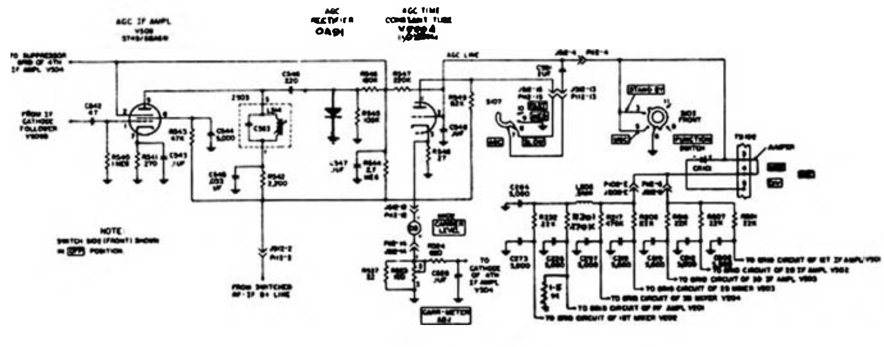


FIG. 3. AGC CCT DIAGRAM (MODIFIED AS PER AR JULY 75)

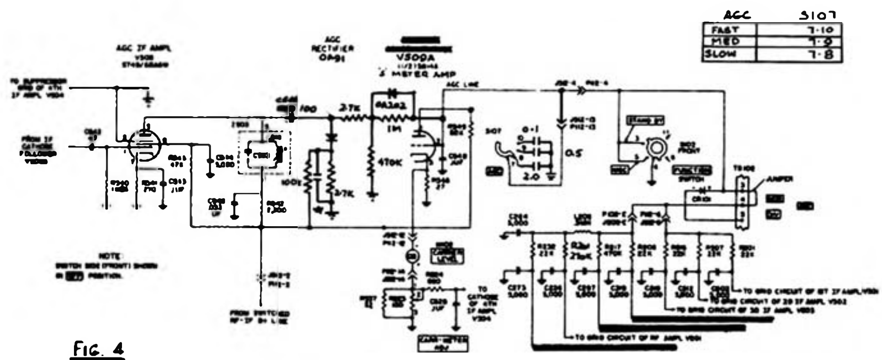


FIG. 4 AGC CCT DIAGRAM (MODIFIED FOR SSB)

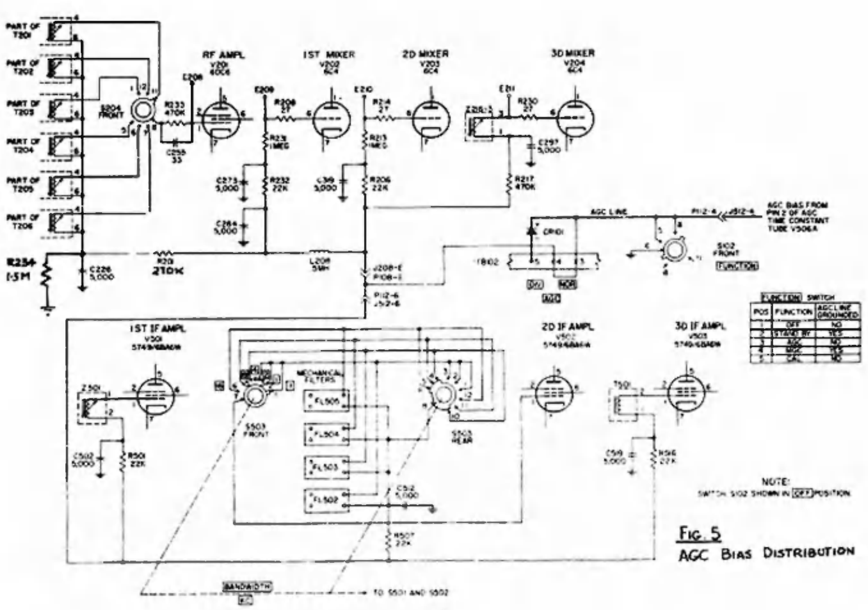


Fig. 5
AGC Bias Distribution

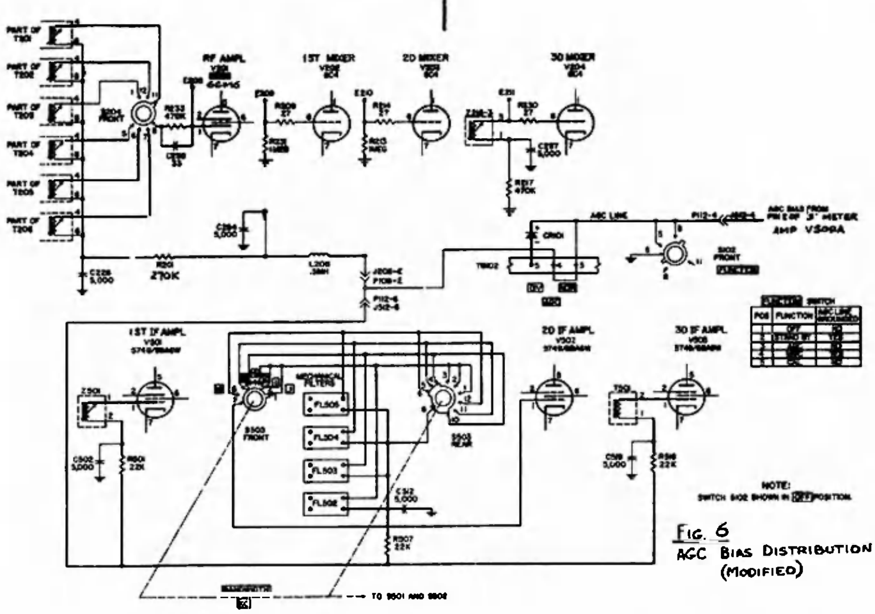


Fig. 6
AGC Bias Distribution
(Modified)

was found in the action of the AGC time constant tube V509A (refer to AR July 73) Rewiring of the AGC switch S107 and the inclusion of two extra capacitors ended up giving a very effective AGC for SSB/CW with the choice of 3 time constants. The voltage divider of 100K and 2.7K to the cathode of the AGC detector provides some measure of delay and so holds the AGC line down until the antenna signal level reaches about 3 microvolts.

When the new circuit is installed it is necessary to earth the suppressor grids of the AGC IF amplifier (V508 pin 2) and the fourth IF amplifier (V504 pin 2).

The final items necessary were some changes in the AGC feed to the controlled stages, RF (V201 6GM6), 1st mixer (V202 6C4), 2nd mixer (V203 6C4), 3rd mixer (V204 6C4), As previously mentioned, Fig. 5 shows the original AGC bias distribution while Fig. 6 shows the modified distribution.

The main points to note are the removal of R234 (1.5M) associated with V201 and the removal of AGC to the 1st, 2nd and 3rd mixers. With this change carried out I find I can run the RF gain flat out if necessary and still have no overload or distortion problems even on a 40 over S9 signal. Those who have these receivers in original condition will know that the setting of the RF gain control for reception of SSB signals is rather critical to say the least.

CONCLUSIONS

This now completes the series. However, to round things off, let me answer some of the queries I raised in my first article.

1. Is it possible to obtain better reception of SSB signals than can be obtained from the receiver in its original state?

   My answer to this one is yes. With the modifications as described carried out, I am much happier with the performance of the receiver.

2. Is it possible to build into the set an effective FM demodulator?

   My answer to this one is that all the circuits I have tried have left much to be desired. I believe that an outboard demodulator would be far more effective.

3. Is the noise limiter effective on AM and SSB?

   To this one I must answer yes and no; for AM it is very effective especially on 10 metres; for SSB however, as previously explained the answer is no. More experiments in this area are envisaged, for example, an IF noise blanker; but as this project is only in its infancy, I will make no further comments at this stage.

4. Is the AGC effective on SSB?

   In its original form, no, it is not, however modified as explained in this article the answer is yes, the receiver has a very effective AGC system for SSB.

My thanks are extended to the numerous people with whom I have had informal discussions regarding this project, and whose ideas I may have begged, borrowed or stolen. Finally, my thanks to a very patient XYL without whose typing effort and endless prodding, the article might still be unfinished!

Would you mind very much if I hang out the washing before you continue please

It all Started 40 years ago

BOB CUNNINGHAM, VK3ML
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The four weekends in October, 1934, saw the staging of the WIA (Victorian Division) Centenary contest. This was the first time in history that any division or even the F.H.Q. of the WIA had staged such an enormous undertaking. I had the privilege of being appointed manager of the Centenary Contest Committee under the baton of Harry Kinnear (VK3KN), President of the Victorian Division at that time.

This contest was such a success that it saw the start of what is known today as the VK-ZL annual contest.

In making this report, I am referring to the initial publication of the contest and its rules as they appeared in "Amateur Radio" for the 1st March, 1934 and in QST for October, 1934.

The VK-ZL contest as it is known today, differs very little indeed to the original contest of 1934. However one point was allowed by each contacting station for every 1,000 miles between the capital cities of the States of the competing stations, measured by a great circle line. The Australian stations multiplied their score by the number of countries worked, and the stations outside VK by the number of Australian districts contacted.

It is interesting to note that the prizes offered were donated by Australian organisations such as Philips, A.W.A., and Siemens. These prizes consisted of transmitting valves, meters, etc. However, the main prize I think everybody treasured more than anything else, was a very excellent certificate commemorating the Centenary. A reproduction of this certificate appears in these notes and it should be noted that we were fortunate in obtaining a sketch of Batman in 1834 visualising the city of Melbourne.

The results of the contest were very interesting. In the Open Section, 1st place went to "Snow" Campbell (VK3MR) with 100,320 points, 2nd place to VK3GQ with 97,218 points, and 3rd place to VK3JQ with 56,666 points. VK3MR worked 38 countries, VK3GQ, 36 countries, and VK3JQ, 29 countries. in the Handicap Section, VK3HL won with 40,181 points with an input of 23 watts. Outstanding overseas station scores included G2ZQ with 3,850 points, J2GX with 3,414, PA0AZ with 4,908, VE5BI with 2,256, W6EXW with 7,854, closely followed by W9TB and W9FM and D4BAR with 5,400 points.

The complete results of this contest appear in "Amateur Radio" for the 1st March, 1935 and in QST for May and June, 1935.

It is of interest to note a very important point other than that of the contest itself. This period was the actual opening of the 10-metre band to international stations.

To recall the success of this contest, I would like to quote from a letter received from Horace Greer, W6TI, as follows:

> "On behalf of the Oakland Radio Club, I would like to take this opportunity of expressing our sincere congratulations and wishes for your October DX contest. We would like to go down on record in offering our complete co-operation in making your first contest of this nature most successful in every respect, and one to be long remembered in the hearts of loyal amateurs in all parts of the universe, to the best of our ability."

BELOW: A copy of the certificates awarded in this historic contest.

Soldering for Electronics

By Roy Hartkopf VK3AOH
Reprint from Zero Beat, December 1972

Every trade and profession has some implement which is associated with it. The gardener has his spade and rake, the carpenter his hammer and nails and the doctor his stethoscope. The basic tool for anyone who works in electronics is the soldering iron and until you can use it well you will never get much satisfaction from your work. There is no magic about using a soldering iron. Like any craft there are some tricks and bits of knowledge which only come with practice. However there are some fundamental requirements and in the first part of this article we will consider these.

CLEANING SURFACES

Solder is an alloy, a mixture of tin and lead, sometimes with small amounts of other elements. This alloy melts at a fairly low temperature and on the cleaned surfaces of some metals the molten solder will 'wet' the surface and penetrate a tiny amount into the structure making a bond which is as effective as if there were no joint but a continuous piece of metal. To get this result the first essential is that the surfaces should be completely free from contamination. Plumbers and sheet metal workers achieve this by using acid (this is called a flux) to etch the surface and remove all dirt and corrosion. In electronics work it is not possible to use this drastic method because the acid fumes and the acid left on the joint eventually corrode the components. So it is necessary to use a non-corrosive flux such as resin. This has the ability to dissolve some of the impurities which are on the surface although the surface must be fairly clean before this can happen.

When the metal to be soldered is tin the resin is very effective as the tin alloys with the tin in the solder and a perfect bond is formed. This is why most components and hookup wire are made with a tin coating over the copper conducting wire. An additional advantage of tin is that it does not corrode (that is, tarnish) in the atmosphere as much as many other metals do.

Circuit boards also often have their copper foil coated with tin, if they are not protected by a coating of resin. Occasionally you will find circuit boards, copper braids and so on without any protective coating at all. If this copper is clean and bright you will have little difficulty in soldering, but if the surface is dull and discoloured, it may well be impossible to make a good joint unless you scrape the surface thoroughly to remove the impurities. Sometimes disposal components which have been stored for a long time have corrosion even on the tin coated surfaces. Again the only remedy is to scrape the surface thoroughly until it is bright and shiny. This extra trouble is often worth the effort, because the manufacturers cannot afford the time and trouble involved in doing this, and often unload such components on the disposals market at very low prices.

CHOOSING SUITABLE SOLDER

The solder itself does not present many problems. As mentioned before, it must be used with a non-corrosive flux. The best way to get this is to use solder which is in the form of a hollow tube with the resin flux in the hollow centre. This is known as resin cored solder and is almost universally used in electronics work. Some manufacturers make solder which has not one but up to five separate cores so that the flux is distributed more evenly. Solder which has a large percentage of tin — about 60 per cent — is more expensive, but the extra cost is justified by the improved results. Some solders have a trace of copper in them and this is very effective in preventing the copper bit of the soldering iron from being eaten away.

Resin cored solders can be bought in different gauges, and the use of the correct gauge for the job not only makes a better soldered joint but makes the work easier and saves solder. For the soldering of valve type equipment and general heavy work 16SWG is quite satisfactory; for soldering integrated circuits on to circuit boards and other fine work a gauge as light as 22SWG can be used to advantage. Experimenting with different gauges will soon show you the best gauge for any particular job and it will pay in the long run to have two or three different gauges of solder handy.

CHOOSING THE CORRECT SOLDERING IRON

Probably the most important thing of all is to get the correct soldering iron. The electrically heated soldering iron is almost universally used nowadays, and there are many brands and types of soldering irons on the market. They range from those which are excellent to some which are so unsuitable that one wonders if the manufacturer ever used a soldering iron in his life! A fairly common mistake of some manufacturers is to try to make a general purpose tool. If you see an advertisement which tells you that a particular soldering iron is a universal too and is suitable for the entire radio, electronics, telephone and hobbyist areas, **don't buy** it. It attempts to do everything, and you can be certain that it will do nothing really well.

There are several reasons for this. The purpose of a soldering iron is to store heat and apply it to the joint. The question is, **how much heat** is needed and **how hot** should it be? A small soldering iron is fine for small joints but it can only store a small amount of heat. If this iron is applied to a joint which contains a large amount of metal (for example, if you are trying to solder a thick wire to a metal chassis) there just is not the necessary **amount of heat** available to raise the temperature of the large volume of metal to a level where a satisfactory joint can be made. The manufacturers of these so-called universal soldering irons try to get over the problem by increasing the power which the iron uses. What they seem to overlook is that a small bit stores only a small amount of heat and also has a small surface area. When the iron is not in use and is resting on its stand, the air around it has only a slight cooling effect and the bit gets far too hot. This means that the solder on the bit, and the bit itself, oxidises (burns or corrodes), so that the bit must be constantly scraped and re-tinned. When the iron is used on light work, such as circuit boards, the heat is so great that small components and the adhesive bonding the copper foil to the board are burnt and ruined. Even if joints are made, the overheating causes them to be unreliable. On the other hand if the iron is used on heavy work it is still unsatisfactory, because although it may be too hot, it will still not have a sufficient amount of heat stored to heat the large volume of metal. The spot where the iron touches may be overheated for an instant, then the heat will spread out and the temperature drop so that the rest of the area is still too cold.

Even for an expert at soldering the use of the wrong type of iron can make good quality soldering almost impossible. For a beginner the results can be disastrous. Quite a lot of people have lost interest in electronics because they could not solder without burning components and spoiling circuit boards. In almost every case the fault is not with the person, but due to him using the wrong soldering iron and, possibly, the wrong solder.

Now that you can see how important it is to choose the most suitable iron here are some hints which will help you:

1. Look for an iron which you find comfortable to hold. (You will be holding it a lot!) A light weight flex is an advantage because it does not drag when you move the iron around. Also make sure that the lead is long enough.

2. If you expect to do a lot of work with printed boards, transistors and integrated circuits then choose a small iron, but don't expect to be able to use it in heavier work. The power rating of such an iron would be from about 10 Watts to a maximum of about 20 Watts. A physically small iron which consumes more than this, say 25 or 30 Watts, will be in the 'universal' class mentioned above and will burn light work but still not have enough heat capacity for heavy work. Generally it will be an endless source of trouble.

3. If you are building only valve type equipment and want to solder tinplate then a 30 to 40 Watt iron would be more suitable. It should of course be much larger physically and have a bit at least a quarter of an inch in diameter. It will be too large for really fine work.

4. All modern soldering irons have replaceable bits. See that these are available when you buy the iron. With care, and an iron that does not overheat, the bit should last a long time but it is a good idea to have a spare in hand for when you need it. There are some fancy shaped bits available, but unless you are doing very specialised work they are not much use. A simple circular bar with the end filed at an angle of 30 to 45 degrees is all tht is needed.

5. The above comments apply whether the iron is operated directly from the mains or from a low voltage transformer or battery. The heating effect depends on the power in watts and not on the voltage. It is largely a matter of personal preference as to which type you choose. The low voltage iron can be operated from a battery if necessary and is usually more robust and at the same time lighter than the mains iron. On the other hand it requires a battery or a bulky and expensive transformer.

6. Finally there are two special types of soldering iron which should be mentioned. There is the heat controlled type which warms up very quickly but never overheats. This is very nice if you can afford the price which mainly limits it to laboratory and professional use. The other type has a switch on the handle so that the iron can be switched on and off during the actual soldering operation. This is very useful if one is not soldering continuously as the iron heats up quickly and the temperature can be controlled. A fair amount of experience is necessary, because if one does not let the switch go soon enough, the iron can become red hot and everything burns. These irons are available in different sizes for light and heavy work.

When you have selected your iron, you should buy or make a suitable stand, and mount it firmly on the bench so that if the lead is accidentally pulled, the iron does not fall and smash on the floor, possibly giving you a nasty burn in the process. Incidentally, if you do drop your iron it is a natural reaction to try to catch it. You should learn to overcome this as you will invariably catch it by the hot part and get a very nasty burn. It is better to look down to where it is going to fall so that you are ready to pick it up by the handle as soon as it has touched the floor.

There is one final accessory that you will need. When you have been soldering for a while you will find you are either a **wiper** or a **flicker**. Even though the soldering iron bit does not get too hot or the solder burn off, it is still necessary when making a joint to have a bright and shiny film of solder on the point of the bit. If the iron has not been used for a couple of minutes, the surface of the solder on the bit becomes dull and this impedes the transfer of the heat to the joint. So to get a bright and shiny film of solder it is necessary to melt a little fresh solder on the bit just before using it. To remove the blob of solder thus formed one either wipes it off or flicks it off. The writer, a confirmed flicker from way back, has an open topped container about four inches square screwed to the workbench under the soldering iron stand. Over a period of months this box gradually fills with solder and saves a great deal of mess on the floor. The wipers should organise a similar box with a piece of sponge slightly damped, or a piece of rag.

That concludes the first part of our article on soldering. We will now consider the soldering operation itself and its application in various fields of electronics.

SOLDERING TECHNIQUE

Soldering is something like painting a house. If you have the correct materials and equipment, and the surfaces are perfectly prepared, the job is easy. If not then no amount of skill can make up for poor materials and lack of preparation.

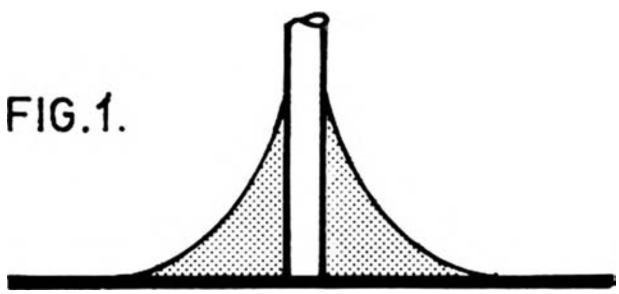
Careful preparation of the materials means seeing that they are bright and clean as mentioned earlier. Contrary to what many people seem to imagine, there is not the slightest need to wrap wires round tags or twist them together before soldering.

This idea has come about because some manufacturers assemble a lot of components and then solder the lot at once to save time. If you can't hold the wires and solder them at the same time there is no reason why you should not hook them together. It won't make the least difference to the strength of the joint. In fact a wrapped wire can sometimes make a badly soldered joint harder to detect. And if you want to dismantle the project later and use the components again a wrapped joint makes it very difficult to do so.

What is a properly soldered joint? If you have reasonable eyesight you will soon be able to see. The important characteristics are shown in Fig. 1. The sketch represents a wire being joined to a flat surface end on.

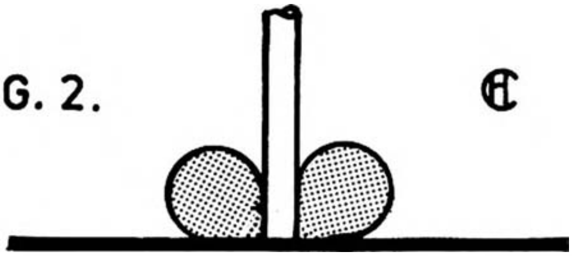
The solder should run or flow over the

FIG.1.



The solder flows along and up the wire, with the main body of solder being smooth and shiny without lumps.

FIG. 2.



Solder draws away from the surfaces.

metal and the wire. The usual description for this is that the surfaces are "wetted". The opposite situation is where the solder does not wet the surfaces but draws away from them like water on a greasy surface. This kind of poor or "dry" (opposite to wetted) joint is shown in Fig. 2.

If you see this effect anywhere on the joint you can be sure it is a bad one and it should be re-cleaned and re-soldered. If you ever want to remove the solder from a joint, then a piece of clean copper braid laid on the joint and heated with the soldering iron will soak up the solder as though it were blotting paper.

Finally, if the solder is not heated sufficiently, or the wire is moved before the joint has hardened properly you can get the kind of result shown in Fig. 3.

A joint which looks like this should be re-heated until it looks like the one in the first figure.

There is one general tip which applies to all soldered joints from the finest wire in a meter movement to the soldering of guttering and down pipes for a house. If you have any trouble making a good soldered joint take the joint apart and clean and tin each surface separately and only try to solder them together after both have been completely wetted with solder.

Incidentally if you use this method it is quite easy to solder a wire to a sheet of aluminium or two pieces of aluminium together. Provided of course that the soldering iron has enough heat capacity to bring the aluminium up to the soldering temperature. This is how it is done. Clean the surface of the aluminium as thoroughly as you can and put a drop of ordinary engine oil on it. Then, with a sharp knife or scriber, scratch the already cleaned surfaces of the aluminium underneath the oil film and, without wiping the oil away, tin the surface of the aluminium as you would do any other metal. Once it has been tinned you can solder any other tinned metal on to it. But remember that if the aluminium is even moderately thick you will need a very heavy iron (a very hot small iron is no substitute as has already been explained) in order to provide the large amount of heat needed to heat the aluminium.

That covers most of the basic information you will need to make a success of the craft of soldering — essential for everyone who works in electronics. The formula for success can be summed up as, preparation, the right tools and materials, practice and patience.

SEMICONDUCTORS — SPECIAL PRECAUTIONS

After everything has been wired up, and the joints are perfect, it is not very encouraging if you find the gadget you have built does not work. But this can happen when dealing with semiconductors such as transistors, FETs, or integrated circuits. Contrary to popular belief these will withstand a surprising amount of heating and bending or twisting of their leads. In many years of experimenting, the writer has never experienced a case where a transistor has been spoilt simply by overheating. Of course if you use a dirty iron and hold it on the pin of the transistor for a minute or two trying to make a good joint with dirty surfaces you will burn it up, but it will stand normal soldering perfectly well. In fact in some projects the same transistors and components have been taken out of a discarded circuit board and soldered into a new one as many as seven or eight times (another good reason for not wrapping leads), and they were still as good as ever.

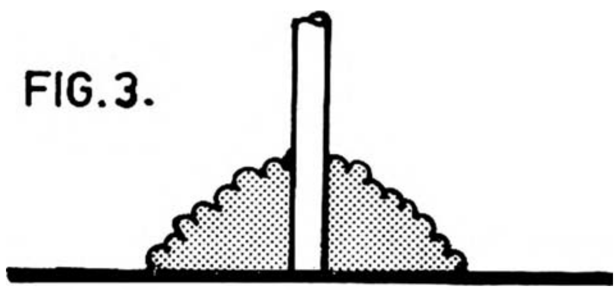
However, a few months ago I was working in another workshop with a strange soldering iron. I made a couple of joints and then discovered that a whole board full of integrated circuits had been ruined. I soon discovered the reason. The soldering iron was a low voltage one, fed from a transformer. The iron, as is usual with this type had the two leads from the transformer and no separate earth lead. When I put the probe of an oscilloscope on the tip of the iron I found there was no less than 150 volts of alternating voltage between the soldering iron and ground. This voltage is not dangerous because there is practically no current behind it. It is caused through capacity leakage between the windings of the transformer. You can experience the effect in another way if you can get a high impedance voltmeter or an oscilloscope. If you hold the probe in one hand, and take hold of ordinary mains flex in the other you will see if the flex has power on it. The instrument will indicate anything up to a hundred volts according to the type of flex, the floor you are standing on and so forth. You won't feel anything because as mentioned before there is almost no current. But this static voltage is quite sufficient to ruin semiconductors.

Although in most ways, semiconductors are far more robust than people give them credit for, there is one thing they can not take, and that is high reverse voltage. For example, a power transistor which will handle more than a hundred watts and will work with sixty to eighty volts and carry several amps, will go out like a light if it gets a reverse base-emitter voltage of more than five volts. Even amateurs who have worked with valve circuits for many years have almost given up using transistors because they have many failures and do not realise what is causing them. There would probably be even more failures but for the fact that most circuit boards, when being soldered, are isolated from any earth connection so that this voltage does not then appear across them.

This leads to the final recommendation; when soldering semiconductors either everything should be earthed or nothing should be earthed. If the soldering iron is not effectively earthed, then you cannot make alterations to the equipment unless it is completely isolated. This problem does not arise with valves and ordinary components because they are affected by this kind of static voltage.

There are many more practical tips one picks up through experience, but if you master the basic technique and start in the right way with a suitable iron and the correct solder you will have won the major battle. Good soldering! ●

FIG.3.



Rough and dull surfaces.

Commercial Kinks

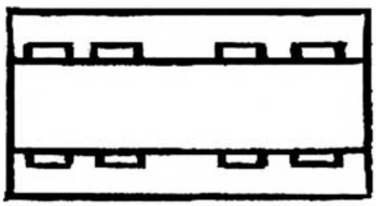
with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley, 3150

KEN KP202

The little KEN KP202 still evokes ideas for simple modifications. Any one who has used it for mobile work for any length of time will no doubt have discovered the problem of driving and operating the KEN at the same time. To start with, some form of external microphone possibly mounted on a boom or head band would be needed. Then, if some form of external operation of the push to talk switch could be devised, full remote operation of the KEN could be achieved. The first problem has been overcome by Mr. K. Moore, VK4IJ, the second has yet to be solved. Perhaps a solution might be a bracket which could be attached to the car dash board and fitted with a relay which mechanically operates the push to talk bar. In this way, no internal wiring changes would be required. All that is needed now is some bright person to work out the details. **(Such an article has been submitted by Mike O'Burtill, VK3WW, and will be published shortly—Ed.)**

However, back to the external microphone and over to VK4IJ.

"While it is possible to fit a relay and PTT for an external microphone it does involve considerable modification. I have fitted an external microphone and still use the PTT on the case. While this does involve two hand operation, it is an improvement when using an external aerial. The main problem was finding a small socket. Finally, two different types of eight pin IC sockets were found, one for the socket as shown in the first drawing and one for the plug as in the second.



These have connections in the form of flat pins which fit nicely into one another. The shielded cable from the microphone was soldered to two of the contacts and the whole top of the plug encased in araldite.

The socket was mounted on the sloping panel which carries the name plate. A sliding switch was fitted to cut off the internal microphone on the side of the bulge immediately alongside the grill covering the internal mic. This cuts out extraneous noises and possible echo with two microphones in parallel".

Another thought for mobile operation might be to use some of the vacant pins on the plug to bring out connections for an external speaker to give improved quality. ●

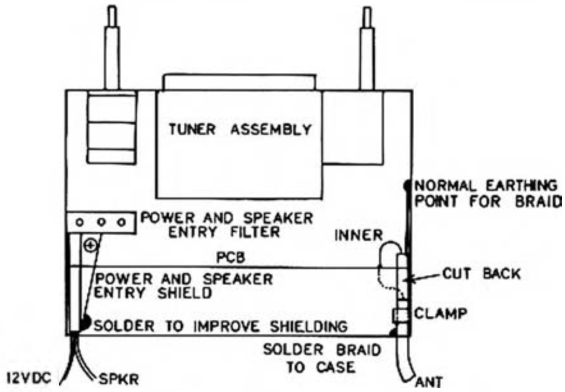
Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

IGNITION NOISE REDUCTION

Many cheap car radios are now on the market which have both excellent sensitivity and selectivity. These can be used as tunable IFs for VHF as well as their primary function of broadcast reception. However, when used in a car, the ignition interference has to be heard to be believed. The suppression kit supplied and the usual suppression procedures appear to have little effect on the residual noise level. When the case of the radio is opened, input filtering of speaker and power leads is evident, although this may be improved by an auxiliary lowpass filter using a toroidal choke and disc ceramics. This is only a partial cure. Closer investigation will reveal that the input filter and the antenna lead in earthing points are up to 50 mm from the rear of the case. This results in an effective 1 turn loop coupling noise into the case. Earthing of the antenna coax braid at the point of entry by soldering it directly to the case and similarly soldering the bent metal power and speaker entry shield will result in a large improvement, to the point of elimination, of the interference.

G. Sones, VK3AUI ●



HUNTING LIONS IN THE AIR

(Reprinted from the Australian LION Magazine, November, 1974)

Lions and Leos whose hobby is ham radio will once again make contacts in the name of international friendship and understanding, when the annual "Hunting Lions in the Air" contest hits the airwaves on January 11, 1975.

Originated in 1971 under the sponsorship of the Rio de Janeiro (Arpoador) Lions, the first "hunt" showed 1,550 operators in 26 countries on five continents participating. Since then, the contest has expanded to a network that spans the globe.

Open to all licensed radio operators, Lions, Leos and non-Lions, the contest will begin at 1200 GMT on January 11. It will run for 24 hours, using the top 25 kHz of the 40, 20, 15 and 10 phone and CW bands.

Amateur radio operators participating in the contest will transmit by calling "CQ . . . Contest — 'Hunting Lions in the Air' — Lions International" together with his prefix. When a contact is made, the operator will state his QRA, QTH, the number of contacts, and the QTR (hour) of each. Lion and Leo members should identify their club names as well.

Each participant will note in his log the QTR, the prefix of the station contacted, and, if the contact is a Lion or Leo, the name of the club. Log entries will be confirmed by comparing the logs of the participating clubs.

Within 30 days of the end of the contest, each contestant must send his log sheets to:

Contest Committee
Hunting Lions in the Air
Lions Club of Rio de Janeiro (Arpoador)
Rua Souza Lima no. 310 —
Apartamento 802
Rio de Janeiro—20.000-ZC-37-Brasil.

The Arpoador Lions will verify point totals after examining logs submitted to them by contestants. One point will be given for each communication, with no extra points allowed for more than one contact with the same station.

Each communication made with a radio operator who is also a Lion will have a two point value when verified with the log of the Lion contact. For contacts made with Lion radio operators from the Lions club of Rio de Janeiro (Arpoador) and the Lions club of Curitiba (Marumbi), the following points will be awarded: (a) within Brazil — 3 points, (b) participants from other countries who make contacts with two above-mentioned clubs — 5 points for each participant.

After verifying point totals, the contest committee will refer the results to the co-ordinating club. They, in turn, will submit a report to the chairman of the International Understanding and Youth Exchange Committee of the International Board of Directors before May 15 of the current year.

Lions International will then present first, second and third place awards in two categories — phone and code (CW). The first place winner in each category will receive a trophy; the second place winner in each category will receive a trophy medallion; the third place winner in each category will receive a plaque.

The Lions club of Rio de Janeiro (Arpoador) and Curitiba (Marumbi) will award medallions in vermillion with identical inscriptions to the fourth through tenth place winners in each category.

Each contestant making more than 20 points will receive a QSL from the Arpoador Lions.

Lions and Leos may invite non-club members to join the world-wide radio hookup. However, a Lion or Leo should be present during all contacts and should take care to explain to non-members the purposes and ideals of Lions International with regard to international understanding.

"Hunting Lions in the Air" is a unique yet effective method whereby initial contacts are formed, contacts which have the potential for lasting international friendships between individuals and clubs. It is a special way for Lions and Leos to reach hands across borders via the unseen roadways of the air. Won't you join in this "contest" of communication?

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Crafers, SA. 5152

WADM SERIES

1. The awards are available to licensed amateurs and shortwave listeners (on a "heard" basis).
2. Contacts after 14.7.1953 are valid for WADM 1, 2 and 3 and after 1.1.1968 for WADM 4 and 5.
3. Do not send QSL cards. A list, showing full details of the contacts should be certified by two licensed amateurs or a club official.
4. WADM 1 to 4 is issued for CW, phone or 2 x SSB but not mixed modes. It is NOT available to shortwave listeners for 2 x SSB. WADM 5 is issued for CW or phone but not mixed modes.
5. The fee for each award is 7 IRCs.
6. The address for applications is:
   Radioklub Der DDR
   DM Award Bureau
   DDR—1055 Berlin
   Hosemannstrasse 14, DDR.

Rules:

East Germany is divided into 10 districts, denoted by the LAST letter of the call sign (DM2 BCD is District D).

Each district may be contacted ONCE per band for WADM 1 to 3.3 and each contact is ONE point. If, however, the same station is contacted on four or five bands then four or five extra points are counted (DM2ABB on five bands counts as five band points and five extra points).

A "special station" may be substituted for any missing district on the same band as the QSL from the special station but once only per band. WADM 4 and 5 are available on one band only — see below.

Requirements:

WADM 5 — 10 points, with 10 districts on either 3.5 MHz or 28 MHz.

WADM 4 — 20 points, with 10 districts represented on 3.5 or 28 MHz.

WADM 3 — European stations require 40 points with 13 districts represented and non-European stations require 32 points with 13 districts represented.

WADM 2 — European stations require 75 points with 15 districts represented and non-European stations require 45 points with 15 districts represented.

WADM 1 — European stations require 120 points with 15 districts represented and non-European stations require 75 points with 15 districts represented.

DM Calls:

The number in the call sign means —

DM2	Private stations
DM3, 4, 5	Club stations
DM6	District special stations
DM7	Reserve
DM8	Special stations
DM9	Foreign amateurs
DM0	Central and special stations

9HI AWARD

1. The award is available to licensed amateurs and shortwave listeners.
2. Contacts after 21.9.1964 (Independence Day) are valid.
3. Do not send QSL cards. A list showing full details of the contacts should be certified by the Awards Manager of a National Society.
4. The fee for the award is $1 or 10 IRCs.
5. The address for applications is:
   Malta Amateur Radio Society
   "Mayfair" New Street
   off Ursuline Sisters Street
   Guardamangia
   Malta

Rules:

The same station may counted once per band. Only 5 bands may be used.

9HI SWL cards may be used (provided that SWL has received a reply) on the bands on which the report was made — up to a maximum of 2.

Band points:

CQ Magazine Zone	1.8	3.5	7.0	14.0	21.0	28.0	*
	Points per contact						
14 15 16 33 34	5	3	2	1	3	5	25
All other Zones, except as under	15	12	6	2	6	10	45
Areas north of Arctic Circle and south of Antarctic Circle	3	25	15	5	12	20	50

Band in MHz

*all other bands

Requirements:

50 points required for one band working
40 points required for two bands working
30 points required for three bands working
20 points required for four bands working

Magazine Index

With Syd Clark, VK3ASC

Before commencing the indexing of this month's bag of overseas amateur journals I would like to take this opportunity of wishing my readers the "Compliments of the Season".

RADIO ZS June, July, August & September

"You're Off Frequency Old Man"; Reminiscences of ZS Ancient Radio Practitioner; Thank You Hams.

The Port Elizabeth 2-metre Repeater; South African Police Wachthuis Radio Reserve.

Speech Processing; Extracts from the Radio Regulations; Omega.

Hamnet; Yacht Surprise; R.F. Power Measurement; Electronic Breakthrough for Instant TV; New Swop Shop; They Probably Wouldn't but They Just Might.

RADIO COMMUNICATION August & September

A Speech Clipper for SSB Transmitters; And it Can be Done . . .!; Performance of Transistorised Car Ignition; Technical Topics; Building Blocks for the Novice.

A Self Contained High-Power Linear Amplifier for the HF Bands; Building Blocks for the Novice; An SL600 Series SSB Transceiver; A Three-Stage Pre-Amplifier for the 1296 MHz Band; Modifications to a Trap Dipole; Technical Topics.

BREAK-IN September 1974

Let's Build a Keyer; A 20/15/10 Metre Triband Vertical; Satellites in the Amateur Radio Service; Crystal Checker; The Surprise Story.

73 MAGAZINE July & September 1974

4-1000A Grounded Grid Linear; Free TT Batteries; The Scotch Transistor; Poor Man's Universal Frequency Generator; Universal AFSK Generator; A Cheap Ten Minute Timer for the Shack; A Low Frequency Phased Array; DC Isolation; Little Bill: 3 kV DC Power Supply; Diagrams.

Moskey; A Ham Radio Severe Weather Warning Net; The Agitable; LXpedition; 50 Megahertz DX; Questions Questions Questions; Improve your Heath 10-103; Mono Reproducer; Low Power 6 Metre AM Transmitter; Inexpensive RF Speech Clipper; Professor Beams Special Lecture to Class; My Favourite Band; The Audio Bishop; 4UITU — Geneva; Use that 120 volt Variac on a 220 volt Circuit; Western Satellite Picture on Your SSTV Monitors; Someone Should Do Something About . . .; Nostalgia; A Universal IC Tester; Tabus; Making it Small; Easy-Way Tower; Low Cost Infinite Attenuator for Amateur Use; Lightning in a Bottle — Flashtubes; Modernising the Select-o-Ject; Profile Roy Alciatore W5RU; It Happened in Mexico! . . .

QST October 1974

A New Front End for Direct-Conversion Receivers; Dipole Passe?; Solid-State Repeater Control; Apartment Dwellers Slinky Jr Antenna; An All Solid-State Keyer for Cathode-Keyed Transmitters; The Twenty-Metre DX Weasel; Repacking the Ten-Tec Power Mite; A Remote Head; Two-Toter Two; Reviews of: Curtis Electro Devices KB-4200 Morse Keyboard; Regency HRT-2 FM Transceiver; The Henry Radio Kenwood Pair; Spectrum International UHF Equipment; Getting Told the Ham Story; Amateur Radio in our Independent Civilisation; Tornadoes Strike . . . Hams Help.

HAM RADIO August & September

High-Power Solid State Linear Power Amplifier; How to calculate Wind Loading on Towers and Antenna Structures; Scanning Receivers for Two-Metre FM; Integrated-Circuit SSB Transceiver; Harmonic Phase Detector; Amateur Marine Installations — Small Boat Style; Electronic Speed Control for RTTY Machines; Battery Power.

Easy-to-Build SSB Transceiver for 1296 MHz; Miniaturised Communications Receiver; Intermodulation Measurements on SSB Transmitters; Modern RF Amplifiers for Communications Receivers; Design Data for Pipe Masts; Reciprocating Detector Converter; Miniature Filament Transformers; Versatile Squelch-Audio Amplifier for FM Receivers; Adding Carriage Return to the Automatic Line-Feed Generator.

PROJECT AUSTRALIS

with David Hull, VK3ZDH

OSCAR 6 EQUATOR CROSSINGS FOR "ON" ORBITS OVER VK — JAN. 1975

(Dates local, Times Z)

Orbit No.	Time (Z)	Equator Cross (°W)
Thurs. 2/1/75		
10126	0744	164
10127	0939	193
10128	1134	221
Sat. 4/1/75		
10151	0739	163
10152	0934	191
10153	1129	220
Sun. 5/1/75		
10157	1909	335
10158	2104	4
10159	2259	33
Mon. 6/1/75		
10176	0734	161
10177	0929	190
10178	1124	219
Thurs. 9/1/75		
10214	0824	174
10215	1019	202
10216	1214	231
Sat. 11/1/75		
10239	0819	172
10240	1014	201
10241	1209	230
Sun. 12/1/75		
10245	1949	345
10246	2144	14
10247	2339	42
Mon. 13/1/75		
10246	0814	171
10265	1009	200
10266	1204	229
Thur. 16/1/75		
10302	0903	184
10303	1058	212
10304	1253	241
Sat. 18/1/75		
10327	0858	182
10328	1053	211
10329	1248	240
Sun. 19/1/75		
10332	1833	326
10333	2028	355
10334	2223	24
Mon. 20/1/75		
10352	0853	181
10353	1048	210
10354	1243	239
Thurs. 23/1/75		
10389	0748	165
10390	0943	193
10393	1138	222
Sat. 25/1/75		
10414	0743	163
10415	0938	192
10416	1133	221
Sun. 26/1/75		
10420	1913	336
10421	2108	5
10422	2303	33
Mon. 27/1/75		
10439	0738	162
10440	0933	191
10441	1128	220
Thurs. 30/1/75		
10477	0827	175
10478	1022	203
10479	1217	232

See notes in Nov. AR.

It was hoped to supply at least preference orbits for Oscar 7 by this time (late Nov.) but so far all supplied orbit data has been wildly inacurate after a few days. Please listen to local division broadcasts for later details. Australis will keep state co-ordinators advised as data is made available.

Book Review

"LET'S TALK TRANSISTORS"

Robert Stoffels is an author who is recognised as an authority on his subject.

In this nine-part series, now assembled into one pamphlet by the ARRL, is packed a considerable amount of information to set students of Electronics on the road to success in a discipline which challenges the most vivid of imaginations.

Available as a re-print from "Magpubs" at $0.95 plus 25c postage.

VK3ASC

VHF UHF
an expanding world
with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

AMATEUR BAND BEACONS FOR JANUARY 1975

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RTX, Devonport	144.900
VK8	VK8VF, Darwin	52.200
P29	P29GA, Lae, Niugini	52.150
3D3	3D3AA, Suva, Fiji	52.500
ZL1	ZL1VHF, Auckland	145.100
	ZL1VHW, Waikato	145.150
ZL2	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

Main changes to beacon listings this month are deletions, which should bring the list to being substantially correct. First news came from Steve VK3ZAZ that there would be little likelihood of any VK0 6 metre contacts this year due to shortage of operators. Confirmation of this, and further news that the Macquarie Island beacon was not on the air, came in a letter from Don VK3AKN who advised that as a result of a contact with Dave VK0DM on Macquarie Island first hand news of the VK0RSA beacon was on hand. It appears the original location caused severe problems with the HF equipment, and so it was switched off. Another location was tried later but then interference resulted to physics equipment, so it is now off at least until next March when it is hoped to have a third try to find a suitable operating position. No confirmation at present of the Mawson and Casey beacons but these have been left on the list for now.

The Carnarvon beacon VK6RTT is also off the air, and resting on a shelf, mainly due to lack of operators in that area. The P29GA beacon should be all solid state by the time you read this, with a photo-electric keyer with "P29GA LAE PNG" ident. continuously on 52.150 to a 2 wavelength collinear.

George VK3ASV advises the Eastern Zone of VK3 two metre beacon is not likely to be operating for some time yet, further advice later on. As if to confirm my comment last month on lack of a channel for JA1IGY due to heavy band population on 6 metres in Japan, George VK3ASV has included a comment in the Eastern Zone Bulletin that as of March 1974 the number of Japanese amateur station licences issued was 436,377, and may be 500,000 by Christmas. If only 10 per cent of these operated on 6 metres that's 50,000, and if only 10 per cent of these were on 50-54 MHz at any one time, that's less than 1 kHz per operator — see what I mean? Imagine having 1,000 operators on an FM channel at one time — and I heard someone on Channel 4 the other day complain that the repeater always seems to be occupied!!

SIX METRES AND DX

What else is the main topic at the moment on the VHF bands? As was predicted earlier this year, 1974 looks like being a real bumper year for VHF contacts. At time of writing (late November) no 2 metre contacts have been made but these could have eventuated by the time you read this — however, that's for next month — concern for the moment must go to six metres. Openings started towards the end of October, and came along with a vengeance in November, some of the best early openings for many years, probably since 1963. All VK States, P29 and ZL1 to 4 inclusive have been the order of the day frequently. After waiting 11 years between, I worked my second ZL4 on 20/11 when Stan ZL4MB came on for a brief burst. At the same time Eric ZL3QE was S9 + 20, the strongest I have ever heard a ZL station, so if I have to wait for ZL3s to be that strong it may be a long time before I work my third ZL4! However, be that as it may, there appears to be plenty of 6 metre activity in ZL this year, and it is pleasing to see those boys recognising that most VK stations are now operating transceive, and so coming up into our 52 MHz segment to allow SSB transceive contacts to be made. Very few modern 6 metre stations today would have separate VFO tuning ability for VHF, so it is necessary for the ZLs to come up to us as we are unable to go down to them.

Pleased also to work Noel P29GA again this year, and grateful indeed are we that he is interested enough to keep that beacon going on 52.150. In a letter to me Noel mentions quite successful operation through Oscar 6 since 28/10, having worked VK2, 3, 5 and 7, and heard DU and JA stations. Good luck Noel, and thanks for the letter.

A pleasing feature of DX so far this season has been the very wide-spread nature of the contacts — openings to as many as four or five States at once, plus ZL. Long distance contacts are more common too, VK4 to VK6, VK5 to VK8, VK5 to P29, VK5 to ZL, VK4 to ZL etc. Northern VK4 stations have been heard more often, and all signals have been consistently good.

AM stations have almost disappeared from 6 metres it seems, and FT620s have taken their place, some barefoot, others with good sized linears. There is no doubt whatever that the SSB signals on VHF are readable for longer, and at much lower signal strength than the former AM signals, and do not suffer the same phase distortion (to the ear anyway) that the other mode does, during fading periods. At the same time signals are generally well stabilized, and with most operating transceive, it is inevitable more contacts must be made.

My nearest amateur neighbour, Fred VK5FT, about 1 mile away, and separated by 1,000 feet of hill, has finally succumbed to the thrill of 6 metres after purchasing a 6 metre device. Being a doyen of HF operation, particularly the R.D. Contest, Fred has a veritable antenna farm of sundry V beams pointing in all directions, switchable from the shack. These have been pressed into service through a suitable tuning unit, and Fred has been sending out some mighty 6 metre signals from 10 or so watts — how he gets out from behind those hills I just don't know, but he's doing it. Welcome to the bands, Fred. What about some of the others in the HF gangs around VK helping to populate our VHF bands. Suitable commercial equipment does not cost that much nowadays if you do not have the time to build something, and many of you smoke more cigarettes in a year than the cost of a good transceiver for 6 metres!

Don VK3AKN advises in his letter that Western Victoria is having its share of VHF SSB operators, some still building and testing. Most monitor 52.050. I quote the following from Don's letter as it is of interest: "Recent tropospheric openings have of course resulted in some severe shambles when Melbourne stations have been hearing and triggering our repeater Ch. 1 at Mt. William and fondly imagining they were working through VK3WI/R1 on Mt. Dandenong. I get the impression that many of the repeater operators do not have a clue as to what goes on. Such openings are described as 'unusual' or 'freak', and you can't tell them that they are as normal as the rain in winter." There are many excellent articles written on the subject of VHF propagation and, for those not so well informed on such matters, make very interesting reading, and will at the same time give a better understanding of such phenomena.

TWO METRES ETC.

Kerry VK5SU at Ceduna sent along an interesting letter, too long for inclusion of course as the information keeps me informed, but I would like to mention one day, 9th November, as an indicator of the excellent state of VHF. Ceduna is 550 km from Adelaide. Times stated for this particular exercise are Eastern Summer Time, as the information is only likely to be of interest to VK, and therefore such times relate more easily to the situation at the time.

0830 VK5VF beacon on 144.800 S5, Ch. 4 repeater Adelaide audible.
0930 Trigger unknown Ch. 2 repeater.
1130 VK5VF S5. Trigger Ch. 4.
1330 2 metre fade-out.

Away from home during rest of day and evening.

0025 Worked VK5ZMJ at Pt. Pirie (500 km) via Ch. 4 Adelaide!
0030 Worked VK5PB via Ch. 4, also 144.010 SSB. VK5ZPS 144.010 and 52.050. Worked VK5PB various cross band duplex e.g. 2 x SSB, 2m repeater and 6 metres.
0100 Trigger Mt. William (Victoria) Ch. 1 repeater. Various Adelaide stations on Ch. 4.
0300 Trigger Mt. William using 1 watt Signal 30dB over 9 on IC-22 S meter.
0350 VK5ZTS went up to Mt. Lofty, worked mobile via Ch. 4, then directly on Ch. B using ¼ wave whip on car, and 52.525 FM. VK5ZTS was using a mismatched 6m dipole clipped to car and 2 feet above ground!
0504 Heard VK3LX and VK3ALU mobile via Ch. 1 repeater. (Kerry notes: It is still uncertain if this was Ch. 1 Mt. William or Mt. Dandenong as neither repeater has auto ident like Adelaide. Distance to Mt. William 1015 km and Melbourne 1240 km).
0820 VK3AV, VK3AKN and VK3BDH via Mt. William, many Adelaide stations.
0933 VK5CU direct on Ch. 50. VK3BRB and VK3YEJ, both Mildura, via Mt. William repeater. VK5WI broadcast on Ch. 4.
1000 VK5VF on 2m S9.
1015 VK5VF etc. all inaudible.
1305 VK6ZDY, VK6ZHJ, VK6ZBW and VK6ZBM Kalgoorlie on 6m.

And then to work!

That is really dedication for you. No sleep for one complete night, two periods of work, rest of the time operating various bands, and making plenty of interesting contacts. Just shows what can be done if you have the gear, the time and the dedication, and the band conditions are right. And look at the time VK5ZTS got the car out and went up to Mt. Lofty, 0350 in the morning! Can't be married surely! My doghouse wouldn't be big enough if I tried that! Thanks Kerry for a very interesting letter; more please.

BITS AND PIECES

John VK4ZJB advises after 1st December he will be out each week-end on his favourite mountain with 400 watts of SSB on 6m, and from Wednesday 25th to Sunday 29th December inclusive. Did not say whether he would have 2 metres . . . Our old friend Lindsay VK4ZIM now has the call of VK4AAL, still with the excellent signal as before . . . Steve VK3ZAZ not now going to Norfolk Island, costs have risen too high with recent increases in plane fares and accommodation . . . about 20/10/74 HL9WI worked by VK4RO, VK4GS, VK4ZRG and VK4AAL . . . VK4RO will be on 144.090 this year crystal locked . . . colour TV from ZL has been viewed in Sydney . . . VK8VF being heard from Darwin around VK, but very little heard of amateurs from same area . . . Rod VK2ZQJ now sporting new call of VK2BQJ, has not spoken to me yet!

PORTABLE OPERATION

You are reminded that a number of stations will be out portable over the Christmas-New Year period again this year. Details of all known operation were included in the December issue. It is hoped as many as possible of the home stations will be on the air to make the efforts of those camped on mountain tops worthwhile. Two metre and 432 MHz will particularly be in demand.

NEW CHANNEL 5A STATIONS

I am sure the dedicated VHF operators around Australia read with dismay recently that new Channel 5A TV stations are to be scattered all around the countryside, high power stations at Loxton S.A. and Gosford N.S.W. and one other place I have temporarily forgotten, plus translators and repeaters of low power. What a dismal thought. The high power stations are bad enough with the amount of garbage they put on to 144 MHz, even if the spurious responses are within specified limits. 50 dB down from 100 kW ERP is still plenty strong enough to spoil reception efforts by the amateurs. Low power stations simply means that amateur operators within the limited service area of such stations just won't be able to come on because of TVI. Some areas have already been severely affected because of Channel 0 operations, now it seems the one world wide VHF band left to us is to be smothered with rubbish or at best will stop operators from coming on during TV hours.

The following comment is purely my own opinion, and I want it to be known as such. I knew it had to come. With the clamour going on from vested interests for the FM band to be opened up, the P.M.G. has little option but to make available the same frequencies as used overseas for FM (88 to 106 MHz) which means a shift around of TV channels. Greedy eyes have long been cast on 144 to 148 MHz by the commercial interests as being an area of small activity overall, but one providing quite a few two-way radio channels if it could be wrested from the amateurs. Unfortunately, there are many of you who read this who have done nothing or very little to keep the band in constant use, and so added to the problem. There are probably several thousand operators throughout Australia who use some portion of 144-148 MHz, a very small percentage use the lower tuneable portions, whilst the majority sit on a few FM channels about the middle of the band and contribute nothing towards general band occupancy elsewhere. It is interesting to note that in the main the operators who use the tuneable portion of the band also have FM capability, in other words, they have spread their interest to include a wider area of operation. And I suppose now with more compatible repeater channels covering the countryside, city operators will be content to work two metres DX through a repeater. In case anyone gets the wrong idea, I have worked on 2 metres tuneable for years, first with AM and latterly with SSB, both home and portable. I also can work on at least three FM channels including Ch. 4 repeater, and I do use FM from time to time, so my interests are not narrow.

I personally see the widespread use of Channel 5A as the thin edge of the wedge, gradually easing out operation on the lower part of 144-148 MHz by the amateurs due to QRM and TVI. In the end we will be told that as we do not use 144 to 146 we do not need it, so will lose it, after all, most operation is above 146 MHz, and it is easily proved we can get by with three or four FM channels, no worry! And that's all we will have.

I can never understand why in Australia there seems to be so much pressure for spectrum space, with eyes constantly looking at the few MHz we have. In the U.S.A. they seem to be able to manage in a country about the same size as ours, and with a few more people, nearly 200 million more in fact, and I think they would surely have a few more radio telephone and similar services than we do, and more TV and radio stations, and more FM stations, and with only the same amount of spectrum space. Just makes me wonder what is behind it all.

So, all you amateurs who operate on VHF, you had better start doing some thinking pretty soon and get some more gear operating on other places than purely FM channels, or is that all you really want? If I were a betting man, I would take even money that if Melbourne is to have a fourth commercial channel, or another channel anyway, in the future, it will be on Channel 5A. Sydney, the other centre of population able to support a fourth commercial channel, probably will miss out on a 5A, but then they have one either side, at Wollongong and the new one at Gosford. Overall, the situation looks very bleak for amateur radio in the future, and what will you do about? Nothing?

It seems a pity to end these notes on such a pessimistic note, but those are the facts I can only hope 1975 will finish a little brighter than it looks like starting. However, plenty of DX on 2 metres during 1975, it may be the last you will work in some areas, ever. The thought for the month: "A newspaper is not just for reporting the news as it is, but to make people mad enough to do something about it". Quite relevant, I believe.

The Voice in the Hills

Contests

with Jim Payne, VK3AZT

Federal Contest Manager,
Box 67, East Melbourne, Vic., 3002

CONTEST CALENDAR

Nov to Jan 19: Ross Hull VHF-UHF
Jan 8-9: YL-DX to Nth America (CW)
Jan 29-30: YL-DX to Nth America (Phone)
Jan 11-12: YU 80 metre CW
Jan 11-12: DL QRP CW
Jan 18: RTTY Flash Contest (Italy)
Jan 24-26: CQ WW 160 CW
Jan 25-26: French CW
Feb 1-2: ARRL DX Phone
Feb 8-9: John Moyle Field day
Feb 15-16 ARRL DX CW
Feb 22-23: French phone

REMEMBRANCE DAY CONTEST

All the certificates for this contest have been posted and logs returned to those contestants who requested same. Please let me know if yours has not arrived.

YL-DX TO NTH AMERICA CONTEST

YLs on Nth American continent will be working DX YL's. Phone & CW are separate contests and require separate logs. Same station may be worked on each band for QSO credit and only QSO's with other YLs are valid. Please send SASE to FCM for details.

ARRL INTERNATIONAL DX COMPETITION:

Phone — first full weekends Feb & Mar, **CW** — Third full weekends in Feb & Mar, Starts 0001 GMT Sat, ends 2400 GMT Sun.

Classes — Single op: All band; high band (20, 15, 10); Low band (160, 80, 40); enter only one. Multi op. single Tx or Multi Tx. All band only.

Object — DX stations QSO as many stations in the 48 contiguous US and Canadian call areas as possible. Repeat contacts on additional bands are permitted.

Points — Each complete contact 3 points; incomplete count 2 points.

Exchange — Send RS(T) and DC input power. The W/VE will transmit RS(T) and his state or province.

Multiplier — On each band your multipliers are the 48 contiguous US, plus VE1 through VE8 and VO; a total of 57. Your final multiplier is the sum of multipliers worked on each band. QSO points times the final multiplier equals claimed score.

Logs — Must contain dates, times in GMT, bands, exchanges and points. Signed legible copies of your station log are acceptable. Logs must be accompanied by a summary showing valid QSO's and multipliers for each band, and a multiplier check sheet showing the number of contacts with each of the 57 states on each band. Logs etc. must reach ARRL, 225 Main St., Newington, Connecticut, USA. 06111, before last Monday in April.

BARTG SPRING RTTY CONTEST

Ted, G8CDW, BARTG Contests and Awards Manager, has sent particulars of the latest RTTY contest to be arranged by the British Amateur Radio Teleprinter Group. The contest will be held from 0200 GMT on Sat Mar 22nd until 0200 GMT Mon Mar 24th, 1975. Please send SASE to FCM for details.

JOHN MOYLE MEMORIAL NATIONAL FIELD DAY

It's on Feb 8th and 9th, 1975. See Dec issue for details. Making yourself independent of the power mains limits the number of high power SSB stations which can be heard in this contest as portable units. However, if you can't be in the field please tune up at home and send in your log in due course.

Intruder Watch

with Alf Chandler VK3LC

1536 High Street, Glen Iris, 3146

As I missed out on the December issue I must hereby wish all Members a Happy and Prosperous New Year, and may 1975 fulfil all your wishes.

From reports received it seems that the 3.5 MHz band is being clobbered by Broadcast stations at the present time. It may be presumed that the 7 MHz band is so full of these insiduous broadcasters that the 3.5 MHz band has become more profitable to the newcomers because of the good propagation now. In any case the following frequencies have been reported as being occupied, but I would appreciate identifications of call signs or country of origin if Members would mind taking the trouble to listen at various times in the hope that some may be given. The reports all, so far have been submitted by the VK6 Division. Times of observations are 1100 to 1230 GMT.

3512	A3	Female singer.
3528	A3	Singing group.
3535	A3	Dialogue, male and female.
3560	A3	Piano and orchestra, male announcer.
3580	A3	Woman singing.
3632	A3	Foreign language.
3641	A3	Musical programme.
3695.5	A3	Foreign language.

Would you please refer to my "Letter to the Editor" regarding jamming and jammers. Good hunting.

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

The Editor,
Dear Sir,

I feel that I must comment on a piece of information contained in the letter by VK5JE in the October issue of the magazine.

John my boy, you are a little off beam!

The WIA "started the ball rolling" as you put it some years ago when I advocated the formation of what I designated "The QRM Brigade". Unfortunately, this has not been utilised as much as I had visualised, some members being opposed for ethical reasons. However, it has been useful and effective when used by those who have participated. It is most eefictive with those point to point CW intruders.

I cannot agree that "it is a long and sometimes hopeless process in getting rid of them". We have many successes internationally and two instances immediately come to mind — we had a South American News Agency station in the 21 MHz band, and we couldn't get his call sign until a German Amateur reported him and gave us the call. By co-operation between countries this station was removed. Another instance — we couldn't get an identification on a station on 14231.7 kHz for a long time, but it eventually turned out to be a Thai station. With Amateur methods we ran it down to a broadcast transmitter of the local television company at the airport in Bangkok. We found out it was an old transmitter, but they didn't want to replace it because they hoped it would stand up for a little while longer. We managed to persuade them to take it off that frequency. Thus you see, we have had our successes.

As I mentioned in my Intruder Watch column in the normal sense Jammers are far more insiduous than the actual stations being jammed, the main reason being that they use far more of the band. I would heartily congratulate anybody who could get the co-operation of the ARRL, the RSGB and especially the JARL, or our own Administration on the aspect of "controlled jammers".

Go to it, John and get together a CW net who are prepared to operate my "QRM Brigade" idea. You're in the clear.

Alf Chandler, VK3LC
Intruder Watch Co-ordinator for WIA

The Editor,
Dear Sir,

I still can't figure out why the Amateur Service is screaming over the increase of the cost of the licence to $12.00.

If the subject is looked at in the broad sense the following points must surely evolve:—

1. The commercial services now pay $20.00 for a base and $12.00 for each mobile.
2. The handphone service costs $12.00 for each unit, however the licence provides for at least a pair of handphones, thus $24.00 per annum.
3. The amateur licence allows each proprietor the use of mobiles, which can be crammed with as many transmitters as desired, and that same licence permits the operation of a separate base station with another compliment of

transmission gear including television if required.

4. Despite the fact that the broadcast and television receiving licence has been scrapped, we still are told of cases of hardship — if that is found to be so, the matter should naturally be looked into by the Institute.

So what's the beef — it's a bargain!!

M. R. Morris, L30134

The Editor,
Dear Sir,

Are we in VK considering changing our call sign to G? You must be joking.

In these days of unemployment benefits, retrenchment benefits and Government handouts the VK amateurs are jumping on the bandwagon and saying that $12 for a licence is too much, and we want a benefit handout as well.

This $12 fee is cheap. About 50 middies per year or one per week or 25 packs of cigarettes per year or ten per week and so I could go on.

Alright the cry goes up "what about our senior and junior members". O.K. what about them, why don't **WE** as an Institute, do something instead of whinge.

Most Divisions look after their senior and junior members by having a lower fee structure, so why not for the same price include a licence. But don't ask for a Government handout. No! Ask it of every WIA member. For that lower fee the local Division could buy that right, **BUY** the licence for each senior and junior member and this would be subsidised by all other WIA members.

We must learn to help ourselves as an institute and stick together rather than cry poor-mouth to the Government.

We should be showing the administration that WE as an Institute can, and are, united and able to look after ourselves; then, when an important crisis occurs, our voice will be heard.

Members, stop crying WOLF and unite.

Wally Watkins, VK2ZNW

Book Review

THE ARRL ANTENNA BOOK

The 13th Edition of THE ARRL ANTENNA BOOK represents the most extensive revision this publication has received within the past 25 years. Although much of the basic information of previous editions on subjects such as radio wave propagation and antenna theory has been retained in early chapters of the book, all information has been carefully edited for clarity and has been supplemented with later data where modern technology has brought new knowledge.

In the later chapters some striking changes from previous editions will be noted. A large section appears on the use of the Smith Chart in solving transmission-line problems. Information on cubical-quad antennas has been greatly expanded. Design and construction information on log-periodic antennas has been added. Construction information on "standard" antennas — dipoles, Yagis, and simple arrays — has been revised extensively, and new antenna types such as a 40-meter "sloper" are described. Information on rotator and tower selection and installation has been added.

Four new chapters appear in the 13th Edition, one on antennas for restricted space, one on antennas for space communications, one on measurements, and one on specialised antennas that amateur radio enthusiasts often hear about but are unable to find information on — the Beverage, discone, conical monopole, fishbone, bobtail curtain, and others. From its newly designed front cover, which retains a bit of the appearance of the covers of older editions, to its completely new index at the back, this edition is packed with useful information on all types of practical antennas.

Hamads

* Eight lines free to all W.I.A. members. $6 per 3 cms. for other amateurs and S.W.L.'s.
* Copy should be in block letters or typescript, signed and forwarded to The Editor, P.O. Box 150, Toorak, Vic., 3142.
* Excludes commercial advertising.
* Closing date for Hamads is the 3rd day of the month preceding publication.
* QTHR means the advertiser's name and address are correct in the current Australian Callbook.

FOR SALE

VK3ASC Quad, Triband — Castings with fibreglass spreader, assembled, as new $90.00. W. J. Bennett, VK3EJ, 4 Karralla Court, Lilydale. Ph. (03) 735 1350.

KEN, KP202 portable FM transceiver in new condition with 2 repeater and 4 simplex channels, $110.00; also new base station mic., dynamic, 200 ohms, cost $24.00, sell $14.00. Ring (03) 467 2131 bus. hrs.

Gallbraith Noise Bridge, wired and going, $12.00. Ampress speech processor, as new, $30.00. VK3LC, QTHR. Ph. (03) 50-2558.

2 Mx FM Carphone, similar to A.R. model, but updated version, very neat construction with AWA escutcheon, dual gate Mosfet front end in Rx, Tx, Rx & xtal switching all on a single P.C.B., 6 channel capacity, Ch. 40 installed, Tx 25 watts, $125.00 O.N.O. Neil Osborne, VK3YEI. Ph. (03) 763-0256, evenings only.

MTR13, good cond., unconverted, $40.00. John Lancaster, VK3ZWL. Ph. (03) 62-0201, ext. 2486 (B.H.) or (03) 89-9017 (A.H.).

TCA1677 2 metre transceiver with instruction manual and mobile mount, fully converted and in good condition, with xtals for Ch. B, 4 and X. Best offer around $100 or swap with cash adjustment for good, general coverage, communications receiver. VK2BJK, QTHR. Ph. (02) 449 1598.

HW-7 QRP Transceiver, complete kit in unopened factory sealed package. Travelling overseas and will have no time to construct, $107. Ross Treloar, VK2BPZ, QTHR. Ph. (02) 259-5267 bus. hrs.

2m FM base and mobile units comprising AWA MR10 base with A.C. power supply, in-built speaker, and separate carbon P.T.T. mike both Rx and Tx separately switched; xtals for Ch. A, B and C. Pye Reporter with transistor power supply and xtals Ch C out Ch A in, with two cradles and circuit diagram. Recent satisfactory mobile contact with Orange repeater from Dubbo and Parkes. Some spare tubes including 2E26. Base station $50, mobile $35 or both $80 O.N.O. VK2AWY, Box 843, P.O., Orange 2800. Ph. (063) 62 1533 or A.H. 62 1807.

R5223 Receiver Modules, large quantity including the following: VFO, tuneable IF, IF Army, Detector, AF Amp, xtal Cal Osc, set of one each, $30. Also front panels and complete dial mechanism assemblies, $30. 48 Milham Crescent, Forestville, N.S.W. 2087. Ph. (02) 888-2981 A.H.

Trio Rx 9R-59DS, 1.6-30 MHz coverage, AM/SSB/CW reception, 4 years old, AR mods, good condition, except for front panel slightly marred, $85; consider exchange for antenna rotator. Also No. 10 xtal cal., $16. VK3LJ, QTHR. Ph. (053) 32 3412 but during Jan try (03) 347 1729.

Yaesu FTDX560, mint condition, only 18 months old, $400 ONO. 6 meter Transverter, 6/40 in final FET converter, $90 ONO. VK5AS, c/- P.O. Cowell, S.A. 5602.

WANTED

Band Spanner or similar mobile HF antenna required. Offers to VK4ZEZ, 35 Sycamore St., Pimlico, Townsville, 4810.

Coax Switch, two or more outlets. VK3LC, QTHR. Ph. (03) 50 2556.

Yaesu Type F, 5.1724 MHz sideband generator. David Farquharson, 29 Roberts Road, Belmont, Vic. Ph. (052) 43-2176 A.H.

ZL Repeater Crystals for KP202. VK3BAX, QTHR. Ph. (052) 97401.

Ex R.A.A.F. RT-322/APG-30A and PP-2170/APG56 (modified unit), information on units wanted. Lionel Sharp, VK4NS, QTHR.

Two Antenna Rotators, one suitable for a VHF Yagi and the other suitable for an HF cubical quad or beam. Price and details to VK3ZR (ex VK3ZIP), 30 Mitchell Rd., Mont Albert N. 3128. Ph. (03) 89 4645 A.H.

Yaesu FV400 ext. VFO and FTV650 transverter. Particulars to VK3LP, QTHR, or Box 20, Castlemaine 3450. All replies answered.

Prop Pitch Motor. Price and particulars to VK5SW, QTHR. All replies answered.

Silent Keys

JOHN WATSON	VK6JW
JOHN WALKER	VK2GA
BOB O'MAY	VK7OM

LEW SCOWN VK5YS

It is with deep regret that we record the passing of Lew Scown, VK5YS. Operating from the Brahma Lodge area in the Salisbury district, Lew was an active amateur up to the end.

Always cheerful and bright despite two recent heart attacks, he carried on with his work where he was employed as a Technical Assistant at the Weapons Research Establishment, Salisbury and participated in the 2 metre net run nightly amongst his fellow hams after knock-off time at that establishment.

Lew died on the morning of Saturday, 26th October, aged 52 years after a major operation.

Whilst in hospital, Lew carried on with his amateur radio activity, having taken his 2 metre transceiver there with him so as to keep in touch with all his friends. He had not been operating on VHF for very long, but in the short period that he did operate on the net frequencies he became well known to many who had not heard him on the HF bands.

Lew's main interest in amateur radio was antennas, and he spent many hours working on same with a special emphasis on designing and testing miniature and loaded type arrays.

He worked on all the HF bands using both SSB and CW, and ran a number of skeds both with other VK5s and also interstate stations.

Lew held a licence for 20 years and in that time his hobby of radio was by far his major interest.

Lew leaves behind him his wife Thelma, two sons Lee and Dean, his daughter-in-law and one grandson. We extend our sincere sympathy to them in their loss.

He was a member of the 9th Division, A.I.F., and at the age of 18 years fought in the battle of El Alamein.

Lew will be remembered in high esteem by his many friends in the world of Amateur Radio.

Ian J. Hunt

FRANK W. NOLAN VK2BNB

Passed away peacefully early on 18th November, after a long illness. He was an old-timer from Queensland and until recently was still active on 14 MHz CW.

Mr. M. D. CLEGG VK5ZEG

Sadly missed by many amateurs and all his friends.

JANUARY, 1975

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amateur radio

VOL. 43, No. 2

FEBRUARY 1975

CONTENTS

COVER PHOTO

Peter Williams, VK3IZ, operating at VK3AUP, one of the WICEN HF control stations during the Darwin Disaster. See page 9 for further information.

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

amateur radio

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The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying any reason.

Advertising:
Advertising material should be sent direct to **P.O. Box 150, Toorak, Vic., 3142,** by the **25th of the second month preceding publication. Phone: 24-8652.**

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Penny Printing Co., incorporating Tully Printing, 33 Roberna Street, Moorabbin, 3189. Tel. 95 6462.

FIRE!

At the same time as cyclone Tracy was wreaking havoc on Darwin, a fire gutted the building occupied by the printer of Amateur Radio magazine.

Much of the material which had been prepared for this and future issues of AR was destroyed, including manuscripts, drawings and photographs.

We have had to find a new printer, arrange re-drawing of diagrams by our draftsmen, and commence the tedious business of resurrecting the destroyed articles.

Following is a list of articles whose publication will be delayed because of the fire:—

"Some Useful Modifications to the FT101 Series" — Geoff Wilson, VK3AMK.
"Vertical Extended Double Zepp for 2 Metres" — John Hassell, VK6ZGE.
"A Cradle for Ken" — Mike O'Burtill, VK3WW.
"Rotating a 3-Element 20 Metre Beam with a Stolle" — Les Newsome, VK4LR.
"Modifying the Trio JR60 Receiver" — C. P. Daw, VK2AGJ.
"A Mini-Size Field Strength Meter" — Maurie Evered, VK3AVO.
"Modification to the VK3ABP 2 and 6 Metre Converters" — Geoff Wilson, VK3AMK.
"The Shack" — J. A. Gazard, VK5JG.
"Microstrip Data Curves" — Neil Weste, VK5TB.
"Vehicle Ignition Noise Suppression" — Rod Champness, VK3UG.
"Antenna Measurements" — Dick Turrin, W2IMU.

Bill Roper, Editor

ARE THE AMATEUR FREQUENCIES JUSTIFIED?

This was a question asked in Mobile News and G3BID in the Oct. '74 issue says he well remembers in the old days winding his own coils but he did not refine his own copper nor draw the wire so he might even in those days have been classed as an appliance user having actually bought the wire off the shelf. He wound his own coils for no other reason than that they could not be bought. As soon as coils, etc., could be purchased the amateur was then free to spend more time experimenting with systems of modulation, antennas, etc. Gradually we could buy our transmitters off the shelf and, so he says, this is progress and allows the amateur to move on to the next problem. Let us be grateful, he concludes, that much of the ground work is taken off the amateur by his being able to buy a 'black box' so that he has far more time available for experiments on the vast number of subjects which stil need to be investigated.

GARBAGE CAN LIDS

"Several of the smoothly-rounded type of ordinary domestic galvanised iron dustbin lids", writes G3RPE in his Microwaves column in Radio Communications for Oct. '74, "have been checked and all have been found sufficiently accurate paraboloids to make efficient dishes at frequencies up to 10 GHz at least. Their diameters ranged from 18 to 24 inches. A rule of thumb is that a dish should have a diameter exceeded 5 pi and preferably 10 pi at the frequency of operation so this size of dish is best used above 3 or 6 GHz. The gain to be expected (on one model) ranges from about 76 dB at 5760 MHz to 38 dB at 24 GHz".

THOUGHT

QST, Oct. '74, has a quote of the month by WA4BDW "So long as we depend on the publicly-owned frequencies for amateur radio's very existence, we had better make sure the public knows who we are and what we do".

QSP

DOES COLOUR TV QUALIFY FOR INTRUDER WATCH ACTION?

The following is the text of a letter sent by the Executive on behalf of the Institute to the PMG and others in specific reference to the use of TV channel 5A:

"At the recent Inquiry into Frequency Modulation Broadcasting a submission on behalf of this Institute was made that the broad principle of international uniformity should be followed in the use of the electromagnetic spectrum particularly in relation to the entertainment service. The submission also supported the early introduction of UHF television and recommended relocation of stations using channel 5A and channel 0 to the UHF band as soon as possible.

Unfortunately a decision has been made (possibly due to economic considerations) that there shall now be greater use of channel 5A.

The spectrum between 108 and 170 MHz is allocated World Wide to such International services as Aeronautical, Land and Harbour mobile, Satellites and Amateur. Australia however is the only country to have allocated a television channel in this segment; vide note 279A.

Past experience, (as indicated by the need to hold the Independent Inquiry into FM Broadcasting) has shown the necessity for conformity with international allocations and the economic penalties incurred by non-conformity. These penalties may be expected to increase greatly the longer conformity is delayed.

Therefore it is submitted that before the use of channel 5A becomes more widespread, a decision should be made at once to phase out its use for television. To permit this to take place as soon as possible it is urged that the fitment of UHF tuners to all production television receivers be made mandatory immediately, thereby permitting the early introduction of UHF television. This will also permit implementation of the Institute's recommendation to the FM inquiry that channel 0 be transferred to UHF on the grounds that it is the TV channel most susceptible to electrical interference, that it can produce interference problems in conjunction with FM broadcasting and that there are technical difficulties with transmitting colour on this channel.

It is considered that there will be a long term benefit to the community as a whole if action along the lines recommended can be taken without delay by all authorities concerned."

This is yet another step taken by the Institute in an attempt to tidy up the VHF spectrum allocations.

Most of us are aware of the uniqueness of the Ch. 5A allocation but how many amateurs realise that we appear to have yet another burden about to be placed on our backs, namely colour TV, in association with the allocation of the Channel 5A and Channel 0 frequencies.

The problem of introduction of colour TV is not so much the interference caused by amateurs to its reception as to the interference by the colour broadcast itself. Interference by amateurs may not apparently be as big a problem as we were led to believe.

Complaints are coming in from members about additional spurii appearing in the 6 metre band whilst colour programmes are being transmitted. It is demoralising enough to have TV channels adjacent to our bands without having to put up with noise and crud from them within our bands.

At this stage more details are essential in order to prepare suitable, properly documented, submissions to the appropriate authorities.

Are you experiencing more problems in using 6 metres or any other of your favourite bands since colour TV began? Can you specifically pinpoint any additional noise or interference on the bands concerned which can properly be attributed to colour TV? If so, write in with full details plus, of course, any data on the Ch. 5A problem which has come within your own practical experience.

Peter Wolfenden, VK3ZPA
Member of the Executive
Chairman VHF/UHF Advisory
Committee

AMATEUR RADIO LICENCE FEES CORRESPONDENCE

Postmaster-General,
Canberra, A.C.T., 2600

Dear Colonel Bennett,

I refer to your letter of 30th September, 1974, addressed to the Minister for Defence, the Honourable L. H. Barnard, concerning the recent increase in fees for amateur radio station licences.

I should like to explain that licences for civil radiocommunication stations are granted in accordance with the provisions of the Regulations made under the Wireless Telegraphy Act. These Regulations provide for the payment of an annual fee in respect of the grant or renewal of such licences and the revenue collected is intended to cover the costs incurred by my Department in its role of ensuring the orderly development and conduct of radiocommunication services generally. Since 1950, developments in techniques have been such as to permit of a large expansion in the commercial and other fields and more than 203,000 licensed stations are now in operation. I need hardly add that in order to meet the varying requirements of users it has been necessary for my Department to institute a wide variety of licensing conditions which add to the administrative load.

There have been developments in amateur radio corresponding to those referred to above. Thirty years ago, for instance, there were only 335 licensed amateur transmitting stations using quite limited operating techniques. The number has now grown and at June, 1974, there were 6698 licensed stations using a far greater range of techniques than in earlier years. Today amateur licensees are authorised to pursue experiments in the V.H.F., U.H.F. and S.H.F. bands, to undertake television experiments and to employ single sideband and pulse transmissions. Amateur licensees also now engage in experiments involving moon reflected signals and communication satellites.

In determining the new fee structure which was to apply to all radio services, account was taken of the fact that the costs associated with the licensing and surveillance of land and fixed stations are greater than those associated with stations in the mobile category. Accordingly the fee for the former has been set at a higher rate than for the latter.

Although the large majority of amateur stations more appropriately belong in the fixed category, it was decided that because amateur stations have no commercial involvement and their activities are normally confined to experiments that they should be included in the lower rate licence fee category. Nevertheless, the Government's views in relation to leisure time activities should not be construed as to presume its acquiescence to the community at large bearing any portion of the costs involved in the pursuits of hobbyists.

In return for this $12 fee my Department is required to grant licences, issue and record call signs, inspect stations, investigate complaints, arrange for reciprocal agreements with other countries, frequency measure and monitor transmissions as required and liaise with other Administrations and the International Telecommunications Union in regard to amateur radio stations generally.

You may be assured that I am well aware of the part which amateur radio operators have played and are continuing to play in providing emergency communications during national emergencies. I also appreciate the encouragement given to the study of the radio art through amateur radio activities.

In considering the effect of the increased fee on pensioner amateur station operators it should, perhaps, be borne in mind that the increase represents only a very small proportion of the overall cost of maintaining an amateur station. In terms of weekly contributions this amounts to only 12 cents.

The increased fees are not expected to fully reduce the discrepancy between revenue and costs. I regret to advise, therefore, that the Government cannot continue to subsidise the administration of amateur radio stations to the extent that it has done over recent years and the way is not clear, therefore, to reduce the new fee of $12.

Yours sincerely,
R. Bishop

Lieutenant Colonel J. McL. Bennett,
Public Relations Officer,
The Wireless Institute of Australia Executive,
P.O. Box 150,
TOORAK, Vic., 3142

SUNSPOT BULLETIN

Thanks to the Swiss Federal Observatory Bulletin for 30th Nov., it is noted that the first spot of the new cycle was observed on 15th November. The smoothed mean for May 1974 was given as 36.4, the provisional mean for Nov. '74 was 23.9 and the smoothed monthly predicted sunspot numbers for the next 6 months were given as Dec. '74 — 29, Jan. '75 — 27, Feb. — 25, Mar. — 24, Apr. — 23, May — 22. ●

Darwin Diaster Communications

John McL. Bennett. VK3ZA.
WIA Executive. Public Relations Officer

Christmas morning 1974, what would normally have been a happy day, dawned over Darwin, Australia's northern-most city, to show the carnage left in the wake of Cyclone "Tracy" in all her fury.

Hardly a building or structure of any sort had escaped the thrashing of cyclonic winds, which reached an estimated 160 knots. Most of the city's 40,000 inhabitants were homeless and, within the next few days, more than 28,000 of them were to be evacuated in the biggest air-lift in Australia's history.

In this, Australia's worst ever natural disaster, the total cost of property and equipment loss is still being calculated long after the event.

Darwin is remote, even in the vast continent of Australia where the people think little of travelling long distances — Darwin's help could only come from outside — from Sydney and Melbourne, 3,200 km away; and from Brisbane, Adelaide and Perth, all around the 2,700 km mark!

The remoteness of Darwin was emphasised by the near-total loss of communication facilities.

Darwin, normally well equipped with and well serviced by communication facilities, had lost her voice and contact with the outside world to tell of her plight . . . almost, but not quite, lost her voice.

Shortly after 1 a.m., Eastern Australian Summer Time, the last telephone call from the city was cut short — the OTC Telex link failed at 6.30 a.m. For the next three hours or so, little or nothing was heard. Then, an amateur operator's voice was heard from Darwin!

Bob Holland, VK8RR, having found his mobile gear serviceable, came up on 14 MHz and was the first known voice from the devastated city. This was around 9.00 a.m. EAST.

About the same time, Bruce Wilson VK3IG, a Technical Officer with Radio Australia at Shepparton, 220 km north of Melbourne, was calling "CO Darwin" in the hope of ascertaining the status of "RA" equipment there, as the telex link with Darwin and Shepparton transmitters was "out" and all attempts to contact Darwin by other means had failed.

Bruce's call "CQ Darwin" was heard by HL6WI in Seoul, South Korea, who told Bruce that there was a VK8 on the band and that a cyclone had apparently hit Darwin. A quick call for Bruce from P29WB informed him that VK8RR was operating down on 14195 kHz . . . so contact was established on that freq . . . although it later moved down to 14175 kHz.

Bob, VK8RR, is the Manager of the OTC Coastal Radio Station, VID, Darwin and his concern was to get a message to OTC headquarters in Sydney to advise the present state of OTC communications in Darwin. This traffic was swiftly passed by telephone. Around 10.30 a.m. EAST, Bob was on his way to Darwin wharf with other OTC operators to establish CW communications with the Marine Operations Centre in Canberra using the radio facilities of the coastal trading vessel "Nyandra", anchored in Darwin harbour. This link was opened at 14.30 EAST using the call sign VID-2 . . . VID itself having suffered considerable damage in the cyclone.

Those amateurs known to have been on watch and operating on 14175 and 14195 kHz between 0.900 and 12.30 EAST were: VK3IG, VK3KF, VK3ZA, VK4YG, VK4DK, VK4GD, VK5SL, VK5NJ, VK5QX and VK6NA.

Doubtless, there were numerous others monitoring the frequency, as was the case throughout the entire operation, all of whom were ready to give assistance if required.

Nothing further was heard from VK8RR after 10.30 EAST, as Bob was flat-out with the operation of VID-2.

As that circuit, Army RTTY and other links came into service around midday, the picture of Darwin's plight began to emerge at the headquarters of the Natural Disasters Organisation in Canberra.

At 5.30 p.m. (0630Z . . . from this point in the story all times will be quoted in "Zulu" . . . GMT . . . showing in date time group style e.g. 250630Z . . .).

So . . . at 250630Z . . . the next amateur voice was heard.

Trevor "Slim" Jones, VK8JT, operating an FT101 mobile, about 8 km from the centre of Darwin, called "Mayday" on approximately 14114 kHz and the call was heard in Melbourne by Ken, VK3AH, who immediately advised the Victoria Police communications centre "D24". Within minutes, the police were at Ken's Mooroolbark home at the foot of the Dandenong Ranges, some 40 km east of Melbourne.

By 250645Z the police had declared 14114 kHz "a police priority channel for emergency traffic only". A telephone link was established by Ken's 'phone with "D24". This 'phone link was later supplemented by a police UHF radio link. In Darwin, "Slim" had informed the Police Commissioner of the existence of the amateur radio emergency circuit with the Victoria Police in Melbourne and, as a result, a police walkie-talkie radio was installed adjacent to "Slim's" gear to complete the hook-up between the two police organisations.

The Victoria Police established com-

The scene at Disaster Control, D24, where members of WICEN provided the link from the HF stations to the Victorian Police, and control for the VHF stations at Tullamarine and the Commonwealth Centre.

munication with the Natural Disasters Organisation operations centre in Canberra and so the chain was completed and police information began to flow over the amateur radio circuit out of Darwin.

Word quickly spread through the amateur world and soon an effective net was established which allowed for relay facilities between Darwin and Melbourne and Cairns and Perth. The need to QSP was vital to the success of the circuit as 14 MHz, although quite good between Melbourne and Darwin for a large part of the day, couldn't be relied on for the whole 24 hours!

The stations involved in primary relay and logged in the first 30 minutes of operation at VK3AH were: Ted VK4YG, Terry VK2BTS/4, Mount Isa, Craig VK8CW, Alice Springs, Owen VK8OM, 270 km from Darwin, Bert VK5AH and Ian VK5QX, both of Adelaide.

Three overseas stations also played a significant part in relay ops . . . VR4BD; 9M2ML RAAF Butterworth, Malaysia; and HL9WI in South Korea.

HL9WI, in the first three or four hours after VK8JT commenced operation could read Darwin clearly and QSP traffic to VK3AH. Most useful to the relief operation was HL9WI's ability to both receive and transmit on service aircraft frequencies . . . this enabled him to relay the Darwin weather report, sent by VK8JT, to the first RAAF C130 Hercules transport inbound with support for the city.

If you have a story to tell about Amateur involvement in the aftermath of the Darwin Disaster, please write to:
AMATEUR RADIO STATION VK3ZA,
P.O. Box 134,
Mount Eliza, 3930

In those first few hours, the "net" grew to an estimated 200 participating stations with unknown hundreds listening on the frequency as "Slim" and his assistants, Gary VK2BNN/8 and his XYL Wendy, who were on holiday in Darwin, passed police traffic tirelessly. This was no easy task as "Slim" was operating under great difficulty with make-shift antenna slung-up with string!

At 251400Z, seven and a half hours after Ken, VK3AH commenced operation, he was joined by Bruce, VK3UV and these two alone kept going with meals and coffee brewed by Ken's wife Bett, continued to control the net and handle police traffic for a further 18 hours. At that stage, 260643Z, both men were very tired and the operation was now very large. Ken was notified that the Wireless Institute Civil Emergency Net was ready to commence operation. Ken signed clear at 0647Z and WICEN took over a well-oiled machine which was to steadily grow in complexity and continue operating for another three and a half days and nights.

Initially, WICEN control station was VK3AUP, operating from Templestowe, with a VHF FM link utilising the 2mX channel 1 repeater between there and police headquarters at Russell Street. Andrew Moffatt VK3FJ acted as co-ordinator in overall control. VK3LM, at East Ringwood later carried on the same function of VK3AUP using the same facilities.

VK3AUP continued to handle police and Natural Disasters Organisation (NDO) traffic until 270640Z when advised by NDO through VK3ZA that PMG circuits to Darwin were almost fully restored for NDO purposes and that there was no further requirement for WICEN net for official purposes. NDO had closed their radio link in Canberra with WICEN around 270100Z but asked WICEN to remain on standby in case there was a need to reactivate the net at short notice. From the official close-down time of 270800Z for NDO traffic, WICEN took on a new role.

Although NDO traffic had ceased, the Victoria Police considered that there was need for the net to continue in order to handle the volume of traffic arising from the evacuation of some 28 to 30,0000 people from Darwin.

At 280445Z, VK3AUP changed callsign to VK3WIA, the official call sign of the Executive of the Wireless Institute of Australia. Coincident with that change, VK3WIA called "CQ CQ VK, CQ VK" . . . with a message from WICEN Sigcen Melbourne. ". . . . All stations operating into Darwin . . . PMG has authorised third party traffic in and out of Darwin may be accepted and passed to this station from VK8 stations or interstate relays or to local Police Headquarters for onward transmission to D24 Melbourne. Priority is to be given to sigs out of Darwin unless vital . . . ."

Within an hour, the official Wireless Institute callsign of every State in Australia was on the air, together with about another 20 stations in major provincial areas. These stations handled and relayed messages of a welfare nature until the closure of the net at 291300Z — on the fifth day of operation.

Tribute must be paid to all those amateurs who operated and staffed the repeater links on 2 mX FM between WICEN HF control stations and D24, the second repeater link between D24 and Tullamarine airport and the simplex net between Tullamarine and the Commonwealth Centre in the City of Melbourne. Without these links, much of the traffic handled on the Darwin-Melbourne circuit would have been meaningless or wasted.

Nor can one find words to express the gratitude due to the many amateurs throughout the country who so willingly made available their equipment to be sent to Darwin to supplement the meagre resources there or for use in the VHF nets.

Behind every amateur involved there stood the support of XYLs, YLs and Mums without their unflagging efforts, be it in Darwin or wherever, many an operator may have flagged!

Thank you ladies, one and all.

There is a host of stories and anecdotes yet untold about this disaster and there are countless names and callsigns richly deserving of a place in the history of this communications challenge.

For these sins of omission, please forgive the historian at this stage.

As more and more information comes to hand, the full story will take shape, thus enabling us to publish, in due course, the complete history of communications with, within and from Darwin in the aftermath of Cyclone Tracy.

All that has been attempted here is to chronicle the key points of the saga of restoring contact with Darwin. The author would appreciate any information which readers may care to add or amplify, whether it concerns amateur radio or other forms of communication . . .

We, the amateurs of Australia, capably assisted by the brotherhood of fellow amateurs outside the Commonwealth, fulfilled our emergency role of providing a replacement and backup support for the normal facilities of the Australian Post Office . . . . and in the words of a police Inspector in Melbourne ". . . a good job well done".

However, we were only a part of the "big picture" in providing emergency communications and our part, with your help, will be told, along with that of all the other agencies and organisations involved, in a later edition of "Amateur Radio".

The Shack

Alan Shawsmith, VK4SS

Maybe it's carpeted, rich in decor
Or humbly furnished and bare of floor
Spacious and specially made
Or a tiny room, downstairs laid.
It could house gear worth dollars 10K;
The sky-hook, a reaching phallic array
Or is there simply a rig QRP,
Working an LW or inverted 'V'?
Do trophies and merits adorn the wall
Or is there no space for cards at all?
Maybe it's built up high in a tree.
There are such places known to be—
—or is there only to be had,
A cellar in which the air is bad?
Does it stand on a hill or country glade
Or deep in a slum in eternal shade?
—or have you as a last resort,
Converted a corner of the carport?
No matter what or where it may be,
It's THE one place where a man is free.
It's THE SHACK — the Ham's Holy Pad,
Where pleasure unhindered is to be had.
Who cares a jot if it's tidy or bright,
So long as the person in it, feels right.
It's the Den, wherein you can do,
What the spirit moves the fancy to—:
Chase rare DX or call a CQ,
—or simply give the rag a good chew.
And if the bands are dull or dead,
Work on some homebrew job instead.
It's the Inner Sanctum, so shut the door.
And the daily 'rat race' is no more.
Switch on the rig, spin over the dial,
And just for an hour or longer while,
In this Castle the Ham is King.
Here, from the fones, voices ring,
to come and talk, to QSO
With friends, whose hobby all do know,
Has no distinction to embrace
Any creed, politics or race.
A society egalitarian,
Of Joe, Nick, Karl, Ivan, Sven or Ben.
The SHACK — that imperative territory,
Where I am a Ham and I am me.

20 Metre Quad Tuning Made Simpler

Harry Capsey, VK2OQ
58 Ellis'on St., Chester Hill, N.S.W. 2162

Many amateurs have difficulty in finding a suitable power source for adjusting a quad antenna. The author used 70 ohm co-ax coupled by a 2 turn link to the coil of a GDO.

A simple SWR bridge using a 50 uA meter was used in the line and this gave ample sensitivity. The circuit of the simple indicator is shown in Fig 1.

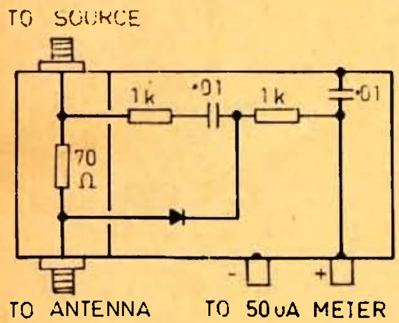

FIG 1 SIMPLE SWR BRIDGE 70 Ω

Leave the meter leads long and the meter can be read outside the shack, or through field glasses from the tower or pole (even longer and you could have the meter next to you! — Tech. Ed.) All that is required is to slide the gamma bar along approximately 3 feet, then adjust the 100 pf capacitor. This can be a close spaced capacitor small enough to fit in a small plastic container for weather proofing. If metal acts as a shield, this also makes earthing to the lower centre of the driven element easy. A coaxial connector can be used for the 70 ohm cable. The rough layout of the beam and tuning is shown in Fig 2. If the SWR is not to minimum or very close to a pure resistive 70 ohms, re-adjust the Gamma Bar and Capacitor.

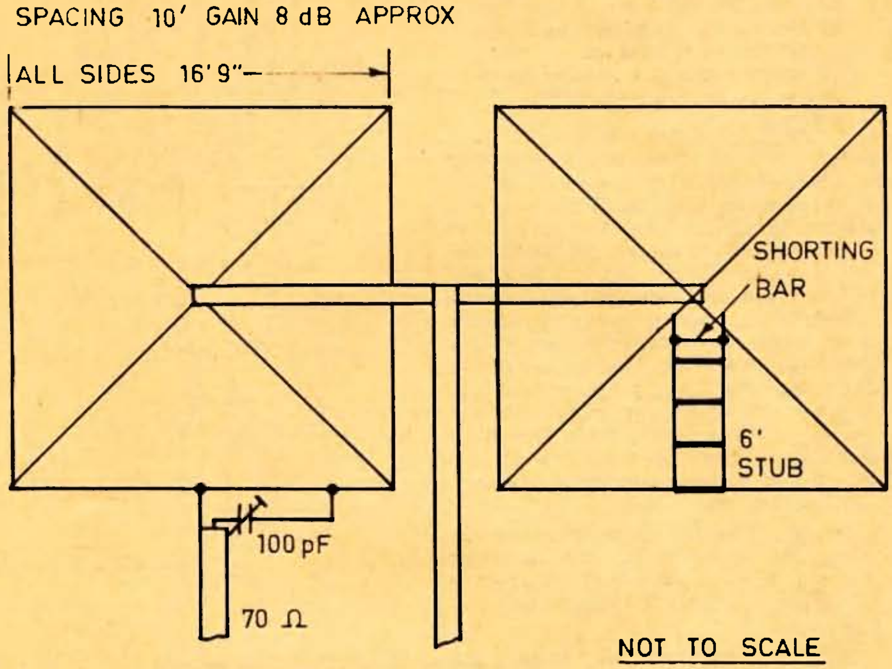

FIG 2 GENERAL DETAILS OF QUAD

Note:—For those wanting a 50 ohm resistance on the Quad, simply replace the 70 ohm resistor in the bridge with one of 50 ohms.

TUNE UP METHOD

Set GD Oto 14.150 MHz, adjust 2 turn link to give a full scale reading on a 50 uA meter. With the quad lead disconnected, connect a terminating resistor of 70 ohms to load the co-ax terminal. The bridge meter should now read zero. Without touching anything, except to replace the 70 ohm terminating load with the antenna 70 ohm cable to Gamma bar and driven element, adjust length of Gamma match and 100 pf capacitor for bridge meter reading of zero. Leave set-up as is and rotate the beam with the reflector facing a dipole 10 feet high and as far away as possible.

With the 70 ohm feeder at the end, insert the meter with a diode across the line, and tune the reflector stub shorting bar for a minimum signal on the reflector. Repeat above adjustments to ensure accuracy.

RESULTS:

Back to front ratio — 6 "S" units, ends approx. 2 "S" units. Lobe spread approx. 45-50 degrees.

These are the owner's figures with the antenna only 20 feet high.

Note by the Technical Editor:

If the test dipole cannot be placed say, 50 feet or more from the Quad, then a small dipole (say 3 feet per side) could be used closer in. A diode should be connected in series with the feedline and bypassed with a 0.01 uF capacitor in the feedline side so that the meter sees only DC.

A Keyer for VK3RTG

Roly Roper, VK3YFF
15/10 Brook Street, Hawthorn, 3125

The design and circuitry of the keyer for the VK3 two metre beacon is discussed. A novel approach to the design to save on components and an extensive list of references are features of this article.

Late in 1972 the author visited the station of Gil Sones VK3AUI. During the course of the evening the discussion turned to the keying system used at the Victorian 144.7 MHz beacon at Vermont, Melbourne. The system then in use was an optical disc encoded with the call-sign rotated by a 1 RPM motor and operating the keying relay. This system suffered the usual problems associated with mechanical-optical discs. The code timing tended to be sloppy with the dahs varying from two dits to four dits long. The encoding discs had to be replaced at roughly two monthly intervals and had to be photographically produced and re-produced.

As a result of this conversation, the Victorian VHF Group of the WIA requested that the author design and construct a fully electronic keyer to replace the existing system.

After exploring the methods used by others in this field it was decided to try to economise on matrix space as far as possible. Certain basic characteristics of the Morse code were used to achieve this end. This keyer differs from most others in that it uses a variable clock rate to optimize matrix usage. Roughly a 60 per cent saving can be made in matrix space for a given message using a variable clock compared with a fixed clock. Use is made of the fact that every morse character is followed by a space at least one dit long. This information is made part of the circuit external to the matrix, thus reducing by one bit, for each character stored, the number of bits needed to be stored. The second important basic relationship is that a dah is three times as long as a dit. If the stored dahs are generated by an external timer (monostable multivibrator) then only one bit need be stored for each dah rather than three, giving a saving of two bits for each dah stored.

Referring to the block diagram it can be seen that the keyer consists of two inter-locked loops.

The first loop is through the four monostable multivibrators (74121s). These monostables form a two state oscillator in which one of the states is fixed and the other is variable. The fixed part consists of the dit space mono and the variable part is selected by the counters and matrix and may be dit, dah or two dit space.

The path of the first loop is through the dit space mono, along the "recycle" line and through whichever mono is selected by the matrix and back to the dit space mono via a combining gate.

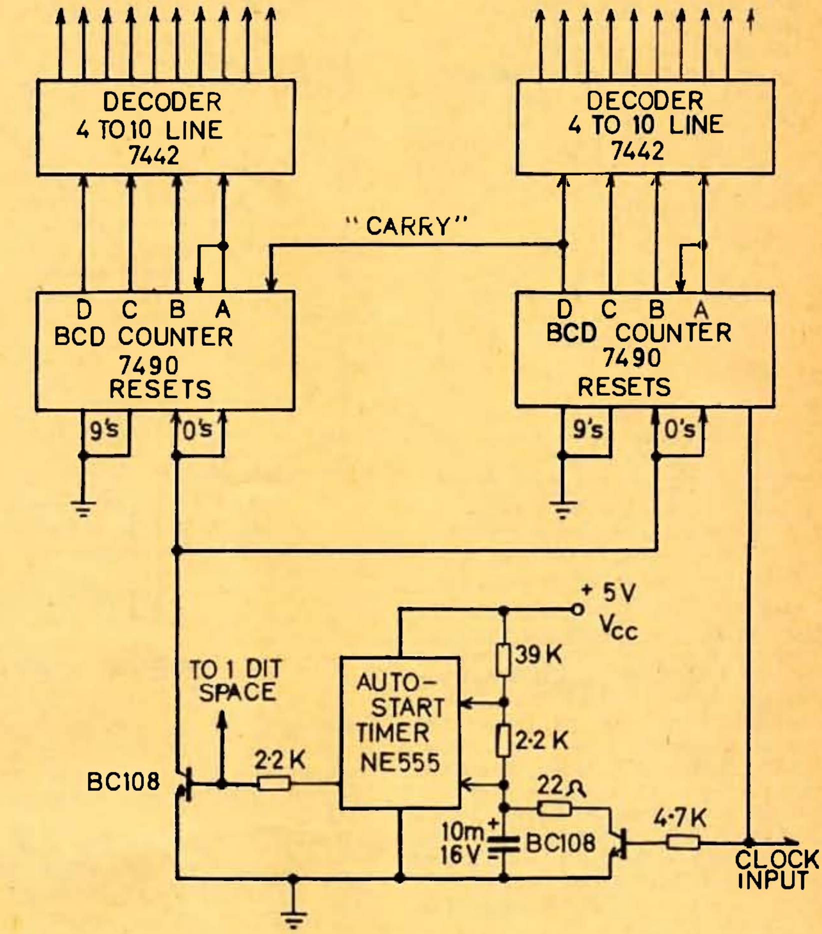

FIGURE 2 COUNTERS, DECODERS AND AUTO-START CIRCUITS

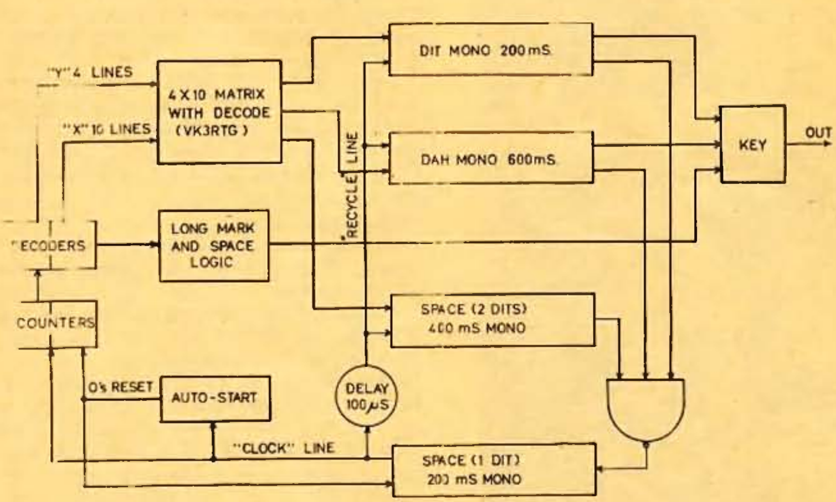

FIGURE 1 BLOCK DIAGRAM

DICK SMITH ELECTRONICS CENTRE

Professional THROUGH-LINE SWR & POWER to 2kW

Only $48.50

SWR Meter

Type	Directional Coupler
Ratios:	1 : 1 to 1 : 10 & ∞
Frequency Range	3 MHz to 200 MHz
Impedance	75 ohms & 52 ohms
Full Scale Minimum Power:	50W at 3.5 MHz 15W at 7 MHz 5W at 14 MHz 2.5W at 21/28 MHz 0.5W at 50/144 MHz

Power Meter

Type	Through Line
Power Ranges.	0-200W, 0-2kW at 3.5 MHz 0-20W, 0-200W, 0-2kW at 7/14/21MHz 0 2W, 0-20W, 0 200W, 0-2kW at 28 MHz 0 2W, 0-20W, 0-200W at 50/144 MHz
Accuracy:	± 15% at SWR 1 on Center
Safety Rating	2kW at SWR 1 1-1 750W at SWR 1.5-1 200W at SWR 3.0-1
Meters:	95uA D.C.
Connectors:	UHF Type (SO-239)
Dimensions:	76m/m high X 110m/m deep X 220m/m wide (3" high X 4-3/8" deep X 8-5/8" wide)
Weight:	1,250gs (2.8 Lbs) net

OSKER BLOC SWR200 Professional SWR Power Meter

At last a truly professional instrument for the keen Amateur. Uses the THROUGH-LINE principle. Covers 3 MHz to 200 MHz (guaranteed) with inbuilt change-over for 52 or 75 ohms U.H.F. Connector. Each unit is INDIVIDUALLY calibrated with its calibration chart attached to the instrument. Four power ranges cover 0-2W, 0-20W, 0-200W and 0-2 kW.

Measures VSWR 1:1 to 1:10 and ∞.

This is the first instrument of its kind under $100. Hurry your order, first shipment of 50 units at only $48.50 (P & P $2.00).

VALUPACKS

RESISTOR PACKS

Compiled from Philips computer listing of usage. Definitely not the usual useless pack with 2 or 3 of every value like 33 ohm, 18k etc. In our's you get 20 x 1k and only 2 x 56 ohm. However there's at least 2 of every value from 22 ohm to 470 k. Over 50 different values and 260 ½W, 5% carbon film resistors. Normal value over $8.00. You get over 260 resistors for only $6.50.

CAPACITOR PACKS

Here is our first computer listed pack of single ended electros. 42 top quality caps based on usage (not the useless values). Check what you get:

10V 2 x 33 uF
16V 4 x 100 uF, 4 x 220 uF, 2 x 470 uF
25V 4 x 2.2, 4 x 4.7, 4 x 25, 2 x 33, 4 x 47, 4 x 100, 4 x 220, 2 x 330, 2 x 470

You see it's not a random pack but based on computer usage listing. CAP1 pack has 42 electros for only $7.90. Normal value is around $12.50.

DIGIPACKS

These have been produced for counter enthusiasts. A detailed instruction sheet covers the operation of the ICs and how they are interconnected. Clocking, reset and latching are described. Both packs can be cascaded.

TTL 'A' pack has a Datalit 707 display with 7490 BCD counter and 7447 decoder driver and forms the basis of a single decade counter for only $6.90.

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ZIPPY BOXES

Here's the boxes for project builders who want a real professional look to their projects. These boxes are moulded in ABS, so they are tough yet easy to drill. The finish is a posh black with ingenious posts in each corner to take self tapping screws and hold a printed circuit board. They are supplied with a flush fitting aluminium panel which fits all ways round (such is the precision of these boxes). Special panels are also available made of bakelite at 50c and matrix board at 60c (large size only).

Size UB1 15 x 9 x 5 cm $2.00
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GRAB THESE

R.F. POWER TRANSISTOR SPECIAL

Huge pre-devaluation purchase of R.F. power transistors from Solid State Scientific enables us to REDUCE prices on these devices. Fully guaranteed, premium quality devices at savings up to $2.00 each.

2N5589 7W was $6.60 NOW $4.90
2N5590 15W was $7.75 NOW $6.90
2N5591 30W was $9.85 NOW $7.50

Set of 3 to give complete chain (see Kits) was $22.50 NOW $19.26.

Get together with your friends (or club) bulk purchase and share the savings.

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Ideal for H.F. and VHF circuits. American made using India Ruby Muslovite mica for the dielectric. 250V DC working and will naturally take RF current.

		1-9	10 up
Type 402	1.5 to 20pF	50c	45c
Type 404	7 to 60pF	70c	65c
Type 406	15 to 115pF	90c	86c

ICOM IC22 SEE E.A. DEC. 74 $199

Icom IC22 144-148 MHz, FM transceiver has power outputs of 1W and 10W. The 22 channels all have separate trimmers. Deviation 5-15 kHz. Features solid state Tx/Rx relay, large built-in speaker, MOSFET front end with 5 helical filters, noise cancelling mic., quick disconnect mobile mount. And if the spec doesn't grab you, the looks will. Soft green back lighting, special transmit light and even a light to tell you of incoming signals if the volume is turned down. Supplied complete with workshop manual and accessories right down to a silicone cloth to keep the set like new.

Fitted with one set of crystals (146.5). Normal price is $245.00, but we have a shipment coming in at $199.00 (P & P Insured freight for $3.50). Crystals are also available at $9.00 a pair as follows

New Channels	42/45	146.1	146.7
	48/60	146.4	147.00
	50	146 5	146.5

UD112 Dynamic Microphone

Specially intended for Amateur use and very compact measuring 8" x 3" x 4½". Response from 60 to 15000 Hz. 50 k impedance. Complete with base featuring push to talk switch with slide lock, chromed gooseneck and 10 ft lead. Unidirectional Cardiod pattern. UD112 $17.50 (P & P $1.00)

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We are now importing these books direct. They are the best available on their subjects. Every amateur should have a few lying around in his shack.

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NOVICE RADIO GUIDE is the perfect book for any beginner. Several chapters of theory help the reader to both prepare for his licence and also to better understand his station as he puts it together.

The reader is shown how to build simple transmitters and a simple receiver. The antenna problems which confront the novice are explained and our beginner is also given some good help in learning the code.

Any beginner or novice is sure to learn more and learn it faster with this excellent new book. He'll thank you for having made it available to him. $4.50.

The World Radio-TV Handbook is the complete directory of radio and TV. 400 pages give complete and exact information on every transmitting station in the world. Constant reference book for Shortwave listeners. DX-ers as well as professional users. Recommended by Radio Australia $5.75 (Latest Edition). (P & P 75c).

Ken KP202 146-148 Hand-held transceiver, has 5 channel capacity with 2W output. Telescopic aerial, squelch, provision for external aerial and PL259 adaptor plug supplied. Operates on penlight cells. Crystals included for 3 channels. A very popular unit at $160.00 (P & P $2)

Crystals included as follows (please specify)

Alternative A	Tx	Rx
1 Channel 50	146.5	146.5
2 Channel 42/45	146.1	146 7
3 Channel 48/60	146.4	147.00

Alternative B	Tx	Rx
1 Channel 8	146.00	146.00
2 Channel 1	146.1	145.6
3 Channel 4	146.4	145.9

Special KCP-2 NiCad battery set and charger with 10 cells to suit the KP202 available at $35.00.

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The BP100 is the greatest development yet. Runs off a rechargeable cell giving up to 120 joints per charge. Press the button for soldering heat in only 5 seconds plus built-in working light.

Ideal for use on cars, caravans, boats etc. Anywhere you can't trail mains leads. Serviceman's dream. Ideal for CMOS and delicate IC circuits since there are no earth leakage currents. Only for electronic soldering (won't mend kettles!). Iron complete with tip at only $19.50 Mains charger BP100AC only $10 or build a 6V or 12V car charger for only 50 cents (P & P $1.00) 90 day guarantee. Spares available.

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(1196 pages). This massive book contains everything you need to know. Over 1¼ million copies sold all over the world. Contributions from 100 leaders-in-their-fields, engineers, professors, government experts and staff of ITT. 45 chapters, 100s of charts, nomographs, diagrams, curves, tables, pictures. Yes there's 1196 pages full of everything. We have a large quantity of the latest edition still at $28.50 post FREE. Postage is normally over $2.00 because it's so heavy!

KITS

REAL SUPERHET TUNER ONLY $8.90

Here's all the basic parts for a 3 transistor superhet tuner. Printed circuit, all coils, ferrite bar antenna, tuning gang. Covers 530 to 1600kHz (thumbwheel dial included). Only 45 mm by 135 mm, ideal for converter IF strip (less than parts alone!). Self-oscillating mixer, 2 stage IF amp with agc into diode detector, NPN transistors and operates off 9V. Why fork out $20, this is only $8.90 (P & P 75c).

No. 46 30W VHF Amp 144 MHz

A complete VHF Amplifier Kit comprising three stages. Definitely not a beginners kit but designed mainly for Amateur use. 30W on 144 MHz with only 300 MW input using a 12.6V supply. Ideal for mobile use. Circuit and instructions supplied. Uses the virtually indestructable 2N5589, 2N5590, 2N5591 VHF Communications Trans $39.50 (all P & P 75c).

This unit is also available in three seperate stages: –

No. 46A	7 watt stage	$12.50
No. 46B	15 watt stage	$14.60
No. 46C	30 watt stage Final Amp.	$18.60

Please Note: Instructions for conversion to 52MHz are available on request. However a separate kit is not available.

MVA100 is a really professional instrument having a large scale 10uA movement. This meter features a 10A ac range as well as dc current. Robust case with carrying handle/bench stand. Mirror scale. If you want the best here it is at $42.00.

Ranges:

DC Voltages:	0.5V, 2.5V, 10V, 50V, 250V, 500V, 1,000V (100 Kohm/V)
AC Voltages.	2.5V, 10V, 50V, 250V, 1,000V (12.5 Kohm/V)
Decibels:	–20–+62dB
Resistance:	R X 1,0–20 Kohms R X 10,0–200 Kohms R X 100,0–2 Megohms R X 10,000, 0–200 Mohms
DC Current:	10uA, 250uA, 2.5mA, 25mA, 250mA, 10A
AC Current:	0–10A

$42.00

NOTE: All meters should be sent by road freight to avoid damage.

Dick Smith Wholesale Pty. Ltd.
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Bankstown: 361 Hume Hwy, Bankstown
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YAESU

FT-224

• 24 Channel FM Transceiver

Join the action on FM - the "Fun Mode". The FT-224 is an advanced, solid state transceiver, that features 10 Watts and 23 channel flexibility plus one priority channel, all in one compact package. The FT-224 includes a built-in tone burst for repeater actuation and six popular channels Installed. Additional plus features includes automatic high VSWR protection of the final output transistor, and reverse power line polarity protection. The FT-224 comes complete with a built-in speaker, mobile mounting bracket, and dynamic microphone.

$259

Sigmasizer-200R

• 200 Channel Synthesized Transceiver

YAESU now offers the FM enthusiast a complete, solid-state, 200 channel 2 Meter FM transceiver. The Sigmasizer-200R features advanced, synthesized circuitry for total repeater and simplex coverage of the 144 to 146 MHz or 146 to 148 MHz FM band. Frequencies are selectable in 10 KHz increments and front panel selectable ±600 KHz transmitter offset oscillators give complete flexibility for repeater operation. A built-in tone burst oscillator is included for activation of tone coded repeater systems. A priority channel may be preset for instant selection of

$448

FT-2 Auto

• 8 Channel 2M "Auto Scan" Transceiver

A new concept in a 2 meter FM transceiver is the FT-2 Auto. The unique "Auto Scan" circuit, with priority channel search, place the FT-2 Auto in a class by itself. The versatile capabilities of this transceiver are achieved through the use of advanced digital logic circuits. The "Auto Scan" circuit monitors your favorite 8 channels at the rate of 20 channels per second with indicator lights for each channel. It automatically locks upon receipt of a signal on any channel.

$389

All sets supplied for 146-148 MHz operation. — All prices incl. S.T., freight extra. Prices and specifications subject to change. — All sets pre-sales checked in our workshop and carry our 90 day warranty. — Comprehensive range of spare parts.

bail

ELECTRONIC SERVICES

60 Shannon St., Box Hill North, Vic., 3129.

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N.S.W.	STEPHEN KUHL, P.O. Box 56, Mascot, 2020	Ph Day 667 1650 A.H. 371 5445
S.A.	FARMERS RADIO PTY. LTD., 257 Angas Street, Adelaide, 5000	Ph 23 1268
W.A.	H. R. PRIDE, 26 Lockhart Street, Como, 6152.	Ph 60 4379

Sets supplied by B.E.S. are equipped with all crystals installed for channels B, 50, 1, 2, 3 and 4.

Specifications

GENERAL

Frequency Range: 144 to 146 MHz or 146 to 148 MHz.
Number of Channels: 23 plus 1 priority channel.
Mode: FM.
Frequency Stability: ± 0.001%.
Antenna Impedance: 52 Ohm unbalanced.
Circuitry: 30 Transistors, 23 Diodes, 4 IC, 5 FET.
Power Source: 13.5 VDC.
Power Requirement: 0.4 A receive, 2.2 A transmit (DC).
Size: 180(W)x70(H)x220(D) m/m.
Weight: 2.5 Kg.

RECEIVER

Sencitivity: 0.3 μV for 20 dB quieting
Selectivity: 15 KHz at 6dB, 25 KHz at 60dB.
Audio Output: 2.5 Watts at 4 Ohm

TRANSMITTER

RF Output Power: 1 or 10 Watts.
Spurious Radiation: -60 dB better than -60 dB.
Deviation: ±5 kHz nominal

FP-2

AC POWER SUPPLY FOR HOME OPERATION

The FP-2 can be used with the FT-224 or Sigmasizer-200R supplying regulated 13.5 V DC. Provision has been made for installation of optional colloid batteries which are automatically charged, and connected when the AC supply stops. The colloid batteries last approximately 10 hours. Contains a 80 x 120 m/m speaker.

Output: 13.5 V DC, 2.2 A maximum.
Power Requirement: 100/110/117/200/220/234 V AC, 50/60 Hz, 35 Watts.
Size: 160(W) x 120(H) x 230(D) m/m.
Weight: 4 Kg.

$79

your favorite channel. Automatic final protection against high VSWR is another total performance feature of this outstanding transceiver.

Specifications

GENERAL

Frequency Range: 144 to 146 MHz or 146 to 148 MHz.
Number of Channels: 200 (10 KHz intervals) Simplex and -600 KHz TX offset for Repeater operation.
Mode: FM.
Frequency Stability: ±0.001%.
Antenna Impedance: 52 Ohm unbalanced.
Power Source: 13.8 V DC (negative ground).
Power Requirement: 0.45A receive, 2.2A transmit.
Size: 220(W)x80(H)x230(D) m/m.
Weight: 3 Kg.

RECEIVER

Sensitivity: 0.3 μV for 20 dB quieting
Selectivity: ±8 KHz at 6 dB, ±16 KHz at 60 dB.
Audio Output: 2 Watts at 4 Ohm

TRANSMITTER

RF Output Power: 1 or 10 Watts.
Spurious Radiation: -60 dB minimum.
Deviation: ±5 KHz nominal.

Individual lock-out buttons enable you to eliminate any undesired channels. To transmit on a channel being received, a momentary depressing of the mike button locks the transmitter to the receiver. A priority circuit may be activated to check your favorite channel every two seconds. A built-in front panel switchable tone burst generator is included for repeater actuation. Only the YAESU FT-2 Auto offers you such a unique two meter transceiver; complete with cables, mounting bracket, crystals for six popular channels and microphone.

Specifications

GENERAL

Frequency Range: 144 to 146 MHz or 146 to 148 MHz.
Number of Channels: 8 (6 supplied, B, 50, 1, 2, 3 & 4).
Mode: FM.
Frequency Stability: ±0.001%.
Antenna Impedance: 52 Ohm unbalanced.
Circuitry: 61 Transistors, 94 Diodes, 7 IC, 3 FET.
Power Source: 100/110/117/200/220/234 VAC 50/60 Hz or 13.5 VDC.
Power Requirement: 30 Watts (AC), 0.5 A receive, 2.1 A transmit (DC).
Size: 210(W)x95(H)x270(D) m/m.
Weight: 4.2 Kg.

RECEIVER

Sensitivity: 0.5 μV for 20 dB quieting.
Selectivity: 7 KHz at 6dB, 16 KHz at 60dB nominal.
Scanning Rate: 20 channels/second.
Scan Delay: 0.3 second.
Priority Channel Check: Every 2 seconds.
Audio Output: 2 Watts at 4 Ohm

TRANSMITTER

RF Output Power: 1 or 10 Watts.
Spurious Radiation: -60dB better than -60dB.
Deviation: ±5 KHz nominal.

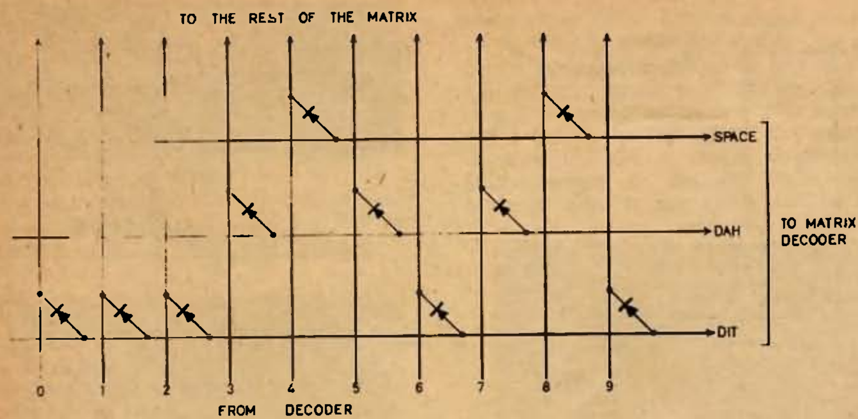


FIGURE 3 MATRIX WIRING FOR VK3RTG

The second loop controls the addressing of the matrix and passes through the dit space mono, the counters and decoders, the matrix, the selected mono and back to the dit space mono.

AUTO START

The auto start is required to provide clock pulses in the event of a power failure as it is most likely that the counters (7490s) will set up into an "illegal" state when power is restored. The decoders are designed not to give any output unless the input is a binary number between zero (0000) and nine (1001) inclusive. Therefore, no number is presented to the matrix which consequently has no output. In this case the keyer would never start, hence the need for the auto-start. The auto-start consists of a timer (NE555) which is set to a time of about one second. Normally this timer is unable to time out as it is reset by each clock pulse into the counters which should occur far more often than one per second. The timer times out and a reset pulse is fed to the counters which resets them to zero (0000) which is a decoded state which allows the keyer to start. The auto-start timer is arranged so that in the absence of clock pulses it will continue to produce reset pulses (i.e. until the keyer starts).

COUNTERS AND DECODERS

The counters are binary counters internally "moded" to only count to nine (1001) then reset to zero (0000). The decoders are arranged to decode the binary coded decimal (BCD) into one-of-ten lines to drive the matrix and matrix decoding (7442s).

THE MATRIX

The matrix consists of ten lines crossing rows which are in groups of three. The lines and rows are interconnected with germanium diodes (for lower forward voltage drop) as required for the message.

Fig. 3 shows the first row which has been encoded with the first part of the callsign VK3RTG. In the circuit shown, "VK" and the first dit of the "3" are generated. The matrix is on a plug-in card for easy code changing.

MATRIX DECODING

The four groups of three are selected (7402s) then routed to the keying monostables (7453s and SP317A) as shown in Fig. 4.

The expander input on the SPACE gate is used to run the counters around to the start so that the code may be sent again.

MONOSTABLE MULTIVIBRATORS

When a monostable is selected by taking its A input low, its output Q goes high for its set time. In the case of the dah mono, its Q Output goes high for 600 ms, then it reverts to its resting state. The recycle line is used to retrigger a monostable via its B input if it is required for consecutive characters; the 100 micro second delay prevents false retriggering if a different character is selected.

A gate (7410) is used to provide three long "key down" periods so that the keyer may operate as a beacon.

POWER SUPPLY

The power supply required by standard Transistor Transistor Logic (TTL) is 5 volts + or —5 per cent and this is provided by a bridge rectifier and an integrated regulator (7805).

As the keyer was intended to operate in close proximity to a high powered 144 MHz transmitter, extensive precautions were taken to stop RF getting into the counters or gates. Mains borne RF (and other) interference is filtered by a combination of lossy ferrite beads over the incoming mains cable and a capacitive filter. The logic and power supply were built in separate compartments, and all leads from the power supply compartment into the logic compartment pass through feed through capacitors. The entire unit is housed in a screened case.

Due to the need for a high order of reliability, Light Emitting Diodes were used

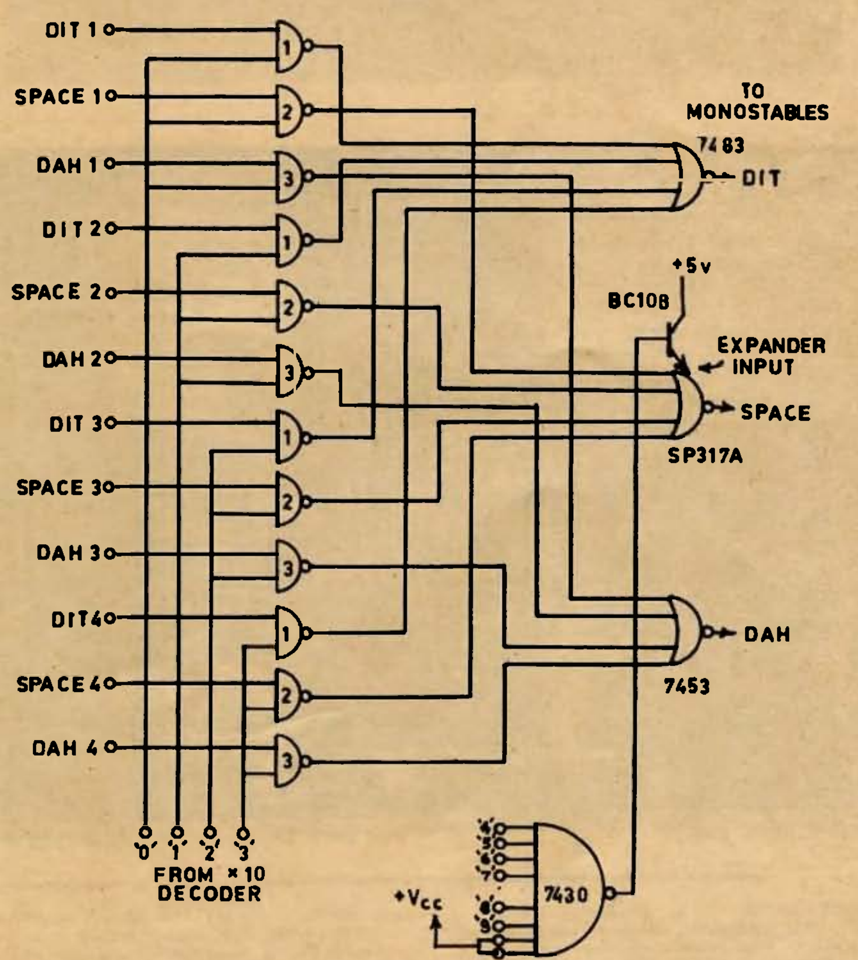


FIG. 4. MATRIX DECODER CIRCUIT

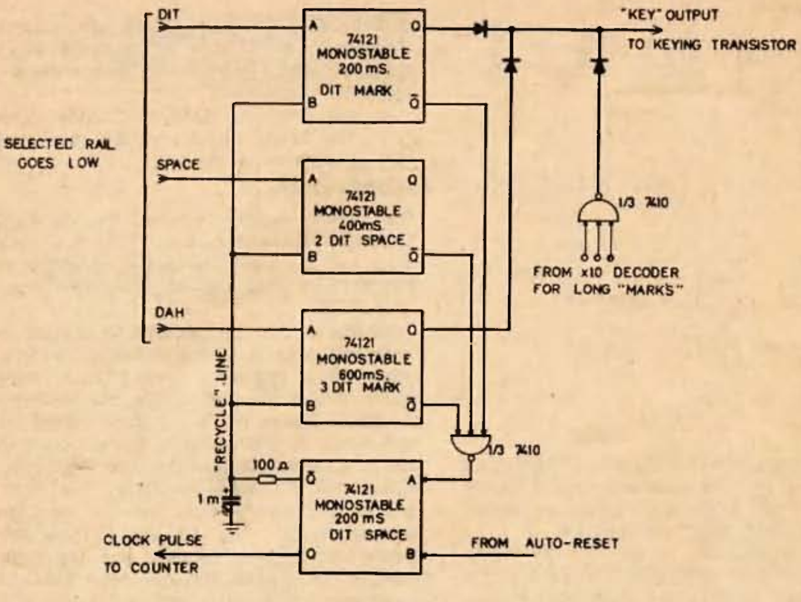


FIGURE 5 MONOSTABLE MV CIRCUIT

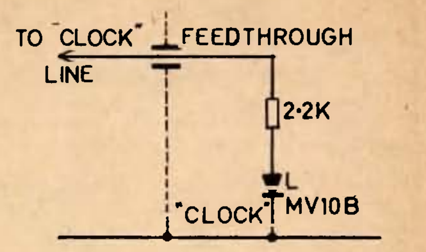


FIGURE 7 CLOCK INDICATOR

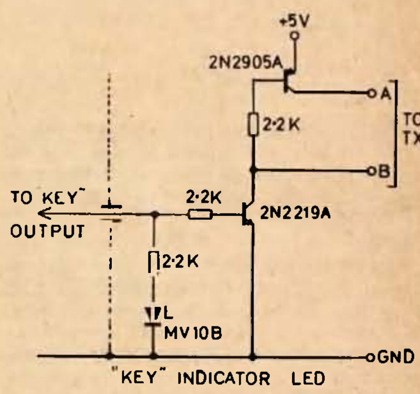
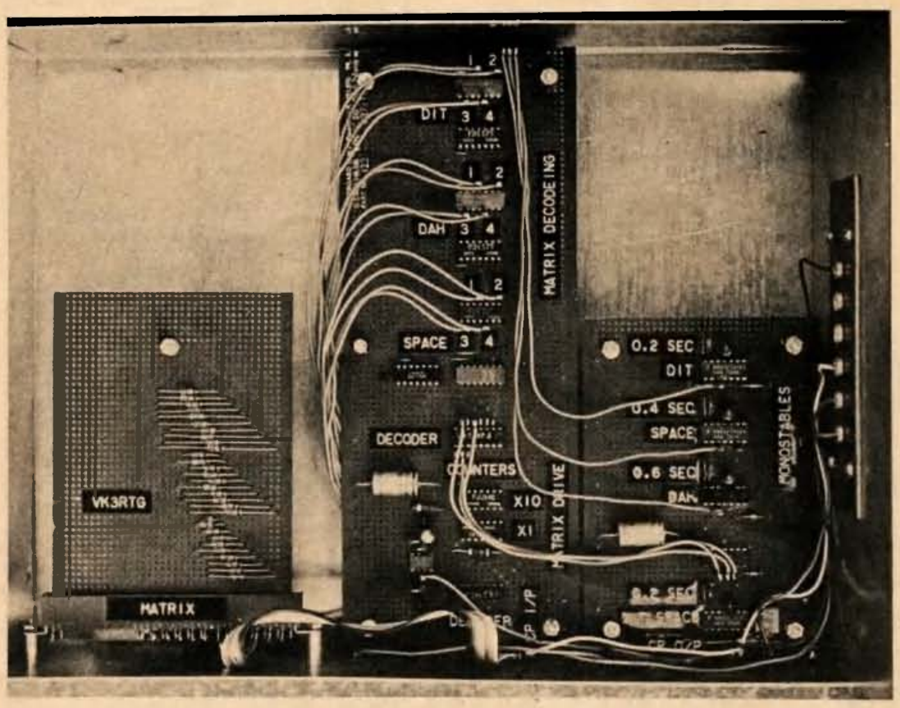


FIGURE 8 KEYING CIRCUIT



as indicator lights as they have a MTBF of about 100 years.

OUTPUT

Fully solid state output was employed with a current sink being first installed (B) and later a current source (A). Refer to Fig. 8.

PERFORMANCE

The unit first ran in early September 1973. A faulty two dit space mono was located and replaced and the unit "soak tested" for some three weeks. It was then placed in service at VK3RTG and has performed faultlessly since.

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Interior view of the keyer with the various stages clearly labelled.

Try This

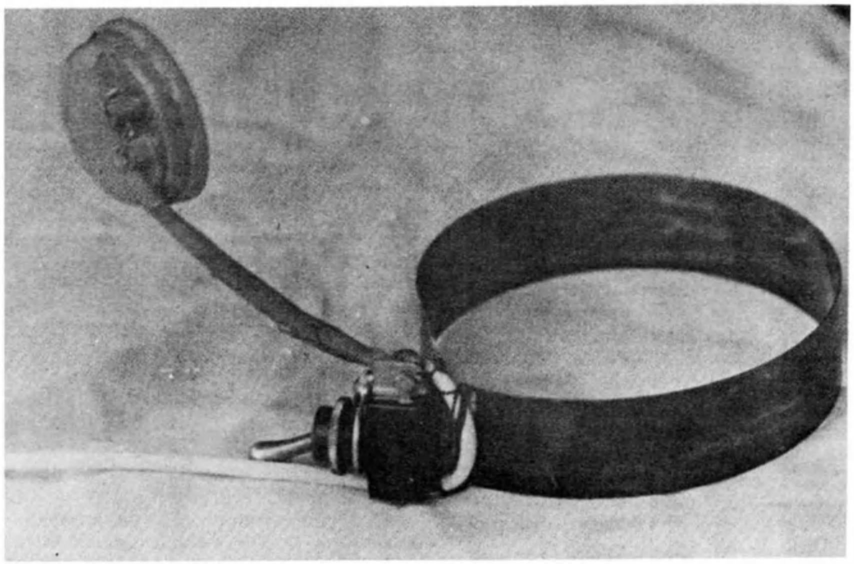
with Ron Cook VK3AFW
and Bill Rice VK3ABP

"LOOK, MA, NO HANDS"

A boom microphone for mobile or VOX operation can be made using a 290 mm piece of 0.42 x 24 mm clock spring as the basis of a collar clip. A piece of light welding rod is silver soldered to one end of the spring. This becomes one lead to the rocking armature microphone as a loop in the end attaches to a mike terminal and supports it. The other conductor is taped to the rod. A toggle send/receive switch mounts on the clip via a silver soldered loop. It can easily be reached by feel alone making it useful for night time operation. The unit takes half a second to put on or take off, yet doesn't strangle or get in the way.

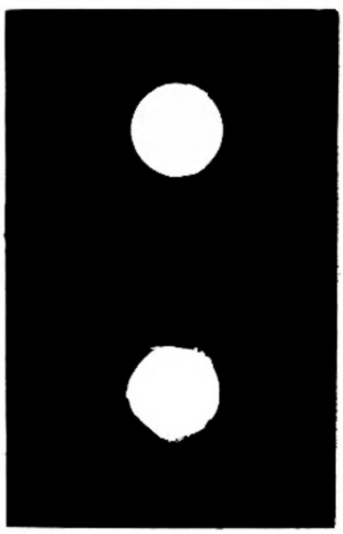
The photos (via VK3GK) showing the unit both in use and lying on the seat of the car illustrate the method of construction.

VK3AKL



AVOIDING "PENTAGONAL" HOLES

Not all hams possess a set of classic punches and therefore have to employ other methods to make large holes in panels, chassis etc., and at times there is no room to fit a chassis punch anyway, particularly in a piece of already constructed equipment.



Very often, holes from say ⅜" to ½" are required, and we are tempted to use plain ordinary twist drills, with the inevitable result — "ugly pentagonal holes" — and this is particularly true in thin sheet metals.

Why they insist on going that way I do not know, but they most certainly do.

Many ideas have been put forward to overcome the problem, such as sharpening the drill somewhat flatter than the normal 110 degrees, or sharpening the drill to provide cutting blades at the edges etc. The result being that the drill is no longer of use for normal work, and drills of these sizes are not cheap.

There is a very simple and tremendously effective way out of the problem, and it requires no special sharpening or spoiling of the drill.

All that is required is a small piece of rag, calico, shirt, etc.

Method: First mark the position of the required hole, then drill a small pilot hole — say 3/32" or 1/8". Take a small piece of cloth about 3½" to 4" square and fold over once each way, giving four thicknesses of material.

If you have a drill press, first make sure the point of the large drill centres on the pilot hole when the handle is pulled down.

Keep the job steady and place the folded rag over the pilot hole; pull the drill handle down and drill as usual. You will be pleasantly surprised to see a nice clean cutting come spiralling up through the cloth.

A sharp penknife, or chisel, will easily remove the very thin cutting on the lower side of the hole — a clean round hole.

I have drilled ½" holes in 20 S.W.G. aluminium and 24 S.W.G. hard rolled copper sheet with equal success, and with no soul-shattering noise and vibration. Larger holes have not been tried for the very good reason that ½" is the largest drill which I possess.

I do not have the slightest idea why the idea works as it does, and the gent who first put me on to it had no idea either, nor did the very old craftsman who told him.

If you do not have a drill press, you can still use a hand or breast drill, or electric drill, provided you make sure the drill is centred over the pilot hole when you have applied the folded cloth.

I have made ½" holes in existing equipment with no trouble of any kind.

Alex Slight, VK2ZA

Continued from page 18

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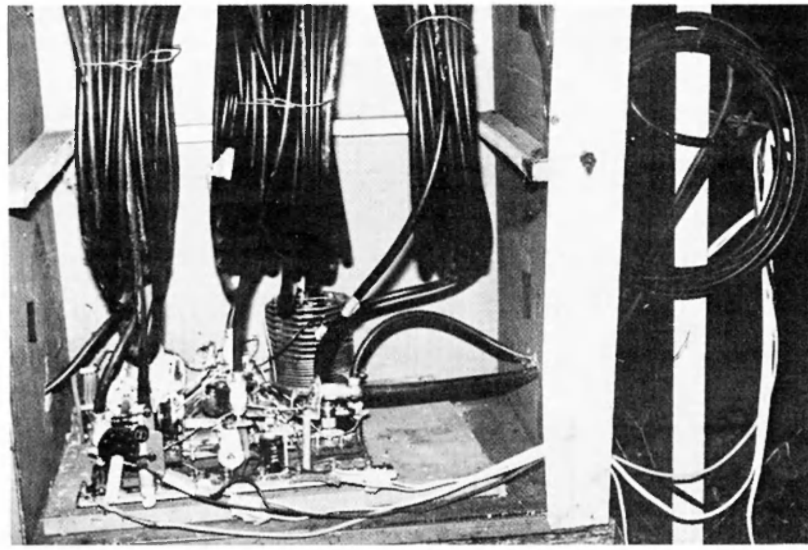
Phased Vertical Antennae

Bruce Mann, VK3BM
P.O. Box 724, Swan Hill, Vic. 3585

This article describes the features of the 3 verticals in the background of the cover picture of AR in October 1973.



Each of these verticals is 75 feet high and they are in line on U.S.A., one quarter wave apart on 3.675 MHz (66 feet 9 inches). The two outer verticals are therefore one quarter wave apart on 1837 kHz. The verticals are insulated at the base by hefty disposals ceramic insulators, and there are 30 radials of old copper wire buried from the base of each vertical to the boundary of the QTH 150 feet x 100 feet block. The ideal of course, would be to have these radials much longer.

At the base of each antenna there is a weather-proof box containing a .00035 variable capacitor, a 4 inch diameter x 15 turn tapped inductor, and two 2 pole DC relays to switch either the capacitor or the inductor in series with the vertical. Seeing that the 75 foot height of each pole is a compromise between a quarter wave on 80 metres and a quarter wave on 160 metres, the series variable capacitor will tune the vertical to an electrical quarter wave on 80 metres, and the coil will load the vertical to an electrical quarter wave on 160 metres. It was found that the height of 75 feet when series tuned to a ¼ wavelength on 80 metres gave an impedance of approximately 52 ohms, thus a good match to the co-ax. It was a simple matter using an antenna noise bridge to place a tap on the loading coil to give a 52 ohm match on 160 metres.

Phasing: If antennas A, B and C are simultaneously fed with an equal amount of power through exactly equal feedlines (say ½ wave length for convenient tune-up) from the same transmitter, they will each put out an equal wave in all directions. But the wave from B travelling to the left will at the mid-point meet "head-on" an exactly equal wave from A travelling to the right, and so they cancel out.

Similarly, there will be cancellation between B and C, and a left-travelling wave from A will balance out a right-travelling wave from C. The resultant effect is that the power from the transmitter is concentrated into a sharp figure 8 pattern at right angles to the line of A, B, C.

If, in addition to the above hookup, an electrical **quarter** wave of co-ax is added to the feedine that goes to antenna B, and an electrical **half** wave to antenna C feedline, then we have the condition where the 3675 kHz wave has arrived through air to antenna B at precisely the same instant as the same wave from the transmitter has negotiated the extra quarter wave of co-ax, and arrived to add together and boost the wave from it. This greatly augmented wave then arrives through air at C simultaneously with the signal from the transmitter (delayed by traversing the extra half wave of co-ax) to cause a further boost, and so a strong signal in the direction A-C is obtained. Waves in the opposite direction clash with oncoming waves and so cancel out.

To reverse direction, all one has to do is to switch the half wave delay line from C to A.

The first attempt gave little gain and front to back ratio, but a visit from VK5PB was needed to discover the error. When the co-ax was properly fitted with connectors and everything tuned exactly with the noise bridge, it worked. Surprisingly, having got it so exactly tuned, we could QSY quite a deal without too much loss of performance.

A number of 12V DC heavy duty relays were made up from military disposals types, and switching arranged so that 4 directions and an omni-directional pattern were obtained on 80 and 160 metres as per chart.

At this stage in the testing, VK3QI/M circled the antenna at about 1 mile distance, and again at about 12 miles radius. The pattern obtained was very satisfactory, indicating 18-20 dB front-to-back, and gain 6-9 dB over the single vertical.

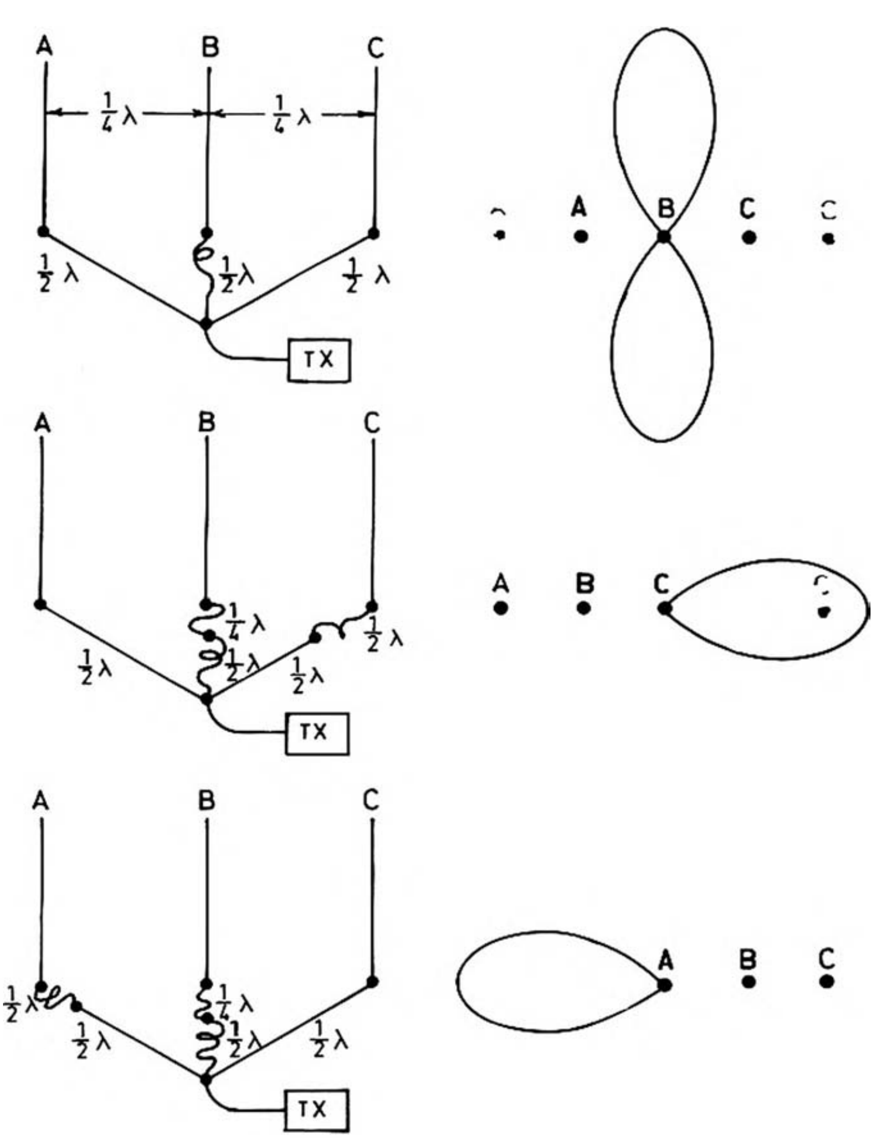
A few weeks later, performance and front-to-back ratio had fallen off seriously. A thorough overhaul of relays and a retune, and performance was again o.k.

Then weeks later, another tune up was indicated — no F.B. and no gain over the dipole! This repeated frustration led to a spate of reading and discussions with some of the famous antenna experts overseas and in VK. All this and a further temporarily effective tune up confirmed the growing belief that the trouble was in the "earth" — In fact literally the earth. There is not enough of it, and it is not the right quality. Although there are at least thirty copper radials around each vertical out to the fence boundary where they join a

RELAY SWITCHING

80 METRES	**ANTENNA A**	**ANTENNA B**	**ANTENNA C**
Omni Directional	Floats	Fed thru ½ wave length	Floats
North East	Fed thru ½ wave length	Fed thru ½ wave length plus ¼ wave length	Fed thru ½ wave length plus ½ wave length
South West	Fed thru ½ wave length plus ½ wave length	Fed thru ½ wave length plus ¼ wave length	Fed thru ½ wave length
NW/SE	½ wave length	½ wave length	½ wave length
160 METRES	**ANTENNA A**	**ANTENNA B**	**ANTENNA C**
Omni Directional	Floats	Direct	Floats
North East	Fed direct	Floats	Fed thru ¼ wave length 160 — (½ wave length 80)
S-W	¼ wave length 160 (½ wave length 80)	Floats	Direct
NW-SE	Direct	Floats	Direct

Note: Half wave co-ax delay lines on 80 metres used for ¼ wave length on 160. For convenience in tune-up, ½ wave of co-ax was used to each antenna base tuner — but exactly equal lines of any length would be o k.



cable right around the perimeter of the "antenna farm". The problem is that the antenna farm is only 100 feet by 150 feet, and some of the radials therefore are only 15-18 foot long, and furthermore these shortest radials are in the direction where length is most important.

Some articles in U.S.A. journals and some hams contacted have commented on directional effects according to the disposition of the radials. Almost invariably where really good results have been regularly obtained with phased verticals, the soil has been flat and wet, and a great mat of wires has extended out to or beyond ¼ wave.

Previous very successful use of a vertical on the unlimited space on a farm was obtained using ¼ wave radials 10 feet above ground. Here in Swan Hill the radials are of necessity buried, they are too short and the soil is exceptionally sandy and non-conductive, the average rainfall being less than 14 inches.

It was concluded that the problem is due to the short radials in sandy soil, in which the conductivity and therefore the tuning varies greatly with each rain or dry spell of weather.

Now for some comments on the performance when it did work. Strength 8 SSB reports were obtained from Europe, and 9 plus from U.S.A. and occasional reports from somewhat closer stations who were in the path of the beam of 9 plus 30, falling to strength 6 when the phasing was reversed.

It is believed that a similar set-up, with adequate radials would be very effective indeed, and in the four beam directions. It was surprising that the system is so sharply directive, and I believe that in most cases, the 3 verticals in triangular formation, giving 6 directions, would serve better.

At a DX location better reports are usually obtained on the verticals or even on the single central vertical than on a dipole at about the same height. The horizontal wire invariably gives quieter reception in this noise plagued location. ●

Re-Vamping a VTVM

MAX RILEY, VK2ARZ
6 Baringa Rd., Mortdale Heights, NSW, 2223

A Japanese VTVM failed some years ago, and after several attempts at getting the open circuit meter repaired or replaced, it was finally concluded that the task was hopeless. Ten years later the need arose for a VTVM and another attempt, successful this time, was made to get the unit back into operation.

Further examination revealed that the small power transformer had developed short circuited turns, and the small semi-conductor rectifier which provided HT for the valves was open circuit.

A locally made transformer was installed. This was a universal type which enabled a secondary voltage of 100V RMS to be obtained.

An EM401 diode was substituted for the defective diode.

A "University" movement was bought to replace the original one.

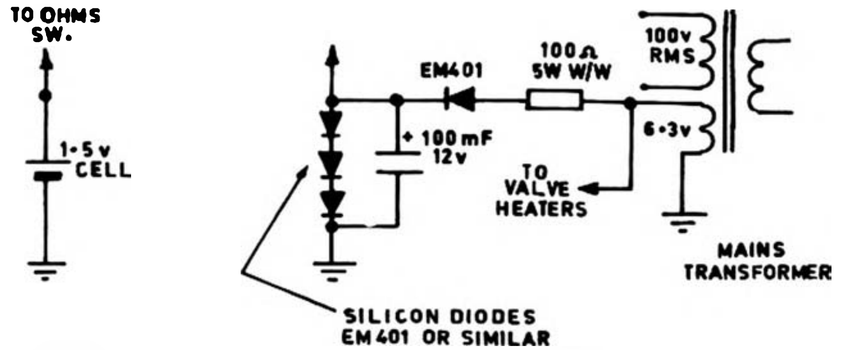
All components fitted into place with a little re-arrangement.

The VTVM then operated satisfactorily, but the need to replace the small dry cell used in resistance measurement seemed an obvious shortcoming in the design.

After giving the matter some further thought the following circuit was installed.

It can be seen that the three silicon diodes are used as voltage regulating devices. It was found that some diodes gave slightly different forward voltage drop figures, and eventually, three were located that produced 1.8V in series (see Fig 2).

This figure was slightly higher than the 1.65V which is found with a new cell, but it was found that the normal range of adjustment would accommodate the difference (2 diodes would not provide enough voltage to enable this to be done).



1. BEFORE 2. AFTER

The VTVM is now working beautifully and, given reasonable luck, it should not be necessary to open the unit up for a long time.

Since carrying out the repair, it was discovered that other people have had similar problems with small test equipment manufactured in Japan.

It is suspected that the transformers in these units are really designed for use at 60 hertz, and as a result, they tend to over-heat when used on 50 hertz mains.

In some cases, devices of this nature have been observed which were rated at 220V.

A combination of over-voltage operation and insufficient core material would predestinate such equipment to a short life in this country.

Improvements to the Loudspeaker Filter

Bruce Mann, VK3BM
P.O. Box 724, Swan Hill, 3585
Phil Williams, VK5NN
40 Hyland Tce., Rosslyn Park, 5072

In September 1973 an article by VK3BM was published in AR entitled "Improved Loudspeaker Reproduction of SSB". **It described the use of a sealed speaker enclosure and high-pass filter to improve intelligibility under noisy band conditions by attenuation of the lower audio frequencies. VK5NN suggested (in a letter to VK3BM) that the filter could be made much more effective by modifications which are the subject of this article.**

The original filter was designed for use with an 8 ohm speaker. At such a low impedance level the capacitors are relatively large, electrolytics being unavoidable, and the inductors tend to have a low effective Q. Consequently the filter efficiency is low, and the attenuation increases only slowly as frequency drops below cut-off. If a higher impedance is used, requiring larger inductors and smaller capacitors, the filter efficiency can be improved. Also, with more practical sizes of components, it becomes simpler to add another stage to the filter and obtain a much sharper cut-off. Incidentally, there was an error in the original article in that the centre capacitor should have been only 30 microfarads rather than 60, but this does not produce any great change in the performance.

600 OHM IMPEDANCE

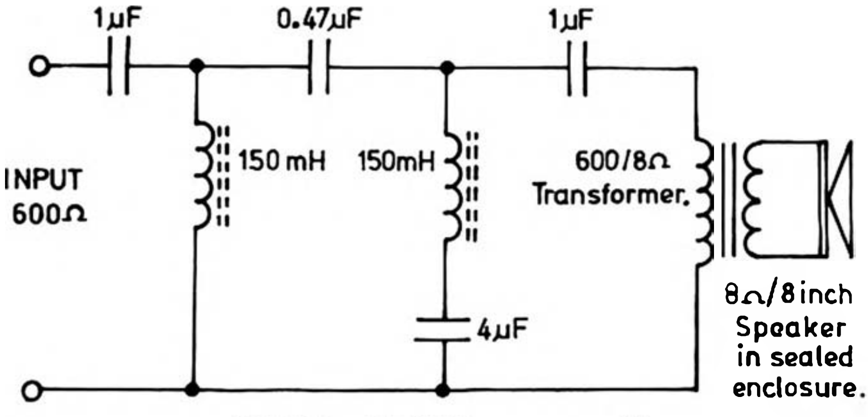
It is no coincidence that 600 ohms is the standard impedance used for most audio work involving fllters, for example in the telephone system, as this provides a good practical compromise between the effects of series loss resistance and stray shunt leakage and capacitance, as well as permitting more practical values for filter components. Most audio equipment, including numerous models of amateur SSB transceivers, therefore include 600 ohm output terminals as well as lower impedances for direct speaker connection. Thus, by making use of this facility in conjunction with a separate 600 ohm to voice-coil transformer, the speaker filter may be designed for input and output impedances of 600 ohms. If the receiver or transceiver provides only voice-coil output (4, 8, or 15 ohms) then two transformers are necessary, but even then the benefit will be worth the slight additional cost.

The circuit of the improved filter is shown in Fig. 1. It has two sections, the first being of constant-k form, which gives steadily falling response below cut-off, but the attenuation becomes "infinite" only at zero-frequency. The second is known as m-derived, involving a series resonant shunt leg which gives a frequency of very high attenuation not far below cut-off. Its response at still lower frequencies then tends to rise, but this is offset by the still-falling response of the first section.

FILTER PERFORMANCE

The filter characteristics were calculated (by the Technical Editor) using the component values specified in Fig. 1, and the standard filter design equations available in many handbooks. The impedance of both sections was found to be 550 ohms (near enough to the nominal 600). The cut-off frequency of the constant-k section is 290 Hz, and of the m-derived section 360 Hz. The frequency of high attenuation by the latter is 210 Hz. The combined effect of both sections should be to give negligible attenuation of frequencies above 360 Hz, but with rapidly increasing attenuation as the frequency drops towards 210 Hz. For all frequencies below about 220 Hz the attenuation will probably be more than 50 dB. This contrasts greatly with the behaviour of the constant-k section alone, which does not give 50 dB attenuation until the frequency has dropped to about 20 Hz.

As explained in the earlier article, most of the audio energy which makes 'static" and electrical interference so distracting is contained in the lower-frequency part of the spectrum. Conversely, most of the components of speech which are necessary for intelligibility fall in the range be-



FILTER CIRCUIT.

tween about 1 and 3 kHz. Even with its relatively modest amount of low frequency attenuation, the earlier filter was capable of greatly improving intelligibility, so it may be expected that the improved filter will do even better, and reduce much more the hearing fatigue produced by almost continuous crashes of static.

COMPONENTS

It is suggested that the filter capacitors should be the polyester type, of 100 or 160 volt rating. The 4 microfarad value may need to be made up of two 2.0 or 2.2 microfarad units in parallel, or perhaps an old-style block paper capacitor may be available from the junk-box. None of the values is especially critical. For the inductors the use of ferrite pot-cores is recommended (type FX2242 or similar). The manufacturer's data on such cores usually gives a figure for the number of turns to give 1 millihenry inductance. Since Inductance is proportional to the square of the number of turns, about 12½ times the 1 mH turn figure will give the desired 150 mH. More information may be found if desired in the article "Building High-Q Inductors with Ferrites" by VK3ZRQ in the February 1973 issue of AR.

Finally, it is suggested that a switch be Included to cut the filter In or out, or change to a normal speaker system to make possible a rapid comparison between the two. It is guaranteed that on a noisy band the result will be found most impressive, particularly if you are an older amateur and tend to have a restricted high-frequency hearing response. ●

To 1200 GMT Saturday, 14th March.
Mode CW only 3.5 to 28 MC.

Eligible entrants are radio amateurs licensed to operate in British Commonwealth call areas. VK1-8; Lord Howe VK2; Willis VK4; Christmas VK9; Cocos VK9; Norfolk VK9; Heard VK0; Macquarie VK0; and Australian Antarctica are all separate contest areas. P29 is now a single area.

Two Trophies have been presented for competition between VK stations — a silver medallion for the highest VK scorer in the official RSGB results, and a bronze medallion for a middle placed VK scorer based on total VK entries divided by two i.e. for 26 entries, to 13th placing; for 33 entries, to 17th placing. Overall winner in 1975 was VE3BMV and only 60 points separated the first four, VE, G, VE, G. VK3MR, placed 16th overall, and VK7RY, 81st, won the 1975 medallions.

Scoring: 5 points for contest exchange, plus 20 bonus points for 1st, 2nd and 3rd contact with each call area other than one's own (there are 111 in all, with G, GW, GC etc. counting as a single area) — exotic prefixes are the rule rather than the exception.

Logs: Separate logs are required for each band showing columns — 1. Date and time GMT; 2. Station worked; 3. Nr sent; 4. Nr received; 5. Band; 6. Leave blank; 7. Contact points claimed; 8. Bonus points.

Each band log should be separately totalled and should include at the end, a check list of all as worked on the band. Separate band totals should be added together and the total claimed score entered on a cover sheet giving particulars of station, QTH, equipment, power, and a declaration that the rules and spirit of the contest have been observed.

Entries may be single or multi-band. Single band entries should claim contacts on one band only, but submit details of contacts on other bands for checking purposes only. Entries should be addressed to — D. J. Andrews G3MXJ, 18 Downsview Crescent, Uckfield, Sussex, England. Closing date 17th May, 1976 (by airmail, please).

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

The Editor,
Dear Sir,

QRP IS ALIVE AND WELL!

The purpose of this letter is to kindle some more interest in the low power field, as well as eliciting information from other QRP operators as to what they are up to and with what results.

Recent QRP/QRP QSO's from this QTH, include ..rrie ZL2PV, Jim VK2BBO using a G5RV and -7, Snow VK3MR with his 1 watt rig, Drew VK3XU winding down to 500 milliwatts, John VK2LM with his 15 watts and Vee, and Yoshi JH1RUF sporting 10 watts to a 2 element beam. These QSO's were from 40 and 20 metres and all CW.

The author has been experimenting with 40/20 metre directional antennas in order to come up with an effective QRP station, and the list includes 4 element fixed beam, 40/20 X-beam, 40/20m quad and X-Q quad. The CQ WW DX CW contest was worked with the 3 watts into the 4 el beam, and resulted in 190 QSO's, 20 zones, 23 countries and a lot of fun, all on 20 and all CW.

Quickest QSLers as I see them are, W0IPU, VK5XD, VK5BS, KV4AA, VK4NL and VE3EWY.

Best 20m DX worked so far — A9XU, YV5AE and ZS6ME to complete the QRP WAC, and HZ1AB.

The old 5763 rig is due for mothballs shortly, as the belated Christmas present, an HW7, is due any day.

Hope to hear from other "Fleapower Men" either by Mail, QSO or on the CWN Sunday Mornings. Till then, best DX and vy 73s.

David S. Down VK5HP/QRP.

Dear Sir,

The article by Alan Shawsmith, "The Golden Years of AR in VK" (AR Dec., 1975) might have been interesting and more convincing had he taken the trouble to check his facts.

It was not to Charles Maclurcan A2CM, that the honour of making either the first VK-W or the first VK-Europe contact went. That honour belongs to Max Howden, then A3BQ, now VK3BQ and still active on the amateur bands. On Monday, 3rd November, 1924, just after 1900 EAST, Max worked U6AHP (not 6EKY) — see, for example, "Radio in Australia and New Zealand" Vol. 2, No. 45, 10th December, 1924 — and it was Max who wrote in this magazine, "I did my best to answer him, and he certainly managed to read me, although local 'hams' say they never heard such fearful sending. I admit my hand acquired a double phase vibration in place of the usual single, but it couldn't have been too bad". In the 26th November issue of the above magazine, Maclurcan wrote: "Congratulations to 3BQ for being the first Aussie to work U.S.A. 2CM had hopes, but it was not to be".

On Friday, 14th November, at 0500 EAST Max worked G2OD to obtain the double — first to America and first to Europe. The wavelength used for these contacts was about 85 metres.

Maclurcan, who certainly contributed greatly to amateur radio through the 20's was the first Australian to contact England on 20 metres. This was on Saturday, 2nd May, 1925, and G2OD was the other station (see, for example, Radio in Australia and New Zealand, Vol. 3, No. 59, 24th June, 1925).

What Shakespeare wrote was "All the world's a stage, and all the men and women merely players" (As You Like It, Act 2, Scene 7). Pedantic perhaps, but weren't we taught that if inverted commas are used, i.e. the writer is quoting, then the original words must be used and not a paraphrase of them. A careful reading of the story of Nebuchadnezzar as given in Kings, Chronicles, Daniel and Jeremiah fails to reveal anything about "scales". Was Alan thinking about that famous king's son, Belshazzar, at whose feast the mysterious hand wrote on the wall "Mene Mene Tekel Upharsin" (Numbered, numbered, weighted and divided) Tekel being interpreted in more detail as "thou art weighed in the balances and art found wanting". Let us hope that this will not be the fate of amateur radio!

By all means let us remember the past, and the exploits of the men who laid the foundations of amateur radio, but for goodness sake let us have the facts, which may be found in the documents of the time, and not woolly memories which only serve to create confusion.

Yours sincerely,
F. K. McTaggart VK3NW/2BNW

Dear Sir,

I am interested in using a Parametric Amplifier on 146 MHz and due to my difficulties experienced in obtaining the information required, I would be grateful if one of your readers could assist me.

Yours faithfully,
Gary Stern VK2ZBB,
C/o P.O. Box, 330,
Hurstville, N.S.W. 2226.

Trade Review

NEW TRANSFORMER

Ferguson Transformers P/L. have provided a sample of their new PL50/60VA transformer, a recent addition to their 'low profile' range. This small (10 cm x 6 cm x 5 cm) transformer, which looks somewhat like a 'fluro' ballast choke, has two windings of 25 volts, topped at 20 volts and rated at 1.2 amps each.

With the two windings in series the off-load voltage of 57V AC only fell to 53V AC at full load.

Connections are made via round 'quick connects' and six 30 cm coloured leads are provided with one end tinned and a connector on the other. A 10 cm lead is also provided with a connector on both ends for linking the windings.

On test the transformer was quiet and met the ratings given. It is claimed that this transformer meets AS C126. — VK3YFF.

IPSWICH RC 2M PREAMPLIFIER

"If I can get it going, anybody can". Well, I did, but reference to the relevant article in AR was a must. The instructions that came with the kit were poorly printed and vague, and the tinned copper wire provided to wind the coils was only enough for one coil.

Once mounted inside my deaf Pye 789, however, the story was quite different. Channel 40, dead a few moments before, was filled with stations and I found that my rig could now receive much better than it could transmit; reversal of the previous situation.

An A/B test on a recent trip to Ballarat showed that I could hear both 3RML and 3RWZ with the preamp, but not without.

A preamp will not necessarily improve a good rig, but if yours is a bit deaf, then I am sure that you would be pleased with the results of fitting one of these IRC units. — VK3YFF.

1976 SUBSCRIPTIONS REMINDER

No final notices will be sent out this year from the Executive Office.

All subscription notices already mailed carry the wording —

"FIRST AND FINAL NOTICE"

Please take note and arrange to pay your 1976 subscription at once if you have not already done so.

AR's will soon cease for unfinancials and missing copies cannot be supplied if your supply ceased because of being unfinancial.

PLEASE TAKE NOTICE.

The voltages quoted above are full load rms voltages. The no load output voltages could be up to 25 per cent higher, however the three samples tested exhibited better load-no load characteristics than his.

The DC resistance of the secondaries were found to be unbalanced by about 10 per cent in each of the samples. However, due to the high resistance of the primary (1.6 k ohms) and careful matching of turns ratios, there was negligible imbalance of secondary load currents in the parallel connection.

A pleasantly surprising feature of these transformers is the low temperature rise of the assembly. Even when seen on the bench at 20 per cent beyond maximum recommended load the transformers did not get very hot.

These transformers meet the requirements of ASC 126 for construction and insulation and the manufacturer claims they are the smallest locally manufactured stock type available.

The core size is approximately 4 x 3.2 x 1.4 mm. This trio of transformers deserves to be popular.

VK3AFW

PROJECT AUSTRALIS

OSCAR 6 ORBITS FOR FEBRUARY

The satellite is on Sunday morning, Monday night, Thursday night and Saturday night local times.

The time period is 114.99455 minutes. Longitude increment — 28.7487 degrees/orbit. Times are in GMT and longitudes are in degrees west of Greenwich.

		Orbit	Time Z	deg. Long W
Sat.	1.2.75	10498	0042.5	59.1
Sun.	2.2.75	10511	0137.4	72.8
Mon.	3.2.75	10523	0037.4	57.8
Thur.	6.2.75	10561	0127.2	70.2
Sat.	8.2.75	10586	0122.0	69.0
Sun.	9.2.75	10598	0021.9	53.9
Mon.	10.2.75	10611	0116.9	67.7
Thur.	13.2.75	10648	0011.7	51.4
Sat.	15.2.75	10673	0006.5	50.1
Sun.	16.2.75	10686	0057.9	59.1
Mon.	17.2.75	10699	0152.9	72.8
Thur.	20.2.75	10736	0047.69	56.5
Sat.	22.2.75	10761	42.55	55.2
Sun.	23.2.75	10774	0137.48	68.9
Mon.	24.2.75	10786	0037.41	53.9
Thur.	27.2.75	10824	0127.2	66.4

OSCAR 7 ORBITS FOR FEBRUARY

Time period is 114.945 minutes. Longitude increment is 28.736 degrees/orbit.

Orbit	Date	Time Z	Long W deg.	Mode
969	Feb. 1	0042.7	60.6	A
982	Feb. 2	0136.9	74.1	B
994	Feb. 3	0036.3	59.0	A
1007	Feb. 4	0130.6	72.6	B
1019	Feb. 5	0029.9	57.4	A
1032	Feb. 6	0124.2	71.0	B
1044•	Feb. 7	0023.5	55.8	A
1057	Feb. 8	0117.8	69.4	B
1069	Feb. 9	0017.1	54.2	A
1082	Feb. 10	0111.4	67.8	B
1094	Feb. 11	0010.8	52.6	A
1107	Feb. 12	0105.0	66.2	B
1119	Feb. 13	0004.4	51.0	A
1132	Feb. 14	0058.7	64.6	B
1145	Feb. 15	0152.9	78.1	A
1157	Feb. 16	0052.3	63.0	B
1170	Feb. 17	0146.6	76.6	A
1182	Feb. 18	0045.9	61.4	B
1195	Feb. 19	0140.2	75.0	A
1207	Feb. 20	0039.5	59.8	B
1220	Feb. 21	0133.8	73.4	A
1232	Feb. 22	0033.1	58.2	B
1245	Feb. 23	0127.4	71.8	A
1257	Feb. 24	0026.8	56.6	B
1270	Feb. 25	0121.0	70.2	A
1282	Feb. 26	0020.4	55.0	B
1295	Feb. 27	0114.7	68.6	A
1307	Feb. 28	0014.0	53.4	B

Please note this new method of orbit prediction. The system has been changed to allow for more uniform coverage of both Oscar 6 and 7 and to conserve AR space. A few minutes work with a calculator and the standard orbits from the AR printout will provide azimuth and elevation for any particular QTH and orbit. Please also note that the modes of operation of Oscar 7 have been changed from those printed in December AR.

Hamads

FOR SALE

Yaesu FT2FB 2 Mx FM TXCR. 12 channel capability —Channels 40, 50, R1 and R4 (new) and 3 Japanese Simplex channels. Also Mobile Mount and Microphone, v.g. cond., 18 mths. old, $185.00 ONO. B. Bathols, VK3UV, 3 Connewarra Ave., Aspendale, 3195. Ph. (03) 90 6424 (evenings).

Geloso TX G4/228 P/SG 4/229, 1968 per SSB — CW — AM, beautiful condition, $350.00, mike and manual. E. Wookey, 158 Kilgour St., Geelong.

Lafayette HA-144 2 AM transceiver tunable Rx Tx xtal locked on 144.180, $100. FTV-650 6m transverter, wired for use with FT101, $100. Orion Stereo car cassette player less speakers but perfect condition, $55. VTVM, needs new meter, $10. VK3NM, QTHR. Ph. (03) 88 3710.

ZL Repeater crystals for Ken KP202, VK3BAX, QTHR. Ph. (052) 97401.

TCA1677 converted to 2m single channel. Very clean condition. Circuit and mobile mount. $80 ONO. VK3BAX. Ph. (052) 97401.

Collins 75S3 receiver, 32S3 xmitter, W/516FZ AC supply, 30L1 linear, all as brand new, huge saving, sell complete only. Ph. (03) 24 1231, AH (03) 20 6135. A. R. Roy, VK3ADR, 16 Kent Court, Toorak.

MTR13 converted, six channels, xtals for channels B, 1, 4, $65.00. Ph. (03) 550 3521. Bill VK3SB.

One BSR Oscillator (audio), excell. order, $25.00. BC221 W/O P/SU with xtal, $20. One 3.5MHz — 7.5MHz tunable IF EA complete nearly, $30. Dusty Leopold, 9 Hyland Ave., Darlington, SA, 5047. Ph. (08) 296 4250 after 5 p.m. weekdays till 10 p.m.

FL-DX-2000 Linear Amplifier, $170.00 ONO, looks and goes as brand new. VK3TG, 2 Willow Court, Kyabram. Ph. (058) 52 1636.

SWR Power Meter, Asahi ME 2B, never used, $15.00. VK3TG, 2 Willow Court, Kyabram. Ph. (058) 52 1636.

MR6 FM mobile, good condition, unconverted, $35. Signal generator, advance 300kHz-60MHz, $20. Set of Eico 753 spares, $5. 100kHz vacuum crystal, $4. 1296MHz solid state converter, $15. Approx 70 Electronics Australia, $3 the lot. Bob Halligan, VK3AOT, QTHR. Ph. (03) 949 6612 Bus., (03) 277 8295 AH.

Heathkit HW22, SSB trans. mod. for 80-40-20, $80. SAE details, 100 logic ICs, $12. SAE details, vert. ant., as new, 4BTV and RM 80, 80-10, $45. VK3BBH, Main Rd., Harrietville, 3741.

FT-101, perfect condition, $450.00. "Ham-Cat" Hy Gain Mobile base mast and 80m, 40m and 20m coils, $65.00 Lot. All with manuals. VK3ASI, PO Box 907, Geelong, 3220. Ph. (052) 43-1283.

WANTED

R65/APN9 Schematic R391, R39Z, or 51J1, cond. secondary, spares, incomplete anything US armed forces technical manuals, also PRC74, 77, 25 or similar. Dusty Leopold, 9 Hyland Ave., Darlington, S.A., 5047. Ph. (08) 296 4250 (AH).

VHF or HF receiver, transmitter, transceiver, any band/mode, for new high school student ham. VK2YCR. Ph. (02) 982 3707. Tony Richardson, 15 Pertaka Pl., Cromer, 2099.

FT/FP200 transceiver, VK2QC, QTHR or Ph. (069) 62 3100.

Control Boxes and handbooks for R101/R101/ARN6/ARN6 radio compass receivers. Lionel L. Sharp, VK4NS, QTHR.

Fax Freaks to make up bulk order to import Desk-fax Facsimile Transceivers 6" x 4" printout 300 lines per inch definition. Approx. $14.00 in Sydney. Details from VK2AKG via VK2BEE, QTHR.

FT101B or similar transceiver in good condition. Details and price to F. G. Storey, VK3ZNT, QTHR. Ph. (03) 277 3082.

Facsimile Machine, preferably direct copy type. Type, condition and price to VK5JE, QTHR. Ph. (08) 262 4622.

FT200 preferably with power supply. Ph. (03) 467 2131, business hours.

Silent Keys

Dr. R. W. ALLISON	VK2AEA
Mr. W. S. RINGROSE	VK2BSR
Mr. F. W. CHAPMAN	VK4TH
Mr. B. WHITMEE	VK4ZW
Mr. R. A. ISAAC	VK4ZAI
Mr. W. W. PARSONS	VK5PS
J. F. HURREN	VK1JH

JOHN WALKER VK2GA

It is with deep regret and sadness that I have to record the passing on 24.11.74 of John Walker, VK2GA. John was active on most bands since the war, he was an associate member of the I.R.E.E., a foundation member of the Woy Woy Rotary Club, a Past Master of Lodge Morning Star, and a life member of the Ettalong Memorial Club. Simply he was a wonderful community bloke, who responded to every demand on him and sought nothing in return.

His passing is a sad loss to the Central Coast and on behalf of all his amateur friends I extend to his wife Chris and family our deepest sympathy.

Major, VK2RU

J. C. (JOHN) WATSON VK6JW

It was with regret that we learned of the passing of John Watson VK6JW, on Saturday 26th October, 1974.

John first took out his licence in the Eastern States in 1947, shortly before coming to the west. He was a trained Pharmaceutical Chemist, and followed this profession for a number of years. In the early 1950s John was elected to the Council of the VK6 Division.

Amateur radio was not his sole interest however, as yachting played an important part in his spare time activities. He was at one period, Commodore of the Royal Freshwater Yacht Club. Naturally he was often heard operating maritime mobile from his vessel 'Silver Fin', under the callsign of VK6SF.

Prior to his passing, John had renewed his interest in the administrative side of the hobby and was once again elected to the Divisional Council. He was also keenly interested in the W.A. VHF Group and their project, the Communications Museum at Wireless Hill, where he was resident caretaker.

Both the Wireless Institute of Australia and the W.A. VHF Group, will miss John's enthusiasm and energy.

20 Years Ago

with Ron Fisher VK3OM

TWENTY YEARS AGO

January 1955

Amateur Call books were the in thing twenty years ago. The Editorial page of the January 1955 issue of Amateur Radio told of the arrival of the NZART Break-In Call Book. They have of course been producing this excellent reference ever since.

A technical article that was no doubt referred to many years after its publication was Command Conversions For Five Bands by Jim Herd VK3JK. Jim described how the various transmitter models could be converted for operation on the 80, 40, 20, 15 and 10 metre amateur bands, along with a suitable power supply, antenna coupler and multi band antenna.

A 'Simple S Meter'. Les Eliason VK3ALE described a simple bridge type meter circuit that could be applied to almost any receiver. Les used it with his BC348.

Expectations of six metre DX were high with the news that Macquarie Island was expected on the air in early January. A report just in from VR2CG tells of his reception of two VK6s on six.

Two comprehensive reports were published on the NSW Woy Woy Field Day and the Victorian Annual State Convention.

FEBRUARY, 1975
VOL. 43, No. 2

amateur radio

VOL. 43, No. 3 MARCH 1975

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COVER PHOTO

"Foxhunting" is a popular 2 metre activity in Australia. It is surprising what excellent results are obtained with a simple three element beam mounted on the side of the car.
Photo: Roly Roper VK3YFF

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

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Specifications

Frequency Range: 80 metre band — 3.50 to 4.00 MHz; 40 metre band — 7.00 to 7.30 MHz; 20 metre band — 14.00 to 14.35 MHz; 15 metre band — 21.00 to 21.45 MHz; 10 metre band — 28.00 to 28.50 MHz, 28.50 to 29.10 MHz, 29.10 to 29.70 MHz; WWV — 10.00 MHz.

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Transistor: 12 Transistor & 8 Diode; Frequency: FM 88-108 MHz, AM 540-1600 kHz, AIR-PB108-174 MHz; Power Output: Maximum 500 mW, Undistorted 280 mW; Speaker. 3" 8 ohms; Earphone: Magnetic 8 ohms; Power Source: DC 6V UM-2 x 4 pcs. or AC 230 Volt. Antenna: Ferrite bar for AM, Rod antenna for FM/AIR-PB-WB; Controls: Volume (w/on-off switch); Selector (AM/FM/AIR-PB-WB); Accessories: Earphone & batteries; Dimensions: 3 3/8" x 6¾" x 9¾.'; Weight: Approx. 3 lb.

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amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA. FOUNDED 1910

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QSP

IARU NEWS

Arrangements are going ahead well for the IARU R3 Association Conference in Hong Kong from 4th to 13th March in the Lee Gardens Hotel (see Jan. AR, p.6).

The Agenda for the Conference was circulated before Christmas and predictably includes the usual round of formalities including the appointment of Conference Chairman, Secretary and Asst. Sec., Credentials and Editorial Committees, Agenda and Rules of Procedure. Reports from officers, Society delegates and other interested amateurs are then taken, followed by discussions on these.

Then comes matters arising from the 1971 R3 Tokyo Conference, a summary and review of the 1971 ITU Space Conference by Tom Clarkson ZL2AZ and an address about the 1979 WARC by IARU President Mr. Noel Eaton VE3CJ.

The formulation and adoption of policies as the result of further discussions and appointments of Working Groups then follows in association with the best methods of implementing such policies.

Two additional matters arising from the 1971 Tokyo Conference are then on the agenda namely "Conformity with the ITU Radio Regulations" and "Development of amateur radio activity in Region III."

Discussion on the Intruder Watch Scheme is followed by general proposals submitted by member Societies, the budget, election of Directors for the next triennium, date and venue of the 4th IARU R3 Conference and formal closure.

The triennium budget as might be expected shows that Inflation may well catch up with the R3 Association for the 4th Conference, not because of increases in the exceedingly modest secretariat expenses, but from anticipated travel and accommodation charges which would then have to be met for the Directors and officers of the Association despite the assumption that the Association should expand slightly. The budget prudently includes a little for travel expenses within the Region.

The WIA have three main papers for this Conference to date. An Intruder Watch document which could prove difficult "to sell" in the light of the WIA apparently being the sole interested party in intruders throughout the entire region. A well documented up-to-the-minute paper about the need for international uniformity of frequency allocations in the VHF/UHF region by the Chairman and members of the Institute's VHF/UHF Advisory Committee is the second of the three papers and ideally is aimed at Administrations rather than other amateurs who need little convincing about this (e.g. Malaysia and absence of the 2m amateur band). The third paper is a report by myself as the WIA delegate.

Tom Clarkson's reports about the 1971 WARC are of course exceedingly bulky and much of the material has already been adequately reported over the years since then. Tom Clarkson also produced proposals for consideration by the R3 Conference for strengthening the Amateur Service influence in the right directions for WARC 1979. Tom suggests, inter alia, that during 1976 and 1977 a personal call should be made by the IARU President (or Deputy) upon the heads of all the Radio Administrations and this should be sought and arranged by the national Society.

A report by Michael Owen VK3KI, one of the Directors, supports Tom Clarkson's proposals with a number of detailed suggestions to aid in implementation.

I am looking forward to this Conference as your appointed representative but I feel a little disappointed that although WIA Divisions, were specifically asked to send material forward to help me at this Conference but the response was noticeably poor.

Let us wish the R3 Association well for their Conference which may well be crucial for this part of the world in the next few years.

D. A. WARDLAW VK3ADW
Federal President

IN DAYS OF OLD
"A splendid attendance of members and visitors totalling about 100 was the result of a broadcast invitation. All were very enthusiastic and the meeting was an unparalleled success. Several proposal forms were filled in and a great many more were taken away for completion. A very interesting lecture on Induction Coil Construction was delivered by Mr. J. Strickland and was greatly appreciated by those present. A hearty vote of thanks was accorded the lecturer. Several specimens of home made instruments were on view". Excerpts from the minutes of a General Meeting of the Amateur Wireless Society of Victoria held in the Oxford Chambers, Bourke Street, on 5th December, 1912.

EMERGENCY COMMUNICATIONS IN PERU
"It (the Regulations dealing with radio amateur activity) also lays down that all radio amateur stations must be permanently operational in the 40 metre band so that they can be called upon at any time to take part in the emergency service". Radio Amateurs column in the Telecommunications Journal, Oct., 1974.

70 cm DRAFT BAND PLAN
Are you active on the 70 cm band? If so, have you sent in your comments on the proposed 70 cm band plan as printed on page 9 of AR Oct. '74? If not, do it now or be for ever silent, as the saying goes.

QSP

WENTWORTHSHIRE BUSHFIRES FROM DECEMBER 27th

A note from Geoff Syme, a WIA member in Pooncarie, gives some details of communications operations carried out by a number of various operators, including the Shire President, Jeff Whyte VK2AHM, using equipment loaned by the NSW State Emergency Services. He commented that the size of the shire makes VHF impracticable without the use of repeaters and that almost all fires in the area are started by thunderstorms late on a summer's day makes HF contacts almost impossible during the initial period of fire fighting. Also he said that most of the fire fighting is done during the night because the fires tend to be quite uncontrollable during the day. He concludes that VHF is essential in areas around a fire especially as HF gets very difficult at night unless portable aerials can be strung up high enough and greater power is available.

AR AWARDS

The Publications Committee announce the following awards for the year 1974 —

Higginbotham Award (worth $50) to Eric Jamieson VK5LP for his splendid work in continuing his interesting VHF/UHF column.

A.S.J.A. (Plaque and $10) to Don Marshall VK4ZAF for his article "The Brisbane Valley Flood Disaster" published in April AR.

Technical Award. Because so many articles vied equally with each other for first choice the Committee felt unable to select any particular one as more outstanding than the others for the purposes of this Award (worth $25).

MORE STATISTICS

Radio Communication for Nov. '74 contains a chart which shows that the income of the RSGB for the year ended 30th June 1974 derived from subscriptions 53 per cent, book sales 34 per cent, advertising 11 per cent and sundries 2 per cent; whilst expenditure for the same period went out at 43 per cent production cost of Radio Communication, 25 per cent cost of books, 21 per cent salaries and wages and staff costs, 8 per cent all other items and 3 per cent surplus. The comments in Council's Report about "Radio Communication" are that this is RSGB's largest single outgoing (and so it should be) and would cost more if it were not for the considerable savings achieved by forward purchasing of paper, combined with judicious juggling of paper weights and pages per issue to make the most economical use of postal rates. It seems that AR is not therefore unique in the way we also must juggle!

OVERSEAS LICENCE FEES

Taking the old $6 as a yardstick, what major countries charged more for the annual amateur licence renewal? Nearly all the communist bloc countries made no charge, but of the others with amateur populations exceeding Australia's, the fee was greater in Canada, West Germany and France. The most expensive licences were apparently Belgium, Ivory Coast and Austria, which were well in excess of our present $12. Spain, at 15 cents per watt, was an interesting variation since there was no apparent upper power limit. Other countries which had licence fees in excess of our new rate included Switzerland and Lebanon.

2m BAND IN U.K.

"I am afraid it is not yet possible to allow amateurs full access to the 144-145 MHz segment, but the aeronautical assignments have been reduced to the three frequencies 144.0 MHz, 144.54 MHz and 144.9 MHz. We cannot say when these remaining channels will be given up and amateurs must continue to avoid them". Extract from a letter from UK Radio Regulatory Division quoted in Mobile News, Oct. '74.

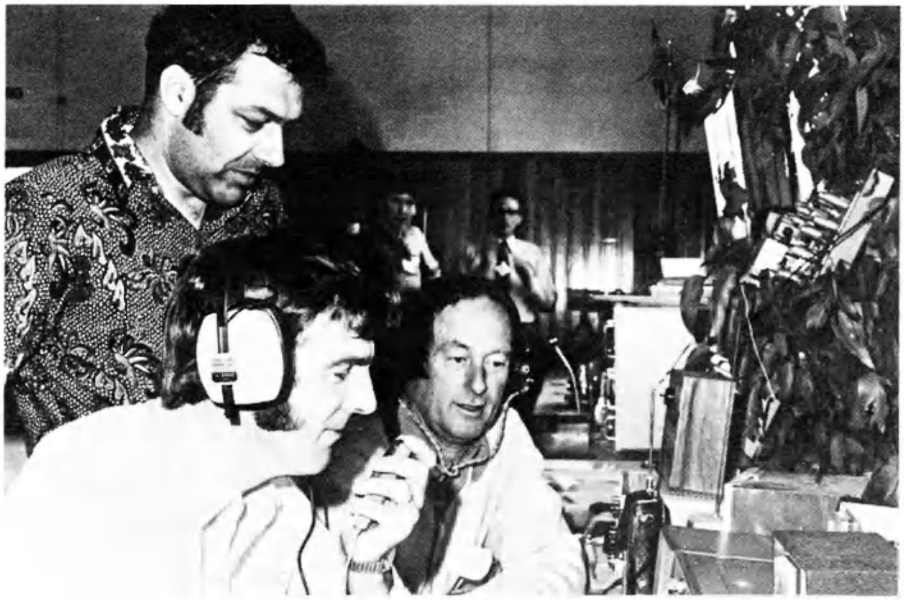
CW NETWORK PROGRESSES

Founded about two years ago by Frank (VK4II), the CW Net is now a regular each Sunday morning on 7 MHz. At the time of writing, the net has functioned 97 times, and has drawn into its ranks a large number of expert CW operators. These men are firm believers in the permanence of telegraphy in a world where technological complexity is often developed for its own sake, or for commercial reasons.

Till recently the Net Controllers have come from either VK2 or VK4, but on Sunday January 5th, a Victorian, VK3XU, conducted the net for the first time and in a most effective manner. Drew handled the necessary QSOs for eighteen amateurs during a two-hour session, and repeated the performance on the following Sunday. And when one considers that each station would average about three contacts per session, this represents a considerable amount of work.

The net is there to be used by anyone reasonably proficient in CW operation. It will be found on 7025 kHz at 1000 hrs EAST on Sundays.

VK2AV for CWN



Operators (l. to r.) at the VK7 Divisional Hamfest were Bob VK7ZJS, Tony 7AX and Ken 7KH. This was the first hamfest organised by the N-W Branch and was held on 16/17 Nov. 1974 in the Turners Beach Hall, 8 miles west of Devonport. A number of social activities (including a fashion parade of night attire) were greatly enjoyed by the 80 or so adults attending. Photo courtesy The Advocate of Burnie.

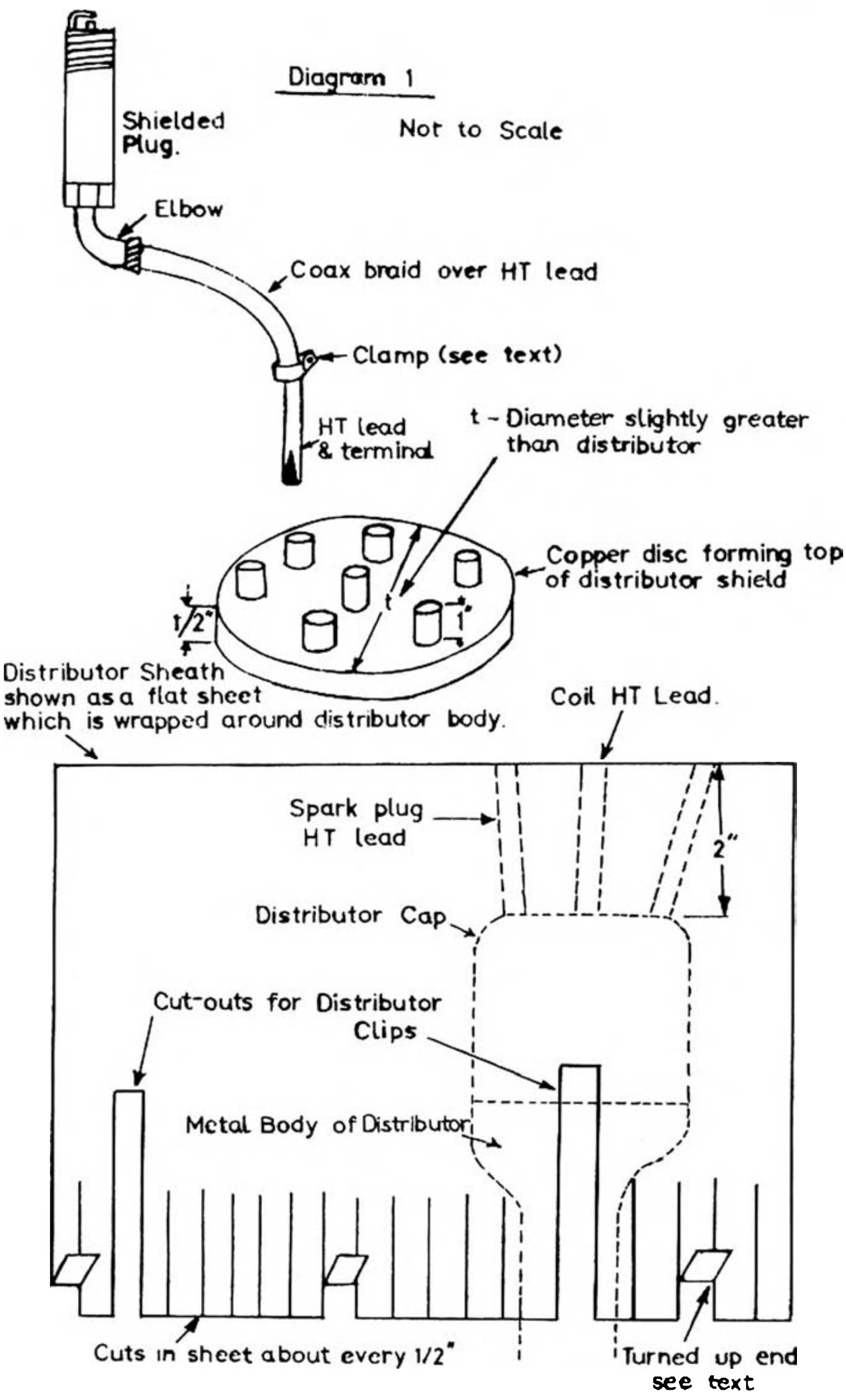
Trade News

Peter Williams, VK3IZ, has recently been appointed general manager of newly-formed VICOM International Pty. Limited. Peter (known around the traps as "IZ") has been active in WIA Federal, State and International affairs and until recently managed the Australian Electronic subsidiary of the Schaeffer Pen Group.

Vehicle Ignition Noise Suppression

Rodney Champness, VK3UG
44 Rathmullen Road, Boronia, 3155

The noise created by the ignition and other electrical circuitry of the common automobile is well known, and well cursed, by the amateur who has tried mobile operation. Some, of course, have been frightened off by the apparent problems involved in suppressing a vehicle. I intend to show a few methods of suppression from the easy to the much more laborious methods.



There are three easy methods. Firstly, if you are wealthy enough, you can buy a diesel powered car. A diesel produces no interference. The second method is to switch off the motor of your car whilst you are mobile. This is hardly practical and additionally is dangerous with the latest cars which have steering locks. The third method which may or may not be feasible is to wait for the introduction of the steam driven car. For the average person none of these easy methods is practical, so I will concentrate on the laborious but effective methods I have tried myself.

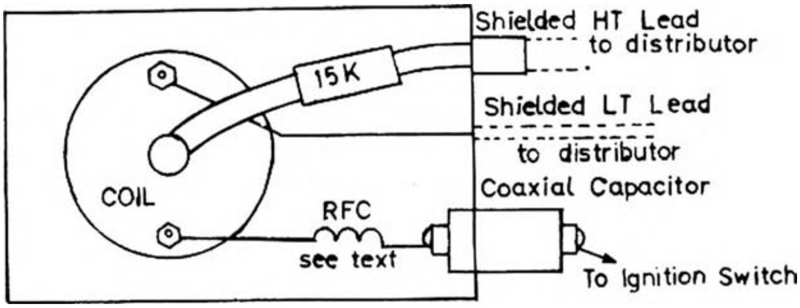
One of the first things that I found out when doing extensive experimentation on the suppression of spark ignition engines was that it would be a long job if the right techniques were not used. The final conclusion that I came to was that **THE WHOLE OF THE INTERFERENCE CAUSING SOURCE MUST EITHER BE SHIELDED COMPLETELY OR HAVE SUPPRESSION FILTERS FITTED WHERE SHIELDING IS NOT PRACTICAL.**

The ignition system of a car must have the whole of the HT spark system shielded, and this includes spark plugs, HT spark plug leads, distributor, connecting wiring to the coil, and the shielding of the coil top. The low tension lead from the coil is filtered because it would convey interference to all sections of the car as it is integrated with the rest of the wiring. It is also much easier to filter this lead. There is no practical method that I know of, of filtering completely the HT spark system. The carbon trace leads fitted to most new cars when new, do reduce interference quite considerably. Regretably, many car owners and ignorant garage mechanics treat suppression leads as if they are the prime cause of engine trouble. They do give suppression figures of up to about 25 db over an unsuppressed vehicle ignition system.

Having made my point in regard to the general philosophy of suppression, I will describe two methods of suppression. The

Diagram 2. View of coil from top of shielding box.

Not to Scale



first has been reasonably successful on the HF bands but not particularly so on VHF. The second method was a lot of work but is very good at MF, HF, and VHF, and should be reasonable at UHF. I don't claim that what I have done is necessarily original, but this style of thing has not been published in AR for many years, if ever.

METHOD ONE

At one time I was involved in the Emergency Fire Services of South Australia and the Country Fire Authority of Victoria. I was concerned with communications, particularly the communications to and from my mobile. I used a No. 122 transceiver and these are not blessed with a noise limiter as such. I didn't bother modifying the set so I had to do something about the noise from the ignition system of the FE Holden.

I had quite a bit of old half inch coaxial cable so this formed most of the raw material source for the suppression. The cable was stripped down to its components. The only section used was the coaxial braid. It was cut into lengths that suited each individual plug wire and a length to suit the HT line between distributor and coil. Each of these tubes of coaxial braid was slid over the appropriate distributor-plug lead. The ends of the braid were trimmed away from the plug at one end and the top of the distributor lead rubber gaskets, so that no arcing from the HT system to earth occurred. At each plug end a braid lead was soldered on and extended to the rocker cover where it was earthed. At the distributor the seven braids were bonded together. At the coil end of the distributor-coil lead the braid was bonded to the coil frame. FE Holdens do not have resistive HT cable so I fitted one of the 15,000 ohm resistive suppressors in the coil-distributor lead. This concludes all the information on the shielding of the HT system.

The coil LT lead had a 0.5 uF 40 ampere coaxial capacitor fitted in the ignition line at the coil. These are much better than the normal suppressor used for car radio suppression work, even though three times the price. The generating system of the vehicle also required attention. The output and field leads were shielded, like the HT line, from the generator to the regulator. The output lead to the battery was filtered with a coaxial capacitor, 0.5 uF 40 ampere. The field terminal of the regulator was bypassed to earth with a series combination of a 5 ohm resistor and a 0.001 uF mica capacitor. The coaxial capacitors must have their frame lugs bolted directly to the frame of the vehicle. The idiot light line was suppressed also, this time with a series RF choke situated at the regulator. The RF choke used was a LT choke from an old Astor vibrator car radio.

I could now work mobile to base distances of 25 miles whilst mobile which I certainly could not do before. If the set had had a noise limiter no doubt this range would have been even greater. The output power of the base was only of the order of 5 to 8 watts so I believe this was a credible performance. I found it most desirable to have the aerial on the rear of the vehicle to get as far away from the engine as possible, and so escape whatever interference still remained. I bonded the engine to the firewall with a heavy earth strap such as used on batteries and did the same to the bonnet. How desirable these were I am not sure. I do know that the noise at VHF emanating from this vehicle had to be heard to be believed — it could be heard a block or so away — and other vehicles were not audible.

With later types of vehicles which have a rubber sheath over the spark plugs it is likely that the braid shield can be extended down onto the top of the plug which is partially recessed into the engine. This may improve VHF suppression. If you do this style of suppression you will probably find that the ignition timing has changed and may have to be advanced or retarded: I cannot remember which.

METHOD TWO

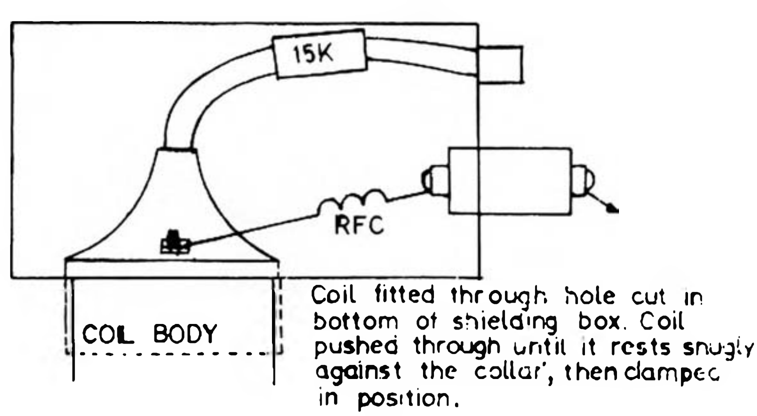
If you really want to have your vehicle suppressed so that a sensitive AM receiver at a few feet hears no interference — then this is the method for you. A vehicle suppressed using this method should not have any trouble passing the **Society of Automotive Engineers interference specification SAE-J551.** The vehicle suppressed in this case was a 1970 Ford Falcon.

There was a lot of blood, sweat and tears shed during this project before success was ours. This was not originally my project — my boss decided that he wanted his vehicle suppressed so that any receiver, AM or FM, could be operated in the vehicle on any frequency from the broadcast band to a couple of hundred megahertz. This was to be on a set with no noise limiter. Some task!

The ignition system was to be suppressed along the initial lines of method one only in a more thorough manner. The carbon trace HT spark plug lines were removed— not because we didn't like them, but because they would not suit the end terminations we would use, and they were too short. The distributor was to be completely shielded, and some interesting metal work evolved during the exercise. A metal disc slightly larger than the diameter of the distributor formed the basis of the distributor shield. This had a half inch lip bronzed to it, and through the top of the disc 6 equally spaced holes were drilled around the disc. The holes were large enough to take normal wire cored ignition HT wire. Six tubes each one inch long able to take these cables were bronzed around the circumference of the holes.

Diagram 3 Side view of coil shielding box

Not to Scale



An additional hole for the coil-distributor HT lead was bronzed to the centre of the disc. You may have realised this was a six cylinder engine.

Around the lip of the disc was wrapped a piece of 26 gauge galvanised sheet steel and this extended down past the distributor assembly. It was held in place onto the lip of the disc by a large hose clamp. Underneath the distributor another clamp was fitted and this was intended to draw the metal of the sleeve close into the distributor housing. To facilitate this drawing in of the metal, slits were cut vertically in the metal so that adjoining pieces of metal would fit under one another. It was found necessary to turn up a few of the ends of the metal strips so that they would prevent the clamp from slipping off the metal sheath. This must be fairly tight otherwise RFI leaks out from the small gaps underneath the distributor. There were two slots cut in the metal sheat to allow access to the distributor cap clips. All of this can be seen in diagram 1.

The HT leads extend through the disc mounted above the distributor. The disc is mounted about 2 inches above the top of the distributor cap. The HT lines are covered with heavy duty coaxial cable braid as were the leads in method one. We had no shielded spark plugs so the braid was extended as far down the spark plugs as could be achieved. The spark plug leads all had heavy rubber sleeves over them on the ends where they attached to the spark plugs. The braids were all bonded to the rocker cover near each spark plug. The coaxial shield braids were clamped onto the tubes protruding from the top of the disc on top of the distributor. Small screw type clamps available from Ford dealers or the smallest size hose clamps were used to do this job.

The HT lead from distributor to coil was also shielded, and clamped in the same way. A small metal case was made to go over the top of the coil. Access to the coil was gained by removing a small panel from this case. The HT lead outlet on the case was the same as the tubes on the top of the disc over the distributor and the braid was clamped in the same way. A 15,000 ohm resistive suppressor was placed in the HT lead. The coil to distributor LT lead was also shielded using a thinner coax braid. The braid was earthed at the coil and the distributor.

The ignition switch volt 12 active lead to the coil was filtered with a variety of L and C. A small balun core as used in many TV sets was used to wind a small VHF choke. Two or three turns of single core hook up wire was used through the two holes in the core. One end went to the coil LT line the other went to a 0.5 uF 100 ampere coaxial capacitor. The capacitor output end should be the only terminal of the capacitor visible outside the case. The filtered end of the RF choke should be very short as the capacitor may not be completely effective at VHF. **Robert Bosch (Aust.),** have some quite elaborate filters for this job — complete pi networks in the one metal case. The filtering is quite effective.

After all this hard work success should have been ours — it wasn't. At VHF in particular there appeared to be virtually no noise reduction — it was enough to make a grown man cry. What was wrong? Hadn't we done something we should have? What was wrong with our reasoning? We were at a loss. We thought it may have been the bonding of the vehicle itself. We had all the mudguard panels spot welded every 3 inches to the engine compartment; we had the back edge of the bonnet bonded every 3 inches to the fire wall; we had the bonnet cleaned of paint so that it would make metal to metal contact with its hinges and bonding straps; we had the whole of the engine bay, engine mounts and exhaust pipe bonded with zero success. This is probably the stage that many people get to and give up — and I wouldn't blame them. After all this work we were not going to give up. We were going to succeed, and succeed we did.

Initially, we had been unable to obtain shielded spark plugs and these had now become available. **KLG-Lodge** are the only manufacturers of aircraft style shielded plugs that I know of. We obtained a set of these complete with elbows, fitted them and then listened to the glorious hiss of the receiver when the engine was running, no ignition noise. We did hear ignition noise though — that of passing cars but not ours. The type numbers of the shielded plugs I believe from memory is the same as the plugs that you may be using at the moment, only they are prefixed with the letter S. Shielded plugs are only made to order, I believe, and take about 2 weeks to come through. These plugs cost about 3 times as much as ordinary plugs and the elbows cost about the same as the plugs.

The alternator and regulator also had to be suppressed. The leads from the alternator were all shielded except that the battery lead had a coaxial capacitor wired in series with it and was unshielded. Two more coaxial capacitors were fitted to critical leads from the regulator but I cannot remember which. Later regulators will not require these extra capacitors. The shields must of course be earthed at each end for the shield to be effective. The instruments on the Falcon are fed via a small voltage regulator and this causes noise. Dismantle the instruments and inside either the fuel or temperature gauge will be found a small bi-metal regulator. A small 0.05 uF or similar ceramic capacitor is wired from active to instrument case on the outside and another inside from the regulated line to earth. A small ferrite cored RF choke having about 3 turns of wire through it is wired in place of the pink interconnecting wire in the instrument. This got rid of the plop that was heard every second or so in the receiver. Perhaps not all that annoying, but if suppression is going to be worthwhile the job may as well be done properly. So ends the saga of the suppression of two vehicles. The 3 diagrams will help you should you wish to try out this method. Another Falcon was suppressed identically to the first with complete success, so it wasn't just luck.

COMMERCIAL SUPPRESSION METHODS

For those who wish to suppress their vehicles but do not wish to go to the trouble that we had done in the previous method I would suggest you contact firms such as **Robert Bosch (Australia),** who do specialised work on vehicle suppression. I have seen some of the suppression equipment used and it is quite impressive. It would take under an hour to completely suppress an average 6 cylinder car. The bits and pieces are easily removed when the car is traded in and may suit the new car with slight modification. These suppression kits are not cheap, but I can see them becoming more common as people realise their value in improving mobile communications.

In the United States of America a variety of suppression kits are advertised from time to time — these may be suitable for use here in Australia but this could not be guaranteed. In the March '74 issue of **Ham Radio,** page 63, a book called **Eliminating Engine Interference** was described. I have not seen this book, but from the write-up on it would appear to be an interesting and informative book. Being an American book I am not sure how it should be ordered — Magpubs, or one of the book shops who advertise in AR?

SETS WITH NOISE BLANKERS

Many people will say that suppression is not necessary on a vehicle if you have a noise blanker fitted to the receiver. This is not strictly so. The noise pulses can be of such amplitude that they overload the front end of the receiver. The end results of the high amplitude pulses can be de-sensitisation of the receiver, cross modulation and in some FM receivers, where the IF selectivity curve is asymetrical, the noise pulses ride through. The noise blanker is a very handy addition to a receiver but does not replace suppression of the ignition system.

QSP

VHF PROPAGATION

This is only one of the ways amateurs can justify the portions of the spectrum we occupy — by contributing to the basic understanding of VHF propagation. Conclusion of an article "VHFer's View of Solar Cycle 20". In Ham Radio, Dec. '74.

1976 OLYMPIC GAMES

According to RASO (Radio Amateurs serving the Olympics) the 1976 Olympic Games are in Montreal during the summer and RASO intend to organise Canadian amateurs for active participation in permitted facilities of communications not contrary to third party traffic prohibitions.

USA PACIFIC ISLANDS LICENSING REGION 3

Looking at the U.S.A. dependencies in the Pacific it seems that Guam comes under the F.C.C. and there is an amateur radio club on the island which is not affiliated to the I.A.R.U. except possibly through ARRL. This appears to be the pattern in many other U.S. islands and does not of course help the Region 3 Association in any way. Others of the U.S. Pacific Islands — i.e. the Trust Dependencies — do not appear to come under the jurisdiction of the F.C.C. and no reciprocal licensing arrangements are in force for these areas. In a similar manner it seems that any amateur radio societies on any of these islands also could not join the I.A.R.U. direct.

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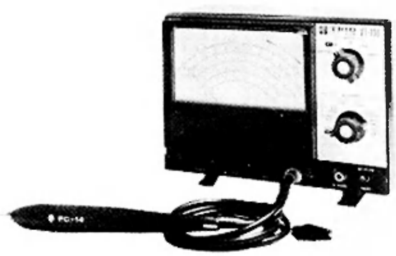

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some useful modifications to the FT-101 series

Geoff Wilson, VK3AMK
7 Norman Ave., Frankston, Vic., 3199

The following are modifications which have been made to a FT-101B transceiver. In each case there is no external change and if desired the unit can always be returned to its original state should this ever be desired.

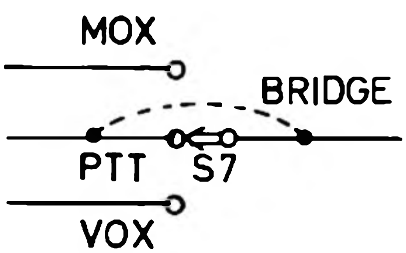
The author has always been of the opinion that unless some very beneficial improvement occurs, it is unwise to make external changes to good commercial equipment as this will almost certainly reduce resale value. Note that these modifications were made to an FT-101B, and due to slight internal layout changes it may not be possible to fit the fan relay (see modification 3) to the FT-101.

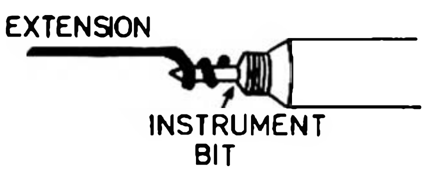
MODIFICATION 1

As supplied, the transceiver showed a tendency for RF feedback when using an external speaker, RF being picked up by the speaker leads. This was cured by the addition of a 0.01 uF 50 volt ceramic capacitor across the external speaker jack (J 12), connecting the capacitor from the green lead to earth.

MODIFICATION 2

When operating VOX it is often desirable to be able to hold the Tx on for short periods without having to continue speaking to do so. As supplied the PTT is inoperative in the VOX position. By bridging S7 (MOX-PTT-VOX selector) the Tx may be held on during VOX operation by pressing the microphone PTT switch. When this switch is released, VOX operation returns to normal, if the PTT switch is not pressed there is no change from normal VOX operation. A link is placed between the moving arm of S7 and the centre PTT contact so that PTT is available at all times. I did this by carefully placing a bead of solder across the contacts which are adjacent, failing this a short piece of wire can be used. Care is required to prevent heat from the soldering iron damaging surrounding wires and components. To make the job easier I used an instrument tip on my iron overwound with a simple extension made of 16g copper wire which provided sufficient heat in the confined space to solder the link.





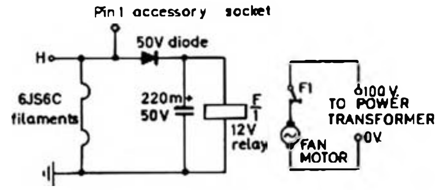
MODIFICATION 3

When using the FT-101B with a VHF transverter, or during long periods when the heaters of the 6JS6Cs are turned off, it is quite unnecessary for the fan to continue to run. Under these conditions the only source of heat is the 12BY7A driver tube which produces very little heat at any stage. The noise produced by the fan can become irritating during long periods of listening and can even tend to mask very weak VHF DX signals. In addition, considerable amounts of dust accumulate in the final cage over a period of time as a result of the volume of air passing through it.

The addition of a relay in the fan supply circuit operated from the filament line of the 6JS6Cs enables operation of the fan to be limited to periods when the tubes are heated. The critical component is the relay. This must be physically fairly small, a 12V type, and capable of switching 100 volts at 0.09 amps. If a suitable type can be found, a reed relay with a 12 volt coil could also be used. Remove the bottom cover plate from the transceiver and check the available space immediately below the electrolytics.

In the author's case, there was sufficient room to fit a small relay on a bracket which was attached to the side of the frame surrounding the power transformer. The dimensions of the bracket and its exact location will depend upon the type of relay used. Ensure that there is adequate clearance from all surrounding parts. Trace the fan supply leads back to the power transformer and unsolder the white lead attached to the 100 volt terminal. Connect another lead to this terminal and then run both leads to the relay contacts, connecting them so that with the relay disconnected the fan circuit is OPEN. Next take a lead from pin 1 of the 11 pin accessory socket and connect this to a spare contact on the relay or a tag strip mounted on the chassis. From this lead connect a diode to one side of the relay coil, connect a 220 uF electrolytic across the relay coil and earth the other end.

Make sure that correct polarity of the rectifier is observed as this circuit must cater for 12 volt DC operation as well as 240 volt AC mains operation. When used on 12 volts DC, the diode conducts and allows the relay to operate. A far simpler way of controlling the fan would be to place an on-off switch in the 100 volt line, but this could easily be forgotten. The relay circuit is completely automatic and ensures cooling of the final tubes whenever they are used.



NOTE: Some relays may run hot under continuous operation if the voltage exceeds 12 volts. If so reduce the coil voltage by adding a parallel resistor of suitable value and wattage. It is not recommended that this principle be used with the FT401 etc. These transceivers have many valves and continuous cooling is desirable, especially in hot climates.

QSP

W.A.R.C. 1979

The fact of the matter is that in these times the voting strength of the ITU is controlled by several blocks of developing countries in South America, Africa and the Middle East. The League is already embarked on a programme of "selling" amateur radio in these sometimes hostile areas, working with other societies in the IARU. In the months ahead there will be more extensive travel by HQ staffers and by ARRL and IARU HQ officers and by the representatives of the regional IARU divisions. In addition we are calling on the services of those amateurs whose business travels take them into critical areas and who have the linguistic skill and the knowledge and enthusiasm to bolster the amateur cause. QST Dec. '74 Editorial.

THE FUTURE OF THE SOCIETY

The RSGB Council as reported in Nov. '74 Radio Communication had been discussing the future of the RSGB and the outcome appeared to be that the Society must now seriously consider the administrative and economic aspects of a move from London; there must be far greater encouragement to younger members to participate in the Society's affairs and it must do far more to publicise the work that it is doing. The WIA no doubt will also be busily considering its own finances in 1975 judging by comments which came in from some members along with their subscriptions this year.

MOBILE DX

During a recent trip to the Northern part of Queensland, VK2AOK found that a sure way to radiate a good signal on 14MHz at about 0930 EAST, was to transmit from the centre of the Jordine River, 38 miles from the top of Cape York.

All of the operators on the frequency at the time from as far south as VK0, were greatly impressed by the increased signal strength as the river was crossed.

The river at this point is approximately 350 metres wide and at least 1 metre deep.

The mobile station used a Japanese transceiver and a small 20 metre vertical antenna mounted on the front mudguard of a Land-Rover.

a twelve months study of the 20 metre band between melbourne and london

Ron Schmidt, VK3LY
73 Rowell Ave., Camberwell, 3124

On the 14th November 1973, Jim G4BGJ, South London, and myself VK3LY, Melbourne, commenced a series of chats on the 20 metre band which in effect continued intermittently for the complete 12 months thereafter.

Everything was going along nicely when about the middle of May 1974, the band went out completely in Melbourne, which of course it had done on previous occasions. However, this particular occasion differed from its predecessors in that it continued to stay out and was now declared extinct. Somehow the band could not appreciate that Jim and I had been in regular contact either in the afternoon or evening (at the Australian-end) for about 6 months. But no matter what my feelings were on the matter the band itself could not care less and like the river just continued on its way.

By this time I of course was beginning to realise that Jim in London would be considering me a very discourteous type of individual — you see I had not told Jim that I would not be back! It occurred to me that if the band itself was not concerned about this lack of courtesy then I most certainly was and so set about finding a way of predicting the irregularities of the mode of communication I had chosen. The idea of a chart occurred to me. Not an ionospheric prediction chart, but a chart which displayed the behavioural pattern of any selected band.

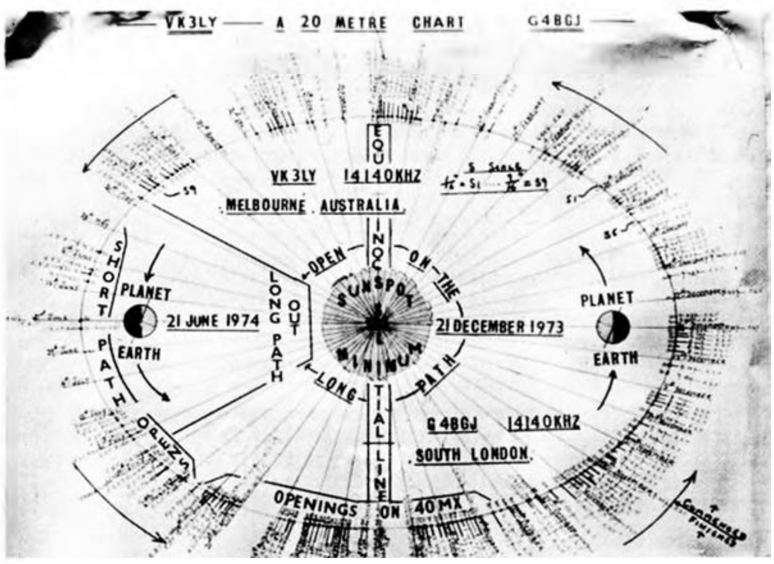
I probably have always been fascinated by the regularity of the passage of the earth in orbit around the sun. Further I have always been fascinated by the fact that the sun shines through the same hole in a cenotaph onto the same spot each year at precisely the same time as the previous year. I was further fascinated by observations I had made over a couple of years while being a 4th floor employee in a 19-storey building noting the short shadow cast by our building in Melbourne on the 21st December as compared with the very-very-long shadow cast on the 21st June each year. Of course we had learnt of this at school but this was now taking on an added realism, as at the window at which I worked I was able to observe at my leisure and observe I most certainly did.

We are told that above us is an ionospheric region situated somewhere between 50 and 300 miles up. We are also told that this ionosphere is affected by the emission from the sun causing the ionosphere to form a system of layers as our earth rotates. Of course planet earth is not a fixture — it does various things at the one time — it rotates on its axis once in 24 hours — it also travels on an orbital path around the sun completing this journey in 365 days. Well so far it seems as though we have no problems and that all is plain sailing — until we realise that the earth amongst other things, is tilted on its axis by 23 degrees, and this alters the whole situation. One is forced to admit that this trick is tremendously ingenious however, for we have now introduced a system of seasons — summer, autumn, winter and spring. You see now the plot thickens because the poor ionosphere doesn't know whether it is coming or going so to speak — for as stated the earth is rotating and continually presenting a different face to the sun. And because the earth is following an elliptical path it is always at a different distance from the sun to that had it been only on a circular orbit, where at least it would have always have been at the same distance from the sun. So much for the complexities which initiated the idea of the chart.

The chart itself was produced by drawing an ellipse with a looped piece of string and two drawing pins. Try it for yourself — put the pins about three or four inches apart, place the string loop over them, now with a ball-point pen or pencil strain the string loop slightly and following the perimeter draw out an elliptic type path. The ellipse itself is then divided into quarters and subdivided until the segments are reduced to the chart as illustrated. One end of the ellipse was elected as representing the 21st December and the other end as the 21st June, while the 21st March and the 21st September are at their usual positions on the equinox line, or equinoctial line as listed on the chart. From there on divisions and date lines follow evenly. The principle applied was that there are 360 degrees in a circle and 365 days in a year — near enough for one degree to equal one day.

All of the G4BGJ signal strength readings recorded on the chart were taken on the long-path, our normal communication path for that time of the day. The few readings taken on the short-path were from other G stations. The length of the lines drawn are scaled to represent the signal strength of the station being received. S1 being a dot 1/16th inch long, S5 being 5/16th inch and S9 being 9/16th inch long. A line drawn from the perimeter away from the sun in the centre of the chart indicates a long-path contact — whereas a line drawn in towards the sun from the perimeter indicates a short-path contact of which a few only are recorded, there being very few short-path loggings as compared to the long-path. Times are shown as Melbourne time and are listed as Eastern Australian Standard Time (EST) which is 10 hours ahead of Greenwich Mean Time or conversely GMT is 10 hours behind EST. Where no contacts are recorded this is because no signals were coming into Melbourne from G land due to ionospheric disturbances caused presumably by solar flares or solar storms, both associated with the manufacture of a sunspot — be it ever so humble. Some of the solar disturbances put the band out of action for 10 days — another lot for 19 days — thereafter in Melbourne was to occur the longest band drop-out of 72 days or 2½ months, that was from 17th May 1974, until the 29th July 1974. This was on the long-path and the frequency was around 14140 kHz and in the normal time region of band openings between 0500 GMT to 1000 GMT, the times in this

Below is a reproduction from a colour slide of the chart prepared by Ron VK3LY



segment being of particular interest and were charted accordingly. There was an occasional opening to Spain or Southern France in that time — but to G land — well if you look at the chart you will see an occasional working but it seemed to an exasperated operator in Melbourne, that "never" would have been a nearer truth.

The shortest QSO betwen G4BGJ South London, and VK3LY Melbourne, was for about two minutes — time only to exchange callsigns when the band faded out. However, that was only on one occasion. The longest QSO occupied us for something like 2½ hours. The average QSO on SSB would have been for about 1½ hours which would also have been about the length of the band opening. SSB was the normal communication mode used. Transceivers at each end were FTDX 401s plus a linear at the G end. Antennas were, at G4BGJ a Mustang Mosley at 40 feet while at VK3LY a 2 element home-brew tribander at 22 feet was operative.

A comparison of charts drawn up by keen amateurs around the world would certainly be most revealing. A chart comparison taken between the Australian cities on the Eastern coast would in themselves be a revelation in displaying the variations of the band over a similar path to any country the amteur operators so elected. This project would call for quite a discipline for the twelve months in that those conducting the experiment would require to be in attendance at band opening times for the sake of recording or not recording on the chart, whichever it turned out to be for that day or night. As stated, a chart comparison taken on the same band around band-opening times at Brisbane, Sydney, Melbourne and Hobart in Australia in itself would be tremendously interesting as each of these capital cities are almost on similar longitudes while differing satisfactorily in latitude for the exercise. The times given on the chart purport to be band-opening times. These became very accurate as the operator became adept in recognising and observing the opening to G land. The commencement date for the taking of readings was the 14th November 1973, and the final reading was the day before that date in 1974. I define the band-opening time as being that time at which the G station became reabililty 5. On first hearing the G station, the time and signal strength is immediately logged together with the dial frequency-reading, being recorded on scrap paper initially for comparison purposes while scanning the band, the final signal strength being recorded on the chart; in short you sample the band.

Because of the rotation of the earth from west to east the New Zealanders hear the G stations open before the VK3 stations. As a result of this it is not uncommon to find yourself listening to the ZLs working the Gs for perhaps a ½ hour or so before the Gs are even being heard in Australia. This in itself is an interesting experiment in that it makes it easy to hear the birth of a G station from nil heard, to the eventual final signal strength at which that particular signal is going to settle down. Only temporarily of course, for the life of a DX signal on the high-frequency bands is normally of a very temporary nature. The birth of the incoming signal when it starts can be from 2 minutes to perhaps 10 minutes before it reaches its maximum signal strength, its final strength being predetermined by conditions associated with the ionosphere, power into the antenna at the transmitting end, and the antenna height and gain. At the receiving end we have exactly the reverse situation except that the receiver takes the place of the transmitter. This of course presupposes that locations are normal and that directional antennas are being used for best DX communication purposes and are of course beamed correctly towards one another.

From the series of observations taken in constructing the chart it became obvious that the boys around Sydney were generally able to contact G land slightly earlier (because of the slight longitude difference) and more frequently than their counterparts in Melbourne. This applied particularly when solar activity was having an adverse effect on the band down Melbourne way; it was not uncommon under those conditions to hear the Sydney boys working and giving the G stations normal signal reports. Under those conditions of course the more southern VK3 knows instinctively from his acquired experience of the band that this is not his night. However, this is not necessarily the end of things for it is not uncommon for conditions to change slightly and favour the VK3 more than previously.

In summarising the advantages of this particular type of chart over the normal ionospheric prediction chart I would say that this particular chart provides the operator with:—

(i) a fuller comprehension of the band by providing a better understanding of its behavioural pattern,

(ii) an indication of temporary band drop-outs of a periodic nature,

(iii) and indication of winter (at the Australian end) band drop-out as well as an indication of a return to continuity of communication for the remainder of the year,

(iv) a rough prediction of probable repeat performance for guidance purposes for the following years, or year at least,

(v) a once in your life comprehension of the band under observation.

Statistically on the chart there are 130 contacts with G4BGJ, 32 G contacts not G4BGJ, plus 12 G stations heard with signal strengths recorded, altogether making a total of 174 recordings. These in their turn produced the final chart. The chart shows an average of one contact every second day throughout the year, remembering that there was a time during the winter months at the Melbourne end when signals stayed out for 2½ months; although a rebirth was around the corner and patience was to eventually win the day.

On discussing the chart with a Canadian who enquired about the principle on which the chart was established, I repeated the opening story of the cenotaph, which brings us back to a repeating cycle of events. In short if there was no sunspot activity ever to cause magnetic storms then the band would not go out as spasmodically as it now does, and you would be left to presume that you would have an even flow of communications at the normal contact times. It should be noted that the solar storm does something else which is not immediately obvious — as stated the solar ~~storm causes~~ the upset in the ionosphere and the result caused by the upset may take place for perhaps 10 days, after which the ionosphere re-settles — but here is the point — it now resettles **not** at the point where it was before the band went out, but resettles at a point which is in direct accordance with the earth's new position on its orbit in space around the sun. If there were 10 days of disturbance the planet earth would have travelled 16 million miles further on its elliptic-path journey and the result of this is that the band would now come in earlier or later than that where it was before the sunspot disturbance under discussion (which produced the resulting magnetic storm). Whether it is earlier or later depends upon whether the earth is heading datewise towards the 21st December which is the longest day at the Melbourne end or the shortest day at the London end and which is recorded on the chart as the 17th December (possibly due to the tilt of the earth's axis from the vertical). For the purposes of straight reading it would be better to put aside this slight discrepancy as that type of change can be a separate study in itself. Let us proceed. On the chart as you approached the 17th December the band in Australia opened to G land later, opening in London also later, for the length of the piece of string holding London and Melbourne together for the purposes of this exercise, does not alter, the band opening being now around 1000 GMT; conversely, as the earth moves away from the 17th December towards the 21st June the time of band opening becomes earlier — i.e. 0530 GMT with the intermediate times of opening being proportionally distributed along the intervening date points on the chart. Inserted on the chart you will find references to 40 metres and an occasional reference to 15 metres. Please consider these as extras in terms of G land openings to Australia and they were not really associated with the main project, that of course being the study of the 20 metre band only.

Having now completed the elliptical trip around the sun on plant earth and having covered something like 583 million miles you now may have a better appreciation of the digestive troubles had by the ionosphere in endeavouring to adjust to its changing surroundings; in spite of everything, the band does have a tremendous element of logic despite a seeming multitude of inconsistencies.

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VALUPACKS

RESISTOR PACKS

Compiled from Philips computer listing of usage. Definitely not the usual useless pack with 2 or 3 of every value like 33 ohm, 18k etc. In our's you get 20 x 1k and only 2 x 56 ohm. However there's at least 2 of every value from 22 ohm to 470 k. Over 50 different values and 260 ¼W, 5% carbon film resistors. Normal value over $8.00. You get over 260 resistors for only $6.50.

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Here is our first computer listed pack of single ended electros. 42 top quality caps based on usage (not the useless values). Check what you get

10V 2 x 33 uF
16V 4 x 100 uF, 4 x 220 uF, 2 x 470 uF
25V 4 x 2.2, 4 x 4.7, 4 x 25, 2 x 33, 4 x 47, 4 x 100, 4 x 220, 2 x 330, 2 x 470

You see it's not a random pack but based on computer usage listing. CAP1 pack has 42 electros for only $7.90. Normal value is around $12.50

DIGIPACKS

These have been produced for counter enthusiasts. A detailed instruction sheet covers the operation of the ICs and how they are interconnected. Clocking, reset and latching are described. Both packs can be cascaded.

TTL 'A' pack has a Datalit 707 display with 7490 BCD counter and 7447 decoder driver and forms the basis of a single decade counter for only $6.90.

TTL 'B' pack has the same components as the A pack but also has 7445 latch IC which holds the display while counting. Only $7.90.

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Here's the boxes for project builders who want a real professional look to their projects. These boxes are moulded in ABS, so they are tough yet easy to drill. The finish is a posh black with ingenious posts in each corner to take self tapping screws and hold a printed circuit board. They are supplied with a flush fitting aluminium panel which fits all ways round (such is the precision of these boxes). Special panels are also available made of bakelite at 50c and matrix board at 60c (large size only).

Size UB1 15 x 9 x 5 cm $2.00
Size UB3 12½ x 6 x 4 cm $1.65

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2N5589 7W was $6.50 NOW $4.90
2N5590 15W was $7.75 NOW $6.90
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Set of 3 to give complete chain (see Kits) was $22.50 NOW $19.25.

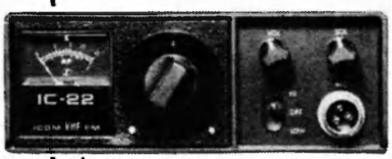
Get together with your friends (or club) bulk purchase and share the savings.

ICOM IC22 SEE E.A. DEC. 74 — $199

Icom IC22 144-148 MHz, FM transceiver has power outputs of 1W and 10W. The 22 channels all have separate trimmers. Deviation 5-15 kHz. Features solid state Tx/Rx relay, large built-in speaker, MOSFET front end with 5 helical filters, noise cancelling mic., quick disconnect mobile mount. And if the spec doesn't grab you, the looks will. Soft green back lighting, special transmit light and even a light to tell you of incoming signals if the volume is turned down. Supplied complete with workshop manual and accessories right down to a silicone cloth to keep the set like new.

Fitted with one set of crystals (146.5). Normal price is $245.00, but we have a shipment coming in at $199.00 (P & P Insured freight for $3.50). Crystals are also available at $9.00 a pair as follows

New Channels	42/45	146.1	146.7
	48/60	146.4	147.00
	50	146.5	146.5



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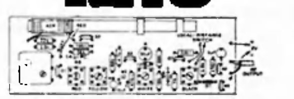
Specially intended for Amateur use and very compact measuring 8" x 3" x 4½". Response from 60 to 15000 Hz. 50 k impedance. Complete with base featuring push to talk switch with slide lock, chromed gooseneck and 10 ft lead. Unidirectional Cardiod pattern. UD112 $17.50 (P & P $1.00)

Microphone Matching Tranny — $7.90

Cannon type connectors for in line mounting 50 k to 50,150,600 ohms LT700 $7.90.

KITS



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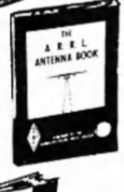

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Questions and Answers, a study guide for the radio Amateurs licence is published in New Zealand but is ideal for anyone contemplating the exams. There are 18 chapters and 60 pages covering all aspects from Ohms Law to Aerials and propogation. The rules naturally apply to NZ and Australian readers should check the differences. Recommended at $1.50.

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The reader is shown how to build simple transmitters and a simple receiver. The antenna problems which confront the novice are explained and our beginner is also given some good help in learning the code.

Any beginner or novice is sure to learn more and learn it faster with this excellent new book. He'll thank you for having made it available to him. $4.50.

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Crystals included as follows

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1 Channel 50	146.5	146.5
2 Channel 42/45	146.1	146.7
3 Channel 48/60	146.4	147.00

Special KCP-2 NiCad battery set and charger with 10 cells to suit the KP202 available at $35.00.

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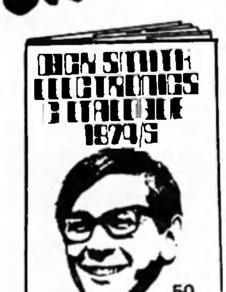

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AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany x	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RTX, Devonport	144.900
P29	P29GA, Lae, Niugini	52.150
3D	3DAA, Suva, Fiji	52.500
ZL1	ZL1VHF, Auckland	145.100
	ZL1VHW, Waikato	145.150
ZL2	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
ZL3	Z3LVHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

x denotes addition

Beacon news this month shows the new Albany 6 metre beacon with a listing on 52.950, and reported heard by Kerry VK5SU at Ceduna. It uses slow CW with 5 watts output presently to a 5 element beam pointing east, but an omnidirectional antenna is planned for the beacon. No news has been heard of the Darwin beacon VK8VF since the cyclone, so it can only be presumed to be lost along with so much other damage, and I guess there are more important things to do in Darwin at present than worry about the beacon. However, probably something will be heard about it by the time the next DX "season" comes around at the end of the year.

SIX METRES

This band seemed to be behaving in a somewhat unusual manner this "season". Excellent early openings were observed to all States in November, with a frequency indicating something was going to happen early. Possibly the best way of going over activities would be to pick out some of the highlights as I saw them, and with some news from other areas to complete the picture.

One of the highlights would have been the copying of the Fiji beacon 3D3AA by VK7JV and VK7ZAH on 24th November for 15 minutes with signals 5 x 3. Distance would be over 3000 km. . . About this time news came to hand that VK8VF, the Darwin beacon, was operating as a transponder and was capable of giving signal reports back to the calling station . . . 16/12 Rod VK2BQJ (ex ZQJ) reported digging in the garden — consequently missed working ZL4s . . . John VK4ZJB worked some JAs on this day . . . 26/12 all ZL districts 1 to 4 worked 27/12 VK7ZAH heard 3D3AA beacon, and later worked VK2BKE on Lord Howe Island, who was using an FT200 driving FTV650. Jim VK5ZMJ also worked VK2BKE. Good work chaps. ZLs still available . . . 1/1/75 open to all States, all day to VK4 . . . report came in, still unconfirmed that Clarrie VK5ZCV heard 9Y4VV in Trinidad . . . 4/1 ZLs again, including ZL4PG (David) . . . From the end of the first week in January conditions tapered off quite markedly, or the operators did, but openings did continue intermittently most days culminating in a good opening to VK6BV and others in Kalgoorlie on 28/1 and a very strong opening to VK1 and VK2 on 29/1.

Summing up my impressions of six metres this time: not as many good openings or contacts to VK3 as some times . . . VK2s very noticeable by their absence, commented upon in many circles . . . Activity in VK6 quite high with many excellent signals . . . northern VK4 prominent, some Brisbane activity, but no doubt hampered by Ch. 0 . . . most stations operating SSB now, many using FT620 barefoot, with about 10 watts output, others using same to drive fair sized linears, therefore many very strong signals. Several good, strong, well modulated AM stations noted, mostly matching it with the SSB boys . . . weaker AM stations noted often working quite well further up the band — good idea to get out of the QRM if crystal locked— noticed they went up further of their own free will! Band operating manners very good, never heard a cross word from anyone, and most operators indicating they would move off the fequency on completing a contact so leaving the position to the original station; nice thought boys.

TWO METRES

As predicted last year, two metres was again available this year for long distance sporadic E contacts, and there were some very interesting ones. I think the letter from Kerry VK5SU would sum up most of the two metre operating, so here are some extracts for your interest. Again, these times specifically are Eastern Summer Time so you can better associate the time of day with the activity indicated.

22/11	1115	Adelaide repeater Ch. 4 worked.
23/11	0700	Ch. 4 again worked.
	0815	VK5BC heard 144.103 S6 CW, S3 AM.
	1005	VK5LP S1 SSB 144.107. Also via Ch. 4.
7/12	0845	VK3ZAZ Ballarat worked via Adelaide Ch. 4 repeater.
	0930	VK5CU/5 mobile Adelaide worked Ch. 50 and B.
15/12	0835	Heard briefly VK2YDK in QSO on Ch. B.
	0850	Heard VK2ZAY Gunnedah 144.1 SSB 5 x 4 via Es.
16/12	1218	Worked VK5ZK, VK5ZTS 144.1 SSB.
21/12	1220	Worked VK2ZAY Gunnedah (1636 km) 144.1 5 x 3 SSB via Es.
	1225	Worked VK2ZCV at Tamworth 144.1 5 x 9 SSB.
	1251	Worked VK2ATI mobile Ballina (1974 km) on Ch. B. 5 x 4, Es.
	1253	Worked VK2YBZ portable Evans Head near Ballina Ch. B. 5 x 9. Es.
	1254	Heard and called by VK4ZJB Brisbane Ch. B. No report obtained!
23/12	1029	Worked VK2ZRH Sydney 144.1 5 x 9 SSB.
29/12	1200	Heard VK5NC Mt. Gambier.
	1735	Worked VK5DK Mt. Gambier CW 5 x 4.
30/12	0820	Worked via Ch. 4 Adelaide.
	0826	Worked via Ch. 1 Mt. William (Vic.) repeater.
	0838 to 1100	Worked VK5MT, VK5MC, VK5RO, VK5LP, VK5SPS, 144.1 SSB.
5/1	0733	Worked VK3ASV and VK3ZVL/3 60 miles east of Melbourne via Mt. William repeater, also VK3TN aeronautical mobile via Ch. 1.

Now that's a pretty fair effort, and shows that the interest Kerry is able to give to the game has allowed him in a very short while to make some very good contacts. I would like to add the following bits as well before summing up the two metre situation.

During the 2 metre opening on 21/12 Jim VK5ZMJ at Port Pirie in the mid-north of SA worked 22 stations in VK2 and VK4 using SSB and Ch. B FM. That's a pretty fair effort too. On 16/12 Tony VK5ZDY and myself worked Daniel VK7ZDA, and was the only reported occasion (to me) of VK7 to VK5 this year . . . Around 1/12 a report was received from Sydney that QRM was being experienced in that city to the international PMG system from a station in Hawaii just below the 144 MHz band! Now that's a long way — perhaps someone should have VFO'd down and told them to come up into our band for a contact! . . . VK5VF, Adelaide 2m beacon heard in Perth on 29/12 by VK6ZCN and VK6ZFY . . . Numerous reports of cross Eastern States openings, VK3 to VK4, VK3 to VK2, VK2 to VK4, much short skip around top end of VK4, Bundaberg to Rockhampton for example.

Taken all round, it was a great time for 2 metres, both SSB and FM. It shows how one mode can help the other. Having operators fairly constantly using FM on fixed channels gives interested operators the chance to monitor something, and it looks as though Ch. B (40) will remain a pretty popular frequency for a long while, despite Ch. 50 being nominated as a national calling frequency. Looking back at the FM scene one could probably say more stations in Adelaide in particular would probably have worked into VK2 and VK4 on FM if they had better antenna systems — the idea of a small vertical antenna is fine for cross town working, but when the guns are out, you need something better. A 5 or 6 element beam doesn't cost much to build, and the ideal would be one for both vertical and horizontal polarization — there are some operators around who only have horizontal, but certainly 5 elements at least vertical would be a great improvement. So what about it you guys. Get on the job ready for next November and December when there should be sporadic E openings on 2 metres again.

Summing up, 2 metres was really good this year, helped by plenty of stations having equipment on one or other of the sections of the band, and in general having better equipment than that of a few years ago. More vigilant operators help to keep signals on the various frequencies and in turn more people hear them. It would be nice to see more stations migrating to the lower section of the 144 MHz band in tune with the sentiments I expressed last month about using the 2 metre band — we don't want commercial stations operating right up alongside even the FM channels — or do you? With so many operators now having SSB equipment on 6 metres, it is not an enormous task to utilise the SSB portion of that gear for 2 metres, a 52 MHz exciter unit, coupled to a 144 MHz transverter with the use of a 92 MHz oscillator chain will start you on the way if you are not keen on starting the SSB at some lower frequency. There are plenty of QQE03/12 valves around for 15 watts or so at 144 MHz, the QQE03/20 will give you 40 to 50 watts and a QQE06/40 double that, and none of these will cost you a fortune to get going. It's essential more of you blokes give very serious thought to getting off the FM channels at times and spread your interest to other areas of the band, or you may live to rue the day that you did not do something about it. Channel 5A is coming!!

PORTABLE OPERATION

Well, the big portable operation I started out on just after Christmas ended in disaster! The first day (26/12) was very pleasant and many 2 metre contacts were made, plus 6 metres of course. That night the winds shifted to the north, first bringing with it a violent thunderstorm and drenching rain. I was out at 2.30 a.m. battening down everything, finishing up with 9 guy wires on the mast with the 6 and 2 metre antennas and rotator. Gradually the winds shifted to the west and increased in violence until they were screaming around the 1445 foot peak of Myponga Hill in excess of 40 knots, threatening to tear everything apart. I spent most of the night standing up in the caravan in one corner holding it down against the wind which was raising the van 2 to 3 inches with each gust. The rain still poured down. My only comfort was the torch. The alternator was outside covered down (I hoped) so couldn't give me any cheerful lights.

Next morning the rain slowed down, but the winds continued to rise in strength, and anger. I tied the caravan down as best I could with baling twine and iron droppers. When the rain finally stopped, I uncovered the alternator, and got it going, deciding I might try my luck on the bands despite the winds. All the equipment was safely housed in a Kombi van, which weathered the storm well, and kept everything quite dry.

From time to time I had to sweep off the operating table because of the fine sand being blown onto it. The antennas (4 el. on 6, 10 el. on 2) took an awful hammering, and so did the very plucky rotator, but they all held together. By mid-afternoon I couldn't stand watching the caravan lift off the ground a few inches with the stronger gusts, so decided to pack it in — much to my disappointment.

Summoning some nearby help I was able to finally get the mast and antennas down in one piece. How I still don't know. The rotator was encrusted with salt from the spray off the sea, and then I realised from where all the sand had been coming on to the table. The map showed I was 9 miles from the nearest part of the ocean, yet the winds were so strong and unabating that they never allowed the spray or sand to drop once it became airborne. What an ordeal! I'll go out portable again one day of course, but I don't think to Myponga Hill — too exposed to the

elements, but what a pity, such a beautiful site for VHF. If only to console myself to a degree, I did hear eventually that some of the VK3 boys also packed up due to adverse conditions, so I didn't feel quite such a chicken after all.

MOONBOUNCE

Congratulations to Chris VK5MC for his continuing success with 144 MHz moonbounce. At 1105Z on Saturday 30th November Chris contacted VE2DFO and W8KPY on CW, then a 2 way contact was successful with W8KPY on SSB, which looks like being a VK first for SSB moonbounce. Chris sent 5 x 5 and received S2 back. Chris used 150 watts input for CW and 300 watts PEP output for SSB, to 4 stacked rhombics 50 wavelengths per leg length. Converter uses U310 FET for the front-end situated at the antenna feedpoint, and then coupled to a pair of MPF121 FETs. Trevor VK5NC was in the shack at the time and was witness to the successful contacts.

The Dapto (NSW) boys have run into trouble with their moonbounce equipment with extensive damage caused by a nearby lightning strike. Diodes and transistors have had to be replaced in the power supply, defective coil in the control system, faulty coaxial relay, transmitter multiplier board and receiving converter oscillator chain transistors etc. all need repairs. In addition the valuable 575 transistor in the front end of the converter whilst not destroyed shows a marked deterioration in noise figure, so it appears it will be several months before the equipment will be operational again.

From Roger VK2ZFB comes news that Andrew VK6ZCN is starting on a 144 MHz moonbounce project, and tests are scheduled to commence in March with 600 watts CW to a bay of 4 x 14 el. (112 el. total) crossed Swan yagis spaced approx. 4m with mesh reflector and will have the capability of reversing sense of polarization.

News is also to hand that Barry VK2ZAY in northern NSW is starting out on moonbounce and is currently looking for a suitable receiver. No other details available at the moment, but Barry will let me know in due course of his experiments.

METEOR SCATTER

Results of Geminids Complex meteor scatter skeds on 13th to 16th December 1974 between VK6TZ and VK6ZGQ at Kalgoorlie on 13/12 a.m., VK6TZ-VK6ZBM Kalgoorlie and VK6TZ and VK5SU on 14/12 a.m., VK6TZ-VK6ZBM on 15/12 a.m. and p.m. and VK6TZ-VK6ZBM 16/12 a.m., on 52.100 SSB. Ross Hull numbers were passed on each of the 5 m/s sked sessions with Kalgoorlie and Kerry VK5SU was heard on 14/12 in Perth off the back of VK6ZBM's beam! Others participating were VK6ZGZ and VK6ZJD. Lewis VK6ZGQ went portable to Esperance and with vertical whip heard returns from Perth. Hour rates for 14/12 were ; 15/12 600; and 16/12 704. VK6TZ used 250 watts PEP into QQE06/40 with 5 el. beam at 50 feet, FT620 driver.

52 MHz FM SURVEY

Latest news from George VK3ASV indicates the world-wide standard 6 metre calling FM channel of 52.525 MHz is slowly growing in activity in Australia, especially northern VK4, replacing the old AM net frequency of 53.032 MHz. In addition to the FM net in Brisbane, many stations have moved away from 53.032 and now operate on 53.995. This frequency has been suggested as suitable for use in VK3 to reduce Ch. 0 TVI. 52.525 FM was quite active during the last DX season in Melbourne, but has since gone rather dead.

In VK6 the primary channel is 52.656 and secondary 52.765 MHz. VK6WI re-broadcast their Sunday morning news on 52.656 also. The WA VHF Group Bulletin in November 1973 proposed a 6 metre band plan, viz. FM nets 52.500 to 52.800; AM nets 52.800 to 53.300. Experimental 53.300 to 54.000 MHz. VK6 also have used 52.586 as an AM net.

In NSW we find 52.656 used in some locations, but the primary FM net appears to be 53.950 in Sydney, especially for WICEN. The VK2 Division broadcast by VK2AWI is on 52.525 FM and 53.866 AM, and VK2BWI on 53.982 AM in the Wollongong area, this being an AM net in the Illawarra area. Other AM nets used in VK2 are 53.786, 53.826, 53.866 (primary AM), 53.920 (South Coast), 53.982 (Wollongong). Also 53.538 MHz has been used as an FM net. George adds — "What a mix-up!"

SA, including Alice Springs, use 52.525 FM, the main AM net being 53.100 MHz. Neither of these two frequencies are used by VK5WI; instead broadcasts are made on 52.150 using tuneable equipment and SSB.

Victoria, South Australia and Tasmania still use 53.032 AM net, but its use appears to be dying out. VK7WI and VK3WI up to recently used 53.032 AM for their broadcasts.

At the VK3 VHF Group meeting last March, John VK3ZMA advised two new 6 metre AM nets had been started in the Melbourne area, namely 52.900 and 53.100 MHz. In conclusion George adds he would like to see AM nets fade away, unless only for beginners up near 54 MHz away from TV, and more use made of low power 6 metre FM nets.

Thanks George for the information, which came via VK2ZTB. The most important point to come from your survey is the need for some semblance of order to be arranged for 6 metre net operation, whether AM or FM.

That will have to do for this time, there is quite a lot more which could be written, but due to the time lag at the moment, much of the news is too old for inclusion. Closing with the thought for the month: "The way some people find fault you'd thing there was a reward".

The Voice in the Hills.

STOP PRESS 432 MHz RECORD BROKEN

On Sunday, 2nd February 1975, a two way contact on 432 MHz was successfully completed by Wally VK6WG in Albany and Les VK3ZBJ in Melbourne. Signals were not strong, Wally used CW and Les SSB. Distance about 2440 km. That now narrows down the field for anyone wishing to extend the distance further; eastern Victoria or Tasmania remain about the last chances unless someone makes it to New Zealand. Good work boys, let us hope it acts as an incentive to others to get on 432 MHz.

BIG 144 MHz OPENING

For days the 2 metre enthusiasts in VK3, VK5 and VK6 have been watching the build-up of conditions suitable for long distance 2 metre operation. Finally with a zone of high pressure extending right across southern Australia conditions came right. First news came on 31/1 with Wally VK6WG at Albany working into VK5, also Aub VK6XY. Then Bob VK6BT was noted working Harry VK3XI on Channel B FM, and later VK5ZOO. Saturday conditions continued good right through to mid-day, then Sunday evening produced its share of signals together with the 432 MHz record. Bob VK6BE who deserves some reward through keeping up 40 metre schedules almost daily with VK5ZK and VK5LP, worked 10 VK5 and 16 VK3 stations on 144.100 SSB for a total of 67 contacts which is a pretty good effort. Bob commented that signals were up to 5 x 9, best contact being with VK3BMD who was operating mobile in Melbourne running 20 watts PEP to a five-eighth wavelength whip! That's hauling them in! Bob also added that VK3 had been worked via the Albany Ch. 2 repeater. Sunday evening contacts to Bob from VK5 were not over strong, but Garry VK5ZK and Peter VK5ZPS were able to work him. I had to listen to the others as Bob was too weak here. Garry commented that it was interesting that it was possible to work Bob on 2 metres but not on 20 or 40 metres. So much for VHF.

So that's the reward of the diversified operators. Those confined to repeater operation miss out on so much. Even after many years on VHF I still get a thrill from working someone long distance away, with my own equipment, not that provided by someone else on a hill. And how very interesting it becomes watching the weather pattern emerge, finally to note conditions are right. This time the ducting or inversion was centred some distance below the continent, restricting operation to those more favourably situated near the coastline, particularly Mt. Gambier and Victoria.

LATEST ON MOONBOUNCE

On 30/12 Chris VK5MC worked W8KPY on CW, received 449, sent 549. Heard K4IXC, then W8KPY called on SSB, Chris received 4 x 4, sent 5 x 4. W8KPY heard for three consecutive periods of 2 minutes. Both Ron VK3AKC and Trevor VK5NC present on those occasions.

On 21/1 heard 3 stations, but not well. Antenna not always in right spot for moon position.

Trevor VK5NC in Mt. Gambier with his 56 elements on 2 metres has heard the VK5MC echoes, also unidentified CW. Ron VK3AKC has improved his control system for 1296 MHz, now hearing good echoes 3 dB above noise consistently.

Contests

with Peter Brown VK4PJ

Federal Contests Manager, G.P.O. Box, 638
Brisbane, Qld., 4001.

CONTEST CALENDAR

MARCH	1 & 2	ARRL DX Phone
	8 & 9	BERU CW
	8 & 9	YL-OM CW
	15 & 16	ARRL DX CW
	22 - 24	BARTG Spring RTTY
	29 & 30	CQ WW WPX SSB
APRIL	5 & 6	Polish (SP)
	12 & 13	Swiss (H22)
	26 & 27	WAEDC RTTY

CONTEST DETAILS

A small number of overseas radio associations send full details of their forthcoming contests to the WIA and these usually arrive several months in advance of the contest date. It is not practicable to publish these rules and scoring tables in full as most would require a page of our journal. Most other information about DX contests is supplied by Frank W1WY, and this arrives by airmail about the middle of the month. Unfortunately the detailed info generally refers to contests which are to be held during the next calendar month. As copy for our magazine for that month must be with the Editor by the third of the preceding month it is frequently not possible to include as much contest information as some readers would like. However, if you send a SASE to me at Box 67, East Melbourne, 3002, the detail required will be forwarded to you.

1974 WPX SSB RESULTS

Frank, W1WY sent these out by airmail together with the following comment, "Not a bad showing for VK, but think you fellows could do better".

OCEANIA — Australia

VK1AOP	A	111,006	335	126
VK2OW	A	8,358	71	42
VK4VU	A	274,247	642	139
VK4FH	"	182,832	536	116
VK4AK	"	21,375	110	75
VK5NO	A	351,770	838	145
VK5MF	"	74,980	283	92
VK2XT	21	31,977	323	33
VK3SM	21	23,779	193	43
VK4PJ	"	714	19	14
VK2APK	14	229,824	479	171
VK6LK	14	99,975	281	129

ROSS HULL MEMORIAL CONTEST

Only two logs to hand up to this date, 26th January. A VK3 has 98 QSOs on 2 metres and 43 on 6 metres. A VK4 well north of Brisbane has 225 QSOs on 6 metres. There are some letters to hand and a few of them comment on the very limited opportunities amateurs in the Brisbane, Wagga and Melbourne areas have to use 6 metres. Another refers to similar restrictions in an area where TV Channel 5A limits 2 metre operation.

It is also suggested that the contest runs for too long a period; that there are better times in the year for VHF working; and that to score accurately one needs to be a mathematician with a very good atlas supplemented by detailed road maps of the various states. Then, if you have those qualifications and the equipment, there is the time necessary to calculate the distance of each QSO. Fortunately most writers, while being critical, also include constructive suggestions. However, all have stated that they enjoyed the Contest.

Well, I would not attempt to draft new rules for this Contest as it seems that special sections must be carefully defined. With that in mind I have requested that a committee be set up to "overhaul" all the contest rules and scoring tables. Recommendations can then be made and you, the contestants, should have the opportunity to comment before final decisions are made.

BERU 1975

A reminder that this contest will run from 1200Z Saturday, 8th March to 1200Z Sunday 9th March.

Rules as notified in AR for February. Trophy medallions to VK winner and middle placing.

RESULTS BERU 1974

VK2BPN	1775	VK3KS	480
VK3ZC	815	VK3RJ	275
VK2BJL	580	VK3KX	215
VK6RU	565		

The Receiving Contest was won by Eric Treblicock BCRS 195 who receives the Receiving Rose Book.

VK silver medallion VK2BPN, Bronze VK6RU.

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Crafers, SA, 5152

9G1 AWARD

The award is available to licensed amateurs. Contacts on and after 1st January 1958 are valid.

The applicant's own QSL cards for the Ghanian stations with whom contact is being claimed must be included with the application.

The award is available for all CW, all phone or mixed modes.

The fee for the award is 7 IRCs.

The address for application is:

QSL Awards Manager
Post box 3773
Accra, Ghana.

Requirements: Confirmed contacts are required with 5 different 9G1 stations using at least two bands.

5N AWARD

The award is available to licensed amateurs and shortwave listeners (on a "heard" basis).

Contacts with 5N stations are valid.

Do not send QSL cards. A list, showing full details of the contacts should be certified by the Awards Manager of a National Society.

The award is issued for all CW, all phone and mixed modes.

The fee for the award is 5 IRCs.

The address for applications is:

Nigerian Amateur Radio Society,
Post Box 2873
Lagos, Nigeria.

Requirements: Confirmed contact with 5 different 5N stations are required.

P.A.C.C.

The award is available to licensed amateurs.

Contacts on and after 1st June 1945 are valid.

Do not send QSLs. A list showing full details of the contacts should be certified by the Awards Manager of a National Society.

The fee for the award is 7 IRCs.

The address for application is:

Traffic Bureau VERON, C/o PA0AAC
Post box 1166
Arnhem, Holland

Requirements: Confirmed contacts are required with 100 different PA/PI stations. Stickers are available for 200 and 300 contacts.

Special Note: VERON organises an international PACC contest every year during the last weekend in April. Contacts made during this contest count without QSL cards provided that logs have been submitted by the PA/PI station for checking purposes.

DARWIN RELIEF FUND

The following donations to the WIA's Darwin Relief Fund for members who lost equipment in Darwin arising from Cyclone Tracy are acknowledged with grateful thanks—

List No. 1 — Total $92

VK6CW	$10
VK2ZHP	$20
VK7MX	$10
VK3LC	$50
VK7JU	$2

The Executive

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

The Editor,
Dear Sir,

I would appreciate it if you would make the following matter as widely known as possible.

Until January of this year, I had the call sign VK2HT and had been a member of the WIA for 15 years. In May 1973, I had a severe heart attack, and was in the hospital four times in the year.

I realised I would have to retire from my profession, and gave up all my gear to various clubs. I surrendered my licence and resigned from the WIA reluctantly. I went to live in a small unit where aerial systems were impossible. My problem is that for a few past years there is a very active pirate who uses my call sign VK2HT, and for several years I have been getting a flood of DX cards for contacts he has made in my name. He has the nerve to use my name and address (former) and I have been greatly embarrassed by his activity. I would like it known that VK2HT is now no longer a legitimate call sign. I would appreciate it if anyone can catch this pirate and let me know, and I shall take legal action against him. He is still vary active. Recently, I had an official letter from Germany asking for details of a QSD a month or two ago, as they were suspicious about the call. I have not made a call on the air for nearly two years.

If anyone can supply me with information I would be very glad to take steps. The pirate is very familiar with my, or what was my setup, and is very active. Is there any way that he can be nailed and stopped, as he is still active and cards especially from Japan are coming in?

Thanking you for all tha years of good fellowship and wishing you wall with many new recruits in the coming year.

73,
(Rev.) Harry Harris
5/25 Etonville Parade,
Croydon, NSW, 2132

The Editor,
Amateur Radio
Dear Sir,

Townsville Pacific Festival Results for Contest.

Re the abovementioned contest results, it would be appreciated if a correction could be published.

In the published results I omitted to include tha score of VK1VP.

Score for VK1VP was 150 points in section 'A' and was the highest score for VK1.

R. R. Kearney, VK4HE
Queensland Contest Manager

The Editor,
Amateur Radio
Dear Sir,

In reply to the letters in AR January 1975 about the increase in licence fee, a number of points need to be discussed:—

1. Mr. Morris implies that amateurs are paying considerably less than the "poor" commercial operator. Unfortunately as an amateur I cannot use my radio for the purpose of gaining income nor can I claim the licence and equipment costs as a tax deduction thus effectively halving the cost of these items. My radio actually COSTS me $12 whereas tha majority of commercials would be savings costs or actually making money from their operations.

2. If Mr. Watkins had been a complainer he would hava, lika me, received a letter from the PMG which clearly illustrated how littla our political masters realise what amateur radio is and what contribution it makes to the community. The important crisis when it comes will most surely be settled against us in the present climate of opinion. We must be sufficiently politically aware to realise that without continual representation of our interests to parliamentarians and bureaucrats we will most certainly be ignored as insignificant and ineffectual. However, if we choose to represent our case at every turn against us, and the fees increase is an ideal opportunity,

then we will avoid losing the majority of the 144 MHz and 432 MHz bands to the commercials, so beloved by Mr. Morris. These same commercials realise something amateurs do not; they are prepared to employ considerable monies on direct and indirect lobbying . . . even to the extent of fostering a feeling of helplessness in the ranks of amateurs perhaps

Amateurs must stop being ostriches. Politicians hold the power of life or death over our hobby and will not just go away if we are "good boys" and keep quiet when we are disadvantaged. There are plenty of others waiting in the wings to knock the amateur and take over our frequencies for the purposes of commercial profit.

Yours faithfully,
R. Martin Luther VK4VU

Editor,
Amateur Radio
Dear Sir,

With reference to Eric Jamieson's VHF/UHF column of December AR I wish to take issue with several of his inferences.

I cannot believe it is the opinion of the bulk of SSB tuneable stations in the 6 metre band that AM stations, tuneable or crystal locked, should be excluded from the first 300 kHz of the band. The fact that AM requires a bit more spectrum than SSB should not preclude AM operation anywhere in a band 2 MHz wide. If Eric is worried about bandwidth why advocate impressing 25 watts of audio on 35 watts of carrier with the resultant splatter Some SSB signals I have heard on 6 metres occupied a dam site more bandwidth than a well modulated AM rig. Perhaps some operators without the ability or interest to home-brew a rig, even lack the ability to operate commercial equipment! To infer that the first 300 kHz of the 6 metre band is the preserve of SSB tuneable operations smacks of self indulgence that is hardly compatible with the ethics of amateur operations in the VHF/UHF spectrum as I understand them — those of tolerance and encouragement.

A well known fact is that a certain percentage of amateurs are well heeled and can afford commercial SSB equipment. Eric may well be one within this group but I sincerely hope his indulgent sentiments for that group are not representative of that group. A great percentage of the amateur fraternity is comprised of the lower income group whose capacity for investment in equipment is limited to homebrew, ex-commercial or disposals type equipment very little of which is SSB. I find intolerable the inference that this group should not pursue their hobby with the equipment available to them in the spectrum not specifically designated for other services.

As DX is, generally, first worked within the first 300 kHz of 6 metres, as the MUF slowly arises, to suggest that only SSB stations should be first (as they invariably are anyhow) to work it would be to deny a section of our fraternity the very experience to which they aspire. I remind Eric that AM stations which perennially utilise the 6 metre band help justify our frequency allocation. Many SSB stations only work the frequency during the DX "season".

I consider we should actively encourage all modes of operation anywhere in the tuneable sections of 6 metres and can do without the parochial attitudes that frequently prevail.

P. Pendlebury, VK3ZAA

The Editor,
Amateur Radio
Dear Sir,

My thanks to you for giving me an opportunity of replying to the above letter. My first reaction after rushing to look at what I had actually written and heaving a sigh of relief, was to ignore the letter if only because of inaccuracies and misinterpretations, but after a couple of days decided the best interests of "VHF — An expanding world" would be served by a reply.

I would suggest readers at this stage get out December 1974 "Amateur Radio" and look at what I did write on page 19, the VHF page, under the sub-heading "The DX is coming". Having done this, now read the letter from VK3ZAA again.

How anybody can possibly dream up the implication that I advocate AM stations should operate above 52.3 MHz is beyond me. There is no mention of AM, not even by implication, at all until halfway down the paragraph when I say: 'If you are running AM, please see your signal is well modulated . . ."

I suggested operating above 52.3 MHz for crystal locked transmissions simply because a station up there should be in the clear "when the band is wide open" and being in that region such a station would be less likely to finish on top of someone else, and better able to be worked by others. Good grief! What should I say? The suggestion I made for those type of conditions is perfectly sound — if VK3ZAA wants to operate 10 kHz inside the band or elsewhere, crystal locked AM or SSB that's ok by me — but any inability to move up or down a few kHz to get into the clear under crowded conditions will certainly preclude many contacts.

Mr. Pendlebury comments at the start of his second paragraph that he doesn't believe it to be the opinion of the bulk of SSB operators that AM stations should be excluded from the first 300 kHz of the band. Of course it wasn't. Who said it was? I did not. How anyone can read that out of what I wrote is beyond me. How do you reply to such wild statements? If he can read that out of my writings what hope have I of convincing him of anything.

I note Mr. Pendlebury received his call sign in late 1972. Perhaps he is young, and rather inexperienced. If so, time will help this situation. If he is of mature years then he would be well advised to study more carefully written words before rushing into print. When he has experienced one of those days "with the band wide open" as they were some years ago, but not so much of recent time, he will surely better understand the reasoning behind my suggestion.

To accuse me of parochial attitudes and other various inferences is quite laughable. I guess there are many who have read my notes in various publications over the years who would back me completely when I state I have always believed I have adopted a most tolerant and understanding attitude towards all on the various bands — i.e. steering a middle course, and with as little bias as possible. I cannot remember when the Editor last blue-pencilled any of my notes!

Yes, Mr. Pendlebury, I do have a few items of commercial equipment, but I have a lot of home-brew too, I guess there would not be a lot of amateurs around in VK who over the years have constructed more equipment than I, ranging from AM, DSB, SSB and FM for both HF and VHF. Various converters, 6 and 2 metre transverters, 432 MHz transverter, power amps., linear amps., portable and mobile equipment, SWR meters, noise bridges, antenna tuners, antennas, test equipment, power supplies, and so I could go on. Perhaps you will grant me the privilege to own a few pieces of commercial equipment now. My operational interests are surely diversified when you know that I operate 160 to 10 metres SSB, 6 and 2 metres AM, SSB, FM and CW, 432 MHz AM, SSB and CW, and before long on 576 MHz too. Apparently in your words this makes me self-indulgent, lacking in tolerance and encouragement. At least I do my share to keep the bands occupied by operating in all segments and using all modes Are you playing your part to keep the bands alive?

I conclude with a relevant thought from the writings of Bertrand Russell . . . "The degree of one's emotion varies inversely with one's knowledge of the facts — the less you know the hotter you get".

73, Eric Jamieson, VK5LP

solar flux and sunspots

Frank Hine VK2QL
30 Abbotsford Road, Homebush, 2140

Arrangements have been made by Frank VK2QL with the Ionospheric Prediction Service, for the daily flux number for the preceding week to be included in the weekly broadcast over VK2WI.

A word of warning though is necessary. This Solar Flux number is not related to the actual sun spot number, but for the avid DXer, this flux number can be used as a guide to propagation conditions that have taken place, and one can form an opinion of what may be expected in the future.

For those who have the means of listening to WWV, this flux number is given every day at 18 minutes past the hour.

An indication of how this flux number could be used was the weekend of the CW section of the VK/ZL contest when excellent conditions prevailed until the Magnetic disturbance round 1200Z on the Sunday. The flux number in this instance reached 144, and then plummeted to round the 70 mark.

The flux number could have been used as a guide for the CW section of the WW contest when again the flux number rose, with a quiet sun, to almost 100 after slowly climbing from the mid 80s. During this contest the 28 MHz band was wide open to all parts of the world.

At present there are 2 theories being advanced on the current cycle. One is that it will follow aproximately the normal 11 year cycle, and on going back to the sunspot number records Frank has since 1954, it could be about the middle of next year. However, mathematicians have produced a strong case to indicate that the bottom t time will not be reached until the year 1977.

The I.P.S. have advised VK2QL that one sun spot of the new cycle has been sighted for a short period of a few hours only. When nearing the bottom of a cycle, it is possible to tell whether a sunspot belongs to the old or the new cycle, but it is too involved to cover in this report.

COMPLETE SUMMARY OF SMOOTHED MONTHLY MEAN VALUES OF SUNSPOT NUMBERS AT ZURICH

Year	Jan	Feb	Mar	Apr	May	Jne	July	Aug	Sep	Oct	Nov	Dec
1954	6.4	5.6	4.2	3.4	3.7	4.2	5.4	7.2	7.8	7.9	9.4	12.0
1955	14.2	16.4	19.5	23.4	28.8	35.1	40.1	46.5	55.5	64.4	73	81.0
1956	88.8	98.4	109.2	118.8	127.4	136.9	145.5	149.6	151.4	156.0	159.9	164.3
1957	170.2	172.2	174.3	181.0	185.5	187.8	191.4	194.4	197.2	199.5	200.8	200.0
1958	199.0	201.0	201.2	196.8	191.4	186.8	184.7	184.9	183.8	182.2	180.8	180.5
1959	178.6	176.8	173.5	168.4	164.4	161.4	155.8	151.2	146.2	141.0	137.2	132.6
1960	129.0	125.0	121.6	119.6	117.0	114.0	108.6	102.4	97.8	92.8	87.4	83.6
1961	80.2	74.8	68.8	64.3	60.0	55.8	53.1	52.4	52.3	51.8	50.9	48.7
1962	45.2	41.8	39.8	39.4	39.2	38.3	36.8	35.0	32.7	30.8	30.0	29.8
1963	29.4	29.8	29.8	29.0	28.8	28.2	27.7	27.2	26.9	26.0	23.8	21.3
1964	19.5	17.8	15.4	12.7	10.8	10.2	10.4	10.4	10.0	9.7	10.3	11.2
1965	12.0	12.3	12.7	13.8	14.7	15.2	15.4	16.5	17.2	19.4	21.9	23.9
1966	27.0	30.6	33.6	36.4	39.5	43.3	48.8	56.4	62.7	68.8	69.0	71.2
1967	73.1	78.4	79.4	81.5	84.2	87.8	93.8	94.6	94.4	94.0	96.2	100.0
1968	102.2	102.7	104.8	107.4	107.8	107.0	105.2	104.8	107.1	109.6	110.0	109.4
1969	108.6	107.6	105.3	103.0	103.2	102.6	106.1	106.9	105.8	104.5	105.0	105.6
1970	106.2	106.7	106.8	106.6	106.1	105.1	103.3	99.6	95.4	91.8	87.2	81.6
1971	77.8	75.2	71.6	68.0	65.0	63.9	65.5	65.0	66.4	67.1	67.6	69.9
1972	76.8	71.2	72.4	73.4	72.9	70.4	68.1	65.4	62.0	60.4	58.5	54.8
1973	50.4	45.9	43.6	42.2	40.3	38.6	37.6	36.4	34.8	33.2	32.6	32.6
1974	34.2	36.2	35.8	35.7								

Commercial Kinks

with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley, 3150

This month it's back to our old friend the FT200 for a few quick and easy hints.

First it's over to Lionel Swain VK2CS.

"Ever since I have had my FT200, the associated FP200 power supply has had a terrifying metallic "Clunk" every time it was switched on, due apparently to the momentary short circuit in the form of the discharged filter capacitors. In fact during that time, I have blown the 5 amp fuse in the power transformer primary twice due apparently to no other reason than that the switch closed at the instant of maximum current.

During the week I had a rush of brains and installed a CZII thermister in the transformer primary circuit — and the saints be praised, there is now only a barely perceptible grunt when the power is switched on. There are many types of thermistors available, but the CZII seems to be optimum for most transceivers although the higher power types may need a CZ12".

Lionel's idea is certainly worth the time it would take. Many amateurs have had trouble with diodes blowing in the FP200. The thermistor would no doubt ease the strain on them too.

Receiver cross modulation is a problem that seems to effect some amateurs more than others. Over the years I have had no serious trouble with the FT200 in this regard but if you happen to live in an area where broadcast signals are strong on 40 metres, here are a few simple modifications.

The harmonic producing diode (D301) in the output of the crystal calibrator circuit is the number one suspect as it is connected to the receiver input at all times.

Fortunately, there is a spare set of switching contacts on the receive/operate/calibrate control, and this can be utilised in two different ways.

The first and easiest way is to route the output line of the calibrator through the switch. It is necessary to use a small diameter coaxial cable for this and in order that the capacity of the cable does not appear across the input of receiver, insert a 10 pF ceramic capacitor at the junction of the cable and the receiver input. The second method is a little more sophisticated. It involves applying a bias to the diode to effectively cut it out of circuit. Four new components are needed plus a small amount of re-wiring. Needed are two 47K ohm resistors and two 4700 pF ceramic capacitors. First locate the 9 volt connection on the Rec/Op/Cal and bridge to the spare section so that it connects to the moving arm in the operate position.

From the junction of C306 and D301 connect a 47K resistor to ground. Connect one of the .0047 mF between D301 and C301. Now connect a 47K resistor from the junction of the 4700 pF capacitor and the diode to the moving arm of the Rec/Op/Cal switch and bypass the switch end of the 47K resistor to ground with another 4700 pF capacitor. This completes the modification.

Many of the older SSB transceivers lacked a means of varying the drive under tune-up conditions. Next month we will discuss means of incorporating a drive control in Swan and similar rigs.

PROJECT AUSTRALIS

with David Hull, VK3ZDH

FUTURE

In the middle of March the author will be attending an AMSAT meeting in Washington which will explore the roles of the National groups in future satellites. Up for consideration by the meeting will be a new Project Australis command system together with an integrated RTTY Telemetry/Codestore system. If present plans work out these sub-systems will be part of a future joint Australis/AMSAT CANADA satellite project designed to provide a continuation of the low orbit (a la Oscar 6 and 7) programme into the late 1970s. Members are invited to write to Project Australis with suggestions for future satellite projects. Any mail should reach me before my departure on March 13th.

PAST

Some difficulties were experienced in late January and early February with Oscar 6 commands affecting Oscar 7. At this time the satellites were virtually in the same spot in the sky and despite precautions some of the dozens of commands a day fired at Oscar 6 caused unscheduled mode changing in Oscar 7. We apologise for any inconvenience caused but these problems were really out of our control.

OSCAR 6 REF ORBITS MARCH

Day	Orbit	Time Z	Long °W
1	10849	125.24	68.7
2	10861	25.18	53.7
3	10874	120.10	67.4
4	10886	20.04	52.4
5	10899	114.96	66.2
6	10911	14.89	51.1
7	10924	109.82	64.9
8	10936	9.75	49.8
9	10949	104.68	63.6
10	10961	4.61	48.6
11	10974	59.54	62.3
12	10987	154.47	76.0
13	10999	54.40	61.0
14	11012	149.33	74.7
15	11024	49.26	59.7
16	11037	144.19	73.4
17	11049	44.12	58.4
18	11062	139.05	72.2
19	11074	38.98	57.1
20	11087	133.91	70.9
21	11099	33.84	55.9
22	11112	128.77	69.6
23	11124	28.70	54.6
24	11137	123.63	68.4
25	11149	23.56	53.3
26	11162	118.49	67.0
27	11174	18.42	52.0
28	11187	113.35	65.7
29	11199	13.28	50.7
30	11212	108.21	64.4
31	11224	8.14	49.4

OSCAR 7 REF ORBITS MARCH

Day	Orbit	Time Z	Long °W
1	1320	108.23	6.8
2	1332	7.56	51.6
3	1345	101.85	65.2
4	1357	1.18	50.0
5	1370	55.47	63.6
6	1383	149.75	77.1
7	1395	49.09	62.0
8	1408	143.37	75.5
9	1420	42.71	60.4
10	1433	136.99	73.9
11	1445	36.32	58.8
12	1458	130.61	72.3
13	1470	29.94	57.2
14	1483	124.23	70.7
15	1495	23.56	55.6
16	1508	117.85	69.1
17	1520	17.18	54.0
18	1533	111.47	67.5
19	1545	10.80	52.4
20	1558	105.08	65.9
21	1570	4.42	50.8
22	1583	58.70	64.3
23	1596	152.99	77.9
24	1608	53.32	62.7
25	1621	146.61	76.3
26	1633	45.94	61.1
27	1646	140.23	74.7
28	1658	39.56	59.5
29	1671	133.84	73.1
30	1683	33.18	57.9
31	1696	127.46	71.5

Intruder Watch

with Alf Chandler VK3LC

1536 High Street, Glen Iris, 3146

A few of the successes that the Intruder Watch has achieved may be interesting to Members, but firstly a plea may be more appropriate. I have a rather comprehensive report on the Broadcasters in the 3.5 MHz band emanating from Indonesia, but need more information. On comparing notes with the U.S. I find that the frequencies given are compatible with frequencies on which Observers in the U.S. can hear A0 carriers, but cannot get enough strength for identification. I quote from a communication from K6KA — "We need help, particularly from Region 3 because it involves tropical and southern reports where we can NOT, repeat NOT, get anything at all here during the winter months.

I have been hearing only a very few signals on 14 MHz so that we are down to practically nothing, but if we know from southern hemisphere reports that a certain signal is coming through we can watch for it and just as soon as we find it we can alert it to FCC and get some action. This has proved extremely useful".

Now for some successes —

1. A harmonic on 14240 from the BBC relay in Johore, Malaysia, was causing a lot of interference. The RSGB became interested and got the engineers to suppress the 2nd harmonic down to —79DB and we haven't heard it since.

2. We complained about a harmonic from a station on Okinawa on 14330 kHz and they fixed that.

3. On 14115 the Voice of America station in the Philippines was heard and reported by one of my Observers. I subsequently reported it to the U.S. and the engineers cured the spurious. An interesting phenomenon occurred here. It was found that two closely located transmitters were interacting to produce the spurious — the harmonic of one and the fundamental of another transmitter were mixing to propagate a signal on 14115 kHz.

4. A spurious signal (A3) on 14231.7 kHz took a long time to track down. We eventually found it to be in Thailand. By Amateur methods we ran it down to a broadcast station of the local television company at the airport at Bangkok. The company didn't want to replace the old transmitter because they hoped it would stand up for a little longer, but by persuasion through their engineers it was replaced and the spurious cured.

There are many more I could recount, but space does not permit. You will remember in a previous issue about KJG in Yugoslavia, and TCX in Turkey. It is by co-operation between Observers, and between Amateur Societies that the best work has been done; in other words **BY AMATEUR METHODS.**

Reference the Majak (Russian) jammer on 7030-7040 kHz jamming the Peking broadcast on 7035 kHz the signal strength from that jammer has been measured in Los Angeles and is 2000 microvolts (that's two millivolts) that is an awful lot of signal, and no wonder it is so troublesome here in Australia.

20 Years Ago

with Ron Fisher VK3OM

MARCH 1955

Our Waning Heritage. The Editorial for March 1955 looked at our use or perhaps our non-use of the amateur bands. One paragraph was significant: "To protect what's left it has been said that we cannot now expect to rely on the two larger world societies to represent Australia at the next International Conference — when ever that might be. We must have our own representative there". And indeed we did.

Only one main technical article appeared, however it was a case of quality rather than quantity. Eric Cornelius VK6EC, remembered of course for his superb series on television a short time earlier, wrote on "Wobbulators — Sweep Generators".

The late Don Knock VK2NO supplied a few interesting "Hints and Kinks". Six metre men were having fun. The VHF column, "Fifty Megacycles and Above" reported DX contacts between VR2CG in Fiji and VK6HK in Perth. FK8AB listening only, heard VK2, 4, 5, ZL and VR2, while VK1ZM on Macquarie Island heard many New Zealand stations.

The Short Wave Listener Section reported on stations heard, activities of members plus a few technical ideas including the perennial 'S' meter circuit.

Hamads

- Eight lines free to all W.I.A. members. $6 per 3 cms. for other amateurs and S.W.L.'s.
- Copy should be in block letters or typescript, signed and forwarded to The Editor, P.O. Box 150, Toorak, Vic., 3142.
- Excludes commercial advertising.
- Closing date for Hamads is the 3rd day of the month preceding publication.
- QTHR means the advertiser's name and address are correct in the current Australian Callbook.

FOR SALE

A.R. Type Frequency Counter with prescaler to 200 MHz, $120.00 ONO. B. Bathols VK3UV, 3 Conewarra Ave., Aspendale, 3195. Ph. (03) 90 6424 (evenings).

FT101 excellent condition (no 160m), $430 or best offer. ICOM IC-22 mobile transceiver, 4 months old, complete with 1/4/50 and accessories, $175. Russell Kelly, VK3NT. Ph. (03) 81 7243.

AWA MR6A Car Phones, FM. One on ch. 40, one on 52.525. Both in clean condition and work well. Easily changed to multi-channel operation, $50.00 each, or $95.00 for the two. VK4UX, QTHR.

Swan 350 T/R, AC PSU, spare PA tubes. **BC221** Freq. Meter with handbook and circuit for solid state. **Phillips** CRO 2 inch CRT. Variety PWR transformers, valves, etc. Best offers. VK3AJR, QTHR.

TV Equipment. AWA TV off air receiver, $40.00. Video monitors, various sizes, $40.00. Studio Sync. generator RCA T92, $45.00. Monoscope TV picture generator with sync. generator, spare tubes, $50.00. EMI 302 Wave Form Monitor, $40.00. RCA Video Switcher 3 x 9 inputs, $50.00. Various other TV equipment. All items ONO. D. Stokes, VK2ZPM, QTHR. Ph. (02) 476 2304.

2 Phillips Battery Eliminators with valves, very early AWA radio. 9 valve Kriesler radio P.P. 2A3s are gassy. Also Type "S" power supply, in good order. J. E. Mackie, VK2ZDM, Hillston.

Geloso Transmitter and PSU G4/229 with matching speaker, mike, manual, 80-10 Mx SSB — 260 W PEP, CW 225 W, AM 120 W. As new condition, $350.00. Miss E. Wookey, 158 Kilgour St., Geelong. Ph. (052) 21 2674.

Completed Wellington VHF Group handheld 2m FM Transceiver Kit with xtals for channels R1 and 40 plus 7W amplifier stage and pre-amp, $75. Mosley 4 band trap vertical 10-40 m, $30. Type 3 Mk 2 portable transceiver AM & CW, 14-1.8 MHz, $50. VK3AHG, QTHR. Ph. (03) 288 2024.

Yaesu FT101B. Brand new, $545. VK3YBA, 97 Victor Rd., Sth. Oakleigh, 3167.

Yaesu FT75 Transceiver, DC75 power supply, FV50 C VFO, Hygain 18V portable antenna 80m-10m. And 30 ft. UR67 coax — all in new condition and complete, $300.00. R. F. Lloyd, VK3KK, QTHR. Ph. (03) 652 8377 bus.; (03) 46 4200 A.H.

6m FM Model 88 set and handbook, $5. Also Selr motors, offer, VK3ZKS, QTHR. Ph. (03) 38 6793.

Collins R391/URR Receiver, .5-32 MHz, good cond. including manual. See articles AR, $500. J. G. Maciver, 27 Jeanette Ave., Springwood, Qld., 4127. Ph. (072) 80 4020 A.H.

Yaesu-FL200B Transmitter, in excellent working order. 80 to 10m. Complete with matching microphone and 10 new spare valves. $160.00. VK6HE, QTHR.

Solid State Television Vidicon Camera, complete with fast scan to slow scan sampling converter for SSTV operation. Home brew but very neat construction and small in size. Vidicon nearly new and complete with lens, $100.00. VK5GV, QTHR. Ph. (08) 262 5152.

Tower 25 ft., single section Hills, 10 in. triangle, $15. Hills 10 el. 2m Yagi $7. CDR rotator TR-44 with indicator and 240/110V trans, $40. VK2AQW, QTHR. Ph. (02) 449 3538.

104 Copies QST, 1965-1973, some complete years, good condition. Any reasonable offer accepted. Also RSGB "Radiocommunication" 1965-1972, 101 copies, some complete years, good condition, price as above. VK4MY, QTHR.

Eddystone 888A Receiver, ham bands 1.6-30 MHz, 100 kHz calibrator with data sheet, price $150.00. VK4MY, QTHR.

FT DX 560, immaculate condition, little used, professionally modified to better than FT DX 401D specs. Incl. 160 metres, fan, CW filter, noise blanker, noise limiter, full metering of HT, screen current and volts, SWR, $495. **FV 401,** external VFO as new in carton, $110. Matching external speaker, $25. **Magnum Six RF** speech processor, suitable FT DX 400, 401, 560, as new, little use, $135. The lot $740. VK3ARZ, 12 Explorers Court, Vermont South, 3133. Ph. (03) 232 9492.

AR7 all coil boxes, $80. Many aerial tuning caps, OAK switches and ex aircraft gear. Phone 668-9054. VK2ZKV, 41 Torres St., Kurnell, 2231.

WANTED

SSB HF Bands Transceiver, suitable for AC and DC operation. W. Marshallsea, VK2ADZ, 28 Probert Ave., Griffith, N.S.W., 2680. Ph. (069) 62 3718 A.H.

Kindly Amateur to Coach keen but busy prospect at my QTH or yours to pass AOCP in August 1975. Agree to pay coaching fee for good no nonsense knowledgeable approach. Offers to Stephen Phillips, 7 Macedon Court, Nunawading. Ph. (03) 878 8336 — S. G. Phillips.

Service Manuals for Pye Transistor FM Ranger model PTCA 8002 TWL and Vinten Vantage MTR 19 B. J. Cleret, Linton, Bombala, N.S.W., 2553.

Circuit Diagram for No. 19 wireless set wanted urgently. John Sparkes, 105 Daglish St., Wembley WA, 6014. Ph. (092) 81 6030.

Heavy duty commercial 12 volts DC Mobile Power Supply Unit to suit Swan 350, 800 volt at 500 ma. etc. etc. Price and specs. to VK4OV, 4 Topaz St., Mount Isa, Q. 4825. Ph. (077) 43 2808.

Economical Mobile/Base Station FT-201

FEATURES

- Built-In AC power supply (DC optional)
- 260 Watts peak SSB 180 Watts CW & 80 Watts AM
- Factory sealed, solid state VFO with 1 KHz readout
- Effective Noise Blanker, threshold adjustable, for elimination of noise spikes
- Built-in front panel adjustable VOX
- Automatic break-in CW operation with sidetone
- ±5 KHz receiver clarifier
- Built-in WWV/JJY reception
- Adjustable carrier level for tune-up and Novice operation
- Indicator lights for internal VFO and clarifier operation
- All mode operation · SSB, CW, & AM
- Fast or slow receiver AGC
- Built-in internal crystal control provision and dual VFO adaptor
- Built-in final cooling fan
- Complete line of compatible accessories for flexible station design

TECHNICAL DATA

GENERAL

Frequency Range: 3.5–4.0 MHz, 7.0–7.5 MHz, 14.0–14.5 MHz, 21.0–21.5 MHz, 28.0–30.0 MHz, WWV 15 MHz (receive only).

Mode: Selectable USB, LSB, CW or AM.
Frequency Stability: Within 100 Hz during any 30 minute period after warm-up. Not more than 100Hz with 10% line voltage variation.
Calibration Accuracy: 2 KHz maximum after 100 KHz calibration.
Backlash: Not more than 50 Hz.
Antenna Impedance: 50 to 75 Ohm unbalanced nominal.
Circuitry: 32 Transistors, 9 FET, 6 Integrated Circuits, 52 Diodes and 3 Tubes.
Power Requirement: 100/110/117/200/220/234 V AC, 50/60 Hz, 380 Watts maximum, or 13.5V DC nominal, 6.7 A for standby, 0.7 A for receive (Heater OFF) and 24 A for transmit.
Size: 340(W) x 153(H) x 285(D) m/m.
Weight: 15 Kg.

RECEIVER

Sensitivity: 0.3 μV for 10 dB Noise plus Signal to Noise Ratio on 14 MHz.
Selectivity: 2.4 KHz nominal bandwidth at 6 dB down, 3.8 KHz at 60 dB down on SSB, CW and AM. 600 Hz nominal bandwidth at 6 dB down, 1.2 KHz at 60 dB down with optional CW filter. 600 Hz nominal bandwidth at 6 dB down, 12 KHz at 60 dB down with optional AM filter.
Harmonic & Other Spurious Response: Image Rejection better than 50 dB. Internal Spurious Signal below 1 μV equivalent to antenna input.
Automatic Gain Control: AGC threshold nominal 6 μV. Selectable AGC time constant, fast or slow. Fast attack time 3 milli-second and slow attack time 5 milli-second. Fast release time 0.35 second and slow release time 2 seconds.
Audio Noise Level: Not less than 40 dB below 1 Watt.
Audio Output: 3 Watts to internal or external speaker at 4 Ohm impedance.
Audio Distortion: Less than 10% at 3 Watts output.

TRANSMITTER

Input Power: 260 Watts PEP on SSB, 180 Watts on CW at 50% duty cycle and 80 Watts on AM. (Slightly lower on 10 meter.)
Microphone: 50 K Ohm dynamic type.
Carrier Suppression: −40 dB.
Sideband Suppression: −50 dB.
Spurious Radiation: −40 dB.
Distortion Products: −30 dB.
Frequency Response: 300 Hz to 2700 Hz ± 3 dB.
Final Tube: 6JS6C x 2.

(continued from July, 1974)

3ZYO—P. S. Collins, 5 Van-Wyk Court, Springvale, 3172
3ZZG—I. R. Gillard, 6 Miami Court, Bendigo, 3550

QUEENSLAND

VK4AS—K. H. Smith, 17 Sefton Avenue, Clayfield, 4011
4NM—A. B. Nyhuis, "Forests Lodge", Port Douglas Road, Port Douglas, 4871
4OH—D. R. Ham, 20 Alfred St., Charleville, 4470
4SI—J. E. Spencer, Station: Burnside Road, Nambour; Postal: PS 1712, Nambour, 4560

SOUTH AUSTRALIA

VK5GZ—E. B. Gliddon, 31 Hillside Ave., Highbury, 5089
5VU—A. J. Pawelczyk, F/23 Cartlidge 515 MN North Road, Elizabeth, 5112
5ZLB—L. J. Blee, 18 Norfolk Ave., Fulham Gardens, 5024
5ZMW—B. M. Wallis, Lot 9,Quintrell Road, Virginia, 5120
5ZRT—R. Battilana, 7 Mitcham Avenue, Lower Mitcham, 5062
5ZZA—B. J. Lenny, 5 Wells rescent, Valley View, 5093
5BO—A. E. Williams, 33 May race, Ottoway, 5013
5FV—V. Clemence, 21 Thompson Ave., Salisbury Downs, 5108
5SF—M. H. Wood, 22 Bloomfield Cres., Elizabeth Downs, 5113
5TW—W. E. Giles Clark, 355 Shepherds Hill Road, Blackwood, 5054
5ZB—E. B. Stephenson, 1 Emily Ave., Clapham, 5062
5ZOF—G. C. Adams, 4 Willowie St., Eden Hills, 5050
5ZPC—P. Clemence, 21 Thompson Ave., Salisbury Downs, 5109

WESTERN AUSTRALIA

VK6XK—B. A. Wheeler, Station: 1 Yalberee St., Newman; Postal: P.O. Box 146, Newman, 6753
6DR—J. G. Harmsen, 3 Silverton Tce., Willetton, 6155
6NY/P—M. B. Bertram, Station: Portable; Postal: 26 Gloster St., Subiaco, 6008
6EM—S. E. Harrison, 18 Linton Place, Morley, 6062
6PR/T—R. T. Fisher, 16 Lindsay Way, Padbury, 6025
6QR—D. M. Maley, 16 Narrung Way, Nollamara, 6061
6NL—V. H. Harris, "Birkenhead", Lot 650 Scotsdale Rd., Denmark, 6333
6ZBC—G. J. O. Coles, Station: 90 Parramatta Road, Doubleview; Postal: P.O. Box 164, Doubleview, 6018
6ZKO/T—P. R. Casper, Lot 61, Burrinjuck Road, Gooseberry Hill, 6076

TASMANIA

Nil

NORTHERN TERRITORY

VK8AC—A. J. Kelso, Captain Cook Hostel, Nhulunbuy; Postal: P.O. Box 55, Nhulunbuy, 5797
8AJ—A. C. Johnson, 2922 Knowles St., Jingili, 5792
8ZRD—Dr. Gordon, 3312 Thornton Crescent, Casuarina, 5792

CANCELLED STATIONS

AUSTRALIAN CAPITAL TERRITORY

VK1IGI—I. Grant, non-payment
1SR—S. N. Graves, not required
1ZPB—P. S. Bell, not required

NEW SOUTH WALES

VK2BRC—Taree O.K. Youth Radio Club, no longer required
2LM—L. M. Wilson, non-payment
2YAI—L. G. Baker, no longer required
2ZXB—F. R. O'Hare, no longer required
2ZWF—B. J. Foster, non-payment
2AT/T—L. Altman, deceased
2IU—M. J. McDonald, non-payment
2ZGT—R. C. McGregor, not required
2ZYZ/T—H. J. Smith, not required
2ZRX—W. S. Baynes, non-payment
2BPR—H. Pearson, non-payment
2BZE—M. S. Hort, not required
2UG—R. W. Eagling, not required
2BZA—W. Senior, not required
2YBE—N. C. Welstead, not required
2ZCW—J. B. Webster, not required
2BVT—G. Ulm, non-payment
2YD — T. D. Withnall, non-payment
2ZWO—J. H. Howe, non-payment

VICTORIA

VK3DT—M. J. Rieper, transferred to New South Wales
3XU—J. R. Oxley, not renewed
3AZK—W. D. Harwood, now VK3SR
3AMY—M. J. Mains, not renewed
3BGO—R. N. Swift, not renewed
3YFJ—P. G. Niehoff, not renewed
3YFW—W. G. McDerrmott, transfered to Queensland
3YHJ—M. J. Ross, now VK3LT
3ZNW—L. R. Stewart, now VK3ASW
3ZRO—R. W. Duckworth, now VK3AIC
3ZQW—J. L. Gras, transferred to New South Wales
3YGS—Q. J. Clare, transferred to Queensland

QUEENSLAND

VK4AG—A. J. Greenham, not renewed
4DS—De La Salle College Radio Club, disbanded
4EJ—E. J. Chandler, deceased
4OY—J. C. A. Young, deceased
4RS—R. E. Stacey, deceased
4RT—R. H. Coat, transferred to South Australia
4YU—G. C. F. Dillon, transferred to Victoria

SOUTH AUSTRALIA

VK5OM—J. L. Watts, not renewed

WESTERN AUSTRALIA

VK6RV—R. G. B. Vaughan, left country, now in United Kingdom
6WK—T. W. Ruse, not renewed
6ZAG—G. E. Waits, non-payment renewal fee

TASMANIA

Nil

NORTHERN TERRITORY

Nil

AUGUST, 1974

NEW STATIONS

AUSTRALIAN CAPITAL TERRITORY

VK1ZSH—S. H. Neilsen, 6/86 Anzac Park, Campbell, 2601

NEW SOUTH WALES

VK2DT—M. J. Rieper, 5 Cobbittee St., Mosman, 2088
2TZ—A. Roberts, 55 Windsor Rd., Kellyville, 2153
2WO—Wollongong University College Amateur Radio Club, Northfields Lane, Wollongong, 2500
2YD—T. D. Whitnall, 195 Marco Ave., Panania, 2213
2AOB—J. T. Morgan, 3/83 Wentworth St., Randwick, 2031
2AOD—South Broken Hill Boys Club, Central Street, Broken Hill, 2880
2AGK—H. J. Hathrill, 5/12 Bando Rd., Cronulla, 2230
2BCU—L. N. F. Smith, 8 Dora Creek Road, Cooranbong, 2265
2BDE—E. R. Cooper, c/- G. S. Bracewell, 36 Corang Road, Westleigh, 2120
2BMF—M. Flynn, 10 Redman Pde., Belmore, 2192
2BZK—W. Lean, 3 Eighth St., Boolaroo, 2284
2CAB—R. G. Wright, P.O. Box 24, Coogee, 2034
2YDD—D. J. Grant, 3 Kapala Ave., Bradbury, 2560
2YDP—P. A. Dalton, 68 Unwin St., Bexley, 2207
2ZNW/T—W. A. Watkins, 154 Moulder Street, Orange, 2800

VICTORIA

VK3CC—C. M. Cohen, 21 Bowen St., Chadstone, 3148
3JY—I. Sykes, 14 Ruskin St., Orbost, 3888
3KA—W. J. Kirkhope, 271 High Street, Lower Templestowe, 3107
3OV—P. O'Shannessy, 19 Kilpatrick Ave., Shepparton, 3630
3PC—C. R. Fine, 1 Hoyington Place, Toorak, 3142
3TI—R. S. Pearce, 115 Plenty Rd., Bundoora, 3083
3KL—J. A. Hudson, 33 Burke Rd. North, East Ivanhoe, 3015
3AGA—J. T. Franklin, 7 Bradford Ave., Kew, 3101
3AHS—Harbour Trust Amateur Radio Club, P. Weaver, Lot 84, Lockwood Rd., South Belgrave, 3160
3AKG—D. C. T. Arnold, 8 Russell St., Camberwell, 3124
3AQB—W. Babb, 76 David Ave., East Keilor, 3033
3BCO—R. W. Bell, 38 Spray St., Rosebud, 3939
3BEW—J. Baytala, 5/68 Kernot St., Spotswood, 3015
3BHK—S. K. Bushell, 74 King Parade, Knoxfield, 3180
3YEC—P. J. McDonald, 24 Higgins Ave., Sunbury, 3429
3YEL—D. J. Stuart, 32 Burrindi Rd., South Caulfield, 3162
3ZQY—H. J. De-Deugd, 422 Upper Heidelberg Road, Heidelberg, 3084
3ZVT—M. J. Atkinson, 6 Mark Court, Dandenong North, 3175

QUEENSLAND

VK4AAB—S. N. Graves, 25 Churchill St., Maryborough, 4650
4AAS—E. J. Smith, 20 Tinglewood St., Kirwan, Townsville, 4814
4AE—G. K. Williamson, 210 Grafton St., Cairns, 4870
4CL—M. L. Barrett, Flat 4/8 Ridley St., Auchenflower, 4066
4UO—E. W. B. Wollen, Sunshine Motel Caravan Site, Elizabeth Ave., Clontarf, 4019
4ZEG—A. E. Burge, 4 Jacaranda Drive, Albany Creek, 4035
4ZJK—J. H. Bartlett, 54 Domoch Terrace, West End, 4101
4ZYA—L. G. Baker, Station: 34 Millchester Rd., Charters Towers, 4820; Postal: c/- 10 Sqn. Radio R.A.A.F. Base, Townsville, 4810
4ZZZ—W. G. McDermott, 10 Pinelands Street, Lawnton, 4501
4ZJZ—G. J. Clare, 42 Scherger St., Moorooka, 4105

SOUTH AUSTRALIA

VK5IG—R. J. W. Hester, 13 Lambert St., Ceduna, 5690
5QQ—J. Klimes, 60 Marrett Drive, Ingle Farm 5098
5RV—R. H. Coat, 6 Warunda Ave., Seaview Downs, 5049
5RZ—D. L. Nestrom, U1/29A Winchester Street, St. Peters, 5069
5ZBL—P. C. Bachil, 50 Birnie Avenue, Kensington Park, 5068
5ZSL—L. H. Smith, 66 Ways Road, Manningham, 5086

WESTERN AUSTRALIA

Nil

TASMANIA

VK7ZYZ/T—H. J. L. Smith, Station: 425 Invermay Road, Mowbray Heights; Postal: P.O. Box 9, Mowbray Heights, 7250

NORTHERN TERRITORY

Nil

COCOS ISLAND

VK9YT—Wayne Warden Jnr., not known "exactly" on Island (Route 12, 704 Meadowbrook, Bloomington, Indiana, U.S.A. 47401)

CHANGE OF ADDRESS

AUSTRALIAN CAPITAL TERRITORY

Nil

NEW SOUTH WALES

VK2KT—L. P. Gerrity, "Ebbtide" Marine Dr., Bennetts Head, Forster, 2428
2NL—H. J. Freeman, 318 Maroubra Rd., Maroubra, 2035
2ZK—W. G. Kirchner, Lot 3, Paterson Rd., Woodville, 2321
2ADR—D. W. Reed, 100/1 Bridge St., Muswellbrook, 2333

MARCH 1975
VOL. 43, No. 3

THE W.A. BULLETIN

WEST AUSTRALIAN SUPPLEMENT TO
"AMATEUR RADIO" MARCH 1975.

Patron	Bgdr.G.P.Hunt C.B.E.	VK6QJ	
President	A.Austin	VK6MA	681808
Secretary	N.Penfold	VK6NE	463232
Treasurer	C.Waterman	VK6NK	684717
Asst. Treasurer	P.Dew	VK6EU	684902
Broadcast Officer	A.Austin	VK6MA	681808
Equipment Officer	G.Ogg	VK6KY	494433
Minute Secretary	R.Greenaway	VK6DA	242909
Membership Secretary	B.Pemberton	VK6VW	871269
W.I.C.E.N. Co-ordinator	P.Beacher	VK6DD	763346
Bulletin Co-editors	L.Ball	VK6AN	281100Ext240
	R.Greenaway	VK6DA	242909

All material for inclusion in the "Bulletin" to reach the editors by phone or to :-22 Salisbury St., Leederville. before the 10th. of each month.

CORRESPONDENCE. All correspondence should be addressed to :-
Hon. Secretary, W.I.A. (W.A. Division).
P.O. Box N1002,
G.P.O. PERTH. 6001.

DIVISIONAL NEWS BROADCAST. VK6WI
Sundays, 0930 W.A.S.T.

80 metres	SSB	(Approx 3600 KHz)
40 metres	SSB	(Approx 7080 KHz)
20 metres	SSB	(Approx 14100 KHz)
6 metres	FM	(52.656 MHz)
2 metres	FM	(Channel 1)

GENERAL MEETINGS. Held on the THIRD TUESDAY of each month at 7.45 p.m. at Science House, 10 Hooper St. West Perth.

COUNCIL MEETINGS. Held on the LAST FRIDAY of each month at 7.30 p.m. at the above address - - observers welcome.

SLOW MORSE TRANSMISSIONS. Practice sessions are held Monday to Friday inclusive, on 3550 KHz ± QRM at 8.30 p.m. W.A.S.T.

- - - - - - - - - - -

SUBSCRIPTIONS are OVERDUE - have you paid yours ?

W.I.A. Darwin Appeal all donations to the Divisional Treasurer.

INTRUDERS. Make it a habit to log and report at least one Intruder every time you go on the air - please !

S.W.L. CORNER by MARK THREE

This concerns all SWL's.

An attempt is being made to have a column of this Bulletin set aside for all SWL's and this can only be achieved by you chaps getting behind the 8 Ball and contributing items of interest, comments and questions

It is felt that you have much to contribute and every effort will be made to encourage you to participate.

Do you know of any SWL who is not a member of the W.I.A.?? If so, let us know and we will endeavour to encourage him (or her) to join Remember they will be joining the ranks of some of the finest chaps anyone could wish to meet. They are always ready to offer advice and assistance where ever possible You can show your appreciation by making this column a worthwhile section of the Bulletin. Further details can be obtained by writing to the Editor clearly marking your envelope "SWL CORNER" and any contribution by way of notes, items of interest and etc. can be forwarded in the same manner. So come on chaps - lets have it.

A "pen name" may be used but all correspondence must have name and address attached.

....

A few weeks ago I was visiting the shack of a SWL and was most concerned to see a small child of about 3 years of age climbing under the work bench where a fully exposed Power Supply was switched on This could have ended in tradgety PLEASE use extreme caution with your equipment. It is a simple matter to install safety shields etc. and to put that gear back in its nice safe cabinet after you have been working on it.

....

Do you know of any "pirates" operating????? Remember these clots are only making things bad for us all. They have a total disregard for rules of any sort.

REPORT THEM IMMEDIATELY

....

Wednesday 15-1-75 on 2 metres.

Who was the operator transmitting with his car radio blaring out background music. Could he be committing a breach of Regulations?

....

The thanks of all SWL's go to the Operators responsible for putting over the News Broadcasts on Sunday mornings. Many of us cannot phone in or be on the "call back" but we assure you that the service is greatly appreciated by us all

,,,,,,,,,,,,,,

I would like to hear from all SWL'S giving me your name, address, age, equipment and any particular interests. This would be of great help and may enable us to be of assistance to some other service or part of the W.I.A.

73.

....

SCHOOL RADIO CLUB NOTES

HAMILTON SENIOR HIGH SCHOOL RADIO CLUB

Hamilton Snr High School have aquired an FM 60 2 metre Base Station and are keen to become active as VK6HH. Unfortunately the transciever has to be put on to 2 metres and the club leaders VK6NH and VK6KS cannot obtain the information Would any Amateur who is willing and has any details of this unit or know how please contact VK6NH - QTHR or 992?36. The help would be gratefully recieved.

The group is also keen to obtain a 2 metre mobile transciever at a reasonable cost. If you have equipment for sale which does not need modification or repairs would you please contact VK6NH

BUNBURY CATHEDRAL GRAMMAR SCHOOL

The above mentioned school opened in January 1972 and immediately offered Radio 1 Option to First and Second Year students.

The following year, Radio 1 and Radio 2 were offered and about 30 boys and 4 girls took the course. Most were successful and many recieved certificates at the various levels after passing the Y R S exams.

This year 15 students have studied Radio 2 . Seven have gained Intermediate Certificates

Keith, VK6PT the Club Organiser, has written a Radio 3 Course which prepares students for the A.O.C.P. examinations.

Three students sat for the A.O.C.P. in August. Two passed Regs and got Theory marks in the 50's Both are keen and will be sitting again in February We wish them luck.

A disappointing feature of the clubs activities has been the lack of skeds on VHF- only three Perth stations were contacted.on 6 metres in three years although we were getting through 5 - 6 and 5 - 8 on 52.586.

Now that the school is eligible for a full callsign (VK6AG ??) and hF equipment we hope to be more successful.

If any operators (retired) can come up on 80 Metres on Mondays 4 - 5 pm or any lunchtime 1.00- 1-25 pm we would be only too pleased to "sked" as the lads are very keen

73 Keith VK6PT

PERTH MODERN SCHOOL RADIO CLUB

The P.M.S. Radio Club was a little late starting off during 1974 due to the lack of an Operator. We believe that some of the ladsput some pressure on Les VK6AN who came to their assistance and in September VK6PS was back on the air. Quite a deal of experimenting with antennas was done by the members as suitable areas are a bit of a problem. Finally came up with an Inverted V for 80 and 20 metres in time for J.O.T.A. and from reports these must have worked quite well.

Details for 1975 are as yet unavailable but do believe some of the lads will represent their station at the Albany Hamfest.

If you didn't have any success with the last couple of "puzzles"

TRY THIS ONE.

[illegible]

From the QSL Manager's Report :-
'There has been a small increase in turnover with a greater proportion destined for Japan and U.S.A. This has led to a better economic handling until October last when the rise in postage was over 60%. Approval was thus requested for a rise in sticker prices to 80 cents per 100 and dated from the December General Meeting.

A close measurement of postage costs compared with cards despatched since October has been kept and in packs of 100 gm and over there is some slight gain to offset a number of obscure addressees. The position will be reviewed each quarter of this year and any abnormal situation will be advised.

The assets of the Bureau are $79.13 to commence the new year which is considered quite adeqaate.'

THE WIRELESS INSTITUTE OF AUSTRALIA
W.A. DIVISION

QSL BUREAU AS AT 31ST DECEMBER, 1974.

RECEIPTS			PAYMENTS		
1. 1.74 to 31.12.74	Sale of Stickers	$106.00	1. 1.74 to 31.12.74	Purchase of Stamps	84.42
				Box F319 Rental	21.00
				Receipt Book	00.58
		$106.00			$106.00

TRADING ACCOUNT

1. 1.74	Stock of Stickers	$65.92	31.12.74	Sale of Stickers	$106.00
	Stock of Stamps	$33.03		Stock of Stickers	$ 53.08
	Purchase of Stamps	$84.42		Stamps on hand	$ 26.05
	Trading Profit	$ 1.76			
		$185.13			$185.13

ASSETS

1. 1.75	Stock on hand	
	Postage Stamps	$ 26.05
	Stickers atcost	$ 53.08
		$ 79.13

VK6RU
J.E.RUMBLE QSL Manager.

* *

Answer to last months Brain Teaser

```
3 8 7 2 0 - 1
5 - 3 2 - 4 4
5 - 9 - 3 5 2
- 1 6 1 0 - -
7 2 - 1 9 1 3
0 - - - 7 9 2
2 7 - 1 6 - 5
```

A BEAM FOR TWO METRES.

Contributed by Will VK6UU.

This six element wood boom Yagi is the best performer on 2 metres I have come across. Several have been built, including 2 stacked 6 by 6.

The single 6 element has a gain of 10 db with a 3 db beam angle of about ± 30 degrees.

Elements are cut from 1/8 in. brass rod. and the boom from a suitable length of 3/4 in. wood.

Construction : Drill holes of such a size that the elements require tapping into position - this should hold them in place.

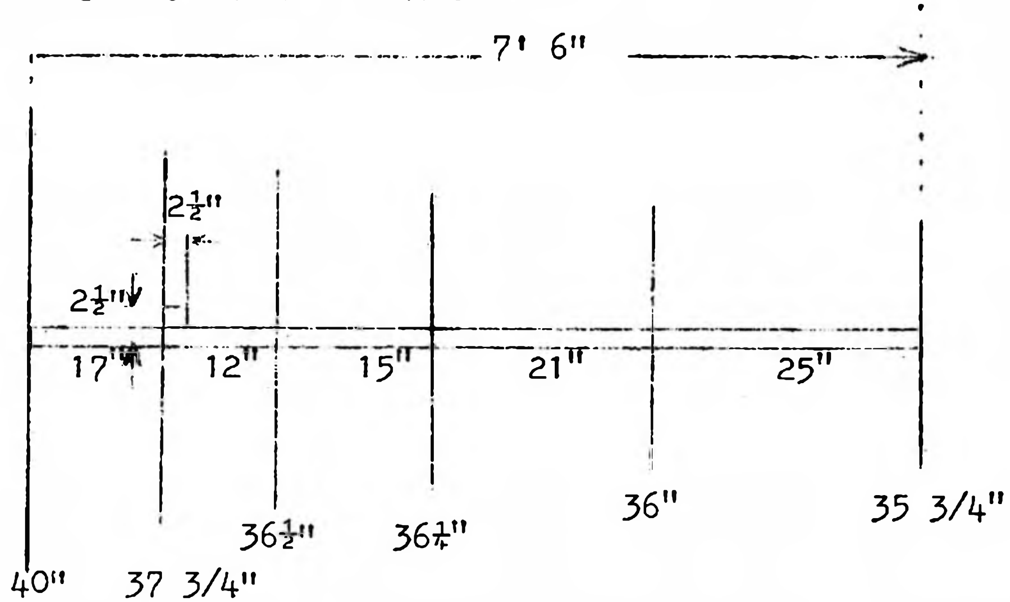
Gamma rod is mounted in the same manner and in the same plane as the elements. The Gamma capacitor is a 30 pf beehive type.

Method of water proofing - this is up to you.

When attaching coax braid to centre of driven element, divide braid into two parts and attach one half onto one side of driven element and the other onto the other side . This is necessary because the wooden boom makes attachment to the exact centre rather difficult. If you want to be sure that the elements wont fall out, a drop of solder on either side of the wood boom will do the trick.

Gamma dimensions are for 50 ohm cable .

Frequency 145.5 to 147.5. MHz.



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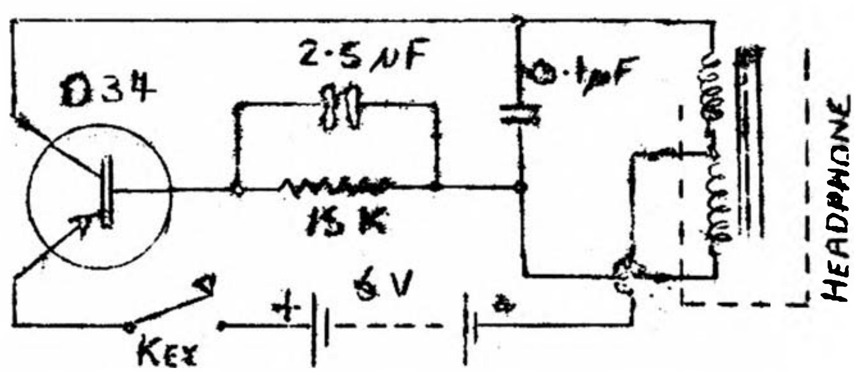


CODE PRACTICE OSCILLATOR

Knock the Zed Off your callsign-huh ?

Below are some of the highlights from the report from the Scout Association of Australia 17th Jamboree -on-the-Air.

' About 20% more Scouts, but about 20% less Guides and the lowest number of visitors for five years took part. The weather was terrible - a very stormy week-end which threatened the portable antennae systems, but showed the value of proper pioneering methods- so that probably accounted for the drop in numbers.'

'Christmas Island reported in for the first time and showed what a dream DX they had- Malaysia,UK, Finland, Malawi, Italy, Germany, Bahrain, India, Sweden, Denmark, and South Africa.'

' For the first time RTTY was used between Scout Groups in W.A. and demonstrated operating DX, but not to a Scout station.'

'From the log Sheets it seems only one station in W.A. (VK6AN) was able to contact VK1BP for the official opening. Our attempts to tape the exercise for rebroadcast at a time convenient to W.A. were unsuccessful. It is still not sure whether 1500 or 2000 hours is more convenient.'

' A copy of a report apparently printed as a press release accompanied one of the Guide returns, and it shows the true spirit of W.I.A./ J.O.T.A. co-operation:-
J.O.T.A. meant a very interesting and enjoyable Saturday afternoon for the 1st. South Perth Guides and their Leader,who were accompanied by the Division Commissioner of Lee Steere South, Mrs Gelley. There were friendly conversations with other W.A. Guide and Scout Groups and with the 1st. Silkstone Scout Group of Ipswich, Queensland. The callsign was VK6LG and the operator frequently gave his identification by saying' 6LG - Six Lovely Girls' much to the blushes and amusement of the Guides who , appropriately, numbered six. Between calls, the operator, Mr. L.G. Wilson, told of his contacts and experiences over many years of ham operating from the time he was introduced to radio in the 1920's. He played a tape recording,which included traditional Japanese music,sent by a fellow "ham", a Japanese doctor.

After having stayed far longer than intended,thanks were extended to our host, who seemed reluctant to say goodbye, and homeward bound the girls all agreed that it had been a satisfying afternoon in more ways than one- the pleasure gained from contact with other groups, and being in the company of a fine old gentleman who apparently really enjoyed himself in his first participation in J.O.T.A.with Guides.'

Once again many thanks to all those who made the weekend activity possible - Amateurs and their wives, National Organisation, Branch Staff, Liaison personnel, Leaders,Scouts and Guides.

Report from:- Peter Hughes VK6HU
Branch Commissioner for J.O.T.A.

* * * * * * * * * * * * *

This is a magic space

to make it grow B I G G E R and B I G G E R before your eyes

DONT CONTRIBUTE ANYTHING TOWARDS THE BULLETIN.

From an SWL friend of mine, Bill Marchant, en route from Melbourne to Broome, comes this first hand account of how business as usual (almost) is the order of the day in Darwin in the aftermath of cyclone Tracey. I dont think Bill or the boys in Darwin will mind me putting this to print.

Dear Ross,

I'm still " on the road" but I have made my stop-over in Darwin a lengthy one by giving a hand on some of the repair work, mainly re-roofing.

Last night I had the priveledge of attending the 100 th. meeting of the Darwin Amateur Radio Club. This was held in the ground floor flat of Henry VK8HA, the secretary, and since the flat was a ground floor one it was in reasonable condition, the noise of a port-able generator outside being the only indication that something strange was afoot. However, if you looked out the window at the wreck-age of the Club H.Q. you'd realise these were extraordinary times.

The minutes of the 99th general meeting were read out :

"Meeting held at residence of VK8HA on 6.1.75
Meeting opened at 1930 hours.
Present: VK8HA , hon. sec.
Due mainly to the aftermath of Cyclone Tracey devestation, no other members available for the meeting.

(Signed) VK8HA Hon. Sec."

Needless to say these minutes were passed and seconded amid great laughter, and general business consisted of finding out the condition of beacons, towers and masts etc. This didnt take long, as they were all wrecked. Most personal equipment was intact - but water damaged and members agreed their big loss was that of technical notes and publications. Just when the Club becomes operative again is very doubtful since some members are either transferred or leaving Darwin, and those remaining have a prime concern of getting homes rebuilt so that wives and children can return. And if you see the colossal damage it is hard to imagine when that will be.
By the way, some of those present were Doug VK8KK, Barry 8ZCF, Henry 8HA, Trevor 8ZTW, Dave 8ZRB, Colin 8CM, and in the visitors book I noticed the signature of Basil 6NA.

There were quite a number of QSL cards received which unfortunate ly cannot be acknowledged. One I notice was from R.A. Gray VK6RQ.

P.S. Rainstorm sent a few things afloat in my room, including this letter but apart from another envelope, I dont have to re-write.

* * * * * * * * * * * * * * * * *

I wonder if we could do a practical service for this club by collecting spare copies of "A.R.", QST, etc and ARRL Handbooks or other technical publications to help re-establish this club?

****

Just a brief reminder to anyone willing to do a little bit more work as a member of council - bung in a nomination form - thats the first step , then just sit back and wait for the election -if there is one!

* * * * * * * * * * * * *

WANTED URGENTLY PROGRAM ORGANISER URGENTLY WANTED

Must be willing to spend hours on the phone twisting arms by remote control. Must be flexible -able to change lectures instantly.

H A M A D S

FOR SALE ; Mosley Tri-Band Beam
Please contact VK6WC Phone: 571550

FOR SALE : Pye Ranger VHF Hi Band AM 12V Transcievers
Ideal for modification and satellite work — $20.00

Pye hybrid Low Band AM — $ offer

Weston Low Band AM — $25.00

Pye 50W Hi Band AM Base — $40.00

Communications Reciever Lafayette HA-600
12V and 240VAC Solid State — $135.00

Numerous Hi Band Pye Overland 10W
50' Crank Up Tower with new guys — Offer
Quantity of Aluminium Tubing

Shack Sell Out
VK6NW Dave Bridge 574060 (B667487)
264 High Road, Riverton 6155

FOR SALE: KP202 (Chan B, 1 , 4) plus 10 NICADS
plus Charger — $140.00
VK6EU QTHR Phone: 684092

WANTED : Rotator Ham II, CD44 or similar.
VK6HK QTHR Phone: 462864

FOR SALE : Globe D S B 100 Transmitter - ex VK6EJ
DSBSC 80 mx - 10 mx with H/D Transformer and wire
ready to go on air. — $50.00 o.n.o.
Contact VK6CW for demo

REPEATER GROUP NOTES

The new Solid State Repeater, which the group has decided to build , is already functional and may be in use when you read these notes.

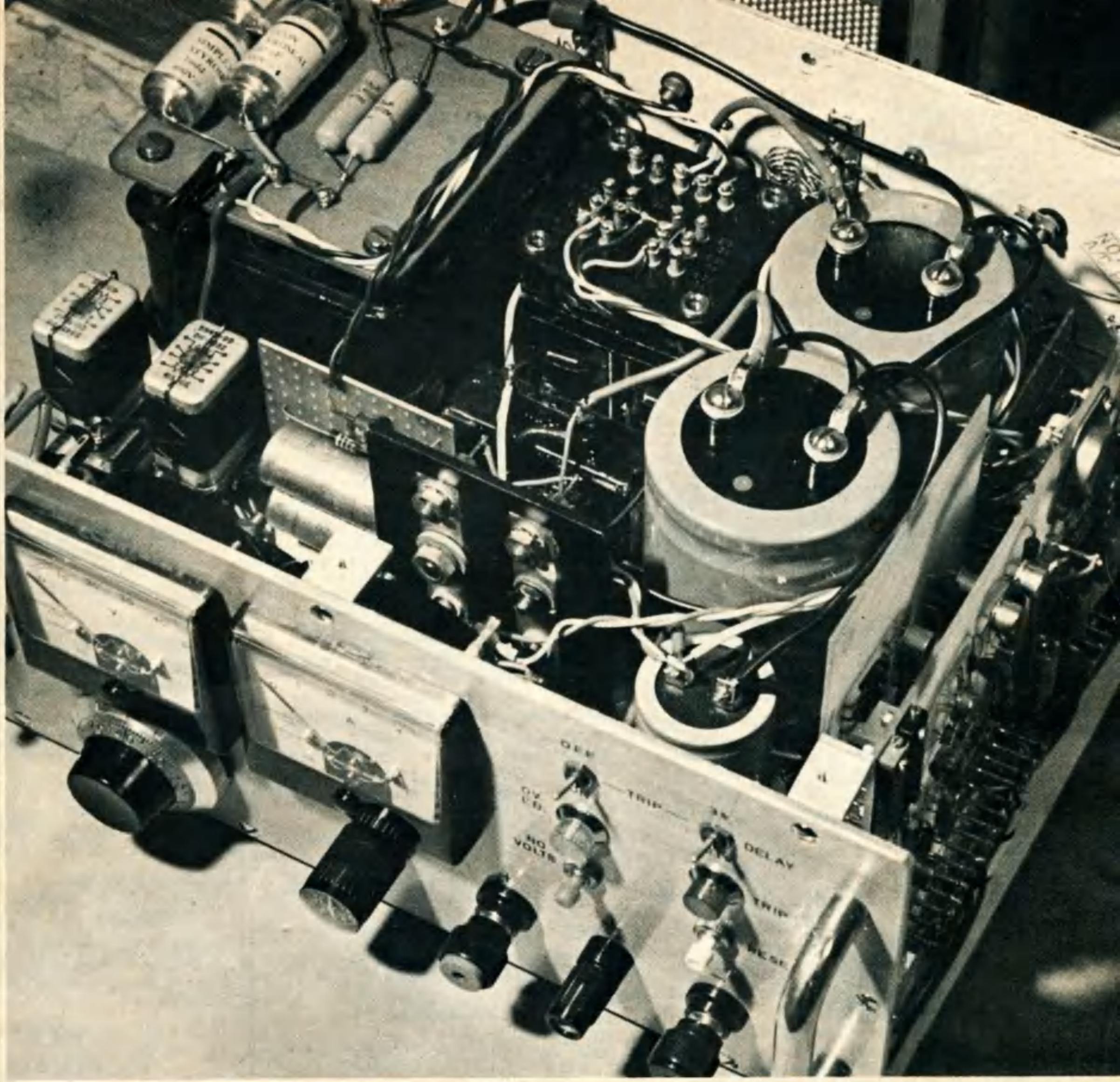
The Repeater Fund is running short and there are a lot of users of the Repeater who have not, as yet, helped financially.

PLEASE - THE REPEATER NEEDS YOUR FINANCIAL ASSISTANCE.

Cheques etc. are payable to:
J.C. Farnell
C/- P.O. Box 87
SCARBOROUGH
W.A. 6019

EARBASHERS please note - Lecturers are required for our general meetings. Please feel free to choose your own topic!
HURRY - before someone beats you to this wonderful opportunity.

amateur radio



VOL. 43, No. 4 APRIL 1975

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FRONT COVER

The "Experimenters Delight" is a very interesting regulated power supply described in detail on page 5 of this issue. This view shows the general layout of the unit.

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA, FOUNDED 1910

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FEDERAL CONVENTION

April is the usual month of the Federal Convention. It is in April this year — over the Anzac Day weekend of April 25th, 26th and 27th, 1965.

This year is the first departure from "tradition" which hitherto dictated that the Federal Convention must be held at Easter.

For the first time in many years the Federal Councillors could have taken their families out or maybe could have gone fishing over Easter. Easter will have passed when you read this.

This year's Convention will be in Melbourne and will be held at the Belvedere Motel in Church Street, Richmond. For the first time it will be paid for out of Executive funds.

At the time this is being written it is not known who will be representing each Division but indications are that old friends Neil Penfold from the West and Lawrie Blagbrough from the Sunshine State will be with us. New friends will be with us, probably including Peter Frith from Tasmania, Ed Perkins from the ACT, and Ian Hunt from South Australia. At this moment we have no definite news about the New South Wales delegate. The "host" Division, last but not least, will probably field the same team as last year captained by Russell Kelly, the Victorian Division's President and Federal Councillor.

Most of the business to be transacted at this Convention ought to have been in the system by the end of 1974 if last year's Convention Motions had been properly observed. That this has not occurred is understandable because of the protracted delays in getting the 1974 Convention Minutes out. This arose through a misunderstanding that the Minutes must follow the traditional pattern. The marathon performances in the 1974 Convention would have pushed up the cost of the Minutes if written out in the old manner and in fact this would be unnecessary as the tapes are available and copious notes can be referred to by any Federal Councillor.

Obviously, some of the Agenda items left over from last year's General Business will come up for discussion this year. There are good reasons to believe that a few items from last year will require further consideration not only because there has been insufficient time to finalise some of them but also that some further discussions could be useful in clarifying them and certain others.

New items will, of course, have been submitted one month beforehand as explained in some of the recent Divisional broadcasts but any last minute items could be brought up under General Business if the Chairman concurs.

However, the problem with these items under "A.O.B." is that they rely upon enough time being available for adequate discussions after all the Agenda Items have been cleared away in one working day less this year than in previous Federal Conventions. Last year some were in fact left over.

Whatever transpires, there is every indication that so much of interest to amateurs will be discussed in depth at the Convention that a visit by members in the Melbourne area will help them in understanding what amateur radio is all about.

Better still, why not come and help. Volunteers are needed to help with recordings, photo-copying, transport of delegates and many other essential functions.

If you do not take an interest in the business of the Federal Convention you cannot hope to have your pet complaint aired, let alone discussed.

Perhaps this Convention could be the beginning of a new era in the organisation of the Institute.

THE EXECUTIVE

QSP

EMERGENCY COMMUNICATIONS BY SATELLITE
"Nevertheless the long distance transmission (a walkie-talkie into an old golf umbrella through ATS-3) showed that simple radio gear and a collapsible antenna — plus a space satellite orbiting somewhere overhead — would enable persons in distress to summon help from any point on earth". Part of editorial in Ham Radio, December 1974, before the Darwin disaster.

ENVIRONMENTAL PROTECTION
No responsible person ever has contended that the generation, transmission and propagation of radio communication signals have any effect whatsoever upon the air, water, or soil, i.e., the environment. The only possible connection with the environment is in the area of aesthetics . . . aesthetics cannot be regulated or controlled by statute, ordinance or regulation because there is no readily definable standard. 'Beauty is in the eyes of the beholder'. Amateur radio has painstakingly developed a body of law over the years (in the USA) which provides that the installation and operation of an amateur radio station, including its absolutely essential outdoor antenna and supporting structure, is a normal and permissible use of residential property and cannot be restricted or prohibited by zoning ordinances and building codes". Part of ARRL submissions to FCC as quoted in QST Dec 1972, p.78/81.

DXCC OF ARRL
ARRL announce a new DXCC Award for CW only for contacts made on and after 1st January 1975. Applications will be accepted from 1st June 1975. ARRL also announce new fees for all DXCC Awards endorsements from 1st June 1975. All new applications will cost $US10.00 (or 56 IRCs) each. Thereafter each endorsement will cost $US2.00 plus postage for the return of QSL cards. From that date the application charge for 5BDXCC will be $US20.00. Basically the charges are intended to cover return postages for QSLs, lapel pin and handling. There is no mention of reductions if you do not want your confirmations returned to you, so if you want your ARRL DXCC Award in future, these are the fees.

3.5 MHz BAND
In Region 3 the 80m band is shown as extending from 3500 to 3900 kHz shared with fixed and mobile services. In Australia the band 3500-3700 is allocated to the Amateur Service and 3700-3900 is allocated to the fixed and mobile service. In India the band 3500-3890 is allocated to the fixed and mobile services and the band 3890-3900 kHz is allocated to the amateur service. A letter from JARL advises that after many years of petitioning the Japanese amateur service has been granted a new frequency allocation from 3793-3802 kHz from 1st January 1975. The WIA 1971 Federal Convention (Motion 71.15.01) passed a motion seeking a band 3790-3800 but nothing further on this has transpired although it was duly put forward. In New Zealand the amateur band extends from 3500-3800 kHz. The 80m amateur band in Region 2 extends from 3500-4000 kHz but for the USA possessions in Region 3 (Guam, Samoa, Wake, etc.) the band extends only from 3500-3900 kHz.

NEW HEBRIDES CONDOMINIUM
According to Kev Magee (ex VK3KM) the whole of the Condominium is now YJ8 as FU8 seems to have been discontinued. Amateur licences are obtainable from the Condominium Post Office at Port Vila against an overseas full licence, provided you are a resident, at 1,000 NH Francs per annum. There appears to be no reciprocity for visitors but anyone interested should write direct to the Condominium Post Master.

SUPPLY OF AR
Many have received the message AR ceases to be sent out to unfinancials. Because of escalating costs the period of grace in future years could be reduced. AR ceases to unfinancials by means of an automatic function of the EDP; the computer address label is omitted. By the way, in Australia AR only goes to financial members of the WIA and on direct subscription to Libraries, schools and similar organisations. AR is freely available on direct subscription to anybody resident outside the VK area. ■

vertical extended double zepp for 2 metres

John Hassell, VK6ZGF
17 Federal Street, Cottesloe, W.A. 6011

Derived from the old long wire Zepp antenna, the VEDZ cut for two metres becomes an antenna of manageable proportions with a number of useful features.

The VEDZ gives a very low angle of radiation, requires no ground plane, is not critical to adjust and needs only an SWR meter to set up on frequency. The antenna can be fed with 300 ohm TV ladder line giving a cost saving over expensive co-ax.

The Zepp antenna is basically an end fed ½ wave wire. Adding another ½ wavelength and feeding at the centre gives the Double Zepp. Extending the arms of the antenna to 0.64 wavelength causes all the radiation to take place at 90 degrees to the axis of the antenna. Used as a vertical the radiation is omnidirectional and at a very low angle. Extending the antenna further is not recommended, as the radiation pattern breaks up into four lobes as the dimensions tend towards 1½ wavelengths.

The VEDZ, being 1.28 wavelengths over all, is not resonant and presents a high capacitive reactance at the feed point. To bring the antenna to resonance, inductance must be added to tune out the capacitance at the feed point.

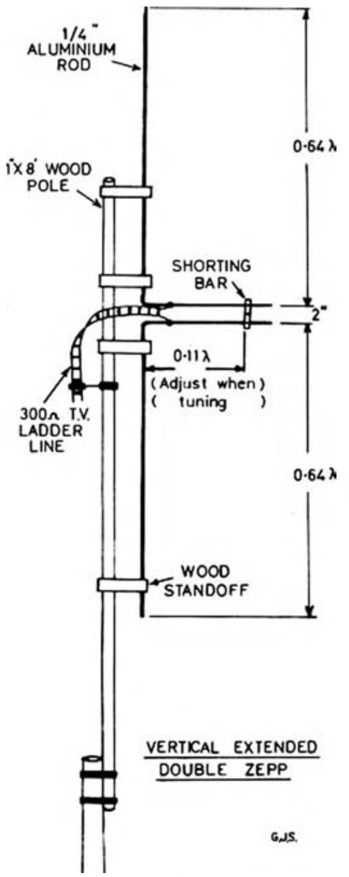
This is done by using a shorted stub less than ¼ wavelength long. This stub will provide the required inductance as well as acting as a matching transformer for the feedline. The stub length works out at 0.11 wavelength. If you add it all up, the stub brings the total length of the antenna to a resonant 1.5 wavelengths (0.64 + 0.64 + 0.11 + 0.11).

The radiation pattern remains the same as for 1.28 wavelengths (which we want) as the stub does not radiate.

CONSTRUCTION

The antenna is constructed from ¼ inch aluminium rod and is mounted on a well painted (to keep out moisture) wooden pole. Wood or preferably ceramic stand off insulators are used. The aluminium rod is cut and bent to the dimensions as shown in the diagram. Cut the rod forming the stub longer than required and trim after tune up. The shorting bar for the stub is made from a strip of aluminium bent to form a clamp and is finally secured with two small bolts.

The stub allows a balanced feed of almost any impedance. Sliding the feedpoint to the shorted end of the stub will give a low impedance match and sliding towards the antenna end gives a high



impedance match. The most economical way to feed the antenna is to use 300 ohm ladder line with a balun or tuning unit at the Tx end.

ADJUSTMENT

To adjust the antenna all that is needed is an SWR meter and a transmitter on the required frequency.

The first step is to connect the feeder to the stub at about the centre. Apply power from the transmitter and adjust the shorting bar on the stub until a dip is seen on the SWR meter. This should bring the antenna to resonance. Now slide the feeder up and down the stub for the lowest SWR. Some interaction between the positions of the feed and the shorting bar will be noticed. Juggle both for the best result. An SWR of 1:1 should be possible without too much trouble.

RESULTS

Simple comparison tests showed a considerable improvement in performance over a ¼ wave ground plane and a noticeable improvement over a ⅝ wave ground plane used at this QTH. ■

experimenters delight

Rolf B. Peterson, VK5ZIE
11 Gundawarra Street, Woomera 5720

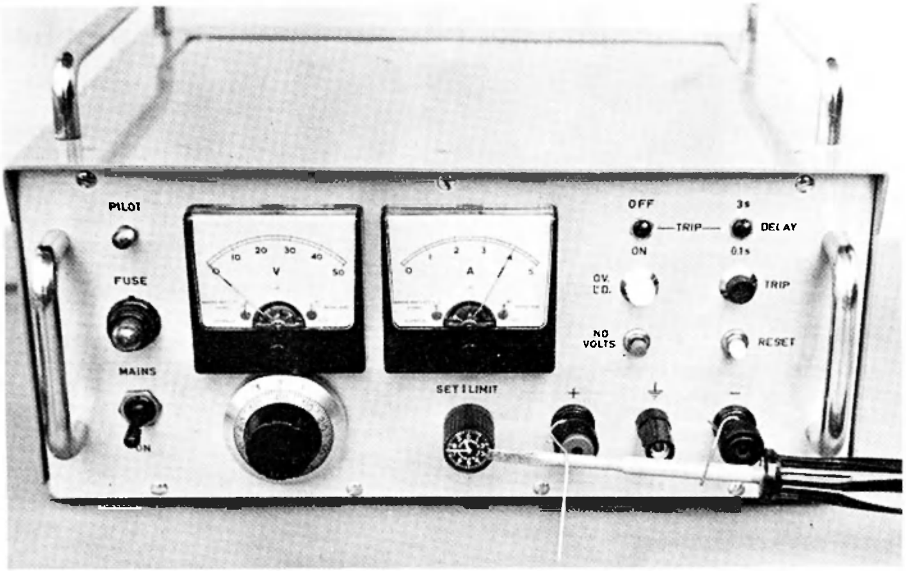
This is the description of the fruit of quite a few hours of thinking and experimenting. It deals with a power supply which has been found to be a "delight" to use.

How would you like to have available, on your own bench, at a twist of your wrist, any voltage between zero and 50V to the tune of four amperes? Should you not want four amps, there is another knob for your second wrist that will control the maximum to anything between zero and four amps. If your hands are like all left thumbs, and you drop screwdrivers, etc., across the output, this power pack will not mind. It's nicely protected and also affords protection for your circuit. No need to unplug the leads to remove the volts either; there is a little button — touch it and no volts are there in a wink. To get the juice back touch button B. If your chosen current limit is exceeded, an amber light tells and the volts go down.

If you wish, and flick a small switch, the "no volts" condition comes up automatically as soon as there is an over current. You may wish again and flick another little switch and the "no volt" condition is delayed two or three seconds. Just enough time to get that telling meter reading. You get a red light with the "no volts" too. Do you like it?

A few more smallgoods; there are two meters to monitor the output, the fuse holder lights up a self-contained neon when or if the fuse goes and, of course, there is a mains pilot neon which glows when the mains are on and the switch is made. And nothing runs blazing hot. The output is obtained at fairly good efficiency (power in over power out). That's all — from the outside.

In order to have the unit "keep its cool", good efficiency must be built in. A cool running piece of gear will be more stable and last longer. With less self-heating, it can tolerate higher ambient temperatures. To this end a switching regulator is employed. This provides initial stabilisation and converts a high DC voltage to a low one at good efficiency. It does put out some ripple, however, and on its own, therefore, is of limited usefulness. To get a smooth output as well requires further regulation by a linear regulator. That is what was done, ending up with the best of both ideas; low loss pre — and precision post-regulation.



The "Experimenters Delight" pushing 25.16 x 10^{18} electrons per second through a screwdriver.

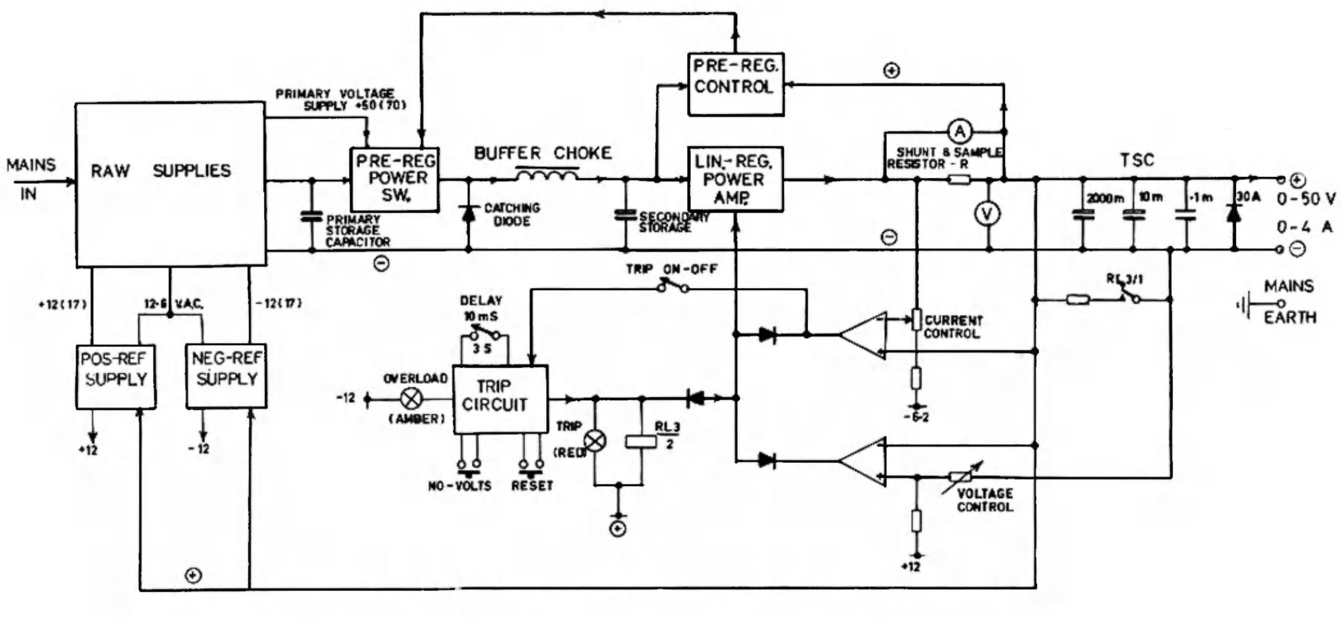


FIGURE 1 BLOCK DIAGRAM

GJS

What happens in a switching regulator is briefly this; an excess voltage is generated to cover all contingencies — and then connect the load to this excess for brief periods of time, so that the average power coming through is just right. The same thing happens in automobiles. It's like taking from a 500 gallon tank by the cupful or bucketful. In this power supply, a transistor switch is used to do the connecting of the load, which in this case is the linear regulator, to the excess supply — a capacitor charged constantly by the raw supply to 70 Volts. Have a look at the block diagram now and if you didn't know before, a light should start to glow.

There is a block called "raw supplies", connected to mains and pre-regulator etc. That has in it transformers, rectifiers and such like, putting out raw DC with the ripple, keeping the primary storage capacitor at 70V. This primary storage capacitor (PSC) feeds the secondary storage capacitor and thus the linear regulator, via the transistor switch pre-regulator (PR) and a buffer choke. Contact is made whenever the voltage on the pass transistors in the linear regulator goes below 2.5 volts. The block marked pre-regulator control sees to that. It will signal the power switch to open again as soon as 2.5V difference between output and input of the linear regulator is re-established. The pre-regulator control compares the volts on the secondary storage capacitor (SSC) with a bias on the second input of its op. amp. (741).

This makes the pre-regulator a "switch on demand" type rather than the usual continuously running, pulse width modulated one. It results in a simpler circuit. Of course, when there is a load on, this one is also continuously switching.

Now something about the buffer choke. Its purpose in life is to limit the huge surge of electrons, too much for the transistors, from one capacitor to the next, to lower values. It does this because of its self-inductance. When volts are applied to it a current commences to flow and the slug generates a back EMF which opposes the applied voltage, thus leaving us with only just enough current to keep generating the back EMF. That action causes the current through the inductor to rise from low values to a maximum value at a rate that is higher at first but which decreases with time. The maximum current is set by the voltage across the primary storage capacitor (PSC) and the total circuit resistance. It can reach many amps. In a pure non-saturating inductor with no series resistance, the current would rise from low values linearly to infinity. Practical inductors have resistance, but it can be made quite low. Monitoring the current rise in such a device then, shows the initial increase up to several amps to be quite linear.

One of those in series with our pre-regulator power switch will cause the charging of the secondary storage capacitor (SSC) to be a pleasant affair instead of a violent one. It gives more time to do it. Why an inductor and not a resistor? Because of the lower losses — much lower. A resistor would dissipate $\frac{E2}{R}$ watts.

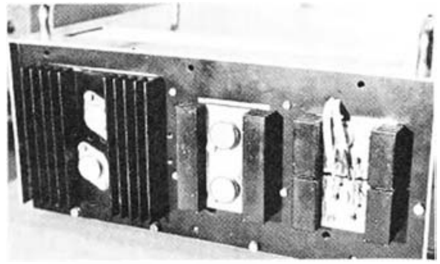
With the primary storage capacitor at 65-70V and the output at 6V, 4A, for instance, that resistance would have to take care of roughly a couple of hundred watts! Our choke has very little resistance and therefore behaves like it should; instead of wasting the extra energy, it stores it, and, when the transistors switch off, the stored energy is pumped into the SSC via the catching diode. It is as if the choke were a generator and charged the capacitor SSC via the diode. Of course, it is only releasing now what was put into it before the pre-regulator switched off.

The electrical parameters of the choke are not all that critical, as long as certain requirements are met. If it is to operate efficiently, it must not go into saturation. The iron core must be a reasonable size. The author's measures 2½" x 1⅞" x ¾" (E — 1 core) and employs a 0.7 mm air-gap. Finding the wanted value of L took some cutting and trying, and starting once more, approximately 90 turns were made finishing up with 3 mH and about 110 milli-ohms. The wire is 19g. and there is enough room for 18g. wire too.

Having spent all available pocket money on the major parts, only 2N3055s and an ordinary 300V 10 amp diode were available for the pre-regulator power switch. It was found that they do not like to switch heavy currents and high voltage at an inaudible rate. They would do it, but they got a bit too warm for comfort — reasoning on the thought of long term reliability. That is why 3mH was chosen and got cooler running. The current in the pre-regulator rises up to about twice the load current. This is caused by the pre-regulator current having to rise to equal the load in order to stop any further discharge of the secondary storage C. It must then rise further to restore the charge to the switch off level which is 2.5V above the output voltage. In the process of doing this, it reaches about 8 amps. or so. The repetition rate and duty cycle adjust themselves to requirements.

The first time a load of 4A was connected onto the output, an electromechanical process was witnessed, with the surety that the pre-regulator operated. The choke made a *lot* of noise. The choke was vacuum impregnated with a plastic floor finish. This was done twice, in a large glass jar with a stiffened lid to which a simple valve was fitted. The choke was immersed, the lid screwed on and the arrangement connected to the intake of a compressor. Lots of bubbling showed escaping air, and upon restoration of atmospheric pressure the goo was pushed into all the nooks and crannies. Each time it was dried in the sun for a day. Now it sings softly instead of screaming.

Back to the block diagram. The box marked "linear regulator power amp" contains a compound emitter follower which is driven via an OR gate by a precision op. amp. type 777. 471s or 709s may be used also. The 777 was selected particularly as it did not cost all that much more than the others. It also does exhibit more stability. Using this amp., the thermal drift is mainly due to the reference drift. Monitoring the output volts and the reference shows that both have almost the same temperature co-efficient. Only two decimal places could be checked after zero on 50V out.



Rear view of the unit showing, L to R, linear regulator, pre-regulator, and main 50V rectifier.

No special tricks are used to stabilise anything in this supply apart from staying clear of obvious layout and wiring errors. The voltage control amplifier compares the output volts with a reference and does any necessary adjusting. A 3 amp. load causes a voltage drop of 3 mV. This means an internal resistance of 0.001 ohm (on DC anyway). If you look onto the left side of the block diagram you will find two reference supplies. These are complete 12V regulators of conventional design except perhaps for the peak voltage supply in each, which feeds the first emitter follower and the error amplifier collector via a constant current source (CCS). Makes it quieter and it can operate on slightly lower voltage. The two blocks put out +12V and —12V respectively, which are used as references and also as op. amp. supplies. The zero point for them is not 0V, but the positive output rail. In other words, the references "ride" on the output. Connection is made at the output terminal.

An important point here

A whole bunch of solderlugs have been provided and are connected directly to positive and negative output terminals respectively, as reference points. So anything that you find on the circuit diagram, which is connected to positive output (marked +) or negative output (—) goes directly to these two bunches and not to any other convenient point. There is one exception, and that is the negative rail from the raw supply and the wires from the pre-regulator. They have a separate gathering point and that is connected to the 2000 micro-farad output capacitor, which in turn connects to the negative "bunch". For the negative main rail which is mentioned as an exception and its positive counterpart, heavy wire is used — 70 x .007.

Back to the reference. The positive 12V is used for voltage control and the negative 12V for current control. In each case a resistive divider is used which is adjustable from the front panel. It puts a bias

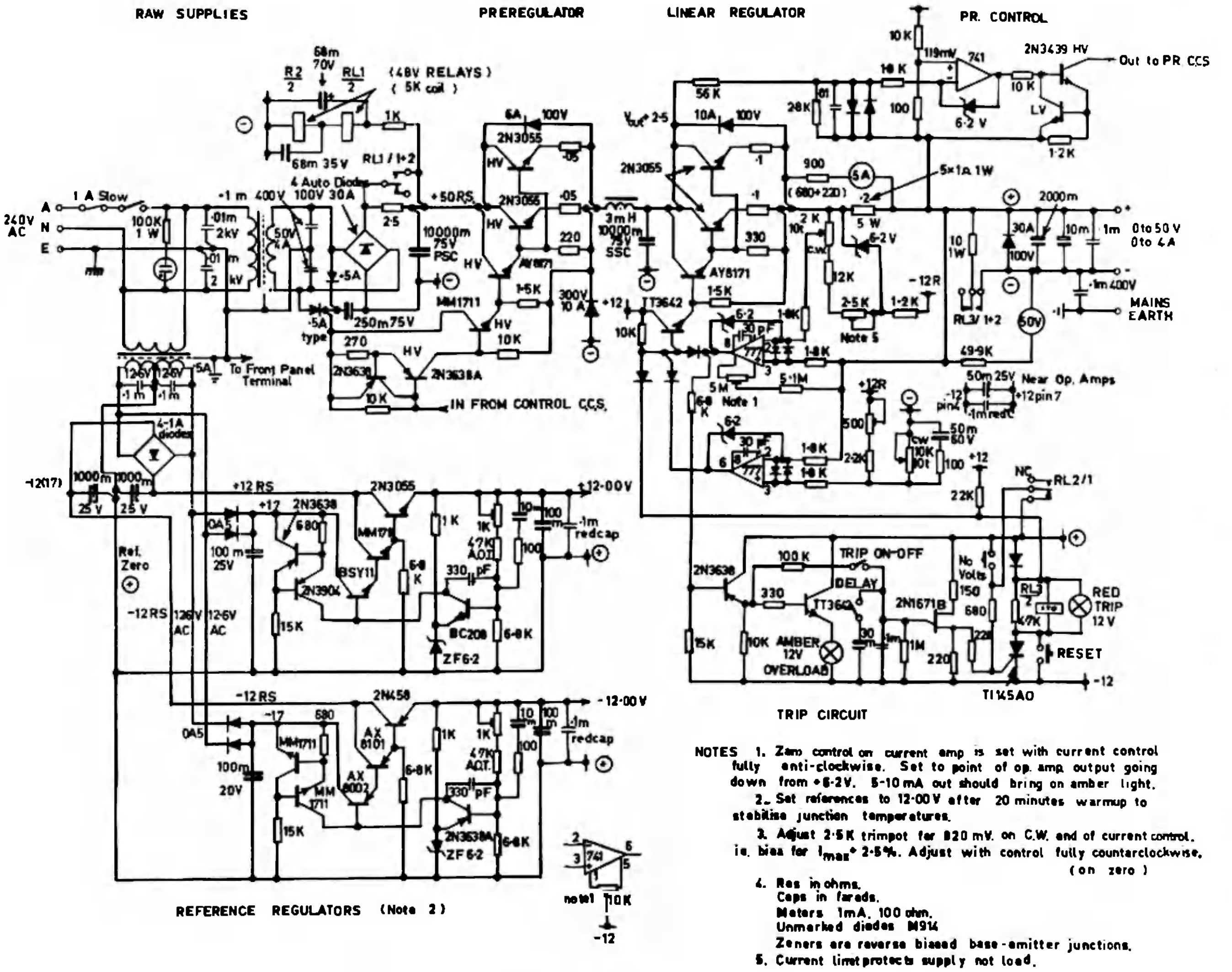


FIGURE 2. CIRCUIT DIAGRAM

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onto one input of the respective op. amp. which will drive the output via the emitter follower to make its other input look the same, the other input being connected to the positive solderlug in case of the voltage control amp, and to the other end of a sensing resistor in case of the current control amp. The output of the latter is nominally at +6.2V with respect to the positive solderlug, and the volts amplifier has control. In case of an overload, the current amplifier takes over via the OR gate. This happens when the voltage drop on the sensing resistor exceeds the bias set in on the current control. In order to obtain linear response of this control, the —12V reference is used to make a 6.2V reference with its reference on the regulator side of the sensing resistor R. Both controls employ 10 turn potentiometers with counting dials and that makes it so convenient. You can preset the output to your requirements before switching on and expect to have things happening your way. They do — within 1 per cent. In fact it was found that the control reading is always closer to the output than the meter reading. No regrets are held having spent the extra. It can be done with a coarse and a fine control too, of course, using resistance values of 100 to 1 or 50 to 1, but this costs a bit less and "tastes" rather more ordinary.

Now for the last main blocks, the trip circuit. It is not needed; you can have 0 to 50V and 0 to 4A without that. It's one of those extras like a car stereo or a TV set. Not necessary, but nice to have. Here is how it works. The current control amplifier signals an overload to it and a lamp driver lights up an amber light. If the TRIP ON-OFF switch is made a capacitor will also be charged. This one is in the emitter circuit of a unijunction transistor (UJT) and will switch it on when the capacitor volts are high enough (6 or 7V). The UJT then fires a small SCR which conducts via a resistor and a clamping diode and connects to the 3rd input of the OR gate. It takes over control from the op. amps. and clamps the drive for the regulator emitter follower to just below the voltage at the positive output terminal, thus switc.. ing the latter off. At the same time a relay slaps 10 ohms across the output and a red light glows. The SCR can be fired manually via the "NO VOLTS" button. To release the clamp we short out the SCR with the aid of the RESET button. To get the delayed TRIP you close the second small switch and the value of C at the UJT is upped to make the charging time longer.

So much then for the tour of the block diagram. Now a few more explanations of various details. Back at the raw supplies, you will find on the detail diagram two more relays. RL1 has two contacts paralleled and is used to short out a "startup" resistor which is used to limit the switch on surge to 30A or so. Both of the relays are delayed a little. RL1 pulls in first and RL2 about 250 ms later. RL2 fires the SCR in the trip circuit as soon as the negative reference comes up, which happens before RL2 pulls in. This action allows the reference volts and the op. amps to settle. In other words, when switching on "from cold" the supply does not start up under load because the "NO VOLT" condition exists. You have to push the RESET button in order to get an output. It gives the "innards" a second or two to settle. Strictly speaking, that feature is not needed — but it is felt that the start resistor and RL1 are a reasonable idea. There is, also in that block, a 70V peak voltage supply. It feeds the pre-regulator drive via a constant current source with more and cleaner DC than is available on the Primary Storage Capacitor, and drives the pre-regulator emitters closer towards the collectors, saving a bit of heat or dissipation. The link between pre-regulator control and pre-regulator power section consists of two constant current sources, each using a high voltage output transistor.

A transistor switch was wanted on the positive rail. There is the possibility of using a PNP switch in the negative rail which can be fed from a sensing circuit sed on OV. However, that would force the whole transformer secondary to fly up and down as it switched, and it was felt that it may generate unnecessary noise. It was fed in — so to speak — bit by bit, you can see it on the circuit diagram. One of the problems was to feed the NPN switch on the positive side with a reasonable value of base current over the 70V range. Resistors just would not do. Constant current sources will. Two are necessary because the control section can be at any level between zero and +50V, and also the pre-regulator switch bases and emitters can be at any level between +2.5 and +52.5V in the off condition. In the on condition they are close to the collector voltage, about 65-75V.

The solution was therefore to give the pre-regulator control section a constant current source. This puts out a 0.5 mA signal whenever the pre-regulator is to be on, and the power section another constant current source, providing a constant 2 mA /e when requested by the 0.5 mA signal from control, all this regardless of the voltage differences. The type of constant current source will work down to 1.2V as long as enough base current is available for the output transistor. It changes its current with temperature though, because the E to B junction of the bottom transistor is used as the reference. Whereas in this application it does not matter, in others it may. So if you wish to use it elsewhere, you might have to compensate. It's not hard to do.

Some words now on the buffer choke. When the pre-regulator switches off, the choke produces a "backfire" which will drive its pre-regulator end towards OV, taking emitters and bases of the switch with it. Upon going through OV the catching diode turns on and now forces the choke to discharge into the secondary storage capacitor.

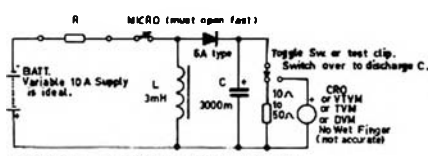
When that job is done the cathode of the diode, emitters and bases of the switch and one collector of constant current source pre-regulator power section, go to the voltage level present on the secondary storage capacitor, until the next cycle.

Heavy diodes have been connected across both regulators and across the output — in reverse. They do not do anything normally but abnormal things can happen. For instance you want more volts and use this supply in series with another. The other one might be switched on first and that would put reverse volts onto the regulators. They do not like it. It cost a few new 2N3055s to find that out, the output goes up and with it the emitters. The collectors are held at OV by an empty large capacitor, and $2.20. Now with the diodes, that last mentioned capacitor is charged and so the reverse volts on the transistors will not be high enough to ruin them. The reverse diode across the output comes into action when polarity mistakes are made. It causes big sparks, blows fuses and saves your circuit. Use one that can stand up to it — like a 30A model, perhaps 50A would be even surer. Ridiculous? Could be, but it's foolproof.

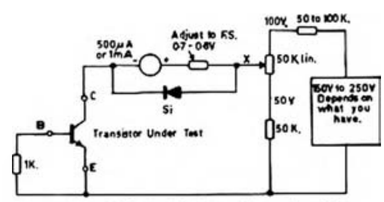
A short note on the reference regulators. The power transistors in the supply are bigger than need be. But what you can shift in a wheelbarrow will not hurt a truck! During experimenting it was found that the temperature stability of the 12V rails was 3 times better, percentage wise, than the 6.2V zeners. It is due to cancellation, in part, of the positive temperature co-efficient of the zeners by the negative one of the E to B junction of the amplifier transistor. One more thought; you can put the rectifier, and capacitor feeding each regulator, on the same etched circuit card, but if you do, beware of hum injection via common ground conductors. It was amazing to see how much voltage will drop along a short strip 2" by ¼". You may possibly want to know why two power transistors were used in parallel in the linear regulator. The beta of 2N3055s and such like drops off fairly drastically at high current levels. Although 4 amps is not all that high it would, in the particular brand used, drive the transistor too close to a region of its characteristic in which the thing starts to look like a transistor with a fairly low value resistor in parallel. That means more noise on the output rail and reduced loop gain. With two helping each other, we have more savoury conditions.

Perhaps even another little trick? Primary and secondary storage capacitors are 10 milli-farad, a fairly large size which keeps the ripple current per unit capacitance down, hopefully resulting in longer life. At the same time there is less ripple voltage for the regulators to iron out. On the output, 3 capacitors in parallel are used in an effort to have the smaller ones shunt the inductance of the larger ones. The meters are hand calibrated 1 mA 100 ohm models.

Little trouble was experienced in getting anything in the unit to work. It really is handy on the bench. When you analyse the circuit you will see that it is all more or less basic ingredients.



APPENDIX A Rough Check on Choke Saturation



APPENDIX B Circuit for High Voltage Test on Transistors

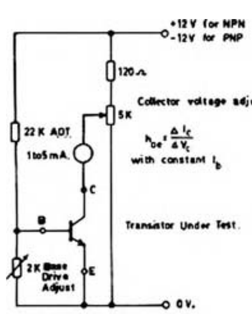


FIGURE 1

APPENDIX C.

APPENDIX A

Rough check on saturation:—

Procedure: Adjust R so that the current through the choke L under test is say to the rated current. Open micro-switch and note reading of VTVM, discharge C. Increase current through L to 2/10ths of rated current. Open micro-switch. The VTVM should show twice the voltage previously measured. Note this value also. Repeat the procedure until an even current increment no longer gives an even voltage increment. The choke is now starting to saturate.

The value of C given will produce a reading of 1V per A. Discharge C each time. The micro-switch needs to make only for ¼ of a second. Test to 10 amps. **NOTE POLARITIES!**

APPENDIX B

Circuit for high voltage test on transistors:—

Procedure: Increase volts slowly until you see meter deflect. From there on, the reading will increase more rapidly. You can use the transistor up to the point of current noise. From there on it may be risky. If a variable supply is available that can cover 50 to 100 volts, do **NOT** use the potentiometer drain. Instead put 50 to 100K into point X. All transistors contained in or connected to the pre-regulator should go to 80V or better. Make certain they do!

APPENDIX C

Checking output admittance, hoe:—

Constant current sources and voltage amps are best equipped with transistors exhibiting low hoe. The circuit described here helps to find them.

Wire up the circuit as shown in Fig 1.

Adjust base drive to give IC used in your circuit with 6 volts (Vc not critical), then sweep collector volts up and down. Look for the transistor with least variation of IC between 1.5 and max. Vc.

In a constant current source, only the output transistor is important in the above respect. ■

modifying the trio jr60 receiver

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This article describes a number of worthwhile modifications to the JR60. These modifications are equally applicable to the Lafayette HE80 receiver.

One of these units was acquired some years ago and it was most disappointing to observe that this particular unit drifted bady even on BC. Many fruitless hours were spent trying to improve it. The conclusion was that it was a heat problem due to compact design. First modification involved replacing the 6CA4 rectifier with silicon diodes. Running the valve heaters continuously helped greatly, but valve life was reduced to an unacceptable degree and there was still some drift. The only answer seemed to be transistorisation to eliminate the heat.

This has been a long process over a period of several years and the unit still uses valves for the second IF amp, product detector and 2 metre converter.

The modifications carried out are listed as follows:

(1) A pair of germanium diodes were connected across the antenna input to protect the RF transistor.

(2) The RF valve was replaced with an MPF102 source follower feeding a BF115 amplifier (see AR June 1968) with the emitter resistor unbypassed. A partial bypass (100 ohms in series with 40,000 pF) increases gain but creates cross modulation problems. The existing 1K and 10,000 pF B+ decoupling network was used. The existing AGC decoupling was retained.

(3) The 6CA4 heater winding was connected in series with one of the other 6.3V windings to produce 12.6V AC. This end was connected to a 2500 uF 25V capacitor via a silicon diode. Half-wave rectification seems adequate. The DC output was fed to a 1.5W 12V zener diode via a 300 ohm resistor. This 12V source was fed via a 560 ohm resistor to a 400 mW 6V zener which feeds the local oscillator and BFO. The existing HT wiring was removed from the "remote" socket and 12V connected to this so that the set can be remotely controlled.

(4) The tape recorder outlet was removed and a 3 amp toggle switch fitted in the hole. The converter heater lead was wired in so the heater can be switched off when not in use. This also requires rewiring one dial light so it isn't switched off when the converter is off.

(5) The 6BE6 mixer was replaced with an MPF105, with a 10K source resistor bypassed with 1000 pF capacitor.

The RF transistor was wired to the existing valve socket plus a terminal strip mounted adjacent to the valve socket. The mixer was also wired to the 6BE6 socket. Do NOT wire transistors to 7 pin plugs and plug them into valve sockets if instability is to be avoided.

The original circuit shows a cathode follower between the oscillator and mixer but this was not wired in my set; injection was direct from the oscillator grid to the mixer grid via a 20 pF capacitor.

(6) The 6AQ8 oscillator was replaced with an MPF104 soldered to the valve socket and a terminal strip mounted under one of the socket bolts. No variation was found in calibration with the MPF104 but a slight shift was noticed using a 2N3819. A source follower after the oscillator was tried but it was considered unnecessary. Injection to the mixer is fairly critical. A 5 pF coupling is a good compromise.

The drain end of the RFC must NOT be bypassed since oscillation on top band depends on extra feedback provided by a 10,000 pF capacitor connected to a winding on the top band oscillator coil.

(7) The first IF amplifier was replaced with a MPF105 source follower feeding a BF115 amplifier. To preserve stability the FET should be mounted on the IF transformer and the Bipolar mounted on the 6BA6 IF amplifier socket. Lead length between the FET and the BF115 is not so important, being relatively low impedance. AGC was applied to the gate of the FET via existing components.

From here trouble occurred. Another MPF105, BF115 combination was tried in the second IF but could NOT be stabilised. Replacing the BF115 with a 2N3564 (lower Beta) did stabilise the stage but it then suffered overload. An MPF121 was tried in place of the FET-bipolar combination but had the same overload problem. Not satisfied with the solid state result in this stage, the 6BA6 was re-used.

(8) AGC action was now superior to the original and it was necessary to shunt the S meter with 220 ohms. As each stage was removed from the B+ line the voltage rose as resistive filtering is used. The voltage applied to the second IF 6BA6 screen exceeded valve ratings, so a 22 K ohm 2W resistor was required to feed the screen of this tube.

(9) Several different RF gain control arrangements were tried, but none found satisfactory. Finally the system shown on the circuit was tried. 6.3V AC from the valve heater line was rectified with a silicon diode to produce a negative voltage (no filter capacitor is required) and applied via a 7.5K ohm resistor to the existing 10K RF gain control. The moving arm was connected via a small silicon signal diode (has to be silicon for high back resistance) and a 1M ohm isolating resistor to the AGC line. This gives limited control but is quite smooth and adequate. It does upset the S meter reading but in practice the RF gain is rarely used since the AGC is adequate.

(10) The 6AL5 NL was replaced with 2 germanium diodes mounted on a 7 pin plug with a back cover to protect the diodes, and plugged into the valve socket. The noise limiter is inferior to the original. A silicon diode was tried but was still not as good as the original, however the noise limiter at best is not very effective so the germanium diodes were left in. The germanium diode detector performs as well as the valve.

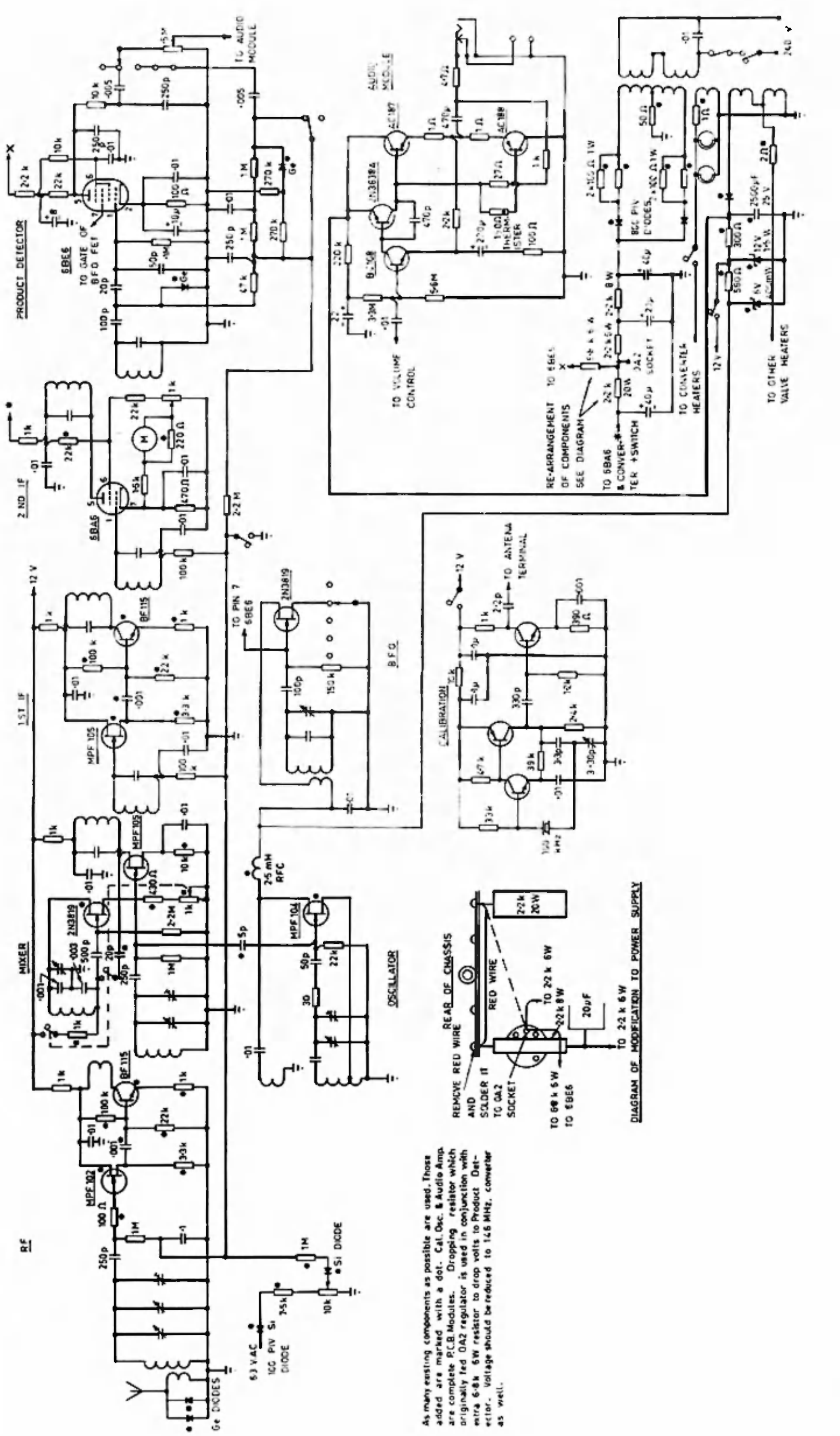
(11) An MPF121 and a 2N3819 were tried as a product detector. The MPF121 worked well on weak signals, but overloaded on strong signals. The JFET worked, but injection was extremely critical (gate injection). Both were inferior to the 6BE6 so the valve was re-installed.

(12) The BFO valve was replaced with a 2N3810 supplied from the 6V DC regulated voltage. The slug in the BFO coil required slight adjustment to centralise the front panel BFO control.

(13) The audio stages were replaced with a transistor amplifier as used in the "EA 270" and solid state Deltahet. The PCB heat sink was home designed so that the unit was self-contained. This amplifier has approximately the same gain as the valve amplifier and produces about the same output with 17V B+ and a 4.7 ohm resistor in series with a 3 ohm speaker.

The speaker should be 8 ohms but all speakers on hand were 3 ohms, hence the 4.7 ohm series resistor. The high input impedance of this amplifier allows retention of the 500K ohm volume control. This module is mounted above the chassis over the sockets of the valve audio amplifier.

(14) The 6AQ8 calibration oscillator and Q multiplier was removed from its socket and a nine pin plug inserted. A 2N3819 was wired to provide the Q multiplier "triode" connections. A 1K ohm switch potentiometer with DPDT switch was fitted in place of the existing 10K ohm potentiometer. This requires enlarging the chassis hole to ⅜", taking care to avoid marking the front panel. Also the shaft of the potentiometer has to be reduced to fit the metric size knobs. This was done using an ordinary file, and some care. (Tip: make a diagram of connections before removing pot). The feed resistor was reduced from 22K to 1K ohm and connected to 12V DC. The original 5,000 pF injection capacitor was reduced to 20 pF since the original design severely detuned



As many existing components as possible are used. Those added are marked with a dot. Cal. Osc. & Audio Amp. are complete P.C.B. Modules. Dropping resistor which originally fed OA2 regulator is used in conjunction with extra 6·8k 6W resistor to drop volts to Product Detector. Voltage should be reduced to 145 MHz, converter as well.

the first IFT. Even with 20 pF some detuning occurs and the capacitor could possibly be reduced, however this has not yet been tried.

(15) Simple replacement of the triode calibration oscillator with a FET did not work. The "EA" circuit (EA Oct. 1970) was built on a home made PCB as shown in the circuit. This circuit works very well and is slightly superior to the original on higher frequencies. This module is mounted above the chassis over the mixer and local oscillator valve sockets.

(16) It is necessary to reduce the HT on the product detector by using an extra 12K ohms of appropriate wattage in the HT feed to reduce the anode voltage to about 100V.

(17) The reduction of current required for valve heaters plus the fact that the TRIO was designed to operate on 220V AC instead of 240V meant that in this set, the heater voltage rose to 7.40V. This was reduced by fitting a 2 ohm resistor in the heater circuit to the 6BA6 and 6BE6 and a 1 ohm resistor in circuit to c lamps and converter heaters. Resistors were made up from resistance wire. Some electric jug elements are solderable but several strands may be necessary to keep the temperature of the resistor down. (Alternatively suitable resistors may be purchased from a radio parts supplier — Ed.). The existing HT resistors can be re-arranged to reduce the HT to appropriate voltages with the reduced drain. The red wire linking the ends of the 2.2K 8W and the 2.2K 20W nearest the rear of the chassis is removed from the 2.2K 8W and soldered to the B+ pin on the now vacant OA2 voltage regulator socket. From this point an added 6.8K 6W goes to the product detector.

This arrangement requires a minimum of change and gives 170V at the B+ end of the 6BA6 IFT plate winding and 75V at screen of 6BA6 (with 33K extra dropping resistor reduced to 22K) with the converter off. With the converter on, the voltages become 115V at the B+ end of the IFT and 48V at the screen of the 6BA6 and 125V to the converter. The 2.2K 6W resistor gets fairly hot with the converter on so if prolonged use of the converter is envisaged, a higher wattage resistor in this position may be desirable.

Although some drift is still apparent, the improvement was well worth the effort. The mixture of FETs used shown on the circuit was not deliberate — they just happened to be ones that were on hand, and although they have not been tried, probably MPF102, 104, 105 or 2N3819 would be equally suitable.

Existing valve circuitry has been retained except where the HT had to be changed to 12V or 6V and, where possible, existing HT decoupling and AGC decoupling has been used. The results have been very satisfying. ■

REFERENCES: Q mult "EA" April 1969 p.58; XTAL CALIB "EA" Oct. 1970 p.101; SOLID STATE MODULES "AR" June 1968; SOLID STATE DELTAHET "EA" Feb., Mar., Apr., May 1971; EA 270 "EA" Feb., Mar., Apr. 1970.

a cradle for ken

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This is not a bedtime story. Most two metre enthusiasts are familiar with the KEN KP202 transceiver. Those with extensive funds have one as a spare; others, like the author, use a KEN for all 2 Mx FM operation.

It was decided that the KEN could be used for other than portable operation. Mobile seemed a good idea, but how to operate safely in the car?

Being very conscious of road safety and the dangers of driving, it was determined that mobile operation would not compromise the driving technique. Also being very keen on caravanning, the car is a manual shift model. (It is believed that a manual is a better all-round towing vehicle.)

The following requirements for mobile operation with the KEN were set:—

1. Switch to talk (not PTT).
2. Boom microphone (two hands on the wheel).
3. Power from car circuit rather than in-built batteries.
4. Minimum action to revert to hand-held portable operation.
5. No serious change to appearance of the unit.

For every change there is some compromise. In this case it was decided that the nicad battery positions were not required, so this space was used for the power circuit modifications. Of course, if you want to use nicads you don't really need to use power from the car, so just delete this section of the modifications.

A 2.5 mm socket was fitted to the base of the KEN battery box. Be careful of the metal plate in the base, also the two nicad charging points are not slotted so initial removal is difficult. Before reassembly, cut a slot in each screw thus allowing a screwdriver to be used for reassembly.

Trace the power circuit with a multimeter and wire the socket so that with the plug removed internal batteries run the rig, and with plug inserted external power is applied. This system has the added attraction of being available for use with a bench power supply.

The socket can hardly be noticed in the base so does not detract from the appearance of the KEN.

Speaking of appearance, the only visible modification is that which brings the speaker and microphone connections from the unit to two 3.5 mm sockets.

Drill two ¼ in. holes in the name plate just below the speaker. Through these holes bring twin shielded cables, one for speaker and one for microphone. These are wired to the 3.5 mm sockets so that the internal equipment operates when no plug is inserted, and external equipment is connected when the plugs are inserted. (Plug insertion disconnects internal equipment.) There was no room to mount two 3.5 mm sockets on the case of the KEN, so a mounting plate was made from a piece of copper. The plate measured 6.5 mm x 6.2 mm and was bent as shown in the diagram. With careful application of paint this can look quite neat and, while it is an obvious modification, it does not detract from the KEN's appearance too badly. Four small holes are drilled at the corners and the plate is mounted using small self-tapping screws.

Once installed any type of external microphone can be tried. If you don't have a boom microphone, try one of the cheap JA microphones that can be hung around the neck; some work quite well.

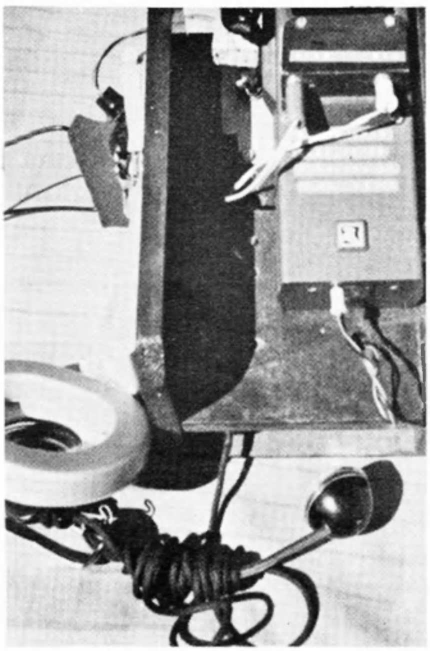
The external speaker function is not used in this installation, but is there to balance the appearance and to provide the facility to use an ear piece if required.

We now have inputs for power, microphone and speaker, all of which disconnect the in-built equipment.

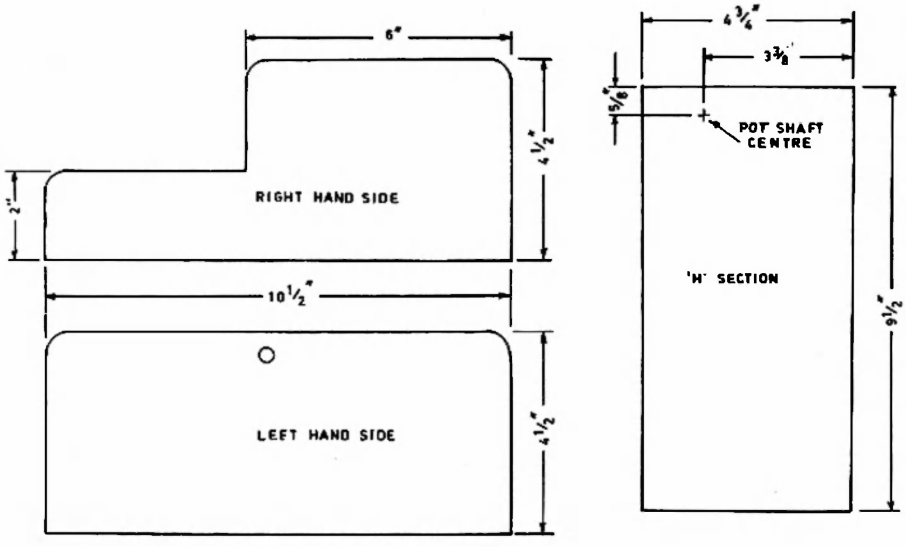
All that is required now is switch-to-talk and the rig will be ready for mobile operation.

One look at the miniaturisation in the KEN and all thought of bringing the PTT function out to a plug or some such is forgotten.

If it cannot be done electrically, then try a simple mechanical device. It was reasoned that if the KEN were to be held firmly in one position, a cam could operate the PTT. Here was borne the idea of the cradle.



A close-up of the complete installation ready to put in the car.



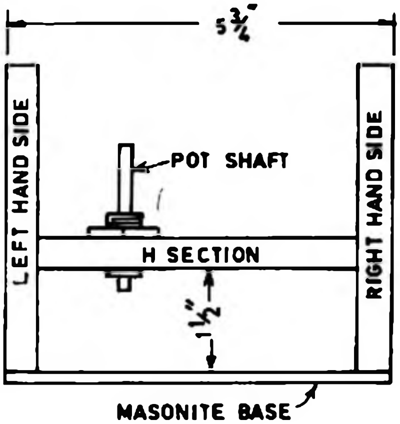
'KEN' CRADLE ALL MATERIAL ½" BOARD

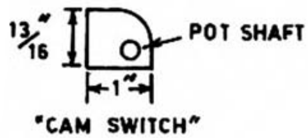
A U-shaped cradle was knocked together from scraps of pine board, and a small cam was made of the same material. An old "pot" shaft was fitted to the base of the U in such a position that it could swing the cam against the PTT switch on the KEN. Once this was tested the cam was glued (araldite) to the pot shaft and the lot was fitted to the cradle.

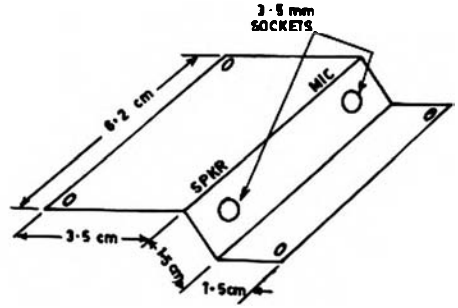
This first cradle was rough and ready, for in addition to holding the KEN position, it also contained the socket for the head set and a filter board which was made up for mobile operation.

This set-up was used with good effect until June '74, when the time was found to design a better cradle and neaten the whole thing up.

Pine board (½ in.) was used and this







time a form of "H" structure was made (see photos and diagrams). The base of this was covered with masonite which was found to slip on my seat covers. To stop this two strips of "hook" were glued to the base which stopped all slipping.

(Hook strip is one part of the stuff used for joining materials by pressing them together. The complete system is called "hook and pile".)

The construction of the cradle is a simple woodworking job; ¼ in. dowel, 1 in. panel nails, Selleys Aquadhere, and ½ in. pine board.

For anyone who wishes to copy this design, diagrams giving dimension are provided. Obviously this idea could be adapted to suit many different cars and radio equipment.

The cradle holding the KEN sits on the seat on the left and when desiring to transmit, just throw the cam switch with your left hand. When finished, release the cam and you are receiving.

Apart from the very quick excursions of the left hand to set the cam switch, you have two hands on the wheel all the time. The diagrams and photos show the cradle and cam switch. A small clip on the left hand side of the cradle holds a mini pen in which to log mobile QSOs.

It is hoped that this short article will be of interest to other KEN owners and perhaps stimulate a few more ideas. See you on two mobile. ■

rotating a 3 element 20 metre beam with a stolle

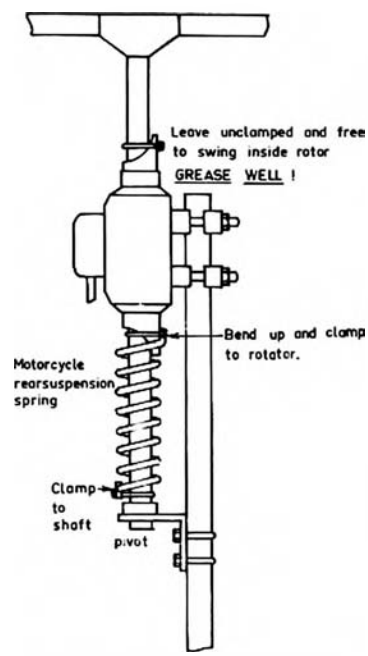
L. R. Newsome, VK4LR
58 Prospect Terrace, St. Lucia, 4067

Not wanting to go to the expense of a heavy-duty rotator, the way was cast to enable a TV type rotator to be used with a shortened version of a 20 metre yagi. The trick is easy enough.

While TV type rotators are capable of carrying up to about 20 kg in load, they are limited in the amount of torque which the motor gearing can supply to the rotating elements. It is not that a large array requires a large turning torque, once the array is on its way. It is the initiating impulse to start the array, and the mechanical strength necessary in the gearing to stop the array at the required place. More seriously, a gust of wind hitting the array off-centre can severely damage the lightweight gearing in the rotator.

The solution was to take all bearing weight off the rotator and provide a mechanical buffer between the beam's mass and the rotator. The mechanism is depicted in the drawing. The buffer was a spring from the rear-end of a motorcycle. With the aid of an "oxy" torch, the ends of the spring were turned at right-angles to provide lugs for clamping to both the shaft of the beam and the rotator. The head weight of the present beam is about 8 kg and the boom is 6.5m of 5 cm diameter aluminium. The longest element is about 8m, each element being shortened by the use of loading inductances 1m in from the ends.

So far the rotator has been in service for about two years and has passed through one or two mild cyclones. The rotator can be reversed instantly while the beam is still swinging in the opposing direction. The motor seems to accept this abuse quite readily. On initial operation, the beam seems to take about three or four seconds to start moving, although the motor can be heard running almost instantly. Some lag and oscillation occurs at the ends of the run also. In a high wind the beam will oscillate up to about 20 degrees in either direction, but this is a small matter. One does, however, have to check the wind conditions before giving out a report of rapid QSB! ■



fm directory

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2

Vicom have made available a frequency counter in the front window of the Auburn showrooms to assist mobile 2M FM rig owners in staying on frequency. Come anytime and tune your rig while parked at the curb.

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2

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NEWS.... NEWS.... NEWS....

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microstrip data curves

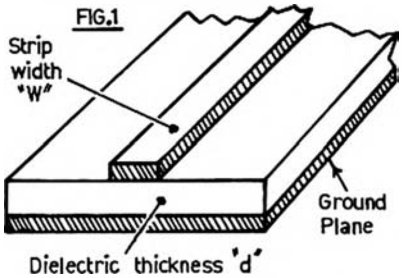
Neil Weste, VK5TB
Electrical Engineering Dept.,
University of Adelaide, S.A. 5000

Interest is growing in the ultra high frequencies, on which certain techniques are useful, although impractical at lower frequencies. The one dealt with in this brief review is the use of microstrip transmission lines.

The construction of the line consists of a ground plane separated from the conductor by a dielectric (see Fig. 1). An ideal medium to form such a line is double-sided fibreglass circuit board. Despite some limitations it provides a good basis for experiments with microstrip.

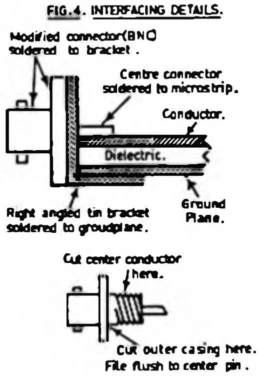
Recently a number of articles have appeared relating to the use of microstrip in amateur projects. Refs 1, 2. It is the main purpose of this article to present the relevant-design curves to enable the amateur to "roll his own" filter, coupler, or ıer transmission line device.

FIG.1



As with other transmission lines there are two parameters of interest, these being impedance and velocity factor. In the microstrip medium the factors affecting these two quantities are the dielectric constant of the separating dielectric (K), the distance of separation (d) and the width of the strip (w). In amateur circles the most available medium would be fibreglass PCB. With this in mind the parameters for this medium are presented in graph form in Figs. 2 and 3. This assumes d = 0.0625 in, K = 4.4. It has been found in practice that these values represent a good average of the different boards available. Thus for width w, the impedance may be read off the graph. Similarly the velocity factor may be found.

FIG.4. INTERFACING DETAILS.



EXAMPLE 1

Suppose a quarter-wavelength 50 ohm line is needed at 1296 MHz. From the graph it is found that a width of 0.115 inches gives an impedance of 50 ohms.

Next, for w = 0.115 in, it is found that the velocity factor (n) = 1.84. Hence length of line . . .

$$\frac{3 \times 10^{8}}{1296 \times 1.84 \times 4}$$

Included in Figs. 2 and 3 are the curves for teflon-impregnated fibreglass PCB as used by DJ1EE in his 1296 preamp.

This extra data enables one to convert from one medium to another, allowing the cheaper PCB to be used. Values assumed were d = 0.0625 in and K = 2.1.

INTERFACING AND USES

The lowest discontinuity (and hence loss) results when the coaxial connector is mounted as shown in Fig. 4. Usually connectors have to be modified to fit flush with the structure, this being achieved by a touch of discreet cutting and filing. The protruding centre conductor is soldered to the microstrip.

To use microstrip fully, an understanding of transmission line techniques is definitely an advantage. However, with a bit of imagination, uses will become evident. The primary aim of this article is to present the data, and it is hoped that future articles will show the methods of design and indicate where the line can be used.

LIMITATIONS

Microstrip is a relatively low Q transmission line and thus more lossy than stripline or waveguide. However the losses involved are still very small. An improvement may be made by using teflon-glass board but considering the economics it is the author's view that fibreglass PCB provides the best compromise. At 2.5 GHz the losses are still at a tolerable level for most amateur applications.

Accuracy of strip widths and lengths is another minor problem. The claimed accuracy of the graphs is plus or minus 2 per cent. Considering the flatness of the graphs around 50 ohms, one may be confident that the design is reasonably close. Keeping to an accuracy of 0.05 in will usually suffice.

CONCLUSIONS

While only an outline has been presented, it is hoped that the data presented will provide some motivation to explore new methods and techniques in our UHF bands.

REFERENCES

1. "23 cm Preamplifier with printed microstrip-lines", K. Hupfer, DJ1EE. VHF Communications, Sept. 1972.
2. "A High-Performance Balanced Mixer for 1296 MHz", Paul Wade, WA2ZZF. QST, Sept. 1973.

FIG.2
MICROSTRIP CHARACTERISTIC IMPEDANCE

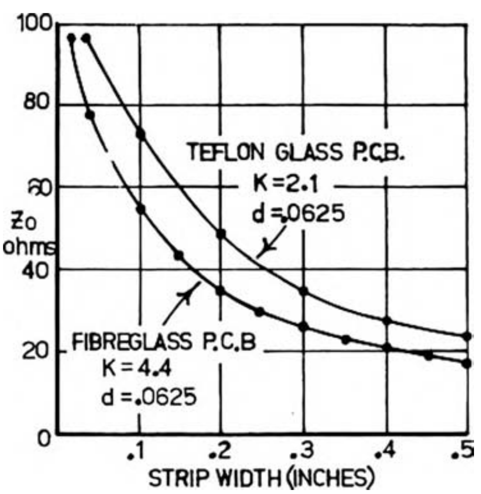
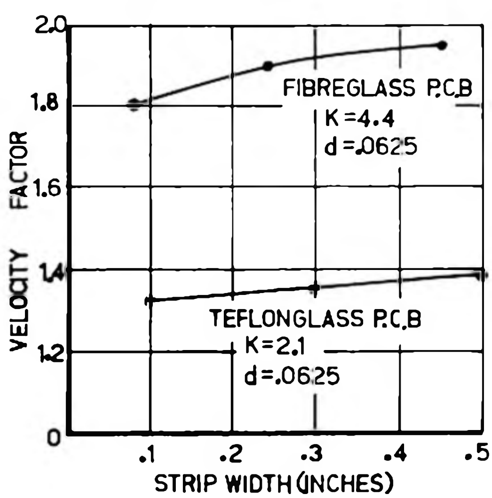


FIG.3
MICROSTRIP VELOCITY FACTOR



proportional crystal oven

H. MOORES, VK4IJ
6 Thomas St., Wilston, Brisbane, 4051

The following is used to hold the temperature of the crystal of a frequency counter at 40 deg. C. A special crystal was ordered for this temperature.

Five silicon diodes in series, type unknown, ex computers, are used as the sensing element. These are in series with a 16k resistor across a 7V Zener rail connected to one input of a uA741 op amp: the other input is connected to the same 7V rail through a trimpot, which sets the desired temperature.

The sensitivity is such that holding the sensing diodes between the fingers will swing the output of the op amp from 9V to zero.

When the unit was finally set up, the trimpot was replaced with fixed resistors, juggling the values to obtain the desired temperature.

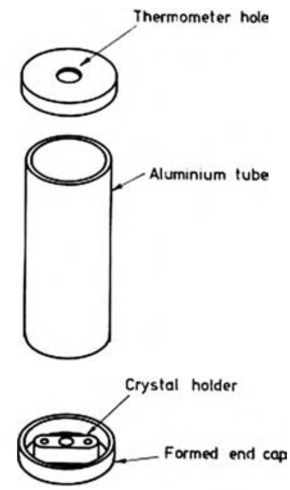
The oven consists of 2" of 7/8" ID aluminium tubing, squeezed in a vice to an oval. Caps were cut from sheet aluminium, flanges formed on them and the lower one araldited on. An HC6U crystal holder mounts by a bolt through the lower cap. Two strands of fine wire through insulating bushes connect to the crystal. These are fine so as to prevent thermal losses through the leads. The heating element is 15" of fine (probably 40 SWG — Tech Ed.) Nicrome wire wound over aluminium tube with a couple of layers of brown paper under it for insulation. The sensing diodes were tightly tied over the element with cotton and the whole liberally covered with araldite. Very close contact between the sensing diodes and the element is necessary to prevent hunting.

The use of brown paper and araldite in an oven may seem out of place, but remember the temperature is only 40 deg. C.

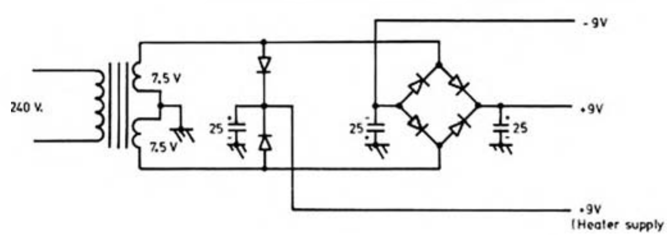
The oven is clamped between two hollowed out pieces of Coolite to provide thermal insulation. A ¼" diameter hole (normally plugged) permits the use of a thermometer for setting up.

The power supply is provided by one 15V CT, 1 amp rated, transformer. The op amp draws about 20mA, and the heater 450mA cold; this reduces to 100mA after a few minutes and finally settles down to about 50mA.

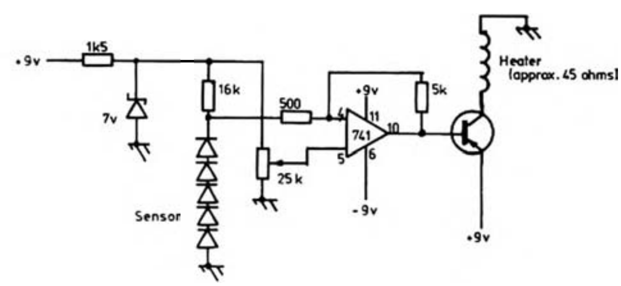
The value of the electrolytic capacitors may seem low, but they were on hand and they work OK.



CRYSTAL OVEN CONSTRUCTION



POWER SUPPLY FOR VK4IJ CRYSTAL OVEN



VK4IJ CRYSTAL OVEN

Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

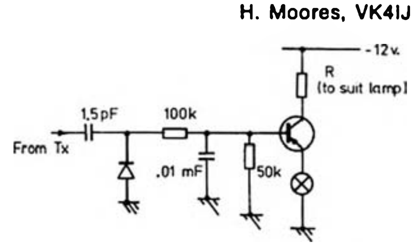
MOBILE OUTPUT INDICATOR

This output indicator is fitted to a "Courier Car Phone" and removes the query "Am I getting out?" when no one replies to your calls. The coupling capacitor is only 1.5 pF and so there is no discernable loss of output, measured on a Field strength meter with the indicator connected.

The indicator bulb is a panel light from a VW which mounts through a ¼" hole in the front panel, and is held in place by two rings cut from thick walled plastic tubing of ¼" ID.

Some juggling with resistor values will be necessary to give a satisfactory indication, the ideal is the bulb just coming to maximum brightness with full TX output.

H. Moores, VK4IJ



MOBILE OUTPUT INDICATOR

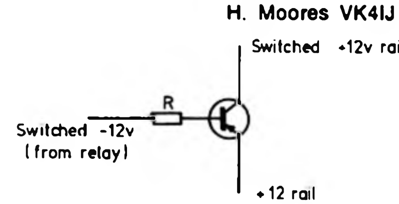
EXTRA RELAY CONTACTS

After fitting the front end of a VK3 (Jenkins/Hepburn) carphone to my courier car phone, I was faced with the problem of supplying a switched plus 12V rail to the front end as the courier uses P types and the new front end N type devices.

No extra relay contacts were available, but a switched minus 12V rail was. The use of one PNP transistor solved the problem thus:

(The resistor "R" in the diagram is for base current limiting, around 6.8k ohms — Ed.)

H. Moores VK4IJ



EXTRA RELAY CONTACTS

Newcomers Notebook

with Rodney Champness VK3UG

44 Rathmullen Rd., Boronia, Vic., 3155

A NEW CONTRIBUTOR

My pleas for assistance in producing Newcomers Notebook have brought a welcome offer of help from David Down of Christies Beach in South Australia. With David's assistance it is hoped that a wider range of subjects of interest can be covered — and a vital point is that you will get two points of view instead of one. David's first article will be on setting up a station for low power DX. For the Newcomer to amateur radio it will set you on the road to DXCC.

Presently more short circuits and other articles from Zero Beat will be published. For a few months it has not been possible to produce articles. During that period a transceiver was designed and is nearing completion. A few problems have been encountered with some established American and Australian designs — to put it plainly they don't work properly. More of this later — now over to David.

LOW POWER DX

Many new amateurs gain the impression that expensive equipment, a hilltop QTH, and a lot of luck are the requisites to make regular foreign contacts. This is categorically untrue. For the newcomer, be assured, many long distance contacts are made every day with simple equipment, from urban residential locations. How then does one start?

FIRST:

We'll assume you are a licensed amateur, or soon will become one, and that you are in a position to establish a simple station. If you are the holder of one of the new Novice licences (when they arrive) strive for the full licence as soon as possible.

SECOND:

Plan your equipment to operate on *one* of the DX bands, 7, 14 or 21 MHz. Going multiband can come later, and will be the subject of a future article in this column. While it is natural to want to become *multiband* like most others, it is a natural progression from the suggested *monoband* operation, by which time, certain listening and operating expertise will have been attained, a knowledge of propagation will be added to by simple practical application, certain aspects of antenna design, construction, erection and tuning will be more familiar and the operator will have a greater depth of constructional knowledge of equipment he will need, on which to expand.

THIRD:

Plan to do most of your serious long distance, low power work on CW (morse). Less generated power is required for DX work, equipment construction is simpler and more economical, and in addition, prototypes have been, and are still being built by the author, for insertion in this column as projects towards setting up your first low-power, home-brew DX station.

FOURTH:

Plan to spend plenty of time and work on your antenna system, as this is primarily where the important factors in DX work commence. A monoband rotary beam, vertical whip or half-wave dipole antenna can be employed, and the RSGB and ARRL handbooks can provide many types to choose from. It is up to you to select, construct and erect the antenna of your choice, but *don't* let it stop there. Experiment with antennas, their theory, construction, location and methods of *feeding*, and you should learn a lot, in addition to achieving self-satisfaction from something so important that you have done *yourself*.

FIFTH:

Provide yourself with a good receiver, the basic requirements of which include:

1. Freedom from bad connections and hand capacity.
2. Stability — the ability to tune in and hold a signal despite reasonable mechanical shock and over a reasonable period of time.
3. Sensitivity — the ability to bring weak signals up to an audible level. A good practical test is to alternately connect and disconnect the antenna at the receiver. If the noise level does not markedly increase when the antenna is connected, your receiver will hardly do well on weak foreign signals.
4. Quietness and convenience — your receiver should not produce any sounds apart from a smooth quiet hiss when the antenna is connected (until a signal is tuned in). If it hums, crackles, grunts or groans, it needs internal attention (or maybe even replacement). It should also have a non-slip, smooth-acting tuning mechanism if you are to tune in the weak ones on the nose. A receiver need not be expensive and indeed, a properly built 2 valve unit will qualify easily on all four counts. *Remember*, it is not how loud the signals are, but how well the *weak* ones come through, that counts.

   For best results, use your transmitting antenna for receiving too.

SIXTH:

Use a good variable frequency oscillator (VFO) with your transmitter. Construction details of a suitable and economical VFO will be another project in the series forthcoming.

SEVENTH:

Adjust your transmitter to produce a steady, clean, reliable signal. If one or more valves overheat, bad connections exist, or it needs a kick to make it work, you'll miss many good DX chances (in addition to incurring the PMG's displeasure.) The transmitted power is inconsequential, both experience and maths verifying that, indeed, the *lower* the power, the greater the challenge to the *true* Amateur Operator. Anyone can catch fish with a depth charge, similarly, anyone can contact all the continents in one afternoon with a 400 watt, store-bought transceiver, but that is commercial radio, not amateur radio. 30-100 watts is adequate and sporting.

EIGHTH:

Operate intelligently. *Never* call CQ DX. Instead, wait and listen for the foreigner's call, then answer it. Look for DX at the proper time. You must be on hand when the ionosphere is right, if you want results. Be a gentleman. Other amateurs judge you and your country by your behaviour on the air. Don't give up. Try another time, another antenna or a different frequency, but there are plenty of DX stations about, so start your planning, and go to it. ■

Commercial Kinks

with Ron Fisher VK3OM

3 Fairview Ave., Glen Waverley, 3150

A DRIVE CONTROL FOR THE OLDER SSB TRANSCEIVERS

Most of the original sideband transceivers such as the Swan 240, 350 series, the Galaxy 300 and the National NCX3 did not incorporate any form of drive control as an aid to the tune-up procedure. In all cases a carrier balance control was provided and this was used to provide some carrier for tune-up and also for AM transmission. In many ways this was not an ideal method. Firstly the minimum carrier position was often a very critical point, difficult to find without some sensitive RF indicating device. As later model sets have shown it is better to leave this control set and provide a separate carrier control.

In all cases this proves to be a simple modification. In the case of the Swan 350 it is necessary to connect a one megohm potentiometer in series with the wire connecting pin 9 of the 7360 balanced modulator tube (V13) to the receive/tune switch S2. Now remove the 50 pF capacitor connection on S2 and return this to a convenient ground point.

For the earlier Swan 240 the modification is similar. Once again a one megohm potentiometer is inserted in the lead connecting pin 9 of the 7360 (V9) and the function switch SW1. The 50 pF capacitor from pin one of the 6U8A carrier oscillator to the function switch should be disconnected at the switch end and grounded.

No doubt many owners of early model Swans have looked at photos of the later model 500C and 500CX and noticed a small knob to the left of the dial labelled "output level". This knob does not in fact vary the output level at all, but only output indication on the meter when in the tune mode. It is however an ideal place to put your new carrier level control.

Commercial interest

Looking through a copy of Ham Radic magazine the other day I noticed the following under the signature of James Young from Spectronics, the US Yaesu agents of that time. In relation to spurious output from the FTDX 560 he states; 'Starting with serial number 30001, the VFO frequency range in the FTDX560 was changed from

Some of our Accessories for the Amateur Station

BALUNS

RAK BL-70A, 75 ohm, especially suitable for dipole use **$15.90**

KW Balun, 1:1, for 50 or 75 ohms, screw terminals, 1kW **$11.90**

BN-86, broad-band ferrite Balun, 2 kW for Beams and Doublets **$24.00**

BN-27A as above especially for 11m CB band **$22.00**

ROTATORS

Ham II, 230 V AC **$175**

AR-22L Light, low cost rotator, 230 V **$59**

Cable & Conductor for Ham II CD-44 .... **75 cents** yd.

ANTENNA ACCESSORIES

LA-1, Lightning Arrestor, for installation in standard 52 or 72 co-axial feedline, designed to Mil. specs. **$39.00**

LA-2, smaller size co-ax arrestor **$8.75**

C1, Centre Insulator, for Doublets **$10.00**

421A, Power meter, 3-60 MHz, reads SWR, power on 10, 100 & 500 W scales, and AM modulation percentage. Especially made for Novice & Marine 11m use **$48.00**

476 TVI filter, attenuation begins at 41 MHz and is 25 dB down at 54 MHz, SO-239 connectors **$15.00**

Yaesu TVI filter, 3 section, with SO-239 connectors **$25.00**

KW TVI filter, 5 section, SO-239 connectors, A superior job with excellent attenuation **$39.50**

KW Multiband trap dipoles:—
- With approx. 65 ft. co-ax and balun, 500W **$87.75**
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- With approx. 75 ft. twin feeder **$69.75**

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WIDE RANGE of Co-axial cable and connectors in stock.

K-20 70 ohm twin feeder .... **24c** yd.

KW multi-band dipole traps with ceramic "T" centre insulator, 80-10m bands per pair complete with insulator **$24.00**

KW co-axial switch, 3 position, 500 MHz **$19.50**

Co-axial B & W switches, 5 position, Model 590G **$24.00**

RAK L1 SWL trap antenna, 3-30 MHz **$15.90**

SWR METERS AND DUMMY LOADS

SWFS-2, single meter type, combined SWR and FS meter, 50 ohms, inc. FS pick-up whip, size 5" x 2" x 2¼". 3-150 MHz, UHF connectors **$15.00**

SWR-2, dual meters, 50 ohms. Simultaneous reading of forward and reflected power, 5" x 2" x 2¼". 3-150 MHz, UHF connectors **$22.00**

SWR-200 large dual meters, switched 50-75 ohms, with calibration chart for direct power readings to 2 kW in three ranges. A very elegant instrument. 7⅝" x 2¾" x 3¾", 200 MHz **$44.00**

KW ELECTRONICS Z Match Antenna Couplers 80 metres to 10 metres. Beautifully finished in communication grey (see review "QST" July, 1972):—

KW E-Zee Match, screw terminals at rear, size 5½" x 6" x 12", 30-2500 ohms, 400W **$67.80**

KW-107 Supermatch, as above but with addition of SWR meter, power meter with large 50 ohm dummy load to read up to 1 kW PEP, UHF sockets at rear. A superb piece of equipment, 7" x 8" x 13" **$187.50**

KW-109 high power version of KW-107, larger condenser coils **$218.00**

KW-160 "L" network single wire or co-ax. feed coupler especially for 160m. Also usable on 80 & 40 .... **$57.00**

KW-103 SWR Power Meter uses toroidal coil pick-up for continuous operation 52 ohms 1 kW max. to 30 MHz SO239 UHF sockets, very accurate **$49.00**

KW Dummy Load 52 ohm Air Cooled. Will handle up to 1 kW (ideal for use in the workshop or field) **$36.00**

HN31 Cantenna Kit 1 kW oil cooled (oil not included) **$26.00**

OTHER ACCESSORIES

AT-3 RF actuated CW Monitor and **Code Practice** Audio Osc. uses 4 transistors, 2 diodes, with built-in speaker and tone control.
Requires one UM3 penlite cell. In grey metal case, 2' x 3¼" x 3½" **$16.00**

EKM-1 Audio Morse CP Osc with speaker, one transistor. Headphone socket and tone control, requires one UM3 cell, in black metal case 3¼" x 3¼" x 1⅝" **$8.50**

AT-8 Audio Osc, larger de luxe type CP Audio Osc., 3 transistors. Includes relay for transmitter keying if required, and headphone socket. Tone and volume controls. Plenty of volume, suitable for group practice or tests. Nicely finished brown metal cabinet, 3¼" x 5" x 5". Requires four UM3 cells **$30.00**

MC-701 Mic. Compressor, battery operated. Available with 4 pin or TRS mic. connector, improved model **$39.50**

Yaesu YO-100 monitorscope, compatible with most other equipment. Includes IF for 3180 kHz (IF kits 455 kHz or 9 MHz, $9.00) **$192.00**

Yaesu YC-355D frequency counter, 200 MHz **$335.00**

MORSE KEYS

HK-708 light weight morse key suitable for practice or Tx use, flat style knob. Same mnfr. as HK-701 **$9.95**

EK-108 Electronic keyer, super quality, IC with dot memory. Built-in monitor & paddle. Solid state "relay". 230 V AC & 12 V DC types **$78.00**

HK-701 De luxe heavy duty morse key. Heavy base. A really beautifully constructed and finished unit. Fitted with a dust cover, standard knob and knob plate, ball bearing shaft **$20.00**

MK-701 Side Swiper key to actuate Electronic keyer **$24.50**

BK-100 (BUG) Semi-automatic bug key, full adjustable **$29.50**

NEW — VHF FM TRANSCEIVERS, 146 MHz
Arriving soon, a 25W 24 channel commercial quality set, superb construction in a compact metal case. Price approximately **$220.00**

Also a 10W 12 channel set at approximately **$175**

And, after many delays, some FT-220 due around end of April. Will include provision for operating FM repeaters. With extra crystal. Anticipated price **$475.00**

Also available: Equipment for novice, CB and Marine use on 11m band. Antennas, beams, Walkie Talkies, base stations, and accessories. Digital clocks.
Digital Clock BC/FM radios, Automatic VHF/UHF scanning receivers, SSTV, Generator noise filters.

Servicing facilities for all types of Amateur and Novice equipment. We check all sets before sale and provide a 90 day warranty.

All prices incl. S.T. Postage and freight extra. Prices and specifications subject to change without notice. Availability depends on stock position at time of ordering.

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N.S.W.	STEPHEN KUHL, P.O. Box 56, Mascot, 2020	Ph Day 667 1650 A.H. 371 5445
S.A.	FARMERS RADIO PTY. LTD., 257 Angas Street, Adelaide, 5000	Ph 23 1268
W.A.	H. R. PRIDE, 26 Lockhart Street, Como, 6152	Ph 60 4379

8400-8900 to 8700-9200 kHz. The resulting change in local-oscillator frequencies produced a heterodyne with the second harmonic of the 3180 IF in some units to produce the spurious output. This was eliminated by addition of the 6358.6 kHz crystal. All FTDX560s manufactured after introduction of the FTDX-570, and all FTDX570s have this circuit modification incorporated during production". ■

VHF UHF
an expanding world
with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RTX, Devonport	144.900
P29	P29GA, Lae, Niugini	52.150
3D	3D3AA, Suva, Fiji	52.500
ZL1	ZL1VHF, Auckland	145.100
	ZL1VHW, Waikato	145.150
ZL2	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

No alterations or additions to the beacon listings this month. Anyone in the know who can shed some light on the situation in regard to operation of the VK0 beacons could help me by confirming or denying the existence of the two beacons listed. Thank you.

SIX METRES

Although things have gone rather quiet (probably many ops writing up their Ross Hull Contests Logs!) there have been a number of openings to various parts of the country. Probably the best was on 9/2 when VK1, 2, 3, 4, 5, 7 and 8 plus ZL3 were worked at my QTH, and with a number of other stations joining in. The various VHF portable stations out for the John Moyle National Field Day would have had a ball considering the excellent conditions. After this the general decline set in, but for those operators with 144 MHz equipment, and following the activity around the start of February and its great DX, we now saw further . . . DX on 144 MHz and 432 MHz.

The excellent conditions prevailing since 31/1 continued on into February when on 4/2 Garry VK5ZK contacted Wally VK6WG on 432, crossband 432/144 with VK6BE. Wally VK6WG heard VK3ZDW and VK3ZFJ on 432. Bob VK6BE heard VK3AUU on 432, while Bob's total of contacts on 2 metres for the opening at this stage had risen to 98! A lull in proceedings started soon after this, but the 2 metre beacons in Adelaide and Albany were being watched very carefully.

The right conditions commenced building up on 15/2, with some contacts VK5 to VK6. However, 16/2 was the night. The sked on 40m. with Bob VK6BE confirmed something big for VK5 was coming up, and then it happened. 144 and 432 MHz both opened up with a vengeance, particularly into VK5 Adelaide area. Garry VK5ZK and Peter VK5ZPS wearing their voices out with a multitude of contacts to Albany. Garry was heard to remark at one time to the boys in Albany that there did not seem to be any more ways they could be worked on VHF; contacts had been two way 144 MHz, two-way 432 MHz, crossband 543/144, 146 FM both ways and crossband, all manner of antennas used, right down to whips etc. 5 x 9 signals both bands 144 and 432. From my location 50 km inland once more I had to sit on the fence and listen to those in Adelaide getting amongst it. Finally my turn came, albeit very brief, but at 1123Z on 16/2 I worked Wally VK6WG and nine minutes later Bernie VK6KJ. Soon after that the band closed for me again except for 4 minutes about an hour later when Wally VK6WG was again heard. Others to join in the general proceedings were VK5MT, VK5RO and most of the boys in the Mt. Gambier area.

Looking back on the 144 and 432 scene, one could have to say it has been a rather outstanding period. Excellent conditions coupled with generally very good equipment now in use has allowed better contacts to be made over a longer period, and this situation could well improve further when hopefully more 2 metre operators will start going tuneable, and the present tuneable operators go further up and include 432 in their range. Perhaps those further north in the eastern States do not share a great deal in this form of ducting and inversions, but may have some other worthwhile 2m and 432 contacts. Why not let me know and we will all hear about it!

EME CONTACTS

The moon has been bombarded with quite a few signals of late, and been returning them safely to earth as usual. On Saturday, 22/2, Ron VK3AKC heard WA6LET on 432 at 0730Z, report 429. Later at 1335Z Ron had a two-way contact on CW with PA0SSB, received 529, sent 539. PA0SSB was using a 24 foot dish to a UPX4 front end, transmitter a ringed amplifier using six 3CX100A5s with 1 kw input. 1430Z on 23/2 Ron contacted OZ9TR, O reports exchanged, similar Tx to PA0SSB but with a 28' dish. At 1525 Ron worked PA0SSB on CW, with O reports and rogers.

Chris VK5MC on 22/2 heard WA6LET, W6PO and VE2DFO on CW. Around 0640Z he heard these stations in contact with VE2DFO on SSB, on 144 MHz EME. To follow up, on 23/2 at 0738Z Chris worked K1WHS, sent 439, received 339. K2RTH slightly stronger, sent 449, rec. 439.

Tests on 22/2, 23/2, were facilitated because WA6LET had been able to use the 150 foot dish of the Stanford Research Institute. Schedules were arranged to call for the first 30 seconds of each minute during the time the moon would provide a window for both ends of the circuit. This commenced at 0640Z on 22/2 here and continued until after 0750Z, with elevations ranging from about 1 degree to 11.5 degrees, true north azimuth ranging from 58.9 to 48.7 degrees. Operating frequency 144.190 for calling and receiving about 144.120. This split frequency operation was necessary due to stations calling out of sequence and on the same frequency causing severe interference on previous occasions.

Chris VK5MC was good enough to pass on this information to Peter VK5ZPS who in turn passed it on to me. As I had never tried to listen for any EME signals from my home QTH, I thought nothing to lose by trying. Due to some miscalculations somewhere along the line the beam headings at this end were initially in the wrong place by about 10 degrees. When the moon finally became visible through the clouds corrections were made and lo! There were the signals from WA6LET. First signals were heard at 0750Z and copied at one minute intervals for 9 minutes until disappearing. These signals were recorded on tape as proof and were quite readable on the loudspeaker despite a high noise level emanating from the relatively wide-bandwidth of the SSB receiver, 2.3 kHz. Had a CW filter been available I am sure much more could have been heard. It goes to show that if there is enough power capability at one end to overcome most of the path losses, then reasonable equipment at the other end can complete the job, and I would be less than honest if I said other than it gave me quite a thrill to hear these signals so well. Now I wonder how much a 30 foot dish would cost . . . hmm? The XYL needs a fur coat first though!

2304 MHz RECORD

Alan VK3ZHU writes in a letter which was unfortunately mislaid, with details of a two-way contact between himself and Ian VK3ATY, on Mt. Cowley and Lake Mountain respectively, at 0130Z on 7/12/74. Reports, Alan received 5 x 6, sent 5 x 8. He suggests these are somewhat optimistic as calibrated pads indicated only readable 2-3 with 34 dB attenuation. Also readable 3 with VK3ATY transmitting on a ¼ wave whip — i.e. 1¼ inches long! — As a CW signal it was estimated it would have been an R5 signal with 40 dB attenuation. Equipment at VK3ZHU all solid state, BLY89 final on 144 MHz, MA4060 quadrupler to 576 MHz, SV220 quadrupler to 2304 MHz. Power out 2W. Slot-dipole-reflector used with a 4 foot parabolic reflector. Converter using 1N23F mixer to 144 MHz IF TIS88 converter to Barlow Wadley receiver (tuneable IF).

Equipment at VK3ATY identical except for 144 MHz exciter and QQE03/20 final, a valve tuneable IF. Liaison was via old Channel B crossband duplex operation (very helpful to optimise deviation and antenna alignment. Mode NBFM. Subject to verification and any other pending claims, this is probably a new Australian record. Estimated distance-209 km (130 miles). Further experiments will be made in 1975 when it is hoped to have at least a one-way contact on 3456 MHz, which awaits completion of final doubler 1728 to 3456 MHz.

Congratulations Alan and Ian. It was well worth the effort. Thank you for writing, and I know readers will be pleased to hear what you achieve in 1975.

VARIOUS JOTTINGS

David VK3AGB writes in a letter which also got missed, that he had a contact with VK4MM at Rockhampton at 0940Z in December using 10 watts of FM power into a "Ringo" antenna at 50 feet. He enquires if it has been bettered by anyone else for such low power and half wave aerial, distance about 2000 km (Warrnambool to Rockhampton) . . . I would think the contact between VK6BE and VK3BMD mentioned earlier would have to eclipse the above surely. The Victorian station was operating mobile in Melbourne using a ⅝ wavelength whip and 20 watts. That's a distance of some 2700 km, which is a very good effort. Thanks for writing anyway, David.

I must stress once again the necessity for sending any material for publication to REACH ME not later than the 28th of the month. I say this because I received quite a lot of information about a proposed portable expedition by Peter VK3ZAA, John VK3ATQ and Jan VK3ZUE for the 13th to 15th December 1974. This information did not get to me until 15th November, and copy for the December issue closed on 3rd Nov. Therefore, I could do nothing about publicising the expedition. Sorry chaps, you will just have to be earlier next time.

A letter from Gordon Featherstone, SWL40392, of Gladstone, Qld., advises of the death of Bob VK4ZAI, on 23/12/74. Bob was certainly well known in VK5, and we are sorry to learn of his passing. Gordon mentions that Bob had acquired new equipment for 6 and 2 metres not long before his death, and had logged a number of contacts in the Ross Hull Contest with the gear. Thanks for writing Gordon, and pleased to note you keep a close watch on six metres.

Wally VK2ZNW (ex VK5ZWW of meteor scatter fame) currently has no antennas erected whilst awaiting permission to stand up a tower to hold same. Wally now resides at Orange, and was heard a few times in VK5 on 6 metres. We in VK5 hope Wally will eventually put out a strong signal on 2 metres and 432 MHz for contacts this way — the distance is not much over 1000 km, not an impossible task. Let us know when you are ready, Wal.

New material which arrived at my desk recently was "APC", the newsletter of the Moorabbin & District Radio Club. Call sign VK3APC. A very well presented journal, the initial copy coming from Percy, VK3ZQP, Publicity Officer. I am hoping it will be a regular arrival in the future.

Roger VK2ZTB, Editor of "6 UP" when it was being produced, indicates he has a lot of original material on hand which could be of interest to readers. He is considering a proposal to present same in book form, at a reasonable price, as he believes the articles and information are too valuable to be gathering dust at his place. If you are interested why not write him a few lines and say so . . . to Roger Harrison, 47 Ballast Point Road, Birchgrove, NSW 2041.

Finally, the letter to me bearing news from the Publications Committee that I had been awarded the Higginbotham Award for 1974 came as a surprise, and a pleasant one at that. This award had never ever crossed my mind, but I am indeed

RUN 200W pep FOR OSCAR

NEW 2 METRE ANTENNAS
9Y2DXW 144-148 MHz 9EL YAGI
Specially designed for OSCAR $69.00
($4 Road Freight extra)
3Y-21L 3EL YAGI 144-148 MHz 6 dB
gain — ideal for fox hunts ONLY $12.00
(P & P $2.00).

SSM EUROPA B 10 METRE TO 2 METRE SSB TRANSVERTER

The Europa B is a linear transmit and receive converter from 28—30MHz to 144 to 146MHz A crystal switch and extra crystal can be fitted to extend the frequency coverage. It is suitable for use with either a transceiver or a separate receiver/ transmitter. It is ideal for Oscar operation as well as normal tropo work. Although its primary use is for SSB, it will receive and transmit any mode of which the H.F. equipment is capable, SSB, AM, CW, FSK, FM.

Once attached to your H.F. equipment, you operate it exactly the same as on the H.F. bands, the Europa B does the rest.

The receive converter is broadbanded to cover the whole band without any tuning of the Europa B. It uses protected dual gate MOSFETs to give you optimum sensitivity, gain and minimum trouble from strong signals. In fact the H.F. receiver will normally overload before the Europa B does.

The transmit converter employs valves to provide, high power, good linearity and extraordinarily high rejection of spurious signals. This gives you a clean, sharp signal. The transmitter tuning is brought out to the front panel and requires retuning as you move around the band, in the same way as H.F. equipment requires tuning up.

The oscillator chain is a stable solid state circuit to ensure same frequency transceive operation, or correct netting with separates. The crystal used has a very high stability specification with only 5ppm tolerance.

* Dual gate MOSFETS in the receive converter.
* Bipolar transistors oscillator chain.
* Valves used in the transmit converter.
* Low receive noise figure - 2dB.
* Receive converter gain - 30dB.
* Transmit drive requirement, 200mW.
* Internal aerial change over relay included.
* A crystal switch and extra crystal can be fitted to extend the frequency coverage.
* High power - 200W maximum input 50% efficiency.
* Stable highly developed circuitry.
* Clean transmit output - 80dB except for harmonics of the fundamental.
* Attractive appearance, inside and outside, size only 9" x 4¾" front panel 4½" deep.
* Panel meter reads D.C. input and r.f. output.
* Power supply requirements:-
  1. 600-800V at 250mA.
  2. 300-360V at 70mA.
  3. Between -75 to -150V at 5mA.
  4. 12.6V ac or dc 1.8amp.

The Europa B plugs directly into the accessory socket of the FT101, FT227, FT200, FT250. Some older designs of YAESU equipment only have 6.3 volt A.C. available at the accessory socket (FT560, FT401, FL400, FL500). With these units a separate 12.6V supply must be provided for the Europa B.

Many people are using the Europa B with Heathkit.KW, Trio etc., equipment, we have the information on how to couple this to the Europa B.

TOTAL PRICE: $229 Road Freight $3.00. Available ex-stock, includes 90 day warranty.
Valves included: 2 off QQVO3/10/1 off QQVO6/40A.

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grateful to receive it, and makes me feel the efforts expended for so long have been worthwhile. Thank you, fellas!

I cannot, however, let the opportunity pass without again saying how much I appreciate receiving all those letters from all over Australia with news, notes, information for the VHF page, usually with a word of thanks for what is written into the column. The various Club Secretaries and Publicity Officers who send regularly copies of their magazines and journals for my perusal; without them news would be a bit scarce at times.

Therefore, it is really one big effort when you think about it — all who take the trouble to write to me share in the final set-up of our page, after all I only put it together, really. If you like to read our page, and find something of value in it from time to time, then I ask no more, I have received all the thanks I need.

Well, after all that, let's close with the thought for the month: "Love looks forward, hate looks back, anxiety has eyes all over its head".

The Voice in the Hills

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

The Editor,
Amateur Radio,
Dear Sir,

"An SL600 Series SSB Transceiver", by B. D. Comer, G3ZVC.

A small number of the transceivers built from the above article, which you published recently suffer from apparent AGC instability. The symptoms are generally motor-boating at certain signal levels.

The problem is not, in fact, due to the AGC but to instability caused by IF feedback through the unused transmitter section of the circuit. It may easily be cured by connecting a single 0.1 uF capacitor with low RF resistance between the transmitter section power supply rail and ground — as near as possible to the SL610C amplifier.

Installing this capacitor does not remove the necessity of grounding the transmitter power rail during reception and vice versa.

I apologise to anyone who has been inconvenienced by this fault but the majority of these transceivers are not affected and the problem has only recently been brought to my attention.

Brian D. Comer, G3ZVC

The Editor,
Amateur Radio,
Dear Sir,

We are pleased to inform you that the 5th SEANET Convention will be held in Kuala Lumpur 7-9th November 1975. Since we have been going for a rather long time then it might be time to tell everyone who doesn't know what it is who we are.

SEANET AND SEANET CONVENTION

The South East Asia Net (SEANET) meets every day at 12.00 GMT on 14.320 kHz and is a very active net. 4S7PB Paddy is normally acting as net control but VQ9R Carl is also acting at times. Any station in Asia, Middle East, Pacific, may call in when respective call area is being announced by net control station. Other stations outside the mentioned call areas are called at the end of the net.

In order to get closer to each other every year we also have what we call the SEANET Convention. Previous conventions have been in Penang 1971, Bangkok 1972, Singapore 1973, Manila 1974. The convention for 1975 will be held in Kuala Lumpur 7-9th November.

The convention is informal and merely intended to meet hams from various countries. A club station with a special call sign is set up, and we will this year be operating from 9M2SEA. There is sometimes an exhibition of amateur equipment etc. In Singapore there was a film from the Spratly DX expedition by SEANET members and so on. The latest convention in Manila gathered around 125 people and hams from VK, YB, 9V1, 9M2, HS, XV5, W, JA, F and DU.

73,
Roland Fisk 9M2CJ for MARTS

The Editor,
Amateur Radio,
Dear Sir,

In reply to VK2AGZ regarding his comments of lament in the Letters column of the February AR, may I be permitted to clarify my position with Colin in that I am not one of those "one-eyed Labour Party Supporters" as he seems to think.

My condonation of the $12.00 licence fee had nothing whatsoever to do with party politics — no way — so where did I go wrong?

Yours faithfully
M. R. Morris L30134

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Crafers, SA. 5152.

OE SERIES

General

1. Various awards are available to licensed amateurs and shortwave listeners.
2. Contacts on and after 1st April 1954 are valid with the exception of worked all OE/160 and heard all OE/160 where contacts on and after 19 February 1964 are valid.
3. Stations should submit a list certified by the Awards Manager of a National Society.
4. Awards are available for all CW, all Phone, 2 x SSB, 160 metres and mixed modes.
5. The fee for each award is 10 IRCs.
6. Address for aplications is:
   OeVSV
   Awards Manager
   Postfach 999
   A-1014 Vienna, Austria

Rules:

The same station may be worked on different bands for WAOE in the case of stations in Europe generally.

The same station may be worked twice on 160 metres provided that the contacts are at least one month apart.

Requirements:

WAOE — Stations outside Europe need one contact with any 8 of the 9 call areas.
WAOE/160 — Stations outside Europe require one contact with 4 call areas on 160 metres.
HAOE — This award is available to shortwave listeners who submit proof of having heard 8 of the 9 call areas.
HAOE/160 — This award is available to shortwave

listeners on the same requirements as WAOE/160.

WABP AWARD

General:

The award is available to licensed amateurs and shortwave listeners.

There is no date limit.

Do not send QSL cards. A list, showing full details of the contacts, should be certified by the Awards Manager of a National Society.

Any bands and modes may be used.

The fee for the award is 5 IRCs.

The address for applications is:

ON5TO
UBA Awards Manager
P.O. Box 634
Brussels, Belgium

Requirements:

Confirmed contacts are required with each of the 9 provinces on two bands.

List of Provinces:

WV — West Flanders; OV — East Flanders; AN — Antwerp; LM — Limburg; LG — Liege; LX — Luxembourg; NR — Namur; HT — Hainaut; BT — Brabant.

THE CYPRUS AWARD

The award is available to licensed amateurs.

Contacts on and after 1st May 1972 are valid.

Either log extract plus QSLs or a list of QSLs certified by the Awards Manager of a National Society should be submitted.

Contacts with both 5B4 and ZC4 stations are valid.

There are no mode endorsements.

The fee for the award is 10 IRCs or equivalent.

The address for applications is:

Awards Manager,
CARS
Post box 216
Famagusta, Cyprus

Requirements:

CQ Zone	MHz 1.8	3.5	7	14	21	28	144
	Points per contact						
20	4	2	1	1	2	4	16
1, 2, 3, 6, 7, 10, 12, 19, 24, 25, 26, 27, 29, 30, 31, 32	16	8	4	2	4	8	—
All other zones	8	4	2	1	2	4	16
Cyprus amateurs	4	2	1	1	2	4	8

Applicants outside Cyprus require 50 points if all contacts were on 1 band, 40 if on 2 bands, 30 on 3. ■

POSTMASTER GENERAL'S DEPARTMENT AMATEUR OPERATOR'S CERTIFICATE OF PROFICIENCY

EXAMINATION PAPERS: FEBRUARY 1975

TELEGRAPHY

SECTION L (Receiving)

(SPEED — 10 words per minute)

The 4 cylinder twin overhead camshaft engine punches out a very crisp 157 horsepower it certainly mooks people who think that fast acceleration can only come from most 6 or 8 cylinder motors it makes 80 kilometres per hour in about 9 seconds and has completed the standing kilometre from 32

SECTION L (Sending) — (Time allowed 2½ mins.)

An old newspaper account says that 225 men 840 horses and bullocks and about 130 camels were used for this work great expanses of country did

SECTION M (Theory) — (Time allowed — 2½ hrs.)

NOTE: SEVEN questions only to be attempted. Credit will not be given for more than SEVEN answers. All questions carry equal marks.

1. (a) Explain the fundamental difference between frequency modulation and amplitude modulation.
   (b) With the aid of a circuit diagram, explain the theory of operation of the discriminator stage of a receiver suitable for reception of frequency modulated signals.
2. (a) Explain the theory of operation of a junction type transistor.
   (b) Draw a circuit diagram of a single stage audio amplifier in which use is made of a junction type transistor.
3. (a) Explain briefly the theory of radio transmission via the ionosphere.
   (b) Discuss the effects on high frequency transmission of the daily variations of the ionosphere, the seasonal changes and the eleven year sunspot cycle.
   (c) What is an "ionospheric prediction chart"?
4. (a) Using appropriate curves indicate the current and voltage distribution on a half-wave transmitting aerial (dipole).
   (b) Show whether even or odd quarter wave sections of resonant feeders are necessary to provide parallel tuning at the transmitter-end when the aerial is to be:
   (i) current fed;
   (ii) voltage fed.
5. (a) What is the essential difference between a "Tuned Radio Frequency" type of receiver and one of the "Superheterodyne" type?
   (b) Explain why an "image" signal can sometimes be received on a Superheterodyne type. Discuss means of reducing "image" effect.
6. (a) With the aid of a sketch, describe the construction and theory of operation of a crystal microphone.
   (b) Listing component values, show by means of a circuit diagram how this type of microphone is connected to an amplifier.
7. Explain the theory of operation of a "grid-dip" meter. Use diagrams to illustrate your answer. Give a practical example of the use of such an instrument.
8. (a) Show a circuit diagram of the final RF stage of a transmitter using a triode valve, and state step by step how you would neutralise it.
   (b) What effects could result from operating such an amplifier which was not neutralised? Explain.
9. Two resistors, R1 and R2, of 20,000 and 10,000 ohms respectively are connected in series across a 20 volt DC supply of negligible impedance. Calculate:
   (i) the potential difference across each resistor;
   (ii) the power dissipated by R2;
   (iii) the voltage reading which will be obtained if a voltmeter having an internal resistance of 10,000 ohms is connected across R1.

SECTION K (Regulations) — (Time allowed 30 minutes)

NOTE: THREE questions only to be attempted. Credit will not be given for more than THREE answers. All questions carry equal marks.

1. (a) What precautions should be taken by the operator of an amateur station before he commences to transmit?
   (b) During the period of working with another station or stations what procedure must be adopted concerning announcement of call-signs?
2. (a) State the maximum power which may be used in an amateur wireless station using:
   (i) amplitude-modulated double sideband emissions (A3);
   (ii) single-sideband suppress-carrier emissions (A3J).
   (b) In each case, indicate where the power should be measured.
3. (a) What is meant by a "third party" message?
   (b) State the requirements of the regulations in regard to the handling of "third party" messages by licensees of amateur wireless stations.
4. Give the meaning of the following abbreviations:
   QSA? QRG QSB? AS QRV? ■

DIVISIONAL BROADCASTS

Do you have the time and want to keep in touch with events? If so here are the latest details available of Divisional broadcasts.

VK1WI

Sundays 10.00 Z —
3595 kHz
27125 kHz AM
146.5 MHz FM
BC Committee VK1VP, IMP, 2YS/1.

VK2AWI

11.00 local time Sundays:
3595 kHz AM
7146 kHz SSB
52.525 MHz FM
53.866 MHz AM
145.13 MHz AM
146.00 FM
Hunter Branch Mondays 19.00h 80m.

VK3WI

10.30 local time Sundays:
1825 kHz AM
3600 kHz SSB
7146 kHz SSB
144.5 MHz AM
Ch1 FM
(subject to availability at present of relay stations whilst under re-location).

VK4WI

09.00 local time Sundays:
3580 kHz AM
7146 kHz SSB
14342 kHz SSB
re-broadcast on Ch B FM. BC officer VK4HB.

VK5WI

23.30Z Sunday mornings originating on 1.8 MHz band and relays as follows—
3.615 MHz by VK5ZQ
7.125 MHz by VK5NB
14.170 MHz by VK5TY
52.2 MHz by VK5ZEG
Channel 4 Repeater, Adelaide
VK5DK in Mt. Gambier on 2m FM

VK6WI

09.30 local time on Sundays:
3600 kHz SSB
7080 kHz SSB
14100 kHz SSB
52.656 MHz FM

VK7

09.30 local time on Sundays originated on Mt. Barrow 2m repeater VK7RAA and re-broadcast in Launceston area 3672 kHz SSB, 7130 kHz AM and in Hobart area on 53.032 AM, 144.1 MHz AM, 146 MHz FM and 432.1 MHz AM. ■

QSP

COMMUNICATIONS

"The Australian P.M.G. has announced that the APO will commission an integrated series of social research projects over the next two years to study how new technologies could affect the way we live. They will focus on three basic questions concerning the current and future relationship between Australian Society and its "nervous system" — the national telecommunications network. The questions relate to social trends (A. Nat. Uni. team under Dr. F. Emery), the information industry (computers, etc.) and telecommunications and transportation". Adaptation from article in ITU's Telecommunication Journal of Nov. '74. ■

RESULTS OF THE 1974-75 ROSS HULL VHF-UHF MEMORIAL CONTEST

FOURTH TIME IN A ROW FOR VK5SU

Trophy winner — VK5SU J. W. K. Adams
48 hour certificate — VK5NC T. Niven

Detailed scores: first column 7 day; second column 48 hour.

Section (A) Transmitting Open		
VK5SU	3570	943
VK3AUQ	2009	787
VK4DT	798	241
VK2HZ	—	272
Section (B) Transmitting Phone		
VK5NC	2494	1146
VK7ZAH	2041	829
VK4DO	1985	714
VK6ZKO/T	1931	1056
V..5LP	1226	370
VK1VP	1194	515
VK5ZTT/T	1042	328
VK5ZMM	670	300
VK6ZGZ	618	341
VK3KK	464	292
VK8ZGF	450	—
VK5ZDG	291	—
VK3ASV	186	—
VK2ZCT/T	178	128
Section (C) Transmitting CW		
VK4XA	200	55
Section (D) Receiving		
L2074, J. M. Hilliard	507	—

Contests

with Jim Payne, VK3AZT
Federal Contest Manager,
Box 67, East Melbourne, Vic., 3002

NOTES ON THE ROSS HULL VHF-UHF MEMORIAL CONTEST 1974-75

Again it is congratulations to Kerry for a very good win and also to Trevor VK5NC for his fine effort in the 48 hour section. Only 20 logs were received for this Contest and the winning scores indicate the extend of the reduced activity. Last year the top scores for the 7 day and 48 hour divisions were 7300 and 2211. However, Kerry scored his win last year from 1008 contacts with 252 different stations. This time he worked 218 different stations for 622 contacts.

The modes used by stations received by Kerry during the last 3 contests were:—

	1972/73 %	1973/74 %	1974/75 %
SSB	52	70	78
FM	30	24.5	19.7
AM	17.9	5.4	1.9
CW	.05	.08	0.3

Kerry also commented that the trend in operating modes is now almost 100% SSB on the tuneable section of 52 MHz and two metres DX.

The highest scoring contacts recorded in the logs received were claimed by Trevor, VK5NC for 2 contacts with 6KJ and one with 6BE when using) watts SSB on 144 MHz on 20th Dec 1974. these were worth 125 points each. Kevin, 3AUQ worked 3ZBJ over 125 kilometres using FM on 1296 MHz on 8th Jan and repeated the effort on 11th Jan using cross mode CW/SSB. These contacts were worth 50 points each. The following contacts on 144/146 MHz were scored at 75 points:—

21.12.74 VK5SU to 2ZAY, 2ZCV, 2ATI/M2, 2YBZ/M2
VK5ZTT/T to 4UX, 4MM, 4NY, 4QB.

All those contacts were made around 0220 GMT.

CONTEST COMMENTS

Again this year there are a number of requests for use of GMT wholly, that is start and finish on GMT days as well as use GMT. Kevin, 3AUQ referred to GMT and concluded with "otherwise not a bad contest, in spite of lack of DX openings". Trevor, 5NC commented, "A most enjoyable contest. I thoroughly enjoyed it and only operated on 144 MHz. Had over 300 contacts — Sorry I have not enclosed my full log — too much writing (Hi)". VK7ZAH commented, "A friendly and most enjoyable contest as usual. Unfortunately band conditions were not as good as in past years". Harold VK4DO suggests "that distances be calculated from state to state with points awarded accordingly for respective distances". Murray 5ZMM wrote "If we are to log times in GMT it is logical to use GMT days and not EAST calendar days as required. Experience at this QTH indicates that propagation tends to keep GMT days".

Mark 6ZGZ commented "Friendly contest again this year with all stations giving information on equipment, QTH, etc. Lousy DX season in Perth. Did better last year running xtal locked AM than this year's VFO SSB". The only entrant in the CW section, Russ VK4XA wrote "Activity appeared to be down on last contest when I participated as VK3KX". And the last word goes to 2HZ, "Conditions were poor compared with last year — appeared to be reduced activity also".

CONTEST CALENDAR

April
5/6 Polish CW DX
12/13 Swiss (H-22)
19/20 Bermuda phone
19/20 WAEDC RTTY
26/27 PACC Phone/CW

May
3/4 Bermuda CW
10 World Telecomm phone
11 Worked all Britain (LF Phone)
17 World Telecomm CW

POLISH CW DX CONTEST

Starts 1500 GMT Sat Apr 5. Ends 2400 GMT Apr 6.

The world working SPs 3.5 thru 28 MHz. Single op, single and all band, multi-op all band. SWLs also. Send usual RST and receive RST plus letters (powiat letter). Each SP QSO 3 points with multiplier for each powiat (once only). Separate sheet for each band, summary sheet and declaration. Mailing deadline April 30th to PZK Contest, Box 320, 00-950, Warszawa, Poland.

SWISS H22 CONTEST

Many of the rare cantons are activated for this contest offering an excellent opportunity for the attractive H-22 certificate. All bands 1.8 thru 28 MHz. Phone and CW. The same station may be worked on each band for QSO and multiplier credit but only on one mode. Usual RST, Swiss stations will include their canton. These are AG, AR, BE, BS, FR, GE, GL, GR, LU, NE, NW, SG, SH, SO, SZ, TG, TI, UR, VD, VS, ZG, ZH. Each QSO counts 3 points. The multiplier is the sum of the cantons worked on each band, a possible of 22 on each band. Final score is QSO points by sum of cantons from all bands. Mail log within 30 days to USKA Traffic Manager, HB9AHA, Im Moos, 5707, Seengen, Switzerland.

Please send SASE to FCM for full details of contests listed for May.

Magazine Index

With Syd Clark, VK3ASC

BREAK-IN November 1974
Slow Scan Television; The Restless Atmosphere; ZL1BKB Wideband Dipole Antenna; An Electronic Thermometer; Two Cheap and Easy Regulated Power Supplies; Radio Expo '74.

December 1974
A Direct Conversion Receiver; Automotive Interference Suppression; Improving Your FT200; Amsat-Oscar 7.

CQ September 1974
An SSTV Keyboard; Short-Term Predictions for Ionospheric Propagation; QRP (Fdeature).

November 1974
Impedance Measurements at Radio Frequencies; CQ World-Wide DX Contest; Visiting the Balkan Hams.

HAM RADIO November 1974
Low Power CW Transceiver; Scattering Characteristics of Artificial Radio Aurora; VHF FM Channel Scanner; Measuring Peak Envelope Power; Harmonic Prediction; The Code Mill; Automatic Phone Controller for Repeaters; Tuneable Low-Frequency Converter; Solar Power.

QST November 1974
A Two-Band Delta-Loop Array for Oscar; Digital Clocks for the Amateur Station; More Basics of Solid-State Transmitter Design; Communicating at VHF via Artificial Radio Aurora; A QRP Solar-Cell Supply; Antenna Performance Measurements; ARRL 10 & 160 metre contest announcements.

December 1974
Another Look at Reflections, Part VI; The Minooka Special; The RYer; The Tower-Guard System; A One-KW Linear Amplifier Using Four 811As; VHF Antenna Arrays for High Performance; Some leads on Antenna Couplers.

January 1975
Practical Ideas for the ATV Enthusiast, Part 1; An Integrated Keyer/TR Switch; An Inexpensive Low Noise Preamplifier for 432 MHz; A Simple Fixed-Direction Quad; Frequency Counter-A Modular Approach; 100 Wat's PEP Output with Power Transistors; The Octopus; A No-Junkbox Regulated Power Supply; Annual ARRL Novice Roundup Announcement; On Handling Public Service Traffic; Recent Equipment: The HAL DKB-2010 Dual Mode Keyboard and Regency HR-6 FM Transceiver.

RADIO COMMUNICATION November 1974
A 2m Helical Aerial for Satellite Communications; The Oscar File; Injection Locking of Reflex-Klystron Oscillators; 4m SSB from a Pye Ranger; A Balun Transformer for 50 and 75 ohm Lines.

The Cambridge on 2m; An Outline of Pulse Code Modulation; An Integrated Circuit Two-Tone Generator; A Converter for the 432 MHz Band.

SHORTWAVE MAGAZINE September 1974
Getting Going on 23 Centimetres; Transistor Cascode Amplifier; Easy Top Band Vertical; Ground Plane for Two; Booster for the FDK Multi-2000.

RADIO ZS November 1974
Oscar-EME Working Group and area notes only.

73 October
The FCC As Seen By W6EIF; Introduction to Micro Transistors; Build a 2m Frequency Synthesizer; Repeater Government Guide; The Heath HWA202-1; Simple Power Supply for Digital Work; The Wet Net; The GDO the VOM & XYL; Selective Calling; Removable VHF/UHF Mobile Antennas; Two-Metre Types You Have Met; How to Win Friends and Influence the 2m Man; AM or FM Inputs; Another Look at Vertical Waterpipe Antennas for 2m; Adjusting FM Deviation; A 146 MHz Mobile Antenna; Miniboxing the 1.65 MHz IF; Hold on to that Rig; It's a Call; Moskey; Oscar 7 with a Receiver; High Output Accessory Mic; A High Power Low Pass Filter; It was a Bench Job; Ham Radio & Foreign Languages; Simple Six Pre-Amp; The Three Wire Dipole; Loading up for Optimum Anode Current or RF Output; A Digital Interlaced Sync Generator for Closed Circuit TV; Notes on Converting the AC/DC for WWV; Electric Extension Cords; Longer Tube Life with the NCX-5.

November 1974
Dipole Antenna Tuning; Latest Counter Update; Who Needs a 5V Supply; How to Win a Big Contest; Digital Wind Direction Indicator; Build a 2m Frequency Sythesiser; Experiment in Terror; A Wind-Proof 20m Beam; Tones and How to Touch Them; The Double Stub Matching System; How You can Teach Novices; Build This Digital SWR Computer; A Real Hot Front End for Six; Build a Basic Bridge; Moskey, Part 3; August 73 Converter Update; Beep-Beep-Beep, You're High; What's Really Inside the Regency HT; Would You Believe 187,000 Phone Patches.

December 1974
Making Nicads Behave; Zillions of Parts for Nothing; C31 or Bust; Wind Indicator for Your Shack; Modified Weather Satellite; A Logical Keyer; The Perils of Novicehood; Can FM Simplex be Solved; Meters and Their Faces; Slow Scan Tape Secrets; Simple Probe Logic Check; Public Service Band Converter; Tuned Diode VHF Receivers; Automatic SWR Computer Part 2; El Cheapo Tower; Hamshack Goodies; Hamfest Wheeling and Dealing; Rhombics and Their Worth; DX Chasing; Heathkit GR-78.

20 Years Ago

with Ron Fisher VK3OM

APRIL 1955

April 1955 was one of the first 'special issues' devoted to one particular aspect of amateur radio. This one was for VHF. Gordon Bowen VK5XU presented two antenna articles. The first was the 'Skeleton Slot' Antenna. Gordon told of its history, development and then described construction and feed methods. His next article Twin Lead 'Sprigs' told how a single 300 ohm feeder could be used to feed two antennas, one on 144 MHz and one on 50 MHz. A series of quarter wave stubs were used to isolate the two antennas.

Back to 'Skeleton Slots' this time with Don Knock VK2NO. Don described how he went about building the slot, finishing up with some thoughts on using it on lower frequency bands.

Receiver noise has always been a problem on VHF. The goal always a better RF stage; Fred Bail VK3YS decided that the one for him was a push-pull 6J6. Full construction information was given plus the circuit of a follow-up mixer oscillator also using a 6J6. An article reprinted from CQ, "The Silicon Crystal Noise Generator", by William Orr, W6SAI. The construction and use of this simple device was explained in Bill Orr's usual manner.

"Max Howden VK3BQ". A word picture of this pioneer amateur and the equipment he was using on VHF at that time was given by Jack Duncan VK3VZ. Max of course is still going strong and still an active amateur.

On the Federal front, a report indicated that steps were well in hand towards the formation of the Papua and New Guinea division of the WIA.

The DX page reports that conditions were on the up-grade. There was even a report of a W6 being heard on 28 MHz. However many good contacts were to be had on 15 and 20.

REPEATER CALL SIGNS

In letter RB4/4/23 of 9th January 1975 the APO confirm that the callsign block RAA to RZZ (preceded by VK plus appropriate State numeral) is reserved for use by amateur repeater and beacon stations. It seems that the blocks RSA to RSZ and RTA to RTZ have been retained for beacons but clarification on this is still awaited.

Teleprinters and associated equipment wanted by Australian Amateur Radio Teleprinters Group. If you have a teleprinter not being used, why not dispose of it through our Group to someone anxiously waiting to get started on RTTY. Particulars and price to: Secretary, WIA, WA Division (AARTG), Box N1002, GPO, Perth, WA 6001.

Hamads

- Eight lines free to all W.I.A. members. $6 per 3 cms. for other amateurs and S.W.L.'s.
- Copy should be in block letters or typescript, signed and forwarded to The Editor, P.O. Box 150, Toorak, Vic., 3142.
- Excludes commercial advertising.
- Closing date for Hamads is the 3rd day of the month preceding publication.
- QTHR means the advertiser's name and address are correct in the current Australian Callbook.

FOR SALE

Heathkit HW22, Dynalab tri-banded for 80, 40 and 20 metres, complete with AC PSU and speaker, two 12V DC supplies, mic., mobile mount, spare final tubes, manuals. $125. VK3ARZ, 12 Explorers Crt., Vermont South 3133. Ph. (03) 232-9492.

455 kHz Mechanical Filters: Toyo CM, 2.4 kHz bandpass, $20; Kokosai 2.7 kHz with data sheet, $17.50; Collins 3.1 kHz with data book, $17.50. VK3ARZ, 12 Explorers Court, Vermont South, 3133. Ph. (03) 232-9492.

Rack 4 ft., $5.00; **Frequency Counter,** 1 H.P., 524B, 20 CPS 100 MCS, $198.00; **STC High Band Mobiles,** 4 MTR 25/121; **STC Low Band Mobiles,** 2 MTR 25/11, $25.00 each; **2m FM Unit,** solid state home brew, going $100. VK3YDB, QTHR. Ph.: (03) 91-3905.

GEC 1 x 4 high band repeater system, $30.000; **Low Band** MR10, $10.00; **AWA** deviation meter, 40 to 170 MCS, $60.00; **B47,** 6m tuneable transceiver (FM), $35.00; **Palec** sig. gen. SG1, $20.00; **CRO** Cosser, 1049, dual beam final CTT HT transformer U/S, $30.00; plus assorted other bits and pieces. Having general clean-out. VK3YDB, QTHR. Ph.: (03) 91-3905.

Eddystone 830/7 receiver, 300 KC/S — 30 MHz continuous coverage, perfect condition, recently overhauled, $450.00, manual and spare valves. J. V. Hitch, 37 Harding Street, Portarlington, Vic. 3223.

AWA BS-50D base station with RC-1A remote control unit. Unmodified lo-band in good working condition. Ex QATB $50.00 ONO or exchange for SSTV components. VK4ZKI, QTHR. Ph. (072) 76-1284.

FT75 Solid State HF transceiver, including AC power pack, DC power pack and VFO. Worth $500 — sell $350 ONO. Peter Cossins VK3BFG, QTHR. Ph. (03) 231-2778.

Solid Fibreglass Rods 9/16" to ¼", 10 feet long, $5; BC 221 Frequency Meter, $30; Command Tx 3.5 MC CW, $10, will accept nearest offers. C/- Box 279 Nambour, Q. 4560.

Rack 6 ft high, incorporating 2 Mx FM Base and 6 Mx FM Base, both AWA and with 6-40 finals. Also HF Linear Amp, legal limit for 80-40-20 Mx, including power supplies for the above. Price $350 ONO. P. Milne VK3BEJ, Box 30, Mildura, Vic. 3500. Ph. (050) 24-5814.

Yaesu FL2100 linear amplifier, as new, in original packing. $390. VK3VF, QTHR. Ph. (03) 64-0661, ext. 595 Bus.; (03) 723-3554 A.H.

FTV-650 6m transvertor, complete with all cables and instruction book, and spare 6146 final. All new. $175.00, or will exchange for FT-75 Transceiver, cash adjustment. Claud Singleton, VK4UX, QTHR.

2 Vintage Receivers ATR-2C, ex RAAF. 1 near orig. & going. 1¾ converted to 160 Mx. CCT supplied. $35 each. 1 power supply for same in mint cond. $30. Sold if both Xceivers sold. Offers? Aileron cable heavy duty for guys. 10c yd. VHF pre-amp. Commercial valve type with p/s. $10. Power Xformer 750-750 at 2 amps, $30, offer? VK3WW, QTHR. Ph. (03) 465-2991.

Shack Clean-out Collins 75S3B, late model, mint, $525; Yaesu FT2FB, 8 channels, as new, $185; Pye overland, solid state, valve PA 2 FM 1, 4, 40 & 50, $125; Trio 9R59DS, very good, $125. VK3OM. Phone (03) 560-9215.

WANTED

FT200 and matching PS or similar transceiver. VK3OM, QTHR. Phone (03) 560-9215.

Unused Spare Valves, Swan 350 transceiver, including matched pair 6HF6s. Prices: L. Peasley, VK2BLP, 53 Iris St., Moree NSW. Ph. (067) 52-2172.

Silent Keys

It is with deep regret that we record the passing of—

Mr. A. WILLIAMSON	L30304
Mr. E. N. STEET	L30200
Mr. F. R. WHITFIELD	VK6XF

PROJECT AUSTRALIS

Reference Orbits for April & May, 1975. Code: Date, Orbit No., time Z and degrees west, of Equator crossing of first orbit of GMT day.

OSCAR 6 / **OSCAR 7**

APRIL

1	11237	103.07	63.1	1	1708	26.80	56.3
2	11249	3.00	48.1	2	1721	121.08	69.9
3	11262	57.93	61.9	3	1733	20.42	54.7
4	11275	152.85	75.6	4	1746	114.70	68.3
5	11287	52.79	60.6	5	1758	14.04	53.1
6	11300	147.71	74.3	6	1771	108.32	66.7
7	11312	47.65	59.3	7	1783	7.66	51.5
8	11325	142.57	73.0	8	1796	101.94	65.1
9	11337	42.51	58.0	9	1808	1.28	49.9
10	11350	137.43	71.7	10	1821	55.56	63.5
11	11362	37.36	56.7	11	1834	149.84	77.1
12	11375	132.29	70.4	12	1846	49.18	6[illegible]
13	11387	32.22	55.4	13	1859	143.46	75.[illegible]
14	11400	127.15	69.2	14	1871	42.80	60.3
15	11412	27.08	54.1	15	1884	137.08	73.9
16	11425	122.01	67.9	16	1896	36.42	58.7
17	11437	21.94	52.8	17	1909	130.70	72.3
18	11450	116.87	66.6	18	1921	30.04	57.1
19	11462	16.80	51.6	19	1934	124.32	70.7
20	11475	111.73	65.3	20	1946	23.66	55.5
21	11487	11.66	50.3	21	1959	117.94	69.1
22	11500	106.59	64.0	22	1971	17.28	53.9
23	11512	6.52	49.0	23	1984	111.56	67.5
24	11525	101.45	62.7	24	1996	10.90	52.3
25	11537	1.38	47.7	25	2009	105.18	65.9
26	11550	56.31	61.4	26	2021	4.52	50.7
27	11563	151.24	75.2	27	2034	58.80	64.3
28	11575	51.17	60.1	28	2047	153.08	77.8
29	11588	146.10	73.9	29	2059	52.42	62.7
30	11600	46.03	58.9	30	2072	146.70	76.2

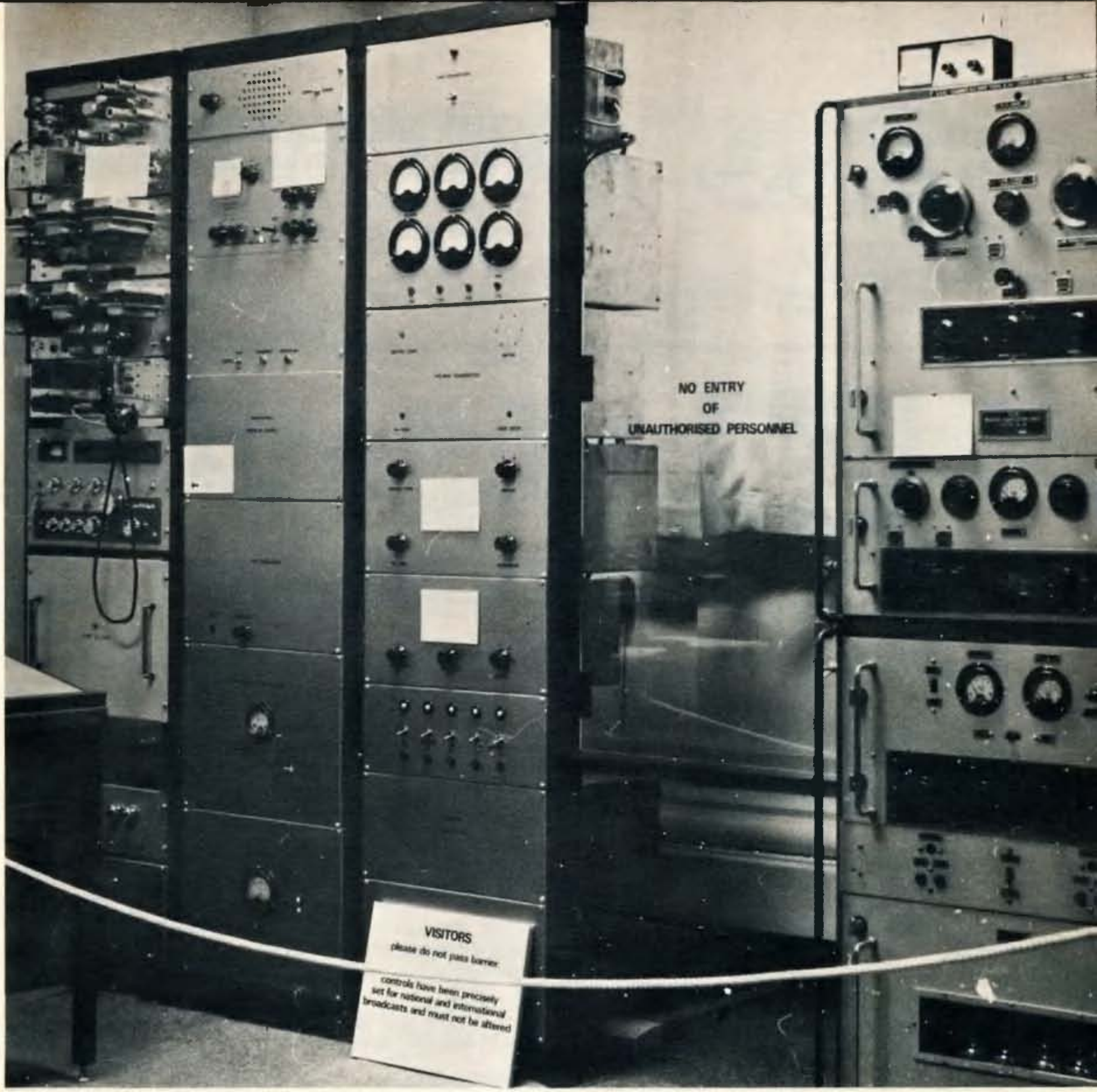
MAY

1	11613	140.96	72.6	1	2085	240.98	89.8
2	11625	40.89	57.6	2	2097	140.32	74.6
3	11638	135.82	71.3	3	2109	39.66	59.5
4	11650	35.75	56.3	4	2122	133.94	73.0
5	11663	130.68	70.0	5	2134	33.28	57.9
6	11675	30.61	55.0	6	2147	127.56	71.4
7	11688	125.54	68.7	7	2159	26.90	56.3
8	11700	25.47	53.7	8	2172	121.18	69.8
9	11713	120.40	67.4	9	2184	20.52	54.7
10	11725	20.33	52.4	10	2197	114.80	68.2
11	11738	115.26	66.1	11	2209	14.14	53.1
12	11750	15.19	51.1	12	2222	108.42	6[illegible]
13	11763	110.12	64.9	13	2234	7.76	5.[illegible]
14	11775	10.05	49.8	14	2247	102.04	65.0
15	11788	104.97	63.6	15	2259	1.38	49.9
16	11800	4.91	48.6	16	2272	55.66	63.4
17	11813	59.83	62.3	17	2285	149.94	77.0
18	11826	154.76	76.0	18	2297	49.28	61.8
19	11838	54.69	61.0	19	2310	143.56	75.4
20	11851	149.62	74.7	20	2322	42.90	60.2
21	11863	49.55	59.7	21	2335	137.18	73.8
22	11876	144.48	73.4	22	2347	36.52	58.6
23	11888	44.41	58.4	23	2360	130.80	72.2
24	11901	139.34	72.2	24	2372	30.14	57.0
25	11913	39.27	57.1	25	2385	124.42	70.6
26	11926	134.20	70.9	26	2397	23.75	55.4
27	11938	34.13	55.8	27	2410	118.04	69.0
28	11951	129.06	69.6	28	2422	17.37	53.8
29	11963	28.99	54.6	29	2435	111.66	67.4
30	11976	123.92	68.3	30	2447	10.99	52.2
31	11988	23.85	53.3	31	2460	105.28	5.8

Oscilloscope, good condition, vertical response to 3-4 MHz (or greater) and calibrated timebase. Prefer external triggering option. Price and Details to: P. Hall, Levendale, Tasmania, 7204. Ph. (002) 28-5264 (A.H., weekdays).

Taylor R&C bridge, model 110C, full schematic, or details of range switching required. VK4ZMF, QTHR. Ph. (072) 97-5667.

amateur radio



VOL. 43, No. 5 MAY 1975

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FRONT COVER

The equipment racks of amateur radio station VK3BWI/VK3AOM permanently on display at the Melbourne Science Museum. See story on page 9.
Photo courtesy of Science Museum of Victoria, Photographic Section.

STOP PRESS

NOVICE LICENCE APPROVED
See Page 22

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA. FOUNDED 1910

MAY 1975
VOL. 43, No. 5
Price, 70 cents

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QSP

The Crossroads . . .

The Wireless Institute of Australia exists to provide a service for its members. Australians who are interested in amateur radio.

However, like many similar organisations, it has reached the stage where it cannot function effectively without paid staff.

The amount of work which can be expected from unpaid volunteers becomes increasingly difficult due to the many side attractions of the affluent society in which we live.

But paid staff means more money. More income from more members.

Why are only 50 per cent of the licensed amateurs in Australia members of their own radio organisation?

Surely not all of those 3000 non-members are inactive, or freeloaders. (Free-loaders. Non-members who reap the benefits of the expenditure of time and cash of members.)

If they are not members because of disenchantment with policies, facilities, or even personalities, then they are burying their heads in the sand.

They should become active members of the Institute and bring about change. After all, the Institute is only as good as its members, and it is a society of amateurs for amateurs.

One school of thought is that "AR" should provide the additional income. But "AR" barely stands on its own feet.

If the content was widened to include hi-fi, stereo, and other general electronics, the public may be interested in buying it on the news-stands. But then the magazine would cease to be "personal" to amateur radio.

How long is it since you put something constructive back into this fascinating hobby of ours? Attended a meeting, submitted an article to "AR", assisted one of the many groups in the Institute, signed up a new member?

Or are you just a taker?

The Wireless Institute of Australia is your society. And without your active assistance, IT WILL NOT SURVIVE.

BILL ROPER, VK3ARZ

MARITIME MOBILE, LAKE EYRE

Plans are well advanced for an expedition of Melbourne amateurs to Lake Eyre during May. Two members of the Publications Committee (VK3ABP and VK3YFF) among others, expect to operate maritime mobile on the HF bands from a sailing boat for a period of about two weeks. It is also hoped to provide good publicity for amateur radio as well as Australia's impressive inland sea by producing a documentary movie of the expedition. Lake Eyre has been full of water for about two years and looks like remaining full for some time to come.

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Hamads should be sent direct to **P.O. Box 150, Toorak, Vic., 3142,** by the **3rd of the month preceding publication.**

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making the most of mercator part 2

A. M. Phillips VK5ZU
27 Prospect Terrace, Prospect, SA 5082

SATELLITE TRACKING

The methods outlined in Part 1 (AR November 1973) are further developed to plot the path of a satellite in near-circular orbit and to determine its position in space and time with respect to a given observer, by use of a simple overlay.

THEORY

The track of a satellite in circular orbit is typically as shown in Fig 7. It can be shown that the latitude of point B and its longitude with respect to point A, the ascending node, are related to the orbital inclination (angle BAC) and the orbital travel (angle AOB) as follows:

$$\sin \text{Lat B} = \sin \text{BAC} \cdot \sin \text{AOB}$$

$$\sin \text{Long B} = \frac{\cos \text{BAC} \cdot \sin \text{AOB}}{\cos \text{Lat B}}$$

Also, if "t" is time from ascending node

$$\text{Orbital travel angle AOB} = \frac{t \times 360}{\text{period}}$$

If time intervals of four minutes are used in calculation, allowance can be made for the rotation of the earth simply by adding one degree of longitude for each four minutes.

Calculated data for the orbit of Oscar 6 is given in Table 2 and plotted in Fig 8.

Fig 9 shows the path of Oscar 6 in elevation. For a given elevation, "E", the angular range "R" can be computed as follows:

$$\sin F = \frac{6370 \sin (90+E)}{7830}$$

$$R = 90-(E+F)$$

giving the following values:

Elevation E (°)	0	15	30	45	60	75
Range R (°)	35.6	23.2	15.2	9.9	6.0	2.9

Circles of constant elevation (range), when plotted on a Mercator chart will appear as shown in Fig 10. The points of intersection of these curves with lines of given bearing at point A can now be computed, using the formulae derived in Part 1 and above as follows:

Given:

	Example
Latitude "a" of reference point	35 deg
Bearing "b" at reference point	45 deg
Range "R" from reference point	23.2 deg

Compute:

$s = \cot b . \sec a$	1.221
$y = \text{arc} \tan\sqrt{s^2 + \tan^2 a}$	54.6 deg
$x = \text{arc} \cos \dfrac{s}{\tan y}$	29.8 deg
$0 = \text{arc} \sin \dfrac{\sin a}{\sin y}$	44.7 deg
$0 + R$	67.9 deg
Lat P $= \text{arc} \sin [\sin (0+R) \sin y]$	49.1 deg
Long P (from point 0) $= \text{arc} \sin \left[\dfrac{\sin (0+R) . \cos y}{\cos \text{Lat P}}\right]$	55.0 deg
Long P $-$ x	25.2 deg

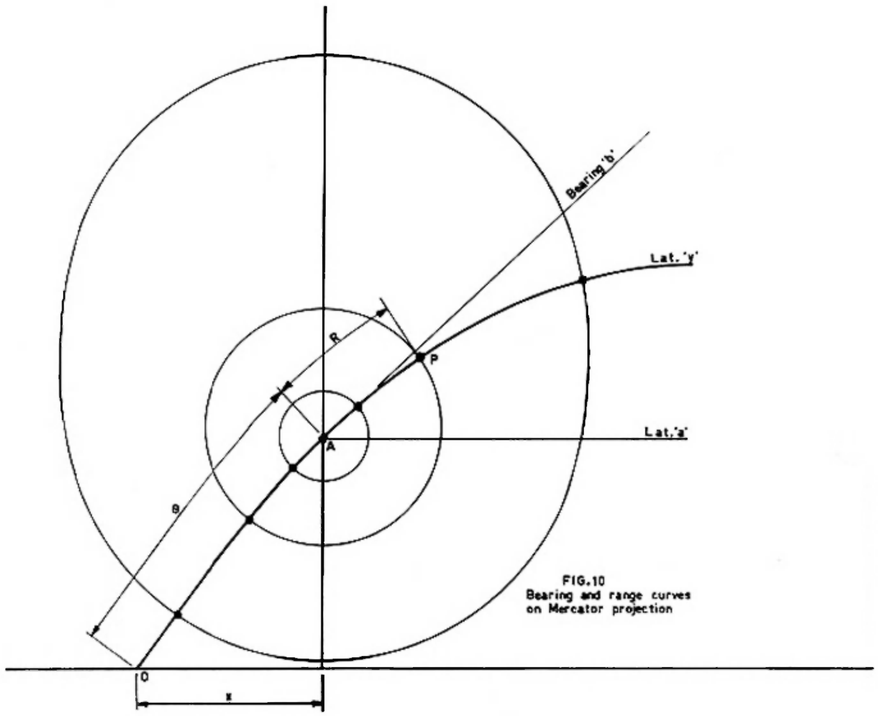


FIG. 10
Bearing and range curves on Mercator projection

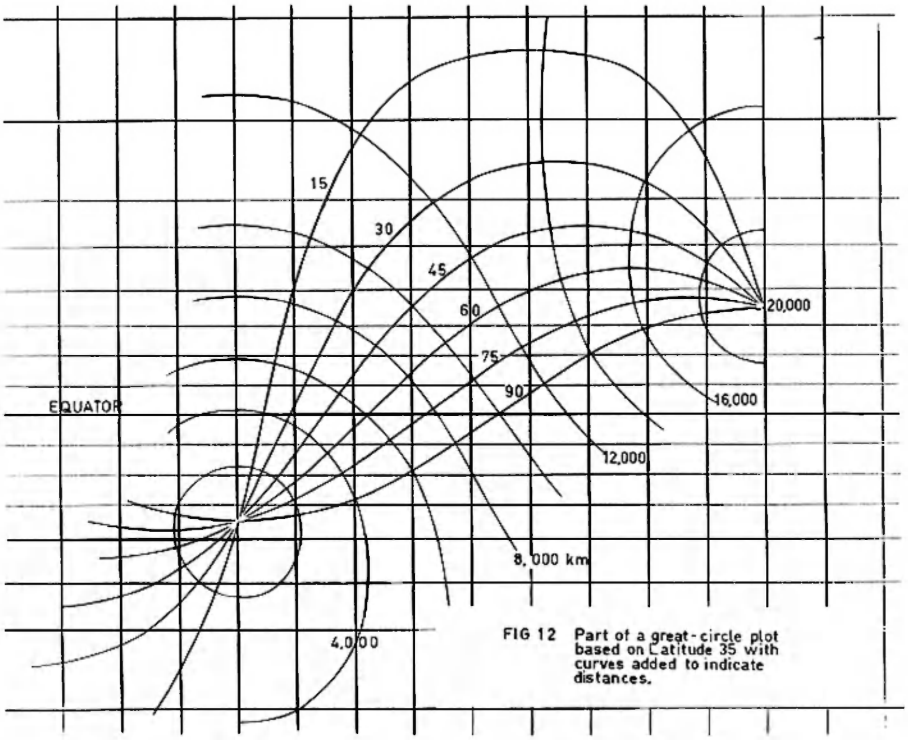
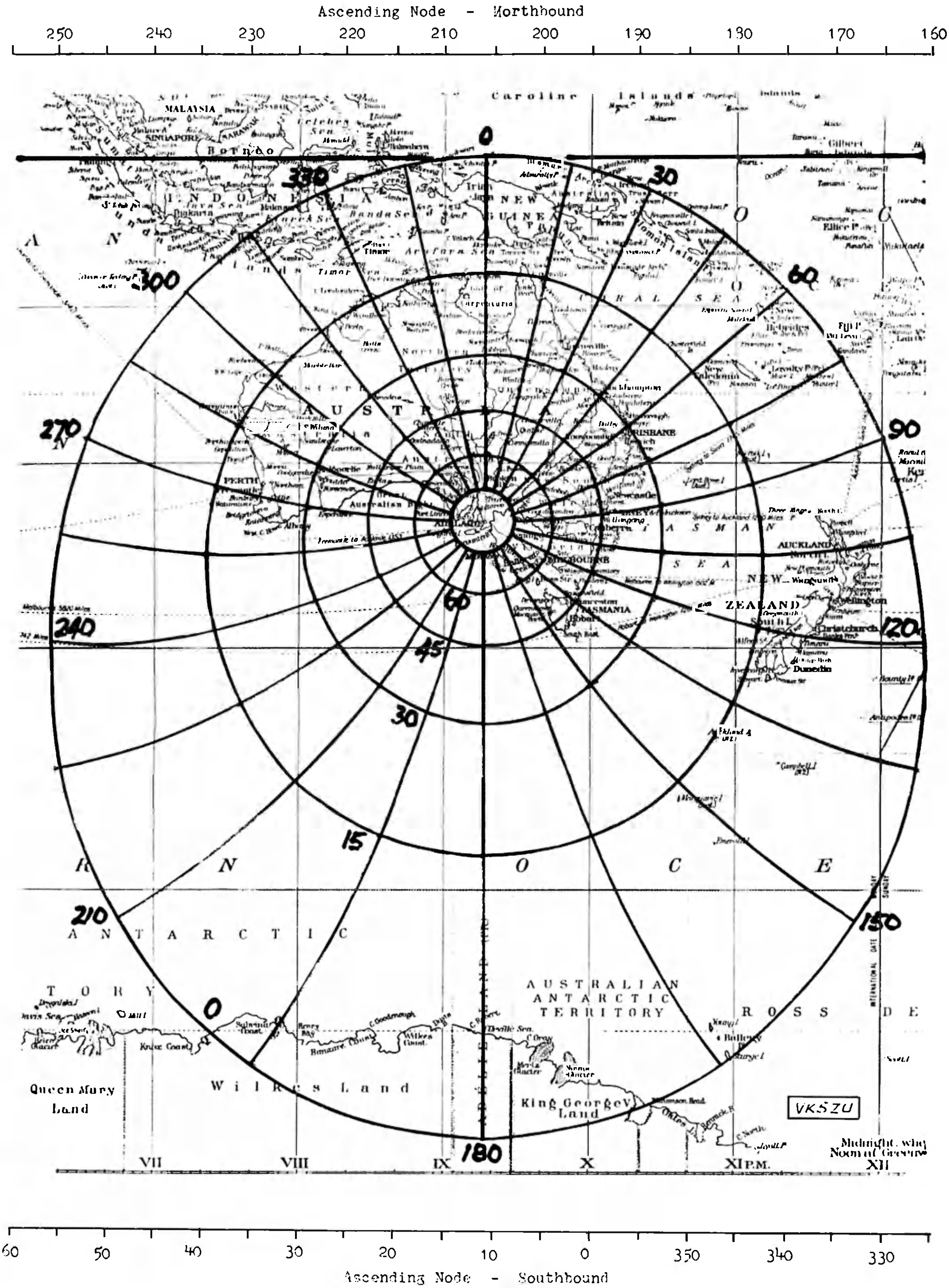


FIG 12 Part of a great-circle plot based on Latitude 35 with curves added to indicate distances.



Ascending Node - Northbound
250 240 230 220 210 200 190 180 170 160
Caroline Islands
MALAYSIA
SINGAPORE
SARAWAK
Borneo
INDONESIA
NEW GUINEA
Timor
Arafura Sea
Banda Sea
CORAL SEA
New Hebrides
New Caledonia
Fiji
AUSTRALIA
PERTH
BRISBANE
SYDNEY
Canberra
MELBOURNE
TASMANIA
Hobart
ADELAIDE
TASMAN SEA
NEW ZEALAND
AUCKLAND
Wellington
Christchurch
Dunedin
Australian Bight
ANTARCTIC
AUSTRALIAN ANTARCTIC TERRITORY
Queen Mary Land
Wilkes Land
King George V Land
Knox Coast
ROSS
VII VIII IX X XI P.M. XII
INTERNATIONAL DATE
VK5ZU
0 30 60 90 120 150 180 210 240 270 300 330
15 30 45 60
60 50 40 30 20 10 0 350 340 330
Ascending Node - Southbound

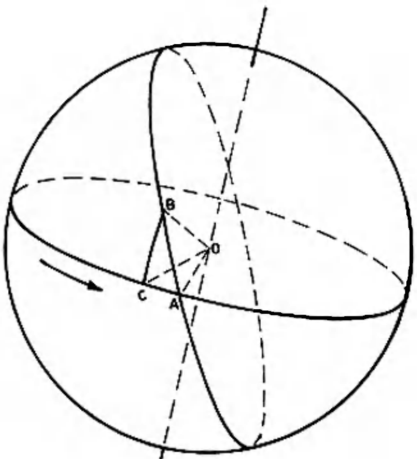


FIG. 7. Typical satellite orbit.

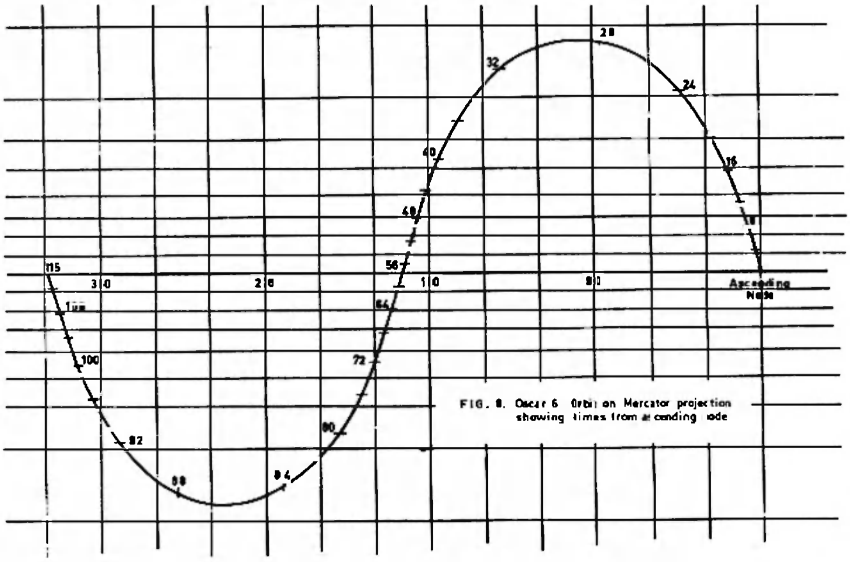


FIG. 8. Oscar 6 Orbit on Mercator projection showing times from ascending node

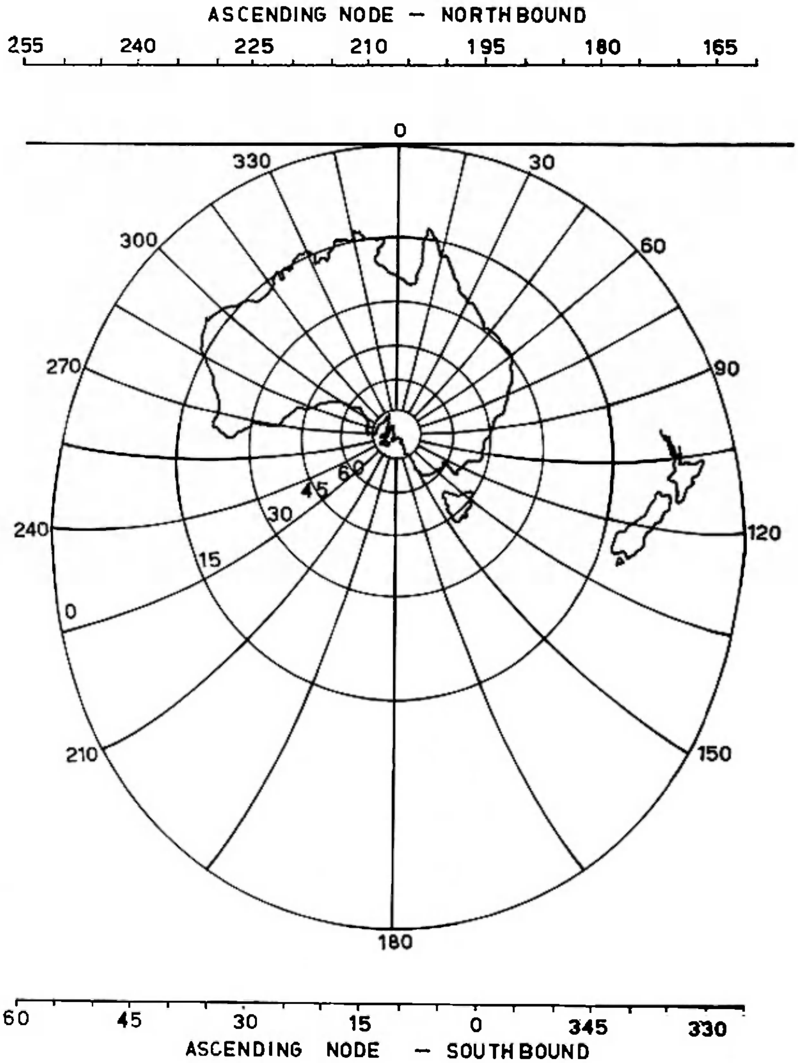
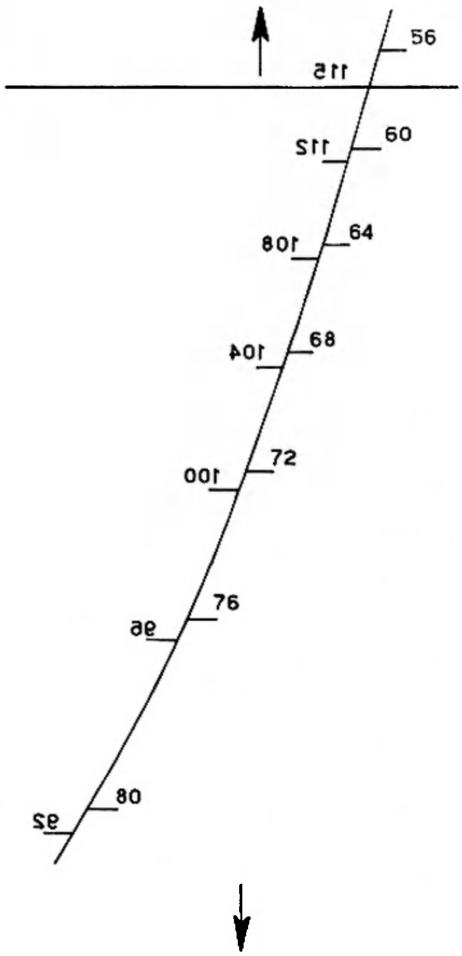


FIG 11 (a) Bearing / Elevation chart for Oscar 6
Altitude 1460 Km.



(b) Track of Oscar 6
(Latitude 0-70°S)
Showing times of ascending node

Repeat for all desired values of R— positive and negative. Repeat for next value of b.

APPLICATION

Using a Sharp Model PC-1001 programmable desk calculator, the complete plotting data was obtained in less than half an hour. Another half-hour was required to carry out the manual plot, the result of which is shown in Fig 11a.

That portion of the Oscar 6 orbit from 56 to 82 minutes after ascending node was then plotted on transparency to the same scale. (Fig 11b). By superimposing the two plots, with due regard to the longitude of the ascending node, the time and bearing of acquisition can be read off directly and the pass can be tracked in detail.

To cover the northbound leg, the transparency was reversed and time-markers from 92 to 115 minutes were added, together with the appropriate index for longitude of the ascending node.

The most time-consuming part of the exercise is the calculation and plotting of the bearing/elevation curves. To simplify this, the problem was fed to a Hewlett Packard Model 9810A Calculator and its

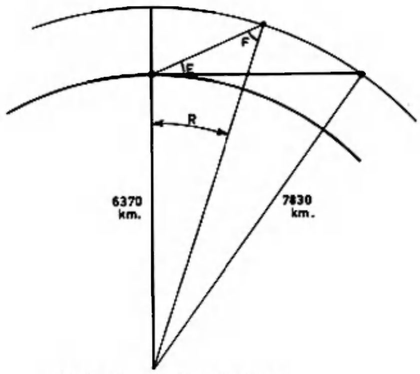


FIG. 9. Oscar 6 orbit in elevation.

associated X-Y plotter. The complete calculation and plot was then carried out in about two minutes.

Note: In plotting to Mercator's projection, if unit length is taken as one degree of longitude, then a point at latitude X will be $131.9 \log_{10} \tan \left(\frac{X}{2} + 45\right)$ units from the equator.

FEEDBACK TO PART 1

The method used above provides an alternative means of deriving the great-circles shown in Fig 5 of Part 1, together with additional curves indicating distance from the reference point. Such a plot is shown in Fig 12.

Note: An angular range of 9 degrees represents 1000 km.

TABLE 2
ORBITAL DATA RELATING TO OSCAR 6
Orbital Inclination 78.35 deg. Period 114.99 min.

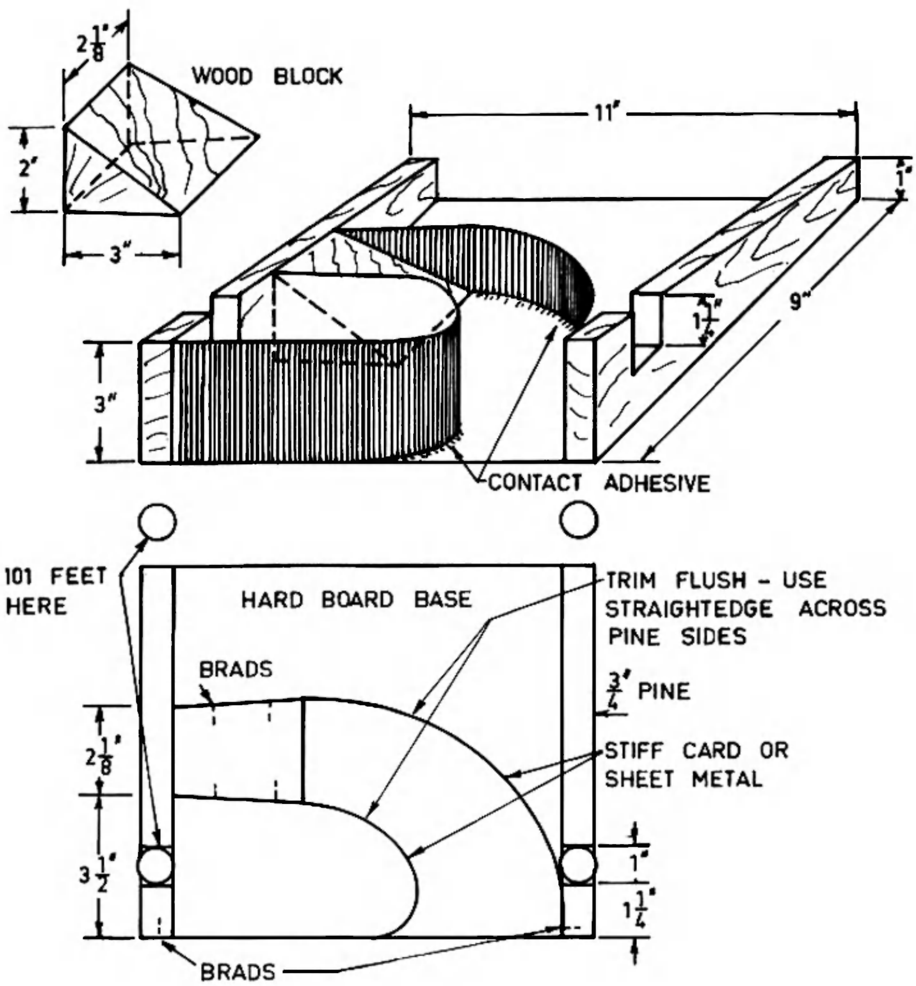
Time (mins)	Orbital Travel °	Latitude °	Longitude, deg W from ascending node: Earth stationary	Earth rotating
4	12.5	12.3N	2.6	3.6
8	25.1	25.5	5.4	7.4
12	37.6	36.7	8.8	11.8
16	50.1	48.7	13.6	17.6
20	62.6	60.4	21.3	26.3
24	75.1	71.2	37.3	43.3
28	87.7	78.1	78.6	85.6
32	100.2	74.6	131.6	139.6
36	112.7	64.6	154.2	163.2
40	125.2	53.1	164.0	174.0
44	137.8	41.2	169.6	180.6
48	150.3	29.1	173.4	185.4
52	162.8	16.8	176.4	189.4
56	175.3	4.6N	179.1	193.1
60	187.8	7.7S	181.6	196.6
64	200.4	19.9	184.3	200.3
68	212.9	32.1	187.4	204
72	225.4	44.2	191.6	209
76	237.9	56.1	197.9	216.9
80	250.5	67.4	209.6	229.6
84	263.0	76.4	238.6	259.6
88	275.5	77.1S	295.4	317.4
92	288.0	68.7	328.2	351.2
96	300.5	57.5	341.1	365.1
100	313.1	45.7	347.8	372.8
104	325.6	33.6	352.1	378.1
108	338.1	21.4	355.4	382.4
112	350.6	9.2	358.1	386.1
115	360	0	360	388.75

FOOTNOTE:

Received recently is data relating to the orbit of Oscar 7 which indicates that, for all practical purposes, it is identical with that of Oscar 6. The comparative data is as follows:

	Oscar 6	Oscar 7
Inclination (deg)	101.6534	101.7287
Period (minutes)	114.994355	114.944785
Regression (deg)	28.74897	28.736
Semi-major-axis (km)	7832.583	7830.336

The differences are so small — much less than the plotting accuracy of the diagrams, that they will apply equally well to both Oscar 6 and Oscar 7.



Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

THE YAESU 101 AUDIO GISLICK

Most 101 users find it hard to think up an improvement. Here's one If you have an hour to spare. I have found it works so well that I am going to paint itl Build It and you can remove those magazines or such used to prop it up, place the rig on top, locate the front feet into the slots provided and hey presto, you have real beaut out front sound and a 101 that looks you right in the eye. The unit has no ill effect on the ventilation and will also serve as a mobile fitting.

The Melbourne Science Museum Amateur Radio Station

Peter Cossins VK3BFG/T
and David Turner VK3ADE

To the majority of people, mention of the word 'Museum' conjures up images of dusty old bones fussed over by ageing recluses and a place once visited when very young, probably on a wet day.

This picture however, is not accurate. There are collections, some of which seldom see the light of day, but the Science Museum has many activities going on, and mechanised displays to demonstrate fundamental principles to the delight of both young and old.

Over the past 103 years of its existence, the Science Museum has engaged in various activities involving the general public including the training of telegraphists (1873), lectures on geology, chemistry, etc. and more recently (1965), lectures on astronomy in the planetarium and the observatory. The latter service is provided by the Astronomical Society of Victoria, utilising both their own and Science Museum telescopes. Also on the staff of the Science Museum are five teachers seconded from the Education Department, who give demonstrations both at primary and secondary level on sound and light, including a CCTV link via laser. Other technological topics such as development of musical instruments, transport and communications are illustrated with items from the collections.

The Museum is always looking for ways to increase its activities, and resulting from a chance discussion with Jim Lloyd VK3CDR, in late 1973, a joint WIA/Science Museum radio station was conceived. The main objectives of this station were:

(a) to provide a facility to educate the public in radio communications, particularly amateur activities; and

(b) to accommodate the VK3BWI broadcast equipment.

After agreement on facilities and services to be provided by both parties, a suitable site was selected for the station. Consideration was given to staff access and attraction of visitors' attention. Visitors number 500,000 per year (one seventh of Victoria's population). The position on the ground floor of a gallery facing Swanston Street, although a premier position for operation, was quite distant from suitable roof top antennas (HF — 130m, VHF/UHF — 30m). Good quality UR67 and FHJ (Heliax) co-axial cable was installed to overcome transmission losses. After nearly twelve months, stage one has been completed — comprising the installation and modification of VK3BWI equipment, the construction and installation of a control console, and a console with HF and VHF transceivers for the Museum station VK3AOM.

The VK3BWI console is a multi-program source, multi-output audio, system to drive the transmitters which are housed in racks. RF feedback problems encountered were largely solved by the addition of LP filters inserted at strategic points within the console. Much of the equipment which was transferred from the old QTH at 478 Victoria Parade, was in poor repair and was given an extensive face-lift.

At the time of writing this article, the 432 MHz transmitter has been built but no antenna has yet been installed. All co-axial feeders are in a sealed duct and hence an interesting problem is posed for any further expansion of frequencies. The possibility of diplexing transmitters into the single cable feeding a dual resonant antenna is one possible solution.

As mentioned earlier, there are two roof top antenna sites, one directly above the transmitting room for VHF (which can be seen from Swanston Street) and one towards the rear of the building for HF.

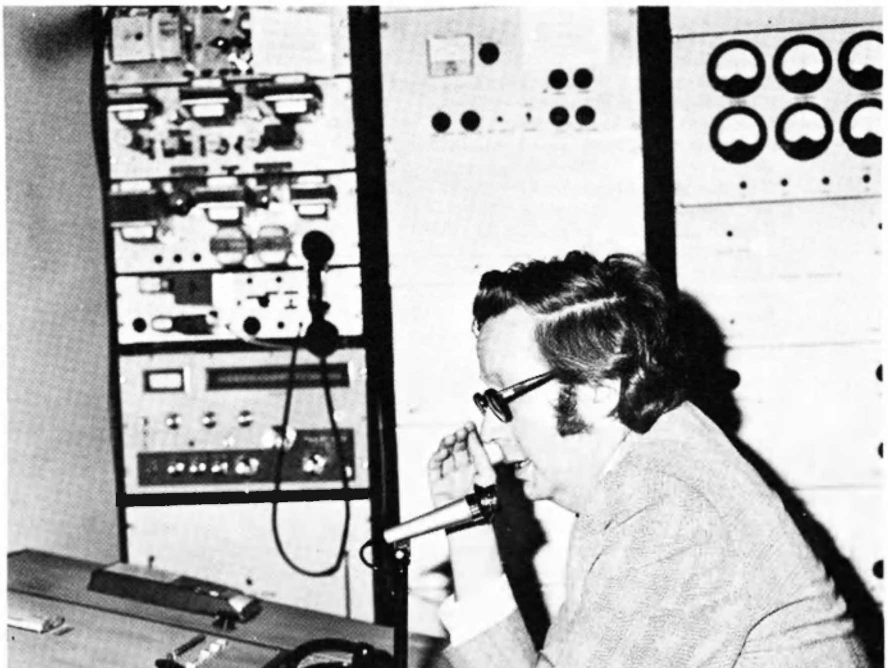
Antennas are as follows:—

160m — Vertical with top hats and counterpoise,
80/40/20 — Inverted vees (a tri-band beam and tilt over tower is planned for stage 2)
53.032 MHz — ⅝ vertical
52.525 MHz — ¼ G-plane
144.5 MHz — Stacked clover leaves
146.1 MHz — ⅝ vertical/10 element beam
432 MHz — Still in planning

From a public point of view the station demonstrates a range of equipment used by amateurs from the ex Navy A14 (80 and 40 Mx), amateur designed and constructed AM (160m, 2m, 6m, 70cm), modified commercial equipment (Ch 1, 6 FM), a 40m transmitter constructed from a kit; and state-of-the-art, a HF transceiver with digital readout and an autoscan VHF transceiver. Public demonstrations have commenced and acquisition of gear for RTTY, SSTV and UHF TV is planned.

Comparison of these wide ranging current activities can be made with items in the Musuem's collection, such as the receiver built by Max Howden VK3BQ in 1923.

If you are interested in operating or demonstrating in your field of interest, please contact Peter VK3BFG/T on (03) 231-2778. ■



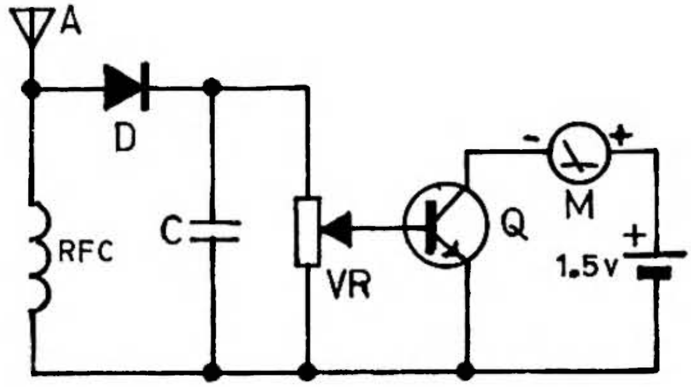
Peter Cossins, VK3BFG seated at the operating position of VK3BWI/VK3AOM. This photo was taken during the callback immediately after the opening ceremony.

SIDEBAND ELECTRONICS SALES and ENGINEERING

a mini size field strength meter

Maurie Evered, VK3AVO
13 Sage Street, Oakleigh, 3166

A field strength meter is one of those instruments that falls into the "useful but not essential" class. However, since this one was first constructed, it has worked overtime. I am sure other operators will find it as useful as I have.



RFC-2.5 mH
D – OA91
C – .001
VR – 50k

Q – BC 108 (2N3565)
M – Any meter 0–1mA (or more sensitive)
A – 6 inch length brass welding rod.

This field strength meter could not be simpler. It consists of only seven components including the meter and battery. It was built on a piece of Veroboard and everything is mounted in a 4" x 2" x 1¼" metal box. The "antenna" is a piece of brass welding rod about six inches long. It passes through a rubber grommet and is soldered directly to the Veroboard.

The circuit is very straightforward. Transistor Q1 is normally non-conducting because there is no external bias applied to its base. RF voltage developed across RFC1 is rectified by D1 and applied to the base of Q1 which then conducts according to this rectified RF voltage. VR1 is to keep the meter reading at ½-¾ full scale deflection. Once this circuit is enclosed in its metal box it is virtually a DC one, so layout is of little importance. There is little more to be said about the instrument itself, it is so simple. However, a few words should be said about its use.

If the meter is used to measure relative transmitter output into the regular station antenna (as it is usually used at this QTH) then readings are quite straightforward and follow those obtained on the SWR meter in its "Forward" position.

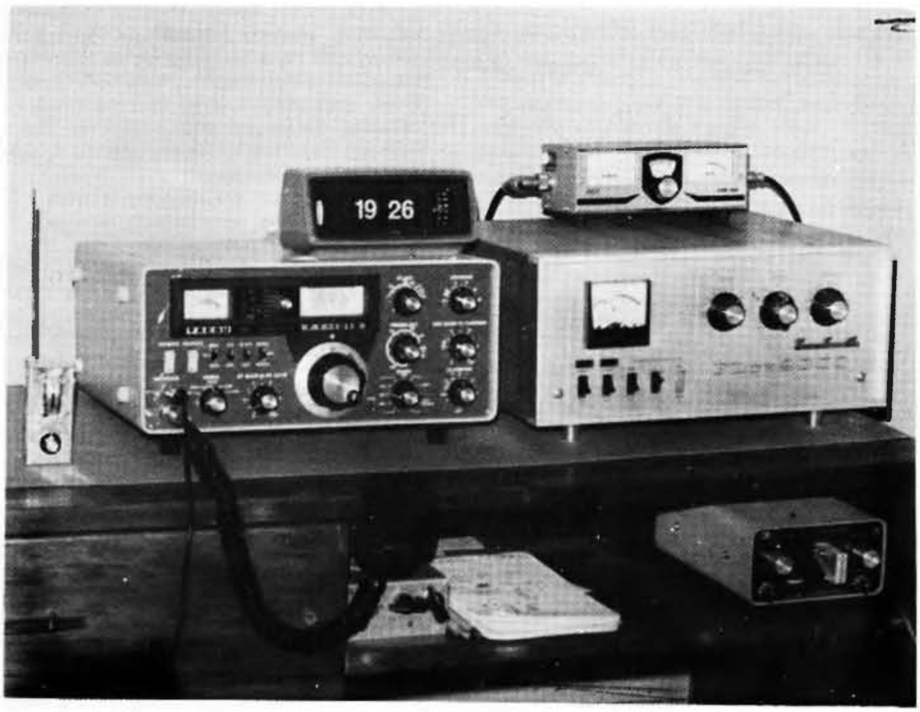
The field strength meter is completely independent of coupling to feedlines, and so gives added confidence compared to any other method of measuring that is used. Just sit the field strength meter in a convenient position on your operating table or desk.

If the meter is used to monitor antenna adjustments the situation is more complex because:—

1. The "antenna" of the field strength meter should have the same polarisation as the transmitting antenna under test.
2. Measurements should be made at a distance of several wavelengths from the antenna being tested. If made within one wavelength the meter may respond to the combined induction and radiation fields rather than the radiation field alone.
3. If an adjustment alters the angle of radiation of the antenna under test it may decrease the measured field strength at ground level although the total radiation level may have increased.

This meter has been used from 3.5 to 30 MHz satisfactorily. If it is to be used at 1.8 MHz with a low power rig it may be necessary to extend the short antenna with a piece of wire and a clip. If this is done it performs very well at this lower frequency.

This little meter is very cheap and easy to construct and once built becomes a very useful addition to the range of instruments in any shack.



In this photo of Maurie's neat station the field strength meter can be seen to the left of the FT101B.

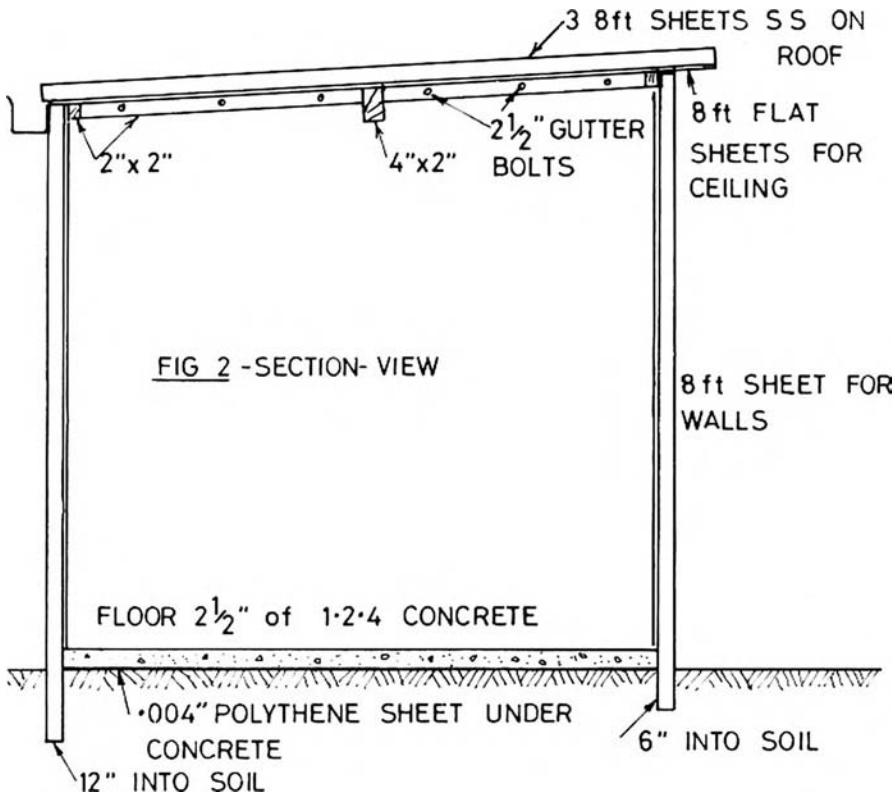
the shack

J. A. Gazard, VK5JG
39 Glenhuntly St., Woodville South, S.A. 5011

The construction of an outdoor building to house the amateur station need not necessarily require the services of a builder. VK5JG describes one way in which you may be able to "roll your own", subject, of course, to the agreement of your local council.

All over the world the place in which the amateur operates his equipment is called "The Shack". The dictionary defines a shack as "a roughly built hut" and it is probable that the name evolved when in the early days, the roaring spark gap working late into the night made it necessary for the amateur to move into an outhouse so described.

Today, there are still advantages in having an operating room outside the main residence. Two of these are the ease of leading-in the aerial and the avoidance of interference with the remainder of the family. With the increase of new operators from Youth Radio and the coming of the novice licence, more shacks will be required and the following suggestion is offered for cheap and easy home construction.



MATERIALS

Common covering material for walls and roof are corrugated galvanised iron or asbestos cement sheets. The costs per square foot of galvanised sheets and 6 inch corrugated asbestos cement sheets are approximately the same. However "super six" asbestos cement sheets are sufficiently strong and rigid to stand up as walls, and support a roof without timber framing. Used thus they are by far the cheapest material for walls. Also, with no timber framing, erection is simple and no special skills are required.

The super six sheets have a wide corrugation at one side which laps with the narrow one at the other side. If two sheets are set up at 90 degrees with the wide corrugations together, it will be found that the edges overlap and can be bolted together with 1" x ¼" gutter bolts to form a corner.

LAYOUT

The layout of sheets for a 10 ft x 7 ft shack is shown in Fig. 1. Gutter bolts are used to bolt the edges of all sheets together.

The bottoms of the vertical sheets can be set in a shallow trench and backfilled and rammed to hold them upright during construction. The trench need only be 6" deep on the high side, and with a 6" roof fall, will be 12" deep on the low side. It is best to lay out the walls flat on level ground first, with the laps nesting neatly, and drill the ¼" holes for the gutter bolts with a masonry drill. Bolts can then be inserted quickly during erection, which should not be done in a gale!

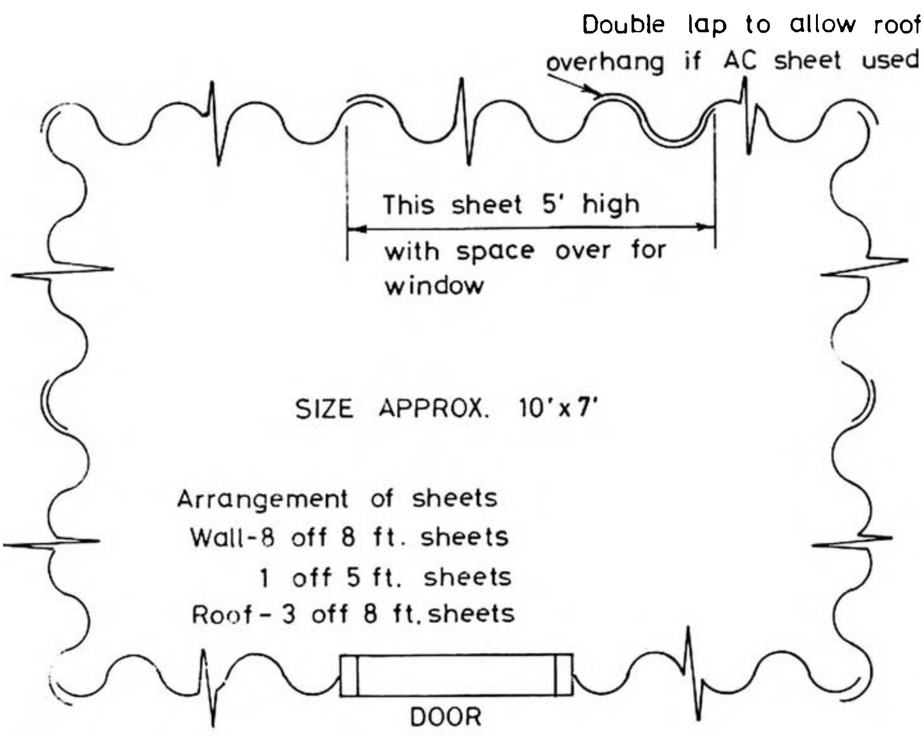


FIG 1

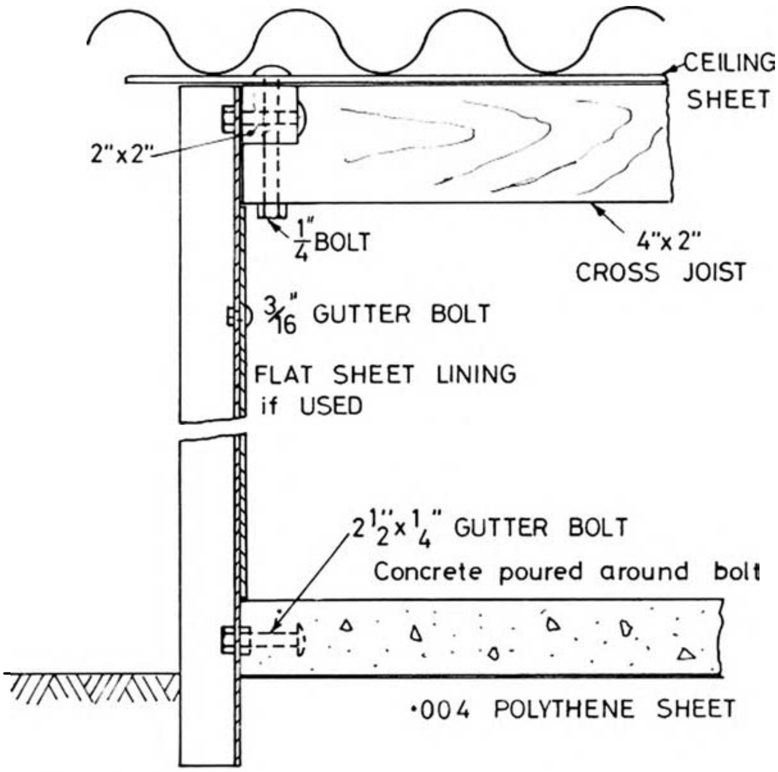


FIG 3 CONSTRUCTION DETAILS

PROCEDURE

It is possible for one man to erect the walls of a small shack in less than a day. The sloping tops of the side walls can be cut with a ceramic cutting disc set in an electric drill. Erection is commenced at one corner. The two sheets are carefully set up at 90 degrees and clamped at the top with a G-clamp. Then the holes (4 per corner) are drilled and the bolts inserted. The corner will have sufficient stability to support two more sheets even if the trench is left unfilled. Around the top of the sheets, lengths of planed 2 x 2 inch timber are bolted to the asbestos sheets, with 2½" gutter bolts. This increases the rigidity and provides a method of fastening down the roof.

ROOF

The roof can be of galvanised iron or supersix. To provide a flat ceiling and block off the open spaces of the corrugations, sheets of flat asbestos are laid on the roof first and the corrugated sheets placed over them. Special screws are available for fastening the asbestos (if this is used) to the 2 x 2s.

When the roof is screwed down with two screws per sheet at each end, the structure becomes very rigid.

Aluminium foil can be laid between the flat asbestos and the corrugated sheet for heat insulation.

DOOR AND WINDOWS

One sheet left out of the wall provides a doorway and the use of a 5 ft sheet instead of an 8 ft sheet makes space for a window. The door and window frames can be made of 4 x 1½". The doors will not be standard size and so will have to be made to fit. It is suggested that doors be framed in 2 x 1 inch and 3/16" hardboard be glued and screwed to each side. For a 3 ft x 3 ft window, half (about 18") could be plain glass and the remainder louvres.

If it is desired to line the shack, flat asbestos sheets can be bolted inside to the super-six with 3/16" gutter bolts. This lining, which can be painted, greatly improves the appearance and insulation.

The shack shown in the sketches is 3 sheets by 2 sheets — approximately 10 ft x 7 ft but other sizes can be used. The largest shed built by this method has been 5 sheets by 3 sheets (16 ft x 9 ft). If super-six is used for the roof, one of the laps in the wall will have to be a double lap so that the roof will have an overlap at each end.

Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

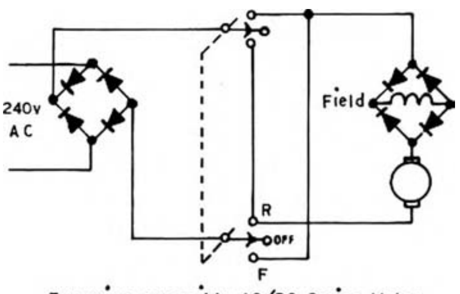
TWO-WIRE REVERSING OF AC/DC SERIES MOTORS

When the distance between shack and tower is a long one, it is desirable to keep the number of wires to the rotator down to a minimum. At the same time, those of us who make their own rotators find that the most inexpensive suitable motors are the series-wound AC/DC motors commonly used in electrical appliances. The problem is how to use these motors with the ON/OFF-reversing switch at the shack and still require only two wires to feed the motor.

The problem has been overcome here by using two bridge rectifiers as shown in the diagram. The motor is supplied with DC via a bridge rectifier from 240V AC. The field, which is still used in series with the armature, is connected through another bridge rectifier which causes it to retain the same polarity at its terminals regardless of the armature polarity, which is controlled by the switch in the shack.

We use a little motor that previously drove a blower. It was found necessary to change the field position slightly in respect of the brushes to obtain similar torque in both directions, and a filter has been fitted near the motor to cut commutator noise down. The diodes in the bridges are normal 400 p.l.v., 0.5A rectifier types.

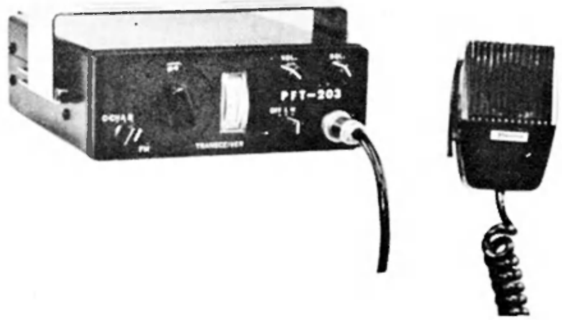
'Tubby' Vale, VK5NO



Two wire reversible AC/DC Series Motor.

MAY IS VHF/UHF

MANY NEW LINES IN STOCK OR ARRIVING SHORTLY
Including the value-packed commercial quality PFT-203 TRANSCEIVER



The model PFT-203, originally designed for marine use in America, is a 30 watt plus, 25 channel mobile FM transceiver for the 2m amateur band. It is compactly housed in a metal cabinet of attractive appearance. The IF amp. frequencies are 10.7 MHz and 455 kHz, clear of HF amateur bands to reduce interference to a minimum. Excellent selectivity is assured by the use of a 2 pole crystal filter and three ceramic filters! A low pass filter is included in the antenna circuit for both transmit and receive.
Incorporates power level adjustment and automatic SWR protection which does not cut the transmission on high SWR but reduces power according to SWR deficiency. Thus you can still transmit even with a relatively poor SWR . . . good for emergency, etc. situations.
The use of a large area heat sink and PA transistor with power dissipation of 70W help to ensure trouble-free operation under arduous conditions. One channel provides priority "call-channel" operation.

TECHNICAL DATA OF PFT-203

GENERAL

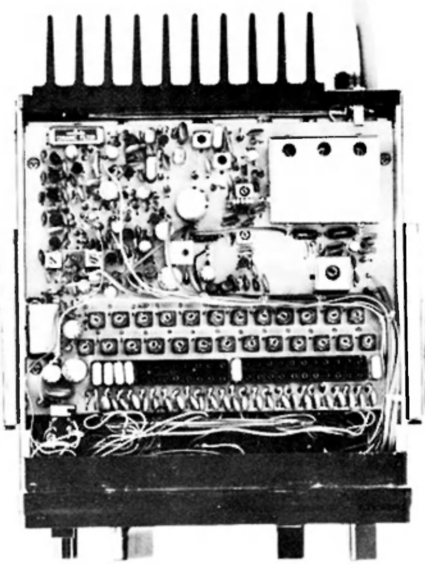
Frequency Coverage	140-170 MHz, factory adjusted to the 2m band
Number of Channels	24 Channels plus 1 memory channel
Maximum Bandwidth per Unit	2 MHz
Mode	F3 (Phase Modulation)
Power Source	13.5V DC (±10%) Negative Ground
Power Drain	Receive 0.3A Transmit 5.0A/25W 1.2A/ 1W
Operating Temperature	—20°C to +55°C
Antenna Impedance	50 ohms
Microphone	Dynamic 500 ohms
Dimensions	61 mm (H) x 166 mm (W) x 215 mm (D) or 2⅜" x 6½" x 8 7/16"
Weight	2.2 Kgs or 4.8 lbs.

TRANSMITTER

Power Output	30 Watts or 1 Watt, switchable (max.)
Modulation	Variable capacitance phase modulation
Multiplications	12 Times
Frequency Deviation	12.5 kHz max. (adjustable)
Harmonics Spurious Radiation	2μW or less
Adj. Chann. Radiation	2μW or less
Frequency Stability	Not exceeding ±0.001% (—20°C to +60°C)
Mod. AF Response	0.3 to 3 kHz +6dB/Octave

RECEIVER

Receiving System	Crystal controlled double superheterodyne
Frequency Stability	Not exceeding ±0.001% (—20°C to +60°C)
Intermediate Frequency	1st IF : 10.7 MHz 2nd IF : 455 kHz
Sensitivity	0.5 μV or less at 20 dB OS
Selectivity	±10 kHz at —6dB, ±20 kHz at —80dB
Spurious Response	Greater than 60 dB
Spurious Radiation	0.002 uW or less
Intermodulation	At least 75 dB down at ±25 kHz separation
Audio Output	1 Watt (less than 10% distortion)



INTRODUCTORY PRICE — $228, includes crystals for B and one repeater chan. (advise chan. required), microphone, mobile mount, etc. Extra standard channels only $8.00. Prices include S.T. Freight or postage and Insurance extra (allow $4.50). All sets pre-sales checked and covered by our 90 day warranty. Prices and specifications subject to change.

AUSTRALIAN AGENT:

bail ELECTRONIC SERVICES

60 Shannon St., Box Hill North, Vic., 3129.
Ph. 89-2213

QLD.	MITCHELL RADIO CO., 59 Albion Road, Albion, 4010	Ph 57 6830
N.S.W.	STEPHEN KUHL, P.O. Box 56, Mascot, 2020	Ph Day 667 1650 A.H. 371 5445
S.A.	FARMERS RADIO PTY. LTD., 257 Angas Street, Adelaide, 5000	Ph 23 1268
W.A.	H. R. PRIDE, 26 Lockhart Street, Como, 6152	Ph 60 4379

MONTH AT B.E.S.

TENKO 2XA

The Tenko model 2XA (similar to the Swan FM2XA) is a 10 watt, 12 channel 2m FM transceiver.
Using dual gate MOS FETS in the front end it exhibits excellent cross modulation and overload characteristics. The 2XA comes complete with mobile mount, microphone, and DC power cable.

TECHNICAL DATA:

Transmitter: Power output: 10 watts. Deviation: ±7 kHz. Spurious Response: —60 dB.
Receiver: Sensitivity: 0.5 μV for 20 dB quieting. Selectivity: 6 dB down at ±12.5 kHz; 50 dB down at ±25 kHz. Squelch sensitivity: Less than 0.3 μV. Circuitry: Double conversion with IFs of 10.7 MHz and 455 kHz.

INTRODUCTORY PRICE — $169, includes 3 JA channels and 2 Aust. channels. Extra standard channels, **$8.00.**

YAESU FT-620B

New model 6m SSB/AM/CW transceiver, Illus. at right. **PRICE — including AM filter and crystal calibrator — $468.**

YAESU FT-220, 2m SSB/FM/CW transceiver, latest model with crystals and mods for FM repeater operation. Similar appearance to FT-620B. Limited quantity only — **$475.**

YAESU FT-224, 24 channel 2m FM transceiver — **$259** with 6 Australian channels installed.

YAESU FT-2 AUTO, 8 channel, auto-scan 2m FM transceiver.

YAESU S-200R, 200 channel, frequency synthesised 2m FM transceiver.

NEW FROM STANDARD CO.:

SR-C146A, 2m FM 2W output, 5 channel Walkie-Talkie. This superior quality transceiver comes complete with a leather carrying case, and auxiliary jacks are provided for external microphone, earphone, antenna and battery charger. Whip antenna telescopes down level with top of set.

TECHNICAL DATA:

TRANSMITTER:		RECEIVER:	
RF output	2 watts	Sensitivity	0.4 uV or less
Modulation	± 5kHz (adjustable)	Selectivity	60 dB down on adjacent channels
Spurious & Harmonics	More than 50 dB below carrier	Circuitry	Double conversion
FM noise	At least 45 dB		

PRICE — $158, includes carrying case and 4 Channels (2 U.S. and 2 Aust.). Optional accessories extra, e.g. hand mic., stubby ant., charger, mobile mount adaptor, 230V AC home use adaptor.

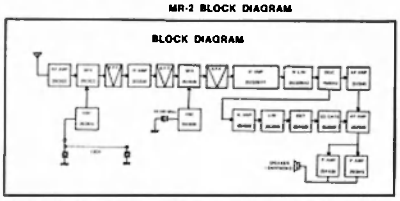
SR-C432A, a new UHF, 70 cm handheld FM transceiver, output power 2.2 watts, with 6 channel capability (435 MHz crystals included). Similar appearance to the SR-C146 transceiver. **Price — $235.**

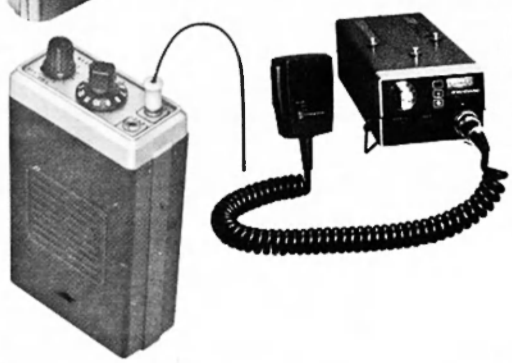
SR-C430 UHF 70 cm mobile transceiver, 10 watts FM, 12 channel (435 MHz crystals included). This would be the bargain of the year at the anticipated price of **$268,** inc. mic. and mobile mounting bracket. Stocks expected in June, place your order now to avoid disappointment.

RECEIVER SENSATION

MR-2 MINI-RECEIVER for pocket use. A little larger than a cigarette packet, the MR-2 is a full double conversion crystal controlled VHF miniature receiver of really high quality. 12 channel capability. Delivery expected June/July with anticipated price under **$100,** including self-contained Ni-Cad batteries, earphone, wire antenna, and battery charger. Crystals will be stocked for the 2m band.

MR-2 BLOCK DIAGRAM





All prices inc. S.T. Freight etc. extra. And . . . don't forget, your purchase from B.E.S. includes pre-sales checking of sets plus our 90 day warranty.

AUSTRALIAN AGENT:

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ELECTRONIC SERVICES

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W.A. H. R. PRIDE, 26 Lockhart Street, Como, 6152 Ph 60 4379

modifications to the VK3ABP 2 and 6 metre converters

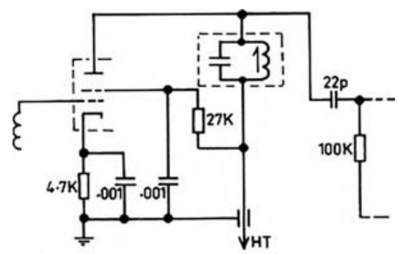
Geoff Wilson, VK3AMK
7 Norman Ave., Frankston, Vic. 3199

It was with some delight that one of the technical editors, VK3ABP, received this article for perusal. He also has found an IF tuned circuit desirable in one case when an IF above 30 MHz was used. The article explains some of the factors involved in choice of IF, and how such a tuned circuit may be added where necessary.

The VK3ABP VHF converters need no introduction to anyone active on 2 or 6 metres over the last decade. There would probably be very few shacks that have not had at least one of these at some stage. I have lost count of the number that I have built and every one was a good performer. In the early days of Ch. 0 the 6m version seemed about the only converter capable of solving the cross mod. problem. Some idea of the success I have had can be seen from the DX of the last season: 2m, VK1-7 inclusive, 6m, VK1-0 & ZL1-4 inclusive, in addition to five JA call areas in other years. All signals received on the standard 2 or 6m version.

The trend today is to use 28 MHz as the tunable IF for VHF converters for a variety of reasons, not the least being the 2 MHz or more available compared with other bands. Unfortunately few receivers give their best performance at 28 MHz, especially when compared to say 80m where gain is usually more than adequate. My 6m converter, while a good performer and relatively free of cross mod, except when beaming directly at Ch 0, seemed to lack the sensitivity of the classic "R, TV & H" type converter which used a 6BQ7 front end. Unfortunately the latter was totally unsuited for operation in Ch 0 areas and had to be abandoned despite its previous excellent performance. My impression has always been that the 6m VK3ABP converter obtains freedom from cross modulation at the expense of gain.

The mixer stage output is untuned and the signal is coupled to the IF by an untuned cathode follower. Therefore the first tuned circuit at the IF is the front-end tuning of the receiver. I set out to see where some additional gain could be

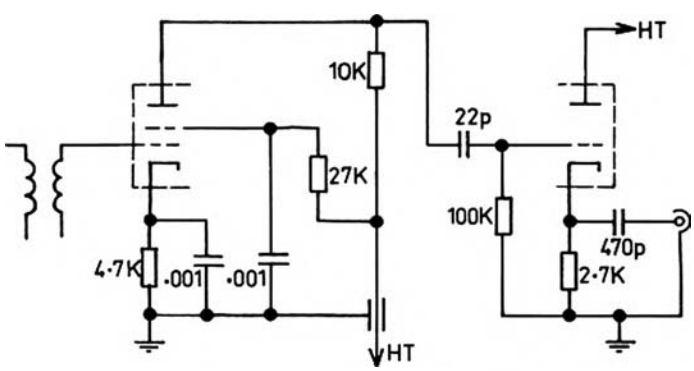


MODIFIED MIXER CIRCUIT - FIG. 2

obtained without drastic modification to the converter, especially as the tunable IFs at 28 MHz were not as hot as they might be. The reason for using untuned circuits in the mixer and cathode follower areas appears to have been to make things as flexible as possible and allow IFs from BC upwards to be used.

The original mixer circuit is shown in Fig. 1 and the modifications in Fig. 2.

The 10 K resistor in the anode of the mixer section of the 6BL8 is replaced by a tuned circuit at the IF and tests on DX signals on both 2 & 6m have shown a very worthwhile increase in gain without increasing cross mod. The 6m version was simply peaked for maximum at 28 MHz but due to the gain of the 6ES8 cascode RF stage ahead of the mixer in the 2m version it was found necessary to back off the tuning slightly as the noise was too great and produced a standing S meter reading of about S6. By backing off the tuning until the S meter just reaches zero with no signal the gain is about right and should give somewhere in the vicinity of 2 to 3 S points improvement over a converter without this modification. The 6m converter, due to the lower gain of the RF amp, does not give any noticeable increase in noise. During a recent 2m opening to VK5, I monitored the VK5VF beacon for long periods and found that the signal was in the noise and not moving the S meter at all without the addition of the tuned IF circuit but as soon as this was added the signal rose to about S3 and was quite clear. Also car ignition was much more pronounced and there was a noticeable rise in background electrical noise, inaudible previously. I made my tuned circuits up on Neosid formers and fitted cans, then soldered the tuned circuits in, directly replacing the 10 K resistor (15 K in the case of the 2m converter). Coil dimensions will vary of course depending upon the IF used. Should any instability result from the addition of the tuned circuits try a damping resistor across the coil; values probably between 2 2 K and 47 K would be suitable. ■



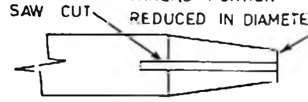
6BL8 MIXER - CATHODE FOLLOWER - FIG.1

Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

MODIFICATIONS TO MINISCOPE SOLDERING IRON

After a period of use, the barrel (although made of stainless steel) oxidises in the thread where the bit screws in, leading to overheating due to poor contact and accelerating the oxidation process. Cleaning the thread with a 5/32" Whitworth tap helps for a short period, but erosion of the barrel thread leads to a poorly fitting bit. To overcome this, a slot was cut in the barrel with a hacksaw blade with the "set" ground off each side (so the cut will not be excessively wide). Cut through the thread on one side, being careful not to damage the thread on the opposite side,



the cut extending a little beyond the tapered part of the barrel. With a pair of fairly heavy pliers, carefully reduce the size of the thread portion by pinching together the cut. Try and maintain the threaded portion circular. Run a 5/32" Whitworth tap through to thoroughly clean the threads. Pinch the end in until a new bit is a firm fit, requiring pliers to screw it in. It pays to clean the thread with a tap each time a new bit is fitted and also check that the new bit is a firm fit in the threads. C. P. Daw, VK2AGJ ■

VHF UHF
an expanding world

with Eric Jamieson VK5LP
Forreston, S.A., 5233
Times: GMT

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RTX, Devonport	144.900
P29	P29GA, Lae, Niugini	52.150
3D	3D3AA, Suva, Fiji	52.500
ZL1	ZL1VHF, Auckland	145.100
	ZL1VHW, Waikato	145.150
ZL2	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

The only item of likely interest in regard to beacons at present is the information from Bill VK2HZ to the effect that from his elevated site at Springwood in the Blue Mountains of NSW he monitored the Fiji beacon 3D3AA on 6/1/75 from 0200Z to 0600Z, being audible for the full four hours, very slow fade — not typical Es fading. Signal S6 at maximum down to S2 at times. Again on 7/1/75 the beacon was heard from 0830Z to 0900Z with signals peaking S3 about 0845Z, otherwise just being audible for most of the period.

If the beacon can be encouraged to keep on air it may well be that towards the end of the year in particular, contacts could be made into what will be a new country for most 6 metre operators.

52 MHz FM SURVEY

Well, some people at least, read the VHF notes. Two letters have arrived taking to task George VK3ASV for apparent errors in relation to VK2 FM activity. The first is from Bill VK2HZ who mentions he has worked 239 different VK2 stations on 52 MHz during the past eight years. 95 per cent of them would have been on the primary frequencies of 52.525 FM and 53.866 AM, the remainder on AM or SSB. To clarify the position a quote from Bill's letter: "George, VK3ASV, has his lines crossed when he lists VK2 52 MHz net frequencies in "52 MHz FM Survey" (AR March 75, P17).

"The primary frequencies are 52.525 FM and 53.866 AM and have been for the last ten years at least (longer for AM frequency). The VK2AWI broadcasts appear on these two frequencies, also on 52.100 SSB.

"Some six or seven years ago 52.656 was generally adopted as a secondary FM frequency. The use of an additional frequency was necessary due to the activity on 52.525 and to provide a spot where stations could enjoy a quiet yarn, without too much competition.

"On the AM side 53.866 was used extensively before Low Band FM Car-phones became readily available, when many stations moved to 52.525. The Illawarra (Wollongong) WIA Branch used 53.982 especially for fox-hunts and the like. In recent years the use of AM nets has fallen with FM operating taking over.

"It would be fair to say that 52.525 FM operation is on the wane, except of course during the DX season when the 'wood-work' opens up!

"The reason for this reduction in activity could possibly be blamed on the ready availability of 144/148 MHz 'Mini-Black-Boxes' with the added interest of repeaters and multi-channels. Just another phase in the ever-changing pattern of VHF activity".

Thank you Bill for setting the facts straight, and George will now be able to bring his book up to date too.

While on the subject of net frequencies, repeaters etc. Is it to be a fact that if one should travel from VK5 through VK3, VK2 to VK4, and north to Townsville, one will need about 7 different repeater channels to be able to have a reasonable coverage of the country? And is it also true that in addition to the main four repeater channels, 1 to 4, on 2 metres FM, VK2 look like using Channels 5, 6 and 7? I guess it would be reasonable to say most operators would consider fitting at least the four primary channels 1 to 4, plus Ch. 40 (B) and Ch. 50, the national simplex frequency, but to be asked to add three more repeater channels seems beyond all reason.

If thoughts are proceeding along these lines, might I suggest some thought be given to Interstate operators as well. Nice to have your own special repeater on say Ch. 6, as long as it's also OK to only talk amongst yourselves in the main! So there! Now someone tear me apart and tell me how wrong my grapevine is, because I will be glad to be told I am wrong — I will be through the eastern States before too long and I am certainly not going to stock up on Ch. 5, 6 and 7.

And still further to the FM business, Jeff VK2BYY writes to confirm what Bill VK2HZ has already noted above, but adds there is little or no WICEN activity in Sydney now or for some years. However, moves are under way to revive WICEN in VK2. Thanks Jeff for writing too.

The Bundaberg Amateur Radio Club advises that as from 2/4/75 channel 50 will be the Club's 2 metre calling and net frequency, so you guys travelling north through Queensland might bear this in mind. Note from Club Secretary D. W. Albrecht, via Editor "AR".

MOONBOUNCE

Not much to hand this time, but the 432 MHz equipment of the Illawarra Branch which was damaged by lightning last October has been largely repaired. It is noted the FMT4575 are now priced at $44 each, duty free, after a price drop! However, such transistors provide a NF of 1.5 dB which is pretty good for 432 MHz. A new PA stage for the transmitter is being constructed to allow for the production of 700 watts of RF output from 1000 watts input, which represents a 3 dB increase in transmit power.

The high ERP signals from WA6LET on 22/2/75 were also received by VK2AMW, the Groups EME station, from 0800Z to 0845Z up to 8 dB above the noise, but repeated calls from VK2AMW were not acknowledged.

Incidentally, the Illawarra Branch of the WIA have adopted a name for their magazine, "The Propogator". So now you will know what I am referring to in the future!

SPECIAL HF BEACON

Although HF news may be rather foreign to these columns, nevertheless, this information may still be of some use to VHF operators. The NZART Upper Hutt Branch are now operating a beacon on 28.170 MHz, and it is part of the RSGB World Wide 10 metre beacon network. Details from "Break In" March 1975: Call signs: ZL2MHF; Freq. 28.170 MHz; Modulation: F1, call sign about every 10 seconds; Antenna: Vertical half-wave omnidirectional; Location: Mount Climie, Upper Hutt, near Wellington, 890 m ASL. Power Input 90 watts, continuous operation.

Because the factors governing communications on 28 MHz are linked to a certain degree with those apertaining to 52 MHz, this 28 MHz beacon could be useful with its continuous operation. The fact that it can be heard at all in VK indicates a rise in the MUF, and good strong signals could herald a band opening around 52 MHz and above. With so many transceivers around these days, it could well be that some good could come from monitoring the frequency on which the beacon operates during those odd moments when you are in the shack doing something else but nattering on the air. And it might be a good idea to tune down to this beacon during the time of any 52 MHz openings and see how strong it may be; from this you could probably work out a pattern related to signal strength which will indicate just how high the MUF might be. Think about it!

As you have probably observed from the lack of specific information little has happened on the 6 and 2 metre scene this month — as seen from this area anyway. However, this could mean some of the usual operations are improving equipment while those habitually on the FM nets are constructing tuneable equipment — I wonder!

Thought for the month: "A man must keep a little back shop where he can be himself without reserve. In solitude alone can he know the true freedom."

The Voice in the Hills

Contests

with Jim Payne, VK3AZT
Federal Contest Manager,
Box 67, East Melbourne, Vic., 3002

ROSS HULL VHF-UHF CONTEST

Although a few days of grace were allowed for late entries some did not arrive until later and consequently could not be included in the results published in the April issue of AR.

Section (A) —

VK2BHO	2555	869

Section (B)

VK3BMD	1446	666
VK3AUJ	1255	533
VK3YJE		694

The PO Box 67 is normally cleared once each week and twice weekly when competition logs are coming in. It is not possible for me to allow more than a few days grace unless the subsequent publication of results is to be delayed for a month. Sorry fellas.

REMEMBRANCE DAY CONTEST

When you read this the popular Friendly Contest will be only four months away. So mark the calendar for August 15/16 and tee up some pencillers. Maybe we will have some variations to both the rules and the scoring table as recommendations have been made to the Federal Council and some decisions should be made at the forthcoming convention to be held in Melbourne during the weekend of April 25/26/27. Unfortunately there has been very little response to my suggestion in the Feb issue of AR to reduce the amount of detail required in logs.

However, one VK5 has a gem of an XYL who wrote "Having written out very lengthy log sheets from this call sign for 21 years, I can see no great advantage in changing the format of the RD log sheets, as suggested. Surely it could be no easier for anyone (non-technical or otherwise) than to copy page for page from the official station log". Well, not many of us may be so fortunate and I pondered the matter again last weekend while disposing of last years RD logs, a pile of foolscap almost 63 centimetres high, in the incinerator. There is so much detail on those sheets that the FCM does not require. Perhaps with a few short cuts we can get at least 1000 entries this time.

CONTEST CHAMPION TROPHY

This matter is being considered by the Executive but it is most unlikely that any announcement could be made until after the Convention.

CONTEST CALENDAR

May	10	World Telecomm Phone
	11	Worked all Britain LF phone
	10/11	USSR M-CQ DX
	17	World Telecomm CW
	17/19	Michigan QSO party (CW & Phone)
June	1	Worked all Britain LF CW
	21	All Asian DX Phone
	28/29	ARRL Field Day

WORLD TELECOMM CONTEST

Phone 0000-2400 GMT May 10
CW 0000-2400 GMT May 17

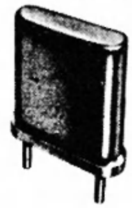
Limited to single operator stations 10 through 160 metres. Use a separate log for phone and CW. Exchange RST plus your ITU zone.

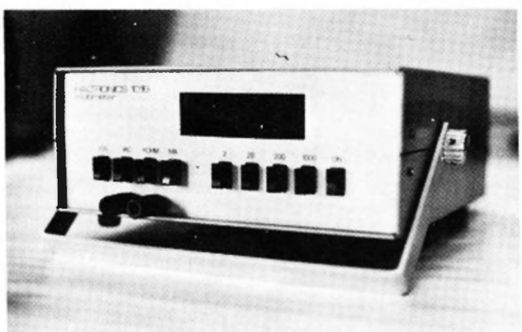
Scoring	10/15/20	40	80/160
Same country	0	0	0
Other country same zone	1	1	2
Other zones same continent	2	3	4
Other continents	3	5	6

Final score: Total QSO points multiplied by different ITU zones worked. The same station may be worked on each band for QSO points but Zone is counted once only. Mail logs before June 30th to Ministerio das Comunicacoes, DENTAL, 70,000, Brasilia, DF, Brazil.

WORKED ALL BRITAIN

These contests are 12 hour affairs from 0900 to





2100 GMT on dates listed in calendar. The LF bands are 160, 80 & 40. Exchange RS(T) and QSO number. UK stations will also give their county and WAB area number. Scoring: Each contact 5 points. The same station may be worked on different bands for QSO points but not multiplier. This is determined by number of different UK areas worked. Logs go to R. L. Senter, G4BFY, 10 Toll Bar Av, Bottesford, Nottingham, NG13, England.

16th ALL ASIAN DX CONTEST

Phone 1000 GMT June 21 to 1600 GMT June 22
CW 1000 GMT Aug 23 to 1600 GMT Aug 24

A brochure has been received setting out full details of these contests. The rules are detailed and a summary sheet is prescribed. You can also be named in the results for a defective log or a false statement in the report so please send a SASE to the FCM for complete details of this competition.

15th ALL ASIAN DX PHONE RESULTS

*VK5NO	M	581	71	41,251
VK7DK	M	589	56	32,984
VK4VU	M	237	23	5,451
VK3SM	M	93	37	3,441
*VK2XT	21	436	27	11,772
*VK3WT	14	50	6	300
VK6DG	14	24	12	288

*Section winners.

1975 JOHN MOYLE MEMORIAL NATIONAL FIELD DAY RESULTS

24 HOUR DIVISION

Section (a) Tx Phone

VK4AL	2022	
3BBB	1880	
1JR	1859	
4FD	1520	
3BCH	302	

Section (b) Tx CW

VK3TX	487	
5DL	150	

Section (c) Tx Open

VK2CAX	2183	
3AUQ	1264	

Section (d) Tx Multiple Phone

VK5AWI	4079	4 ops
8AS	3592	6 ops
5LW	2943	6 ops
3ANR	2296	5 ops
3RV	715	3 ops

Section (e) Tx Multiple Open

P29PNG	6599	6 ops
VK3ATM	6139	16 ops
3APC	5726	16 ops
3AWS	4944	11 ops
1ACA	4752	8 ops
2WG	3738	12 ops
1WI	3852	7 ops
3XK	2892	4 ops

Section (f) Tx VHF

VK3AVJ	1085
2YCK	1031
3AYE	554
2ZCT	338
4ZAF	228
2YDV	192
4ZGR	138

Section (g) Home Stations

VK5LM	545
3BCH	430
3KK	410
3YIG	270

Section (h) Receiving

L3-0042	370

6 HOUR DIVISION

Section (a) Tx Phone

VK3YQ	745
3EF	473
7BM	435
3ADW	414
7AX	110

Section (b) Tx CW

VK2YB	254
2JM	182

Section (c) Tx Open

VK4AAR	624
3HE	410

Section (d) Tx Multiple Phone

VK5SR	1063	? ops
5KR	1007	8 ops
4WIM	670	2 ops
4AAX	669	2 ops

Section (f) Tx VHF

VK2ZHT	800
2ZCX	214
4ZLT	80

Section (g) Home Stations

VK7AL	525
4LP	520
3XB	360
3RN	265
2VM	70
3ALD	45
5LP	45

Section (h) Receiving

R. J. Everett, Tas. 410

Check logs: VK7RY, 4HS

NOTE—Checking of logs not completed. Consequently scores and placings are subject to confirmation.

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

Dear Sir,

One of the highlights of my amateur year is the RD Contest.

I have enjoyed it for many years and hope to continue enjoying it for many more.

The comments, criticisms and suggestions that follow are made with a view to stimulating discussion about, and interest in, the RD Contest and are not meant to be "shots" at anybody or any organisation.

To begin with, let us look at my definition of a contest:—

A contest is designed to test operating skills, reliability of equipment and endurance of the operator.

I believe the first mentioned is most important and a good score (top ten) requires a good operator. The friendly contest concept is OK providing it doesn't detract from the operating skill aspect. I can see no need to swap names in the contest unless it can add to my score.

Please remember that speed and accuracy are vital in a contest. The same skills are vital in emergency communication.

You will always back a good contest operator when the chips are down and the message must go through in spite of bad conditions.

Participation in the RD Contest should be encouraged for the above reason, if for nothing else.

Equipment reliability is a must, and whether you buy it or build it, you will find it gets pretty hot after 20-24 hours continuous operation.

Durability of the amateur? All I know is that each year it's a little harder to last the distance and it takes a little longer to recover, nevertheless I wouldn't miss the RD Contest for such minor discomforts.

PARTICIPATION:

Always there are recriminations about poor participation. I have already written on the subject of the handicap of counting non-starters in the score.

In VK3 we have the largest number of limited licensees, but very very few participate. Some of the ideas given later may encourage more VHF participation but for starters, what about a nominated VHF period during which VHF points score double? I would suggest midnight to 2 am for a trial.

While we are encouraging VHF operators to participate, let's also encourage HF operators to use all bands. Let's have a bonus or multiplier for operation on 160 Mx, 15, 10, 6 and 2 Mx. Say ten QSOs needed on each band to earn the bonus/multiplier for that band.

No bonus for 80, 40 or 20 Mx but for the amateur with limited facilities give an award for single band operation only.

SCORES:

This is always a point of discussion. How can it be made to balance between States of such widely varying amateur population.

I would suggest the following points be considered as a basis for determining the winning State:

(a) Score entries only — not non-starters.
(b) Total scores of top ten logs.
(c) A multiplier for number of bands used.
(d) Give a score for % increase in participation over, say the last three contests.
(e) Give extra score for number of entries with 100 or more points.

Balancing all that won't be easy but I'm sure one of our fraternity has access to a computer which could handle the problem.

To summarise, here are my suggestions for the contest:

1. Bonus or multiplier for 10 or more contacts on each of 160 Mx, 15, 10, 6, 2 Mx.
2. Double points for VHF intra-state from midnight to 2 am.
3. Certificate for highest log entered as single band only.
4. Allow points for different modes with same station on same band.
5. Consider use of repeaters (I don't know if this would be good or bad).
6. Re-vamp Winning State formula.
7. What about a bonus for new modes such as SSTV?

No doubt there are more (and better) ideas floating around, so let's see what everyone thinks via the pages of this Magazine.

73's

Mike VK3WW

The Editor,

Dear Sir,

My wife, Betty, and I arrived in Australia, from England, at the end of November 1974 to visit our son and his family in Sydney.

Prior to our departure from England I had contacted many of my Australian radio amateur friends and received many invitations to visit them.

We are due to leave Australia on the 15th April '75 for home, via Singapore, and we wish to express our sincere appreciation and thanks to the many amateurs who afforded us all the friendship and hospitality that we enjoyed.

I was privileged to be invited to the recent "Old Timers" meeting in Melbourne, and met many of the "Youngsters" who started off with smoke signals!

We were invited to the homes of VK4KS, VK3AAO, VK3BM and VK3GN where we stayed and were treated like VIPs. We met so many "VK" amateurs and received the same wonderful hospitality that it seems unfair to mention any one in particular!

I was impressed by the enthusiasm and know-how of the Australian amateurs and the quality of performance of the home-brew equipment.

My wife and I agree that you have a wonderful country and such grand people — we thank you all for the wonderful time spent in Australia.

73. Yours sincerely,

Leslie and Betty Luscombe

G8NY, VK2BNY, F0NY

The Editor,

Dear Sir,

TOWNSVILLE PACIFIC FESTIVAL CONTEST 1975

The aim of the contest is to foster an interest in the Townsville Pacific Festival, and to increase interest and activity on all amateur Bands by Australian and New Zealand Amateurs.

It will be noted that a further effort is made in this contest to increase popularity of the CW Mode of communication. Hence all CW contacts count for double score.

This is the second year that the Townsville Pacific Festival contest has been run. Last year 1974 VK4IZ scored the highest points and received the trophy.

This year we wish to include the ZL and P29 to get some more interest in the contest. If either win the contest the trophy will remain in

Australia and be presented to the Highest Scorer in Australia.

I trust that all will enjoy the contest and make it as interesting as last year.

73s Good Luck, Hugh C. Barlow VK4AM
Queens'and Contest Manager

1. **Time of Contest:**
The Contest will be of 12 hours duration — 0200 GMT to 1400 GMT Saturday 15th June, 1975.

2. **Sections:**
(a) Transmitting all bands phone only
(b) Transmitting all bands CW only.
(c) Transmitting all bands. Open.
(d) Receiving all bands. Open.

3. **Contacts:**
(a) CW contacts count as double score (CW to CW).
(b) One (1) contact per band per mode only.
(c) No cross band contacts.

4. **Awards:**
(a) A certificate will be awarded to the highest scorer in each section for each call area. Per band.
(b) The entrant with the highest score will be awarded a certificate.
(c) Trophy awarded to entrant with highest overall score within Australia. Trophy to be held over until next contest.

5. **Scoring:**
Bonus — (a) For contact with VK4WIT — 15 points to be added to score on table below.
N B.—VK4WIT and other Townsville stations are the y VK4 stations that other VK4 stations can contact. Scoring for VK4WIT and other Townsville stations will be the same as for other VK4 stations. However VK4WIT and Townsville stations receive no bonus points.

Scoring for VHF & UHF:
Same as for HF except that on bands above 50 MHz — (i.e. interstate contacts are permitted) — for this purpose, a contact on frequencies above 50 MHz within an entrant's own call area will score 1 contact point. With the exception of VK4 where the Bonus rule applies for contact with VK4WIT or other Townsville stations.

Contacts on 160 metres:
Same scoring as in table with additional 5 bonus points per contact.

Contact points as per table below:

	VK1	VK2	VK3	VK4	VK5	VK6	VK7	VK8	P29 VK9	VK0	ZL
VK0	6	6	6	6	6	6	6	6	6	—	3
VK1	—	1	1	2	3	6	2	4	5	6	3
VK2	1	—	2	1	2	6	3	4	5	6	3
VK3	1	2	—	3	2	4	1	6	5	6	3
VK4	2	1	3	—	4	6	5	2	1	6	3
VK5	3	2	2	4	—	1	5	1	6	6	3
VK6	6	6	4	6	1	—	4	1	2	6	3
VK7	2	3	1	5	5	4	—	6	5	6	3
VK8	4	4	6	2	6	1	6	—	2	6	3
P29 VK9	5	5	5	1	1	2	5	2	—	6	3
ZL	3	3	3	3	3	3	3	3	3	3	—

6. **Send logs to:**
Townsville Pacific Festival Contest,
P.O. Box 964,
Townsville, Q. 4810

7. **Closing Date of Entries:**
15th July, 1975.

P.S.—Townsville Stations identify by:
(Phone)—VK4WIT Townsville
(CW)—VK4WIT/TVL.

The Editor,
Dear Sir,

I think it is correct that technical errors in articles should be pointed out. I would therefore like to point out an apparent error in the diagram on Page 11 of March Amateur Radio, 1975.

The author of the article describes how to draw an ellipse which represents the earth's orbit around the sun. The orbit shown contains a major error.

The earth's orbit is not as elliptical as that shown in the diagram. This is quite excusable since an exaggerated diagram can often be used to illustrate a point. In the diagram the major and minor axes are shown as being in line with the summer and winter solstice and the equinox. This is not correct but the difference is only 12 days and this is also a minor point.

The diagram shows the sun as being at the centre of the orbit and herein is the error. The sun is actually at one of the focal points of the ellipse. In the case of this ellipse the focal points are the points where the pins were used to do the drawing. The sun or focal point of the orbit always lies on the major axis and has its closest point along the major axis. The diagram shows the closest points lying along the minor axes.

The following are a few facts about the earth's orbit. The ratio of the distance from the centre of an orbit to the sun compared with half the major axis is known as the eccentricity of the orbit. In the case of the earth, the eccentricity is about 1 in 60 (an almost circular orbit). The earth is closest to the sun on the 2nd of January and furthest from the sun on the 6th of July. The difference between the closest distance to the furthest distance is about 3 million miles.

J. A. Adcock,
Member of the Astronomical Society of Victoria.

SWLs

Would you like an SWL column in AR?

What should this column cover?

What do you want to see in AR?

CAN ANYONE HELP OUT?

QSP

FREQUENCIES

"So long as we depend on the publicly-owned frequencies for amateur radio's very existence, we had better make sure the public knows who we are and what we do". Quote of the month in QST, Oct '74.

STATISTICS

Radio Communications for Nov. '74 advises that RSGB membership at the end of Sept. totalled 17,250 which included 1,720 overseas members and 1,020 associates in the U.K. At the end of Aug. '74 there were 25,333 amateur licences in force in the U.K.

DX QSL Notes

The following list of DX stations and QSL information has been supplied by Ken VK3AH.

3C1AGD — SM3CXS
FB8YC, FB8YD — F9MD or F6KAW
8Q6AC, 8Q6AB — c/- Tokyo Village, Marleigh Rep. of Maldive Islands
SW0WV — U.S. Embassy KAV A.P.O. New York, NY 09259
7P8AQ — P.O. Box 1266 Maseru, Lesotho
7P8AT — P.O. Box 1098 Maseru, Lesotho
ZS6BHW/3D6 — K. Muller, P.O. 283 Mbabane, Swaziland
5U7HL — Rev. T. Schultz, BP 8062, Tokoin Lome Togo
VU2ABC — WA1FEO
VP2KQ — Box 364, St. Kitts, Windward Isles
VP2AB — J. Brown, Box 229, St. Johns, Antigua W. Isles
KV4BW — Box 3680 St. Thomas, American Virgin Isles
VS6AQ — Dr. Lo, Saikung, Hongkong
OH7RF — Ukkola 81290, Finland
KG4GG — Box 12, Usnavsta, FPO N. York, NY 09593
KP4EAX/H18 — K. Gonzalez Rodriguez, Calle 27 No. 22, Ensanche Naco, Santo Domingo Dr.
KX6LN — Eox 1199 APO San Francisco, CA96555
KX6LP — Box 1604 APO San Francisco, CA96555
VK2BZM/9 Norfolk — VE3GUS (Direct only)
FL8BH — H. Bouchet, P.O. Box 10 Ali Sabieh, French Somaliland
VP2EEB — W4REI, WB4ZNH
PJ8IDX — WB4IDX
SP9PT/VE — SP9RU
ZM7AH and ZM7AJ — W5ZF
HDIQRC — WA8TDY, John Croll, 3528 Craig Drive, Lint, Michigan 48506 (S.A.S.E. & 3 IRCs)
CR7IC — AA Pedro Das, Santos, P.O. Box 135 Porto Amelia, Mozambique
WA6TJV/KS6 — M. Hitchcock, Box 1619 Pago Pago, U.S. Samoa
XE2RLP — Box 1147 Mazatlan, Sin, Mexico
3A2CP — Leslie Newport Gwilt, Le Bermuda Monaco, M.C. or WA3HUP
7Q7BC — Peter Conway, Box 5595, Limbe, Malawi Central Africa (VO2BG & 9J2BC)
CP1DN — Malcolm Chris Jensen, Usaid Bolivia APO NY 09867 Casilla 673 La Paz Bolivia
A35AF — Kazu Inoue Box 19 Vavua, Tonga
C21AZ — Bert Beszelzen, P.O. Republic of Nauru
PY2CPK — Osvaldo Reis de Magalhaes, Rua Marques ce Paranagua, 164, 01303 — Sao Paulo Brazil, Sth. America
TG9AU — F. Humborto, Cordon — Apartado Postal 248 Guatemala, C.A.
A4FQ — P.O. Box 1000 Muscat, Sultanate of Oman
VP2DH — W8HM
8R1AG — WA7TDZ

STOP PRESS — NOVICE LICENCE APPROVED

The P.M.G. announced in a press release dated 16th April 1975 that arrangements have been made for the introduction of Novice amateur radio station licences.

Senator Bishop stated that the Novice licence is being introduced to enable persons who have not passed the standard amateur examination to engage in radio as a hobby on a restricted basis and gain the knowledge and experience necessary to qualify for a normal licence. This move by the Government had the wholehearted support of the Wireless Institute of Australia.

To become eligible for such a licence, persons will be required to qualify for a Novice Amateur Operator's Certificate of Proficiency.

The Certificate will be issued to any person, regardless of age, who passes a comparatively simple examination in radio theory and regulations and a morse code test at 5 words a minute.

He said that the fee for a Novice amateur station licence had been set at half the normal rate and would be $6 a year. The fee for the examination will be $2.

Novice amateur station licensees will be permitted to operate within the bands 3.525-3.575 megahertz (MHz) 21.125-21.500 MHz and 26.960-27.230 MHz. All transmitters must be crystal controlled. Powers of up to 10 watts for double sideband and 30 watts for single sideband transmission will be authorised.

Persons wishing to obtain more information concerning the new Novice Licence should contact the Regulatory and Licensing Section of the Post-master-General's Department in the State in which they reside.

VK ZL OCEANIA DX CONTEST 1974 RESULTS

ZL — CW

Call	80	40	20	15	10	Total
1AMM	55	1355	6270	6490	1885	16055
1ARV	—	—	9840	2640	2360	14840
1VD	795	1860	3875	2800	2675	12005
1MQ	55	455	6855	2905	1545	11815
1AFW	220	1320	6370	2845	730	11485
1RK	—	—	11100	—	—	11100
1AIZ	1180	2425	1275	3275	2515	10670
1HV	155	55	5155	3220	1150	9735
1BHQ7	—	5715	—	—	—	5715
1BJH	—	—	—	—	4920	4920
1IL	—	—	—	—	3595	3595
2UW	—	885	9420	6525	1075	17905
2TG	1215	2795	7670	3145	3675	17190
2ACP	165	—	5135	4060	3100	12460
2CD	—	—	—	8020	4290	12310
2AUP	55	575	7765	2230	—	10625
2AKW	165	950	6195	2110	—	9420
2AH	—	—	—	4105	—	4105
2ABT	110	55	2445	265	510	3385
2AI						Check
3GG	365	1145	3270	2320	1990	9380
3GQ	—	8965	—	—	—	8965
BC			1505	—	—	1505
P	100	440	5945	3615	1635	11735
4BE	—	55	1610	3500	380	5545

ZL — PHONE

Call	80	40	20	15	10	Total
1BKX	820	3925	10320	6155	3465	24685
1RK	—	—	13345	—	—	13345
1AMM	165	1185	5840	4550	800	12540
1IL	—	—	—	10360	—	10360
1AGO	—	—	—	9455	—	9455
1AIZ	780	2065	1305	1940	1820	7910
1MQ*	210	165	3740	2170	520	7055
1BHQ	—	4980	—	—	—	4980
1BEB	—	—	—	—	3565	3565
1TB	—	—	1300	1000	1305	3605
1AQO*	920	—	—	—	—	1245
1BKL						Check
2TG*	155	1405	7440	3185	2000	14350
*plus 165 on 160 Mx.						
2BCX	—	—	5035	—	—	5035
2GX	—	—	100	—	—	100
3US	—	—	4570	3290	660	8520
3GG	—	1390	3365	1250	1225	7230
3ABC	165	—	1820	—	—	1985
4FX	275	275	8580	4190	220	13540
4GJ	—	1280	3665	—	—	4945

*1MQ plus 210 on 160 Mx.
*1AQO plus 290 on 160 Mx.

VK — CW

Call	80	40	20	15	10	Total
G	390	1965	9565	5315	2595	19830
2APK	290	1875	7215	5085	2715	17180
2CX	210	590	9360	3910	2670	16740
2GW	—	2845	7485	2970	1910	15210
2BAC	—	—	5100	—	—	5100
2YB	—	830	2395	1090	—	4315
2VN	—	—	1910	555	—	2465
2VM	245	265	265	275	440	1490
3JI	210	300	8210	2020	—	10740
3MR	—	—	9665	—	—	9665
3YD	—	3725	1435	2560	—	7720
3SM	110	110	4360	1025	1015	6620
3OP*	1410	3185	—	—	—	4705
*plus 110 on 160 m.						
3HE	—	—	2010	575	315	2900
3FC	—	390	730	365	—	1485
3BEE*	*160 m only			345		345
4XA	110	2075	7325	3510	1360	14380
4UR	—	1325	6060	3530	2645	13550
4RF	—					3230
4EZ	—	—	2520	—	—	2520
4SF	55	—	610	400	955	2020
4XJ	—	—	—	—	1445	1445
4KX						Check
5NO	345	1500	9400	6695	1985	19925
5OR	155	220	3430	450	420	4675
5OQ						check
6PG	—	—	6505	4730	—	11235
7HE	—	—	530	—	—	530
7RY	—	—	165	100	—	265
8HA	—	—	—	10085	—	10085
ODM	—	—	870	—	—	870

VK — PHONE

Call	80	40	20	15	10	Total
1BC	300	375	2830	1580	—	5085
1GB	55	220	3005	—	—	3280
1LF	380	—	1395	440	110	2325
2XT	400	990	9300	5355	2945	18990
2APK	55	1470	9025	5815	2515	18880
2ARA	440	540	5605	3440	1020	11045
2ABC	—	—	5485	—	—	5485
2OW	—	—	2560	1745	—	4305
2VM	—	—	265	275	215	755
3AFW*	110	105	6040	2505	2390	11380
*plus 265 points on 160 m.						
3ARY	—	580	5695	2265	—	8540
3ASN	—	—	1345	760	755	2860
3TG						Check
3WT						Check
4VU	—	715	9780	5430	3015	18940
4EZ	—	—	7070	2995	100	10165
4AAU	—	—	6065	3515	—	9580
4UA	—	55	5620	2530	1340	9545
4SF	—	—	5550	220	2755	8525
4UR	—	—	6050	—	—	6050
4LZ	—	—	—	6015	—	6015
4PJ	—	—	1690	2070	1750	5520
4QA	110	375	1905	165	580	3135
4OX	—	—	—	1985	—	1985
5NO	—	—	5390	2010	1920	9320
5ZZ/T	—	—	6860	—	—	6860
6NE	110	910	3780	1730	1500	8030
6BD	55	—	3135	2395	155	5740
6PG	—	—	3170	1920	—	5090
6TU	550	—	1615	600	—	2765
8KP	55	155	2130	2265	1635	6240
8AZ	—	—	3450	1235	—	4685
ODM	—	—	320	—	—	320

PHONE

EUROPE

DL8NU	5280	OZ6RT	4484
DL8PC	2414	OZ6MI	800
DL1KB	1742	OZ6PI	16
DK3GI	1272	OZ4PM	2
PJ0EK	644	PI1ARS	196
DJ0XT	324	SM3CXS	3655
DM2AYK	1180	SM7ACB	2865
DM2CUO	416	SM2DMU	1980
DM2EDL	8	SM5EP	1241
DM2DGO	check	SM0AJU	666
EA2IA	280	SMOMC	42
F3KW	1968	SM7ANB	6
G3SEM	1030	SP5BT	765
G3EBE	378	SQ9ABU	2
GW3NNF	666	SP5ANQ	check
HA9KOV	105	YU1BCD	2233
HB9AFI	182	UK2WAF*	737
HB9UD	70	UK2AAA*	140
I5BPD	1610	UK2PAF*	900
LA1KI	1850	UK2GKW*	3514
LA6HL	1578	UR2FQ	1530
LA1K	1320	UV3CE	2632
LA4TG	670	UA3ST	144
LA7DS	216	UK3ABB*	950
LA5QK	30	UA4AN	1442
LZ2RF	44	UK4WAK*	1710
ON4PA	384	UY5DJ	96
OH2HN	2240	UK5IAZ*	1316
OH2BCV	621	UK5ICD*	783
OH2BMG	280	UO5GR	114
OH7NW	120	UW6CA	441
OH2LU	30	UK6APA*	3406
OK1MPP	1078	UK6LEZ*	1580
OK1ATE	130	UK6AAJ*	1150
OK1MGW	100	Check logs:	
OK1DVK	84	UK2BAS	
OK2BNG	21	UK4WAB	
OK1MSP	18	UK3AAO	
OZ5KF	10000		

* denotes Multi Op. Station

ASIA

JA1PCY	11451	JA6CDC	112
JE1MLK	1104	JA6EFT	56
JA1AAT	847	JA7NK	351
JA0BMS/1	767	JA7CUK	248
JH3DPB/1	666	JA7KXD	168
JA1WVK	416	JA8FBM	1648
JH1CXE	170	JA8GO	1216
JH1XSA	161	JA8DFD	924
JA1LB	130	JA8WY	781
JH1BLX	80	JA8UBV	468
JH1LKH	4	JA8SWR	24
JA1RUJ	2	JA8FDB	14
JA1BUI	1	JA9YAY	468
JA2HGA	6576	JA9DUR	360
JH2IYR	1056	JA0CZJ	3024
JH2NWF	558	JA0QXQ	1140
JA2UJ	130	JA0FMB	897
JA2BSD	60	JA0AIE	504
JA3AAW	10064	JA0MHZ	371
JA5CEK/3	1095	JA0PTV	162
JA3ELU	1088	JA0KOH	39
JA3AEV	864	JA0KUP	8
JA3BEA	803	OD5BA	351
JH3BJN	132	9M2DQ	8294
JH3XCU	33	KA6DD	90
JA4AQR/3	21	UD6BQ	52
JR3XUC	3	UK6FAA	40
JR3CQC	check	UL7FM	280
JA4BUA	6183	UL7JAW	175
JA4DZ	168	UK7LAH*	2601
JH4FYE	145	UH8BO	52
JA4UDP	140	UI8CD	532
JH4BXG	18	UJ8JGJ	54
JA5EVQ	8	UA9CBO	2340
JA6NW	2064	UW9WZ	512
JH6DVA	1485	UK9OAZ*	1551
JH6CAW	979	UK9UAO*	852
JH6LDO	972	UK9CAM*	408
JA6EYD	760	UA0FGM	28518
JA6RCH	531	UA0MI	2546
JA6JRI	468	UW0IX	414
JA6CM	270	UACAH	4
JA6RIL	196	Check Log UL7DAF	

NORTH AMERICA

VE3GCO	1095	W2LSX/2*	1727
VE5RA	189	W4WSF	7464
YS1MAE	630	W5RTQ	3060
YS1JWD	344	K6UA	20425
W1GNC	590	K8CFU	624
W2FCR	1440	W8FJS	245
W2GXD	896	WA2WMT/0	9044

SOUTH AMERICA

HK3AYA	320	PY1DBE	336
PY2ELV	488	PY1CHP	3

OCEANIA

VR1AA	29250	KH6IJ	16830
YJ8BL	46920	KH6AHZ	3144
5W1AP*	72709	KH6IIX*	24768
P29RJ	10440		

CW

EUROPE

DL8NU	3358	OH3MG	2852
DK3GI	1068	OH2BCV	568
DJ6RX	950	OH2BNC	240
DJ0XT	708	OH2NW	240
DK6EJ	24	OH2BFX	48
DM2BJD	3120	OH6RC	check
DM2FBL	150	ON4XG	288
DM4YEL	133	ON4PA	280
DM2EDL	126	SM7ANB	3874
DM25N	8	SM3CXS	2737
DM4JA	check	SM0CCE	2760
DM3YBF	check	SM2DMU	1050
G3KMO	1207	SM0CCM	750
G6CJ	396	SM5DSF	588
G3PVA	272	SM3BCS	210
HA5KDQ	3720	SM5AYY	90
HA9KOV	144	SM5FEX	40
HA9KOB*	2016	SM0BDS	check
HA1KSA*	680	OK1MPP	975
HA5KBM*	434	OK3KFF	342
HB9IK	1564	OK1MAW	304
HB9AFI	308	OK1TA	280
LA6HL	24	OK3EE	252
LZ2RF	832	OK2SLS	156
LZ1KDP	780	OK2QX	140

* denotes Multi Op. Station

QSP

USA AMATEUR RE-STRUCTURING

From an article in Jan '75 QST "as anticipated, FCC says we should have two routes of incentive licensing. One would be the present basic HF ladder of Novice to General to Advanced (and Extra). It is termed Series 'A' or the 'short wave' domain, defined as below 29 MHz. The second would be an expanded VHF-UHF progression with a new 'Communicator Class' as the entry point to feed technician ranks, and beyond it, an 'Experimenter Class' — a sort of 'super-tech', paralleling the Advanced level. An amateur would thus have to hold two types of license authorisation to operate both below and above 29 MHz. The Extra Class would remain the top objective".

SARL

From the editorial in Radio ZS for Jan '75 it is observed that 1975 is the 50th Anniversary of the South African Radio League. ZS6IY in the editorial says "our hobby cannot be conducted in isolation and thus by its very nature it depends for its fulfilment on the co-operation of others — there is no such thing as a one-way QSO".

TELECOM 75

The Secretary-General of the ITU proposes a World Radio Amateur Convention be held within the framework of Telecom 75 scheduled for Oct. 1975 (4th and 5th) in Geneva as part of the World Telecommunication Forum. Any member likely to be able to join in please write in to the Executive Office in Toorak.

ARE YOU UNFINANCIAL?

If you are your AR will have ceased and missing issues cannot be sent free of charge when you do pay up. If you are financial your AR will still be mailed out and you should still be getting it so long as the address is correct and there are no errors which might have accidentally crept into the system. ■

OK1KYS	84	UQ2GW	1056
OK1KDR	80	UK2GKW*	2147
OK1MGW	80	UR2REZ	416
OK2BGR	75	UR2RDQ	32
OK2BBJ	70	UK3AAO	4830
OK2BGH	70	UA3ADO	182
OK2BJJ	30	UA3ABD	85
OK1IAR	18	UK3ABB*	1734
OK3KFO	18	UA4AL	234
OZ1LO	2728	UK4WAB*	2440
OZ4PM	217	UB5LAY	780
OZ5ME	154	UB5OE	320
PA0OI	243	UB5VAA	114
PA0UV	50	UK5WAA*	720
SP2AVE	392	UK5VAA*	559
SP5TT	75	UK5QBE*	168
SQ9ABU	16	UK5ICG	145
SP9DH	8	UK5QAA*	44
YU1BCD	469	UA6DL	1131
YU1NZW	90	UW6CA	8
YU2HDN	18	UK6LEZ*	4048
UK1NAA	18	UK6AAJ*	891
UC2WP	264	UK6FAA*	24
UK2WAF*	1120	Check logs from:	
UK2AAA*	441	UP2BL, UK3MAA,	
UK2CAQ*	27	UA4PWW, UK4NAB,	
UP2BAO	50	UA4CAK, UK4WAK,	
UK2BAS*	3542	UA4AA, UK5EAG,	
UK2PAF*	3404	UD6YAA, UA6APP.	
UK2BAO*	95		

ASIA

JA1OLT	1040	JA7ARW	3978
JA1AAT	176	JA7KXD	1600
JH1CXE	168	JA7EWS	168
JA1KQX	160	JA8BB	1120
JA0BMS/1	140	JA8OTE	806
JA1EM	110	JA8FBM	68
JA1LB	84	JA9YBA	4650
JH1LKH	80	JA9CIH	3325
JH1EJA	55	JA9CWJ	728
JH1BLX	40	JA9DUR	480
JA1EL	12	JA9ENB	133
JA1BUI	8	JA9LX	95
JA1BBZ	2	JA0EZP	405
JA1ZSX	2	JA0IAD	8
JA2VUP	9612	UG6JJ	4
JA2CPD	8277	UL7FM	1580
JA2HGA	7170	UL7GBM	8
JA2MYA	2346	UH8BO	162
JH2NDJ	2185	UI8ACI	765
JA2EG	1573	UK8IAA*	1802
JH2WMN	858	UJ8JAS	366
JH2PWQ	351	UJ8AB	8
JH2BFT	324	UW9PT	2431
JA2XH	256	UA9CBM	1106
JA2GXD	210	UW9WL	854
JH2RVP	152	UA9OCI	392
JA2VSS	126	UW9AT	357
JH2IRH	24	UA0BT	39
JA3YBF	12997	UA9YAR	33
JH3LXN	5568	UA9MY	4
JA5CEK/3	2784	UK9OAD*	957
JA3ARM	588	UK9LAA*	564
JA3WHX	208	UK9HAC*	444
JA4AQR/3	108	UA0FGM	16638
JH3BJN	100	UA0MI	4450
JA4XW	8806	UW0IX	3408
JA4BJO	6400	UA0CAV	1428
JA4CLL	682	UA0JAY	320
JH4BHM	300	UA0SAU	315
JA4DZ	110	UA0ACJ	312
JA4YVL	18	UK0LAB*	6993
JA5EVQ	10	UK0FAD*	603
JH6DVA	8568	UK0SAA*	414
JA6SVP	6060	UK0FAJ*	check
JA6AKW	976	Check Logs:	
JA6BDB	864	UL7TA	
JA6LCJ	336	UA9MFM	
JA7MJ	6630		

NORTH AMERICA

VE3BBH	6130	W2HF	check
VE7FE	1062	W4KXV	4428
VE7AZG	243	W4WSF	4424
HR1AT	2352	WA4APG	2037
PJ2VD	264	K4HWW	108
W1EVT	9471	W5SBX	9620
W1BPW	1071	K5LMG	8505
WA1SCX	85	W5OB	2662
W2GXD	9828	WA6EPQ	18480
W2LWI	6330	W6KYA	1368

* denotes Multi Op. Station

W6DGH	8	W9LKI	572
W7IR	18495	W0IUB	5735
W9JA	2256	W0BMM	1760
W9QWM	648	W0HW	704

SOUTH AMERICA

PT2GOK	30	HC1CW	1872
PY7APS	11	LU8ADK	259

OCEANIA

KH6IJ	23808	VR1AA	25080

SWL SECTION

EUROPE

BRS32525	5390	OK1-11861	120
A8482	1768	OK1-17323	112
DM2703/A	408	OK1-15689	48
DM5323/M	360	ONL-383	1572
DM5334/N	208	SP5-1598	1728
DM6405/N	196	SP9-7361	1485
DM2814/M	120	SP6-30003	224
HA7-008	464	UN1-088218	40
I4-20631	5880	UP2-038453	1818
I1-21171	1924	UA2-125138	168
I1-14376	806	UA3-142112	182
I5-51099	468	UA3-127-1	728
I5-50661	434	UA4-09543	6750
I0-55048	324	UA4-133773	728
I0-54651	16	UB5-06832	666
I1523/RB	2	UB5-0661	650
IS0-20907*	1932	UB5-070224	208
LA-M5605	1904	UB5-077483	66
OK1-15835	682		

ASIA

JA6-1697/1	9690	JA4-10379	6848
JA1-11614	7998	JA4-8649	70
JA1-16780	4524	JA7-6745	1632
JA0-1301/1	4351	JA8-3180	363
JA3-8101	2602	JA0-1320	15562
JA3-6863	238	JA0-1918	3002
JA3-8048	224	JA0 2230	225
JA4-10330	9860	UF6-012-74	56

* denotes Multi Op. Station

PLEASE REMEMBER

1975 VK/ZL/OCEANIA DX CONTEST
First two weekends in October 1975. Organised by WIA. Logs to WIA, Box N1002, GPO Perth, WA 6018 or N. Penfold VK6NE (Contest Manager), 388 Huntriss Road, Woodlands, West Australia 6018.

1976 VK/ZL/OCEANIA CONTEST is part of NZART Golden Jubilee with Special Awards — held during first two weekends in October 1976. Logs for 1976 "VK/ZL" to NZART, Box 489, Wellington, New Zealand or Contest Manager, Jock White ZL2GX, 152 Lytton Road, Gisborne, New Zealand. ■

20 Years Ago

with Ron Fisher VK3OM

MAY 1955
May 1955 was a time for looking ahead. The new Federal President, Bill Mitchell, wrote about the forthcoming aims of the Federal Executive, their problems and hopes. Among the most important were a national plan for emergency network operation and the importance of having a representative at the next International Convention. A drive to increase membership was also high on the list.
May was a lean month for technical articles, the only one being a reprint from QST. A Discussion of Receiver Performance. Some fine points and unsolved problems of receiver design. AVC, weak and strong signal reception, and cross modulation were discussed using the Collins 75A3 receiver as an example of current thinking. Much of the article was based on the problems of SSB reception.

Everyone was interested in a Convention. At least this was the impression one gets from reading an old copy of Amateur Radio. A full page was devoted to who was there, who won what, and what was served for supper at the Eleventh Annual Urunga Convention.

The DX activities page looked at a problem, somewhat new at that time, but still with us. Commercials in the 7 MHz band. The suggested remedy — more activity boosted by contests, scrambles, certificates etc.

A large part of the magazine in those days was taken up with Divisional Notes. Actually four and a half pages of fine print for May. We all scanned the columns to see if we rated a mention. ■

Commercial Kinks

with Ron Fisher VK3OM

3 Fairview Ave., Glen Waverley, 3150

ALIGNMENT PROBLEMS WITH YAESU TRANSCEIVERS

A letter from Tom House VK2BHT on an alignment problem with his FT101B brought to mind a trouble that might be familiar to many FT200 owners. However, I will let Tom tell his story.

"There appears to be a rather serious design problem in the FT101B which owners should be warned about.

The initial symptom in my own unit was intolerably inaccurate preselector control tracking on 80 metres to the drive and receive stages. After two replacements of the same component, much mind-bashing, circuit checking and discussions with other amateurs, it was concluded that the driver plate inductance T-105, which is switched into circuit on 40 and 80 metres, cannot stand more than a few seconds of full carrier.

T-105's coil former is composed of plastic and under a condition of maximum steadydriver output, quickly softens and becomes distorted, finally jamming the tuning slug and making realignment impossible.

T-103, the 10-15-20 metre coil, does not seem to be affected in the same way. It is suggested that on 40 and 80 metres, when aligning or tuning up the unit, or adjusting an ATU, the carrier control should be used to hold the carrier level at all times to less than 200 mA. This will prevent overheating of T-105. It is also quite possible that the earlier 101s have the same defect".

Tom was aided in his efforts by VK2BF and VK2AFG.

I have had similar trouble with the plastic coil formers in the FT200 although I am sure for a different reason. After a period of time the slugs in the receiver antenna input and transmitter driver sections freeze up. If too much force is applied, the former will break off before the slug will move. Perhaps some of our readers have had the same trouble and found a solution to it. Up to date the only cure I have come up with is to replace the coil. Let me have your ideas.

Commercial Interest
It would be interesting to know just how much amateur gear is sold on the second hand market in Australia. What proportion of it is advertised in the Ham-ads of this magazine? Answers to these questions are just not available. However we can be sure that a very large quantity of equipment has been sold and that even more will be coming onto the market in the future. Just how do amateurs determine a price for a given piece of second hand gear?

I hope to publish some findings in a couple of months. ■

Hamads

- Eight lines free to all W.I.A. members. $6 per 3 cms. for other amateurs and S.W.L.'s.
- Copy should be in block letters or typescript, signed and forwarded to The Editor, P.O. Box 150, Toorak, Vic., 3142.
- Excludes commercial advertising.
- Closing date for Hamads is the 3rd day of the month preceding publication.
- QTHR means the advertiser's name and address are correct in the current Australian Callbook.

FOR SALE

Transceivers 3.5 to 30 MHz bands. Only used few hours. Complete with AC PS & Manuals in English. ICOM IC700, solid state except transmit mixer & finals, $200 & $250. Also TRIO TS500 including extra VFO. $300 ONO. Syd Clark VK3ASC, QTHR or Telephone (03) 45-3002.

Hallicrafters SX 117 Receiver — HT 37 Transmitter. 80-10 Mx, VOX, SSB — CW — AM. Really good condition. $300 ONO. VK4FT, M. Miller, 95 Finucane Rd., Capalaba, Brisbane, Qld. 4157.

Yaesu FT101B. Little used, unmarked, as brand new with matching Yaesu external speaker and accessories. $475. J. D. Moyle, VK4ZT, Yarwon, 4694, Qld.

Amateur Gear including serviceable BC348, home built bandswitched linear 6146s, power supplies, SSB exciter, $100 the lot to clear. VK3AE, QTHR. Ph. (03) 60-0471 ext. 283 bus.; (03) 211-7965 A.H.

Digital Frequency Counter with pre-scaler to 200 MHz, 6 digit LED display, excellent cond. $120. VK3UV. Ph.: (03) 90-6424 (evenings only).

KEN KP202 Hand held 2 Mx FM Transceiver, modified to include earphone socket. Includes Ch 40, 50 & R1, R4, also helical antenna, 10 nicads & charger — only 4 months old, as new condition. The lot for $180.00. B. Bathols VK3UV, 3 Connewarra Ave., Aspendale 3195. Ph. (03) 90-6424 (evenings only).

50 foot Telescopic Tower, attached to 15 sq. 4 bedr. B/V home. Ideally situated on hill, excellent take off in all directions with nice outlook. Large brick garage and shack, easy to maintain QTH for XYL with considerate neighbours. Contact VK3ANI (soon to be VK6) in Upper Ferntree Gully on (03) 758-5791 for this bargain at $34,900.

TCA 1677 single channel, very clean condition, circuit and mobile mount, $65 ONO. VK3BAX, QTHR. Ph. (052) 97 401 evenings.

Yaesu FTDX 560, $300; Tower 30 ft., $75; Mosley Beam TA33 Jr. $75; TCA 1675 FM 2m $75; Realistic DX 150B, $125. G. Snell, 305 High St., Chatswood 2067.

MR6A, 6 channel, crystals for 8 and 1 CW whip and mobile mount, very clean, $65. Bendix BC433 LF RCV with 240 V supply, good cond., $20. 522 Tx and RCV, good cond., $25. AR88 Tuning Unit only $10. Peter Cosway VK3ZXO, 10 Aitken St., Clifton Hill, 3068. Ph. (03) 489-1385.

Swan 350C with crystal mike and SWR meter and 240 V PSU, $300. Account Late VK2BSR, contact Mrs. Ringrose, QTHR or Ph. Forster 306.

Drake R4C Rx with noise blanker plus xtals for 160, 31 and 19 metres, twelve hours use only, $625. VK3AIF, 8 Abassia St. N. Balwyn, 3104. Ph. (03) 857-5401.

FT DX570 with FV401 external VFO, $450. VK3AIF, 8 Abassia St., N. Balwyn, 3104. Ph. (03) 875 5401.

Yaesu FT/FP 200, cond. as new, at S.H. price, unmodified, with manual, $375 ONO. VK3EM, QTHR. Ph. (03) 58-7745.

Byer R-33 disc recorder, 33, 45, 78, RPM, with sapphire cutters (3) and level meter, with portable case, cast alum. turntable, $25. Tape Recorder, HB 7½" sec. with 12 reels of misc. tapes, xtal mic. and bulk eraser, spare reels, in port. case and working order, $15. VKEM, QTHR. Ph. (03) 58-7745.

Carphone AWA MR10c High band, dual channel, DC PS (less vibs), cables and handset cradle, mod. to 2 Mx, no xtals, with speaker, EC, $20. TV Healing, 17" table model, working order with all channels, useful for shack checks, in cabinet, $20. Filter xtals in kHz, 444, 446, (2) 447, 448, 450, 452, 454 and 458. For BC 348, 912 and 917, the lot, $5. VK3EM, QTHR. Ph. (03) 58-7745.

AWA MR10c (6146 Final) low band, FM, carphone original, as new condition, transistor (2) power supply, control unit and cables, $42. Pye Reporter on 6m with xtal, Rx tuneable, $20. VK2PT, QTHR. Ph. (049) 43-1308.

FTDX100 Transceiver, 80-10 Mx, 230V DC, good condition, $275 ONO. 4 Channel 2 Watt FM 146 MHz exciter, $20, less xtals. VK3AFQ, QTHR. Ph. (03) 96-2414 A.H.

WANTED

455 kHz Mechanical Filter with a band pass of either 1000 or 1500 Hz. VK3ACA, QTHR.

Command Transmitter for wrecking. Exterior condition or frequency immaterial. VK3AFQ, QTHR. Ph. (03) 96-2414 A.H.

Are there any amateurs interested in exchanging tapes of old time radio, Television programmes? Either Australian, British or American? Also, are there any collectors of cinema material? T. King VK2ATJ, PO Box 45, Kensington, NSW, 2033.

Any back issues of:— Electronics Australia, Electronics Today, Amateur Radio or any other magazines for a school library. Contact: G. Scott, VK3ZR ex VK3ZIP, QTHR. Ph. (03) 89-4645.

Silent Keys

Mr. C. C. QUINN	VK2AWQ
Mr. R. G. GARRETT	VK2BRG

VK3ZO

On 14 March 1975, Noel Storck VK3ZO passed away rather suddenly in Honolulu, Hawaii when on his way back to Australia after a holiday in USA, with his wife.

The writer took over the running of the VK3 Inwards QSL Bureau from Noel in early 1961 — we had the easiest of handover-takeovers one could wish for due to Noel's being up-to-date with the Bureau affairs! VK3ZO, a PMG Telephone Technician of long standing, had not enjoyed good health for the past two years and had had a bout of hospitalisation, but recovered sufficiently to enable him to commence (and almost finish) his one big wish of visiting Uncle Sam's country. He operated CW mainly, almost daily, from way back. His body was cremated and brought back to Australia.

Eric Trebilcock
L30042

QSP

FM Bc BAND

It is interesting to note from circular letter B112 (T118) of 21st March from the Sec. of the ABCB that interested purchasers of FM receivers should be advised that only those covering the whole frequency range 88 to 108 MHz will provide adequate reception of the developing Australian FM service. He advises that action is being taken now to transfer the Newcastle national TV station from Ch 5 (101-108 MHz) to Ch 5A to free the band 101-108 MHz for FM transmissions in Sydney and Newcastle.

SILENT KEY

WARWICK PARSONS VK5PS

The sudden death of Warwick a few days before Christmas left all of us stunned at its unexpectedness. Talking with him a month before, he was full of plans for making the bands on SSB with a new FT200, quite an event for such a CW man.

But the "Reaper" is no respector of our personal plans for the future and we, his friends, are the poorer for Warwick's passing.

Warwick was associated with the Council of the VK5 division from immediately after the war until his death, having held the offices of Vice-President, President, Immediate Past-President and Public Officer. During that time we remember how highly regarded were his Divisional notes to AR, and the weekly contribution to the "Advertiser" under his callsign 5PS which did much to keep a good image of amateur radio before the public.

Whenever there was something to be done for the Institute, Warwick would be there assisting in his usual quiet way. So we find him captaining the CW team at the Annual Picnic CW/Phone cricket match, a delightful experience for all, for his sense of fun and the ridiculous was so characteristic of Warwick that we will always remember him thus. As late as November last we were "entertained" at one of his legendary "auctions" when most of us were privileged to see him in action for the last time.

Warwick was no "Yes" man. He held very strong principles and put them into practice, speaking his mind forcefully, but with due regard to the feeling of others. Thus he was an excellent chairman at Institute meetings, never forgetting that Amateur Radio is a hobby.

He had three great loves: love for his family, love for Amateur Radio, love for the Institute.

His greatest love was for his family and it is to them that our hearts go out in sympathy and compassion.

May they take comfort in the knowledge that Warwick was respected and loved by many including those who attended his funeral at Centennial Park, and by all who counted it a privilege to know him.

Warwick Parsons VK5PS was one of Amateur Radio's "GREATS".

VK5XU

HAM HEADQUARTERS!

IC21A - $298   DV-21 - $298
BOTH FOR $570

DV-21 DIGITAL VFO employs a PLL synthesised system with 59 ICs, 34 transistors, I FET and 37 diodes. It can be INTERFACED with the IC22 or any 2m transceiver with 44-45 MHz rx 18 MHz tx, 10.7MHz i.f., lwr side hetrodyne, 8 x basic freq. for tx and 3 or 9 x basic freq. for rx. Only a slight modification is required for such equipment and is detailed in the operating manual. It operates in 5 or 10 KHz steps from 146 to 148 MHz and can scan either empty frequencies, or the frequencies being used, whichever you select. Complete separate selection of the transmit and receive frequencies is as simple as touching the keys. When you transmit, bright easy to read LEDs display your frequency. Release the mic switch and the receive frequency is displayed. These are two programmable memories for your favorite frequencies. You won't believe the features and versatility of the DV-21 until you've tried it. Price $298 includes VICOM 90-day warranty.
THE IC21A is the 10w base station or mobile (146-148 MHz) with variable power control, adjustable deviation, 24 channels, built-in discriminator meter, S meter, SWR meter, PA protection, modular circuitry, runs from 13v DC or 240v AC. Complete with three channels. Price $298

SEIWA SV-230 2M FM, mobile incl 3 channels. 25 watts! $210

6 METRES SSB

YAESU TS-620B transceiver (new release) $435
TRIO TRANSVERTER TV-506 $212
ICOM IC-501 TRANSCEIVER $445

2 METRES SSB

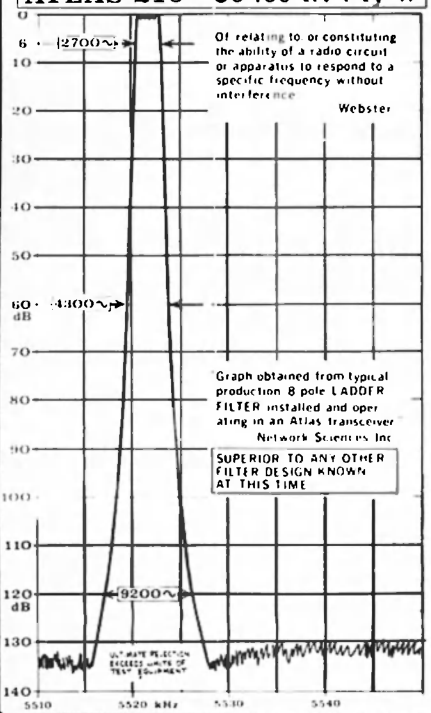
YAESU FT-220 SSB/CW/FM solid state transceiver $480
TRIO TRANSVERTER TV-502 $243

AUSTRALIA'S BEST SELLING 2M-FM rig – the IC-22A

IC22A 2M FM TRANSCEIVER replaces the IC22 and is identical electronically, but features a redesigned front panel with easier-to-read channel selection. It features switchable power 1 or 10 watts, 22 channels, solid state T/R relay, built-in PA protection, filtered d.c. voltages. The unit comes complete with mounting brackets, microphone, cables, etc, and three channels – 1/4/50. Price is $210 incl. tax and VICOM 90-day warranty.

INSPECT ALL THE QUALITY ICOM PRODUCTS AT OUR SHOW ROOMS.

ATLAS-210: Se-lec-tiv-i-ty !!



HF TRANSCEIVERS

Atlas-210/215
SSB Transceiver $570
Atlas 210M/215M
(Mars Model) $585
AR-230 Power Supply ..$150
AR-200 Portable AC
Power Supply $96
Mobile Mounting Bracket
Deluxe Plug-in Model .. $47
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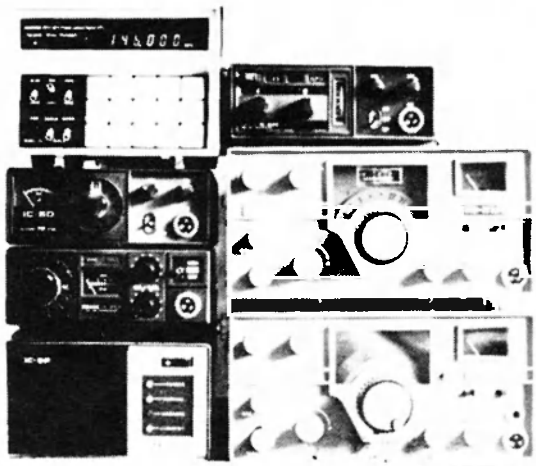
Mobile Bracket Kit $6



OTHER HF GEAR . .

YAESU FT101B 160/10mx AC-DC transceiver. Avl EX-STOCK at $585.
– YAESU FV-101B VFO for FT101B – $102.
YAESU FT75B 80w pep transceiver – $245.
– AC power supply $65, DC power supply – $75.
TRIO TS-520 all band transceiver – $550.
– external VFO $80
YAESU FT-201 $505
YAESU FT-2100B Linear $388

TEST GEAR

TRIO CS1557 CRO DC-10MHz $340
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TRIO SG402 RF GENERATOR covers 100KHz to 30MHz $76
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Persons not in possession of the appropriate certificate of proficiency will not be sold amateur equipment.

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QLD:	db Electronics, 21 Christine Ave., Miami, 4220	Ph (075) 351798
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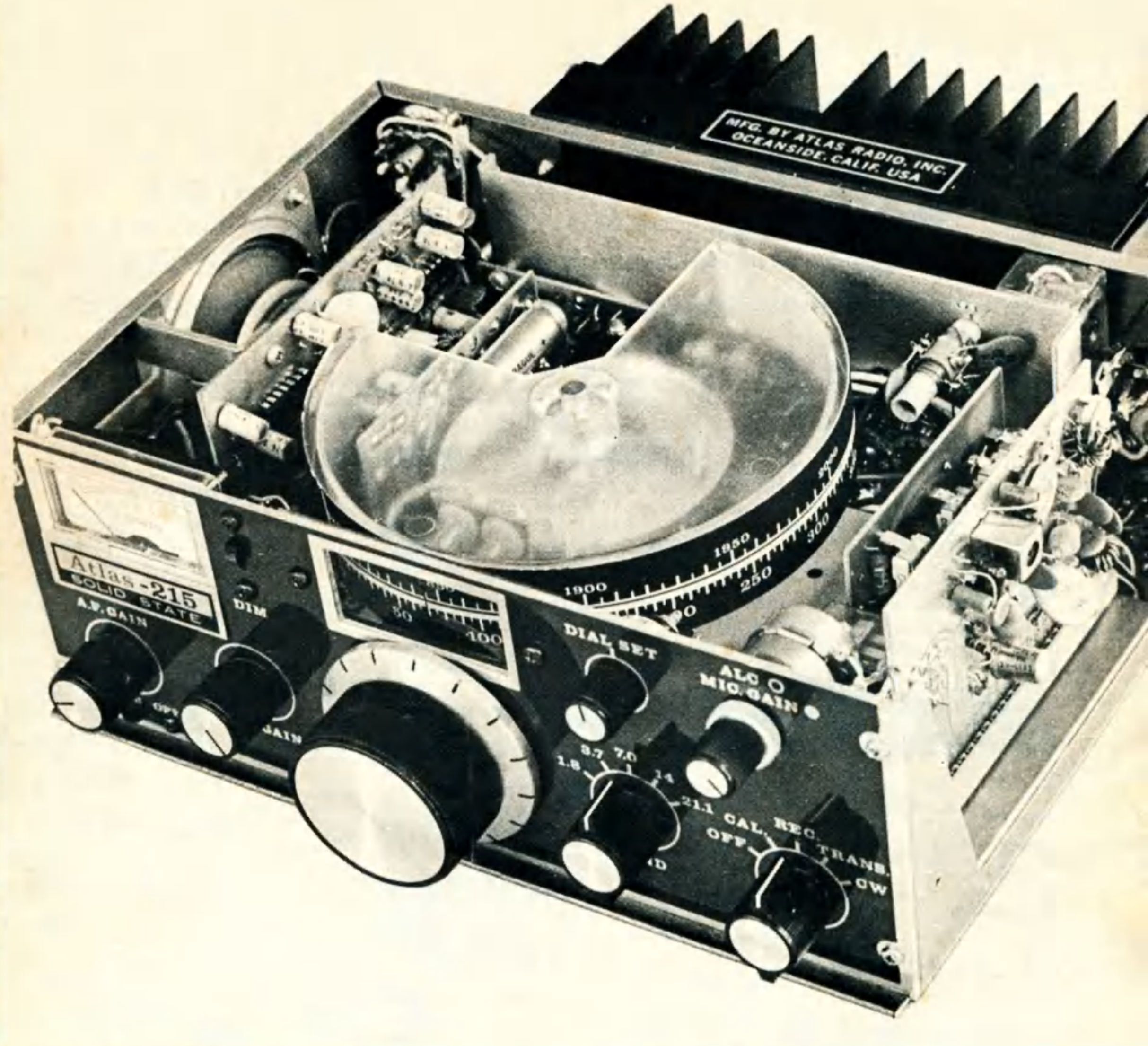
amateur radio



VOL. 43, No. 6 JUNE 1975

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COVER PHOTO

This interesting photo shows much of the works of the exciting new Atlas transceiver. An AR review appears on page 19.
Photo: Barrie Bunning

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA, FOUNDED 1910

JUNE 1975
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QSP

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Copy is required by the **third of each month.** Acknowledgment may not be made unless specially requested. All important items should be sent by certified mail. The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying any reason.

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Advertising material should be sent direct to **P.O. Box 150, Toorak, Vic., 3142,** by **the 25th of the second month preceding publication. Phone: 24-8652.**

Hamads should be sent direct to **P.O. Box 150, Toorak, Vic., 3142,** by the **3rd of the month preceding publication.**

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33 Roberna Street,
Moorabbin, 3189. Tel. 95 6462.

Greetings to the rest of Australia from the VK6 division. VK6?? Where is that?

We are the other third of this great continent to the West of you where most of the mineral wealth of our great country is mined. This is the home of the black swan and the mythical sand groper. There is a small but thriving amateur body, some 300 of which belong to the West Australian Division of the WIA.

Aside from the regular activities, which include ATV, repeater operation and RTTY, there is the embryo of what promises to be the finest radio museum in Australia. The WA VHF group, a sister organisation, has been steadily collecting and restoring both small and large items and slices of Australia's and West Australia's pioneer radio history. The Melville City Council has been busy restoring the old transmitting hall and developing park lands around Wireless Hill, both historic landmarks in their own right, as the heart of the project.

Amateur activity spreads from the North to the South. Our Northern frontiers are represented by Keith, VK6KC, at Kuri Bay and Father Basil, VK6NA, at Kalumburu Mission. Extending further afield we have the boys on Christmas and Cocos Islands. To the South we have the virile and active Southern Electronics Group. This body runs a hamfest, which has become an annual tradition, to which members from all over the state travel to enjoy some of our finest scenery and comradeship.

Despite rumours we are a friendly folk and welcome visitors from the underprivileged Eastern areas. So . . . if you survive the trip over that fast diminishing unsealed stretch of road approaching the WA border, what about dropping in on one of our meetings on the 3rd Tuesday of every month.

A. M. AUSTIN VK6MA
Divisional President

DARWIN RELIEF FUND

	$
Amount already acknowledged	92.00
WIA Queensland Division	45.00
R.C. Dowe, VK2RP	5.00
A. V. Giles, VK2ZGA	10.00
WIA Tasmanian Division, N. Zone	9.20
WIA Blue Mountains Sections	25.00
W. N. Hart, VK5KQ	10.00
J. Van Staveren, VK7JV	5.00
R. V. Ramm, VK4RO	6.50
	$207.70

Thank you. It is known that some other monies have been collected for the Darwin Relief Fund. Could these please be remitted to the Executive Office as soon as possible please, together with any further donations so that the Executive can give thought to the manner of distribution and for whom aid is most required. If anyone has any specialised knowledge about names of amateurs for whom some relief is desirable would he please write in at once with details.

FINAL SMOOTHED SUNSPOT NUMBERS

In a circular received from the I.P.S., the final smoothed sunspot numbers for July 1973 are quoted as follows—

1973		1974	
July	37.4	January	32.7
August	36.1	February	34.4
September	34.4	March	34.0
October	32.6	April	33.8
November	31.8	May	34.6
December	31.5	June	34.5

A FEW IONOSPHERIC PREDICTIONS FOR JUNE (all times are GMT)

VK2 to G seems possible on 20 metres short path about 23.00h and long path 22 to 00.00h with VK3 to G-land 19-22h short path and the same as VK2 for long path. Perth to G seems more problematical a short path but 07-08h and around 00.00h for long path. However Perth to G-land looks better on 7 MHz short path from 18-23h whereas for VK2 on the same band short path looks likely about 19-21.00h.

VK2 to W1 on 14 MHz looks possible around 03.00 and on 7 MHz from 06-11.00h. VK6 to W1 looks rather dismal — maybe an hour or so about 9-11.00h on 7 MHz but little if anything on 14 MHz.

On all bands from 21 MHz upwards the charts show large blank spaces except to VK0 and local hauls. Darwin shows up as offering something on 21 MHz as also does the N-S path from most areas (e.g. VK7 to J). None of the charts shows anything much for 28 MHz.

RADIO SCOUTING

New terms in the language come and go but perhaps Radio Scouting is one which may stay. It could take over from that abbreviation JOTA which is a reminder of the notepad upon which to jot down a few mnemonics. It would be a great pity however if the word Jamboree fell by the wayside. "Last year" we read in the 17th Report "we mentioned the amazing growth of 'Radio Scouting' — the extension of JOTA into the normal scout programme throughout the year . . . we can safely forecast that this section (giving examples of Radio Scouting as opposed to a one hit report on JOTA) will grow steadily year by year."

QSP

IN THIS ISSUE

This issue of AR contains 36 pages, but even so I was not able to include everything I wanted.

June issue was to be exclusively VK6. However, the tremendous pressure for space in the pages of AR precluded this. (At present there are sufficient articles to fill the next 8 issues!)

AR is more than a technical magazine — it is also a news magazine.
In addition to the VK6 articles, an equipment review, and a topical article on a repeater identifier, you will find some important news and information.

As well as the many regular news columns, make sure you read the Executive Annual Report, balance sheet and statistics, the Federal Convention report, Project Australia, and the many QSP paragraphs.

This is Australian amateur radio, happening now.

It concerns you — Are you concerned?

BILL ROPER VK3ARZ

NEW PREFIX
REF advises all IARU sister societies that during May 1975 French Radio Amateurs will use the prefix TK to celebrate the golden jubilee of the foundation of R.E.F. Thus F6XYZ will be able to use TK6XYZ. The REF also advises that its QSL bureau is located at 2 Square Trudaine 75009 Paris, France.

IT CAN'T BE TRUE!
QST for Mar '75 gives the latest Honour Roll for DXCC being the top ten numerical totals. Over 630 stations are listed ranging from 321/354 down to 312/315. The first figure is the participants' total countries less any credits given for deleted countries whilst the second numeral represents the total credits including deleted countries. Only 2 VK stations appear in the list compared with 6 ZLs. The two VKs are VK4QM at 320/351 and VK5MS at 314/342. This seems a numerically poor performance for Australasia.

IMPORT LICENSING
Many amateurs will be aware of all the various problems which arise when a country feels compelled to impose import licensing to conserve overseas funds or for other essential reasons. "Break-In" for March '75 gives some guidelines to amateurs in New Zealand for the purchase of equipment requiring an import licence. Apparently the idea is not to stop the importation of amateur equipment but to reduce it. If nothing else import licensing can help the home brewers.

CALL SIGN INFORMATION
Is your call sign correct in the Institute's membership records? Have you acquired your licence in the past year or two and not advised your Division or the Executive Office of the new call sign? It is known that many call signs have been acquired or changed but nothing has been notified by the member. Please remember that the WIA Call Book call sign details derive from Radio Branch records but WIA membership details derive from the members themselves.

SUNSPOT NUMBERS
The Swiss Fed. Observatory, Zurich, quotes a smoothed mean for September 1974 of 32.1. The provisional mean sunspot number for March 1975 is 12.0 and predictions of the smoothed monthly sunsopt numbers for the next few months are 19 for April 1975 dropping by one each month to 14 for September 1975. The smoothed mean for August 1974 was 33.1 and the revised figure for July 1974 was 34.0.

PREFIXES FOR AMSTERDAM
During 1975 Amsterdam will be celebrating the 700th jubilee and a special station manned by amateurs of VRZA in Amsterdam will be on air from time to time with the call PA700ASD (Papa Alpha seven hundred Alpha Sierra Delta). QSL cards for this will go via P.O. Box 400 Rotterdam, the Dutch QSL Bureau. Also all amateurs living in Amsterdam may change their prefix to PA7 during 1975. An Award is also on offer for the above. Details supplied by VRZA

AT THE 1975 WIA ANNUAL CONFERENCE (Report on page 28)

L to R: Laurie VK4ZGL, Norm VK4NP, Colin VK5HI, Ian VK5QX, and Neil VK6NE.

L to R: Peter VK3ZPA, Eddie VK1VP, VK1YS, Ian VK2ZIU, Andrew VK3FJ, Russell VK3NT and Michael VK3BDL.

L to R: Ian VK5QX, Neil VK6NT, Peter VK7PF, Peter Dodd VK3CIF (Federal Manager), Keith VK3YO, David Wardlaw VK3ADW (Federal President), Ken VK3ACS, Peter VK3ZPA, and Eddie VK1VP.

The ST-5 RTTY Demodulator

VK6 DIVISION

This demodulator unit comprises two type 709c linear integrated 'op amps', one used as a limiter and the second as a trigger stage, which in turn switches a Motorola MJE-340 transistor used as a keyer for the tele-printer. This transistor switches the printer from mark to space.

It has a balanced linear discriminator for 850 Hz and 170 Hz shift, switchable from the front panel giving the operator a choice of 2125/2975 tones or 1275/2125 tones for mark/space, and a tuning meter is provided along with take off points for an oscilloscope if preferred.

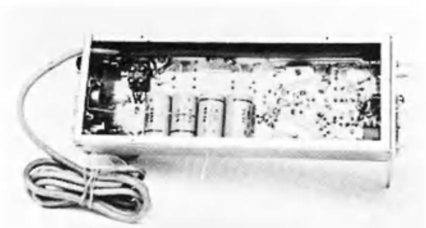
Also included on the front panel is a Normal/Reverse switch, a Standby/Run switch, Mains On/Off, Indicator Lamp and CW Jack. The unit is complete with all Power Supplies for the Demodulator, and for driving the Tele-printer Magnet Itself. These are mounted to the rear of the unit and can be seen in the photo of the top of chassis, i.e. Transformer, Magnet supply Smoothing Capacitor and dropping resistors, while in the photo of the underside of chassis shows the smoothing capacitors of the demodulator supply.

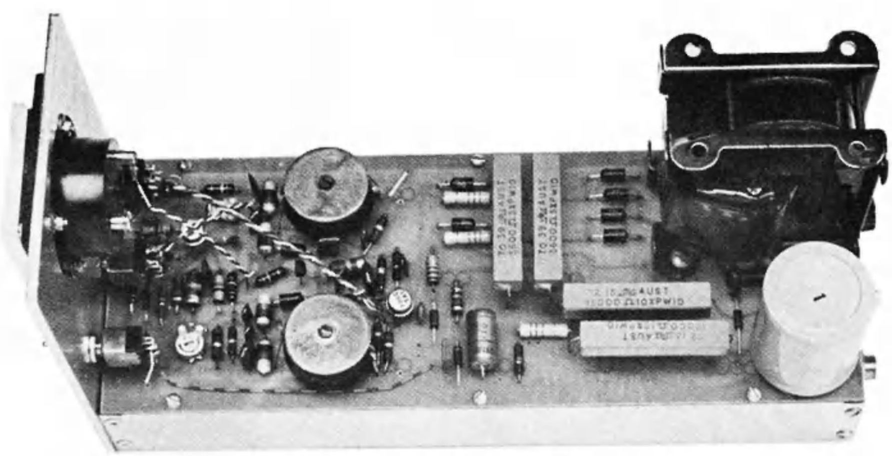
On the rear of the chassis there are the audio input, FSK, and Printer Jack Sockets along with fuse and CW Shift Control. The complete unit is housed in a dark grey metal case, and is 5 in. high x 4 in. wide x 10½ in. deep, these dimensions being less the feet.

It is proposed at a later date to make add-on units to produce auto-start and anti-space, along with an oscilloscope unit to be added in the same case.

The complete kit for the unit is available from the VK6 Division of the WIA, PO Box N1002, Perth 6001, as follows:

(a) ST5 Kit complete — $70.00 post paid. The kit comprising metal case, chassis panel, meter bezel and panel decal, printed circuit board, mains transformer, all diodes, transistors, and ICs, meter, set of resistors, capacitors, plugs, jacks, etc., with Instructions and board layout.
(b) Printed circuit board and layout — $4.50 post paid.
(c) Mains transformer to suit board — $10.70 post paid.
(d) Case chassis and all metal work — $9.50 post paid.
(e) Set of diodes, transistors and ICs — $10.00 post paid.
(f) Set of toroids — $2.00 post paid. ■





FT-101 Technical Notes

A. M. Keightley VK6XY
212 Serpentine Road, Albany, 6330

Quite a number of earlier FT101 owners have been rather perturbed to have reports of being off frequency on some bands, when the clarifier is off or centred correctly and the preset controls have been set up correctly.

Investigation showed the culprit to be the crystal conversion oscillator on the RF Board. This oscillator is coupled to both Rx first mixer and Tx second mixer, and it appears that they reflect a different load on the oscillator, causing the pulling. This can easily be checked by listening to the

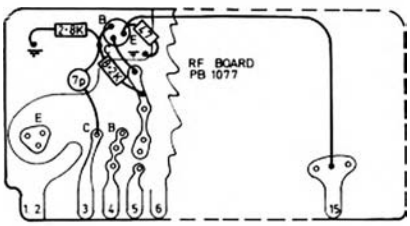


FIGURE - 1

crystal frequency on another receiver with BFO on, while pressing the PTT switch and listen to the frequency shift.

All is not lost, the condition can be corrected fairly easily by installing an emitter follower transistor as a buffer for the oscillator. This is most easily achieved by removing the RF Board and fitting the extra components as indicated in Fig. 1 showing portion of the circuit side of PB 1077. Fig. 2 shows the circuit of the addition.

At present the output from the oscillator taken from a link on T111 by a small coax grey lead to pin 15 of the RF Board socket.

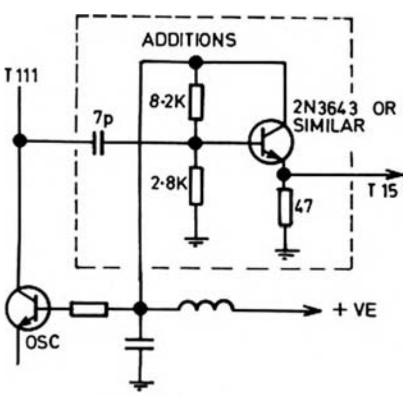


FIGURE - 2

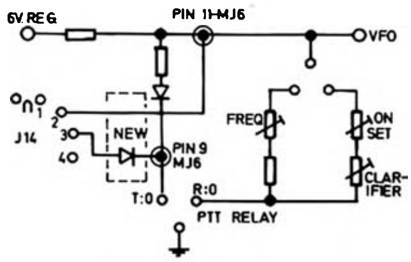


FIGURE - 3

Remove this lead from the coil and socket as injection will now be supplied by the wire shown going from the emitter of the added transistor to terminal connector 15 on the PCB.

Check over the additions carefully, then after replacing the PCB into its socket, set the setting of the clarifier presets by having a signal source such as GDO or signal generator tuned to say 7.1 MHz and another Rx with BFO off, tuned to the same frequency. With the clarifier turned off, set the trimpot "Freq." on the regulator board so that with the FT101 in SSB position (USB or LSB) it receives the external signal zero beat and with Tx on it is zero beat with the signal source in the other receiver. Check this on other bands to show the improvement and now settle down to enjoy being "on frequency".

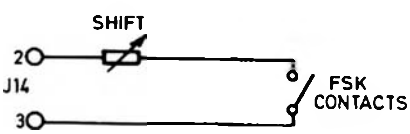


FIGURE - 4

MODIFICATIONS FOR FSK FOR FT101:
It is only a small job to include FSK capability in the FT101. The external VFO socket J13 has pins 2 and 3 vacant and can be used for the external circuit so no holes have to be drilled. Use is made of the clarifier circuitry as shown in Fig. 3.

Couple pin 2 of the external VFO socket J14 to pin 11 of MJ6 and fit a small silicon diode such as OA200 with cathode to pin 9 of MJ6 and anode to pin 3 of J14. As in Fig. 4 a ten thousand ohm variable resistor in series with the FSK contacts will provide adjustable frequency shift. Arrange FSK contacts to be open for MARK condition.

For RTTY operation place the FT101 in tune position and tune up for 100Ma IC meter reading, then using a separate receiver to monitor the frequency of operation, operate the FSK contacts and set the 10K variable resistor to give the required shift, i.e. 170 Hz. The clarifier will require offsetting to '—' side to transceive with another RTTY station, but will operate normally on SSB operation.

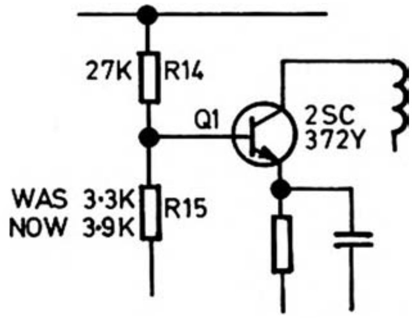


FIGURE - 5

AUDIO DISTORTION:
Distortion on strong signals, has been a problem, when signals over S9 have been accompanied by severe audio distortion.

An exercise with a multi-meter showed that Q1 on the IF PCB was being biased close to cut off causing severe clipping of the signal. Replacing the lower base bias resistor R15 of 3.3K with one of 3.9K cured the trouble (see Fig. 5).

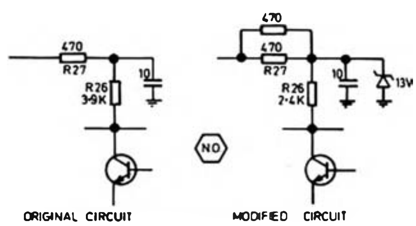


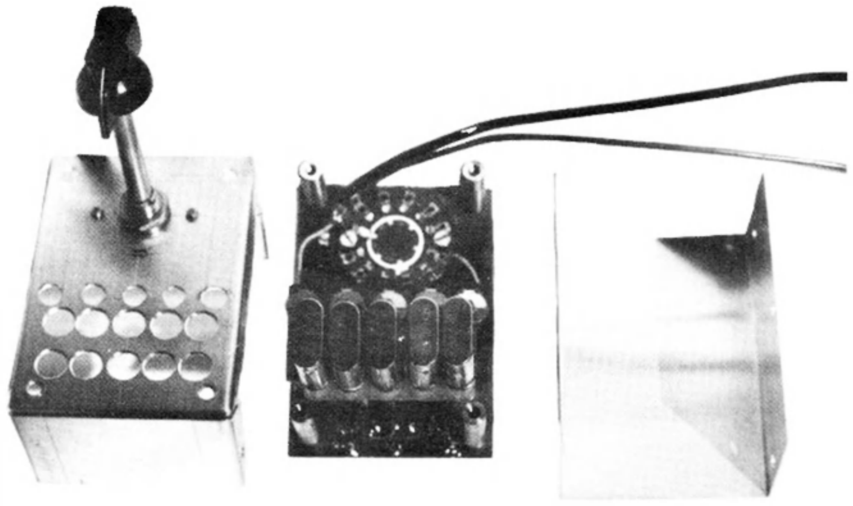
FIGURE - 6

AGC:
A further improvement was to stabilise the supply rail for the AGC circuit. This stabilises gain of the receiver with changing supply voltage, particularly while mobileering. The particular components are on the IF board PB 1080. R27 has a 470 ohm resistor paralleled with it, R26 is changed to 2.4K and a 13 volt, 400 m/w zener diode is fitted from the junction of R26 and R27 to ground. This stabilises this point at about 12.8 volts and the AGC rail now has 9 volts on it with no signal. This gives the receiver far greater AGC range to handle strong signals, without overload (see Fig. 6). ■

Remote Crystal Switching

Design:
M. T. MURPHY VK6ZCX
Construction:
DON S. REIMANN VK6DY

If you need to switch crystals at a distance and have experienced the problems of diode switching then you may like to adapt this circuit to suit your requirements. It uses CMOS (field effect) gates. It is largely immune to reasonable levels of RF or hum on the switching leads and there is no need to use individually shielded coaxial cables for these. See Fig 1.



COMBINING OUTPUTS

There are several ways of doing this:—

1. Take a capacitor from each output to a common output. (Not tried here, due to possible crystal interaction.)
2. Use a NAND gate with an appropriate number of inputs as a buffer. Suitable NAND gates are:—

1. 74C00 2 inputs (4 gates per package)
2. 74C20 4 inputs (2 gates per package)
3. 74C30 8 inputs (1 gate per package)

Any inputs not used should be returned directly to the HT supply (i.e. positive). This only works because oscillators which are not switched on are arranged to produce an output equal to the positive supply voltage (i.e. a "HIGH" output). The output of the NAND gate buffer is "LOW" (—earthed) when *all* inputs are HIGH. If all but one are HIGH and the other (from our oscillator) is going HIGH, LOW, HIGH, then the output will go LOW, HIGH, LOW, exactly out of step with the oscillator.

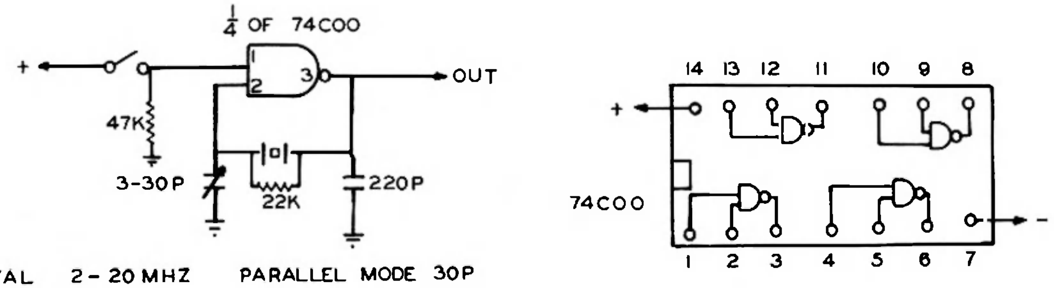
3. Outputs from buffers may be combined by judicious use of diodes, for example see Fig 2.

If G2 has a "low" output and G1 is "HIGH" D2 will be reverse biased while D1 is forward biased.

Hence G1 does not pour current into the output of G2, as it would if the diodes were left out. (This effect could be mutually destructive.)

A version of this has been built and tested on air by VK6DY Don Reimann.

FIG 1 BASIC CIRCUIT (ACTUALLY A PIERCE OSCILLATOR)



XTAL 2-20 MHZ PARALLEL MODE 30P

FIG 2

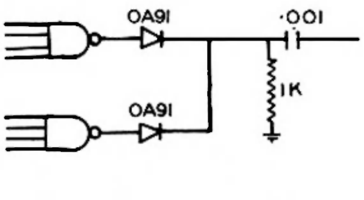


FIG 3

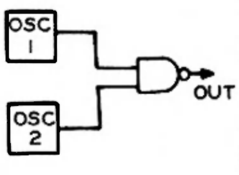
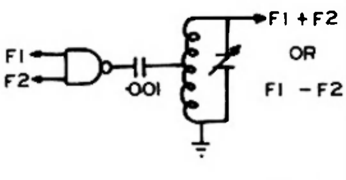
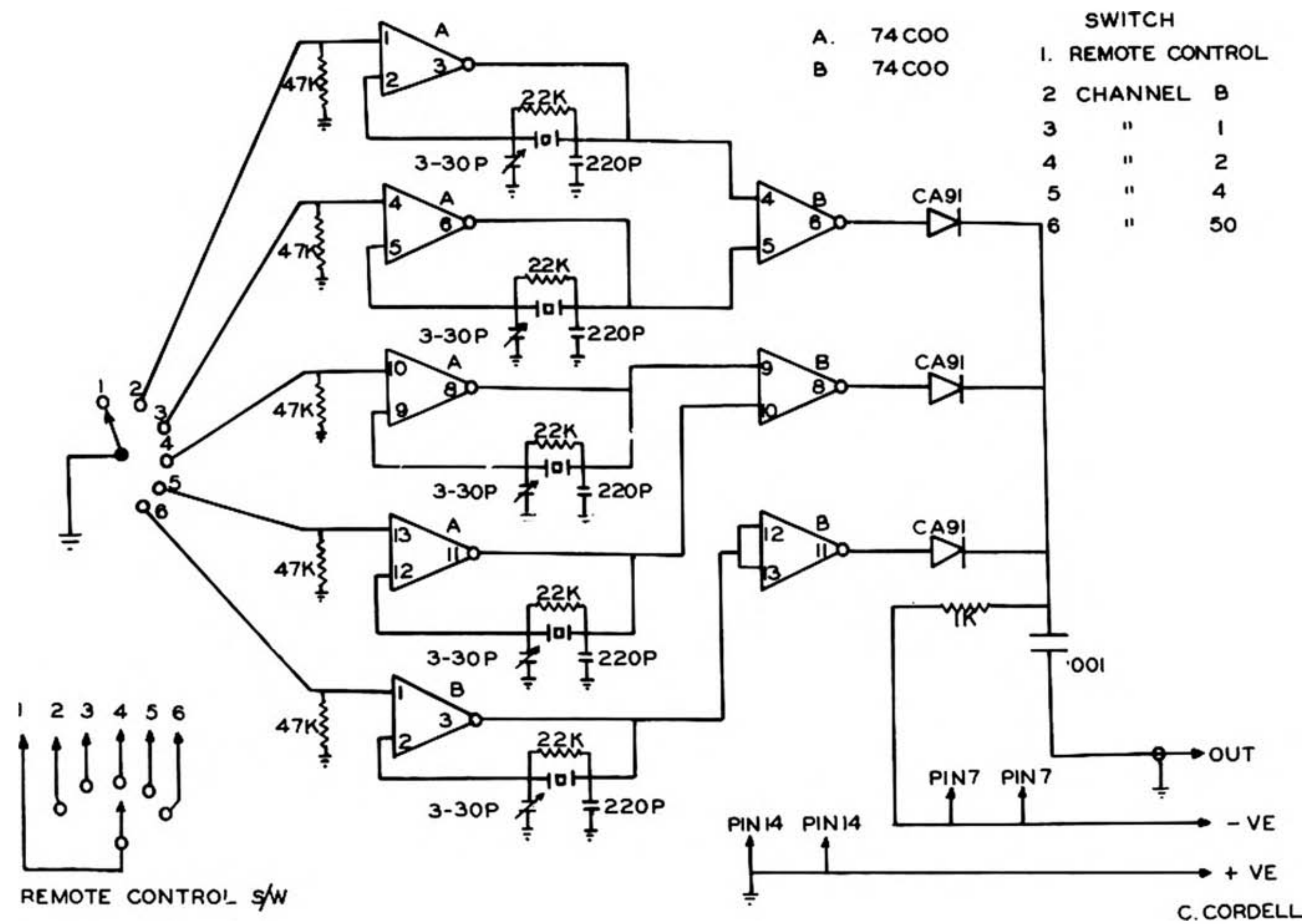


FIG 4



C. CORDELL

FIG 5



This uses 2 × 74C00s. Five gates (of the 8) are used as oscillators. The other three are used as buffers. The outputs are combined using diodes as above (see Fig 5).

This is a very economical circuit (74C00s cost $1.20 each) and performance is excellent.

Output into 470 ohm load is about half the supply voltage, peak to peak. Max. supply voltage is 16 volts. Minimum is about 4 volts.

Although OUTPUTS must not be directly connected together, they *can* be connected to other inputs without any need for capacitors. See Fig 3.

Incidentally, if both oscillators are activated, the buffer becomes a very good mixer, which can then be run into a tuned circuit to pick off the required product. See Fig 4.

AM modulation on F1 or F2 will suffer severe distortion and both must be LARGE signals so this circuit is no good for receiver front ends, only for transmitters. FM on either signal should be OK.

These buffers are digital gates and produce harmonics fairly readily. Hence, DO NOT hang an antenna directly on an output without a tuned circuit.

The possibility of using them as frequency multipliers has not been tried yet, but may be soon (should work to 30 MHz or so).

SUGGESTED LAYOUTS

1 crystal — 2 gates of 74C00
2 crystals — 3 gates of 74C00
3 crystals — 3 gates of 74C00 (3 inputs of a 74C20)
4 crystals — 4 gates of 74C00 (4 inputs of a 74C20)
5 crystals — 5 gates of *Two* 74C00s plus 3 buffers and 3 diodes (see text)
6, 7, 8 crystals — 6, 7, 8 gates of *Two* 74C00s + One 74C30

(Spare gates ignored, spare inputs to positive supply rail.)

CONSTRUCTION

As the transmitters and power supplies for 2 and 6 metres will be housed remote from the operating position, it was necessary to fit both 6 and 2 metre oscillators with a switch for tune-up procedure.

The oscillators are built on a printed circuit board, with the crystals and trimmers on a separate strip mounted ⅝ in. from the main board, and the whole assembly fits into a mini box 3½ in. x 2½ in. x 1½ in.

The abutment plate of the switch fits onto the main case, and the switch wafer is mounted on the PC board. This method allows the whole oscillator assembly to be constructed and wired as a unit, and is then slipped into the case, and secured by four screws.

The oscillator unit is then mounted on the main chassis approximately 1 in. behind the front panel, which has a rectangular cutout covered by a small plate to allow adjustment of the trimmers and removal of crystals, with the selector shaft below.

No trouble should be experienced in duplicating this design if required, or any other lay-out may be used. The switch has six positions. The first is remote and when in this position the oscillators can be controlled from the remote position. Switching to the other five positions brings each separate channel into operation at the transmitter for adjustment purposes, irrespective of the position of the remote switch.

The first unit has been operating for several weeks on 2 metres, and has been completely reliable and can be recommended. ■

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- ☐ Built-in calibrator 25 or 100 kHz (selectable)
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TECHNICAL DATA

Frequency Range: 160m 1.8-2.0 MHz, 80m 3.5-4.0 MHz, 60m 4.5-5.0 MHz, 40m 7.0-7.5 MHz, 31m 9.5-10.0 MHz, 25m 11.5-12.0 MHz, 20m 14.0-14.5 MHz, 19m 15.0-15.5 MHz, 16m 17.5-18.0 MHz, 15m 21.0-21.5 MHz, 13m 21.5-22.0 MHz, 11m 25.5-26 MHz, CB 27.0-27.5 MHz, 10A 28.0-28.5 MHz, 10B 28.5-29.0 MHz, 10C 29.0-29.5 MHz, 10D 29.5-30.0 MHz, VHF6m 50.0-52.0 MHz and 52.0-54.0 MHz, VHF2m 144-146 MHz and 146-148 MHz and additional four bands of 500 kHz segment within 4.0-4.5 MHz, 5.0-5.2 MHz, 7.5-9.0 MHz and 22.0-27.0 MHz (optional extra).

Mode: Selectable USB, LSB, CW, AM, FM or RTTY.

Frequency Stability: Within 100 Hz during any 30 minute period after warm-up. Not more than 100 Hz with 10% line coltage variation.

Calibration Accuracy: 1 kHz maximum after 100 kHz calibration.

Backlash: Not more than 50 Hz.

Antenna Impedance: 50 ohm unbalanced nominal.

Circuitry: 20 Transistors, 12 FET, 4 Integrated Circuits and 33 Diodes.

Power Requirement: 100/110/117/200/220/234V AC, 50/60 Hz, or 13.5V DC nominal.

Sensitivity: 0.3 uV for 10 dB Noise plus Signal to Noise Ratio on 14 MHz for SSB and CW. 1 uV for AM on 14 MHz. 12 dB SINAD for FM reception.

Selectivity: 2.4 kHz nominal bandwidth at 6 dB down, 4.0 kHz at 60 dB down on SSB, CW and RTTY. 600 Hz nominal bandwidth at 6 dB down, 1.5 kHz at 60 dB down with CW filter. 6.0 kHz nominal bandwidth at 6 dB down, 12 kHz at 60 dB down with AM filter. 20 kHz nominal bandwidth at 6 dB down, 45 kHz at 60 dB down with FM filter.

Harmonic and Other Spurious Response: Image Rejection better than 60 dB. Internal Spurious Signal below 1 uV equivalent to antenna input.

Automatic Gain Control: AGC threshold nominal 1 uV. Selectable AGC time constant, fast or slow. Fast attack time 3 milli-second and slow attack time 4 milli-second. Fast release time 0.5 second and slow release time 2 seconds.

Audio Noise Level: Not less than 40 dB below 1 watt.

Audio Output: 2 Watts at 4 ohm impedance.

Audio Distortion: Less than 10% at 2 Watts output.

Size: 340(W) x 153(H) x 285 (D) mm.

Weight: 9 kg.

Price: FR-101D $675. FR-101D/Digital (as above but with Digital readout) $790.

All prices include sales tax. Freight extra. Prices and Specifications subject to change.

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Power Transformers — The Beginnings

E. L. Bradshaw

Power transformers are an essential feature of our every day life, and range in capacity from a few volt amps to hundreds of M.V.A.

One of the major factors limiting transformer capacity is the difficulty or inability to transport units beyond a certain physical size and weight. In any case most of us spare very little thought for this rather uninteresting device until it comes to finding the necessary dB for the purchase of a new one, or cursing the junk box for containing an assortment of everything excepting a tranny of suitable current and voltage rating.

The history of the transformer follows a fairly logical development with the major breakthrough occurring in 1884.

The beginning must date from the independent discovery of the principle of electro magnetic induction, by Michael Faraday on August 29th, 1831, and by Joseph Henry. The early devices were primitive in nature, and relied on the interruption of DC, AC not being available at the time. The principle of mutual induction, using electrically separated primary and secondary windings was discovered by an English priest, N. J. Callan, in 1837. Relatively little further development took place until after the invention of the dynamo electric principle.

The first AC device was produced by Sir W. Grove in 1868, and the arrangement consisted of two separated coils wound on an open iron core. One of these windings was AC excited. Further development continued along these lines, but the devices produced were all open core and multiple units were all connected in series. Voltage was controlled by adjusting the position of the iron core within the coils.

These so-called secondary generators were displayed at an exhibition in Turin, Italy, in 1884. This exhibition was visited by three engineers, Max Déri, Otto Bláthy and Karl Zipernowsky, from the electrical section of the Ganz factory in Budapest. Fortunately, they recognized the additional advantages in using a closed core construction, and operating individual transformers in parallel instead of in series. On their return to Hungary, work commenced on the first transformer, a name coined by the three aforementioned gentlemen. Pages of their laboratory record show that the first written notes of their experiments were recorded on August 7th, 1884. Transformer No. 1, a single phase, shell type unit, rated at 1400W, 40 Hz, 120/70V was despatched from the company on September 16th, 1884.

An opportunity for public display came the following year when 75 transformers were produced to supply power for 1067 incandescent lamps, at the Hungarian National Exhibition. These transformers operated from a single phase alternator, supplying 1350V at 70 Hz. The generator was started and the lights energised on May 1st, 1885, and operation continued until the close of the exhibition in November of the same year.

May 1st, 1885 must undoubtedly rate as one of the most important in the history of alternating current electrical engineering. The exhibition was patronised by many foreign visitors, amongst them George Westinghouse, an early advocate and pioneer of AC in the USA. Many foreign orders were received as a result of this display, and the transformer was launched into the everyday position which it has at the present time.

Finally, it is interesting to note that the transformer as a closed core device, and its position in an AC distribution system was realised by an American, J. B. Fuller, and confided to an associate just prior to his death. His notes found in early 1879 were not appreciated or understood at the time, and so the world had to wait a few more years for Messrs. Déri, Bláthy, and Zipernowsky to find the missing links. ■

Perth 2 Metre Repeater

Will McGhie
21 Waterloo Cres., Lesmurdie, WA 6076

Perhaps the biggest change to Amateur Radio since the widespread use of SSB has been the extensive use of the talk-through repeaters. Satellite and earthbound repeaters constitute a very large, and steadily growing, part of Amateur Radio today, and the future looks exciting.

VK6 was the last state (excluding VK8) to build and operate a 2 metre repeater. This situation was due in part to the small active amateur population and poor communication with those in the east who had already constructed repeaters. To many of us, the problems of getting a repeater on the air seemed formidable. Little was written on the subject and what was written tended to indicate one needed a good clean transmitter, spurious free receiver, considerable screening between the transmitter and receiver, great aerial separation, aerial phasing, cavity filters and, finally, a lot of luck. So for several years most of us talked about building a repeater, but little was done. The biggest motivating force was missing in that few amateurs in VK6 had operated through a repeater, and until you have, the full impact of repeater operation does not become obvious.

However, prior to 1972 not all amateurs who were interested in 2 metre repeaters were only talking. Graham VK6BY and Mac VK6MM were constructing and testing a repeater, and the project was well advanced when Russ VK6CV returned to VK6 from VK3. After sizing up the situation, Russ and Jerry VK6ZAS obtained a Pye F60 base station and converted it to a 2 metre repeater operating on the original channel 4. The repeater was installed at a commercial group site 1200 feet ASL on the escarpment 15 miles S-SE of Perth, and it worked, with no cavity filter, no special aerial phasing or any of the other supposed requirements. So Perth finally had a 2 metre repeater, and it worked very well, except for one problem.

The problem followed the development of the Perth repeater for a considerable time — channel standardisation. You may or may not remember that around 1972 through 73 was the re-allocation of channels. This meant that for many amateurs the purchase of crystals for a repeater channel that may not exist in the very near future was put off. In fact those that were associated with the repeater advised against the purchase of crystals until repeater channels had been decided on. Hence, for the first few months of operation of the channel 4 repeater, very few amateurs were equipped to use it.

After much thought and frustration to find out what was likely to happen in the Eastern states, Channel 1 was decided on as the new repeater frequency. In December of 1972, the repeater frequency changed to channel 1, but as there had been no decision as to repeater frequencies, many amateurs were reluctant to invest in a set of channel 1 crystals. This problem remained until new repeater channels were worked out and the VK6 repeater changed to the new channel 1 frequency during February of 1974.

However, returning to the end of 1972, the repeater had been running with great success and it was about this time that I became interested in doing something about maintaining the repeater. During this time, drift problems with the mute had been eliminated, a high performance pre-amp constructed, and control circuitry and ident. facilities added. The control and ident. circuitry was based on the VK5 design and was constructed to meet our local requirements by Graham VK6BY.

As the site was only temporary, much of the early installation was also temporary, but the general coverage from this site was 60 miles up and down the coast, and about 40 miles inland. Best DX worked was about 800 miles to VK5WE-MM up north of Carnarvon. During this time a narrow IF filter (20 kHz) was tried, but was found to be unsatisfactory due to poor

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audio quality if stations were off channel or running greater deviation than 10 kHz, so the wide band filter remained (30 kHz).

Due to the foresight and generosity of Mac VK6MM, a new site several hundred yards from the original became available, complete with a 250 ft. tower. Power was also available, but it was necessary to construct an asbestos lined wooden box to house the repeater. The complete relocation of the repeater including coax runs, aerial installation, mast head amplifier, power supply connection and cabinet installation was accomplished in one weekend. Those who took part were 6CV, 6ZFG, 6KB, 6PR, 6ZHR, 6TZ, and 6UU. It was an example of how a relatively difficult project can be accomplished, given the enthusiasm and support of a few.

This basic setup is still in use with surprisingly few problems. The aerials used are commercial folded dipoles suitable for direct coax feed. The coax used is lo-loss foam, but even so has a loss of 6 dB and hence the use of a mast head pre-amp consisting of 2 grounded gate TIS88s. The pre-amp may be switched and out of circuit, thus allowing checks to be made on it and the receive aerial. The transmitter runs 50 watts output with an e.r.p. of 14 watts. No cavities or any special shielding is needed. Aerials are separated vertically by 35 ft. Mute sensitivity is very good, opening on signals that produce insufficient audio to be copied. A mute tail operates for 1-2 seconds on weak signals, but strong signals produce no mute tail. This discrimination between strong and weak signals is accomplished by a second mute circuit set to operate at about 1 uV. This second mute switches the delay into the main mute circuit.

During its two years of operation the repeater has only been off the air for two days due to a 6/40 failure. General stability has been excellent and thoughts of a solid state transmitter have not advanced far due to the high reliability of the repeater. As yet no battery standby has been included into the unit but it is hoped that this will be done. Due to the location on an escarpment, coverage inland is only about 40 miles. It was noticed that shifting from the original site where the aerial height was around 60 ft., to the new site with areial heights in excess of 200 ft. produced no noticeable increase in signal strength up and down the coast. However much greater signals were noticed along the escarpment and made the great aerial heights worthwhile.

Since this article was commenced, a 6 dB gain aerial has been added to the transmitter. One interesting change which appears to have occurred is that increased signals are most noticed at great distances from the repeater. Signals received at a closer range appear to be only slightly better, or no change. The reasons for this could be several — but possibly the radiation angle is more favourable at the horizon than at points closer in.

Looking back on the history of the Perth repeater, one can only say that it has been highly successful, due mainly to the enthusiasm of a few and the luck of picking out a piece of equipment that has performed very well as a repeater. The future capabilities of repeaters seems limitless. Some argue that repeaters make it all too easy and this is obviously true. But for every change in amateur radio, there are always afterthoughts.

Perhaps the excitement of repeater operation can best be summed up by being able to work someone 100 miles away and all that is required is a few hundred milliwatts from a hand-held transceiver, AND A REPEATER. ■

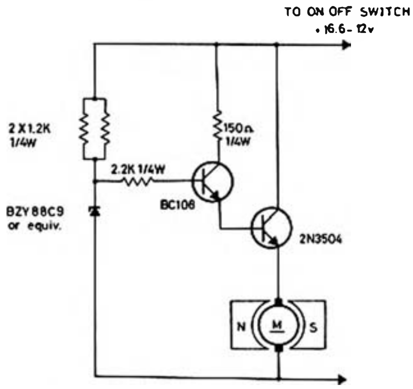
The Pioneer 8 Track Cartridge Player in the Mobile Shack

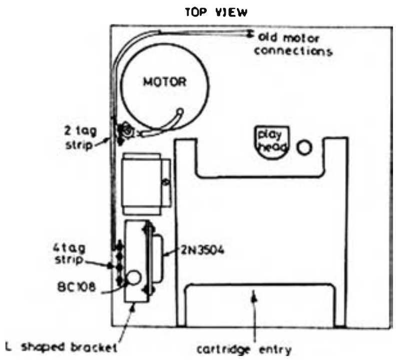
A. M. Austin VK6MA
40 Armstrong Road, Wilson, WA 6107

Not amateur radio but . . . Maybe you have also experienced trouble with erratic tape speed resulting in poor play back. Possibly you too, have broken open cartridges, lubricated spindles, wiped graphite from the pinch roller and cleaned the motor governor contacts without permanent positive results.

Take heart, while all can contribute, the main cause is the governor system. The VDRs across the contacts do reduce sparking but do not prevent it. As a result the carbon build up adds resistance to the motor armature circuit causing erratic running.

Since installing my electronic speed control, some 12 months ago, I now only have to contend with cleaning the cartridge pinch rollers, pressure pads and occasionally free up inside the more troublesome cartridges. The problems are now all external to the player unit.





INSTALLATION:

For the last time remove the motor, take off the outer cover, MHU metal shield and pulley. Remove the circular magnetic assembly and watch out you do not bend or damage those tiny brushes and springs. Using short pieces of 15 amp fuse wire, bridge out both pairs of governor contacts and re-assemble the motor. Fit the motor to the unit. Make an L-shaped aluminium bracket for the 2N3504 and fit the tag strips as indicated. Take care when drilling holes for the transistor bracket and tag strip. The two tag strip earth lug is mounted under the motor holding screw.

The BC108 and other components are supported by the four tag strip and 2N3504 connecting leads. Take care there is only just enough room. Do not forget to use a mica washer and insulated mounting kit for the 2N3504.

CIRCUIT OPERATION:

The motor stalled current of 2 amps is well within the IC max. 4 amp rating of the 2N3504 for starting purposes. Once running, the motor current quickly falls to around 0.25 amp. As the motor back EMF rises with speed the 2N3504 and BC108 emitters tend to float up closer to their respective base voltage values. This reduces their respective collector currents thus controlling the motor voltage (and speed) at a value determined by the zener pegged base voltage of the BC108. The motor voltage is 8.1V in my case. At a maximum input voltage of 16.6V the 2N3504 dissipation would be 2.4W and therefore heat sinking requirements are minimal.

FINAL ADJUSTMENT:

If the speed is too slow, insert a normal forward biased diode in series with the zener to raise the BC108 base voltage.

If the speed is too fast strap a 2K preset potentiometer across the zener and connect the 2.2K resistor to the wiper. Using the preset potentiometer adjust the BC108 base voltage to give the desired speed.

In my case the circuit worked exactly as is but with component variations some final fiddling may be necessary. ■

SIDEBAND ELECTRONICS SALES and ENGINEERING

A Repeater Identifier

H. L. Hepburn VK3AFQ
4 Elizabeth St., East Brighton, 3187

During 1974 it became apparent that the P.M.G.'s Department would require automatic identification to be installed on the various repeaters operating in Victoria.
The writer was asked to produce a unit which would generate the appropriate call signs and have outputs which would give a choice of keying method.
Much discussion indicated that the simplest method of identification on VK3RML was narrow (200 Hz or thereabouts) frequency shift keying since it is normally inaudible and does not require the complex (and expensive) external logic necessary if an audible ident is used which takes into account previous transmissions, current transmissions and time. Nevertheless, the unit had to make provision for an auxiliary keyed audio output should local repeater committees opt for an audio ident.
This article describes the keyer produced for VK3RML.

GENERAL DESCRIPTION

The unit is completely self-contained and is built on a 5½ in. x 4 in. single sided PC board which is housed in a 7 in. x 4 in. diecast box to shield it from strong local RF fields. It will accommodate call signs up to 32 characters long — a character in this context being a dot or a dash or a space. The length of the dot is determined by the internal clock and dashes or spaces are each three dots long. Both sending speed and ident cycle time may be pre-set within wide limits. The only input required is 8-12 volts DC — the 5 volts regulated required for the TTL logic used being provided by an inbuilt LM309 K (or 7805) three terminal regulator. Four outputs are available:

(a) A positive going square wave which is normally low (approx 0.4V) which goes high (approx 3.5V) when keyed.
or (b) A negative going square wave which is normally high (approx 3.5V) which goes low (approx. 0.4V) when keyed.
or (c) A keyed sine wave of about 800 Hz having a maximum amplitude of 2 volts peak to peak and whose level can be set with an on board trimpot
and/or
(d) A "Hold" signal which is normally low (0.4V) but which goes high (3.5V) during the keying cycle. This output can be used to control internal logic.

Programming is extremely simple and consists of putting a germanium diode between the "dot" line and the common line when a dot is required; between the "space" line and the common line when a space is wanted and omitting the diode altogether if a dash is called for. A detailed example of programming is given later in the text.

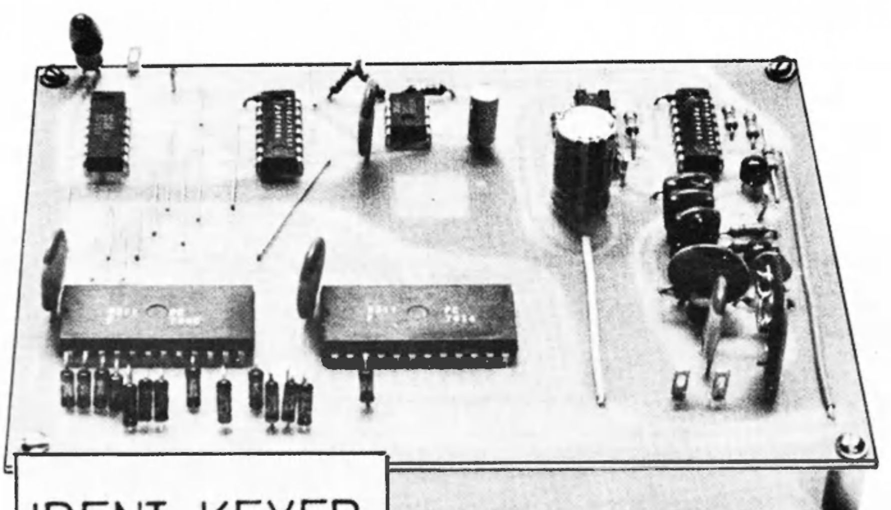
No originality is claimed for the design since, basically, it is that described by Peter Starke K2OAW in the February 1973 issue of "73 Magazine" with modifications to suit the current purpose.

DETAILED DESCRIPTION

Figure 1 gives the full circuit diagram and Figure 2 the layout on the component side of the circuit board.

Other than the voltage regulator four main functions are involved. They are:
1. The cycle timer
2. The clock generator
3. The call sign generator
4. The audio tone generator.

These functions will now be described in detail.



IDENT KEYER

1. The cycle timer:
A NE555 is used to determine how often the call sign is sent. This cycle time is determined by the values of R1, R2 and C1. Fairly obviously the cycle time must not be shorter than the time taken to send the call sign (usually 5-6 seconds at 12 wpm) but any cycle period up to around 5 minutes can be achieved using practical values of R and C. If longer intervals are required it is easier to put a divider (7490, 7493 etc.) between the NE555 output and the controlled device than to scratch around the supply houses looking for very high values of resistance or capacitance. But no matter whether the NE555 is used on its own or in combination with a divider, one point must be considered — the relationship between the "high" and "low" times of the NE555 output.

Normally, with R1 having a low value (say 1/10th that of R2) then the output from pin 3 of the NE555 is close to having equal "high" and "low" times. Since the call sign generator needs only a very short negative going pulse to the clear pin of the 74107 (D) stop/start flip flop to start it, and since a starting pulse having a "low" time greater than the 5-6 seconds needed to send the call sign would cause erratic operation of the call sign generator (fractional call signs for example), then the time output must be such that it is only low for a very short period during each timing cycle. This is achieved by making R1 many times the value of R2. In the unit described the call sign is sent every 20 seconds or thereabouts and the starting pulse is about one second long. Under these conditions R1 is 3.3 megohms, R2 is 470 K and C1 is 4.7 mfd.

2. The clock generator:
The basic string of dots (the clock pulses) for the system is generated by a simple RC oscillator using two gates of a 7400 quad two input NAND array. The other two gates are used elsewhere in the circuit. With the values of 220 ohms and 100 mfd shown the keyed output is around 12 wpm. Some coarse adjustment to keying speed can be obtained by lowering the value of the capacitor to increase speed and vice versa.

Note that the clock generator is always in operation, its output being selected by the subsequent circuitry.

3. The call sign generator:
Until started by a negative going pulse to the clear of flip flop 74107 (D) the system is at rest with the $\bar{Q}$ of 74107 (D) and the clear of 74107 (A) low. Pulses from the clock do not cause either 74107 (A) or (B) to toggle. At rest the enable pins of 74154 (B) are high being held this way by the Q and $\bar{Q}$ outputs of 74107 (C).

When the clear of 74107 (D) is taken low its Q goes high, thus enabling 74107 (A).

If the "dot" line is low (and this depends on whether the outputs of the

74154s have been so programmed) then 74107 (B) is inoperative but one input of Gate 3 "sees" a single dot. If the clear of 74107 (B) is high (i.e., no dot is programmed) then gate 3 receives a dot and a "double dot" from 74107 (B) and outputs a dash.

Output from gate 3 (one pulse for each dot, dash or blank) is divided by 16 in the 7493 and by two in 74107 (C) to give a total divide ratio of 32. These pulses from gate 3 also go to gate 4 which may or may not output them to the keying terminal depending on the programme.

The outputs from the binary lines of the 7493 (1-16 inclusive) pass to the binary inputs of the two 74154s. Only one 74154 is enabled at a time so that the first sixteen pulses to the 7493 cause 74154 (A) to operate and the second sixteen cause 74154 (B) to operate.

The outputs of the 74154s are normally high but when the sequence starts the first pulse causes pin 1 of 74154 (A) to go low, the second pulse causes pin 2 to go low and so on. The overall effect is that a "low" ripples through from the 1 output of 74154 (A) to the 16 output of 74154 (B) to give a total of 32 low going command pulses.

The 32nd pulse causes 74107 (D) to change state. Its $\bar{Q}$ goes low, the clear of 74107 (A) is pulled low and the sequence stops until the next negative going pulse is forthcoming from the NE555 timer.

If a germanium (not silicon) diode is connected between an output from the 74154s and the space line, then when that particular output goes low it will pull the space line low and disable gate 4 so that no output appears from gate 4. If the diode is put between the 75154 output and the dot line, then when that output goes low the dot line is pulled low blocking off 74107 (B). However, the space line is high and gate 4 is enabled so that one dot reaches the output of gate 4. If no diode is present between the 74154 output and either the dot or space lines then 74107 (B) toggles and its output (a "double dot" in effect) inputs to gate 3. This gate adds the "double dot" from 74103 (B) to a single dot from the clock and outputs a "triple dot" which is either a dash or a space. Gate 4, being enabled because no space is programmed, passes a dash to the keying output. Thus, during the on-time of the call sign generator a total of 32 dots, dashes or spaces appear at the keying output. The sequence is determined by the positioning (or omission) of diodes between the 74154s and the dot or space lines.

4. The audio tone generator:
This is a simple single transistor phase shift oscillator. With the values shown the frequency of oscillation is around 800 Hz. Just how close depends on the actual (not nominal) value of the 0.047 mfd capacitors in the collector/base feedback path. The oscillator is followed by a 2N5245 or MPF102 buffer/source follower to provide a low output impedance.

When the call sign generator is inoperative the output of gate 4 is high, the 2N3565 keying transistor is switched on and its collector is at a low potential. The audio oscillators HT feed, being taken from the 2N3565 collector, is also low and the oscillator does not operate.

When gate 4 operates its output goes low, the 2N3565 switches off and HT is applied to the audio oscillator.

The audio output level can be pre-set by means of the 1.0 K trimpot used as a source resistor for the 2N5245/MPF102.

PROGRAMMING
Up to 32 characters can be accommodated by the keyer, a character being either a dot or dash or a blank space. To program the keyer it is first necessary to set down the call sign and determine the number of characters involved. Using the writer's call sign as an example it is first set down as follows:

Position	Characters		Position	Characters	
1	●		17	—	A
2	●	V	18	Space	
3	●		19	●	
4	—		20	●	F
5	Space		21	—	
6	—		22	●	
7	●	K	23	Space	
8	—		24	—	
9	Space		25	—	Q
10	●		26	●	
11	●	3	27	—	
12	●		28	Space	
13	—		29	Space	
14	—		30	Space	
15	Space		31	Space	
16	●		32	Space	

The complete call sign requires 27 of the 32 available positions leaving 5 unused (or space) positions. It is advisable to have

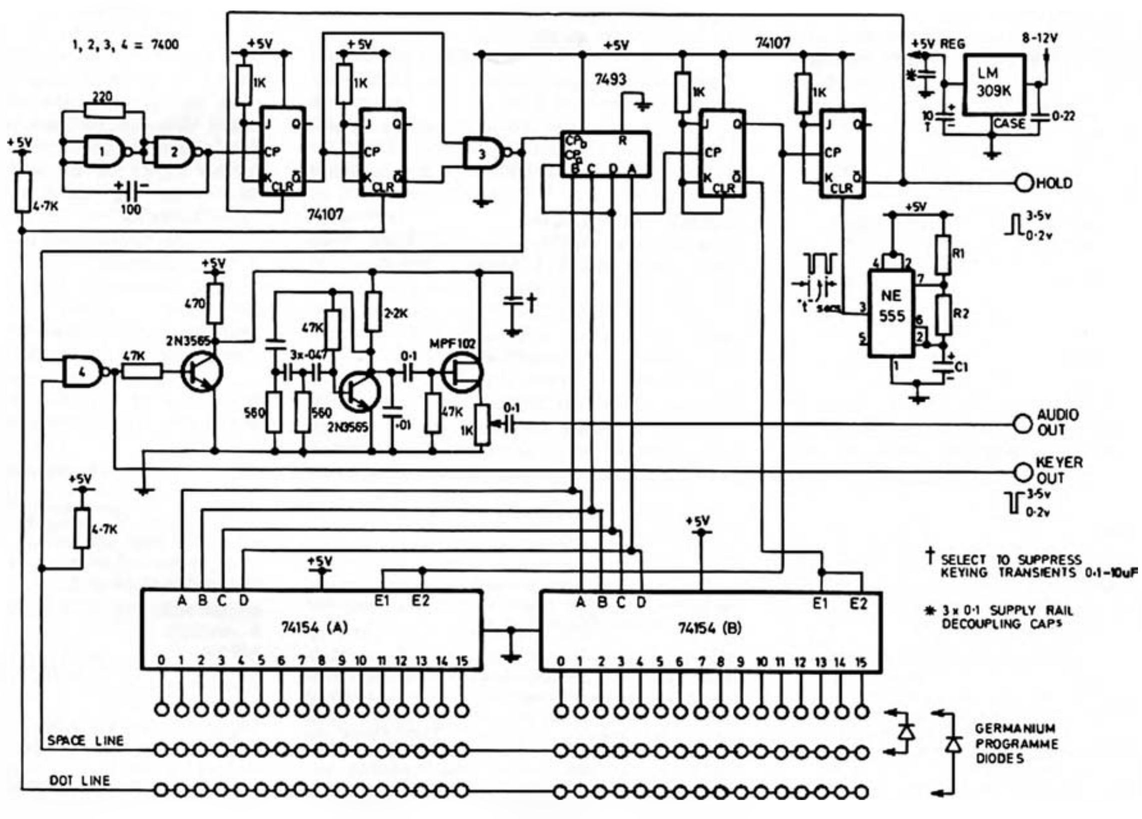


FIGURE 1–REPEATER IDENTIFIER LOGIC DIAGRAM

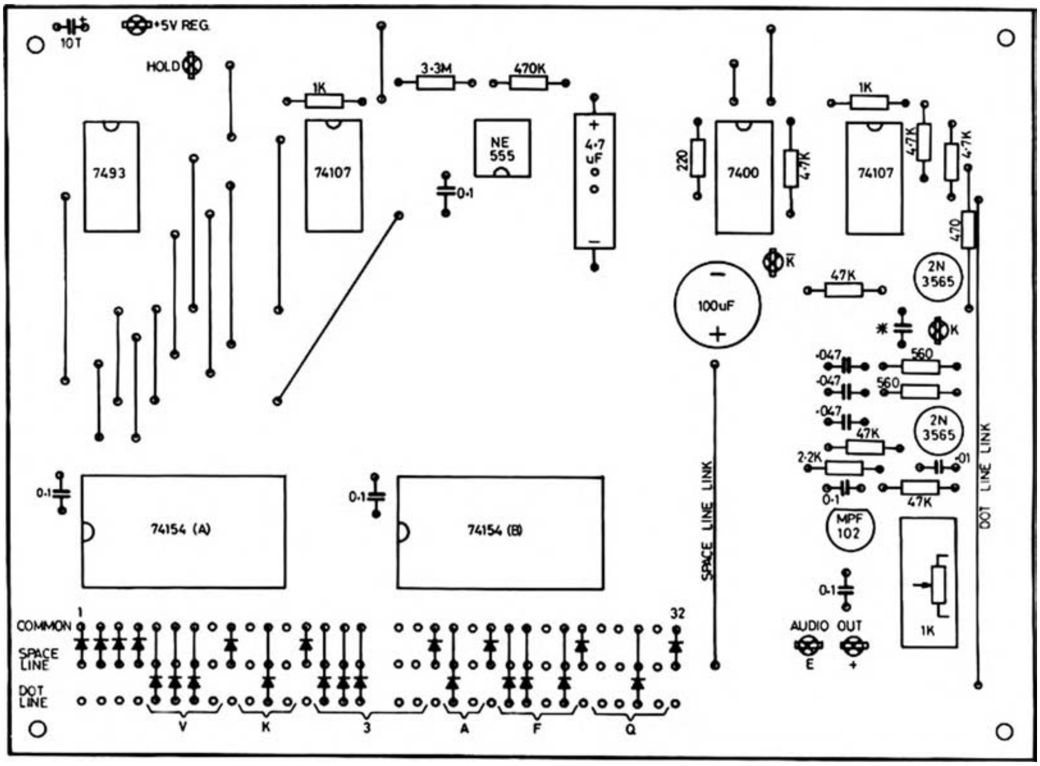


FIGURE 2 — CALLSIGN GENERATOR — LAYOUT OF COMPONENTS

most of the unwanted spaces at the start of the cycle (to allow a transmitter time to come on for example) so that the table is readjusted a bit to give the following:

Position	Character	Position	Character
1	Space	17	—
2	Space	18	—
3	Space	19	Space
4	Space	20	●
5	●	21	—
6	●	22	Space
7	●	23	●
8	—	24	●
9	Space	25	—
10	—	26	●
11	●	27	Space
12	—	28	—
13	Space	29	—
14	●	30	●
15	●	31	—
16	●	32	Space

Note that, if the call sign has 25 characters or less, it is possible to fit in "DE" ahead of it and still have one space at the start and one at the end.

All that is now necessary is to put germanium diodes between the 74154 outputs and the dot line or the space line as dictated by the table. No diode is put where a dash is required.

Figure 2 shows VK3AFQ programmed into the keyer.

USING THE KEYER

The simplest way of using the keyer is to take one of the TTL outputs (the K or the K̄) and use it to drive a varactor diode placed across the transmitter crystal. Suitable decoupling and level control must of course be included.

Alternatively, the keyed audio output can be impressed on the transmitter audio line and the level adjusted so that it does not override any speech audio present. The "hold" output can be used to turn on a transmitter for the duration of the call sign if that transmitter is not already switched on by a received signal. In this case (as in the case of audio tone) the cycle time would have to be lengthened to a maximum of 10 minutes since, without further logic, the TX would come on whether or not the repeater was in use.

CONCLUSION

Whilst the keyer described was built primarily to ident VK3RML (Melbourne Channel 1) it is flexible enough to have alternative end uses. A batch of boards has been struck to allow other VK3 local repeater committees to build their own ident unit but supply is not restricted to them. Others interested in building a similar unit are asked to contact the writer (SAE please!). ■

QSP

DX-PEDITION

News of a DX-pedition by the Barbados Radio Club, has been passed on by Ken VK3AH.

Several club members are journeying to Palm Island (13 deg. 32' N, 61 deg. 23' W) in the Windward Islands Group, and will be operating under one of the VP2S call signs. It is hoped that the call VP2SPI will be allotted, but this detail is not yet certain.

The dates are 20, 21, 22 June 1975 and all bands 80-10Mx will be operative.

QSLs should be sent to the Barbados Amateur Radio Society, Bridgetown, Barbados.

PIRATES

The Australian Citizens Radio Movement, according to numerous sources is spearheading moves to legalise CB activities as they say the Government has unfairly banned them from airwaves they are entitled to use under the Geneva Convention. They also claim that Australia was one of the few western countries where mass two-way radio was outlawed. They even persuade some of the newspapers carrying their propaganda matter to use headlines like "The Hams want a say". Adapted from Westlakes RC news, April '75.

JOTA

Yes, Jamboree-on-the-air is over the weekend 18th/19th October 1975. An interesting comment from the 1974 report "A number of other (amateur) stations combined amateur activities with camping and other scouting activities". This opens up quite a vista of possibilities in conjunction with radio scouting, the new "Novice Licensing" and dare one include the WIA YRCS movement. Perhaps even those keen people who organise field-days and Conventions could well combine all these things into special events throughout the year which, with amateur satellites, especially Oscar 8 could open up wonderful fields of vision for the youth (and even oldsters) of today. The marvel of JOTA seems not so much "what has been done" as "what can be done".

RECIPROCAL VISITORS' LICENCE

A note from VK4NB advises that a visiting Japanese amateur JH2TEL applied for and was granted a licence to operate in Australia during his stay. It seems he has VK4AAY for a twelve-month period. VK4NB asks if this is a first.

STAND UP AND BE COUNTED

"As one of the several dozen radio services which compete for allocations in the radio spectrum, it is important that the amateur radio service make such efforts to enhance its visibility to the people who will play an important role in determining its future", IARU News in QST, February 1975. ■

An A R Special - A Review of the Atlas Transceiver

The ATLAS 210/215 transceivers are five band fully solid state single sideband transceivers and as such represent a new approach to both electronic and physical design. They are manufactured in the USA by Atlas Radio Inc. of Oceanside California, and sold in Australia by Vicom International Pty. Limited of 139 Auburn Road, Auburn. The units used in our tests were obtained from Vicom and readers requiring information on delivery and price should contact them.

The Atlas is the smallest and lightest HF transceiver on the market at the present time. It is only slightly larger than many of the current two metre FM transceivers. Dimensions are 24.1 cm wide, 8.9 cm high and 24.1 cm deep. It weighs in at 3 kg or a shade under 7 lbs.

Current drain at 12 volts is 500 milliamps or less in the receive mode and 16 amps peak transmit. Average current drain while transmitting would however be only about 4 to 5 amps. This represents many hours of operating from an average car battery.

TECHNICAL FEATURES

The 210 and the 215 are identical in all respects except for frequency coverage. The 210 tunes 350 kHz of the 80, 40, 20 and 15 metre bands with 700 kHz on the 10 metre band. As imported, the 80 metre band starts from 3.7 MHz, however full details are given in the instruction manual to retune this to 3.5 MHz to suit local conditions.

The 215 differs in that the 160 metre band is included and the 10 metre band omitted. Coverage on 160 is from 1.8 MHz.

Operation of the Atlas is simplified by the use of broadband output transmitter circuits which require no tuning on the part of the operator and so long as a reasonably matched 50 ohm load is presented to the rig, full output will be obtained. Receiver input is treated in a similar manner and no peaking is provided or needed.

All circuits are powered directly from 12 volts DC, so mobile operation requires only connection to the normal 12 volt car battery. No power supplies are required. Transmitter power is a very healthy 200 watts PEP input on the 160 to 15 metre bands with 120 watts on the 10 metre band.

The inbuilt VFO is calibrated in 5 kHz increments on all bands except for 10 metres which is double this figure. A separate calibration scale for the 160 metre band is provided on the 215, whilst the 210 has a separate scale for the 10 metre band. The tuning drive is exceptionally smooth and has a tuning rate of 15 kHz per revolution. The circumference of the knob is divided into fifteen segments giving approximately one kHz calibration. A 100 kHz calibrator is included as is opposite sideband selection. Provision is made to index the dial setting against the calibrator.

Some very interesting circuitry is employed in the Atlas. In order to overcome front end overload problems common to solid state receivers, no RF or first mixer gain is used. Instead, the input from the antenna goes via individual tuned circuits for each band to the first receiver mixer which is a double balanced diode ring. A low noise high gain IF strip provides all the actual RF gain of the receiver. Single conversion is employed with an IF frequency of 5520 kHz. Selectivity is well taken care of with a special eight pole crystal filter giving a band pass of 2.7 kHz at the 6db points and a total rejection of 130db.

The 'S' meter is calibrated in the usual way to S9 and 50db over S9. In the transmit mode, the meter is switched to read final collector current and is calibrated to 16 amps. Both the meter and tuning dial are indirectly illuminated, with switching to lower the intensity for night time mobile operation.

THE ATLAS ON THE AIR

Unfortunately the time spent testing the Atlas was limited. We were therefore unable to carry out many of the technical tests that make up the usual 'AR' reviews. However the time was quite sufficient to form many definite opinions. As the AR-230 AC power supply console was supplied with the test units we were able to try them out in the comfort of the home shack. As no doubt many amateurs will be purchasing this unit to go with their Atlas transceiver some comments on the AC power supply are also in order.

First impression was the extreme smoothness of the tuning dial. With only 15 kHz per knob rotation, SSB resolution is easy. Because a different VFO range is selected for each band, drift varied slightly from band to band. However the maximum drift from a cold start did not exceed 1.5 kHz most of this occurring during the first five minutes of operation. Although no actual measurements were made, it appeared that the VFO drift was slightly higher during the transmit function than during receive. Receiver AGC action was smooth with only a small amount of harshness occurring on the very strongest signals.

The Atlas specifications claim that the AGC will handle signal levels up to 3 volts. As a test, the normal station transceiver was fired up and the Atlas was used as a monitor for this. Excellent copy was obtained in this extreme situation.

Used with a standard high impedance dynamic microphone, reports on audio quality were excellent however it appeared that it was easy to overdrive the final resulting in a dramatic falling oil of intelligibility. While a front panel ALC adjustment is provided, the instruction manual suggests a try and see approach to its setting.

Tuning up for any band seems almost too easy. Select your band, flip the function switch to the CW position, check that the collector current is around 12 to 14 amps, and you are in business. Speak into the microphone and adjust the MIC gain for a peak current reading of 8 amps. It's rather hard to resist the temptation to adjust the final tuning, but the Atlas does not have or need any peaking controls.

A small loudspeaker is built into the transceiver, but it is on the wrong side for mobile operation in Australia. This also applies to the rear mounted microphone input socket. The Atlas is of course designed to actually plug into its companion mobile mounting bracket. All connections are then made to the bracket allowing easy removal to the home station power supply unit.

With the AC console the Atlas turns into a very elegant home station taking no more space on the operating table then any comparable all band transceiver. Over long periods of transmission the supply remained quite cool. Under very quiet conditions a small amount of both mechanical and via the speaker hum could be heard.

CONCLUSION

There is no doubt the Atlas breaks new ground in HF mobile operation. It would be entirely feasible to fit it into the smallest of cars while the current drain over a period of time would average only two or three amps. No doubt this little rig will catch the imagination of many amateurs. ■

Newcomers Notebook

with Rodney Champness VK3UG
44 Rathmullen Rd., Boronia, Vic., 3155

A MEDIUM WAVE LOOP ANTENNA

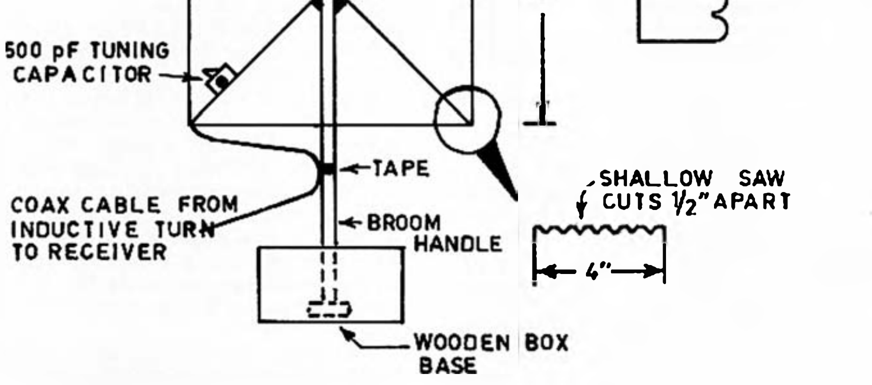
This month David presents a loop antenna/aerial, which ever term you wish to use, that could be of use to those who have problems with electrical interference or with two stations on adjacent frequencies which mutually interfere with one another.

For frequencies between 500 kHz and 2 MHz, the loop antenna takes a lot of beating. It consists of 7 turns of wire (5 or 6 for higher frequencies) around a wooden framework (x-shape as in the diagram). The ends of the wire connect to a 500pF tuning capacitor. A second wire, wound around the centre turn, connects to a coax cable which goes to the antenna and earth sockets on the receiver, or preferably to balanced input.

The loop forms a tuned circuit in conjunction with the capacitor, with the inductive loop providing a low impedance feed to the receiver. The capacitor has to be tuned for each frequency and the selectivity is excellent. The loop is highly directional and by rotating it, interfering stations can be virtually eliminated. The tuning is very sharp and it is advantageous to fit either a slow motion drive to the capacitor or to wire a small value variable trimmer (10 to 20pF) in parallel with it.

The gain is not as high as that of a long wire antenna, but this is more than outweighed by the much improved signal-to-noise ratio and the directional characteristics. The direction of a station can be determined within a few degrees by nulling it out to take its bearing. The broom-handle can be fitted into a box as shown, with the bottom fitting into a recessed slot to prevent it slipping.

The main frame can be made of ¼ in. (6mm) plywood or softwood. The wires should be wound very tight and should be kept that way (under tension the wire tends to stretch slightly). The softwood blocks merely act as bracers and as supports for the broom-handle.



NOVICE

The long awaited Novice Amateur Operators Certificate has finally come to pass. Within a few months we should hear the first Novice Amateurs on the air, as the initial examination is on the 24th of June this year and the following full Novice exam will be on the 18th of November. The Novice conditions are such that a Limited Amateur can sit for 5 wpm morse and obtain a Novice Licence as well as his Limited Licence. It will mean that many of those who seem to find morse the bugbear may be able to get his standard of morse and at least achieve some of the additional privileges a full status amateur already enjoys. Let us all hope that Novice Amateur Radio is a success and that it enriches the amateur service and that it is here to stay.

The conditions for the granting of the Novice licence are not greatly different to those proposed originally by the PMG but there are a few important differences, and I will endeavour to highlight these. There is to be no age limit on people wishing to apply, and the two year tenure doesn't seem to have been retained. The Novice licence will cost $6 instead of the normal amateur licence of $12, so perhaps the din made about the fee to the PMG did have some measure of success. The bands that will be allocated for Novice use are 3.525 MHz to 3.57 MHz, 21.125 MHz to 21.200 MHz and 26.960 MHz to 27.230 MHz, using crystal controlled transmitters with a power **OUTPUT** of 10 watts for constant carrier modes of transmission, and 30 watts **OUTPUT** for SSB.

The output power rating for constant carrier type transmissions is most unexpected and means that the maximum power output is about 50 per cent greater than had been expected with the 10 watt **INPUT** licence condition. It will also mean that low efficiency type transmitters can be used where versatility is more important than circuit efficiency, and that many of the Novice transmitter designs will in fact be considerably different to those normally used. It has caused me to do some re-thinking regarding the style of equipment that I will describe in AR, although the initial Novice transmitter will remain as it is with a few modifications to up its power on CW only.

The modes permitted for use are A1, A3, A3A, A3H, A3J, A3B and F3 with modulation of ± 3 kHz deviation. No doubt all modes of operation will be used although I expect that A3 (AM), A3A and J (SSB) and A1 (CW) will be the most popular modes, with AM/CW rigs perhaps being the most popular initially.

From what I have been able to gather the examination is likely to be of the multi-choice answer type and it will take less time to do than the traditional essay style examination used for the Limited and Full examinations. The Regulations examination will be identical in style to the existing Regulations exam, and of course the morse is just a half speed version of the 10 wpm morse used by the full privilege amateur now.

The style of morse used for the examination will no doubt be required to conform to the standards as set by the International Telecommunications Union of which Australia is a signatory. The characters will sound horribly slow and drawn out. A person who has just learnt the code out of the book should almost be at 5 wpm and be able to take the examination with very little study time involved. However, it is most important that morse be learnt correctly whether you are going to do 5 wpm or 50 wpm so please make sure your morse is of good standard both receive and transmit, as you will need to up-grade it to at least 10 wpm if you intend to become a full privilege amateur. Probably the best DX mode to use as a Novice is CW, also the cheapest, and is a good training ground in operating procedure, etc.

I have reservations about anyone who becomes a Novice and then proceeds to buy some so called Citizens Band radio and merrily operate on 27 MHz to the exclusion of all other bands. It will be a bit like the amateurs who now operate only their little black boxes on the 2 metre band and then mostly via the repeaters. No, don't get me wrong I am not necessarily "agin" FM, fixed frequency operation, and repeaters, but like many things too much of a "good thing" is not necessarily good. The people concerned in many cases appear to have Verbal Diarrhoea, and say nothing over a long period. I hope you as a Novice are not foolish enough to fall into this trap, as it is hard to get out of it.

Over the next few months David Down and I hope to present a number of projects and general hints which it is hoped will help Novices and Novices to be. It is hoped that the articles will be of interest to all newcomers, and that you the readers will write to David and me with your suggestions on how this column can help you. Do you think that the name of the column should be changed or is it okay as is? When Novicing is next written about in this column in about two months time the first exam will be over and the general conditions applying to Novicing should be much clearer than they are at the moment. If you have queries on Novicing please write to me and I will endeavour to get the correct answers so that confusion does not reign supreme. Cheerio for now and good luck in the exam. ■

Commercial Kinks

with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley, 3150

MODIFICATIONS TO THE YAESU FT75

The little Yaesu FT75 transceiver seems to have carved itself into a special niche for many amateurs. Being both small enough and light enough to fit into the family car without encroaching too much on passenger space, its success as a mobile rig is easily understood. Bob Martindale VK3BMA has come up with a few ideas that add to the operating convenience of this unit. Originally published in "The Radio Bulletin", journal of the Eastern and Mountain District Radio Club, Bob has kindly passed it on for inclusion in this column.

"Described here are three modifications I have performed on my FT-75. Performance of the unit is unaffected but operating is made more convenient.

1. Relocation of the PA bias adjusting pot

This potentiometer is mounted on the chassis of the transceiver and access is obtained by removing the top cover. The suggested alternative is to drill a hole in the top cover to enable entry of an adjusting tool. I was not too keen to drill a hole in the case, so a position on the rear panel was selected to enable direct access. The pot was mounted just below the VFO socket on the rear.

The hole in the chassis from which the pot is removed is then fitted with a grommet and the wires to the pot are passed through it after being extended.

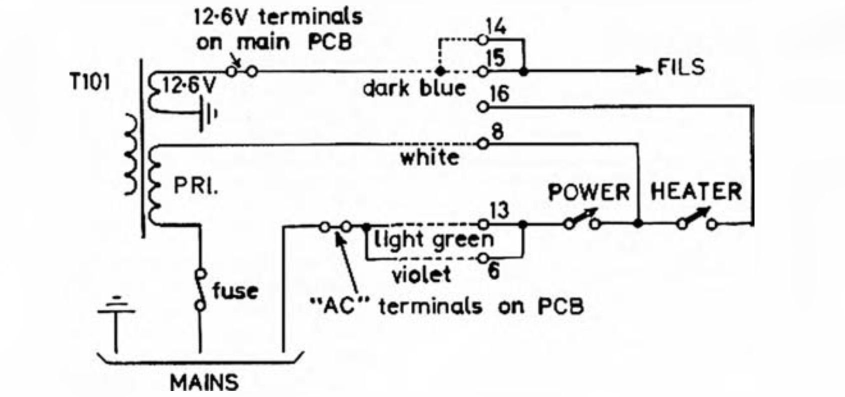
Adjustment of the PA bias is now much more convenient, particularly if the rig is frequently alternated between home and mobile operation with the DC-75 mob. power supply as in my case.

2. Rewiring of the filament supply to the driver and PA tubes

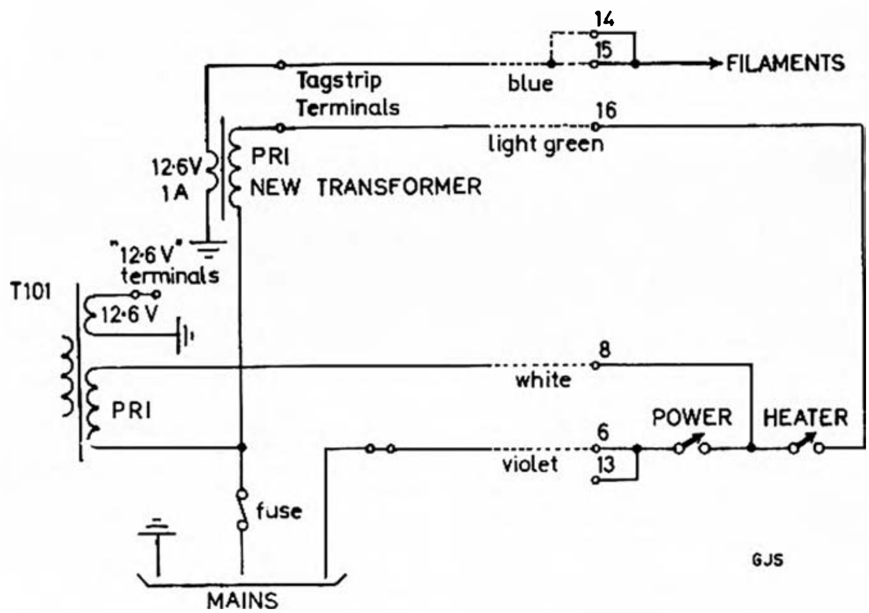
When operating the FT-75 on the FP-75 AC power supply there is no provision for switching off the driver and final filaments during lengthy periods of listening only.

Reference to the circuit diagram produced the following solution: The cable between the FP-75 and the transceiver has two conductors connected in parallel for the switched mains return to the power supply (the light green and violet coloured conductors). If one of these is unsoldered at the connector and inside the FP-75 a spare conductor is now available in the cable.

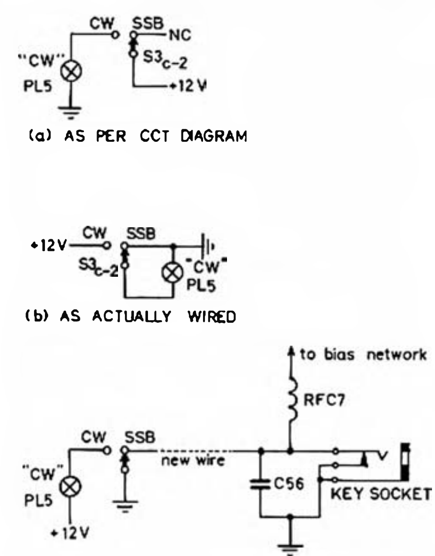
This spare conductor is used to provide mains voltage from the HEATER switch to the primary of an added filament transformer.



UNMODIFIED FILAMENT WIRING - FT75/FP75



MODIFIED FILAMENT WIRING - FT75/FP75



(a) AS PER CCT DIAGRAM

(b) AS ACTUALLY WIRED

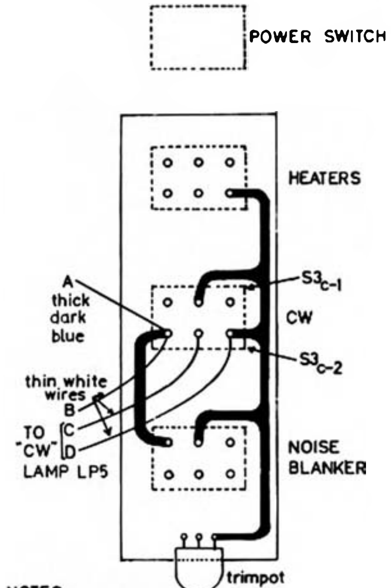
(c) AS REWIRED TO ENABLE KEY TO BE LEFT PLUGGED IN IN SSB MODE

CW SWITCH WIRING - FT75 6JS

The main filament supply conductor is transferred to the secondary of this new transformer.

3. Rewiring of the CW switch

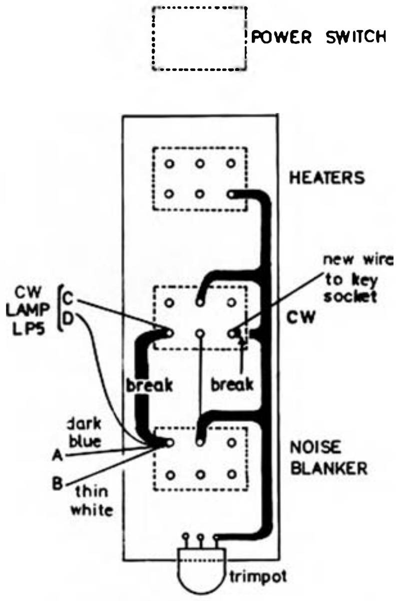
Due to the method by which the FT-75 is keyed for CW transmission and the arrangement for plugging in the key, the rig cannot be operated in the SSB mode while the key is left plugged in unless the key is held depressed. I prefer to leave the key permanently plugged in and select the mode of operation with a switch.



NOTES
1. Only relevant details shown.
2. Viewed from underside of transceiver.

GJS

UNMODIFIED CW SWITCH WIRING - FT75



MODIFIED CW SWITCH WIRING - FT75

Again reference to the circuit diagram produced a simple solution. S3c-2, the switch section controlling the 'CW' lamp PL5 is rewired according to the circuit diagram. The switch now places a short circuit across the key socket when the CW mode is not selected and the PA bias is now unaffected by plugging in the key."

I am sure that owners of the FT75 will find Bob's ideas worth a try. ■

PROJECT AUSTRALIS

with David Hull, VK3ZDH

The 1975 International AMSAT-Oscar Experimenters Conference was held in the Goddard Space Flight Centre, Greenbelt, Maryland, USA over the period 21st to 24th March, 1975. It was convened to define the next satellite(s) in the OSCAR series and to decide the responsibilities of the national groups involved towards developing these satellites.

Those who attended included Larry Kayser VE3QB and Bob Pepper VE2AO from AMSAT Canada, Karl Meinzer DJ4ZC from AMSAT Deutschland, Chuck Swedblom WA6EXV and Dick Kolbly K6HIJ from the San Bernardino Microwave Society, Jan King W3GEY and Perry Klein K3JTE from AMSAT HQ and Dave Hull VK3ZDH from the WIA Project Australis.

The principal area of discussion was Oscar 8 and the possible launch vehicle/orbit opportunities for this project. Without going too much into the alternative possibilities, which included a joint VK/VE satellite in an Oscar 6/7 orbit, it can be stated that the conference decided to go ahead on development of an AMSAT phase III advanced spacecraft for launch in mid-1978 and to concentrate all effort to that end.

The development is constrained by the launch date of the last Itos launch on the Delta 2910, a call-up mission with a mid-1978 target. Failing this launch the Titan 3C/377 Military launch could be considered as could the Space Shuttle scheduled for an expected first launch in June 1979. The orbit possibilities of these launches are 900 miles, Sun Synchronous (as per Oscars 6 & 7) for the Delta, Geostationary Synchronous for the Titan, and low altitude low inclination for the Shuttle. None of these orbits was considered entirely satisfactory for the Amateur Satellite service worldwide at our present state of development.

An optimum location for the Geostationary satellite was impossible to find; it would serve only one area for long periods at a time. The 900 mile orbit had been fully explored with Oscars 6 and 7 and there seemed little point to a lower shuttle height orbit. The only alternative seemed to be an initial launch into a 900 mile orbit with a subsequent in-flight manoeuvre to raise the apogee of the satellite to such a height that a considerable radio range would result for much of the orbit.

What the conference had in mind was to provide a viable alternative to the 20 metre band without any of the propagation problems of the HF bands. This in-flight manoeuvre would require the spacecraft to be fitted with an Apogee Kick Motor (an AKM, a small internal rocket motor) and this would be a completely new development for the Oscar Series. This motor would be fired by ground control some orbits after launch at a time determined by the orbit mechanics.

To this end, and to further advance our command techniques, it was decided to fly, also for the first time, an inboard computer. This unit would integrate the Command, Telemetry and general housekeeping of the whole spacecraft. The Computer would interface directly with Ground Station Equipment (GSE) computers in the worldwide chain of command stations. The Spacecraft computer would also arrange the transmission of telemetry in any format (RTTY, CW, BCD et al) as decided by the software fed from the command stations. Commands and operating schedules would also be decided in like manner by ground loaded software.

All this is an interesting technical exercise from the participant point of view, but what about the Oscar users?

The principal transponder would be a linear unit of 150 kHz bandwidth with reception either in the 2m or 70cm band and transmission in the alternative (70cm or 2m band). The exact choice of uplink, 2m or 70cm, and thus downlink, was not decided and the conference chose to refer this choice to a poll of interested parties.

In general, VE and VK with some of the W's favoured 2m up and 70cm down; the DJ and AMSAT HQ representatives were in favour of the alternative (as in Oscar 7). **Project Australis would appreciate feedback from VK satellite users on this question.**

Two or three Beacons will be flown. There will be a beacon at each end of the passband and, possibly, a 2304 MHz beacon if the present problem with the FCC on this question can be overcome.

It is anticipated that the AKM will push the satellite into an initial apogee over the North Pole of 7.2 earth radii. From the VK point of view this would provide 2-3 hours access to the whole of North America and Japan etc. every 12 hours. In time the apogee would drift southwards with consequent increasing satellite time to a maximum of perhaps 10 out of the 12 hour orbit time. About 1000 watts EIRP would be required for effective communication at apogee.

The responsibilities of the groups involved in building Oscar 8 were laid down as follows:

AMSAT Deutschland:

Design major units of spacecraft, i.e., transponder, integrated housekeeping unit including computer.

Build prototype spacecraft.

AMSAT Canada:

Build spacecraft both prototype and flight units.

Project Australis:

Design and build GSE equipment with ground computer etc., provide prototype for test use and 5-6 integrated units for world command stations before launch. Provide software for both spacecraft and GSE computers.

San Bernardino Microwave Society:

Design and build 2304 MHz beacon.

AMSAT HQ:

Provide overall system management, procure components, arrange launch, provide operations management once spacecraft is in orbit.

As will be seen this is an ambitious program and is, of course, subject to future changes and modifications as circumstances may demand. The planned spacecraft is, however, a logical expansion of the AMSAT-Oscar programme and we believe within the capabilities of the international participants given reasonable fortune and support.

On a personal note I would like to thank sincerely Larry Kayser VE3QB, Perry Klein K3JTE, Tom Clark WA3LND and Jan King W3GEY amongst many others who made the author so welcome and provided the hospitality for which the W and VE amateurs are so well known. In addition, I would like to thank the Executive and Divisions of the WIA whose faith in Project Australis and the Oscar programme made my trip possible. I hope the end justifies the means.

NOTES ON WASHINGTON AND OTTAWA

As might be imagined, the author was very interested in amateur radio operation in North Eastern US and Southern Canada during his recent visit. Due to commitments, listening was limited to Oscar passes and FM operation whilst mobile. The amount of traffic through the Oscars, particularly mode B on AO7, was incredible to a listener used to Southern Australian conditions. At one stage 10 call areas were counted in as many minutes, all on SSB. The number of European countries available to a VE3 just serves to highlight the lack of Oscar activity in the South East Asian countries within our range. It also serves to emphasise just how much a high altitude satellite such as Oscar 8 would mean to VHF in VK. Some measure of the impact of AO7 and 6 on Regions 1 and 2 can be gauged by the number of articles on satellite subjects appearing in the amateur press, but the effect on a stranger first-hand is a little overwhelming. They sound like an open 20m in a contest. This activity is also reflected in the number of amateurs joining AMSAT, currently running in the order of 80 per week! VKs are reminded that AMSAT dues will rise from US$5 to US$10 per annum on July 1st so if you have an interest in satellites join NOW. Life membership, a real bar-

gain now at US$50 will double also. FM repeaters operation in W and VE was also a little strange to a VK. Most repeaters are privately or club operated, some carry Loud idents, some don't, some are on 24 hours a day, some only at night. In the latter category fell the AMSAT repeater in Washington WR3ABU (146.25 to 146.85 MHz). This unit had a loud audio tone ident consisting of the call letters and the words AMSAT REPEATER at 10 wpm. This seemed to go on for ever to the author, but I guess only took 10 seconds or so. Other repeaters are used solely as links to tie two other repeaters together in towns 50 miles or so apart. Remote control of these is common, as in multi-frequency operation with remote telemetry links. All VHF bands from 50 MHz up are used to accomplish this. As can be imagined, there are problems. Particularly in de-sensitisation of a mobile receiver under shadow of a 500 watt repeater on an adjacent channel. One thing I noticed was the remarkable absence of button pushers, all the operation I heard was courteous and well managed. Due to their regulations, call signs are not given on every over and as a personal observation it seemed to me that this cut down a lot of unnecessary transmission. Touch tone operation was required for some repeaters. In general, the same power levels were used. IC 22s and similar rigs were common as were hand-held units. All in all most interesting and perhaps a portent of future operation here.

OSCAR PREDICTIONS

OSCAR 6
JUNE

Day	Orbit	Time Z	°W
1	12001	01.19	70
2	12013	00.19	55
3	12026	01.14	69
4	12038	00.14	54
5	12051	01.09	67
6	12063	00.08	52
7	12076	01.03	66
8	12088	00.03	51
9	12101	00.58	65
10	12114	01.53	79
11	12126	00.53	64
12	12139	01.48	77
13	12151	00.48	62
14	12164	01.43	76
15	12176	00.43	61
16	12189	01.38	75
17	12201	00.38	60
18	12214	01.33	74
19	12226	00.33	59
20	12239	01.28	72
21	12251	00.27	57
22	12264	01.22	71
23	12276	00.22	56
24	12289	01.17	70
25	12301	00.17	55
26	12314	01.13	68
27	12326	00.12	53
28	12339	01.07	67
29	12351	00.07	52
30	12364	01.02	66

OSCAR 7
JUNE

Day	Orbit Mode	Time Z	°W
1	2472B	00.04	51
2	2485A	00.59	64
3	2498B	01.53	78
4	2510A	00.52	63
5	2523B	01.46	76
6	2535A	00.46	61
7	2548B	01.40	75
8	2560A	00.39	60
9	2573B	01.34	73
10	2585A	00.33	58
11	2598B	01.27	72
12	2610A	00.27	56
13	2623B	01.21	70
14	2635A	00.20	55
15	2648B	01.15	68
16	2660A	00.14	53
17	2673B	01.08	67
18	2685A	00.08	52
19	2698B	01.02	65
20	2710A	00.01	50
21	2723B	00.55	64
22	2736A	01.50	77
23	2748B	00.49	62
24	2761A	01.43	76
25	2773B	00.43	60
26	2786A	01.37	74
27	2798B	00.37	59
28	2811A	01.31	72
29	2823B	00.30	57
30	2836A	01.25	71

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With Syd Clark, VK3ASC

BREAK-IN Jan/Feb 1975
Transistor Testers; VHF/UHF Rejection Filters Using Coaxial Stubs; Reflections on a Commercial Rig; Some Thoughts on Mobile Noise Suppression.

CQ MAGAZINE Dec & Jan 1974-75
Digital Speed Readout in an Electronic Keyer; Results of the 1974 CQ World Wide WPX SSB Contest; Announcing the QRPp Transmitter Design Contest; Loss in Transmission Line Systems; Antennas. 1S1A Spratly Island Expedition — 1973; Transistor Final Techniques; Antennas.

HAM RADIO Dec & Jan 1974-75
Understanding Q; Collins 75A4 PTO Maintenance; Circularly Polarised Satellite Antenna; FM Touch-Tone Decoder; IC VTVM Conversion; VHFer's View of Solar Cycle; Improving Vertical Antennas; RTTY Message Generator; Low-Cost Printed Circuit Boards; Az-el Antenna Control System for Satellite Communications; Audio Oscillator; Regulated, Variable High Voltage Power Supply; Electronic Keyer Paddle; Wind Driven Power Generators.

QST Feb 1975
The Contester; A State of the Art QRP Transceiver for 50 MHz; Precision Tuning, WWII Vintage; Frequency Counter, a Modular Approach; Practical Ideas for the ITV Enthusiast; Transmitting Variables — Who Needs 'Em; A Stacked Multiband Vertical for 80-10 Metres; Simple 160 Metre Converter.

RADIO ZS Dec '74, Jan '75
Ham-M Operation for the Blind; RTTY; Intruder Watch, The IARU Monitoring System; Keeping Track of Oscar 7; A Coaxial Phase Detector; PEP Definition and Methods of Measurement.

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

The Editor,
Dear Sir,

On the Queen's Birthday weekend, the NSW Div. VHF & TV Group, is conducting a Field Day contest. The period is from 1200 hours EAST, 14th June to 1400 hours EAST, 16th June 1975. There are 3 sections; Field, Mobile and Home stations, with the best 6 hour and overall score in each section. The points score table is basically as the Ross Hull, on page 13 of the October 1974 issue of AR, with a loading for tunable operation.

Full details can be obtained from the Group's address: 14 Atchison St., Crows Nest 2065.

A. D. Tilley VK2ZYT, Secretary.

The Editor,
Dear Sir,

THE FRIENDLY CONTEST

Amateurs must have been pleased to note that 822 amateur operators forwarded logs in our last Remembrance Day contest. I could suggest that we reached that figure "without even trying"?

All would certainly feel proud if we toppled 1000 by just trying a little.

Book someone, who missed last year, in for this year's contest and for sure we'll top 1000.

Quantity should not reduce quality . . . the exchange of Christian names, for those who have time, and the big scorers do not have time if they are to score well, seems to be catching on and really makes the contest "Friendly".

Help a lot of chaps enjoy the 1975 Remembrance Day Contest.

Peter H. Brown VK4PJ.

The Editor,
Dear Sir,

Recently the VK3 State Repeater Committee held a combined repeater meeting on Saturday 15th February at Melbourne. It was stated at the meeting that the Post Office has as last released the call sign block VK3RAA to VK3RZZ for repeaters. This means that the Victorian application to have repeater call signs in accordance to their place if required will at last come into being.

VK3RML	Melbourne
VK3RGL	Geelong
VK3RWZ	Western Zone
VK3RLV	Latrobe Valley
VK3RMM	Mt. Macedon
VK3RAM	Midland Zone
VK3RSH	Swan Hill
VK3RBA	Ballarat
VK3REG	East Gippsland
VK3RAP	Mt. Arapiles

The meeting decided that all future repeater installations around the State can only be satisfactorily achieved by the use of seven repeater channels in accordance with the 1973 WIA repeater band plan. Many problems of overlap thus will be overcome.

Repeater Standards were fully discussed and unanimously agreed to adopt a universal and uniform set of repeater standards: Deviation plus/minus 7.5 kHz average with 10 kHz peak. Power up to 150 watts DC input if required (local service area repeater will not require this power). Identification: it was agreed that FSK be used. Squelch tails: it was decided for one second Silent tail to be adopted and applied to all repeaters, throughout the State. Two and a half minute timers in accordance with Post Office requirements would be put on, and country repeaters a 5 minute timer would be allowed. A tone on Time Out would also be applied.

Rules for Repeater Operation were also discussed, and were also unanimously agreed to by all repeater project leaders and officers.

1. Repeaters are used for MOBILE working and intended to extend mobile coverage, eg. Mobile to Mobile; Mobile to Base. Also used for any Base to Base or Base to Mobile station to establish contact. Where it is possible for any station mobile or base to work on Simplex, then they should do so.

2. If a Breaker breaks in, he should be given the go-ahead immediately; this allows for emergency calls, or a quick joining or leaving of the net.

3. Up to two minute transmissions to apply, giving the 2½ minute timer a half minute grace before time out. This is in no way to restrict the length of QSOs, only the length of the transmission, to Time Share for all users.

4. Let the repeater drop out before commencing transmission.

5. Don't Talk 'Waffle' — If you have nothing to say — Don't say it.

For further details or information, please write to the Repeater Committee Secretary, Mr. Ken W. Jewell, VK3ZNJ, 100 McClelland Ave., Lara, Vic. 3212.

W. G. Francis VK3ASV, Publicity Officer,
Vic. State Repeater Committee.

The Editor,
Dear Sir,

Since I wrote some time ago suggesting that some VK hams might like to make the effort to speak a little elementary Japanese, I have received quite a few enquiries on the 'phone and on the air.

It would appear that a considerable interest exists and the usual query was "How does one go about it and where do you start?" As all active DXers know, there is never a time of the day or night that you can't hear droves of JAs on at least one of the HF bands, so there is never a shortage of Japanese speaking hams to practice on. Without exception they are extremely co-operative with any foreigner interested enough to try and master a little of their language.

When listening to two JAs rattling off a QSO in their native tongue, it would appear an impossible task to ever get beyond the "sayonara" stage but, by slowing down the tempo, things become a little clearer for all concerned and this is the first essential requirement. Remember it's just as difficult for an average JA to fully understand our rapid mode of everyday speech.

Well now, to get started on a few basic words that are in everyday usage on ham radio and, at the same time, bearing in mind that it is practically impossible to write the correct phonetics of any foreign language in an English form. The obvious answer is to listen intently to the way they pronounce words. What better teacher can you have than a Japanese national brought right into the shack, via the loudspeaker.

Let's start with the usual opening greetings of "good afternoon" and "good evening". These are respectively "kon-nichi wa" and "konban wa" but remembering what I said earlier about concentrating on the way they say it.

I suggest the next simple step would be to make out an "idiot sheet" with the numbers "one to ten" as this fits in admirably in giving a sig. report and it goes something like this —

1. Ichi	6. Roku
2. Ni	7. Nana
3. San	8. Hachi
4. Yon	9. Ku
5. Go	10. Ju

A report of 4-6 would be forty six in Japanese, which is "yon ju roku" from your idiot sheet. Likewise 5-8 would be "go ju hachi". Get the idea!

One other important point when speaking to a JA is to tag "san" on to the end of his handle as a form of politeness, but NEVER on the end of your own name. In the same way he will add "san" to your name, but NEVER to his own name.

Let me finish up by saying I don't possess a Ph.D. in the Japanese language. Far from it. I have only read text books and practised it, via ham radio, and I find that making an effort to meet the JAs half way makes the more mundane QSO a little more enjoyable than the usual "Hello-Goodbye" type of contact.

I trust the foregoing proves of sufficient interest to those who would like to try out their linguistic talents and so gain confidence towards an improved vocabulary in the future.

R. B. Monfries VK5RB,
975 Main Road, Modbury, SA, 5092

EDITOR'S NOTE—For those interested in studying Hiragana and Kata Kana further, the book "How to use Good Japanse" (the Japanese School of the International Students Institute, Tokyo), is recommended.

Contests

with Jim Payne, VK3AZT
Federal Contest Manager,
Box 67, East Melbourne, Vic., 3002

JOHN MOYLE MEMORIAL NATIONAL FIELD DAY

One late entry from VK6II, the 29DX club, with a score of 944 in the 24 hour multi op open. Bad luck seems to have dogged these fellows for the log bears the comment "Hon Sec got horribly lost in trying to find a field day site". However, from the variety of calls listed, it was a good choice.

Lots of comments from all call areas and these will be considered before the rules, etc for the next contest are published. It is difficult to draft the rules free of anomaly but hopefully we are improving.

VK4AL was at Mt. Nebo National Park about 25 km NW of Brisbane, and 1800 feet above sea level. An FT75 for 7 & 14, FT100B for 3.5 and 21 and a Pye 734 for 146 were powered by a 300 watt generator. An inverted V slung in a tree was used for HF and a 5/8 whip for VHF.

VK1JR was near Tumut with a TS520. There is mention of 4 doz. cans — petrol for the 2 kW generator or lubricant for the VF?

VK3YQ was marine portable with an FTDX 100 on Lake Eildon. VK3ADW was in the same area with an FTDX 100 and a 10 watt AM rig for 160. A 133 flat top tuned feeder was used for HF and a dipole for the 160 rig.

VK3TX was using an FT101 with battery pack and generator at Snowy Plains, about 170 km north of Traralgon. Using another rig on 2 metres, Dean's log shows a QSO with VK3LT/P and the RS/T reports are 51009, 529015. A comment on the cover sheet states "The contact with VK3TL/P on 2m is real; my transmission by F2 mode".

VK2YB used an ATR2B with a battery powered vibrator providing about 15 watts input, at Springwood.

VK2CAX selected the Jenolan State Forest to erect an 80 metre dipole, 20m groundplane and 52 MHz Yagi. The rigs HW101, MR20B, a home made linear and a 52 MHz transverter were powered from an E2500 generator.

VK3AUQ went to Christmas Hills, about 35 km east of Melbourne with home brew and other gear to work 1.8 through 28, 52, 144, 146, 432, 576 and 1296. The last two were not used.

VK4AAR operated an FT101 from a battery, into a 300 foot long wire for 20 and a to'ded dipole for 40 and 15 at Moggil, 40 km SW of Brisbane.

VK5AWI was set up 1800 feet ASL on Mt. Gawler, 25 km NE of Adelaide. Their 3 kVA generator failed after only half an hour and an 800 watt took over. Alan suggests that a national simula'ed emergency test similar to those held in the US would provide an opportunity to demonstrate the effectiveness of portable equipment and give valuable experience in message handling.

VK8AS was located 3 miles north of Alice Springs at the old telegraph station with a 6 kVA generator, several rigs SB101, FT200 and TR3. A 400 foot long wire was used for 3.5, 21 and 28.5 bands.

VK5SR used an 18 AVT vertical with 8 radials and an FTDX 560 with a 1500 watt alternator at the Bluff, 20 km NW of Mt. Gambler.

P29PNG was a special call allotted to P29FV, BG, WB, MO, EM and ZMJ for the duration of the contest. The three operating positions were set up within the Murray Barracks area about 5 km from Port Moresby. Gear included T4XB, R4B, FT101B, FL2100, TS510 and FT200. Antennas were 14AVQ, 18AVT/WB, a dipole and long wires.

VK3ATM went to Blue Mountain about 8 miles south of Trentham. They worked all bands 160 to 2 metres.

1975 CQ WW SSB CONTEST

Although this contest fell on Easter holiday this year there were quite a few VKs and ZLs active. Peter, VK4PJ reported that "conditions were not the best. The long path into the east coast of the Americas must have heard of the Easter break but came back to work on Tuesday.

"Very little from the western side of Europe and the evening long path no help. Even JAs were comparatively scarce except for a few 15 metre breaks. Stateside 15 metre stations below par. At the times I operated there were no 10 metre contacts. Quite a few Russian stations on 20 metres which was easily the best band. I heard quite a few VK4s, including Roy, VK4ZQ, with over a 1000 contacts and VK4UR with a substantial score".

REMEMBRANCE DAY CONTEST

This year it is on the weekend of August 15/16. At the Federal Convention the ban on the use of repeaters for contest QSOs was reaffirmed. The rules and scoring table will be in next month's AR.

CONTEST CALENDAR

JUNE:	
7/8	RSGB National Field Day
15	Townsville Pacific Festival Contest
21/22	All Asian Phone
28/29	ARRL Field Day
JULY:	
12/13	ARRL Open CD CW
19/20	ARRL Open CD Phone
26/28	County Hunters CW
AUGUST:	
9/10	European DX CW
15/16	R D
23/24	All Asian CW

RSGB NATIONAL FIELD DAY

1700 GMT June 7 to 1700 GMT June 8th.

Stations outside Great Britain not eligible to enter but a certificate will be issued to the VK station whose check log shows most contacts with British portable stations. Send logs to RSGB HF Contests Committee, c/- A. Davis, 41 Gainsborough Road, Crawley, Sussex, RH10-5LD, England.

VK-ZL Oceania DX Contest Rules - 1975

The National Amateur Radio Association in Australia invites world wide participation in this year's contest.

Objects: For amateurs of the world to contact VK, ZL, Oceania stations on all bands, 1.8 through to 28 MHz.

Dates: Phone — 1st weekend in October, CW — 2nd weekend in October. Starts 1000 GMT Saturday, ends 1000 GMT Sunday.

Type of Competition:

1. (a) Transmitting Phone — Single Operator
   (b) Multi Operator outside of VK/ZL.
2. (a) Transmitting CW — Single Operator
   (b) Multi Operator outside of VK/ZL.

Number Exchange: To consist of five or six figures, made up of the RST report, plus three figures which commence at 001 and increase by one for each successive contact.

Scoring —

Oceania Station: 2 points for each QSO on a specific band with VK/ZL, 1 point for each QSO on a specific band with the rest of the world.

World Station: 2 points for each QSO on a specific band with VK/ZL, 1 point for each QSO on a specific band with Oceania other than VK/ZL.

Final Score for Oceania and World Stations is derived by multiplying total QSO points by the sum of VK/ZL call areas worked on all bands. (The same VK/ZL call area worked on different bands counts as a separate multiplier.)

VK/ZL Stations: 5 points for a contact on a band, and in addition for each new country worked on that band, bonus points to be added as follows: 1st contact — 50 points; 2nd contact — 40 pts; 3rd — 30 points; 4th — 20 points; and 5th — 10 points.

VK/ZL on 80 Metres: As well as to overseas countries, contacts on this band between VK/ZL counts for points. Each call area of VK and ZL to be considered a scoring area.

VK/ZL on 160 Metres: As well as to overseas countries, **for this band only** contacts between VK/ZL, VK/VK, ZL/ZL, count for points: NOTE: an entrant may claim points for contacts in the same call area.

Final Score is the result of the QSO points plus bonus points for that band and final score is the result of the all bands score added together.

Logs: (a) Must show in this order: Date, time in GMT, Callsign of station contacted, band, serial number sent, serial received. Underline each new VK/ZL call area contacted and make separate log for each band used.

(b) **Summary Sheet to show** — Callsign, name and address (usé block letters please) details of equipment used and for EACH BAND QSO points for that band and total of VK/ZL call areas worked on that band.

All Band score will be total QSO points multiplied by sum of VK/ZL call areas on all bands while "SINGLE BAND" scores will be that band's QSO points multiplied by VK/ZL call areas worked on that band.

Sign a declaration that all rules and regulations have been observed.

AWARDS

For Overseas Stations: Top scorer using all bands in each country (each call area in Japan, USA and USSR will be considered as a "country").

VK/ZL Stations: The WIA will award Certificates as follows: 1. Top scorer on each band for VK, and ZL; 2. Top scorer in each VK and ZL Call area.

General: There are separate awards for CW and Phone. Certificates, other than those issued above may be awarded and these will be determined by conditions and activity.

Listener's Section: To count for points, **a VK or ZL station ONLY** must be heard in a QSO and the following details noted in the log — Date, time in GMT, call of the ZL or VK station heard, Callsign of the station he is working, RS(T) of the VK/ZL station heard, band, points. Scoring is on the same basis as for the transmitting section and the Summary Sheet should be similarly set out.

Return of Logs posted to reach —

VK/ZL Manager — WIA, GPO Box 1002, Perth, 6001, Western Australia
or
N. Penfold, VK6NE, 388 Huntriss Road, Woodlands, 6018, Western Australia,

before 31st January, following the contest.

20 Years Ago

with Ron Fisher VK3OM

JUNE 1955

It's hard to believe, but the 6146 tube is now over twenty years old. Philips had a front cover advertisement for this historic output tube on the front cover of the June 1955 Amateur Radio. Apart from the old 807 which is now around thirty-seven years old, the 6146 must rate as one of the most popular 'amateur' tubes ever produced. It's interesting to note that some of the very latest solid state rigs use the 6146 as an output stage.

An interesting group of technical articles appeared for June 1955.

In the first of a two part series, N. Southwell VK2ZF described the theory and construction of 'Wideband Phase Shift Networks'.

Construction of a Cheap Beam. Tom Athey VK5UT used a wooden frame to support an 8JK type beam cut for the twenty metre band. Tom used dressed pine which even today would be fairly cheap. Talking of the W8JK beam, I cannot think of anyone using this antenna any more. Although bi-directional they gave a useful amount of gain with the advantage of multi-band operation.

Have you ever gone portable? The late 'Pansy' Parsons took a lighthearted look at the combined effects of a quiet holiday and amateur radio. After much effort the only contact that eventuated was with an arch enemy from VK3 by name of Pincott.

Several new appointments were announced to Federal Executive. President and Vice-President were Bill Mitchell VK3UM and Max Hull VK3ZS. Other new members included Rick Ewin VK3AGC, Bill Falconer, Bill Gronow VK3WG and George Glover VK3AG.

The Editorial page for June 1955 took an appreciative look at the efforts of all who were working to the benefit of the Institute and its members. Many of those old-timers are still at it. ■

Intruder Watch

with Alf Chandler VK3LC

1536 High Street, Glen Iris, 3146

JUNE, 1975

It is with some feeling of satisfaction I have learned that the formation of the IARU Monitoring Service (IARUMS) Region 3 was achieved at the Region 3 Conference held in Hong Kong in March this year. It is now my responsibility to get the service working throughout the region, and it will take quite a deal of organising to obtain the co-operation of all Pacific countries.

During the last few months reports have been flowing in from Observers more readily than previously, and I must thank all concerned for their reports. Keep it up, fellows!

Unfortunately we are losing our VK3 Co-ordinator. Albert Cash has been doing that job for quite a few years now, and I must thank Albert and note that we are very appreciative of his efforts. It is with a great deal of pleasure, though, that I can announce the appointment of a new co-ordinator in the person of Ivor Stafford, VK3XB. Ivor has had many years of successful participation in the Victorian Division affairs, and I do hope that Members will rally around Ivor to make the VK3 Intruder Watch one of the best in the Commonwealth. There are plenty of stations to report and many Observers are necessary to cover all bands.

Also it is with pleasure that I announce the appointment of Les Weldon VK2AFG as the new Intruder Co-ordinator for NSW. Members in VK2 now therefore have a focal point so please rally round and give Les your full support.

From my summary issued at the end of the three months to 31st March the following Intruders have been identified—

14030-14040	MOEX	— A Red China CW station calling DVQT.
14085	HZV	— A North Vietnamese CW press in English and in Vietnamese.
14100-14130	ZCPU	— A Red China CW station calling YMBK.
14250	BCX24	— A Taiwan CW station in Taipei. Press in English.
7020-7030	NMOY	— A Red China CW station calling WHQ4.

The Radio Peking stations are still operating broadcast in the 7 MHz band accompanied by the Russian jammers, who transmit an overmodulated A3 signal using Majak USSR 2nd program audio, to the dire detriment of Amateurs who use that band. Broadcasts in the 3.5 MHz band also seem to be becoming more prevalent.

I have reported all the above to our Authorities with a strong recommendation, now that the Australian Government has been sending delegations to Red China and to North Vietnam, for complaints to be lodged with the respective Governments.

I wonder if anything will eventuate? ■

Y.R.C.S.

with Bob Guthberlet

3 Bandon Terrace, Marino, SA

A recent Press anouncement indicates that the Novice Licence will become available within the next few months. Supervisors and Club Instructors should start now preparing candidates for the first examination in June 1975. The format is a multi-choice (tick the right answer) type of theory exam and the normal ordinary Regulations exam we have all had to pass. The important message to clubs is that they should produce many candidates and justify this new licence.

To encourage students for future Amateur Radio Operating I suggest that Club Leaders promote Short Wave Listening, making an incentive award each month for the best DX logs. Remember . . . incentive recognition plays an important part in our TV and Radio "soap box operas" and brings results. Another vital factor in successful club management is the element of "surprise". Try something new — don't let your programs become stodgy and, most important, involve the parents.

What's in a name? The Federal Constitution awaits ratification by the Federal Council of the Wireless Institute of Australia. This and its predecessor designates that we are a "Youth orientated organisation. A suggestion has been made that we should consider changing the name to "Amateur Radio Training Scheme" the point being made that we have many adults associated with the Scheme. Now, please do not read this, shrug your shoulders, and say, "So what?" It will cost you just 10 cents and a scrap of paper to write me and express your opinion.

Are you aware that we are part of an organisation which purports to be communicative but which, in reality, is uncommunicative. Now for another suggestion: should we delete the "Hobby" from our Constitution, literature and publicity and substitute, say, "leisure activity"? Again, I would appreciate your reply . . . just a scrap of paper, ten cents and my address, 31 Bandon Tce., Marino, SA. 5049, and I challenge you to prove me wrong about the "uncommunicative" response to communication!

One of the major hindrances to club programs is that of finance. It would appear that in my case, because we handle so little, we do so little. However, let us remember that we are responsible for the monies we receive, and further, if YRCS is to make successful application for Government assistance, it will be necessary to prove that we are worthy of such aid. Make sure that your club treasurer gives receipts, have more than one operator for the banking account, produce a yearly audited statement, and ensure that payments are made with the endorsement of a committee. Without these safeguards we can never hope to receive financial aid. ■

An A R Special
The 39th Annual Federal Convention of the WIA

The 39th Federal Convention of the Institute was held in the Conference Room of the Belvedere Lodge Motel in Richmond, Melbourne over the Anzac Day weekend, Friday 25th April to Sunday 27th April, 1975.

The Convention was chaired by the Federal President, Dr. David Wardlaw, VK3ADW.

Divisional delegations were headed by Federal Councillors E. Penikis VK1VP (assisted by P. Bowers VK1YS, Alternate Councillor) — I. Binnie VK2ZIU, R. J. L. Kelly VK3NT (assisted by Alternate Councillor A. Moffat VK3FJ and observers A. M. Goode VK3BDL, I. R. Morehouse VK3YAY and P. S. D. Edwards VK3ZZU), L. Blagbrough VK4ZGL (assisted by Alternate Councillor N. F. Wilson VK4NP), I. J. Hunt VK5QX (assisted by Alternate Councillor C. J. Hurst VK5HI), N. R. Penfold VK6NE and P. D. Frith VK7PF.

Others giving up all or part of their weekend to attend and assist in specialised spheres included members of the Executive K. V. Roget VK3YQ, K. C. Seddon VK3ACS and P. A. Wolfenden VK3ZPA as well as W. E. J. Roper VK3ARZ, M. J. Owen VK3KI, D. J. B. Hull VK3ZDH and J. B. Payne VK3AZT — Editor of AR, IARU Liaison Officer, Project Australis Chairman, and Federal Contest Manager respectively.

Recording equipment was loaned by Max Hull VK3ZS and both he and Cyril Maude VK3ZCK operated it despite some late evening audio interference from a 120 dB sound source close by in the same building. The Convention ran daily from about 09.00 hours until 23.00 hours or later with short breaks for meals. Additional work continued into the early hours of the morning on several subjects requiring specialised debate or further clarification.

This Convention can be labelled "the Financial Convention".

Very lengthy and searching debates in committee high-lighted in depth research into ways and means of combating the inflationary trends affecting the WIA — exactly as it does the whole of society. The problems were no less easy to resolve when it is remembered that the budget for the year was approved as long ago as the previous Convention and the budget under which the Institute's affairs were conducted last year was set out in April 1973. Some inflation had been foreseen and allowances had been made but in actuality the extent of the rises in costs exceeded all the estimates so carefully calculated for the budgets. Deficits therefore arose each year and have to be faced now rather than be allowed to accumulate to the extent of becoming lethal.

The Institute at the Federal level is owned in equal parts by the Divisions and these are the members of the Federal body. The Federal part of the Institute is, and always has been, keenly aware that the whole of the WIA, including the Federal part, is supported by the members of the Divisions. The WIA exists for the benefit of these members.

It was therefore exceedingly difficult and indeed necessarily unpalatable for everybody to realise that deficits can only be overcome by the efforts of the membership through the Divisional organisations as presently constituted. Whether the necessary finances can derive from additional subscriptions, increased membership, fund-raising activities of various kinds or a combination of part or all of these or other means must rest with the Divisions. The Federal part of the Institute is small in numbers, limited facilities and merely exists as a central body to produce AR, to guard the amateur service at national and wider levels, and to provide various common services which can be more efficiently and economically carried out — in bulk as it were — on a centralised basis.

The Federal Council did not hesitate to demand a further financial review in August/September so as to examine at that time the further depredations of inflation. Each Division can thereafter decide its subscription levels for 1976 which must of course be finalised by November so that subscription notices can come from the computer for distribution. At this point in time the Council directed that the Federal element of RACT grade subsriptions for 1976 should be $14.50 — subject to the review in September. This amounts to only 28 cents per week which in this light appears very reasonable when compared with the price of a daily newspaper. It should be remembered that the rates for students and pensioners are considerably lower.

Having got through this very complex and much undesired but exceedingly necessary business, the Council could then concentrate upon several other important matters requiring attention.

These included such diverse items as the IARU Region 3 1975 Conference recommendations, the urgent need for a properly qualified and impartial person to look into the whole of the WIA to report upon numerous aspects of the Institute including efficiency, administration and organisation, the very recent introduction of Novice licensing, the gathering storm clouds of the 1979 WARC where the whole frequency spectrum will come up for review by the ITU, and a number of domestic affairs requiring examination, revision or action.

The Executive for the ensuing year was appointed and was the same as for the previous year except that Ken Seddon VK3ACS took the place of Jack Martin (departed to South Australia) and Russell Kelly VK3NT replaced David Rankin VK3QV (extended absences on business to Singapore plus his growing duties as Region 3 Secretary). See page 8 AR of May 1974. The Council was honoured with a visit and informal discussions with the DADG of the Radio Frequency Management Branch. Amongst other items he gave an outline of the work going ahead preparatory to 1st July 1975 when the Telecommunications and the Postal Commissions come into being of which the Regulatory and Licensing Branch (RFMB) would not form a part. As a consequence of re-organisation a Radio Act would replace the present WT Act and it was expected this would relate more closely to modern conditions. The arrangements made for Novice Licensing were outlined and it transpired that the theory exam for this would be of the multi-choice ('polysampling') kind although the Regulations exam would of course follow the same lines as this particular exam for the other two grades of Amateur Licence.

Very briefly, the following includes some of the other business conducted at this Convention:—

☐ The WIA follows a policy consistent with the aims of IARU Region 3 in relation to WARC 1979 and prepartory work for this including the following for all ITU Regions:

- Return of 1800-2000 kHz band;
- Eliminate sharing 3500-400 kHz;
- Expand 40 m band to 7000-7500 kHz and eliminate sharing;
- New amateur bands about 10.5, 18.5 and 24 MHz;
- Expand 20 m band to 14-14.5 MHz;
- Expand 15 m band to 21-21.5 MHz;
- Retain 10 m band as it is;
- Press for retention of all presently assigned VHF/UHF bands, new amateur band at 220 MHz and obtain allocation of further amateur bands up to 275 GHz.

☐ A WIA item requires the Executive to pursue the return to us of 50-52 MHz.

☐ Press for the amendment to ITU Radio Regulation 41 describing the Amateur service) which is phrased in such a way that anyone unfamiliar with Amateurs who reads the amended version can immediately see what the Amateur service does.

☐ Delete definition of "Amateur Satellite Service" which is of course the source of present satellite operations band restrictions.

☐ Apply the ITU fund towards the costs of any amateur delegate of the WIA officially participating in WARC 1979.

☐ Begin a fund-raising campaign for increasing the ITU fund.

☐ Support for WIA Project Australis, need for PR work, March visit of Mr. D. Hull to the special meeting in Washington concerning, inter alia, Oscar 8 and possible geostationary orbit such that contacts with KH6, J, VE, W, etc.-lands through such a satellite could be consistently better than present ionospheric unreliability of 20 m band.

☐ 1975-76 Call Book is under way but much work remains to be done. This ends present contract and now must consider future of the publication. AR quality and costings are under continual review — can only produce it from material supplied by the members. Hamads from non-members increased in price in line with current commercial advertising rates recently increased. AR is vitally important to the membership.

☐ YRCS Constitution laid on the table.

☐ Rules for all contests (including RD Contest) now in the hands of FCM, but VK6NE continues (with grateful thanks) VK/ZL/Oceania contest. Every contestant has own notions of what the rules should be and all ideas on this should go to FCM to help him in his work. Satellite endorsement for various VK awards to be investigated.

☐ New 70 cm band plan now required in view of PMGs approval of allowing unattended repeaters and beacons between 430-440 MHz. VHF/UHF Advisory Committee is active on this as well as the TV Channel 5A and Channel 0 problems. The present Committee will continue for another three-year term.

☐ Continuing requirement for a Federal Interference Co-ordinator but no volunteers appeared.

☐ Federal WICEN Co-ordinator (VK1QJ) and Committee (to be set up in WIA ACT Division) were approved to improve VK-wide co-ordination plus liaison with NDO for emergencies (vide Cyclone Tracy experience, etc.).

☐ A very strong need was felt for a full-time Public Relations officer to "sell" amateur radio to the media but finances disallow this at present. Also the need to motivate every amateur to be an ambassador for amateur radio in the proper manner.

☐ WIA to negotiate for the removal of restrictions on Amateur RTTY transmissions in regard to frequency shift, code used and (from 1974) mode of identification (also applicable to ATV etc.). Also WIA to negotiate for removal of separate ATV permits and /T suffix.

☐ Legislation be sought to control the sale of radio transmitting equipment to other than authorised persons.

☐ An attempt to standardise the nomenclature for 2 m repeaters resulted in the descriptions being —

No.	Channel Input	Channel Output	Frequencies MHz	
1	42	54	146.1	146.7
2	44	56	146.2	146.8
3	46	58	146.3	146.9
4	48	60	146.4	147.0
5	43	55	146.15	146.75
6	45	57	146.25	146.85
7	47	59	146.35	146.95

☐ The Executive to investigate the production of a good publicity package with visual aids for use in high school and adult education projects and general interest lectures for the public.

☐ The next (40th) Federal Convention was set down for April 30th-May 1st/2nd 1976 in Melbourne.

☐ Last, but by no means least, the appointment was approved of an expert and impartial investigator to inquire into and report upon the whole of the services and systems of the Institute from top to bottom as quickly and economically as possible. Mr. Bob Arnold VK3ZBB was appointed to this important position and the Federal Council requested that all members should give him every possible assistance in carrying out his work so that his report can be completed about the end of this year.

This is a brief and highly condensed summary of the work done at the 1975 Convention. Any member desiring further details on any particular item should contact his Federal Councillor. ■

STATEMENT OF INCOME AND EXPENDITURE

FOR YEAR ENDED 31st DECEMBR, 1974

		1974	1973
Income			
Members Subscriptions		$29,645	$24,397
Profit on sale of Publications —			
Schedule One		4,494	1,783
Interest on Deposit Monies ..		198	—
Sundry Income		223	1,261
Call Book		—	1,847
		$34,560	$29,288
Expenditure			
Loss—Amateur Radio—			
Schedule Two	$16,804		$11,339
Audit Fees	150		150
Accountancy Fees ..	—		189
Bank Charges	296		192
Contribution—IARU ..	850		814
Committee Expenses ..	377		393
Depreciation	403		148
EDP Expenses	625		834
General Expenses ..	346		128
Insurance	176		144
Licence	—		6
Project Australis	653		491
Provision for Bad Debts	—		200
Postage, Telephone,			
Printing & Stationery	3,064		2,577
Rent & Power	1,759		1,300
Repairs & Maintenance	79		99
Salaries	14,646		10,583
Provision for			
Superannuation ..	500		—
Travelling	860		116
TOTAL EXPENDITURE		$41,588	$29,702
Deficit—to Accumulated Funds ..		$7,028	$415

BALANCE SHEET AS AT 31st DECEMBER, 1874

	1974		1973
Members' Funds			
Balance, 31st December	$(357)		$58
Add Deficit for year ..	(7,028)		(415)
		$(7,385)	(357)
Reserve Fund	627		752
Special Funds —			
ITU Fund	7,206		6,903
IARU Fund	3,306	11,139	3,579
		$3,754	$10,877
This is represented by:			
Current Assets			
Cash at Bank—			
General Account ..	3,578		3,056
IARU Account	446		1,469
ITU Account	—		6,905
Special Bonds	7,000		—
Sundry Debtors	5,656		6,366
Less Provision for			
Doubtful Debts ..	(200)		(200)
Stock on hand —			
at cost	4,613		2,384
		$21,093	$19,980
Non Current Assets			
Furniture & Fittings			
at cost	2,162		741
Less Provision for			
Depreciation	(551)		(148)
		1,611	593
		$22,704	$20,573
Deduct			
Current Liabilities			
Sundry Creditors ..	3,325		2,782
Subs. in Advance ..	14,750		6,664
Loan—VK6 Division ..	250		250
VK4 Division ..	125		—
Provision for			
Superannuation ..	500		—
		$18,950	9,696
		$3,754	$10,877

The Executive Annual Report 1974 - 1975

1. In opening this annual report on behalf of the Executive, I would like to point out that this year has had some very successful aspects in the activities of the Institute. Unfortunately, however, one overpowering matter is causing a considerable amount of concern. Although at the last Convention we set our budget anticipating some degree of inflation, we were distinctly short of the mark.

2. This problem has been of utmost concern to the Executive which has spent a high proportion of time considering the matter.

3. The financial problems of the Institute highlights one of the major disadvantages in its set-up as it is at present operating. That is the inability to be able to react quickly to changes in the financial climate.

4. Consideration was given to areas in which we could make significant reductions in expenditure without upsetting the function of the Institute, bearing in mind the possibility that economies made in one year may have a harmful effect in subsequent years.

5. The Executive feels that an in-depth appraisal of the whole of the Institute, both at a State and Federal level, would be of great value and essential for our future planning in these days of change.

6. **Members of Executive**

The following were appointed at the 1974 Convention:

David Wardlaw VK3ADW, President; Jim Lloyd VK3CDR, Editor (executive position); Jack Martin VK3TY; David Rankin VK3QV; Keith Roget VK3YQ, Peter Wolfenden VK3ZPA.

7. During the year, because of his move to Port Lincoln in South Australia, Jack Martin had to regretfully resign from the Executive. I would like to express my appreciation to Jack for his untiring work on behalf of the Institute during his term of office on the Executive and especially for the personal support he gave me in his position as Vice President.

8. Ken Seddon VK3ACS, a former Victorian Division President, who has just returned to Melbourne after having spent the last three years in the USA, has been co-opted to Executive to act until the 1975 Federal Convention.

9. Keith Roget was deservedly appointed Vice President for the year and remains Honorary Treasurer, where his meticulous attention to the affairs of the Institute in these times of financial problems has enabled Executive to form a current picture of the Institute's finances as the year progressed.

10. Peter Wolfenden as Chairman of the VHF/UHF Advisory Committee has been able to keep Executive especially well informed on VHF and UHF matters.

11. David Rankin, because of his long association with the Executive, has been a valuable member. However, David's business commitments have again caused him to spend more time overseas than he thought at the beginning of the year. David is also the Secretary of the IARU Region 3 Association.

12. Jim Lloyd has been invaluable for his involvement in matters concerning Federal WICEN.

John Bennett VK3ZA as our PRO has been able to give some excellent assistance although, unfortunately, not as much as he would have liked.

13. The following tabulation sets out the attendances at Executive meetings:

Executive:

	Possible	Attended
Dr. D. Wardlaw	15	15
Surg-Capt. S. J. Lloyd	15	10
Mr. K. V. Roget	15	15
Mr. D. H. Rankin	15	7
Mr. J. Martin	2	2
Mr. P. Wolfenden	15	15
Mr. K. C. Seddon	6	7
Assisting:		
Mr. W. Roper	15	11
Mr. D. J. B. Hull	15	7
Lt.-Col. J. Bennett	15	4

THE FEDERAL OFFICE

14. Shortly after the last convention the negotiations for new office space were concluded. This enabled us to move out of our completely inadequate accommodation into an office which provided facilities of a nature far in excess of the additional rent. Peter Dodd has been able to organise the arrangement of the office in such a manner that it is much more comfortable for those being asked to work there.

15. In fact, in retrospect it is hard to see how we were able to keep any employees when the physical nature of the former office was considered.

16. This year Colonel Perry has continued with us on a part-time basis handling the routine EDP matters, thus leaving Peter Dodd freer for other important matters.

17. On the secretarial side we have not been so fortunate, as Mrs. Wendy Hopkins, who showed great promise in her understanding of our requirements, resigned during the year to go overseas. Since then we have had little success in finding a full time suitable replacement.

18. Due to the much higher than anticipated wage rises, secretarial aid in the office is one of the areas of steeply rising costs. Part time assistance is being used as an economy measure, and is proving highly satisfactory.

19. To take care of AR advertising and other routine time-consuming matters concerning printing and distribution of the magazine, we recruited Tom Cook. He is with us on a part time basis and is doing an invaluable job.

20. Even more highlighted over the Christmas period this year, because of the loss of our experienced typiste-clerk, is the desirability of cyclic billing. This would spread this aspect of the work over the whole twelve months instead of a three month rush.

21. The move into the new office made it necessary to purchase some office furniture and shelving. However, we were lucky as the previous tenant left his partitions and air conditioner at no cost to us.

22. There is a great need for a new copying machine, as the present one is wasteful of both time and materials. However, it seems at present that the purchase of such a machine is beyond our resources.

23. In concluding on matters concerning the office, I must pay tribute to our Manager, Peter Dodd, for the manner in which he, realising the drastic effect inflation was having on our resources, initiated as many economies as possible. However, the Executive feels that if the office is to provide the service to the Institute that the Council expects of it then there is a limit to the economies which we can apply.

24. To keep the Federal Council informed of the happenings in the Federal sphere, the minutes of Executive meetings are produced in an expanded form rather than giving just the bare facts. Also distributed are mid-monthly circulars which provide more detailed information on Institute affairs, material for Divisional broadcasts and Institute operating instructions, e.g. EDP forms.

25. As a further aid, notes of meetings with the APO etc. are distributed, as also are notes on Committee meetings held in Melbourne, such as Publications Committee and VHFAC.

26. It is very pleasing to note that the newly formed ACT Division is participating wholeheartedly in the affairs of the Institute.

28. **Handbook for Amateur Operators**

Since the resignation from Executive of Jack Martin VK3TY very little further work has taken place in this area. The matter is further complicated by the shortage of staff within the post office and their present concern with reorganisation.

29. **Trophy**

Our thanks to Peter Brown VK4PJ for the receipt of his Contest Championship trophy which he donated and which was gratefully acknowledged in Minute 74.17.19. Details of the administration of this Award are being worked out.

30. Repeaters

It is heartening to see that all States are now convinced of the desirability of a uniform repeater plan and are willing to conform. There has been some confusion with regard to the requirements of licensing of repeaters, but following representations to the APO it is hoped that national uniformity will be achieved. However, there are some areas where further clarification is still required and undoubtedly negotiations will have to continue.

31. The Victorian Division is to be thanked for their position paper on Repeaters which covered the matter very thoroughly and gave the Executive some useful up to date material on the matter.

32. It has become apparent that at least four primary repeater channels will be necessary to provide interference-free coverage; in fact it may be necessary to employ several of the secondary channels as well.

33. Band planning is good frequency management and it is to be hoped that as frequencies are now available for repeaters in the 70 cm band, planning will be definite and will be adhered to by all States. Any changes should thereafter only be made as a last resort for extremely good reasons.

34. Changes in TV Channels

The result of the FM inquiry is now common knowledge. VHF-FM means that two TV channels have to move. This has resulted in more use being made of Channel 5A adjacent to the 2 metre band and also another of Australia's non-international standard allocations.

35. Realising that there may be problems for amateurs, aid was sought from those in areas aleady served by Channel 5A; unfortunately, the reports did not provide sufficient conclusive evidence of the problems which may evolve.

36. Personal representations have been made to the ABCB and also a detailed letter to the Post Master General and the Minister for the Media, expressing our concern and pointing out the desirability of UHF/TV. We have an assurance that in no case will Channel 0 and Channel 5A be allocated in the same area.

37. 70 cm Band Plan

The VHFAC, after considerable work, produced a band plan which has been published in AR for comment. Much to their disappointment very little was forthcoming, and most of that because of direct approach by members of the VHFAC. It now seems that in view of the frequencies just made available on the band for unattended repeaters and beacons, the plan will have to be modified.

38. WIA Project Australia

The last year was a very satisfying one, with the successful launching of Oscar 7 and Oscar 6 still operating.

39. In December, David Hull VK3ZDH received an invitation to attend an AMSAT Experimenters meeting in the USA. After consultation with the Council it was decided that David must go as matters of vital importance were to be discussed. Executive was to underwrite the trip and Divisions were asked to help later on a pro rata basis.

40. Intruder Watch

It is pleasing to report on the continued activity our Intruder Watch organisation, one of the three leaders in the world. Our sincere thanks to Alf Chandler VK3LC for his dedication throughout the year. A proposal by the WIA for Region 3 co-ordination was carried by the Region 3 Conference and Alf will act as Co-ordinator for the whole region.

41. IARU

The most important IARU matter to be reported is the IARU Region 3 Association meeting which was held in Hong Kong during March. Attending this meeting were representatives of eight member countries, together with further representatives from three other countries not yet members of the association. The major concern of all those attending was the protection of Amateur frequencies and privileges.

42. Some very interesting discussions on the material presented took place, the details of which will be presented by the IARU Liaison Officer in his report. A few points are worthwile including here by way of reinforcement. General support was given to the proposals for additional HF bands: statistics show that there will be about one million Amateurs in the world by 1982. It was pointed out that the increasing use of satellite systems has meant that many fixed services would no longer need their HF allocations. The original allocation of amateur bands on a harmonic frequency basis did not give enough scope in the upper part of the HF spectrum to make full use of ionospheric propagation in maintaining reliable communications on a world-wide basis.

43. The Conference also felt, as does the WIA, that further bands should be allocated above the existing highest of 24 GHz. During the next twelve months it is hoped that agreement will be reached as to what bands to keep.

44. The matter of representation at WARC 1979 was discussed and I would like to make the following points:

It was apparent from the statements of VE3CJ, W1RU and ZL2AZ, who have all attended ITU Conferences, that a strong team is essential to share the load and that continuity is important. However, it is predicted that WARC 1979 may last for 10 weeks and this poses problems as far as IARU reoresentation is concerned.

45. On the financial side, the whole conference expressed their gratitude to the JARL who undertook to subscribe an additional 800,000 Yen ($2100) per year for three years, the purpose of which, as they stated, was for the defence of frequencies used by the Amateur service.

46. It is also pleasing to note that the number of Societies belonging to the Region 3 Association has risen to 11.

47. The subjects mentioned only give a meagre outline of the matters discussed. It was very apparent to me that each country not only has problems which are specific to it alone, but also has problems which are common to us all. I feel that the value of personal discussions with the representatives of such a widespread number of Societies is of inestimable value, amongst other things, in helping to unify the approach to be made to the administering authorities by the various Societies. It is also helped to explain the attitude of certain authorities in their approach to the Amateur service.

48. On the way to Hong Kong, a call was made in Singapore on the officers of SARTS and some very profitable discussions took place.

49. A stopover was made in Jakarta on the return journey from Hong Kong and a meeting was held with the officers of ORARI which at the moment is not a member of IARU. It is likely that they will join later this year with the final formation of the National Society. A detailed report and assessment of the situation in Indonesia will be presented to the Council separately.

50. WICEN

Cyclone Tracy's destruction of Darwin on Christmas morning and the subsequent apparent breakdown in public communications created a situation in which Amateur Radio became involved as a communications link with an isolated ravaged city. At the time of writing this, the final reports on the Amateurs' participation are yet to be received.

51. Over the last two years the matter of Federal WICEN has been discussed by the Federal Council, and the general feeling generated was that the States are operating satisfactorily on their own and a Federal WICEN man would be acceptable as long as he did not interfere in the relationships between the various States and their authorities.

In the latter half of last year, the Natural Disaster Organisation was set up with HQ in Canberra. Contact was made with the NDO and preliminary submissions on the usefulness of Amateurs brought to the notice of the Co-ordinator.

52. The cylone arrived before the full potentiality of Amateur Radio had been able to be assessed, and it is possible that full use was not made of the HF links available. This was a disaster the influence of which extended far beyond State boundaries and obviously required a different type of WICEN co-ordination to that already existing.

John Battrick VK3OR and Jim Lloyd VK3CDR have investigated the matter and it is raised as an agenda item at this Convention.

53. Darwin Appeal

In order to provide some assistance for those Amateurs who lost their possessions in Cyclone Tracy, an appeal has been opened and I commend this to you.

54. Aero Modellers

During the year a meeting took place between members of the Executive and authorised representatives of the Aero modellers who were empowered to speak on a National basis. The complexities and problems of radio control were explained to us and, although there appeared to be no proven cases of interference, it was agreed that some tests should take place. The Victorian Division was approached and offered to help.

55. YRCS

This has been another year of hard work for our YRCS administrators with a Convention being held in Maitland.

A YRCS Constitution is presented to this Convention for ratification.

Thanks go to Bob Cuthberlet for his dedication to the cause during the last year.

56. Amateur Radio

It is really encouraging to see the high standard of the magazine being maintained by the hard-working Editor, Bill Roper VK3ARZ, and his willing Committee.

Rising printing and paper costs and postage charges have been a worry. However, it is pleasing to note the report of the good supply of quality technical articles coming in.

57. Since the introduction of EDP labelling, the number of missing ARs has reduced dramatically. This is a distinct saving as replacing missing copies has to be done by hand and wastes both time and money.

58. The EMC issue of AR produced by the Publications Committee in September evinced very favourable comment both from within and outside the Institute.

59. Post Office

During the year our relationship with the Post Office has been most cordial and regular meetings have taken place between members of the Executive and departmental officers. Agreement has been reached on most matters raised. However, there are several items on which negotiations are still taking place, for example, identification for RTTY.

60. You will be glad to know that permission has been granted for the use of unattended repeaters and beacons on a portion of the 70 cm band.

61. Reorganisation of the APO takes effect on the 1st July, 1975, and as from that date the Regulatory and Licensing section of the Post Office will be a separate entity under its own control.

62. Licence Fee Increase

The Executive, together with all other Amateurs, were shocked to learn in the Federal Treasurer's budget speech of the 100% rise in licence fees.

Immediate protests on your behalf were forwarded to the Treasurer, Post Master General and Leader of the Opposition. Members were urged to protest to their own MHRs and Members.

63. A reply was received from the Post Master General which you have all no doubt read. However, we do not consider the matter closed and further approaches to MPs are being encouraged.

64. 27 MHz Problems

As you are all no doubt aware, political pressure is being brought to bear by the illegal users of 27 MHz hand phone equipment to legitimise this type of use. At this stage I would like to quote a resolution passed at the IARU Region 3 Conference.

"This Conference noting

1. That the question of frequency allocations will be reviewed generally;
2. That frequency bands allocated to the Amateur Service are for use by duly qualified persons.
3. That the competing justifications for frequency allocations of all users is integral to the determination of frequency allocations.

This Conference views with concern the allocation of radio frequencies for so-called citizen band use and resolves that it is opposed to the use of radio frequency on a hobby basis by persons without proper and adequate technical qualifications and urges Member Societies to ensure that the technical qualifications required by their respective administrations for licensing in all portions of the spectrum shall be of a standard such that the principles of good radio frequency spectrum management shall be universally maintained."

65. At previous Federal Conventions the Federal Council has deplored the proliferation of unlicensed operators and their behaviour, also the ease with which they can obtain equipment.

66. Believing that the novice licence would provide an outlet for some of these operators, the Executive again pressed the matter of the

novice licence with the Post Master General who replied that the matter was in hand. We are led to believe that we may see novices on the air before the end of the year.

67. I would like on your behalf to express our gratitude to all Federal Officers of the Institute.

These volunteers give numerous hours of their time in order that the majority of us may derive more pleasure out of Amateur Radio.

68. In conclusion, I would like to thank all the members of Executive for their unfailing assistance during the year.

DAVID WARDLAW, Federal President

APPENDIX B

MEMBERSHIP AND OTHER STATISTICS

1. The following table sets out the membership details adjusted to 31st December, 1974 compared with total licensed amateurs (figures courtesy Radio Branch), percentages and totals for the previous years below:

	Total Licensees	WIA licensed members	% members to total licensees	Other WIA members	Total WIA members
VK1	126	64	50	26	90
	127	44	34	10	54
VK2	2200	968	44	225	1193
	2081	997	45	386	1383
VK3	2122	1083	46	366	1449
	2057	1041	50	396	1437
VK4	781	426	55	174	600
	776	435	51	140	575
VK5/8	843	451	54	186	637*
	808	428	52	166	623
VK6/9X	526	268	51	63	331
	516	254	49	69	323
VK7	238	160	67	53	213
	239	152	63	63	215
VK0	5	—	—	—	—
TOTALS	6841	3420	50	1093	4513
	6674	3292	49	1096	4417

*Includes the following Junior Associates:

VK5	—	8	—	31	39
				29	

2. The licensees distribution was as follows:

	Full	Limited
VK0	5	—
VK1	101	25
VK2 (1 on Norfolk)	1547	626
VK3	1333	789
VK4	529	252
VK5	530	255
VK6 (5 on Christmas Is. & 1 on Cocos)	387	139
VK7	157	81
TOTALS	4665	2176 = 6841

3. PNG statistics — At 31.12.74 the following are the nearest available statistics:

	Full	Restricted	Other
Licensed Stations	70	17	—
Members of the WIA	21	2	8

4. The following WIA preliminary membership statistics may be found useful for comparison purposes (F — Full; C — Country Full; A — Associate; T — Country Associate):

Division	F	C	A	T
VK1	58	2	24	1
VK2	899	8	200	1
VK3	708	264	215	77
VK4	212	185	63	79
VK5	323	94	98	33
VK6	181	62	31	18
VK7	152	1	50	—
	2533	616	681	209

	Pensioners & Students		Clubs	
	Licensed	Unlicensed	Licensed	Unlicensed
VK1	—	1	2	—
VK2	40	14	9	8
VK3	79	68	14	2
VK4	15	27	8	2
VK5	19	23	3	1
VK6	13	13	7	1
VK7	2	4	—	—
	168	150	43	14

	Life Members		Family Members	
	Licensed	Unlicensed	Licensed	Unlicensed
VK1	1	—	—	—
VK2	9	2	—	—
VK3	4	1	3	3
Exec.	8	—	—	—
VK4	2	1	4	2
VK5	3	—	1	—
VK6	4	—	—	—
VK7	5	—	1	1
	36	4	9	6

	2nd Call Signs	Jnr. Associates
VK1	1	—
VK2	3	—
VK3	5	—
VK4	—	—
VK5	1	8 + 31 = 39
VK6	1	—
VK7	—	—
	11	39

5. For those specialising in statistics the following preliminary figures relate to licensed members:

Division	Code 1	2	3	4	5
VK1	46	—	5	10	—
VK2	300	3	393	239	24
VK3	348	5	416	232	78
VK4	309	2	1	121	—
VK5/8	301	—	2	113	—
VK6	209	—	—	49	—
VK7	109	1	—	51	—
	1622	11	817	815	102
			11	102	
			1622		
			2450	917	

Code:

1 — 2 letter calls; 2 — 3 letter C calls; 3 — 3 letter calls, other; 4 — Z calls; 5 — Y calls.

Notes:

(a) VK8 members possessed 15 full and 8 restricted licensee members plus 9 SWLs.

(b) Broken Hill reflected 4 full calls included in VK5 members.

(c) The XYLs are represented by 14 with call signs and 14 without.

The following additional call signs statistics are to be added to the above:

Division	Code 1		2	3
	Full	Limited		
VK1	—		—	—
VK2	7	4	4	2
VK3	9	3	13	—
VK4	16	4	10	6
VK5/8	7	2	4	6
VK6	5	1	—	2
VK7	1	—	—	—
	45	14	31	16

Code:

1 — Call signs of members from other States but no call sign advised for their new State of residence.

2 — Associate Grades with call signs (i.e., regrading not done).

3 — Full Members without call signs (i.e., possessed overseas call but no local call advised, etc.

6. All members are urged to advise the Executive office of any changes in address, callsign, etc., so that the membership records can always be kept up to date. ■

VHF UHF
an expanding world

with Eric Jamieson VK5LP

Forreston, S.A., 5233

Times: GMT

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RTX, Devonport	144.900
P29	P29GA, Lae, Niugini	52.150
3D	3DAA, Suva, Fiji	52.500

No changes to report in the beacon listings this month. However, I do seem to recall reading or hearing somewhere that the 6 metre beacon in Darwin was running again on a restricted schedule — I cannot be sure of this, but I may have been told this on the air. Maybe something definitewith this in time for the next issue.

Keith VK2BGZ (ex VK0MX) has written in response to my requests in regard to VK0 beacons and their operation. He reports the two beacons should still be in operation. He left Casey early in February this year and at that time the Casey beacon was on the air 24 hours a day with about 100 watts output MCW to a 3 element yagi horizontally polarised beaming to Australia. He says the Mawson beacon is identical except for frequency, and believes it still to be operating. Both beacons were constructed by the Ionospheric Prediction Service Branch of the Department of Science. Thanks for the info Keith.

So now we know. All will be hoping both beacons will still be in operation for the end of the year when it may again be possible to hear them, and make further contacts to the VK0 continent.

TWO METRES IN THE USA

Graham Wiseman VK5ZAD has recently returned from a stay in the USA and in response to my request has supplied the following information on operating conditions in the USA.

"In the New York area activity is intense, with forty-five 144 MHz repeaters regularly on the air, and quite a few others on intermittently. The repeaters are run by clubs, groups and even private persons. An example of such a club is LIMARC (Long Island Mobile Radio Amateur Club) which has over 360 active members, and operates 144 MHz repeaters and one 440 MHz repeater. Because of their emphasis on mobile operation and due to the crowded conditions, timers are often set to 50 or 60 seconds. All repeaters are remotely controlled. Many of them have autopatch facilities whereby an appropriately equipped member may "dial" through the auto telephone network from his car.

"Repeaters are spaced every 15 kHz from 146 to 146.4 MHz (inputs), 146.6 to 147.4 (outputs), and 147.6 to 148 MHz (inputs) with the spaces in between used for simplex operation. From where I was staying, running 25 watts into a half wave vertical, I could on several frequencies hear 4 squelch tails following my transmission, indicating I had keyed up 4 repeaters simultaneously. DX activity on FM is not very practicable due to the extremely crowded conditions.

"OTHER MODES . . . On 144 MHz there is a large amount of AM activity between 145 and 146 MHz with SSB and CW activity mainly from 144 to 144.2 and 145 MHz. At times of contests and DX openings there will be hundreds of stations in the north-east USA area operating below 146 MHz.

"144 MHz EME activity is high with unscheduled contacts and even QRM from other EME stations being common, especially during the "universal window" (where both California and Sweden can see the moon). Successful EME antennas range from simple 4 yagi arrays through the popular 160 element collinear, to a 150 foot dish.

"Satellite activity also is quite high, with the satellites undergoing considerable desensitisation when over North America. There are 4 continents and many countries within range of north-east USA so that better equipped stations can readily work good DX.

"Some operators, myself included, have spent considerable time investigating 29 MHz downlink antennas for Oscar, and the general consensus of opinion is that this is the area where most problems exist. El-Az beams are quite practicable for 144 and 432 MHz, and many are used, but they get cumbersome on 29 MHz.

"All these comments are orientated towards 144 MHz as that was all the gear I had". . . . Many thanks for that information Graham, I am sure it will be of interest to readers, and many will heave a sigh of relief that such crowded conditions do not exist here, but 50 times as many as normally operate on the lower end of 2 metres here in Australia would help to keep hungry fingers off our bands!

NEW AUSTRALIAN UHF RECORD

Ian VK3ATY and Alan VK3ZHU have received confirmation of their new Australian record for 2304 MHz which was mentioned previously on this page. The computer distance shows 130.791 miles or 210.487 km. I am sure readers will join with me in congratulating these two boys for their outstanding effort. Who will be next?

THE LONDON SCENE

Mike Farrell, G4DJV (ex VK2AM) writes from London with some news of VHF activity in England, and this too should be of interest to readers.

"I have been operating as G4DJV on 2 metres very intensely, also a couple of contests. 144 MHz in England is a far cry from that in VK. The Belcom Liner 2 has provided an enormous boost to SSB here, there must be hundreds of Liners on the band, and long haul contacts into Wales, North England and the continent are common.

"FM is becoming popular here, but the Gs have avoided the blind development or repeaters as in VK, there are only 2 repeaters going in England at the moment. Most FM operators are aware of what is happening in other parts of the band — a healthy sign.

"UHF is popular — 432 MHz gear (amateur) is available commercially — varactors, converters and even transverters can be bought from several places, so no lack of activity here. Much interest in 1296 and 2304 MHz as well; there are several up there using SSB, usually HBR hybrid ring mixers and 2C39As.

"I have been collecting bits such as VHF and UHF power transistors, type 'N' and 'BNC' connectors etc. as they are cheap here. I have been converted to solid state VHF SSB so will be busy when I return. Certainly miss 6 metres over here; 4 metres (70 MHz) is no substitute — little activity and no DX as it is only a G allocation". . . . Thanks to you Mike for writing, and glad to know you still follow us through the pages of AR even if several months old by the time copies arrive.

6 METRE ACTIVITY IN PAPUA NEW GUINEA

Mike Hennessay, P29ZMJ, has written from Konedobu, PNG with some news of what is going on in that area on six metres. He reports that at present there are 4 operators on 6 metres in Port Moresby, being P29GR, P29ZFS, P29ZJW and P29ZMJ, and more are expected to be on soon. A scheduled Sunday morning net operates on 52.050 MHz at 2300Z, and by the time this is read, on 52.525 FM.

Mike mentions openings to the south seem very rare, and on occasions when the band has shown signs of being open, nothing is heard. He wonders if anyone is aware of their existence. Maybe the backs of all VK beams are on them! Most activity of course takes place at the weekends, but if anyone would like to set up a schedule, it is suggested they write to Mike, P29ZMJ, PO Box 2237, Konedobu, PNG; all letters will be answered, and beams will be pointing south for sure.

Plans are being made for the establishment of a 6 metre beacon in Port Moresby, and by the time the next "DX season" arrives it is expected there will be quite a lot of 2 metre activity up there as well. That last bit makes very good news indeed, and will have the Queensland boys think again about their 2 metre activity. It would be a good water path from the coastal areas to PNG so why not try it?

For the sake of the record, Mike includes these log entries which indicates not too much worked south. 27/12/74 2325Z P29GR Garry worked Lindsay VK4AAL on 52.050 SSB. 2336Z worked Claude VK4WX. 19/1/75: P29ZMJ worked VK4EN, Ron, on 52.525 FM, at 0630Z. 16/3/75: Ch. 0 Brisbane S9+ at 0600Z. 25/3/75: Townsville beacon S2 all day. 28/3/75: 2300Z, Ch. 0 Brisbane S9+. Will be pleased to hear from you again some time Mike, and I hope in the meantime you can have a few more contacts to keep up your interest.

52 MHz AND THE USA

This month the news seems to be coming from all over the globe, so much so that I was pleasantly surprised to find a large air mail letter on my desk recently from Ray Clark, K5ZMS, 7158 Stone Fence Drive, San Antonio, Texas, 78227. I would like to quote portion of Ray's letter.

"I had the privilege of reading your column in AR recently in the March issue sent to me by Peter VK6ZDY. It has a lot of interesting info in it, particularly about the beacons. There are a number of us here in the States who are already thinking ahead to the next solar peak and we are starting to prepare again. I think the major reason we had no contact last time, is that many people were not listening at 52 MHz and above. Many did not know what to listen for. We had openings into ZL areas, but nothing much to your area. We hope to correct that, by providing up-to-date info on what to listen for as indicators of openings into your area.

"I am Secretary/Treasurer of SMIRK (which stands for Six Metre International Radio Klub 6-6 Net). We are also engaged in fighting the RFI problems existing in this country, which are causing many people to leave 6 metres for other bands. Our membership stands at 744 in 46 States and 13 countries, after 1½ years operation.

"To become a member, stations outside the USA need to contact three members of SMIRK. Peter VK6ZDY is the only VK station to qualify so far, with contacts to members HL9WI, JA1LZK and JA1RJU. The one time membership fee is $2 US.

"For years, no one knew what other 6 metre operators in different parts of the world were doing. I have been maintaining a running correspondence with JA1LZK and JA1RJU on their activity over there and telling them about ours here. I do the same with KG6JDX and others in Central and South America. I do my reporting of activities to 73 and QST magazines, so others might find out what is going on. I also add it to our quarterly newsletter that goes out to our members . . . "

Well, that all makes rather interesting reading, and I think I will take up Ray's offer to start correspondence between us to let each other know of developments in our respective countries. At the very least we should have some prior knowledge of what goes on in the USA and other member countries, and this can be passed on to you, the readers, through these pages.

At last it looks as though interest overseas is being shown in our 2 MHz removed allocation. Other countries at last recognise we cannot go down below 52 MHz to speak to them, they must come up and speak to us. However, if they want to get really serious about this, they will also need to make some alterations to their equipment. Large yagi antennas designed for optimum results at 50 MHz are of little use on 52 MHz, so new antennas will be needed. Retuning of transmitting and receiving equipment also will be necessary, though with today's modern transceivers with only one control needing peaking makes this part quite simple. Success will largely depend on what effort is put into the antenna system, and I will emphasise this point in correspondence. 1978 and 1979 should see the start of something worthwhile in across the Pacific contacts if they are going to happen during the next 11 year peak. In the meantime, VK stations should be looking at their equipment needs in the future, with those on the eastern sea-board area having the best chance due to a long water path with little land in between.

THE LOCAL SCENE

Most of the local activity seems to be concerned with DX via the various FM repeaters, notably to Mt. William (Ch. 1) in Victoria. Some contacts have been made to Mildura and Broken Hill from VK5, with Peter VK5ZPW at Angaston operating from his favourite hill being amongst the forefront of activity, and with Keith VK5ZMK at Wasleys also sharing.

Certainly it is surprising how far contacts can be made using a repeater situated on a high spot, but it would be also nice to see something of the same thing being done on the low end of 144 MHz, in the hope that the increased activity will deter the "greedy Fingers" of other interests from wresting those lower 2 MHz from us.

Other than the above, there is little to report. There have been the occasional Es openings on 6 metres, with the TV stations acting as the main beacons.

50 MHz: LU3EX — JA6FR, 12000 miles. 24.3.56.
144 MHz: WA6JRA — KM6GRU, 2591 miles. 29.7.73.
220 MHz: W6NLZ — KH6UK, 2540 miles. 22.6.59.
420 MHz: WODRL — K1PXE, 1210 miles. 16.8.71.
1215 MHz: WA2LTM — W9WCD, 770 miles. 26.10.72.
2300 MHz: W6FZJ — WA6HXW, 330 miles. 6.2.74.
3300 MHz: W6IFE/6 — K6HIJ/6, 214 miles. 18.6.70.
5650 MHz: K6HIJ/6 — W6OYJ/6, 214 miles. 18.2.70.
10000 MHz: W7JIP/7—W7LHL/7, 265 miles. 31.7.60.
21000 MHz: G3BNL — G3EEZ, 45 miles. 12.11.72.

The above are the latest Two-way Terrestrial records according to March 1975 QST. However, I think the 420 MHz record will return to Australia with the contact between Les VK3ZBJ and Wally VK6WG on 2.2.75 over a distance of about 1450 miles. Once this has been confirmed the boys in the USA can amend their records!

EME TWO-WAY RECORDS

50 MHz: WA5HNK — K5WVX, 415 miles. 30.8.72.
144 MHz: SM7BAE — ZL1AZR, 11055 miles. 4.3.69.
220 MHz: WB6NMT — K2CBA, 2650 miles. 16.3.70.
420 MHz: VK2AMW — G3LTF, 10530 miles. 30.3.74.
1215 MHz: WB6IOM — G3LTF, 5492 miles. 27.4.69.
2300 MHz: K4RJ — W6YFK, 1975 miles. 22.11.72.

All records information by courtesy of Ray K5ZMS.

It is interesting to note that in all 16 records have been set down, and of these 13 have been established or re-established since 1969, that is, in the last 5 years. About the only hope for a 144 MHz record to be set in Australia would be for Albany to work into New Zealand; the USA record of 2591 miles will be hard to beat, unless someone works to Hawaii from the east coast of Australia. I have not heard of anyone trying yet, but it should not really be impossible. Anybody with a stack of 8 rhombics on the shore?

Do not forget the South East Radio Group Convention at Mt. Gambier over the Queen's Holiday weekend, 14th and 15th June. Should be a good show as usual. Most of those likely to be interested would have already received registration forms.

That should give you enough to read for now. Closing with the thought for the month: "People who value their privileges above their principles soon lose both".

The Voice in the Hills. ■

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Crafers, SA. 5152

This month I am publicising two Awards which may be described as "temporary".

The first, the "Amsterdam 700 Years Award" has been made available to commemorate the 700th anniversary of the founding of the City of Amsterdam in 1275.

For this purpose a special amateur station PA700ASD will be on the air almost every day on all bands, both CW and SSB. All contacts with this station will be confirmed by a special QSL card, and SWL reports will be confirmed in all cases. Amateurs living in the City of Amsterdam may change their prefix from PA0 to PA7 and will confirm contacts with a special QSL card. The Award is open to every licensed amateur and SWL.

Rules: Contact with a PA0 station living in Amsterdam counts one point; contact with a PA7 station counts two points; contact with PA700ASD counts four points. Dutch amateurs and SWLs need 15 points, European stations need 10 points, DX stations need 5 points. Only one contact with the same station is permitted. All QSOs have to be made in the year 1975. There are no band and/or mode limits. Awards will be endorsed for all one mode, all one band etc.

Application: Send certified loglist (no QSLs) and

4 IRCs or 1 US dollar before 1st March 1976, to VRZA Awards Manager, PO Box 190, Groningen, The Netherlands.

The second Award, which might prove a little difficult to obtain here in VK, is the first Award to be issued in Greenland.

This Award is to commemorate the bi-centenary of the founding of the town of Julianehaab on 7th April 1775 by Anders Olsen. Today the town is the biggest in South West Greenland with a population of 2,900 of whom 15 are licensed amateurs.

To obtain the Certificate it is necessary to gain 200 points. All HF bands are permissible and there are three classes — phone, CW and mixed. VHF, UHF or Oscar can be used if available here, but not crossband QSOs on HF or repeater contacts.

Points are scored as under — 20 points for the first QSO on any band with any one of the stations in Julianehaab, but 30 points for an Oscar 2m — 10m QSO and 40 points for an Oscar 70 cm-2m QSO.

The same station can be contacted three times on the same band but with a minimum of one month between the first, second and third QSO. The second and third QSO will only give 10 points each.

Send your request for the certificate with details of your callsign, date and time (GMT) with your report to OX3AB. Arne Pedersen, PO Box A5, DK-3920 Julianehaab, Greenland, with 5 IRCs to cover postage. The necessary QSOs will be cross-checked with the named OX stations, whose log books are decisive.

The certificate applies to QSOs from 7th April 1975 to 6th April 1976 inclusive. The issue of certificates stops at the end of 1976.

At present, the following stations are located in Julianehaab: OX3AB, AC, BY, CS, EL, FG, HA, KS, LA, MD, PN, RA, RF, WX and ZM.

Even though you might find the certificate rather difficult to attain, those who need a few OXs should find it a bit easier while the Award is current.

By the way, if you work an OX who tells you that his QTH is Qaqortoq, it's OK. That's the Greenlandic name for Julianehaab. ■

Around the Trade

LUCAS MARKET SOLAR POWER IN AUSTRALIA

Joseph Lucas (Australia) Ply. Ltd., Cheltenham, are proud to announce that they have now concluded an agreement with the Solar Power Corporation of America for marketing rights in Australia of their Solar Electrical Energy Systems.

Photo shows — Happy after signing agreement to market Solar Power products in Australia and holding a typical unit are, second from right: Mr. Bob Willis, President, Solar Power Corporation of America; from left: Mr. Barrie Hare, Marketing Manager, Mr. Arthur Wookey, Product Supervisor, extreme right: Mr. Jim Thomson, Director and General Manager, Parts and Service Division of Joseph Lucas Australia Pty. Ltd. ■

Hamads

- Eight lines free to all W.I.A. members. $6 per 3 cms. for other amateurs and S.W.L.'s.
- Copy should be in block letters or typescript, signed and forwarded to The Editor, P.O. Box 150, Toorak, Vic., 3142.
- Excludes commercial advertising.
- Closing date for Hamads is the 3rd day of the month preceding publication.
- QTHR means the advertiser's name and address are correct in the current Australian Callbook.

FOR SALE

Swan 500 CX Transceiver W/Vox, 16 pole filter, AC PSU. Mint condition. 3 el. 20 metre Hygain beam. Ph. (03) 241231, (03) 206135.

Yaesu FT75B Transceiver, DC75B power supply and FV50C VFO. Additional crys'als and spares. All as new. $300. VK3VF, QTHR. Ph. (03) 723-3554 A.H.

HT Transformer 2 kV a side at 1 amp., $25.00. Chokes: 6.5H at 1 amp.; 10H at 100 mA; 3.2H at 1 amp. $10.00 each. All top quality and guaranteed as represented. VK5BI, QTHR. Ph. Cowell 39 Bus. 62 A.H.

Ten-Tec Model PM3 QRP CW transceiver. Rarely used due absences overseas, $75. Ross Treloar, VK2BPZ. Ph. (02) 259-5267 Bus.

Slow Scan Valve Monitor (shown in EA July '73), plus SSTV solid state sig. gen. and 931A scanner attachment, $100. FT2FB transceiver complete with 8 latest channels, $180. Gil Miles, VK2KI, QTHR. Ph. (02) 78-4237.

STC MTR25, 121 Series car phones, lo-band, FM with 3/20 final. Complete except for cradles and mikes. Suit conversion to 6 FM or wrecking. Three available at $12 each complete with circuits. Jeff, VK3ZJS. Ph. (03) 37-1332.

Pye Reporter Units (2 only) converted 53.982 MC AM, with crystals for 12V DC operation (or direct AC with a 12V transformer), $25 each or $45 the pair. AWA FM transceiver on 73.332 MCS, 12V DC operation with PSU, cables and handset, $20.00. 250 FM AWA Box Stn. 73.332 MCS, complete with exciter, receiver and 2 x 125A. Linear and crystals, standard rack $50.00. VK4LN, QTHR. Ph. (071) 82-2675.

Swan Hornet TB-3H three element beam 10-15-20m, $55. Heath SB-220 linear, $450. Heath SB-610 monitorscope, $70. Heath GR-78 general coverage communications receiver 190 kHz to 30 MHz, fully solid state, $55. VK2AQW, QTHR. Ph. (02) 449-3538.

FT200 Transceiver with specially built AC PS/spkr. unit and all 10m and 11m xtals. $320 ONO. VK1DA, QTHR. Ph. (062) 63 3048 BH, 88 4899 AH.

FT101 (Mark II) 18 months old, 160-10 Mx (incl. 11 Mx), microphone, cables, etc. Excellent cond. $485. B. Bathols VK3UV, 3 Connewarra Ave., Aspendale 3195. Ph. (03) 90 6424 (evenings only).

Yaesu FL DX400-FR DX400. Tx/Rx combination. $280 each with spare valves. Will consider selling separately. VK3PR, QTHR. Ph. (056) 62 2291 bus., 62 2711 AH.

Garrard Model 301 transcription turntable, 3 speed, perfect order, and MBH 600 ohm mag. PU. $55. "Gramdeck" tape recorder turntable attachment free with above. A. Roudie, VK3UJ, QTHR. Ph. (03) 874 5632 AH.

FT101 HF Transceiver fitted with optional fan and 160m band. Supplied with spare set of final tubes, mobile bracket, manual and all cables, mike, etc. $480.

FTV 650 6m Transverter with new tubes and recently retuned. With all cables to operate from FT101 plus manual, $120.

HF Long-wire tuner. Imported model with roller inductor and multi-turn dial, $40.

Set HF Helical Antennas. 160, 80, 40, 20, 11 and 10 metres, to fit Philips or Scalar VHF antenna base, $65.

Belcom 2m SSB Transceiver, modified to cover 144.00-144.48 MHz. With auto-changeover mast-head amplifier, all cables, mobile mount, manual, etc. $220.

Two Pye Bantam Solid State 2m Portable Transceivers. 2 watts FM out, complete with mic-speakers and circuit details. One with 40, 1 & 4. Other with 50, 1 & 4, $85 each.

Honda Generator. E300, 250 watts AC or 10 amps at 12 volts. Only used approx. 40 hours, $150.

Aluminium Portable Mast. 25 ft telescopes to 5 ft. With all nylon guys, pegs, etc., $15.

6 metre Beam. 3 element commercial design, 50 ohm feed, $10.

2 metre Beam. 3 element commercial design, side mounting, 50 ohm feed, $10.

Ray Roche, VK3ZRG, 380 Napier Street, Bendigo, Vic. 3350.

Vinten MTR13T with channels 1, 4, 40 and 50. Excellent condition, $75 ONO. David Farquharson, VK3ZOO, 29 Roberts Road, Belmont, 3216.

Yaesu FT2FB VHF FM as new, 6 ch. plus additional Rx and Jap freqs, $180 ONO. 14AVS 4 band trapped vert, sound working order — best offer. VK2VN, QTHR. Ph. (02) 498 2956.

Yaesu FT-75 Transceiver, 10-80m solid state, with FV50C VFO, complete with Yaesu AC and DC power supplies. Condition as new, few months old, $350. VK7MG, QTHR.

Trio Receiver, Model 9R-59D, 550 kHz to 30 MHz. $150. VK6LT, 19 Erinbee St., Riverton, WA 6155.

Solid State Transceiver modules for complete unit, comprising mixer, VFO, transmitter, audio amp., sidetone amp. TEN-TEC, brand new in carton with circuit details and cabinet. Gives 3 watts on 80-40-20-15 metres, $65. VK2BSJ. Ph. (02) 651 1316.

VHF Transceiver TCA-1675, good working condition with Ch B and 4 and 1. $50. VK2BSJ. Ph. (02) 651 1316.

Asahi AS-303A, set of 10 to 80 metre mobile whips, complete with loading coils, HD spring and ball mount. Beautifully engineered. $50 plus freight. Mal Sinclair VK2BMS, QTHR. Ph. (02) 407 0261 bus., 95 2362 AH.

AR7 Receiver with AC power supply and speaker. All coil boxes — higher bands may need alignment, $50. Don Brown VK5KT, 35 Highfield Ave., St. Georges 5064. Ph. (08) 79 4262.

WANTED

Decent morse key, PMG type or long-arm Admiralty model or similar. VK4SO, Box 1513, G.PO. Brisbane, 4001. Ph. (072) 29-4666 Bus.

HF SSB Transceiver. This is your opportunity to donate some surplus equipment to a school YRCS station to help bring on more young men to enter our ranks. **Old Radios, TVs, Components,** etc. for use with YRCS courses in schools. Will pick up if you can't deliver. G. Scott, VK3ZR. Ph. (03) 89-0231 Bus.; (03) 89-4645 A.H.

CW or CW/AM Transmitter. Complete with power supply (home made preferred). VK3NK, QTHR. Ph. evenings (03) 93-1025.

Communications Receiver in good condition. Co age 1.6 MHz to 30 MHz. Contact J. W. Lacey, 6 Mawson Ave., Mt. Gambier, SA, 5290.

Socket for 4CX250B. Bill Currie VK3AWC, QTHR. Ph. (057) 92 2316 evenings only.

Silent Keys

It is with deep regret that we record the passing of—

Mr C. J. ERWIN	**VK2YCE**
Mr M. A. V. DARWEN	**VK4AV**

QSP

INFLATION EVERYWHERE

"The unaudited accounts of the Society for the six months to 31 December 1974 show a loss of £6,900 (around $12,000). The three main causes of this are" — increased cost of the magazine, salary increases, fall-off in subs income (due to admin. problems). Radio Comm. Mar '75.

amateur radio

VOL. 43, No. 7

JULY 1975

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COVER PHOTO

This is the SRI 150 ft. dish used by WA6LET during the February 1975 moonbounce tests on 144 and 432 MHz. See details in letter on page 25.

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

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KENWOOD/TRIO TS 520 5 BAND SSB TRANSCEIVER

Specifications

Frequency Range: 80 metre band — 3.50 to 4.00 MHz; 40 metre band — 7.00 to 7.30 MHz; 20 metre band — 14.00 to 14.35 MHz; 15 metre band — 21.00 to 21.45 MHz; 10 metre band — 28.00 to 28.50 MHz, 28.50 to 29.10 MHz, 29.10 to 29.70 MHz; WWV → 10.00 MHz.

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TS 520 $550.00 with PTT Mike

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AM, 23 channel, 11 metre transceivers, 12V DC operation **$99**

5 WATT

SSB/AM, 23 channel, 11 metre transceivers, 12V DC operation **$195**

144-148 MHz TWO METRE EQUIPMENT

NOW WITH 6 CHANNELS

KEN KP-202, 2W, 144 MHz band. FM. Hand held transceiver with crystals for 6 channels, Ch. 40-50, R1, R2, R3, R4 **$149**

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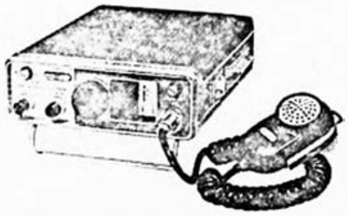

TRIO MOBILE TR7200C

2 METRE FM TRANSCEIVER
22 Channels, fitted with Ch. 1 and 4 repeaters. Technical Data: Transmit 10 and 1 watt positions. Max. freq. deviation +15 kHz. Spurious response —60dB. Receiver less than 1W for 30 dB SW selectivity. 20 kHz at 60 dB down; 40 kHz at 70 dB down.
$235 — Extra Channel Crystals $10 Set

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Originally used in conjunction with PRC10 which covers 30-75 MHz FM. Requires 1-4 watts drive and gives a nominal 25 watts out. Brand new in sealed box with complete service and user manuals.
$25 each

RF SIGNAL GENERATOR Model TE-20D

SPECIFICATIONS

Dial has 7 separate band TE-20D covers 120 kHz - 500 MHz.
(6 Fundamental Bands & 1 Harmonic Band)
Freq. Accuracy: +or—2%
Audio Output: to 8 volt
Internal Modulate: 400 Hz approx.
Tube: 12BH7A, 6AR5
Power Source: 105 - 125V, 220 - 240V AC 50/60 Hz, 12 watts.

TE-20D employs a xtal socket and can be used as below:

a.—Self-Calibration. b—Marker Generator
Small size — Space saving.
Printed Circuit for a uniform characteristics.
Dimensions: 140 x 215 x 170 mm. Weight: 2.8 kg.

Price $52.50. P&P $2.00

DELUXE Model TE-22D

AUDIO GENERATOR
SPECIFICATION

Freq. Range: Sin: 20Hz-200kHz
Square: 20Hz-25kHz
Output Voltage: Sine: 7 volt.
Square: 7 volt.
Output Impedance: 1000 ohm
Frq. Accuracy +3% + 2Hz
Distortion: Less than 2%
Tube Complement: 6BM8
12 AT7, 6Z4
Power Source: 105-125, 220-240V AC, 50/60 cps. 19W
With Attenuation Range
4 Ranges—1/1, 1/10, 1/100, 1/1K

$63.50

GRID DIP METER Model TE-15

SPECIFICATION

Freq. Range: 440kHz-280MHz in 6 Coils
A Coil 0.44—1.3MHz
B Coil 1.3—4.3MHz
C Coil 4.14MHz
D Coil 14.40MHz
F Coil 120-280MHz
Transistor: 3 TRs & 1 Diode
Meter: 500uA Fs.
Battery: 9V (BL-006P)
Dimensions: 180x80x40 mm
Weight: 730g

Price $36.50
P&P $1.00

amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA. FOUNDED 1910

JULY 1975
VOL. 43, No. 7
Price, 70 cents

QSP

IARU

The IARU Calendar (No. 89) of Dec. '74 stated that concern has been expressed in some circles that the radio amateurs of the world, particularly in countries where there are no IARU Societies, do not fully appreciate the importance of the forthcoming World Administrative Radio Conference (WARC Geneva 1979) and that a way must be found to inform the world's amateurs that it may have the most serious consequences for the amateur radio service if we are not adequately prepared for it. It has been suggested that a message from the President of the IARU should be printed in many languages and distributed through QSL Bureaux.

The following is the message —

"The World Administrative Radio Conference to be held in Geneva in 1979 will decide the use to be made of all radio frequencies throughout the world in the following years. This includes frequencies now allocated to the amateur radio service.

"The radio frequency spectrum is a vital and limited resource. Increasing demands upon it are being made by a wide variety of government and commercial services. The result, of course, is increased pressure upon frequencies allotted to radio amateurs.

"Fortunately, the enormous benefits flowing from a strong amateur radio service are recognised by many governments. The world is advancing technically and nearly every nation is experiencing the need for a large cadre of trained engineers and technicians. However, the increasing frequency demands of other services pose a threat to the amateur radio international allocations, and this must be effectively countered if we are to emerge from the 1979 World Administrative Radio Conference with frequency resources which will assure the future growth and development of worldwide amateur radio.

"To this end, each radio amateur can help by:

- ★ *assuring that his fellow amateurs are well aware of the nature and importance of the conference;*
- ★ *working with his fellow amateurs, his local radio club, and his national society to assure that a proper understanding of and appreciation for the benefits of amateur radio exists at government levels; and*
- ★ *encouraging and assisting wherever possible in the preparation of a national policy which will assure allocation of adequate radio frequencies to meet the needs of the amateur radio service in the years ahead.*

"Each of the member countries of the International Telecommunication Union carries a vote to the World Administrative Radio Conference. Decisions on frequency allocations are made by majority vote. It is of vital importance to each radio amateur in the world that his country's vote is cast in support of the modest requirements of the amateur radio service. YOUR help may tip the scales to the advantage of radio amateurs throughout the world for years to come."

73,
(signed)
NOEL B. EATON VE3CJ
President, IARU

The Calendar says that IARU activities are oriented strongly toward making certain that the amateur radio service is in the most favourable position possible entering this Conference. To this end, IARU officers and staff travelled extensively during the year to discuss WARC plans with the officials of member-societies. During each visit, the member society is urged to maintain the closest possible liaison with its government. One goal is to have the radio society consulted by the government during the formulation of the latter's conference policy between now and 1979. ■

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THROUGH A GLASS DARKLY

"So, in the tempo of the times, it would be well to realize that amateur radio is subject to scrutiny. You all know about the squeaking wheel that gets the grease. The louder the squeak, the more the grease. The loudness of the squeak depends a lot on how many wheels are squeaking! You may not be aware of it, but the amateur population in the United States is decreasing at the present time by about 350 licensees per month. This is happening while all other services are increasing". Part of speech by FCC Commissioner Robert E. Lee as reported in QST Feb. '75.

FLEA RADIOS AND CB-ers

The April '75 issue of APO News carries an interesting article about interference on the legal handphone service by kids using pirate walkie talkies preventing communication between a helicopter pilot and surf life savers to locate a swimmer in difficulties between Broken Bay and Wanda in Sydney recently. The helicopter pilot could see the swimmer in trouble but because of the interference could not tell the shore life savers exactly where to find him despite constant repetition. The pilot asked the kids to get off the air but they refused in language which made further entreaties pointless.

The article did not say if the swimmer was ultimately saved but one trusts this occurred somehow. The article goes on to mention a steady stream of complaints from legitimate users of licensed equipment with their operations disturbed by illegal operators and that the APO will not have a bar of the claims being made for a citizens band by the so-called Australian Citizens Radio Movement. It also says the APO is going all out to nab the illegal operators.

(The WIA also will not have a bar of CB operations as confirmed at the 1969 Federal Convention onwards. See also page 8 AR Oct '74—Ed.)

PUBLICITY

From the "Radio Bulletin" (E & Mt. Dist. Rad. Club) April '75 comes a report about the inaugural meeting of the Nunawading Branch attended by the Mayor of Nunawading. In his speech the Mayor is reported as making the point that the general lack of knowledge about amateurs and amateur radio in the community was largely our own fault. He said that if we were to gain the co-operation and support of local and other levels of Government we must be seen to be active in the community. Amateurs have valuable skills and technical knowledge resources, he continued, which we should use to benefit the community as well as to enjoy our hobby. In these days of growing involvement in community affairs, we cannot afford to stay in the background, he said. Hear, hear.

ROYAL AUSTRALIAN SIGNALS ASSOCIATION OF NEW SOUTH WALES

Lt Col Tony Ballantine VK2AAA advises that the Royal Australian Corps of Signals celebrates its 50th birthday this year.

The Corps was formed in 1925 and has distinguished itself in action in three subsequent wars. Many of its members have been decorated for bravery as well as distinguished services in military communications in peacetime.

Amateur Radio generally and the Wireless Institute in particular, has also numbered amongst its ranks, many past and present members who have served in signals. Mutual interests have always helped to maintain closest links between Signals and their civilian counterparts.

As part of the anniversary celebrations a world wide amateur radio link-up is to be conducted from the Australian Army School of Signals at Watsonia, Victoria, and all interested members are asked to note the date, Saturday 8 November 1975. More details are to follow in later editions of AR.

Royal Australian Signals Association of New South Wales will be participating with VK2ANE the official amateur radio station of the 8th Signal Regiment, Lidcombe, New South Wales. Many other VK2s are expected to join the activity and we hope to welcome all other interested VKs.

IARU AND POSTAGE STAMPS & REGION 1

The IARU Region 1 Conference held in Warsaw in May was honoured by the Polish Government by the issue of an IARU commemorative stamp (and special first day cover) to the value of 1.50 zt. The Region 1 conference, advised Noel Eaton VE3CJ, President of the IARU, who attended it, joined Region 3 in the latter's decisions relating to worldwide exclusive amateur bands on 1.8, 3.5, 7.0, 14, 21 and 28 MHz plus 3 new bands in the region of 10, 18 and 24 MHz and the retention of at the very least our present VHF, UHF and SHF bands. He also said there were some minor differences between the two Regions' positions representing only different conditions in them. It is hoped that the Region 2 meeting in Miami next April will take up a similar position.

SUNSPOT NUMBERS

Smoothed mean for Oct '74 was 30.2. Prediction for Oct '75 is shown as 7 in the smoothed monthly sunspot numbers. The provisional mean for Apr '75 was 6.2. Courtesy Swiss Fed. Observatory, Zurich.

LOOSE TALK

An amateur in Akron, Ohio (rather carelessly) announced his location at one of the large supermarket car parks and that he would be back on the repeater after some shopping. On his return all his amateur equipment, a stereo tape deck and other items had been stolen. Quote from QST Mar '75.

UHF TELEVISION

The ABCB in a news release of 12th May, advises again that it plans to introduce a limited number of UHF translator transmissions to improve reception of existing VHF programmes in certain locations in Australia, probably by the end of 1976. Advice is also given that the Board will be seeking still further consultations with industry to ensure that appropriate domestic receiving equipment, including UHF aerial systems and UHF adaptors for existing VHF receivers, will be available to viewers seeking to improve their reception by using the UHF transmissions in the areas where these new transmissions are planned.

DARWIN APPEAL

You will remember an Executive Appeal was made through Divisional Councils for members to contribute something towards helping Darwin amateurs to replace equipment they lost during Cyclone Tracey. An appeal is again made for contributors towards this worthy cause as the closing date of the appeal has now been set as 1st August 1975. If you have not already contributed, send a donation now, direct to the Executive Office, P.O. Box 150, Toorak, Vic. 3142, or through your Division.

SOLAR FLUX

"Use of solar flux as a measure of daily solar activity is now preferred to the use of the daily sunspot count because solar flux has been found to be more direct and objective. It is also much more sensitive to change than is the daily sunspot count . . . Solar flux is a measure of the level of radiation from the sun and, consequently, is an indication of the general state of the ionosphere . . . The values of solar flux broadcast by WWV (14 minutes past each hour) are measured at a frequency of 2800 MHz". Extracts from an interesting article by George Jacobs W3ASK and Theo Cohen W4UMF in CQ Mar '75 describing solar flux, geomagnetic activity indices short-term forecasting and related subjects. ■

COLOUR AMATEUR TV DEMONSTRATION

Friday 21.3.75 saw the first successful public Colour ATV demonstration transmitted in Melbourne on 426 MHz.

From the elevated QTH of Lou VK3ZYD at Mt. Dandenong, Don VK3YV/T transmitted three programmes to an audience of 94 people at the Moorabbin Radio Club's rooms. A distance of 30 km.

The entire programme lasted 65 minutes, and consisted of a monochrome video taped interview with Peter VK3BFG/T for 20 minutes, who explained details of the ATV scene and modulation systems. This was then followed by two excellent colour films from Fairchild showing the design and production of integrated circuits.

The colour segment lasted for 45 minutes.

Picture quality of both the monochrome and colour transmissions was excellent, and considering that the transmitter output was in the vicinity of 3 watts (yes, three watts!), the demonstration was a tremendous credit to the capability of those involved.

Interference from outside sources was negligible, although during the monochrome segment, a little "breakthrough" from one of the commercial TV stations appeared on the audio channel. This was due to the close proximity of commercial TV transmitters.

The colour transmissions were received un-impeded.

Don's transmitter is all solid state and built up from an article described in VHF Communication. The transmitter antenna was an 11-element yagi.

After the colour demonstration further monochrome transmissions between Peter VK3ZPA/T located at Sunbury and Les VK3ZBJ/T at Frankston, were received. Both stations providing excellent quality pictures.

At the end of the evening, details of a simple to build 426 MHz converter for attachment to an ordinary TV set were discussed.

The converter used was that as described in Electronics Australia of January 1972, page 63.

The President, members and visitors of the Moorabbin Radio Club gratefully acknowledge the following amateurs for their efforts in presenting a fine display:—

Don VK3YV/T, Neville VK3YDR/T, Greg VK3YGB/T, Peter VK3BFG/T, John VK3YJB/T, Craig VK3ZBD/T, Les VK3ZBJ/T, Peter VK3ZPA/T, Les VK3BEN (supply of colour receiving equipment).

(Report from VK3UV) ■

TRADE NEWS

As part of a programme to increase interest in the 2 metre band, Dick Smith Electronics is giving one free set away for every ten sold. Purchasers of the new Icom IC22A can nominate the club or division of the WIA they would like the sets to go to. Once ten nominations have been given, a free set is donated to the particular club or division.

Tim Mills VK2ZTM, President of the NSW Division of the WIA is seen in the picture receiving the first Icom IC 22A from Harry Tyreman VK2BHT/G3SLL, Manager of the Amateur Radio section at Dick Smith Electronics. ■

QSP — WHAT IS AMATEUR RADIO?

How does one get amateur radio across to one's neighbours, the public at large, the non-technical administrators in the less-developed countries?

IARU Region 3 Association has put forward a policy that the ITU Radio Regulations should be amended to emphasise the philosophy of the amateur service —

(1) That the amateur service is a voluntary non-commercial service particularly with respect to providing emergency communications.

(2) That the amateur service provides for advancing an individual's skills in both the technical and operating phases of the art thus helping to provide a reservoir of trained operators, technicians and electronics experts and also provides an avenue for further investigation in the electronic art for those persons already engaged in the field.

(3) That the amateur service has a unique ability to enhance International goodwill.

This is designed to replace the existing definition of "a service of self-training intercommunication and technical investigations carried on by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest".

All this tends to be set out in lawyers' language. In plain language l t's try and see what we can explain about amateur radio to people around us. Amateur radio, firstly, is a leisure activity like any other activity for the leisure hours such as mountaineering, golf, collecting stamps or art treasures. It is carried on by nearly a million ordinary people all over the world. To be a radio amateur requires study in order to pass examinations both technical and practical. In the process the elements of electronics must be learned along with the proper behaviour to be observed when communicating with other amateurs over the air. The electronics part of the hobby forms a solid foundation for those who wish to make a career in this science. The behaviour patterns follow, possibly dogmatically (for good reasons) the kind of conduct expected of one civilised person conversing with others. The technical skills and knowledge which the amateur acquires are necessary to enable him to operate his equipment at the best efficiency with the least interference to other radio users. Civilised society accepts that you cannot drive a car or pilot an aircraft without first acquiring a minimum standard of skill to pass exams. The amateur must know not only how to "drive" his transmitter (and other equipment) but he must also know how to mend it if it goes wrong. Thus a bridge is formed for communicating with other amateurs.

Talking over the air with other amateurs poses some (common sense) restrictions. He must not discuss religious, political, advertising or business matters over the air. He is also forbidden to transmit music or entertainment forms and in most parts of the world, including Australia, he cannot send or process messages on behalf of other people. Bad language is strictly forbidden. Any reward in cash or kind from his operations on air renders him liable to severe penalties. Any kind of news about third parties is not allowed. But all this does not prevent him from talking about all kinds of other things to the other amateur he is in contact with in the next town or in some place half way round the world. The bulk of the contacts you might hear on the amateur bands probably would be in English but some would be in French, German, Russian or any other language under the sun.

An amateur could go on and on about his wonderful leisure activity. He could become as boring about his hobby as the golfer expounding at length about his strokes on every hole. What the amateur does with his equipment and how he does it is well known to any other amateur. His knowledge and experience are shared with others although an ordinary member of the public listening in would come up against an unusual array of abbreviations and symbols.

The possession of gear and operating skills allows the amateur to take his place at once in any natural emergencies which arise such as Cyclone Tracy which wrecked Darwin. Amateurs quickly set up channels of communications to the outside world. The licensing authorities readily set aside the rules to allow him to pass traffic for such extended emergencies knowing how amateurs train themselves to handle such traffic.

Each amateur takes pride in being an ambassador for his country and for his chosen leisure activity be he a pensioner or a schoolboy, a bed-ridden patient or an active sportsman, a busy housewife or a prince, a millionaire or somebody struggling to make ends meet.

The next time you need to tell someone about amateur radio why not let him read this as a starter. After all, if there was anything fundamentally wrong with the activity it would not have flourished so greatly as it has done during the past 70 years — The Executive ■

THE TRINITY ANTENNA

Bruce Hannaford VK5XI
2 Meath Ave., Athelstone, SA 5076

The name comes from the fact that the antenna is in effect three antennas in one. The antenna may be either a single band or a multi band design.

BRIEF DESCRIPTION

The Trinity Antenna has three switchable bi-directional patterns equally spaced at 120 deg. apart. By this means good all-round horizontal coverage can be obtained. The problem of directional dead spots of conventional fixed single antenna systems is thus overcome. The switching can be done at any point between the central junction of the antenna radiators and the operating position. Usually it is preferable to do the switching near ground level where it is easy to get at the switches which will usually be relays controlled from the operating position.

The space required is only back yard size if an inverted V design is used, or slightly larger for horizontal elements. The appearance is quite neat with few wires being used. The last two statements refer to an all band 80 to 10 metres design.

WHAT DOES IT LOOK LIKE?

From a birds eye view it resembles the letter "Y", except the angles between the straight lines are all 120 deg., and the lengths of the lines are all equal. From the junction of the three wires at a central insulator, a three wire feeder system is used. The feeder descends vertically to near ground level, say 5 feet high. At this point a switching system followed by a balun is used. A co-ax cable continues to the operating position.

HOW DOES IT WORK?

At the switching point, by selecting the correct feeders, any two of the three radiator wires may be used. This gives the choice of three bent dipoles facing directions 120 deg. apart. The third (unused) feeder wire and radiator wire are located symmetrically with respect to the equal and opposite fields of the other two feeder and radiator wires, so there is little coupling between the active and unused wires either on transmission or reception. To help keep a good balance in the three wire feeder and the antenna system, a 1 to 1 balun is used between the switching system and the co-ax cable to the equipment.

A PRACTICAL DESIGN:

An inverted V trapped dipole Trinity Antenna for 80 to 10 metres. This design uses manufactured traps of a type often advertised in this magazine. The kit contains two 7.1 MHz traps and a T-shaped insulator. It is called a Multiband doublet antenna kit. You will need to buy two kits and have a spare trap left over, or perhaps you can combine with a friend and obtain three kits between you. You could, of course, make your own; there is a design in the ARRL Handbook.

The three radiator legs are each a total of 54 feet long. Each leg is broken at 32 ft. 6 in. from the feedpoint by a trap and after the trap, a further 21 ft. 6 in. is connected. A three wire feeder must be improvised, such as 240 volt electrical wire. As the length used is only 30 to 35 feet, the losses will not be too high. Some three wire flex is reasonably good, or twist some .044 or .064 into a three strand feeder. The feeder system is non-resonant and untuned. The length required is from the top of the pole to the switching point. A single wooden pole 35 to 40 ft. high is used at the centre of the antenna system.

There are three egg insulators equally spaced around the top of the pole and as close to it as possible. The three radiators are joined to the insulators at the top of the pole and the end of the feeder wires connected to them. The feeder is then attached to the pole every 3 feet or so coming down to within 5 feet of the base. When the pole is erected the three radiators also serve as guy wires; they may be anchored to the fence through a couple of insulators. The pole and the anchor points may be moved to get the proper angles between the wires. If space does not permit pulling the wires out straight they may bend down near the end of each wire, preferably as little as possible. However, it is better to use a higher pole so the wires can be straight. The distances between the lower ends of the three antenna legs (if they are straight) should all be equal. Once the right pole position and anchor points have been located make everything properly secure for a permanent job.

The next task is to connect the switching system to the lower end of the three wire feeder about 5 feet from the ground. Various types of switching can be used; possibly the simplest system is to use two relays, each having one set of change-over or two way contacts. The moving arms of the relays connect to the balanced terminals of a 1 to 1 balun. The fixed, normally closed, contacts of the relays connect together and to one of the three feeder wires. The remaining two normally open contacts (one on each relay) are each connected to one of the remaining feeder wires. This means it will be possible to switch the balun to any two of the three feeder wires. Also there will be a short across the balun when both relays are de-energised. This is useful for testing the co-ax cable.

The unbalanced side of the balun is now connected via 50 ohm co-ax to the equipment. A light three wire lead is attached to the co-ax throughout its length to operate the relays. String the co-ax up about 7 feet high or bury it in the ground. Join one side of each relay coil to one of the three relay wires. This is a common wire and at the equipment end is connected to one side of the relay power supply. The other two wires each connect a relay coil via one of two separate on-off switches to the power supply.

With relay power supply on, check that with both control switches on, both relays are energised. Then check that each of the relays can be operated on and off by its own switch. When all is correct, the equipment may be switched on and tests made.

Remember to keep the power down when testing and avoid the short circuit which takes place when both switches are off.

Check the SWR on each band on each of the three usable switch combinations. These combinations are, either one on, or both on, and these of course give the three directional patterns. The readings should not vary significantly if the antenna has been carefully measured and constructed. The length of feeder wire that leaves the tightly twisted part and fans out to reach the insulators at the top of the pole is part of the radiator length.

Assuming you have achieved good standing wave ratios on all bands (10 metres will most likely be the worst) you can now do some listening checks to see how the directivity works. Rule up a writing pad with sets of three columns, one for the band, one for the callsign and one for the switching combinations.

The three possible combinations are denoted as A, B & C and the switching system is marked to show what position is being used. Directivity patterns A, B & C are recorded for future reference.

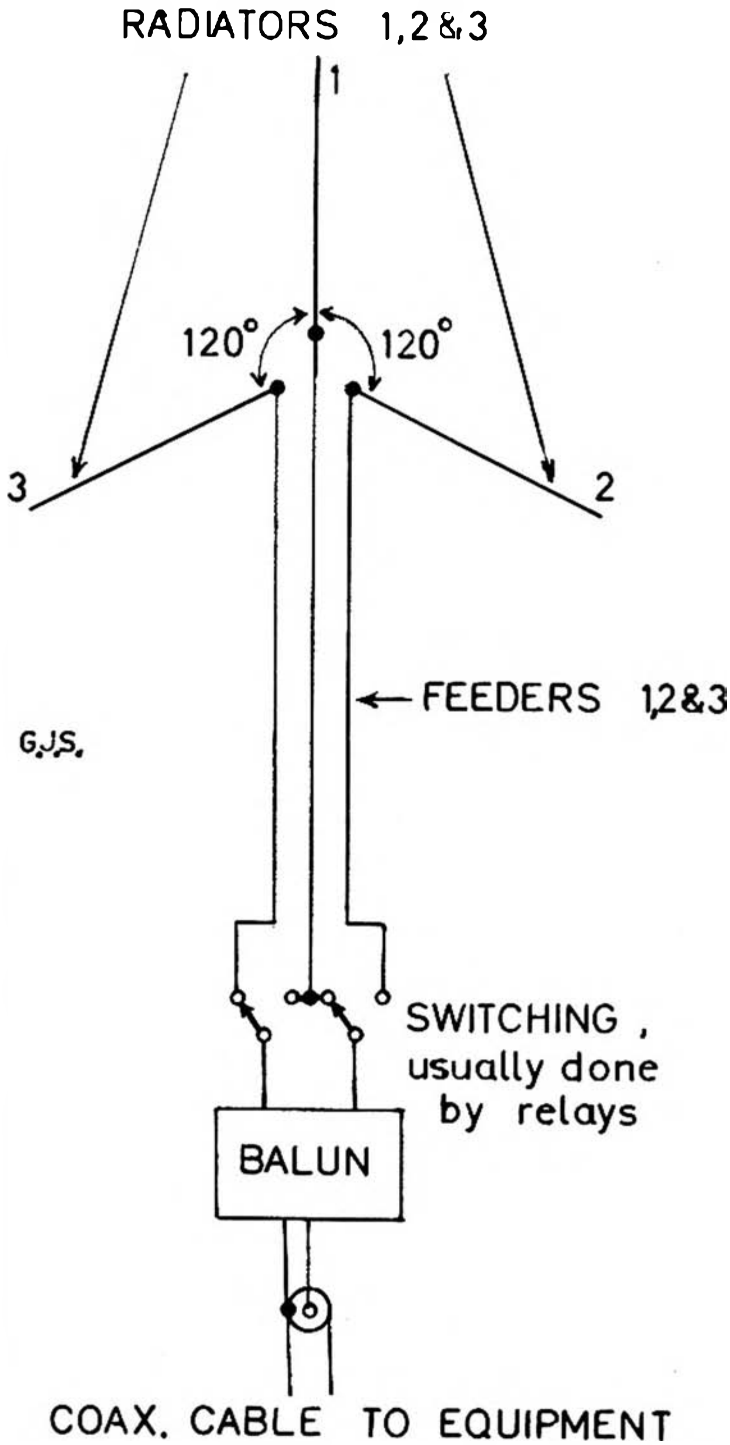
On 20, 15 and 10, it will often be found that changing the pattern will produce a change in the received signal level. If A produces best results but B and C are poor, A-BC is logged in the column next to the call sign. If A and B produce equal results but C is poor, AB-C is logged. If A is best, B is fair and C is poor, ABC is logged in that order. If all are the same, a dash is used, and no letters.

To obtain best results from the Trinity, it is very desirable to keep a systematic record such as this, perhaps by use of an extra column in the log book. Sometimes there will be little difference between the positions, but often one or more positions are about two S points down on the best position. When this happens it shows the benefit of not having only a single fixed antenna in the position of the poor signal antenna combination.

With this inverted V design, very little directivity is noticed on 40 and 80, showing that a ½ wave inverted V is a good non-directional antenna. If a horizontal Trinity is used there will be considerable directivity on 40 and 80, as well as increased directivity on 20, 15, and 10.

In reception one point worth mentioning is that interference may be reduced by using a different pattern. Try for the pattern that gives the best signal to QRM ratio, but if your signals are poorly received, go to the best signal strength pattern for transmission. In group working some advantages may be gained by using different patterns for the various stations. This can be done for reception and also during transmission if your remarks are for the moment directed to one particular station.

Of course everyone will want to compare the Trinity to a rotary beam, but the comparison is not really possible. A beam has only one main lobe in its pattern but the Trinity has many; secondly, the beam will give the impression of great gain as it is rotated simply because of the great attenuation off the back. The actual forward gain compared to a dipole is only about 1 to 1½ S points in most cases and it could well be that the Trinity will equal this, but operating the switches will not produce the same spectacular results as a rotary beam. Remember that the main advantage of the Trinity is good all round coverage without dead spots. It is not claimed it will out-perform a beam. When transmitting it will be found that signals received by a distant station will change in a similar manner to that noticed in reception. There are of course many more points that could be mentioned, however you will no doubt find great pleasure in discovering them yourself as you use the Trinity.



OTHER DESIGNS:

A G5RV design is a good proposition, the radiator lengths are very similar. Make a three wire radiator top and use a three wire open wire feeder with the three wires equally spaced from each other. The bottom end of the three wire feeder is switched in the same manner as described for the previous design. The balun will have to handle high standing wave ratios so use a high power job for safety.

A Tuned Feeder Zepp design with three 33 feet radiators and a three wire 33 feet tuned feeder system with switches at the bottom end is a possibility. By using suitable tuned circuits connected to any two of the three feeder wires, it will operate from 80 through to 10. However this design is difficult to handle with relay switching due to the high RF volts and tuned circuits that need switching. If the shack is under the antenna, these problems largely disappear and the switching and tuning can be done in the shack in comfort.

VHF DESIGNS:

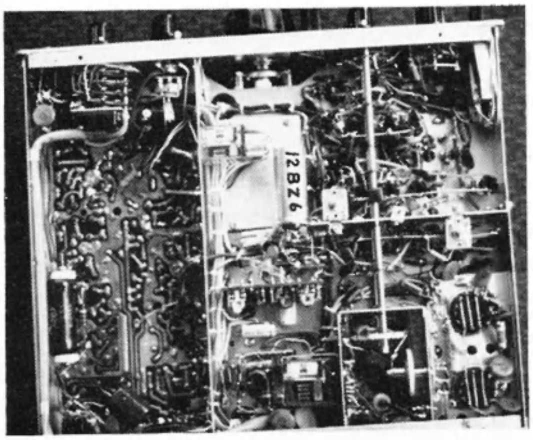
At these frequencies it is possible to make a radiator and attached feeder out of a single piece of metal rod or tubing bent into a "L" shape. The combined length of two of the radiator portions should be an odd number of ½ waves to give low Z at the feed point. The rods are insulated, perhaps with a sleeve of insulating material to give the right spacing for the low Z feed line impedance. The three pieces are placed together, set at the proper angles to each other, and clamped together where the three feeder portions touch and run parallel to each other. The three feeder rods can form the main portion of the vertical supporting structure. At the base of the feeders they can be attached to a support such as a wooden post. The usual switching, balun and co-ax feeder are used as in the previous designs.

CONCLUSION

There are so many designs and variations that it is not possible to mention them all. Only representative types likely to appeal to amateurs have been discussed.

Several small details have been omitted that could have been included, however, if you are uncertain of any aspects, the author would be only too pleased to answer any queries. ■

MORE MODIFICATIONS TO THE FT200



Three modifications to the ever popular FT200 are described. The first involves fitting a 12BZ6 as an additional RF amplifier. The second provides sharper RF peaking and more drive for 80 and 40 metres, while the third covers an improvement to the key click filters.

Athol Pritchard VK3CP
15 First Ave., East Kew, Vic. 3102

I have been a "home-brewer" most of my ham life, licensed as VK3CP in August 1931, and have always been interested in portable operation, but not with a car full of gear. A couple of married sons living in the country provided an incentive to do something about it.

As I was brought up on the *"care and feeding of vacuum tubes"* the logical choice, in my case, for a compact transceiver fell to the FT200, and with Heli whips mounted on the back bumper, fixed portable contacts have left nothing to be desired, VK and DX being a surprise and a delight.

Sensitivity on receiving was more than adequate on the three lower bands, adequate on 21 MHz, but less on 28 MHz. The various modifications were all tried such as 6GM6, 6EH7 frame grid tube, in adapters with very short leads and well by-passed. But the improvement was less than desired. Before this present modification the 100 kHz calibrator "S" meter reading on 21 and 28 MHz was S8 and S1 respectively with normal "S8" meter sensitivity on the lower bands. With the extra RF stage these bands now read S9 + 15 dB and S9 + 10 dB without regeneration or oscillation, and no change to the "S" meter sensitivity control setting, nor realignment of coils necessary.

The extra RF stage uses a 12BZ6 (to save a dropping resistor in the heater) and goes between the driver coils/grid coils and the first grid of the 6BZ6. It is mounted under the chassis adjacent to the 6BZ6 RF stage with its socket soldered by the edge to the vertical partition that is over this RF stage. There is no heat problem as the shield of this extra tube lies against the bottom of the perforated cabinet when this is in place and a self-tapper holds the shield firmly against same, making an ideal heat sink.

All the connections to the new tube are conveniently where they should be. The control grid and cathode resistors go to the same tag strip and are of the same value as used by the 6BZ6. The plate and screen voltage comes from the supply end of the screen resistor to the 6BZ6 RF stage and is open-circuited by the extra contacts on the antenna relay during transmitting. The screen voltage goes through a 4.7 k ohm resistor, and is by-passed at the socket with a .01 uF disc. (Refer Fig 1.) The slug-tuned plate coil has a 330 ohm resistor in series and is by-passed by a 50 pF capacitor at the junction of these two, and this gives extra sensitivity on the lower bands where the slug-tuned coil acts as an RF choke only. The slug-tuned coil is tuned to a little above 29 MHz approximately and this gives adequate gain on 21 MHz and the two 28 MHz ranges. If the coil is tuned to the working range of these bands, oscillation takes place. The coil can be set between 21 and 28 MHz but I prefer it just above the higher range on 29 MHz.

If desired the gain on 3.5 and 7 MHz can be increased by shunting the 330 ohm 12BY7 plate de-coupling resistor with a 150 uH choke.

The modification has been in use here for about five months, with no problems at all. The new tube is protected by the same circuitry as used with the normal RF stage. The AVC and "S" meter action is now better than ever, and taken all round I feel the improvement more than worthwhile. The slug-tuned former is ¼" diameter by 1" long and has 26 turns close-wound with 26 gauge cotton-covered wire.

The job takes about an hour to do after the various bits have been soldered to the socket. The components are wired to the socket before it is soldered to the partition.

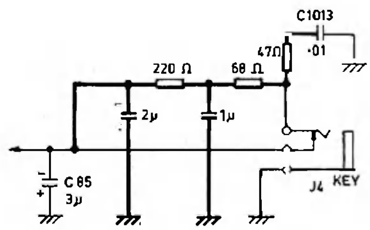


FIG 2 MODIFIED FT200 KEY FILTER

Two other small modifications are as follows:— I have sharpened up the tuning on 80 and 40 metres by increasing the value of the two 10 k resistors R72 (3.5 MHz range) and R73 (7 MHz range) to 47 k. This also gives more drive on these two bands.

The other modification deals with the keying filter. I removed the 330 ohm series resistor at the key jack and replaced it with a 220 ohm and 68 ohm resistor in series (the 68 ohm nearest to the key), and a 1 mF capacitor on the junction of these two to earth. (Refer Fig 2.) (*Note—some models have a 680 ohm resistor instead of 330 ohms—ED*). Also a 2 mF capacitor in parallel with the 3.3 mF electrolytic capacitor. I added 47 ohms in series with the .01 disc that is across the key. This gives firmer keying without clicks. ■

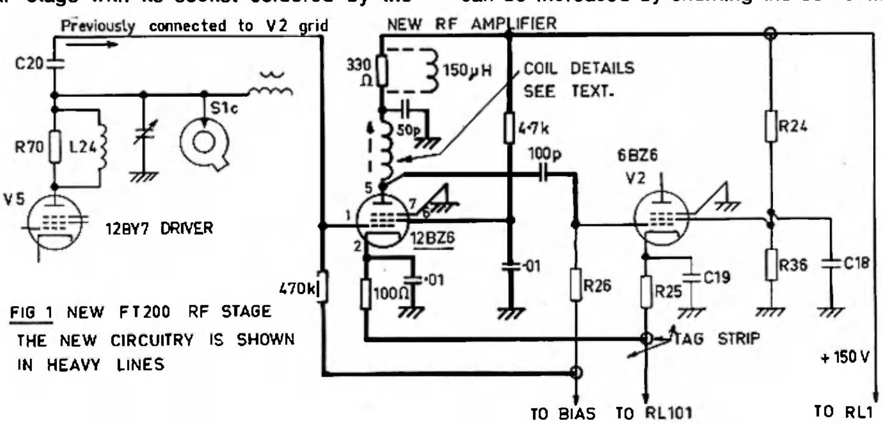


FIG 1 NEW FT200 RF STAGE
THE NEW CIRCUITRY IS SHOWN IN HEAVY LINES

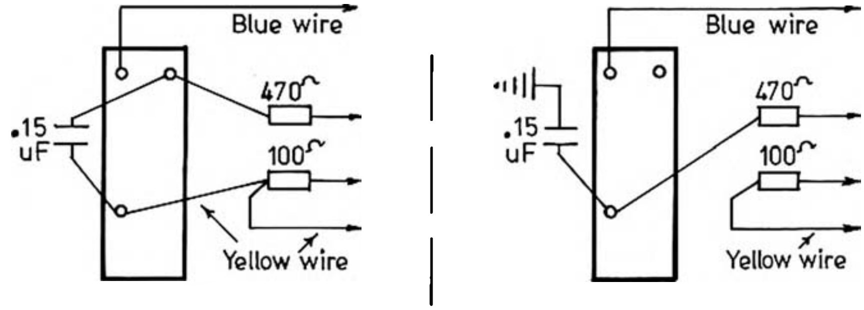
MODIFYING THE TCA1675 AND 1677 FOR USE ON 6 AND 2 METRES

R. H. Wales VK3ACM
Samaria Roadside via Benalla 3672

These units are the hybrid type, the only valves used being a 12AT7, QQE02/5, and QQE03/20. The transmitter audio and crystal oscillator/phase modulator stages are transistorised. The current drain of the units is as follows, receive muted — approx 90-100 Ma., full audio (receive only) — approx. 300 Ma., Standby — 1.2 Amp, Transmit — approx 7.5 Amp. The differences between the 1675 and 1677 are minor, although the oower su^ply is considerably different in the '77.
High band 1675s and '77s should only require tuning up to operate on the various 2 Mx nets.

NARROW BAND — WIDE BAND

FIG. 2.



LOW BAND 1675s and 77s FOR OPERATION ON 6Mx - 52.525 Mc/s
Basic modification data as follows:

RECEIVER

Aerial coil: Add 6 turns of same gauge wire to "hot" end.

Collector coil: Add 8 turns of slightly smaller gauge wire to "hot" end, move collector lead from tap to "hot" end of coil, i.e. to trimmer.

1st mixer coil: Add 6 turns of same gauge wire to "hot" end. Disconnect lead from trimmer of the middle tuned circuit. Disconnect lead from trimmer of middle tuned circuit to RF stage collector coil, run a piece of enamelled wire from trimmer of mixer coil to lead on collector coil. This bypasses the 2nd tuned circuit.

Osc. Mult. coil: Add 6 turns to "hot" end (same gauge wire).

Oscillator coil: Add 8 turns to "hot" end (same gauge wire).

TRANSMITTER

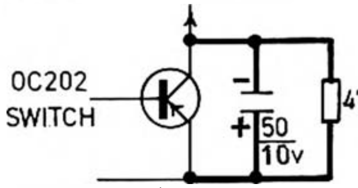
Remove RF filter (under chassis near relay).

T3: Replace windings with 30 turns of about 24 SWG wire, same spacing as original.

L1: Replace winding with 19 turns of same gauge wire.

2/5 plate coil: Replace with 16 turns, spaced 1½", same shape, same gauge, same diameter, tinned copper wire.

FIG. 1. TO AUDIO CARD (CONTROL)



COMMON POSITIVE (EARTH)

3/20 grid coil: Replace with 22 turns, spaced 2", same shape (centre tapped), same gauge, same diameter, tinned copper wire. Add 22 pF across link tuning capacitor (C25).

3/20 plate coil: Replace with 14 turns, spaced 2", same diameter, same gauge and shape, tinned copper wire (centre tapped).

CRYSTAL FREQUENCIES

Rx crystal frequency is calculated from the following:

$$Fx = \frac{Fc + 16.755}{2}$$ where Fx is xtal freq. Fc is car. freq.

For 52.525 MHz, the receive crystal is 36.640 MHz.

Tx crystal frequency is calculated from the following:

$$Fx = \frac{Fc}{24}$$ where Fx is crystal freq. Fc is carrier freq.

For 52.525 MHz, the transmit crystal is 2.18854 MHz.

LOW BAND 1675s and 77s FOR OPERATION ON 2 Mx NETS
Basic modification data as follows:

RECEIVER

Aerial coil: Remove turns from "hot" end until 8½ turns remain.

Collector coil: Remove turns from cold end until 6 turns remain. The collector of the AFZ12 is connected to the trimmer.

2nd tuned circuit: Remove turns from cold end until 7 turns remain. The 1 turn links on the above two coils are to be placed as close as possible to the "hot" ends of the coils.

1st mixer coil: Remove 1 turn from cold end. Remove turns from "hot" end until 7 turns remain. Coil will now be 7 turns tapped 2 turns from cold end.

Osc. multiplier coil: Remove turns from "hot" end until 6 turns remain.

Oscillator coil: Leave as original.

The mixer transistor in these low band units is an AF116N; this works quite well at 2 Mx and above, however some worthwhile improvement is obtained if this is replaced with an AFZ12 (same type as in the RF stage).

TRANSMITTER

Remove RF filter (under chassis near relay, 77s only).

Oscillator card (U3) Replace R5 (The 220K through the shield plate) with 100K. Add 200 pF between card and crystal (102 in high band circuit).

Change R11 (on 77 circuit), the 100K screen resistor for the 2/5, to 2 by 33K 1 Watt in parallel. Change R14 and R16 originally 4.7K 1 Watt, to 1.8K 1 Watt, although this is not strictly necessary, but the screen resistor (R11) *must* be changed to give adequate drive.

Remove the 22 ohm resistor from the centre of the final plate tuning capacitor. It is between the rotor and earth.

Disconnect the Tx audio filter if fitted (between mic. amp. and osc. cards).

Modification to the Tx coils. Note: *Keep spacing between windings the same.*

L2: Remove 1 pie winding, replace 10 pF with 4.7 pF.

T1: Remove 1 pie winding from each side.

T2: Remove 22 turns from each winding (approx. half).

T3: Remove turns until 9 turns remain on each winding.

L1: Remove turns until 4 turns remain.

2/5 plate coil: Remove turns until 4 turns remain, same shape as original.

Link: Remove turns until 1 turn remains, same shape as original.

3/20 grid coil: Remove turns until 4 turns (CT) remain, same shape as original.

Link: Remove 1 turn, leaving 2 turns, same shape as original.

3/20 plate coil: Remove turns until 4 turns (CT) remain, same shape as original. Cut capacitor so that 4 stator plates remain, and 5 rotor plates remain.

Output link: Should be 2 turns.

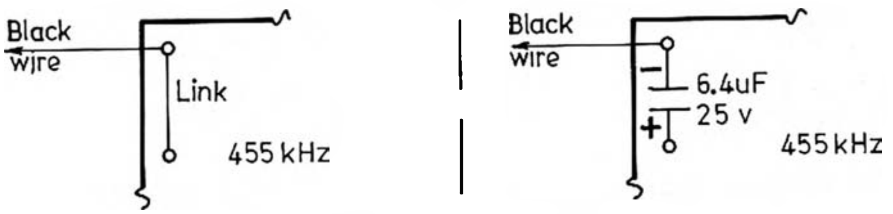
CRYSTAL FREQUENCIES

Rx crystal frequency is calculated from the following:

$$Fx = \frac{Fc - 16.755}{3}$$ where Fx is crystal freq. Fc is carrier freq.

For 146 MHz, the receive crystal is 43.08167 MHz.

FIG.3.



2nd IF BOARD CONNECTIONS.

Tx crystal frequency is calculated from the following:

$Fx = \frac{Fc}{36}$ where Fx is crystal freq.
Fc is carrier freq.

For 146 MHz, the transmit crystal is 4.05556 MHz.

TUNING UP PROCEDURE, BOTH 2 and 6 METRES

RECEIVER

The Rx has a 1st IF of 16.755 MHz, and this is mixed with a 17.210 MHz crystal to the 2nd IF of 455 kHz. The Rx filter is on 455 kHz. It is essential that both IFs are lined up *correctly* before the front end alignment is commenced. The correct peak for the cores in the 1st IFs is the one *farthest* from the middle, i.e. cores should be fairly close to the *top and bottom* of the cans. If the cores are peaked near the middle of the can, the mute circuit may not function correctly on *weak* signals. For more details on the IF alignment refer to a manual on the 1677.

I have found that with most units the IFs are reasonably good, the 1st IFs may need a slight touch up on a weak signal. Now onto the alignment details for the front end. It is a good idea to have a Tx on the frequency to give a really potent signal source to start with. Other equipment required is a stable signal generator, and a fairly high impedance multimeter, and if possible a 25-0-25 uA centre zero meter.

Plug in the Rx crystal, connect a high impedance meter to emitter Ts3 (i.e., lug on stand off), set meter to 3 volt range. Adjust C6 for max reading, making sure that crystal starts reliably. Connect meter to the test point on the 2nd IF card, set to 50 uA range. Feed in a fairly strong signal, then as Rx is peaked up decrease the input signal, whilst still maintaining a useful indication on the meter. Finally peak all trimmers and cores on a *weak* signal. It takes a fairly strong input signal to get an indication from this IF testpoint even when using a 12 uA meter. So final peaking may have to be done by "ear".

Setting Rx on frequency is done as follows:

Connect a 25-0-25 uA meter between the black wire on the audio card and positive, and with an input signal on exactly the right frequency adjust the coil in series with the crystal to give zero reading on the meter.

NOTE: For all *receiver* testpoints the common or meter *positive* connection is receiver *positive*. The *chassis of the RF unit* is a good place to which to connect the meter common lead. The plus and minus rails of the unit are isolated above ground. Care should be taken when working on the Rx. The manual suggests that the voltage regulator stage be disabled when working on the unit, as if the regulated line is accidentally shorted (the whole Rx excepting the audio power stage is supplied via the regulator stage, an AC128) then the regulator transistor will be destroyed.

TRANSMITTER

Plug in crystal, connect a meter to M1. Chassis of the unit is common for all Tx test points except 3/20 IG. Tune L2 and T1 for max, use 300 uA meter range.

Connect meter to M2, 300 uA range, tune T2 for max.

Connect meter to M3, 300 uA range, tune T3 for max.

Connect meter to M4, 300 uA range, tune L1 for max.

Connect to M5 and M6, 1 mA range, tune C23, C25 and C29 for max (may be necessary to adjust the coupling links).

Adjust final tuning and coupling for max RF power out. It is a good idea to recheck these adjustments.

Deviation may be set by getting a report on air or by using a deviation meter.

If the transistor whine particularly with the 77 is bad, this may be reduced by soldering a braid between the shield plate on the osc. card and the main chassis; this provides a "better" earth connection for this shield although it is screwed to the chassis.

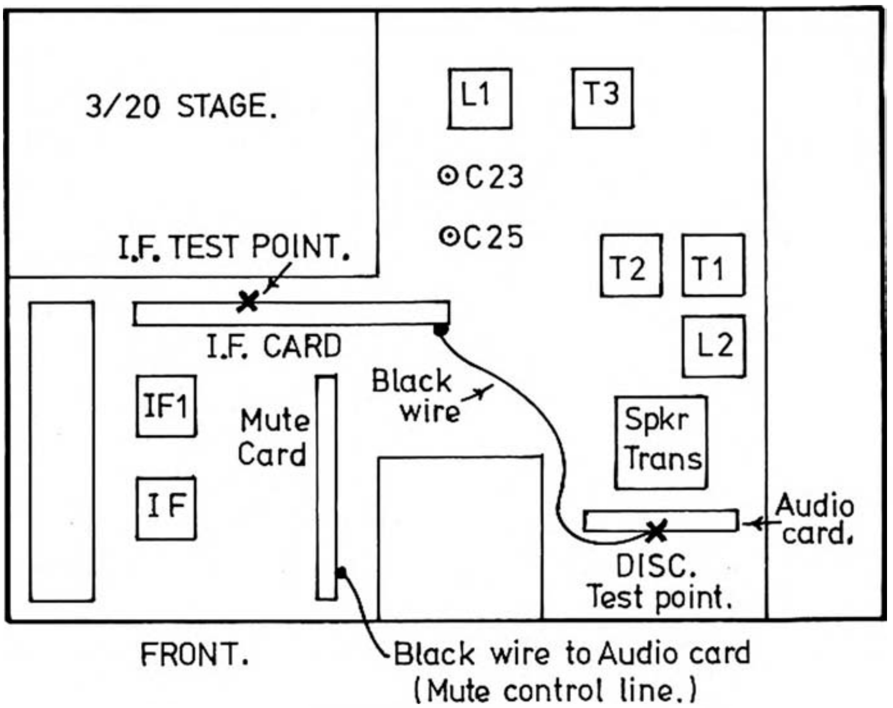
The amount of drive available may not be high but the Tx final (3/20) does not seem to need much drive to get 25 Watts out. 500 uA of drive seems to be adequate, however the more drive you can get, the better.

When the Tx coils are being modified (particularly for 2 Mx) is it a good idea to check the coil with a GDO and pre-tune roughly to the frequency that it is required to tune, before placing the coil back in the unit. This makes alignment a lot easier (it is quite possible to tune the 2 Mx unit up on 128 MHz).

Also, when first tuning up the unit do not run the transmitter for too long a period of time, as some stages will be without drive (and hence some of the operating bias) which may cause the valves to overheat. So, only push the button for short periods until all stages have drive.

This concludes the basic data necessary to get the units going on the required band. There may be short cuts to some of the modifications, but this is what I have done and the results are good. Care must be taken when working on these units. The Tx coils are awkward to remove and replace, and there is quite a lot of work required in converting the low band units to high band. But, provided you have the time and patience, the results are well worth while.

FIG.4. TOP VIEW.



VICOM INTERNATIONAL PTY LIMITED Manager: Peter Williams

FT-101E

Following the successful FT101B comes the FT101E 160m–10m SSB transceiver which comes with lots of little improvements. Toggle switches on the front (replacing those designed for Japanese fingers) and the inclusion of a speech processor are some of the improvements. See the FT101E first at VICOM.

HF TRANSCEIVERS

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Yaesu FV101B VFO for FT101B/E. $102
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Trio TS–520 (80–10m) transceiver, $550 incl. mic.
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Atlas 240v power supply, $150
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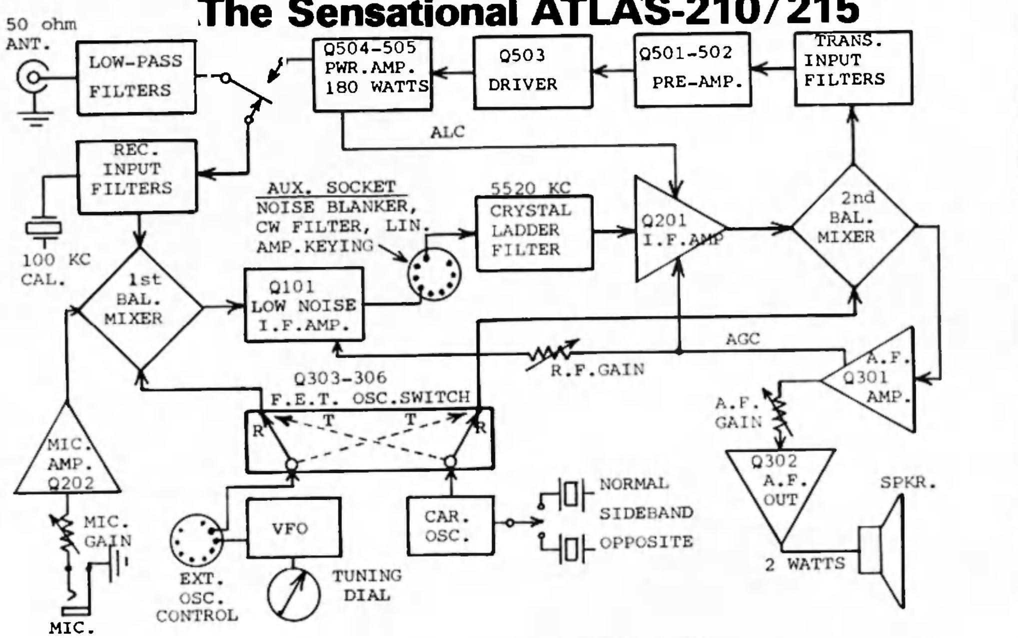

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VT108 FET VOM 8 ranges 0.5 to 1.5kv, 11 meg input. 0.1 to 1000 meg, memory feture $85
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TH6DX 6el yagi 10-15-20. $225
TH3JR 3el yagi 10-15-20. $135
18AVT trap vertical 80-10. $90
14AVQ trap vertical 40-10. $65

TENNA BY VICOM

	Model	Imp	Freq	VSWR	PRICE $
BALUNS	BL-50A	52	1.8 - 38MHz	1.3:1	16.00
	BL-70A	75	1.8 - 38MHz	1.3:1	16.00
COAX SWITCHES (2 & 6 pos)	CS-2A	52	to 300MHz	1.3:1	23.00
	CX-6A(A)	52	to 500MHz	1.3:1	54.00
	CX-6A(B)	75	to 500 MHz	1.3:1	54.00
TRAP DIPOLES	III-N	52	7 to 28MHz	1.2:1	33.00
	AL48DXN	53	3.5 & 7MHz	1.2:1	33.00
	AL24DXN	52	7& 14MHz	1.2:1	26.00
	A-4VPN	52	3.5MHz	1.2:1	26.00
	A-8VPN	52	7MHz	1.2:1	28.00
LISTENER	LI	75	3 to 30MHz	—	15.00
BALANCED FEEDER	BTF-1	600	—	—	12.00

Power AMP for 2 metres. carrier operated relay, infinite VSWR protection, 60 watts from 10 watts in, BNC connectors. $89

VHF ANTENNAE
Scalar Mobile Whips:
M22 2m fibreglass ¼w $7.50
M60 6m fibreglass ¼w $10.70
M21 2m steel ¼w $6.90
LINDENOW 2m 5/8 whip $21, base $2.60
RINGO ARX-2 6db 2m gamma matched vertical $35
Extension kit to improve gain of the old AR-2, $12

ANT. ACCESSORIES

ME-1B SWR PWR METER 3-150 MHz $22
ME-UA UHF POWER METER $69
AS-GM gutter damps 2m $7.50
SH-7E lightning arrester $14.90
CO-AX 58u 45c per m
RB 2m mast amp (144-146 or 146-148) $32
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2 METRES FM.

ICOM IC-21A 10w base station or mobile. Features variable pwr control, adjustable deviation, built-in scriminator meter, S meter, SWR meter and modular circuitry. Includes 3 chs 1-4-50. Price $298. Extra xtals $8.50 pr.
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New

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ectivity, 90dB adjacent channel rejection
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Darwin:	Distributor required
TPNG:	Distributor required

Head Office .... 139 AUBURN RD. AUBURN, VIC 3123. 82-5398

What now follows will be some of the modifications to the units in general to obtain better performance on the amateur nets.

THE MUTE CIRCUIT

As original this works well but, on over-deviated and/or off frequency signals, the mute can have a tendency to close up on audio peaks. This effect is particularly bad if the unit is "hard muted".

To cure this, I have added a delay to the mute circuit, the result being that the mute may take a second or so to close.

Add a 50 uF/10V electrolyte and 47K resistor across the mute control line and place between the black shielded wire on the mute card (which runs to the audio card) and the earthy part of the board (i.e., *positive*). Fig 1 shoula explain this; also refer to the layout diagram.

THE RECEIVER FILTER

If you desire to change the filter to either a narrow or wide type, Figs 2 and 3 should assist in this. The wide filter has one less connection than the narrow one. When the filter is changed don't forget to alter the connection on the IF board also. The narrow filter has 7 cores and is meant for 5 kHz deviation, while the wide filter has 11 cores and is meant for 12.5 kHz deviation.

LOCATION OF TEST POINTS

Figs 4 and 5 should assist with locating the test points. The Tx test points are marked X.

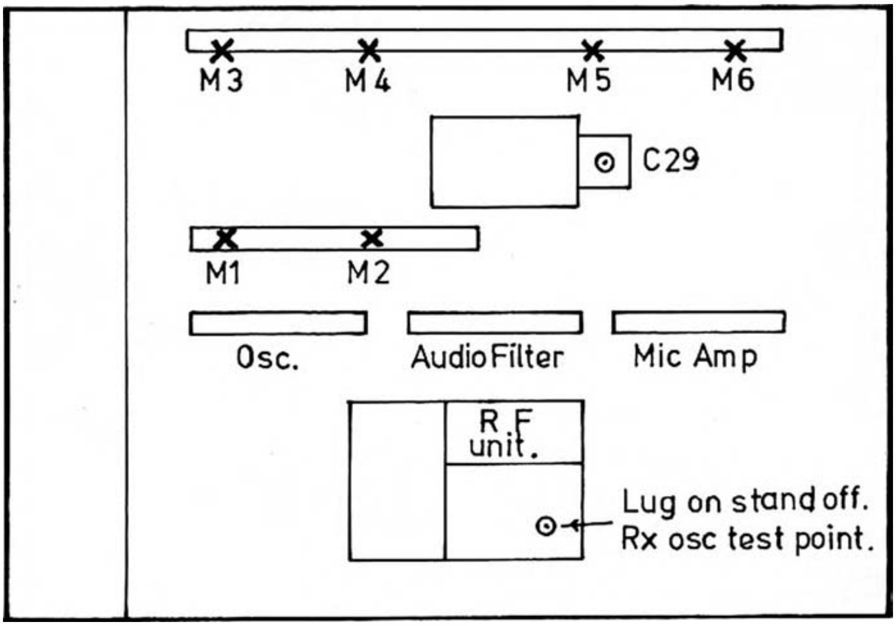
THE FRONT END OF THE 1675

The front end of this is similar to the 1677, but the 1st mixer is not biased, if it is left like this then the performance is very poor. It must be biased as in the 1677.

To do this, lift the base lead of the mixer transistor, connect a 22K resistor from the cold side of the oscillator multiplier trimmer to the base lead, connect a 3.9K in parallel with a .01 ceramic capacitor from the base to the chassis of the RF unit. See Fig 6. The emitter resistor *must* be changed to 1.2K, if this is not done then the mixer (AFZ12) may not last very long.

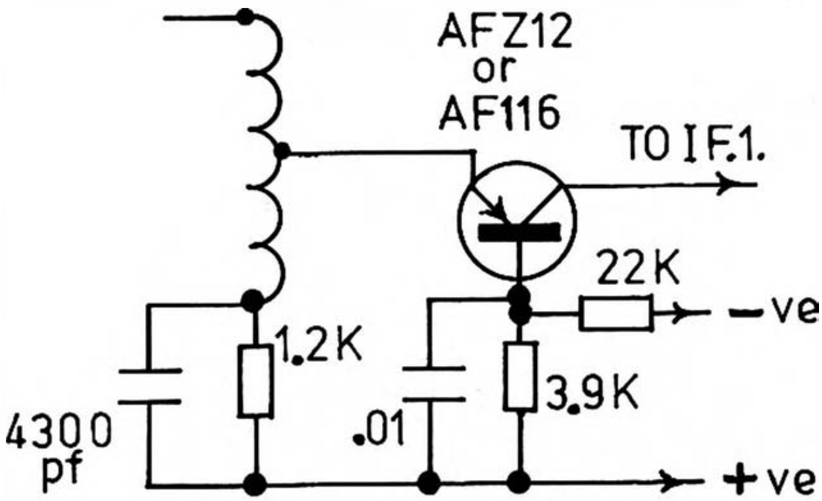
This completes the article. The complete circuit is too large to be reproduced here. Reference to the circuit should clarify any doubtful points. The units are capable of good results when tuned up correctly and should give years of satisfactory service. However, dry joints can be troublesome, and it is a good idea to have a spare AF116N and a AC125 on hand. Once the bugs are ironed out (if any) there should not be too many problems.

FIG.5. UNDERNEATH VIEW.



FRONT.

FIG . 6.



CHASSIS RF UNIT.

TECHNICAL EDITOR'S NOTE:

A note received from John Day VK3ZJF contains the following information which is relevant to the preceeding article.

No information on the relative performance of units modified by the different approaches is available.

(a) The receiver crystal should be cut for SERIES resonance.

(b) Only minor modifications to high-band 1675s and 77s will be necessary for operation on the two metre nets.

RECEIVER

No modifications normally necessary, just re-align front-end board.

TRANSMITTER

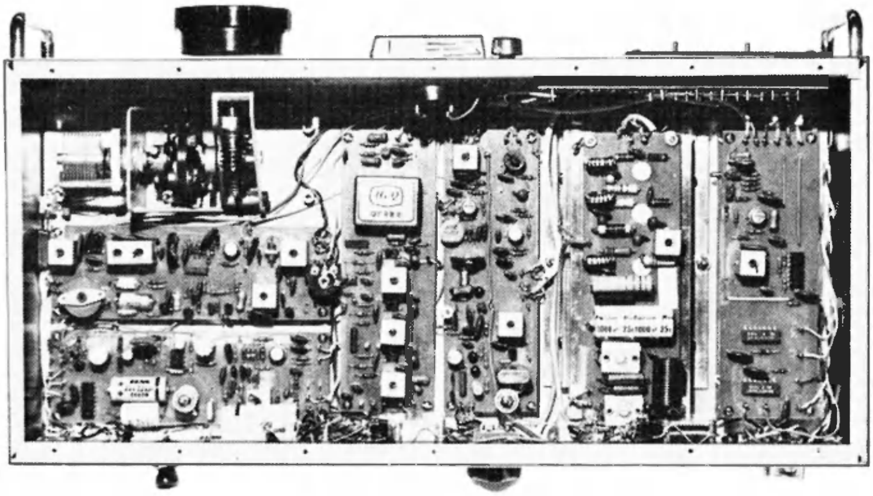
The amount of work required depends on the actual transmitter as in some cases, particularly late model 1677s, the transmitter will tune straight down to two metres. In other cases you may need as much as 10 pF across each winding of T1, T2, T3. Coil L1 will normally be fitted with a brass slug; remove this and replace with ferrite. If this is done and the remainder of the circuit tuned properly, you should have more than enough drive, even for 40 watts of output. Unfortunately, in the search for drive you may possibly need to rewind some coils for improved L/C ratio. In some cases it has been found necessary to add 1 turn to each side of L6 (3/20 grid coil) and 1 turn to each side of L10 (3/20 plate). The 0-25 pF trimmer C42 on the schematic is not included on most 1675s (and even some 1677s). For this use, a 3-30 pF Phillip "Beehive" type trimmer.

The use of a transmitter as a signal source is NOT recommended and should be avoided. ■

AMATEUR BUILDING BLOCKS

PART ONE

H. L. Hepburn VK3AFQ
4 Elizabeth St., East Brighton, 3187



In the amateur constructional literature, especially as it relates to receivers and transmitters, there has been an understandable tendency to describe equipment in terms of a specific finished product that does this and thus, measures so by so, and uses such and such components.

Yet, no matter how complex the final result, these pieces of equipment still consist of a finite number of functions combined together to do whatever the builder had in mind. Rarely, however, has the described article been exactly what the would-be constructor wanted, so that the tendency has been to abstract the parts of the published circuit which are of immediate interest to him.

The writer's main interest in amateur radio has been the evolution of home built equipment and it is the intention of this series of articles to describe a nummer of modules or building blocks. Each module is useful on its own, but modules may be combined to synthesise quite complex arrangements, although emphasis is placed on receivers, transmitters, frequency standards and frequency counters, these being the main pieces of *"hardware"* likely to be of interest to amateurs.

What the articles will, quite specifically, *NOT* do is to describe an all purpose, multiband, multimode "black box" which will be all things to all people. Rather, it presents a useful library of flexible and compatible units from which a selection can be made to build a wide range of end products.

Only components currently on sale in Australia (mostly through supply houses advertising in this and other local journals) have been used and suppliers are quoted where considered necessary. By and large there is nothing sacred about the devices used and, within reason, other equivalent devices can be substituted.

Section 1—

BRIEF DESCRIPTION OF MODULES

All the modules described in this series of articles are constructed on single sided circuit boards measuring 6 in. x 2 in. (152.4 x 50.8 mm). All have four corner mounting holes on 5.7 in. x 1.7 in. centres (144.8 x 43.2 mm) so that, if required, they can be stacked vertically to save space.

The functions contained in each module are as follows:

Unit A

This is a receiver "front end" module and contains —

(a) An RF amplifier whose gain may be fixed or manually controlled or AGC controlled;
(b) A balanced mixer
(c) A VFO capable of covering selected portions in the 1.5-12.0 MHz range;
(d) A fixed frequency crystal oscillator (3-18 MHz) which can be used in place of the VFO, making the module useful as an HF converter.

Unit B

This is an IF amplifier module for AM, CW or SSB. It can be operated on any of the common frequencies between 455 kHz and 10.7 MHz and the PCB makes provision for most (but not all) of the currently available filters. Home wound or commercial IFTs can be accommodated and an off-take is provided after the 1st IF amplifier so that the module can be used in a transceiver.

Unit C

This is a receiver "back end" module and contains —

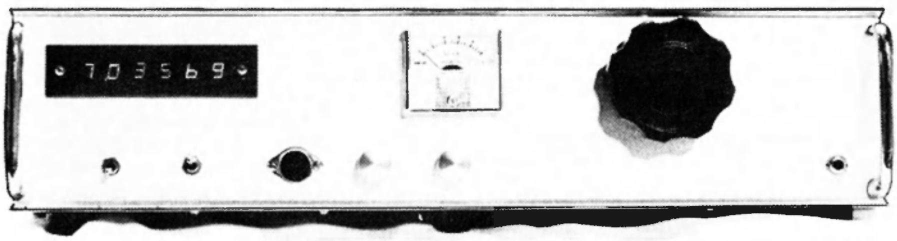
(a) A product detector;
(b) A crystal controlled BFO;
(c) An AM detector;
(d) An audio AGC generator;
(e) An audio preamplifier;
(f) Audio power output;
(g) "S" meter circuitry.

Note that units A, B and C combine together to make a single band receiver.

Unit D

This module contains the additional functions necessary to provide a low level SSB signal when used in conjunction with Units A, B, C above. On board are:

THE VK3AFQ SOLID STATE SSB TRANSCEIVER



A prototype of the solid state SSB transceiver, which can be assembled from circuit boards, to be described in this magazine by Harold Hepburn VK3AFQ, was tested by members of the Publications Committee. The unit submitted for test included the full digital readout dial.

Tested over a period of several days, overall performance was rated first class. Receiver sensitivity and selectivity compared favourably with several commercial transceivers. In fact, due to the very low internal noise level, signals were very easy to copy.

On air reports indicated that the transmit quality was crisp and very readable. Digital dial readout for transceivers seems to be very much a matter of opinion. Suffice to say that this one works well with only a slight amount of flicker appearing on the last (10 Hz) digit.

This project is recommended for those who have had some constructional experience and are familiar with the operation of SSB transceivers. ■

(a) A microphone preamplifier;
(b) A balanced modulator;
(c) A signal frequency balanced mixer;
(d) A (3-18 MHz) crystal oscillator.

Unit E

This is a 25/30 watt single band linear amplifier to build the signal from Unit D up to a useful level for "on air" use.

Note that units A through E inclusive combine to form a single band 25/30 watt SSB transceiver.

Unit F

This is a 1½/2 watt VHF single channel exciter (50-150 MHz) which, if required, can be frequency modulated. Its output level is adjustable so that the unmodulated output can be used, for example, as a carrier injection source for transverters. On board functions are —

(a) Microphone preamplifier;
(b) Frequency modulator;
(c) Crystal oscillator/tripler;
(d) Two doubler stages;
(e) Signal amplifier with adjustable output.

Unit G

This is a 10.7 MHz input FM receiver "back end". It contains —

(a) Filter;
(b) 10.7 MHz amplifier;
(c) Crystal oscillator/mixer;
(d) 455 kHz amplifier/limiter/detector;
(e) Audio preamplifier;
(f) Audio output;
(g) Squelch circuitry.

Unit H

This is a crystal oscillator on 10.00 MHz. Sufficient dividers are provided to give output at decade intervals down to 0.1 Hz. A separate, on board, dual flip flop can be used to divide any of the main clock outputs by 2 and/or by 4 so that outputs down to 0.025 Hz are available. Optional circuitry is provided to enable remote adjustment of the crystal frequency to be carried out. The unit can be used as a frequency standard and/or a counter time base.

Unit I

This is a display unit which is capable of operating in excess of 40 MHz for use in frequency counters, digital dials and timing devices. The number of digits displayed is optional with a maximum of six figures.

Unit J

This is a signal processing module accepting low level (20 mV) sine waves and outputting a TTL compatible waveform. Also on board are the necessary housekeeping functions for timing or frequency counting projects including a single band digital dial.

Note that Units H, I and J combine together to produce a 40 MHz, six digit frequency counter capable of a ±1 Hz resolution and that all units A through J make a SSB transceiver showing operating frequency to the nearest cycle if required. Figure 1 is a simple block diagram showing two of the module groupings possible. Specifically, units A to E produce a single band HF SSB transceiver while units H to J are grouped to give a 40 MHz frequency counter. It must be emphasised, however, that the grouping shown is not mandatory and individual modules, or parts of those modules, can be otherwise put together to achieve other end uses.

The writer is prepared to comment on, or suggest, other specific groupings or end products. A stamped addressed envelope for the reply is requested.

To be continued ■

AN AR SPECIAL

A REVIEW OF THE MULTI-7 2 METRE FM TRANSCEIVER

In the December 1974 issue of Amateur Radio we reviewed the Icom IC22 and stated that more two metre FM transceivers would be reviewed in the future. Here then is the second in this series.

The Multi-7 is a product of the FDK Company of Fukushima, Japan. It is distributed in Australia by Sideband Electronic Sales and Engineering of Springwood NSW, who supplied the unit used in our review. Details of price and delivery can be obtained from the above company.

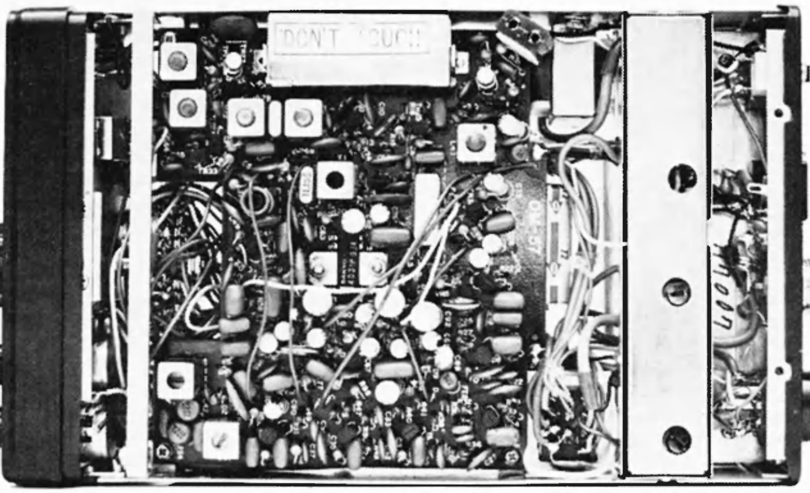
In keeping with the latest approach the Multi-7 has provision for 22 channels plus a priority channel and also an external VFO. There is no indication that the FDK Company produce a matching VFO nor is any information supplied on the use or construction of one.

Naturally, the unit is fully solid state and employs 27 transistors, 3 FETs, 1 IC, 1 SCR and 18 diodes. The Multi-7 is the smallest two metre transceiver currently on the Australian market. The overall dimensions are: 134 mm wide, 216 mm deep and 75 mm high. The weight is 1.6 kg.

No doubt, to match the non-reflecting finish of modern car dash boards, the Multi-7 is finished in a dull black plastic on the front panel while the metal cabinet is painted in satin black. The overall appearance is first class with colour relief provided by touches of satin chrome on the control knobs. The meter and channel selector are both illuminated from the rear and an *"on air"* indicator is placed to the right of the meter. Channel selector markings are unusual in that they are numbered for the frequencies commonly used in Japan, with the colour changing to signify either 144 or 145 MHz. As supplied by Sideband Electronics, 10 Australian channels are included, these being a receive and transmit crystal on every 100 kHz point from 146 MHz to 147 MHz with the exception of 146.6 MHz. In effect this allows operation on simplex channels 40 and 50 plus repeaters 1, 2, 3 and 4 and then the same four repeaters in reverse. Additional crystals are available from the distributor.

The Multi-7 is supplied with the usual accessories, a good quality dynamic microphone, mobile mount with quick release facility, DC connecting cable and spare fuses.

The transmitter is rated at either one or 10 watts output, this being selected by



A Review of the Multi-7 2 metre FM transc.

a three position switch with "off" in the centre. The receiver section of the Multi-7 incorporates two interesting features which to date appear to be unique in a strictly mobile unit. First there is an offset tune control. This enables the receiver to be tuned a few kHz either side of the nominal frequency. This is achieved by pulling the second conversion crystal oscillator, hence the same frequency offset occurs on all channels. So that this control can be effectively used, a rear mounted slider switch changes the meter from its normal functions of RF output and receive signal strength to that of a discriminator zero indicator. The meter is designed to have its zero about a fifth of the way up the scale, so that the actual meter movement is rather sma'l.

Power consumption is rated at 2.3 amps on high power transmit, 1.2 amps on low power transmit and 400 mA on receive. This is at a nominal input voltage of 13.5.

CIRCUIT DESCRIPTION

Apart from the features mentioned above, the circuitry of the Multi-7 is rather typical of modern thought in amateur 2 metre gear. It follows tried and proven methods. The receiver uses two dual gate Mos FETs in the front end, one for the RF stage and the other for the first mixer. The coupling between Is via a three stage helical filter. This system is capable of good sensitivity combined with good immunity to strong out-of-band signals. The first conversion oscillator uses crystals in the 45 MHz region followed by a tripler stage. The receive crystals do not have individual trimmers as this function is well taken care of with the front panel "TUNE" control. It also saves considerable internal space and no doubt contributes to the overall compact size of the transceiver.

Many amateurs might query the lack of receive trimmers, however the fact is that even were these provided, there is no guarantee that the crystal frequency will stay put. With this system it is at least possible to compensate for temperature changes and off-frequency stations.

The IF strip is conventional with a 10.7 MHz, 455 kHz set-up. A standard Murata filter is used in the 455 kHz section, giving a band pass of 15 kHz.

Receive audio consists of a single transistor stage driving an IC as the output. Audio power is rated at two watts with 10 per cent distortion. The speaker size is 92 mm or about 3½ inches. It is mounted in the lid of the cabinet which can be either the top or bottom of the set, the two being interchangeable. This is a handy feature as it overcomes the problem of the speaker firing into the floor of the car.

Transmitter starts off with a 12 MHz crystal oscillator and as is usual is phase modulated. The modulator is followed up with a tripler and two doublers, two amplifiers, a driver and power output stage. High SWR protection is taken from a pick-up link at the output stage, fed to a silicone controlled rectifier which controls the supply voltage to the first tripler stage. I often wonder why some form of SWR indicator is not provided from this circuit. It might not be too difficult to incorporate. High/low power switching is arranged by reducing the voltage on the driver stage with a series resistor.

THE MULTI-7 ON THE AIR

The channel selector was rather stiff in its action and this, combined with a round knob set on a fairly cramped front panel, did not encourage channel swapping. The priority channel, rather quaintly called "MY" channel was easily selected by pushing the buttons. This selected "MY" channel regardless of the position of the main channel selector. With "MY" channel selected the main dial light was extinguished. The meter is rather small and difficult to read at a distance but nonetheless effective. This discriminator position proved most useful when used with the "TUNE" control. Stations off-frequency on simplex channels could be put right on the nose.

Received audio quality was good, but not outstanding considering that the speaker was rather larger than is usually found in this type of transceiver. The transmit frequency was checked on each channel and was found to have been set within ±150 Hz. Stability was exceptional. Checked two weeks later after having been put through all its tests, crystals were still spot on.

Deviation was set at 10 kHz as received from the distributor. Transmit quality was very smooth.

THE MULTI-7 ON TEST

A series of tests were carried out to determine the performance. The transmitter power output was measured with 13.5 volts applied to the set. In the high power setting, 11 watts was indicated on the Horwood PM502 meter with 1.3 watts in the low setting. Current drain was 2.4 and 1.0 amps at the respective powers. Receive current drain was 275 mA with the set muted, 200 mA with "MY" channel selected (Dial light out), and 350 mA at normal listening level.

Receiver performance was checked next using a Marconi TF995 signal generator tuned to channel 40 (146.0 MHz) and the following results were obtained. With the mute set to the just-on point a signal input of .3 uV opened the receiver. Quieting was 17 dB at .5 uV and 25 dB at 1.0 uV with a signal-to-noise ratio of 23 dB and 34 dB at the same two levels. We later discovered that the figures were better at 146.0 than at 146.5 MHz which indicated that the receiver was in fact peaked at a lower frequency. However, as the figures were actually better than the published specification, we did not attempt to repeak the front end. At a later date the receiver was repeaked with a very worthwhile increase in sensitivity. No figures were taken at this point. The signal strength meter was checked and the following calibration was recorded:

.5	1 uV
2	2 uV
4	3.2 uV
6	5 uV
8	8 uV
10	25 uV

Receiver audio output was measured with steady 400 Hz tone. At the onset of audible distortion one watt was indicated. Although this is well down on the specified two watts, no doubt more power would be delivered on voice peaks. All the above figures were obtained with 7.5 kHz deviation on the signal generator.

The front panel "TUNE" control had a total range of 10 kHz with the centre point at the three o'clock point.

INSTRUCTION MANUAL

Two manuals are supplied with the Multi-7 one of which appears to be fairly complete although it is written in Japanese. The second is written in rather odd Japanese English and contains basic operating information but little more. There is a circuit and block diagram but no printed layouts. Alignment and maintenance do not even rate a mention.

CONCLUSIONS

This little set is well built and attractive in appearance. It meets all the published specifications with the exception of audio output, however it would be wise to check the receiver front end alignment if you want all the performance you are paying for. With the number of channels included it represents very good value at the advertised price. ■

Commercial Kinks

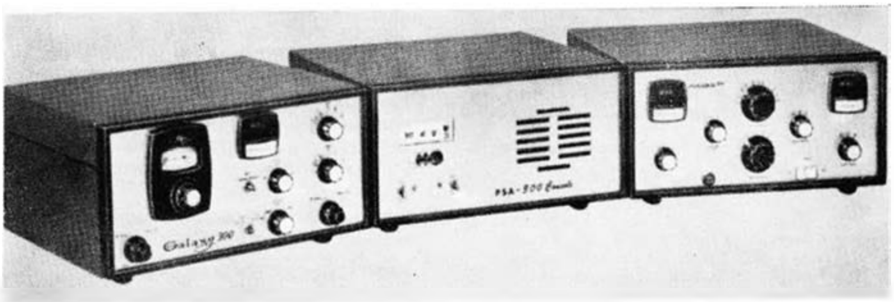
with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley, 3150

In May AR, I finished up on the subject of second hand amateur gear. This sparked off a thought that it might be a good idea to look over some of the older gear in this column from time to time. In doing so, I do not intend to give a full review of the particular piece, but more a general description of its electrical and physical characteristics, plus a photograph to aid in its identification. The whole idea is to help both buyers and sellers of second hand gear.

Perhaps there might be a piece of gear you are interested in. If so, let me know and it can be the subject of a future article. One point however, this does not apply to disposals gear. I regret that my knowledge of this type of equipment is limited.

THE WRL GALAXY 300

The Galaxy 300 was one of the first of the popular priced three band transceivers sold in the United States during 1962/1963. It sold in competition with the Swan 240 and the National NC-3. The Galaxy was the largest in size of all of these and measured 15 inches wide, 13½ inches deep and 7 inches high. It also had the highest power rating at that time with 300 watts PEP input to a pair of 6HF5s in the final.



Galaxy 300 transceiver with matching AC power supply and 2 kW linear. A 12V DC supply was also available.

The circuit worked on the single conversion principle using a 9 MHz IF with possibly the best filter in the lower priced transceivers. Frequency coverage was limited to the American phone bands with the exception of 40 metres. Actual coverage was 3.8 to 4.0 MHz, 7.05 to 7.35 MHz, and 14.2 to 14.4 MHz. As with most transceivers of the time, VOX and crystal calibrator were optional extras. Dial drive was smooth with a two speed planetary and gear arrangement. The meter was switched for final cathode current or "S" meter. An unusual feature was the use of two separate VFOs. One was used for 20 and 80 metre coverage while the other was used for 40 metres. They were both combined into the one enclosure.

Not a great number of these transceivers found their way to Australia. Sideband Electronics did import a few second hand Galaxy 300s around the middle of 1965 and sold them for £150. I cannot remember ever seeing one advertised in the Hamads section of AR so there is no basis for a second hand value. However, because of their limited coverage, they would probably bring somewhat less than the other tri-banders. The units sold by Sideband Electronics were all converted to cover Australian band segments and I would think others would have been similarly converted. Matching Galaxy power supplies are unknown in this country, so of course you could expect to find a home built supply with them.

I do have circuits of these rigs available for any one interested at 40c including postage. A full review of the Galaxy 300 was published in the December 1963 issue of CQ magazine. It was superseded by the well known Galaxy III and V models. ■

Newcomers Notebook

with Rodney Champness VK3UG
44 Rathmullen Rd., Boronia, Vic., 3155

MORSE CODE

From time to time much griping is heard about the morse code examinations. You hear one person say that it was too fast, another that it was too slow, another that the characters are sent too fast with too much gap, another that there is no spacing, another that the dots are too short and yet another that the dots and dashes are the same length. You would think that they were all sitting for separate exams under different examiners whereas they all sat for the one exam which was sent by one examiner.

The morse cannot be all these things at once!! It seems to me that perhaps various methods of mis-instruction of morse students are used. I would imagine that the examining authorities would have some standard which they send for examinations. I would rather think that morse could only be sent fairly if sent to the standard as set by the International Telecommunications Union. Check your morse study against the ITU standards before the August exam.

Now over to David Down with some information on aerials.

PRACTICAL ANTENNA BASICS

This article represents the first "follow-up" to the earlier article in this column "LOW POWER DX". As mentioned therein, plenty of time and work should be spent on the antenna system. The dipole or vertical are excellent types of antennas with which to commence. They are simple to construct and erect, cheap to build, and so are ideal *"firsts"* for the newcomer to amateur radio.

Many and varied are the references on the subject of antennas and, suffice to say here, a simple method of calculating the length of a practical half wave antenna is 468/F(MHz) feet. At resonance the induced voltage will be maximum at the ends of the antenna (high impedance) while the current will be maximum at the centre.

FEEDERS

Since the antenna should be located in the clear and generally as high as possible to produce maximum signal strength, it is necessary to use a feeder to connect the antenna to the receiver. Low impedance feeders may be flat twin (nominal 70-80 ohms), coaxial cable (nominal 50-80 ohms) or flat TV ribbon (nominal 240-300 ohms). High impedance feeders consist of two parallel wires spaced apart by insulators every 8-12 in. or so.

HALF WAVE DIPOLE

Lengths of a half wave antenna in the various HF and broadcast bands are as follows:

BROADCAST		AMATEUR	
Band	Length	Band	Length
11m	18'2"	160m	256'
13m	21'7"	80m	128'
16m	26'	40m	66'
19m	30'	20m	33'
25m	39'4"	15m	22'
31m	48'	10m	16'
41m	65'		
49m	76'		

As the impedance at the centre of a half wave antenna is approximately 70 ohms, either flat twin or coaxial cable will provide a good impedance match to the antenna ensuring maximum signal transfer. The antenna length calculated from the formula given above, is cut at the centre and an insulator inserted, the wires of the feeder being connected to either side of the insulator. When connecting the feeder to the antenna at the insulator, it is good practice to loop the feeder *over* the insulator in an inverted "U" style to prevent rain and dirt from settling in the feeder. Coaxial feeder ends can be sealed for the same reason by means of plastic tape or mastic waterproof compounds.

FOLDED DIPOLE

If you prefer, you may feed a dipole with 300 ohm TV ribbon, but to ensure the best feeder-antenna match it is necessary to form the antenna as shown in Fig 1. This configuration will transform the input impedance by a factor of 2^2 or 4 x 70 = 280 ohms.

If a three-fold dipole is used, the input impedance will be 70 x 3^2 = 630 ohms.

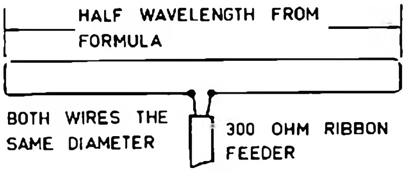


FIG 1

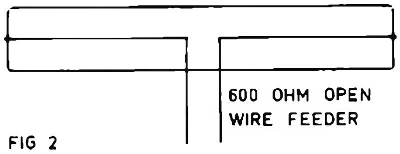


FIG 2

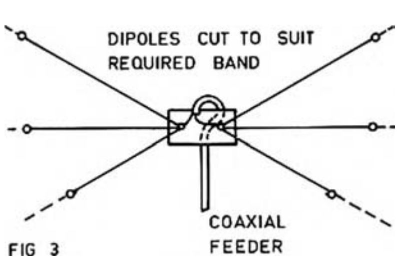
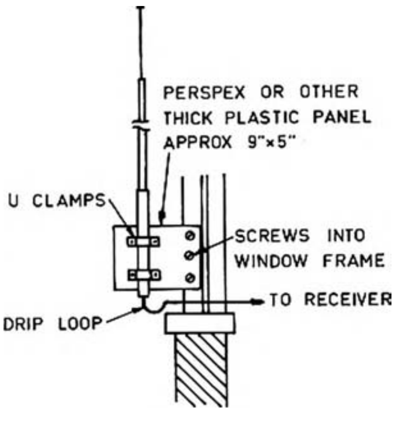


FIG 3



which will provide a good match to an open line feeder as shown in Fig 2.

When constructing a folded dipole using 300 ohm feeder and antenna ribbon, one conductor only of the antenna is cut at the centre, and the feeder inserted and the joints soldered. The junction is then clamped between pieces of insulating material and properly waterproofed. When the 300 ohm ribbon is cut for the half wave antenna length, bare back about ½ in. of the plastic insulation on each of the four conductors, then short each end to complete the folded dipole loop.

MULTIBAND DIPOLE

If dipoles are required for optimum performance on several frequency bands they can be connected in parallel at their centres and fed with a common feeder, thus providing multiband facilities in a minimum of space. The ends of the dipoles may be tied off to any convenient supports and the dipoles need not all be in the same plane. Note that a dipole cut for, say, the 40m amateur band, will be three half waves on the 15m amateur band, thus eliminating the need for a separate antenna for that band. See Fig 3.

VERTICAL ANTENNAS

Also known as "whips" and these come in a variety of forms, many being ex-Government and very cheap. They can be telescopic, lengths of rod which screw into each other, or several tubular sections with a single wire running through them which holds the sections rigid when tightened. In certain locations a whip antenna is about the only practical type, since it can simply be mounted outside a window, as shown in Fig 4. The whip should be as long as possible, but very tall ones present mounting problems due to wind pressure. Generally a whip antenna will be non-resonant on the HF bands and should, ideally, be connected to an Antenna Tuning Unit. If not, it may be connected to the aerial terminal directly or via a variable capacitor.

DIRECTIVITY

Signal pick-up of a half wave antenna is maximum at right angles to the line of the wire and this factor should be taken into account when deciding where to site the antenna. Antennas longer than this tend to have their directivity reduced but improve all-round coverage.

In the next article in this series, the construction and use of an Antenna Tuning Unit suitable for use with the various types of wire antennas will be discussed. ■

Trade Review

Spectrum International market a range of equipment for the amateur radio market. Readers of AR will be aware of some of the HF crystal filters offered by this company. We have been fortunate in obtaining a filter from their range for evaluation.

The filter supplied was the XF-9E, a 9 MHz, 12 kHz wide, filter designed for FM receiving applications. This filter would suit owners of transceivers with a 9 MHz filter who would like to receive FM, or reasonable quality AM.

A passive matching circuit was connected to the filter prior to test. This provided a 50 ohm load/source for the test equipment and a 1200 ohm, 30 pf load/source for the filter. This network unfortunately had a 34 dB loss, which when combined with the filter's ultimate rejection of more than 90 dB, meant that the test equipment should have a dynamic range of 124 dB.

In fact, the test equipment available worked satisfactorily over 115 dB only, and so the ultimate rejection could not be measured. Considerable care was taken to shield the input from the output. The filter was tested in a diecast box and additional shielding was fitted around the input and output circuitry. To obtain the specified performance from the filter in normal use, one would need to exercise similar care. The filter will not give 90 dB attenuation if stray leakage is only 60 dB down! It is also most important to ensure that the filter bottom plate is solidly grounded.

The input and output transformers are built into the filter and the only adjustment required involves adjusting the 30 pf input and output trimmers so as to obtain minimum bandpass ripple.

The bandpass characteristics were obtained using a signal generator, a vector voltmeter and a preamplifier. A later test using a spectrum analyser system confirmed the test results, which are shown in the table.

The performance of the filter is excellent as can be seen from the figures. When mounted on a PCB it is ¾" high and requires an area 1-3/64th in. by 1-27/64th in. This represents quite a lot of performance in a small volume. The bandpass ripple figures of SI filters are always impressive and this unit was no exception.

The unit was delivered within a few days of the request reaching the USA. SI claim this incredibly quick service is quite normal. Allowing for mail delays in VK you should be able to get delivery of goods from SI in less than 10 days.

The filter was well packed in expanded foam and obviously was not affected by its journey.

In summary, an excellent filter at a reasonable price.

S.I. XF-9E FM 9 MHz FILTER

Parameter	Specified	Measured
—6 dB Bandwidth	12 kHz	12.3 kHz
Pass Band Ripple	less than 2 dB	1.2 dB
Insertion loss	less than 3dB	2.6 dB approx.
Shape Factor	(6:60 dB) 1.8 (6:80 dB) 2.3	(6:60 dB) 1.6 (6:80 dB) 2.2

VK3AFW ■

Book Review

"SPECIALISED COMMUNICATIONS TECHNIQUES FOR THE RADIO AMATEUR"

Published by the ARRL. 208 pages.

As the title implies this recent ARRL book deals with some of the more esoteric amateur radio practices. The subjects covered in chapter form include amateur television, both fast and slow scan, space communication via satellites and moonbounce, radioteletype and facsimile. A further chapter is devoted to lasers, and various pulse and digital communication modes.

In general, the book follows the usual ARRL format of background material supplemented by construction articles reprinted from QST. The amount and quality of the reference material varies from chapter to chapter but is generally of a high standard. In particular the RTTY and space communication sections are very well covered. The material on the reception of weather satellite pictures in the facsimile chapter, whilst somewhat dated in choice of circuits, is also good. Thirteen pages of concise background data on moonbounce is provided and the Oscar satellite coverage is excellent.

My sole criticism of this book would be of the editor's choice of some of the circuits. I would doubt, for example, whether an amateur with the technical ability to build a Vidicon camera would choose, in 1975, a valve circuit. Notwithstanding, the book would be excellent value, in my opinion, if bought for the reference value alone. I would recommend it to anyone interested in one or more of the subjects covered.

VK3ZDH ■

VHF UHF
an expanding world

with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RTX, Devonport	144.900
P29	P29GA, Lae, Niugini	52.150
3D	3DAA, Suva, Fiji	52.500

Last month, and again this month, the ZL 2 metre beacons have been omitted from the listings. At this time of the year the likelihood of them being heard in VK is rather remote; they will return to the list when the warmer weather arrives. Long distance 6 metre beacons are still included as these can pop up any time especially as nowadays there does seem to be an increase in distance contacts in the middle of winter. Still no news of the Darwin beacon, someone may advise the situation soon.

Activity in general has been very slack this month, about the only worthwhile activity being an opening to VK2 from VK5 at 0800 to 1000Z on 29.5.75.

Don VK3AKN writes that Steve VK3ZAZ on 5.5.75 heard 3D2AZ at 0945Z and worked the same station at 1050Z via Oscar 6 or 7. Steve again worked 3D2AZ on 13.5 at 0949Z, sent 5 x 7, received 5 x 5. He has now worked 5 countries including two DU stations in the Philippines, DU1 JMG and DU1POL. Also included are P29GA and VK0GM. Steve has now received his QSL for the QSO with VK2BKE on Lord Howe Island on 6 metres, and on 2 metres is hoping for a VK8 to show up to complete Worked-All-States on 144 MHz. A lot of others are waiting too, and if present indications of activity in Alice Springs, the logical place from which to originate such a signal, are any guide, you may all be waiting for quite a while yet!

FM ACTIVITY

Well, it happened. In the May issue I stuck my neck out with a comment on the use of repeaters higher than Channel 4, asking for confirmations etc. I got one. A letter came from Don VK3AKN, and I do not think Don would mind it being printed. It reads: "I am sorry you don't approve of repeaters outside Channels 1 to 4. We, in the Western Zone WIA Vic. Division are planning to put Mt. William repeater on Ch. 7.

"We are quite clear about our aim in establishing this repeater and we have found we can not achieve this fully on any of the four common channels nor indeed on channels 5 or 6. Please give us the credit for knowing what we are doing since we feel that our repeater sub-committee are as well qualified as any others in capital cities or elsewhere.

"While we are always happy to welcome visitors and travellers, this repeater was not primarily established for them. It is very active with local traffic, and consequently DX signals cause quite a lot of interference when openings come about. I am afraid though, if you wish to speak with us, you will have to speak our language. 73. Don."

I suppose the only comment I can make is that one is never too old to learn! It just comes rather as a surprise to me to find that DX on VHF, and at 146 MHz at that, worries people to the extent that frequency changes for the troops are necessary. Nevertheless, I do acknowledge that if the Western VK3 boys do need something akin to a private channel then that is their right and privilege, I wish them well.

George VK3ASV, the Publicity Officer for the Victorian State Repeater Committee, has sent along his latest list of Australian repeaters. It is a formidable list totalling 39 stations, including those presently operating and those projected. According to this list, those operating, or projected, outside Channels 1 to 4 are Tamworth VK2RAB on Ch. 6; Gosford VK2RAG on 5; Blue Mountains area on 7; Wollongong VK2AMW on 6; Wagga on 5; Ballarat VK3RBA on 5; Mt. Macedon VK3RMM 6 or 7; Mt. William VK3RWZ on 7; on a very close study of George's latest listing, which is more comprehensive than earlier, I would have to acknowledge that the two heavier populated States, VK2 and 3, have a case for extending beyond Channels 1 to 4 especially when considering a mutual interference situation due to repeaters on similar frequencies being within operating range. The DX boys will just have to reduce power.

ARE YOU HOME?

Quote from QST March 1975 ". . . a ham in Akrom (rather carelessly) announced his location at one of the large mall parking lots and that he would be back on the repeater after some shopping. Some thieves did some shopping in his absence, taking all ham equipment and the stereo tape deck. A word to the wise . . ." There's a moral in stories like that; repeaters can be useful, in more ways than you might think.

News is pretty scarce this month, so the notes end here.

Thought for the month: "Crowding a life does not always enrich it".

The Voice in the Hills. ■

WORKED ALL INDIAN OCEAN AWARD

Instituted by CHC Chapter 66, Australia

1. OBJECT OF THE AWARD

The object of the Award is to foster an interest by Australian and Overseas radio amateurs in making two-way radio contacts with fellow amateurs in countries bordering on, and islands within, the Indian Ocean.

2. INDIAN OCEAN BOUNDARIES

For the purpose of this award the following specifies the accepted boundaries of the Indian Ocean:

(a) From Cape Leeuwin (Western Australia) to the intersection of latitude 48°-20' Sth and Longitude 60°E, thence along Latitude 48°-20' Sth in a westerly direction to its intersection with Longitude 20°E.
(b) Northwards Longitude 20°E to Cape Agulhas (South Africa), along the East Coast of Africa to the Gulf of Aden, and across the Gulf of Aden via Perim Island to Aden.
(c) Along the coast of South Yemen, Muscat and Oman to Trucial Oman to the Gulf of Oman and across the Straight of Ormuz from Kalhat to Bander-Abbas (Iran).
(d) Along the coast of Iran, the entire coast of India, West and East Pakistan and Burma, the West coast of Thailand and Malaya, down to, and including, the island of Singapore.
(e) A line joining Singapore to the North-eastern tip of Timor. This line passes through the Southern coast of Borneo and cuts through Celebes at, approximately, Macassar.
(f) From the North-eastern tip of Portuguese Timor to the point where the Eastern boundary line of Western Australia (Longitude 129° East) meets the coast between Cambridge Gulf and the mouth of the Victoria River.
(g) Thence along the coast of Western Australia to the starting point at Cape Leeuwin.

3. QSO REQUIREMENTS

Applicants will be required to establish two-way radio contact, by any mode and/or band/s, with one station in ten (10) of the twelve (12) countries, or groups of countries, plus one contact in five (5) of the islands listed in paragraph 4 below, a total of fifteen (15) contacts.

4. COUNTRY, OR GROUP OF COUNTRIES

(a) Western Australia — VK6.
(b) Indonesia — including Borneo and Celebes (Sarawak and Sabah are excluded).
(c) Singapore.
(d) Malayan Peninsula — 9M2.
(e) Burma or Thailand.
(f) India.
(g) East Pakistan or Ceylon.
(h) West Pakistan or Iran.
(i) Muscat and Oman, Trucial Oman, or South Yemen.
(j) French Somaliland, Somali Republic, Kenya, or Tanzania.
(k) Mozambique or Malagasy Republic.
(l) South Africa ZS 1, 2, 4, 5 and 6.

Note: Lesothe — 7P8, and Swaziland — ZD5, both being "land-locked" are not acceptable for purposes of this award.

The following are the acceptable islands: Christmas Island VK9, Andaman Islands VU5, Laccadive Islands VU4 or VU5, DX-pedition, Socotra Island VS9, Seychelles VQ9, Algelega Island 3B6, Comoro Island FB8, Rodriguez Island 3B9, Reunion Island FR7, Juan de Nova FR7, Timor CR8 YB 8F, New Amsterdam Island FB8, Cocos Islands VK9, Nicobar Islands VU5, Maldive Island 8QA, Chagos Archipelago VQ9, Gloriosa Island FR7, St. Brandon Island 3B7, Mauritius 3B8, Zanzibar VQ1, Prince Edward and Marion Islands ZS2, Crozet Islands FB8, St. Pauls Island FB8, Tromelin Island FB8.

Any other islands within the Indian Ocean boundaries specified in para 2 above, and officially accepted by the Wireless Institute of Australia and the ARRL.

Note particularly that Heard Island and the Kerguelen Islands are in the Southern Ocean not the Indian Ocean.

5. APPLICATIONS FOR THE AWARD

(a) The award is available to any radio amateur who submits proof of having made two-way contact with the required number of countries and islands as laid down in paragraph 3, and within the Indian Ocean boundaries as specified in paragraph 2.
(b) All contacts must be confirmed by QSL. Open to all SWL.
(c) QSL cards need not be forwarded with applications for the award, but may be sent should the applicant so desire.
(d) If QSL cards are sent with application it is recommended that they be sent by registered post, with sufficient remittance for return by the same means.
(e) Applications which are not accompanied by QSL cards must contain an endorsement from either one CHC Member, or two licensed amateurs, certifying that the required QSL cards have been sighted.
(f) An operator engaged on a DX-pedition may claim the country or island concerned towards the award.
(g) Contacts made since the end of World War II are eligible.
(h) In general all CHC Rules are applicable.
(i) Applications for the WIO Award, accompanied by QSL cards, or certification/s, plus fees prescribed in paragraph 6 below, should be forwarded to:
VK3APU, J. C. Gutcher,
17 Foulds Court,
Montrose, Victoria, Australia 3765.

6. FEES

(a) By Surface Mail — 50c or 4 IRCs.
(b) By Air Mail — $1.00.

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

The Editor,
Dear Sir,

The following is a list of radio amateur stations whose moon echoes were heard by WA6LET at the SRI 150' dish during the February 22-23, 1975 moonbounce tests. Two-way CW communications was completed with all except those marked with)(, who were only heard, or had incomplete exchange of information. Those stations marked with

& had multiple contacts, and those marked with $ had two-way SSB contacts.

144 MHz (11 hours)

K1HTV—Conn		W7FN—Wash	
K1WHS—Maine	$&	K7HTZ/7—Wash	&
W1YTN—Maine		WA7KYZ—Wash	$&
W2AZL—NJ	)(	W7RUC—Ariz	)(
WA2BIT—NY	$&	K8III—Ohio	$
WB2CIK—NY		K9UYK—Ill	
K2RTH—NY	$&	K9UIF—Ind	
K3NYD—?	)(	K0WLU—SDak	&
K3PGP—Pa	&	VE2DFO—Que	$&
WA3QVN—Md	&	VE3ONT—Ont	
W3TMZ—Md		DK1KO	
K4GL—SC		DL3YBA	
W5ORH—Okla		DL0WW	)(
WA5UNL—Okla		F6CER	
K5VWW—Tex		F8SQ	
WA6UAM—Cal	$	F9FT	
K6DYD—Cal		F9QW	
K6OEH—Cal		PA0JMV	
W6RDF—Cal		SM7BAE	
WA7BBM—Ariz		ZE1DX	

432 MHz (2 hours)

W1SL—Conn		K8UOA—Ohio	
W1JAA—Mass		W9WCD—Ill	
K9AQP/1—Mass		K0TLM—Mo	)(
K2UYH—NY	$&	PA0SSB	
W2SZ/2—NY	)(	ON5FF	)(
W3CCX—Pa		SM5LE	)(
W4ZXI—Fla		ZE5JJ	

53 EME QSOs were made with 36 different stations in 14 states and 6 foreign countries on 144 MHz, bringing our total to 25 states and 8 countries (including USA). Eleven EME QSOs were made with 10 different stations in 7 states and 2 foreign countries on 432 MHz. Three variable power transmitting tests were conducted. Equipmental difficulties allowed only two hours of transmitting time on 432 MHz. It is hoped that these will be corrected, a standby transmitter will be obtained, and the 432 MHz EME tests can be repeated by next fall.

Victor R. Frank

The Editor,
Amateur Radio
Dear Sir,

For two years I studied a WIA Radio Course and finally took the plunge sitting for the examination on 18 February 1975.

I have, 13 weeks later, still not given up hope that one day the PMG will mark it. A friend of mine in Australia has not received his either, so I doubt that it is because I am residing in PNG.

Perhaps there is a very good reason for the delay, although one escapes me. If it took approx 7 weeks to obtain results for a one page Morse Exam then, in proportion, I guess that I have a long wait for a 13 page Theory Paper.

Yours faithfully,
J. T. Connel, P.O. Box 718, Madang.

40 Hardwicke St., Balwyn, 3103

The Editor,
Amateur Radio
Dear Sir,

The morse sessions transmitted nightly through VK2BWI have for many years provided excellent practice and their usefulness will be even more widespread with the introduction of the novice licence.

It appears that some amateurs are not aware of this service, as severe QRM is becoming increasingly frequent from both CW and SSB operators in the Melbourne area.

I am sure that many intending examinees would appreciate 3550 kHz being kept clear for approximately one hour from 0930 GMT.

Yours sincerely,
Richard Goslin, L30598

20 Years Ago

with Ron Fisher VK3OM

JULY 1955

The Australian Amateur Radio call book celebrates its first birthday. The Editorial page of July Amateur Radio of 1955 looked at its success and future possibilities. The call book was published each year in those days. The 1955 edition ran to 140 pages with only about 35 call signs to a page. Rather spread out in comparison to our current editions.

The VHF page reported a couple of firsts. VK2WH at Forbes worked into Melbourne on 144 MHz, while VK3ATN at Birchip made the first VK3 to Adelaide contact on the same band. The gear at VK2WH was typical of the day and consisted of 6AK5 6J6 6AK5 converter in a cascode set up to a BC348 receiver as a tuneable IF. Transmitter ran 95 watts input to a 6/40 and a 32 element phased array antenna. SCR522 transmitters were also a popular means of RF generation around that time.

The DX activity page included a name for the first time that was to become famous over the next few years. Danny Weil of "Yasme" fame. Yasme was of course his first Yacht and used to transport Danny and his many famous call signs on a world wide DXpedition.

Results of the Ross Hull VHF contest for 1954/55 announced the trophy winner as R. Greenwood VK4NG. Top scores in other states were VK2ABC, VK3ZL, VK5MK and VK7ZL with no entries from VK6.

Technical articles in the July 1955 issue of Amateur Radio included: Part two of Wideband Audio Phase Shift Networks by N. Southwell VK2ZF. Modification of MN26 Receivers by Syd Clark VK3ASC. Syd showed how the MN26 could be adapted to a car radio or a high performance broadcast receiver for home use.

An Antenna for the SWL. Norman Burton claimed his simple wire antenna gave 4 to 6 "S" points gain over a long wire.

An Accurate Electronic Timer. VK3 associate member R. Barnett described a timer suitable for photographic work.

Magazine Index

With Syd Clark, VK3ASC

Every now and again we have a light load of magazines for review; probably due to uncertainties of mail arrivals etc. This is such a month, so I have been able to include mention of the British magazine catering to Amateur TV enthusiasts.

CQ-TV Febfuary 1975 No. 89
A Novel Use for a Varicap Tuner; More Facts on Fax; An Image Orticon Camera; Circuit Notebook No. 20 and news of ATV doings.

BREAK-IN March 1975
Crystal Control Operation with the FT101; Another Linear Amplifier; Otago Branch Contest — Receiver Section.

QST March 1975
Using the Double Balanced Mixer in VHF Converters; QRP Shakedown Caymanian Style; A State of the Art QRP Transceiver for 50 MHz; SSTV to Fast Scan Converter Pt. 1; An Up Converter for Oscar Reception; Emergency Electrical Energy via ManPower.

RADIO COMMUNICATION February 1975
VHF Meteor Scatter Propagation; An 80m DC Receiver for the Novice; Control of Aerial Polarisation; Speech Clipper for the Microwave Modules A3 Transmitter; Building Blocks for the Novice; A Strange Case of Mains Interference; Modifications to a Stolle Memomatic Rotator.

73 MAGAZINE January 1975
Using the W.U. Desk Fax; How to find the Satellite; RTTY Secrets; The 432 Receiver; The AN/GRR-5 Receiver; TTL as a Decoder Mode; Simplifying Satellite DXing; Blow a Bundle on TTLs; The R-511, A Real Surplus Bargain; How not to be a Loser; The Versatile Transistor Checker; SSTV Video Analysis; An All-Band Receiver to Build; Keep Amateur Radio a Secret.

Intruder Watch

with Alf Chandler VK3LC

1536 High Street, Glen Iris, 3146

JULY, 1975

As I shall be overseas for some months this will be my last report until my return, and Intruder observations should be forwarded to Ivor, VK3XB until further notice.

A precis of the latest summary may be of interest to Members —

21030	A3	Radio Peking announced.
21249	A1	9VYR calling JOU.
14015.5	A1	WLG calling PEPE.
14016	A1	HBKL calling MVCP.
14021 to 14041		QEBL calling CBFN. This station has been calling and passing traffic every day now at various times and frequencies.
14080	A1	LPU calling AOX with propaganda re Vietnam.
14084	A1	HZV Broadcast of news re Vietnam.
14143.5	A1	MH22 calling CQ.
14150	A3J	Fishing boats off Queensland coast, presumably Taiwanese. (Strong recommendation for complaint put in to PMG.)
14298	F1	HMA22 RTTY with read-out submitted.
14300	F1	HMA9 ditto.
7000	A2	Jammer with CQ superimposed.
7002	A3	Broadcast in Cantonese.
7015	A3	Penang Radio, Malaysian language.
7120	F1	"QRA de HMK22/HMF12 freq 10580/7120 kc KCNA Pyong Yang" (Our old friend moved from 7015).
3504	A1	JF32 calling S8LQ.
3519	F1	RDW2 calling RIX52.
3522	A1	DQB11 "TBO de DQB11".

These are only a few of the reported stations for which I am always grateful, but keep them coming.

Several broadcast stations in the 3.5 MHz band have also been reported, and forwarded to our Authorities.

Awards Column

with BRIAN AUSTIN VK5CA
P O Box 7A, Craters, SA, 5152

WORKED ALL BRITAIN SERIES

1. The awards are available to licensed amateurs and shortwave listeners (on a "heard" basis).
2. Contacts on and after 1st January 1946 are valid.
3. QSL cards must be in the possession of applicants if the claimed contacts were before 1st January 1971 otherwise log entries are sufficient.
4. Do not send QSL cards. A special book, containing application forms (see below) is available from the Awards Manager. The special application form is mandatory. The cost of the book is 65p or $2.
5. The award is issued to the operator and not to the callsign. Where an operator has been operating a club station the contact is to the credit of both the operator and the club.
6. The fee for the award is $1.50, 40p or 10 IRCs. International Money Orders may be used for payment but not cheques on non-UK banks. Cheques should be made out to "The WAB Award Account". Seals are available for a large addressed envelope and 1 IRC.
7. The address for application is

Roy Kirk, G3ULH,
11 Essex Ave
Kingswinford
Brierley Hill
Staffs. U.K.

The United Kingdom is divided into 10 km squares (National Grid) and each square has a reference of two letters and two figures (SP99 TX34 etc.) The book, see above, contains all the grid references with the names of the towns etc. within the square, arranged by counties. It also contains a list of islands etc. around the coast of the United Kingdom — an essential part of the award.

All contacts on and after 1.1.1946 count. However from 1.1.1975 only contacts on and after 1.1.1970 will be valid.

The book also contains details of other WAB awards. All profits from the sale of the book are donated to the RAIBC and donations above the cost of the book are always appreciated.

Requirements:

Basic Award — 300 areas with at least 30 counties and one each of GC, GI, GM and GW.
Bronze Award — 500 areas with at least 45 counties and any 3 UK islands.
Silver Award — 750 areas with at least 65 counties with any 4 UK islands.

Gold Award — 1,000 areas with at least 80 counties and any 5 UK islands.

Diamond Award — Details of this award are in the WAB book and is not confined to working WAB areas.

WORKED ZAMBIA AWARD

1. The award is available to licensed amateurs and shortwave listeners (on a "heard" basis).
2. Contacts with 9J2 and other prefixes in Zambia are valid.
3. Do not send QSL cards. A list, giving full details of the contacts shou'd be certified by the Awards Manager of a National Society.
4. Separate classes of the award are available — all CW, all AM, 2 x SSB and mixed modes.
5. The fee for the award is $1 or 7 IRCs.
6. The address for application is:
   Awards Manager, RSZ,
   Post Box 332,
   Kitwe
   Zambia.

Rules:

Each 9J2 station counts as one point on 7, 14, 21 & 28 MHz. Each 9J2 station counts as two points on 1.8 and 3.5 MHz. Other prefixes count double points. The same station may be worked on different bands.

Requirements:

Stations in CQ Zones 36, 37 and 38 — 20 points; all other stations — 10 points.

Key Section

with Deane Blackman VK3TX

Box 382, Clayton, Vic., 3168

The President's Cup for 1974 has been won by VK3ANU. By the time you read these notes I hope it will have been engraved and be gracing Drew's mantlepiece.

The Cup is an actual cup, first awarded to the Key Section by the Federal President in 1931 and revived in 1973. It is now awarded to the Australian ama'eur who scores the greatest aggregate in the four VK contests for any year. The scores published in Amateur Radio are weighted because it is easier to score in some contests than others. The weighting factors are 100 for the Ross Hull, 80 for the National Field Day, 40 for the Remembrance Day, and 1 for the VK/ZL. These factors were based on actual results in these contests from 1965 to 1972. You do not have to be a member of the Key Section, nor apply in order to win — just be in the contests.

As it is quite some time since any details of the Section appeared in this column perhaps I might, quietly, explain things again. The Section was set up by the Institute in 1972 to promote CW and the interests of CW operators. Membership is not restricted to WIA members. As Federal Manager I have a sort of secretarial function, and control at divisional level is through divisional co-ordina'ors. The present divisional co-ordinators are VK1DC, VK2YB, VK3XB, VK4RF, VK6WT and VK7RH. There is presently no VK5 co-ordinator. If you have any questions about, or ideas for, the Section please write to me.

Congratulations to VK2SG, who topped the VK scores in the CW section of the VK/ZL contest, and to VK2YB, who won the 6-hour section of the NFD. As I will have no entry in August AR, let me anticipate by wishing you now an enjoyable contest.

Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

CONVERT YOUR FT200 TO 11 METRES (26.96 MHz - 27.23 MHz)

If you have looked at your station licence you will realise 11 metres is available to amateurs, that is full, and (in due course) novice, licencees.

Because most rigs do not include coverage of this band, usage is minimal. Or is it? Those able to listen on 11 will know of the many Pirates who are having a ball up there. On our band!

If you have an FT200 and half an hour to spare, you can increase the versatility of your rig by adding 11 metre coverage.

Open the cabinet and with the front panel facing you, you will notice on the right front side a row of crystal positions. As supplied, only one of these positions will be occupied unless you have requested, or have added yourself, extra coverage of 10 metres.

The conversion to 11 metres is very simple.

Step 1 Locate the 42.5 MHz crystal position and solder in a 41.5 MHz crystal.*

Step 2 Move your band change switch to the 28 MHz position and set the black tuning dial to 500. This will co-incide with 27.5 MHz. Activate the internal calibrator and adjust the dial until a beat note is heard. (A stronger signal will result if the antenna is removed).

Step 3 Set the grid control to the fifth stop position and then up-end the set so that you are able to observe the S meter whilst adjusting the slugs in the relevant coils. Peak L3, L8, and L13 in that sequence for the greatest meter reading.

You should now be on 11 metres. If your receiver is a bit deaf, you might consider replacing the first RF tube with a 6EW6.

*41.5 MHz crystal, HC18U holder. Fundamental operation. Parallel mode, 20 pF load. Tolerance .005%.

Steve Bushell VK3BHK

Contests

with Jim Payne, VK3AZT
Federal Contest Manager,
Box 67, East Melbourne, Vic., 3002

CONTEST CALENDAR

July	5-6	Venezuelan Phone
	5-6	DL QRP CW
	12-13	ARRL "Open" CD CW
	19-20	ARRL "Open" CD Phone
	19-20	Colombian CW & Phone
Aug	9-10	European CW
	16-17	Remembrance Day
	23-24	All Asian CW

REMEMBRANCE DAY CONTEST

Variations in the rules have been designed to allow more contacts to be made, particularly during the usually quieter periods. There are lots of alternatives, and more suggestions to help the FCM come up with the ultimate in rules and scoring will be very welcome. In the US a new Area Code Contest will be held on Independence Day and Thanksgiving Weekend. The first of these is on 5/6 July. Telephone area code numbers, of which there are more than 120 in US and Canada, are included in the RST report. Each QSO is to count as 2 points and the multiplier is the number of different area codes worked.

A Space net VHF contest on July 19/20 requires the zipcode (postcode) to follow the RST report and for scoring, the last 2 digits of every zipcode are added. Sum of these digits is your final score, no multiplier.

As it appears likely that the number of amateur stations in Australia may almost double as a result of Novice licensing there should be much more intra-call area activity on the novice bands for the 1976 RD. Just in case some scoring scheme incorporating the postcodes does materialise, some con'estants may wish to keep their new call books up to date as this shows postcodes for each QTH.

VENEZUELAN CONTEST

Starts 0000, Sat July 5th for 24 hours. No indication on detail sheet whether this is local or GMT. Phone only on 10 through 80. Exchange RS and 3 figures starting 001. Scoring is 1 point per QSO (world wide) and 2 points each YV. Contacts in same country no value. Multiplier is 1 for each country, YV and US call areas worked on each band. Final score is total QSO points times the sum of multiplier on each band. In addition to awards, certificates are issued to VK stations who work 5 YVs and stations in 5 other countries and who send $1 or equivalent IRCs for return of what Frank W1WY describes as "one of the most attractive certificates I have seen". Entries to be postmarked not later than Sept 15 to Radio Club Venezolano, PO Box 2285, Caracas 101, Venezuela.

DL QRP CW CONTEST

1800 GMT July 5th to 1500 GMT July 6th. Limited to 10 watts input and CW only. Limit operation to 15 hours. Contacts 1.8-28 MHz. Scoring is complex.

COLOMBIAN CONTEST

0001 GMT 19th July to 2359 20th July.

Exchanges on world wide basis on all bands 3.5 through 28 MHz. Exchange RST and 3 figure QSO number. Scoring is 5 points for QSOs with HKs, 3 points North America, other countries 2 points, in same country 1 point. Multiplier is number of DX countries worked each band. Final score is sum of QSO points from all bands multiplied by sum of different countries worked on each band. Award winners must have at least 50 QSOs on log. Use separate log sheet each band. Include summary sheet and declaration with logs. These must reach L.C.R.A., Concurso Independencia, Apartado, Postal 584, Bogota, Colombia by 30th Sept, 1975. A plaque is awarded for the best log from Oceania.

EUROPEAN CW

0000 GMT Aug 9th to 2359 Aug 10th.

(David VK3QV sent details of this contest from SP5 land. Also received was a handbook containing results of the 1974 contest, log sheets, summary sheet and a multiplier check list for the 1975 contest. The administrative work involved in these international contests must be a mammoth task.)

All bands 3.5 through 28 MHz. Only 36 of the 48 hours of the contest may be used. Up to 3 periods of rest totalling 12 hours are permitted. Contacts from VKs are limited to European stations. Each QSO is 1 point. A station may be worked once per band. Each confirmed QTC, given or received, 1 point. Multiplier for VKs is number of European countries worked on each band. In addition multiplier on 3.5 is multiplied by 4, on 7 MHz by 3 and on 14/21/28 MHz by 2. Final score is total QSO points plus QTC points multiplied by the sum total multipliers from all bands. QTC traffic. Additional point credit can be realised by making use of the QTC traffic feature. A QTC is a report of a confirmed QSO that has taken place earlier in the contest and later sent back to a European station. It can only be sent from a non-European station to a European station. The general idea being that after a number of European stations have been worked, a list of these stations can be reported back during a QSO with another station. A QTC contains the time, date and QSO number of the station being reported, i.e. 1300/DA1AA/134. This means that at 1300 GMT you worked DA1AA and received number 134. A QSO can be reported once only and not back to the originating station. ONLY A MAXIMUM OF 10 QTCs TO A STATION IS PERMITTED. You may work the same station several times to achieve this quota. Only the original contact however has QSO point value. Keep a uniform list of QTCs sent. QTC 3/7 indicates that this is the 3rd series of QTCs sent and that 7 QSOs are reported.

Use a separate log for each band. These must reach the WAEDC Committee, D-895 Kaufbeuren, Postbox 262 Germany, by 15th Sept 1975.

European Country List: C31 — CT1 — CT2 — DL — DM — EA — EA6 — EI — F — FC — G — GC Guer — GC Jer — GD — GI — GM — GM Shetland — GW — HA — HB9 — HB0 — HV — I — IS — IT — JW Bear — JW — JX — LA — LX — LZ — M1 — OE — OH — OH0 — OK — ON — OY — OZ — PA — SM — SP — SV — SV Crete — SV Rhodes — SV Athos — TA1 — TF — UA1346 — UA2 — UB5 — UC2 — UN1 — UO5 — UP2 — UQ2 — UR2 — UA Franz Josef Land — YO — YU — ZA — ZB2 — 3A — 4U1 — 9H1.

EUROPEAN PHONE

13/14 Sept 1975. Same rules etc as for CW contest above.

1975 REMEMBRANCE DAY CONTEST RULES AUG. 16th & 17th

A perpetual trophy is awarded annually for competition between Divisions of the Wireless Institute of Australia. It is inscribed with the names of those who made the supreme sacrifice and so perpetuates their memory throughout Amateur Radio in Australia.

The name of the winning Division each year is also inscribed on the trophy and, in addition, the winning Division will receive a suitably inscribed certificate.

OBJECTS

Amateurs in each VK call area, will endeavour to contact other amateurs:—

(i) In other VK call areas, P29 and ZL on all bands 1.8 through 30 MHz.

(ii) In any VK call area (including their own), P29 and ZL on authorised bands above 52 MHz and is indicated in rule No. 5.

CONTEST DATE

0800 hours GMT on Saturday 16th August 1975 to 0759 hours GMT on Sunday 17th August 1975.

All amateur stations are requested to observe 15 minutes silence before the commencement of the contest on Saturday afternoon. An appropriate broadcast will be relayed from all Divisional stations during this period.

RULES

1. There shall be 4 sections to the Contest.
   (a) Transmitting Phone
   (b) Transmitting, CW
   (c) Transmitting, Open and
   (d) Receiving, Open.
2. All Australian amateurs (VK callsigns) may enter the contest whether their stations are fixed, Portable or mobile. Members and non-members of the Wireless Institute of Australia are eligible for awards.
3. Amateurs may use these modes:
   (a) Phone
   (b) CW
   (c) RTTY
   (d) SSTV.
   However, only one entry may be submitted for sections (a) to (c) in Rule 1. An open log is one where points are claimed for more than one mode. AM, SSB and FM are grouped as one mode, i.e. Phone.
4. Cross mode operation is permitted but both stations may only claim points as for a phone/phone contact. Cross band operation is not permitted, excepting via a satellite repeater.
5. **SCORING**
   (a) On the 3.5, 7, and 14 MHz bands a station in another call area may be contacted once on each band using each mode. That is, you may work the same station on each of these bands on phone, CW, SSTV or RTTY.
   (b) On the 1.8, 21, 26 and 28 MHz bands a station in another call area may be contacted twice on each band using each mode provided that not less than 12 hours has elapsed since the previous contact on that band using that mode.
   (c) Between 1600 hours GMT and 2100 hours GMT on Saturday intra-call area contacts may be made on 1.8, 7, 21, 26 and 28 MHz, once for each mode on each band.
   (d) Between 0300 hours GMT and 0759 hours GMT on Sunday intra-call area contacts may be made on 1.8, 21, 26 and 28 MHz bands, once for each mode on each band.
   (e) On the bands 52 MHz and above, the same station in any call area may be worked using any of the modes listed in Rule 3 at intervals of not less than 2 hours since the previous same band/mode contact. However, the same station may be contacted repeatedly via satellite not more than once by each mode on each orbit.
   (f) All CW/CW, SSTV and RTTY contacts count double. Note rule 4 re cross mode contacts.
6. Multi licensed operator stations are not permitted. Although log keepers are permitted, only the licensed operator is allowed to make a contact under his own call sign. Should two or more licensed operators wish to operate any particular station, each will be considered as a contestant and must submit a log under his own call sign. Such contestants shall be referred to as substitute operators for the purpose of these rules and their operating procedures shall be as shown.
   PHONE. Substitute operators will call "CQ RD" or "CQ Remembrance Day" followed by the call of the station they are operating, then the word "log" followed by their own call sign, e.g. "CQ RD from VK4BBB log VK4BAA".
   CW. Substitute operators will call "CQ RD de" followed by the group call sign comprising the call sign of the station they are operating, an oblique stroke and their own call e.g. "CQ RD de VK4BBB/VK4BAA".
   Contestants receiving signals from a substitute operator will qualify for points by recording the call sign of the substitute operator only.
7. Club stations may be operated by other than licensed members and contacts credited to the Club station call sign. Rule 6 applies to the licensed operator in attendance. All operators must sign the declaration.
8. Entrants must operate within the terms of their licence.
9. **CYPHERS.** Before points may be claimed for a contact, serial numbers must be exchanged and acknowledged. The serial number of 5 or 6 figures will be made up of the RS (telephony) or RST (CW) reports plus 3 figures that will be incremented by one for each successive contact. If any contestant reaches 999 he will start again with 001.
10. **ENTRIES.** Must be set out as shown in the example, using one side of the paper only and standard WIA log sheets if possible. Entries must be clearly marked "Remembrance Day Contest" on the envelope and must reach the Federal Contest Manager, WIA, Box 67, East Melbourne, 3002 in time for opening on Wednesday 17th September, 1975. Early submission of logs will be appreciated.
11. **TERRESTRIAL REPEATERS.** Contacts via terrestrial repeaters are not permitted for scoring purposes. However, contacts may be arranged through the repeater and if successful on another 2 metre channel, that contact counts for scoring purposes.
12. Portable operation. Log scores of operators located outside their own call area will be credited to that call area in which operation takes place, e.g. VK5XYZ/2. His score is added to the VK2 scores.
13. ALL LOGS shall be set out as in the example shown and in addition MUST carry a front sheet showing the following information:
   Name
   Address
   Section
   Call sign
   Claimed score
   Number of contacts
   Modes used
   Declaration: "I hereby certify that I have operated in accordance with the rules and spirit of the contest".
   Signed
   Date
   All contacts made during the contest must be shown in the log submitted. If an invalid contact is made it must be shown but no score claimed. Entrants in the "Open" section must show the various mode contacts in numerical, i.e. chronological order.
14. The Federal Contest Manager has the right to disqualify any entrant who during the contest, has not observed the regulations or has consistently departed from the accepted code of operating ethics. The Federal Contest Manager also has the right to disallow any illegible, incomplete or incorrectly set out logs.
15. The ruling of the Federal Contest Manager of the WIA is final and no disputes will be entered into.

AWARDS

Certificates will be awarded to the top scoring stations in Sections (a) to (c) of Rule 1, in each call area, and will include top scorer in each Section of each call area operating exclusively on 52 MHz and above. Each VK, ZL and P29 call area will count as separate areas for awards. There

SCORING TABLE FOR PHONE CONTACTS — ALL CW/CW, SSTV and RTTY CONTACTS COUNT DOUBLE

	To											
From	0	1	2	3	4	5	6	7	8	9	P29	ZL
VK0	—	6	6	6	6	6	6	6	6	6	6	2
VK1	6	—	1	1	2	3	5	4	6	5	5	2
VK2	6	3	—	1	2	3	5	4	6	5	5	2
VK3	6	4	1	—	2	1	4	3	6	5	5	2
VK4	6	3	1	2	—	3	6	5	4	3	3	3
VK5	6	5	2	1	3	—	4	3	3	6	6	4
VK6	6	6	2	1	4	2	—	3	5	6	6	4
VK7	6	5	1	1	3	2	5	—	5	6	6	2
VK8	6	5	1	1	2	3	6	4	—	3	3	4
VK9	6	5	3	3	3	4	5	6	3	—	6	5
P29	6	5	3	3	4	4	5	5	5	6	—	5
ZL	6	5	3	3	4	4	5	5	5	6	5	—

Read table from left to right for points for the various call areas.

ALL INTRA-CALL AREA CONTACTS ON 52 MHz AND ABOVE, OR AS INDICATED IN RULES 5(c), (d), and (e) are worth one point.

EXAMPLE OF TRANSMITTING LOG

Date Time/GMT	Band	Mode	Callsign Worked	RST sent	RST rec'd	Points

EXAMPLE OF RECEIVING LOG, VICTORIAN SWL

Date/time GMT 16 Aug. 75	Band	Mode	Call sign heard	RST sent	Station called	Points
0612	7	P	VK5PS	58002	VK6RU	1
0615	7	CW	ZL2AZ	559004	VK3KI	4
0618	14	P	VK0ZZ	57006	VK6FI	6
0624	14	P	VK6FI	58004	VK0CB	4
1620	28	P	VK3WI	59077	VK3ZZ	1
17/0750	1.8	CW	VK3YQ	599360	VK3OR	2
0754	52	P	VK3XYZ	58444	VK3XYY	1

NOTE—Times for intra-call area loggings shown in Rule 5.

will not be an outright winner. Further certificates may be issued at the discretion of the Federal Contest Manager. The Division to which the Remembrance Day Trophy will be awarded shall be determined in the following way —

Average of top 6 logs plus (number logs entered divided by number of call area licences, multiplied by total points from all entrants from call area in Sections a, b and c).

VK0 scores are added to VK7 and VK8 to VK5. Scores by VK9 stations are added to the mainland call area geographically nearest. Scores claimed by ZL and P29 stations are not included in the score of any VK call area.

Acceptable logs for all sections shall show at least five valid contacts. The trophy shall be forwarded to the winning Division in its container and will be held by that Division for the specified period.

RECEIVING SECTION (Section d)

1. This section is open to all short wave listeners in Australia, Papua-New Guinea and New Zealand but no active transmitting station may enter.
2. Contest times and loggings of stations on each band are as for transmitting.
3. All logs shall be set out as in the example. It is not permissible to log a station calling "CQ". The detail shown in the example must be recorded.
4. No'e the times and conditions set out in Rule 5.
5. Club stations may enter this section. All operators must sign the declaration.

AWARDS

Certificates will be awarded to the highest scorers in each call area. Further certificates may be awarded at the discretion of the Federal Contests Manager. ■

PROJECT AUSTRALIS

With DAVID HULL VK3ZDH

Reference Orbits for Oscar 6 and Oscar 7. Schedule for Oscar 6. Satellite is "on": Sunday morning, Monday night, Thursday night, Saturday night, local times. Oscar 7 is always "on".

OSCAR 6				OSCAR 7				
JULY				**JULY**				
Date	Orbit No.	Equator crossing Time Z	Long °W	Date	Orbit No.	Mode	Equator crossing Time Z	Long °W
1	12376	00.02	51	1	2848	B	00.24	56
2	12389	00.57	65	2	2861	A	01.18	70
3	12402	01.52	79	3	2873	B	00.18	54
4	12414	00.52	64	4	2886	A	01.12	68
5	12427	01.47	77	5	2898	B	00.12	53
6	12439	00.47	62	6	2911	A	01.06	66
7	12452	01.42	76	7	2923	B	00.05	51
8	12464	00.42	61	8	2936	A	00.59	65
9	12477	01.37	75	9	2949	B	01.54	78
10	12489	00.37	60	10	2961	A	00.53	63
11	12502	01.32	74	11	2974	B	01.47	77
12	12514	00.32	59	12	2986	A	00.47	61
13	12527	01.27	72	13	2999	B	01.41	75
14	12539	00.27	57	14	3011	A	00.40	60
15	12552	01.22	71	15	3024	B	01.35	74
16	12564	00.22	56	16	3036	A	00.34	58
17	12577	01.17	70	17	3049	B	01.28	72
18	12589	00.17	55	18	3061	A	00.28	57
19	12602	01.11	68	19	3074	B	01.22	70
20	12614	00.11	53	20	3086	A	00.21	55
21	12627	01.06	67	21	3099	B	01.15	69
22	12639	00.06	52	22	3111	A	00.15	54
23	12652	01.01	66	23	3124	B	01.09	67
24	12664	00.01	51	24	3136	A	00.09	52
25	12677	00.56	65	25	3149	B	01.03	65
26	12690	01.51	78	26	3161	A	00.02	50
27	12702	00.51	63	27	3174	B	00.56	64
28	12715	01.46	77	28	3187	A	01.51	78
29	12727	00.46	62	29	3199	B	00.50	62
30	12740	01.41	76	30	3212	A	01.44	76
31	12752	00.41	61	31	3224	B	00.44	61
AUGUST				**AUGUST**				
1	12765	01.36	75	1	3237	A	01.38	74
2	12777	00.36	59	2	3249	B	00.37	59
3	12790	01.30	73	3	3262	A	01.32	73
4	12802	00.30	58	4	3274	B	00.31	58
5	12815	01.25	72	5	3287	A	01.25	71
6	12827	00.25	57	6	3299	B	00.25	56
7	12840	01.20	71	7	3312	A	01.18	69
8	12852	00.20	56	8	3824	B	00.18	54
9	12865	01.15	70	9	3337	A	01.12	68
10	12877	00.15	54	10	3349	B	00.12	53
11	12890	01.10	68	11	3362	A	01.06	66
12	12902	00.10	53	12	3374	B	00.05	51
13	12915	01.05	67	13	3387	A	00.59	65
14	12927	00.05	52	14	3400	B	01.54	78
15	12940	00.59	66	15	3412	A	00.53	63
16	12953	01.55	79	16	3425	B	01.48	77
17	12965	00.54	64	17	3437	A	00.47	62
18	12978	01.49	78	18	3450	B	01.41	75
19	12990	00.49	63	19	3462	A	00.41	60
20	13003	01.44	77	20	3475	B	01.35	74
21	13015	00.44	62	21	3487	A	00.34	58
22	13028	01.39	75	22	3500	B	01.28	72
23	13040	00.39	60	23	3512	A	00.28	57
24	13053	01.34	74	24	3525	B	01.22	70
25	13065	00.34	59	25	3537	A	00.21	55
26	13078	01.29	73	26	3550	B	01.16	69
27	13090	00.29	58	27	3562	A	00.15	53
28	13103	01.23	72	28	3575	B	01.09	67
29	13115	00.23	57	29	3587	A	00.09	52
30	13128	01.19	70	30	3600	B	01.03	65
31	13140	00.19	55	31	3612	A	00.02	50

■

Hamads

- Eight lines free to all WIA members. $3 per 3 cms for other amateurs and SWLs.
- Copy should be in block letters or typescript, signed and forwarded to the The Editor, PO Box 150, Toorak, Vic. 3142.
- Excludes commercial advertising.
- Closing date for Hamads is the 3rd day of the month preceding publication.
- QTHR means the advertiser's name and address are correct in the current Australian Callbook.

FOR SALE

Slow Scan Valve Monitor (shown in EA July '73), plus SSTV solid state sig. gen. and 931A scanner attachment, $100. FT2FB transceiver complete with 8 latest channels, $180. Gil Miles, VK2KI, QTHR. Ph. (02) 78 4237.

American Raytheon compact 60 watt marine radio-telephones (four), 8 channels 1.65 MHz-5 MHz, separate 110V AC PSU. Inbuilt broadcast receiver, squelch, mic., cables, 14 valves and diodes incl. 12BY7 osc., 6883 PA, 12AB5 driver, 12DQ6 mod. Ideal for conversion, $85.00 each. Ian Marshall VK2JI, QTHR. Ph. (02) 90 4035.

Multi-7 Crystals, 10 channels 40 to 60, AC power supply, HyGain magnetic whip, new Feb. '75, $225. VK1BH, 99 Warragamba Ave., Duffy, ACT. Ph. (062) 88 6062.

SI Filter XF-9E (see advert. AR, Feb. '75, page 23), new but tested and evaluated, $35.75 post paid. First cheque secures. Box 150, Toorak, Vic. 3142.

Yaesu FT2FB Auto Transcanner 2m, mobile cradle, built-in 12/240V supply, brand new condition, in original pack, 2N5590 15W final, spares. Asahi 5/8 loaded whip, gutter mount, 12 ft. coax. 8 scanned channels and priority, A, B, C, R1, R4, was $400 — asking $240 the lot. VK2ZDR, QTHR. Ph. (049) 33 6501 (day).

Colour TV RCA 21 inch with inbuilt Pal (D) decoder and separate 240V AC to 110V AC step-down XFMR, $350. VK2BRA, QTHR. Ph. (02) 47 0146 A.H.

TH3JR Beam, unused, brand new in carton, $120 ONO.
Hustler 4BTV trap vertical 80 to 10 metres, as new condition, $65 ONO.
FT101B, as new, complete with matching speaker unit, mic., handbook, etc., $525 ONO.
Collins 3.1 kHz mechanical filter, with data book, $20 ONO.
VK3ARZ, 12 Explorers Court, Vermont South, 3133. Ph. (03) 232 9492.

FL50 SSB Tx with FV50 VFO, $150. SR550 Ham Band Rx, $70. STC CTR50-132 Base Station with remote 727 type control unit, $90. PO Box 909, Orange, NSW. Ph. (063) 62 4388, ext. 218 bus; (063) 62 6072 A.H.

HW 32a Heath 20 metre transceiver, 200 PEP, excellent rig, suitable for transverting, $130 ONO. **HW17a Heath** 2 metre transceiver, AM & FM, needs xtals for nets and repeaters, a very fine rig (Rx tunes 143-148 MHz), $160 ONO. G. Scott VK3ZR. Ph. (03) 89 4645.

New 6HF5s, $4.00 ea., **Walky-Talky** 27.125 MHz, one pair for $21.00, postage incl., VK2BMI, QTHR. Ph. (02) 771 1657.

Geloso 222 Tx 70W AM CW 80-10m. Good cond. Geloso 209 Rx SSB AM CW 80-10m. Fair cond. Will sell separately. What offers? VK2ADZ, 28 Probert Ave., Griffith, 2680. Ph. (069) 62 3718.

Eddystone 730/4 communications Rx, 500 kHz-30 MHz, 16 valves, good condition with instruction manual, $200. A. R. Dexter VK5DL, 37 Adelaide Tce., St. Marys, Adelaide 5042. Ph. (08) 79 7901 bus. only.

Yaesu FT101, little used, unmarked, as brand new, all accessories used only as a Rx by present owner, 160-10 Mx, $420 ONO. 30 ft. galvanised self-supporting Southern Cross Tower, $75. No. 62 Set Mk II 1.6-10 Mcs, original condition, $35. No. 62 Mk II transceiver, suitable for parts, $15. G. McNamara, 14 Hyland St., Warrnambool. Ph. (055) 62 8238 bus. only.

Home Brew Linear, pair 813s GG, with power supply, $100. XFB9 9Mc xtal filter with upper and lower sideband xtals, $25. VK3BW, QTHR. Ph. (052) 59 2322.

Swan 350 SSB Transceiver, includes matching AC supply, mic., spare PA tubes, $290. DC supply for above, $45. VK5ZG, 4 Glencoe Rd., Reynella, SA, 5161.

AR7 Receiver, modified to DCA circuit, complete with power supply and all coil boxes, $34 ONO. QQE06/40 power amp with tuned lines for 144 MHz. Suit linear or PA use, $30 ONO. G. Scott VK3ZR. Ph. (03) 89 4645.

Solid State Tracking Rx, 19" rack mount, xtl synthesized local oscillator, digital frequency display. 10, 30, 100, 300 kHz xtl filters, PLL BW 10, 30, 100, 300 Hz. Used for direct reception of 130-140 MHz and as tuneable IF for 400 and 1700 MHz. With two 136 MHz preamps, $330. VK1VP, QTHR. Ph. (062) 48 5882.

WANTED

Modulator Type 17SU-14A Unit for STC AMT125 transmitter and any spare parts available for same unit. Contact I. Keenan VK3AYK, QTHR. Ph. (03) 92 5667.

Maintenance Handbook for frequency meter type AN-URM-32A, reasonable payment. Please write — VK5TI, PO Box 307, Clare, SA, 5453.

52 MHz transverter, suitable FT-101. VK5ZJP, 20 Alexandra Ave., Rose Park, 5067. Ph. (08) 31 1638.

Silent Keys

OWEN BESTED **VK2AEB**

It is with deep regret that we record the passing of Owen Bested VK2AEB. Owen obtained his AOCP at the age of 54, and operated from Griffith where he was a successful wine maker. Retiring in 1969, he moved to Port Macquarie, and was active mostly on twenty metres. Secretary/Treasurer of The Oxley Region Radio Club, his happy nature was always apparent amongst fellow amateurs. He passed away quietly after a short illness on the 24th April at Port Macquarie. Our sympathy to his wife and family, and his brother Phil VK5CS.

N. E. MORTLOCK **VK2PQ**

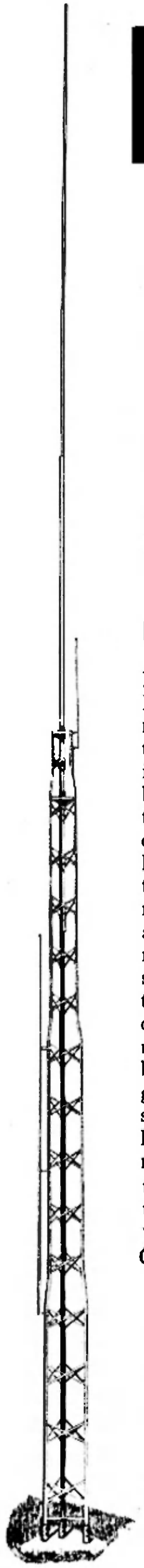
Afterthoughts

NOVICE LICENSING

AR May 1975, page 22, contained a transcription error. The 21 MHz band portion permitted for Novices will be 21.125 to 21.200 NOT 21.125 to 21.500 as printed. This accords with the PMG's letter printed in May 1973 AR, page 7 (see also July 1973 AR, p.15 for other information). Sorry, but it was really a rush job to get it into May AR. ■

SIDEBAND ELECTRONICS SALES and ENGINEERING

hy-gain MULTI-BAND VERTICALS



Hy-Gain's Incomparable HY-TOWER for 80 thru 10 Meters

Model 18 HT

- Outstanding Omni-Directional Performance
- Automatic Band Switching
- Installs on 4 sq. ft. of real estate
- Completely Self-Supporting

By any standard of measurement, the Hy-Tower is unquestionably the finest multi-band vertical antenna system on the market today. Virtually indestructible, the Model 18HT features automatic band selection on 80 thru 10 meters through the use of a unique stub decoupling system which effectively isolates various sections of the antenna so that an electrical ¼ wavelength (or odd multiple of a ¼ wavelength) exists on all bands. Fed with 52 ohm coax, it takes maximum legal power...delivers outstanding performance on all bands. With the addition of a base loading coil, it also delivers outstanding performance on 160 meters. Structurally, the Model 18HT is built to last a lifetime. Rugged hot-dipped galvanized 24 ft. tower requires no guyed supports. Top mast, which extends to a height of 50 ft., is 6061ST6 tapered aluminum. All hardware is iridite treated to MIL specs. If you're looking for the epitome in vertical antenna systems, you'll want Hy-Tower. Shpg. Wt., 96.7 lbs.

Order No. 182 — **$245.00**

Also available . . .
14AVQ/WB 40-10m - **$67.50**
12AVQ 20, 15 & 10m - **$48.00**
All prices include sales tax, freight extra. Prices and specifications subject to change. All in stock at time of preparation of advertisement.

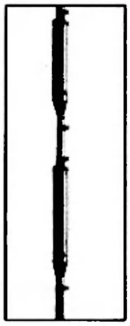
NEW

NOW...A GREAT NEW WIDE BAND VERTICAL for 80 through 10 Meters

Hy-Gain's 18AVT/WB

Take the wide band, omni-directional performance of Hy-Gain's famous 14AVQ/WB, add 80 meter capability plus extra-heavy duty construction—and you have the unrivalled new 18AVT/WB. In other words, you have quite an antenna.

- Automatic switching, five band capability is accomplished through the use of three beefed-up Hy-Q traps (featuring large diameter coils that develop an exceptionally favorable L/C ratio).
- Top loading coil.
- Across-the-band performance with just one furnished setting for each band (10 through 40).
- True 1/4 wave resonance on all bands.
- SWR of 2:1 or less at band edges.
- Radiation pattern has an outstandingly low angle whether roof top or ground mounted.



CONSTRUCTION . . . of extra-heavy duty tapered swaged seamless aluminum tubing with full circumference, corrosion resistant compression clamps at slotted tubing joints... is so rugged and rigid that, although the antenna is 25′ in height, it can be mounted without guy wires, using a 12″ double grip mast bracket, with recessed coax connecter.

Order No. 386 — **$90.00**

The Versatile Model 18V for 80 thru 10 Meters

The Model 18V is a low-cost, highly efficient vertical antenna that can be tuned to any band...80 thru 10 meters...by a simple adjustment of the feed point on the matching base inductor. Fed with 52 ohm coax, this 18 ft. radiator is amazingly efficient for DX or local contact. Constructed of heavy gauge aluminum tubing, theModel 18V may be installed on a short 1⅝ inch mast driven into the ground. It is also adaptable to roof or tower mounting. Highly portable, the Model 18V can be quickly knocked down to an overall length of 5 ft. and easily re-assembled for field days and camping trips. Shpg. Wt., 5 lbs.

Order No. 193 — **$33.50**

bail ELECTRONIC SERVICES
60 Shannon St., Box Hill North, Vic., 3129.
Ph. 89-2213

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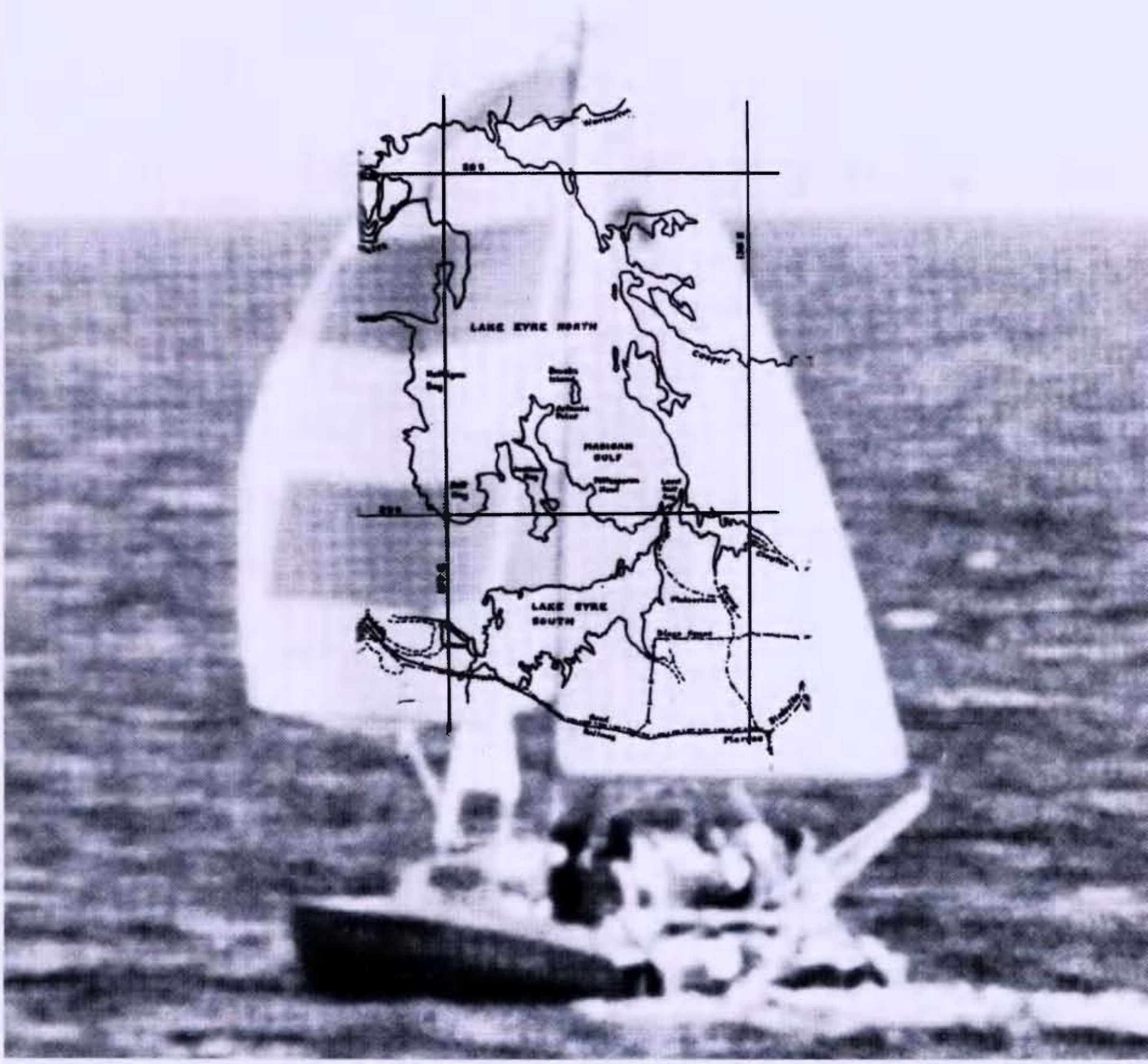
N.S.W.	STEPHEN KUHL, P.O. Box 56, Mascot, 2020	Ph Day 667 1650 A.H. 371 5445
S.A.	FARMERS RADIO PTY. LTD., 257 Angas Street, Adelaide, 5000	Ph 23 1268
W.A.	H. R. PRIDE, 26 Lockhart Street, Como, 6152	Ph 60 4379

amateur radio



VOL. 43, No. 8

AUGUST 1975

CONTENTS

COVER PHOTO

The "Red Baron" and Lake Eyre are almost synonymous to many Australian amateurs. The story of this land-locked mobile-marine expedition appears on page 5.

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

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27 MHz TRANSCEIVERS AND ANTENNAS SUITABLE FOR NOVICE AMATEUR USE

SE501 23 CHANNEL TRANSCEIVER
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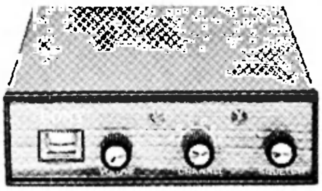
5 Watts AM, 12V DC Operation **$99**

¼ WAVE FIBREGLASS MOBILE ANTENNAS
With insulator and heavy spring base **$35**

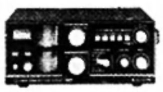
CENTRE LOADED FIBREGLASS MOBILE ANTENNA AND BASE
43 in. long **$16.90**



PONY CB74A 6 CHANNEL TRANSCEIVER
5 Watts AM, PMG approved for 27.880 MHz operation. Fitted with 27.880 and 27.240 crystals **$105**

MIDLAND TWIN METER TYPE SWR BRIDGE AND POWER METER **$25**

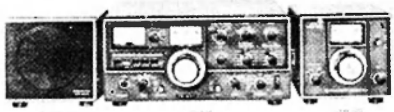
COMMUNICATION RECEIVERS AND TRANSCEIVERS



Kenwood QR666 general coverage communications receiver, solid state, 550 kHz — 30 MHz, 6 bands. 230V/12V.
Price $330

BARLOW WADLEY XCR30 Mk. II RECEIVER — LATEST MODEL
$259

KENWOOD TS 520 5 BAND SSB TRANSCEIVER



Specifications

Frequency Range: 80 metre band — 3.50 to 4.00 MHz; 40 metre band — 7.00 to 7.30 MHz; 20 metre band — 14.00 to 14.35 MHz; 15 metre band — 21.00 to 21.45 MHz; 10 metre band — 28.00 to 28.50 MHz, 28.50 to 29.10 MHz, 29.10 to 29.70 MHz; WWV — 10.00 MHz.

Mode (Receive only) USB, LSB, CW.
Input Power: 160 watts on 80 to 15 metre band, 140 watts on 10 metre band.
Nett amateur prices:

TS 520 $550.00 with PTT Mike

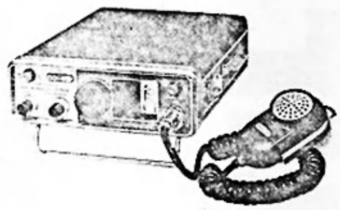
YAESU MUSEN FT101B
SSB/AM 240V AC & 12V DC operation,
160-10m transceiver **$585**

YAESU FT/FP200 TRANSCEIVER P.S.U. COMBINATION **$400**

144-148 MHz TWO METRE EQUIPMENT
NOW WITH 6 CHANNELS

KEN KP-202, 2W, 144 MHz band, FM. Hand held transceiver with crystals for 6 channels, Ch. 40-50, R1, R2, R3, R4 **$150**

KCP-2 NICAD battery chargers & 10 Nicad batteries **$35**

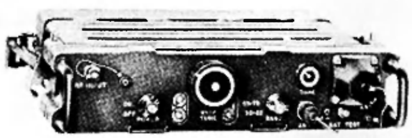


KENWOOD MOBILE TR7200C

2 METRE FM TRANSCEIVER

22 Channels, fitted with Ch. 1 and 4 repeaters. Technical Data: Transmit 10 and 1 watt positions. Max. freq. deviation +15 kHz. Spurious response —60dB. Receiver less than 1W for 30 dB SW selectivity. 20 kHz at 60 dB down; 40 kHz at 70 dB down.

$235 — Extra Channel Crystals $10 Set



RF AMPLIFIER AM-4306/GRC

Originally used in conjunction with PRC25 which covers 30-75 MHz FM. Requires 1-4 watts drive and gives a nominal 25 watts out. Brand new in sealed box with complete service and user manuals.

$25 each

amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA, FOUNDED 1910

AUGUST 1975
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Copy is required by the **third of each month.** Acknowledgment may not be made unless specially requested. All important items should be sent by certified mail. The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying any reason.

Advertising:
Advertising material should be sent direct to **P.O. Box 150, Toorak, Vic., 3142,** by **the 25th of the second month preceding publication. Phone: 24-8652.**

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QSP

ON LAUNCHING WIA NEWS

It has now become possible to organise a regular column in AR — WIA NEWS (pronounced wire news) giving publicity to Federal Institute affairs both at the national and international level.

You must be the judge as to the value of the column, but remember that you can communicate amongst yourselves much more quickly than it takes WIA NEWS to see the light of day in AR because it is at least one month old when it reaches you.

Reluctance to publicise Federal news through the medium of AR is sometimes labelled as a failure. Inability to find someone to write such a column has been the real cause of all the troubles.

Whichever way your views prompt you, please remember that AR circulates all over the world. The desire not to publicise our troubles for the delectation of overseas readers has been in the back of our minds, but perhaps we have been too reticent about ourselves, and too self-conscious to admit our weakness.

The WIA is by no means a perfect organisation. We have our own serious inflation problems. We try to accommodate views which are poles apart while doing our best to avoid fence-sitting. Genuine efforts are always made in the best short and long term interests of amateur radio in Australia.

Priorities constantly vary to meet whatever aspects are currently under discussion.

The Executive must tender an account of its actions to the Federal Council.

This Federal Council consists of your Divisional Federal Councillor, plus one from each of the other six Divisions.

All Divisions must have their say. Some may feel more strongly than others on certain issues. Nevertheless, if we are to operate effectively, all views are required.

WIA NEWS is presented by the executive so that you can be informed of Institute affairs and form effective opinions. Your Divisional Federal Councillor wants to know your views.

D. A. WARDLAW VK3ADW
Federal President

DARWIN APPEAL
The Executive announce that the appeal for donations for those losing gear during Cyclone Tracy in the Darwin area
WILL CLOSE ON 1st SEPTEMBER 1975
● **PLEASE SEND IN YOUR DONATION NOW**

The following is List No. 3 of contributors:—

Amount already acknowledged		$207.70
per VK4 Division		$24.26
VK6 Division		$37.50
VK3YQ		$4.00
per VK5 Division		$50.00
(VK5SE	$3.00	
VK5ZB	$5.00	
VK5NX	$5.00	
VK5PX, I5PML	$8.00	
VK5QX	$10.00	
VK5 Division	$19.00)	
per VK1 Division		$40.90
(L20781	$2.00	
L20657	$2.00	
VK1QJ	$2.00	
LF0018	$2.00	
VK1TR	$2.00	
VK1DS	$2.00	
VK1NE	$2.00	
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VK1ADP	$2.00	
VK1MS	$2.00	
VK1YS	$1.00	
VK1DA	$2.00	
per VK1EP	$12.90)	
Geelong Hamfest Society		$600.00
TOTAL TO DATE		$964.38

The **VK2 DIVISION** would like all persons and QSL Bureaus to note that the G.P.O. Box 1734, will be cancelled later this year.
Mail should be directed as follows:
VK2 Inwards QSLs to:
P.O. Box 134, Charlestown, 2290
VK2 Outwards QSLs to:
P.O. Box 95, Frenchs Forest, 2086
Other Divisional Mail to:
14 Atcheson St., Crows Nest, 2065

SCOUTS STATIONS
In his bulletin 18/2 of 28th May Noel Lynch JOTA organiser, advised that the Boy Scouts of Korea now have a scouting station on the air from 31st May with the call sign HM0S. He also mentions a diploma for contacting stations on a stated number/points scored system from 1st May to 31st July, relating to Algerian Scouts celebrating the 40th anniversary of scouting in that country. For those interested write to 7X2 S.M.A. Service Diploma DOA SMA, Scouts Musulmans Algerians B.P. 69, Alger-bare.

PIRATES
A man was fined $350 in Canberra recently for illegally transmitting broadcasts from a motor vehicle on an amateur frequency and the gear had been seized. It is understood that the case was defended.

REFLECTION
The editorial in Short Wave Magazine for May '75 gives food for thought and can only be briefly summarised here. Austin Forsyth G6FO wrote — "In these days of rapid development in the art of

WIANEWS

Pressures of business to be conducted by the Executive became so great that 1970 saw agreement between the Divisions to employ a Secretary and to set up an office.

A very small office was established in 1971 and it is still small. That year the Divisions saw the advantages of centralised membership records and subscriptions processing. An EDP programme was done in time for the 1972 subscription year.

Also in 1971 "Magpubs" was added to the little Federal office's duties.

In 1972 the publication of AR was handed over to the Executive. In the same year the Executive's office was moved from the Victorian Division's rooms to Toorak. It had been hoped that a joint office would have been more economical than separate offices but so many problems arose which only a move could resolve.

The Federal body does what the Divisions, acting as Federal Council, tells it to do.

The Executive office began with one person — the Secretary/Manager — with clerical and typing assistance. This person was engaged to put into effect the directives of the Executive. He was engaged on a proper salary for expertise, co-ordination and administrative abilities. That salary (with all allowances) by the way is today only 8 per cent higher than it was in 1971.

Unfortunately the work load has increased out of all proportion from the time when the concept of a Secretary/Manager was envisaged in 1970.

In 1973 the Executive recognised this and authorised the employment of a part-timer to do all the EDP and subscriptions work. This part-timer, after training, allowed the Secretary/Manager and his clerk/typist to concentrate on the more important duties of the office — negotiations with Central Office, co-ordination of numerous functions, dissemination of information to Divisions and a host of other administrative and organisational work.

In 1974 it was obvious that the time available to service AR advertising and to get more of it could be improved profitably by employing a part-timer solely for this work. This has paid off. Check the advertising in AR now compared with 1973 for example.

AR, centralised subscriptions processing, membership records, and Magpubs cannot function without a central office. AR could not be distributed without an addressing service for example.

Your AR now reaches you through a computer label addressing system which is part of EDP. In the old days a laborious, time-consuming addressing plate system was in operation.

In the old days each Division prepared, mailed, collected and accounted for their own members' subscriptions. Ask anyone who was involved what time and effort were needed from volunteers year in and year out. In Divisions with the largest membership paid staff were even required.

Improvements are required even if to meet changing conditions from year to year. The Executive has this in mind all the time. Unfortunately very little can be done in the face of severe inflationary financial stresses except to improve efficiency and productivity.

Remember what you used to get for your £2 sub? But then numbers of members were fewer and perhaps you didn't realise the work put in by unpaid volunteers behind the scenes. In those days AR made a profit at 6d a copy. You can't even buy a newspaper for 5 cents today.

Perhaps this is a slight exaggeration but have you compared your present subscriptions to other societies or clubs with what you paid them 10 or 20 years ago?

The 1975 Federal Convention approved the appointment of an Investigator to put the whole WIA machine under a microscope and to come up with some answers.

Have you any ideas how the WIA can be improved?

A tremendous amount of thought has been given to publicising amateur radio in Australia, improving its image and encouraging more members.

One of the big problems is getting good publicity into the media on every possible occasion. Ever tried to convince a newspaper editor to publish a sweet little blurb about what amateur radio is about or what amateur operators did under such-and-such an emergency?

Apart from this one time effort, even if you succeed, how many will read it and how long will it stay in the public's memory? Vice, murder, sport, political bickerings. These seem to be the money spinners.

The yawn of a hippo is puny compared with the yawn of an editor when confronted with amateur radio. But his yawn is just as great on a whole range of other beneficial subjects unless he can "smell" a juicy story.

Anything which can be done to get favourable publicity for our leisure activity is good. Not merely a one time hit. It must go on and on, all the time.

What would you do if you read in your newspaper that amateurs ("hams" of course) were really 007 agents working undercover for the secret service of a foreign power or were Martians in humanoid form?

Would all of you put pen to paper and bombard the editor with letters of correction? And yet this kind of rubbish hits the media from time to time.

Somehow a beneficial and tiny minority group of a few thousand must keep its good works before the eyes of the public millions.

The ACT Division has been given the job of examining ways and means to produce an economically feasible publicity package and film for Divisions for use at shows, exhibitions and for displays to adult and high school groups.

How about offering them your help? Write now to P.O. Box 11⁻ Canberra City, ACT, 2601.

An often asked question: Does the WIA represent the Australian amateur to the authorities? Yes! Six consultations on various matters occurred during the month of June alone between the Executive office and the Central office of the Radio Branch. ■

---

electronics — for it is now an art as well as a science — the field is so vast that no one individual can have much knowledge, and certainly very little experience, outside his own range of activity. The cleverest men are those who realise how little they know and how much there is to learn. As radio amateurs, many of us are not bound by the limitations of the professional radio engineer, who has to keep his mind on the particular aspect of the subject that earns him his living. As freelance radio men, we can range over the whole field at will" and he lists a vast range of subjects. He thinks the amateur generally may be a more competent practical man than his professional confrere and it is this fact that enables the amateur to be a useful and important member of the whole fraternity of radio men.

CITIZENSHIP

April QST carries an item that the (USA) amateur rules have been amended to delete references to citizenship or nationality with respect to eligibility for amateur license. The new rules require each licensee to furnish an address in the U.S.A. The only aliens not eligible to obtain an amateur licence, so it appears, are representatives of foreign governments.

IN BAND TRANSMISSIONS

April '75 QST quotes a clarification by FCC of the rules for amateur transmissions making it plain that both wanted and unwanted products must be confined to the amateur bands within the limits of good practice. An example is quoted of a type A3J emission which limits the carrier power level to at least 40 dB below P.E.P. and in relation to unwanted sidebands and intermodulation products lays down three steps of acceptable attenuation.

ELF

"The spectrum below 10 kHz (at present unallocated) is far from being a forgotten territory and is the centre of much attention in the communications world at the present time". Extract from an article entitled "Radio Communications at frequencies below 10 kHz" by G3XBM in April '75 Rad. Comms.

SUNSPOT NUMBERS

Smoothed mean for Nov. '74 was 27.6. Mean for May 1975 provisionally 8.7. The predictions of smoothed monthly sunspot numbers drop from 9 in June by one a month to 4 in Nov. '75. Swiss Fed. Obs. Zurich bulletin 5/1975. ■

Afterthoughts

An omission from the published results of the VK/ZL Oceania DX Contest 1974:

VK SWL:	L30042	3900
	L4018	2640

Sorry about some photographs reproduced back to front although the printers say this was impossible! Top right hand picture on P4 of June AR and front cover photograph of July AR were thus maltreated.

ASJA monetary award is $15 not $10 as shown on P4 of March AR. ■

ON EYRE

W. M. Rice VK3ABP
54 Maidstone St., Altona 3018

During the May 1975 school vacation, VK3s NS, ABP, YBP and YFF made history by operating marine-mobile from Lake Eyre for the first time ever. This is the story of their expedition.

In 1840, the explorer Edward John Eyre was the first white man to see Australia's largest lake. For 109 years its 9300 square kilometres (named Lake Eyre by Goyder in 1859) was never known to carry more than a few centimetres of water, lying above 40 mm of solid salt. Spanning the latitudes 28 and 29 deg. S, about 700 kilometres north of Adelaide, its occasional salty pools soon dried out under a cloudless sky where solar evaporation can be up to 2 metres each year.

The lake was mapped by J. W. Lewis in 1874-5, first flown over by G. H. Halligan in 1922, and extensively explored by C. T. Madigan between 1929 and 1939. Madigan, who was Professor of Geography at Adelaide University, was of the opinion that the lake could never fill. Although fed by several large rivers, the Warburton and Cooper's Creek being the best known, they are seldom more than dry beds with occasional waterholes. The Lake Eyre Basin covers more than a million square kilometres, about one sixth of the continent, but most of this area is desert, with an average annual rainfall of less than 100 mm.

Then, in 1949, the greatest floods for more than a century filled the inland rivers, and by 1950 Lake Eyre was truly a lake, with up to three metres of water covering its area. An attempt was made to launch a sailing-boat on the lake in 1950, but it was soon swamped by large waves. Before long the seasons returned to normal, and by 1953 the lake was once again dry.

SPEED RECORD

World history was made in July 1964, when the late Donald Campbell established the still-current speed record for a wheel-driven vehicle of 690.9 kilometres per hour over a prepared strip on the bed of Lake Eyre. This story is told in great detail by John Pearson in his book *"Bluebird and the Dead Lake" (Collins, 1965)*. The strip was located in the south-east corner of the lake in the area known as Madigan Gulf. Headquarters for the record-breaking team was at the homestead of Muloorina Station, about half-way between the southern shore and the nearest town of Marree about 110 km to the south-east. Muloorina, established by the late Elliot Price in 1942, is a cattle station of hundreds of square kilometres of sand and saltbush, and is the nearest permanent settlement to the lake. The homestead is adjacent to several waterholes in the normally-dry Frome River, around which grow numerous sizable trees in a landscape otherwise marked by no trees at all.

The author first saw Lake Eyre in 1969, from one of the scheduled civil aircraft which daily link Darwin with Adelaide. In spite of the height and distance it was still impressive, although at the time completely dry. But weather is always setting new records, and in February 1973 extremely heavy rain fell over most of Queensland, breaking an eight-year drought, and bringing floods down the Diamantina and Barcoo into the Warburton and Cooper. Lake Eyre began to fill for the second time in 133 years, only 24 years after the first!

In September 1973 the author flew over the southern end of the lake in a light aircraft, seeing for the first time in his life the vast expanse of water where dazzling white salt was usual; and an idea began to germinate. No one had ever before operated on the amateur bands from a boat on Lake Eyre. Someone had to be first!

PLANNING

Obviously, with limited funds available, one cannot organise transport, equipment and personnel overnight for such an expedition. What type of boat could be used? The water might be too shallow to launch a boat big enough for several people plus equipment. Fuel would be a problem; a sailing boat would overcome that. But sailing boats usually have keels or centre-boards needing a metre or more of water. Perhaps a catamaran? With a weatherproof cabin? No such craft existed, at least not one easy to transport over rough dirt roads for long distances. Power supply? Obviously car batteries. Solid-state transceivers, naturally; they didn't have them in 1950!

While all these factors were being considered, and time rushed on, the lake might have been fast drying up again. But Nature stepped in and poured more floods into the system early in 1974. Lake Eyre, by the end of that year had a greater depth of water in it (about four metres) than had ever been known before. And up in Darwin a man named Neil Fowler had devised a sailing boat which became known as the Red Baron.

Based on Fowler's design, the Western Australian firm of Ken Hill and Dale Cameron began to produce a unique fibreglass craft: a catamaran nearly 6 metres long and 2.4 metres wide, with a cabin in which four people could sleep. The 6 metre mast carried as a minimum about 13 square metres of sail. Yet the boat could be towed anywhere on its lightweight trailer by an ordinary car, and best of all, required only 30 cm of water, not only to float but to sail. And the alloy extrusion mast, insulated at its base by the fibreglass hull, looked a natural choice for an all-band antenna when fed through a suitable transmatch.

Hill and Cameron's Victorian agent, a dedicated yachtsman named Roger Bullock, was approached in February 1975 and was immediately enthusiastic. His only Red Baron could be made available after the Sailboat 75 exhibition in April. He himself would be delighted to take part in the expedition, particularly since the plans by now envisaged making a documentary film to publicise the Lake, the amateur radio aspect, and not least, the boat. Besides, for a couple of weeks anyway, we could all get away from the approaching Melbourne winter!

FILM

The idea of making a professional quality movie of the expedition had been thought about for 12 months, but it was only because of the technical expertise of Tim Robinson VK3YBP that it eventually became possible. Tim had been an enthusiastic movie-maker for several years, and owned a good proportion of the 16 mm equipment which would be needed. Not only that, but he knew where and from whom the rest could be borrowed or cheaply hired. The outlay for the film could therefore be held down to not much more than the cost of film-stock and processing. Even so, this was a sizable amount of money, but not beyond the team's joint resources. The audio side of the venture was looked after by Roly Roper VK3YFF, who was also no newcomer to the movie art.

A number of HF licensees had hoped to take part in the expedition, but unfortunately several could not leave their work for the necessary week or two. This by now had been decided as the period 10-25 May

1975, the first term school vacation, permitting wives and children to join the party. Ultimately there were only two HF operators, Jack Taylor VK3NS and the author VK3ABP. Even so, it was a sizable party of 17 people who left Melbourne at various times on the 9th and 10th of May and headed for Adelaide in four cars. Space was fully utilised in the vehicles and trailers, as all food and water (about 300 litres) had to be carried, plus sufficient tents and camping gear including gas stoves, lights, and a refrigerator. Battery charging was provided for with a *"home-brew"* portable wind-powered generator, plus an engine driven outfit if the wind proved inadequate.

SAFARI

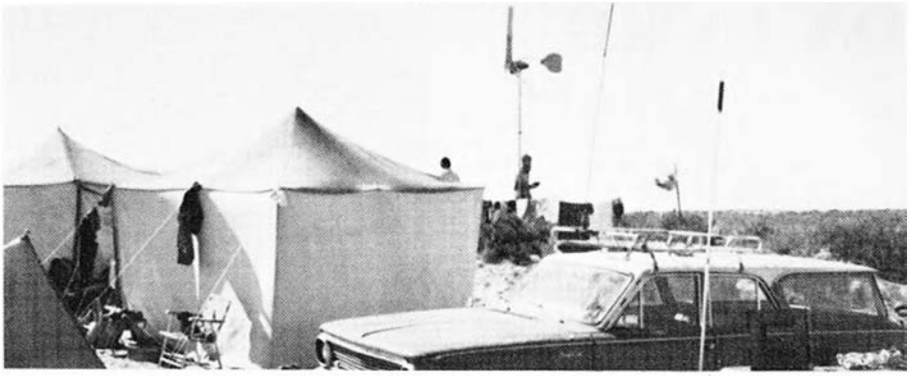
Besides the Red Baron on its trailer, Roger's car also carried a lightweight 4 metre *"Surf Cat"* catamaran on a roof rack. Quite an eye-catching combination on the road, and few people travelling at the time between Melbourne, Adelaide and points north failed to notice it, judging by comments later heard by party members! Incidentally there was also a 3 kW outboard motor in case the Baron ran out of wind.

The team left Adelaide on Sunday morning (11 May), and arrived that night at Hawker, to enjoy the last luxury for a week or so at the Outback Motel. Monday's travelling over somewhat less-than-perfect roads (Hawker marks the end of the bitumen) was hard on trailer fittings, fuel tanks, overloaded roof-racks, and mufflers, but Muloorina was reached just before sunset without serious mishaps. On advice from Keith Price, whose family runs the station, that the remaining 50 km to the Lake was no worse than roads already covered, the convoy pressed on into the darkness, and arrived at the shore of Level Post Bay about 8 p.m. There were some overnight visitors already there around a campfire (they brought the firewood with them!), and their gallant offer of cups of tea all round was gratefully accepted by 17 weary travellers. The tents were set up on top of the sand dunes by flashlight, (the new moon had not yet risen).

After a brief (also flashlight) inspection of the beach and the water, and some marvelling at the myriads of stars shining from the unpolluted and cloudless sky, it was time for bed.

BLUE WATER

Tuesday 13th May, and daylight displayed the great expanse of blue water that was Madigan Gulf, extending northward to the horizon and far beyond, yet still representing only about one-sixth of the area of the Lake. The Baron was eased on its trailer down the slope to the beach, and by mid-morning the largest sailing craft ever on the Lake was afloat. In the event, there was no depth problem; the water was 2 metres deep within 10 metres of the beach. The next few hours were spent in rigging the boat and installing the home-brew SSB transceiver. A plate had been fitted under the stern of the starboard hull and from this a wire was run up to the cabin for connection to the 9000 sq km ground-



plane! The SWR indicator and transmatch (the Rollerless Ultimate from QST of November 1973) were connected to the base of the mast, which was conveniently accessible electrically via a bolt through the cabin roof. Part of what is normally a double bunk was used as the operating table, and the battery was stowed underneath it.

After a late lunch, sailing nowhere in particular the first ever marine-mobile contact from Lake Eyre was made about 3 p.m. with Hughie VK5BC, who was land-mobile at the time, on 40 metres. It would be nice to say that QSOs followed thick and fast after that, but before long there was evidence of sad lack of ampere-hours in the rather old battery, and after a short QSO with Snow VK3MR it was necessary to go ashore and fire up the generator.

BROOKS ISLAND

Wednesday 14th May proved to be the highlight of the trip. By mid-morning there was a good south-westerly blowing, so plans were made to sail up to Brooks Island at the north-west corner of the Gulf about 25 nautical miles distant. A crew of 5 (Roger and Noelene Bullock being the sailors, plus VK3s YBP, YFF and ABP) set out about 11 a.m. with provisions for two meals, and more reliable batteries than before. VK3NS stayed ashore to monitor the proceedings, and with his help the first 20 metre DX was worked from the boat (VE7UZ, WB4SWS and WA6VGJ) plus a few VKs. Reports were somewhat discouraging, and it was obvious that 50 watts PEP and a distinctly non-directional antenna were going to make DX difficult. From a non-radio viewpoint the trip was exhilarating., The course was west to near Pittosporum Head, then NNW towards Artemia Point. For three hours on this leg there was no land in sight, and the waves were up to a metre high. The sun shone brilliantly, cabin temperature was about 28 degrees C, gulls and pelicans flew overhead, and it was hard to realise the boat was 500 km from the sea (and incidentally, about 12 metres below sea-level).

Brooks Island was reached just before sunset. The trip had taken longer than expected, mainly due to the heavy load aboard reducing speed to about 4 knots at the best. At some time the Baron must have crossed the track used by Donald Campbell, but he was faster! It had been hoped to set foot on the island, which is about 7 by 3 km in size and reputed to have a fresh-water spring, but there was neither time nor provisions to anchor for the night. So, as darkness fell and the wind held fair, sail was set for home. At this stage operations were transferred to 80 metres, in the hope of working all VK during the night, but the static was bad and few QSO's were made except reports to Jack giving progress at intervals. Navigation involved little more than keeping the compass heading on south-east, with occasional checks on 146 MHz to establish range from the camp. Jack's 146 MHz signal was first heard about midnight, and the beacon light he had rigged was sighted about an hour later. Surprisingly, it was dead ahead! By this time the wind had dropped almost to nil, so the last few miles were run on the outboard motor, and the crew staggered ashore at camp about 3 a.m. After 16 hours afloat, one tends to stagger on terra firma! Incidentally, who fired a green flare at 2310 CST on 14 May from somewhere east of Madigan Gulf, or was it a particularly bright meteor?

The remainder of the stay was less eventful, mainly because lack of good winds prevented any more long trips being made. Being ashore every night, no more MM contacts were made on 80 metres. Daytime activity, seldom more than a few km from base, was mostly on 20, and for the last three days Jack's FT 101 B was used in the boat, which helped a little with DX, being at least twice the power of the 3ABP rig. On Friday 16th an attempt was made to sail down Goyder's Channel (which connects Lake Eyre North to the much smaller Lake Eyre South), but rather less than half-way even the Surf Cat grounded in soft mud with only about 20 cm of water covering it.

WEATHER

One gratifying feature of the visit was to hear from those worked how bad the weather was in Adelaide and Melbourne, cold, windy, raining; but the Lake Eyre sun was warm all day every day, and the nights quite mild. Enjoyment was tempered by the realisation that before long we too would have to go South and back to winter again. Visitors for the last night at the Lake were Ron VK3AFW, Ian VK3ZDW and their families returning home from Alice Springs, so they also had the opportunity of a brief sail on the Gulf before helping to separate the Baron from the water on the morning of 20th May.

It is a sobering thought to realise that in another two or three years of normal seasons all the vast body of water that is Lake Eyre will have reverted to dry salt. Already there are many thousands of dead fish around its shores as the water falls and the salinity rises. But perhaps this once in a century phenomenon may recur more frequently in the future. Perhaps the weather pattern is changing and the Lake becoming permanent. Who knows? But we will return some day with a sailing craft again, even if needs be a land-yacht! To those who worked us either portable or in the boat, some rather special QSLs will be on their way when we have had them printed. And we hope that all our readers and many others will be able to see our documentary film on television some time in the next few months.

In the meantime we can proudly claim to have been first-ever marine-mobile Lake Eyre (102 stations in 5 countries): to have travelled further under sail on the lake (about 75 nautical miles) than anyone before; and in the largest sailing boat ever seen there: and to have been first under sail to navigate any significant distance (25 nm) across the lake by night. Hopefully the future may allow someone else to outdo some of these claims, but the first can never be contested. ■

VHF/UHF ADVISORY COMMITTEE PROPOSED BAND PLANS

During 1974, the VHF/UHF Advisory Committee proposed a draft band plan for the 70 cm amateur band. This was duly published in the October 1974 issue of AR. Prior to publication it had been forwarded to Divisions for comment. If you have not read the article, or forgot its contents, then dig it out and read it now. The explanations in general remain true for this new plan, although some of the frequencies have been altered in accordance with APO requirements.

During 1974 and early 1975 the Executive office entered into a number of negotiations with the Central Office of the APO during which the case for beacons and repeaters in the 70 cm band was put (23 cm was also discussed but no favourable decision has as yet been achieved).

On 20th March the Central Office wrote to the Executive indicating that repeaters and beacons would be given favourable consideration provided they operated only between 430 and 440 MHz.

The VHFAC then set out to redraft the plan for 70 cm. At the same time it was considered expedient to prepare a more detailed draft for the first 500 kHz of the tuneable section of all bands.

The result is shown in Figs 1 and 2 of the diagram.

Both plans are self-explanatory, and reference should be made to the original article in October 1974 AR. However, a few points are worth mentioning. With respect to the tuneable section, it can be seen that the segment has been divided into three broad categories:

1—DX. 2—Local. 3—Beacons.

Calling frequencies have been nominated. Many of these frequencies are in current use. Some are new. The calling frequencies are mainly related to DX operation. However it can be seen that a second SSB/AM calling frequency has been nominated on .200. This could be known as the secondary calling frequency and would normally be used for local operation.

Calling frequencies are suggested as follows:

CW	.025
Meteor Scatter — all modes	.050
RTTY	.075
SSB/AM	.100 (primary DX calling)
SSB/AM	.200 (secondary local calling)
SSTV	.300

Beacons could be established between .4 and .5 with some overflow down to .35 allowable in certain areas.

The 70 cm Band Plan is self-explanatory. Presently the actual net frequencies and repeater input and output frequencies are being considered. The Federal Repeater Committee should soon be in a position to nominate some channels so as to get the ball rolling in this area.

Further negotiations must now take place with the APO before final approval can be granted. The Executive is hopeful that at least some channels can be agreed to readily by the APO.

Details relating to the remainder of the 6 metre and 2 metre bands will follow at a later date.

Peter Wolfenden VK3ZPA
Chairman VHAC ■

PROPOSED WIA BAND PLANS

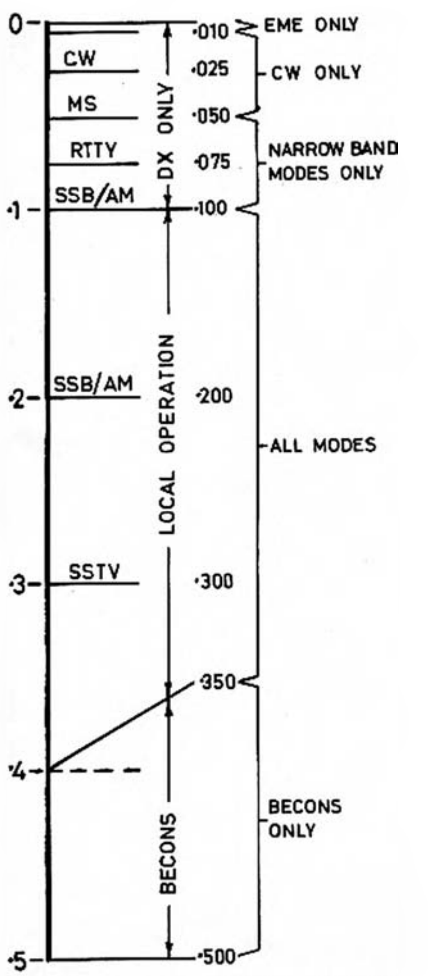


FIG 1 PLAN FOR TUNABLE PORTION OF ALL VHF & UHF BANDS

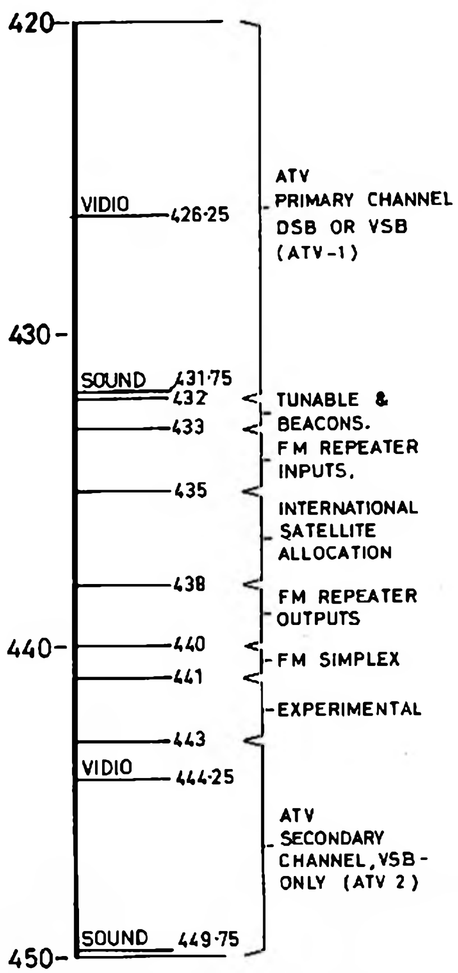


FIG 2 70 cm BAND PLAN

(VHFAC 6/75)

BENCH POWER SUPPLY

Moorabbln & District Radio Club VK3APC
P.O. Box 88, East Bentleigh, Vic. 3165

Described in the following article is a low voltage power supply. No doubt you have seen many power supplies published in this and other magazines, but this particular supply should capture your interest even if you only require some of its features.

The power supply presented here is fully variable in both voltage and current modes from 0 to 15 volts and 0 to 10 amps. It may be used either as a voltage source or a current source and is metered with two 3½" meters.

Regulation and ripple rejection are both excellent and, in fact, put this supply into the laboratory quality class as can be seen in the specification table.

SUPPLY SPECIFICATIONS

Line Regulation: 0.01% for 10% mains change
Load Regulation: 0.03% for any load addition or removal
Ripple Rejection: Better than 76 dB
Metering: Two meters 3" x 3½"
— voltage 0-1 mA FSD calibrated 0-15V FSD
— current 0-1 mA FSD calibrated in two ranges 0-1 AMP FSD 0-10 AMP FSD

OPERATION

Constant Voltage: Output continuously variable 0-15V
Constant Current Mode: Output continuously variable in 2 ranges 0-1 AMP and 0-10 AMP
Voltage Sensing: Selective on front panel for local or remote voltage sense
Temperature: up to 50 deg.C for full output.

You may ask, why go to the trouble of providing these high specifications for amateur use? These features are actually a bonus from the prudent use of integrated circuits and modern design used in this supply.

The supply has been designed to cover applications such as charging single cells or complete batteries, powering logic circuits covering 3.6V, 5V or 7 volt rails, zero derived voltage powered equipment such as 9V, 10V and 15V and mobile/portable equipment such as 4.5V, 6 to 7V, 9V, 12-14 volts.

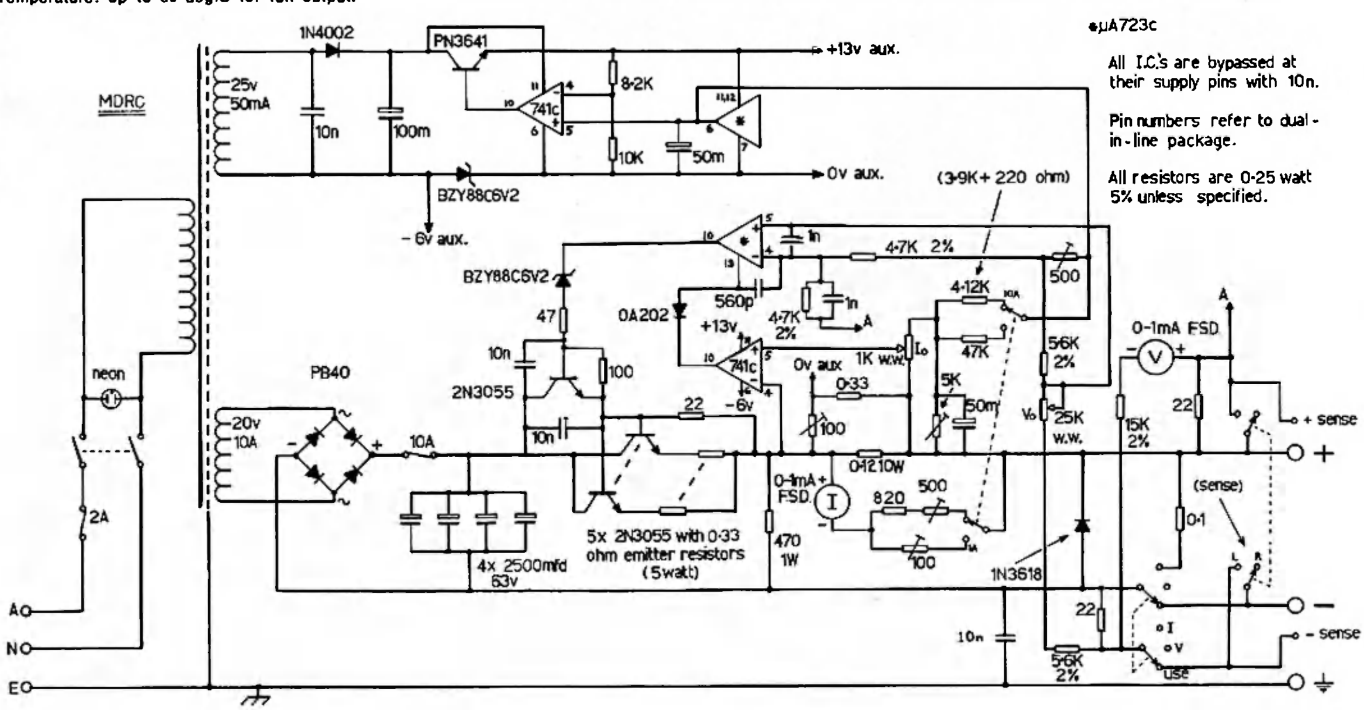
It can be used as a general bench supply powering portable/mobile equipment, but more importantly it can be used in powering equipment where rigid voltage and current control is required (e.g. newly constructed transmitter / transceiver or faulty existing gear — solid state SSTV etc.), or the power supply current can be set to limit at a pre-determined level, thus alleviating possible equipment damage due to short circuits, incorrect terminations or poor tuning up. How many times have you discovered that a fuse has been protected by the circuit it was meant to protect? And when that rig is tuned up you can set the current limit just above normal operating current, thereby protecting the rig during use. Another use is recharging of batteries where the current can be set to give constant current charge with the supply closing down when the battery reaches the set potential, e.g. nickel cadmium etc.

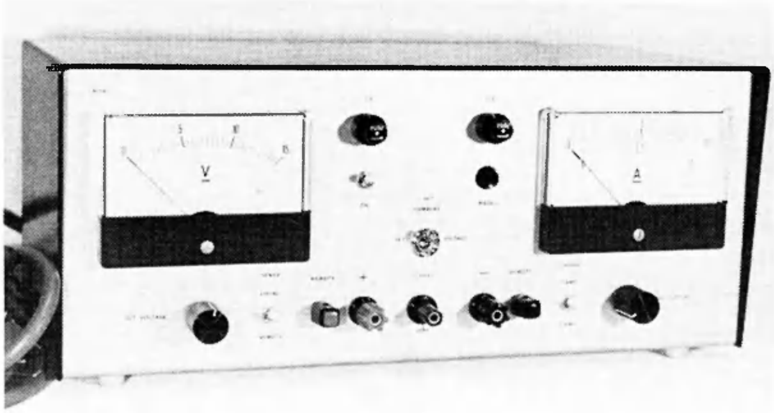
The heart of the power supply is an integrated circuit precision voltage regulator type uA723C. This integrated circuit contains a voltage reference amplifier, an error amplifier, a series pass transistor and a current limiter.

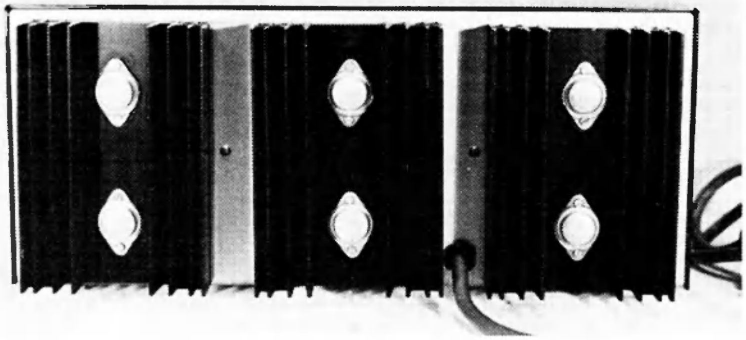
It can be seen that by adding external connections as shown in Fig 2 that we have a regulated supply. The reference voltage is fed to the error detector non-inverting terminal and causes the error amplifier output to rise. This in turn causes the series pass transistor emitter to rise and thus voltage is fed back into the inverting terminal of the error amplifier. When the two inputs into the error amplifier are equal, there will be no change in output voltage. The nominal reference voltage from the reference amplifier is 7.15 volts and hence we would have a regulated 7 volt power supply.

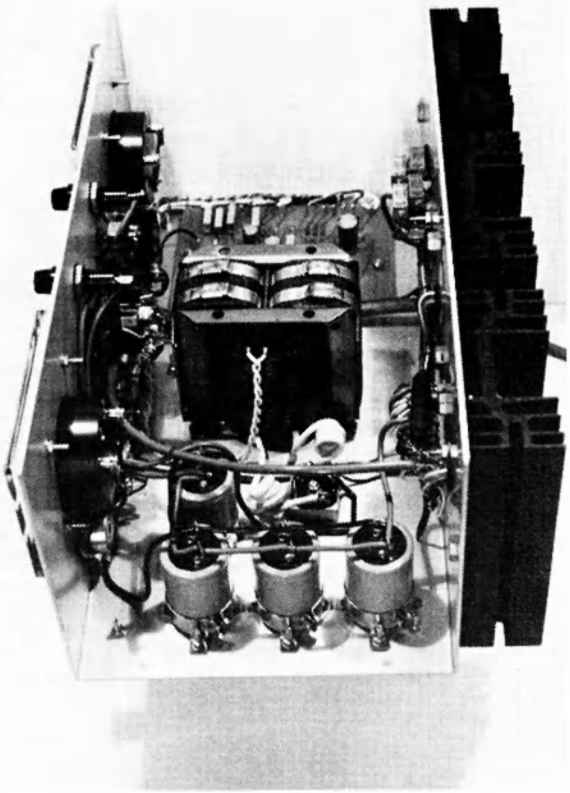
It should now be realised that if we were able to vary the reference voltage (a potentiometer connected across the output of the reference amplifier) to the error amplifier then we would have a variable output voltage which would follow the preset voltage.

Referring now to the schematic, the power supply's operation will be discussed in detail.









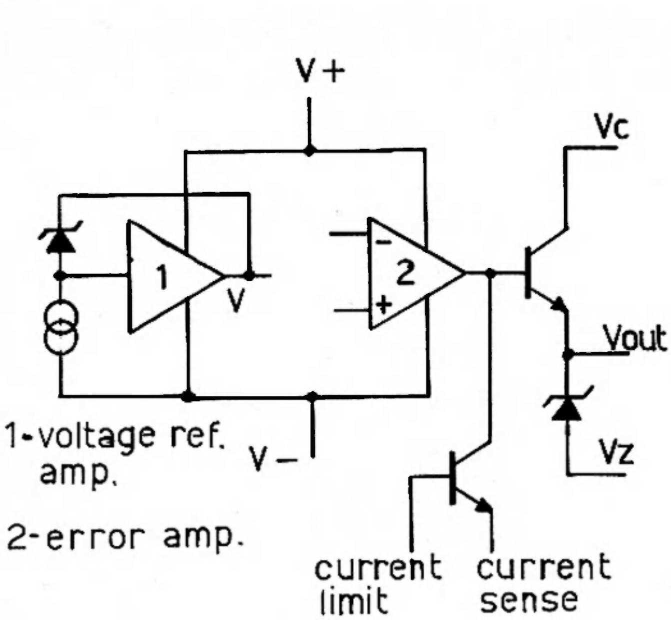


FIG. 1

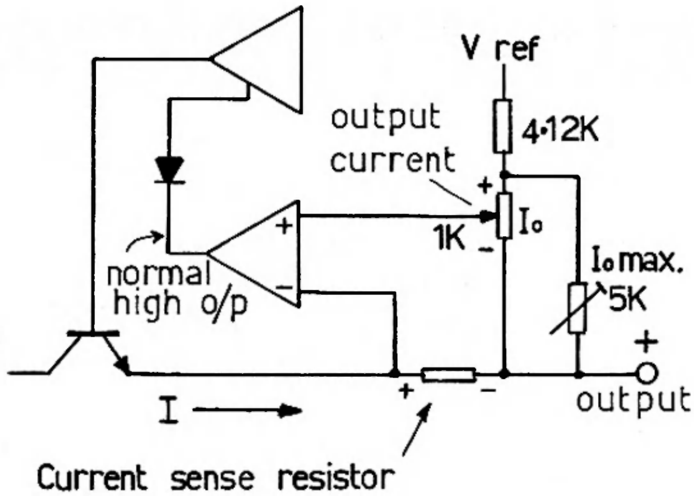


FIG. 4

The auxiliary circuit from the 25V winding is a constant voltage source, and the outputs are used as control voltages for the main regulator.

The auxiliary voltages are derived from a minor secondary winding of 25 volts at 50 mA. The AC is half-wave rectified and filtered by the 100 uF capacitor. This voltage is fed to the supply pins (V— and V+) of the uA723C integrated circuit. This in turn produces the reference voltage which is fed to the non-inverting terminal of the uA741C operational amplifier. This input causes the operational amplifier output to rise thus raising the emitter voltage of the PN3641 transistor.

The 8K2 and 10 k resistor divider cause the circuit to regulate at approximately 13 volts. Hence we have a +13 auxiliary supply with reference to the zero volt (0V) line. Also the insertion of a 6.2V zener diode as shown in the circuit allows us to derive a —6V auxiliary supply. These voltages +13V, reference volts and —6V are used as supply and control voltages for the power supply.

Fig 3 clearly shows the principle of operation for constant voltage control. The reference voltage is fed to two voltage divider networks. One divider is fixed (4K7 network), whilst the other is variable (5K6 network with 25 k potentiometer). When the "rheostat connected" potentiometer is at zero resistance, the error amplifier will only see equal input voltages when the voltage across the power supply positive and negative terminal is zero. By adjusting the 25 k potentiometer away from zero, the input to the error amplifier is no longer balanced and the output rises causing the series pass transistor to rise, thereby producing voltage across the power supply positive and negative terminals.

This in turn biases the 4K7 divider and equilibrium is reached when the error amplifier sees equal input voltages. Hence we have a regulated supply available from the supply terminals.

Fig 4 clearly shows operation for constant current control.

The reference voltage is divided to approximately 1V across the 1 k potentiometer. This is fed to a uA741C operational amplifier and causes the output to remain high. As load current flows, a potential is developed across the 0.1 ohm current sensing resistor. If this potential exceeds the input from the 1 k potentiometer, the operational amplifier output falls and closes down the uA723C regulator via the 0A202 diode. This gives good cut-off characteristics and network switching allows two continuously variable ranges of current control.

Remote sensing is provided and can be used when required. When the load is distant from the power supply terminals, small twin flex can be run from the load back to the supply terminals and remote sensing used to keep load voltage constant under varying load currents.

Monitoring of load voltage and current is carried out by two 0-1 mA FSD meters. The 15 k resistor gives 0-15V FSD and use of the current sensing resistor does away with shunts for measuring current. The current limit switch gives FSD meter indications 0-1 and 0-10 amps.

A "centre-off" DPDT switch enables current and voltage to be set up before applying the load.

The series pass elements are a 2N3055 driver stage controlling five 2N3055s in parallel.

The five 2N3055s are necessary due to the large dissipation evident under conditions of high load current at low to virtually zero output voltage. Each parallel 2N3055 transistor has a current sharing resistor to prevent thermal destruction.

The driver and parallel transistors are mounted two each on three 6 inch pieces of "MINIFIN" — 002.

If you are interested in building this supply, it is highly desirable to obtain the Printed Circuit Board which has been designed so that control circuits are not influenced by small potential drops occurring under high load currents. If these potentials were developed in control circuits, then regulation would be lost.

To make construction of this supply as simple and economical as possible, the Moorabbin and District Radio Club has available a complete kit of parts. This kit includes all items down to the last nut and bolt, and instructions.

Enquiries may be made to the Secretary: P.O. Box 88, East Bentleigh, 3165. ■

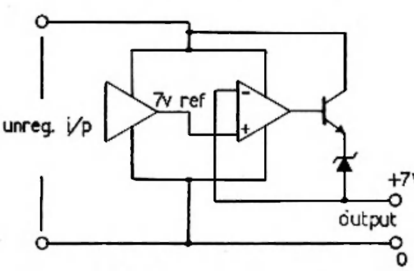


FIG. 2

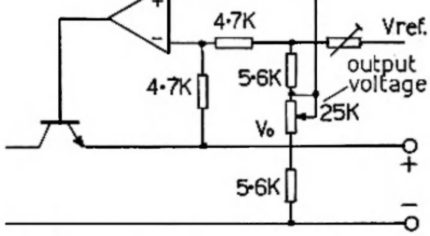


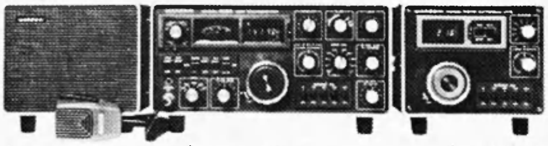
FIG. 3

VICOM INTERNATIONAL PTY LIMITED Manager: Peter Williams

HF TRANSCEIVERS

5 Bands, 200 Watts Input

Atlas 210-215 solid-state transceiver,	$570
Atlas 240V power supply,	$150
Atlas delux mobile mounting bracket,	$47



Uniden 2020 (80-10m) transceiver,	$550 incl. mic.
Uniden External (PLL) VFO	$105
Uniden Matching Speaker	$28
Yaesu FT101B (160-10m) transceiver.	$585
Yaesu FV101B VFO for FT101B/E.	$102
Yaesu FT101E (160-10m) transceiver.	$628
Yaesu FL2100B Linear Amplifier.	$388

Yaesu FT75B mobile transceiver, $245 AC power supply $50
DC power supply $60

Yaesu FT201 transceiver incl. pwr. supply,	$505
Trio TS-520 (80-10m) transceiver,	$550 incl. mic.

2 METRES SSB

SSM-EUROPA B transverter $224
YAESU FT220 ssb-cw-fm solid state transceiver. incl. mod to use fm repeaters.
Price of $445
SPECIAL
TRIO TV-502 transverter $243.

2 METRES FM

KEN KP202 handheld 2 watts. Incls 4 chs (1-4-40-50), $150.
TRIO TR2200G handheld portable transceiver incl. 2 chs, 1-50, ~~$150~~. SPECIAL $130
SEWIA SV-230 mobile rig, runs 25 watts! Price: $210, includes 3 channels, mic, cables and mobile mounting bracket.

SPECIAL

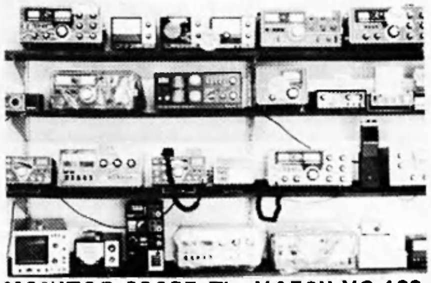
The Seiwa SU–710 70cm fm transceiver runs 10 watts and is the ideal mobile rig. Complete with 1 channel (435.0) and mounting bracket, mic, cables etc. and VICOM 90 day warranty. Price ~~$278.~~ $260

PROFESSIONAL QUALITY 2M FM RECEIVER MODULE . . . Ideal as an auxiliary monitor for the shack or to keep the XYL posted (perhaps not a good idea!), this kit comes complete with a single channel oscillator and a premium grade 11 element if ladder filter. The price of $69.50 includes predrilled fibreglass pcb, all components, if crystal, filter, instruction manual. Add $1 P & P. $69.50

ANT. ACCESSORIES

ME-UA UHF POWER METER $69
AS-GM gutter damps 2m $7.50
SH-7E lightning arrester $14.90
CO-AX 58u 45c per m
RB 2m mast amp (144-146 or 146-148) $32
Rotator – CDR ham II 240v $165.

Vicom have made available a frequency counter in the front window of the Auburn showrooms to assist mobile 2M FM rig owners in staying on frequency. Come anytime and tune your rig while parked at the curb.



SEE IT ALL AT VICOM!

MONITOR SCOPE. The YAESU YO-100 monitor scope can be interfaced with most transceivers and can cover a wide range of modes incl. RTTY. A two tone built-in generator at 1500 and 1900 Hz adds to the versatility. Price: S190.
YAESU frequency counter $250. Covers up to 200MHz max. sensitivity 20mV, hi-lo input impedance.

ANTENNAE

MOBILE WHIPS:
RM-80 Resonator for 80m. $18.50
RM-40 Resonator for 40m. $16.80
RM-20 Resonator for 20m. $13.50
BM-1 Bumper mount $13. Spring $13.
HY–GAIN
203BA 3el 20m beam $168
TH6DX 6el yagi 10-15-20. $225
TH3JR 3el yagi 10-15-20. $135
18AVT trap vertical 80-10. $90
14AVQ trap vertical 40-10. $65
VHF ANTENNAE
LINDENOW 2m 5/8 whip $21, base $2.60.
RINGO ARX-2 6db 2m gamma matched vertical, $35.
Extension kit to improve gain of the old AR-2, $12.

SAFETY MIKE

MICROPHONE HEADSET
for driving safety. $34

Vicom now have a range of suppression kits for the mobile enthusiast, including dc line filters, alternator and generator kits, ignition suppression kits and electroshield kits for the tough jobs.

Distributors

A.C.T.:	Andrew Davis, 32 Kalgoorlie Crescent, Fisher. Phone: (062) 88-4899.
QLD.:	DB Electronics, 21 Christine Ave., Miami. Phone: (075) 35-1798
S.A.:	Graham Stallard, 27 White Avenue, Lockleys. Phone: (08) 43-7981.
Geelong:	Phil Fitzherbert, Phone: (052) 43-6033.
Newcastle:	Digitronics, 188 Parry Street, Newcastle. Phone: (049) 69-2040.
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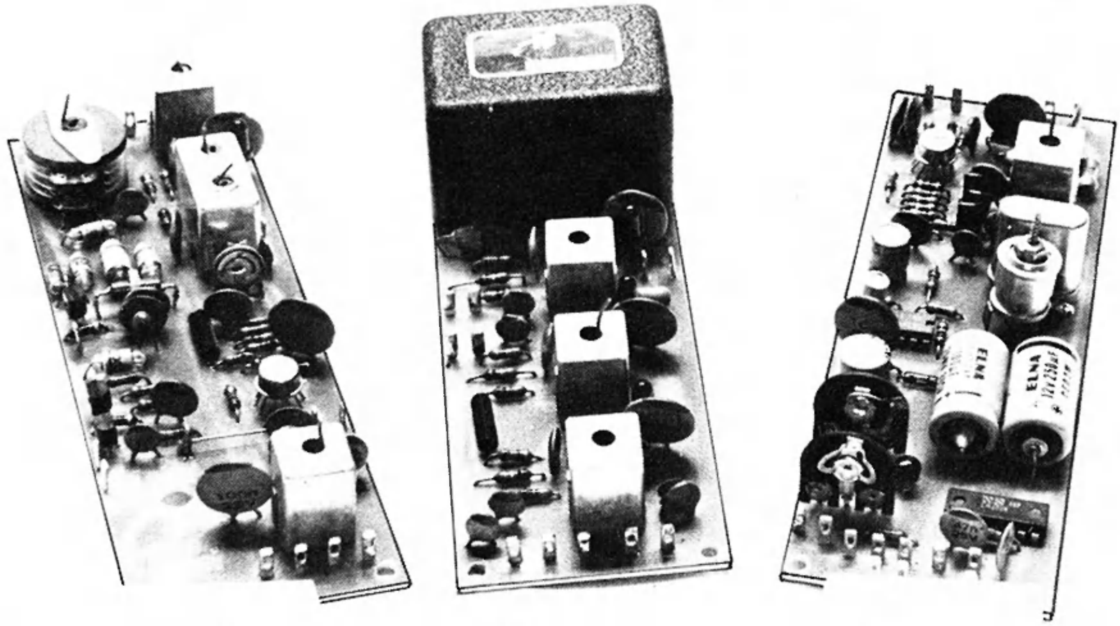


UNIT A UNIT B UNIT C

AMATEUR BUILDING BLOCKS

PART TWO

H. L. Hepburn VK3AFQ
4 Elizabeth St., East Brighton, 3187

Section 2—
DETAILED DESCRIPTION

In this section each of the modules, and the separate functions it contains, is described in detail. Circuit diagrams and component layouts are given as are the details for steering frequency determining circuits to the desired values.

2A — Unit A — RF AMPLIFIER/VFO/ MIXER/CRYSTAL OSCILLATOR

Figure 2 gives the circuit diagrams of the four on board functions while Figure 3 shows the placement of components on the board. Table 2.1 gives coil and capacitor data for the signal and IF circuits, Tables 2.3 and 2.4 detail the VFO tuned circuit constants while Table 2.5 gives representative coil data for the crystal oscillator.

(i) The RF Amplifier

The RF amplifier uses a dual gate protected MOSFET such as the Motorola MPF121, the Fairchild FTO501 or the RCA 40763 or any pin compatible electrical equivalent. Input is at low impedance via the link winding on L1, this latter coil being resonated by C1 for fixed tuning of narrow frequency ranges or by an external variable capacitor if a "peaking" facility is required or if a wide frequency coverage is sought.

Note that the *"cold"* (to RF) end of L1/C1 is returned to the source and not to earth as in the more conventional arrangements.

The source of the FET is maintained at a constant voltage of around 1.6V by using a light emitting diode as a low voltage zener. The gain of the stage is determined by the potential applied to gate 2 of the MOSFET.

With conventional biasing arrangements, using a decoupled source resister and/or resistive biasing of the gates, the voltage across the source resister falls as gain is reduced so that, even if gate 2 is connected directly to earth, there is still some residual gain because gate 2 cannot achieve a potential sufficiently negative with respect to the source to cut the stage off completely. This problem can be overcome by using a negative return rail for the gate biasing network but provision of such a negative voltage supply can be a problem if mobile work is contemplated. The arrangement used here is to fix the source voltage at approximately 1.5V by means of the LED/Zener so that if gate 2 potential is manually or automatically reduced to near ground potential there exists a sufficient differential between gate 2 and source to reduce stage gain to zero

The gain control voltage can be obtained manually by means of a resistor and potentiometer across the main HT supply or automatically from the AGC generator described in Unit C, or combined as shown in Figure 6.

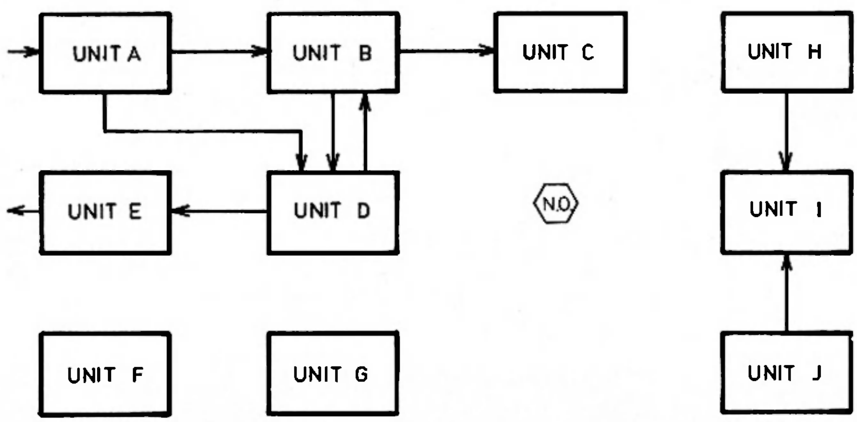


FIGURE 1 - BLOCK DIAGRAM OF MODULES

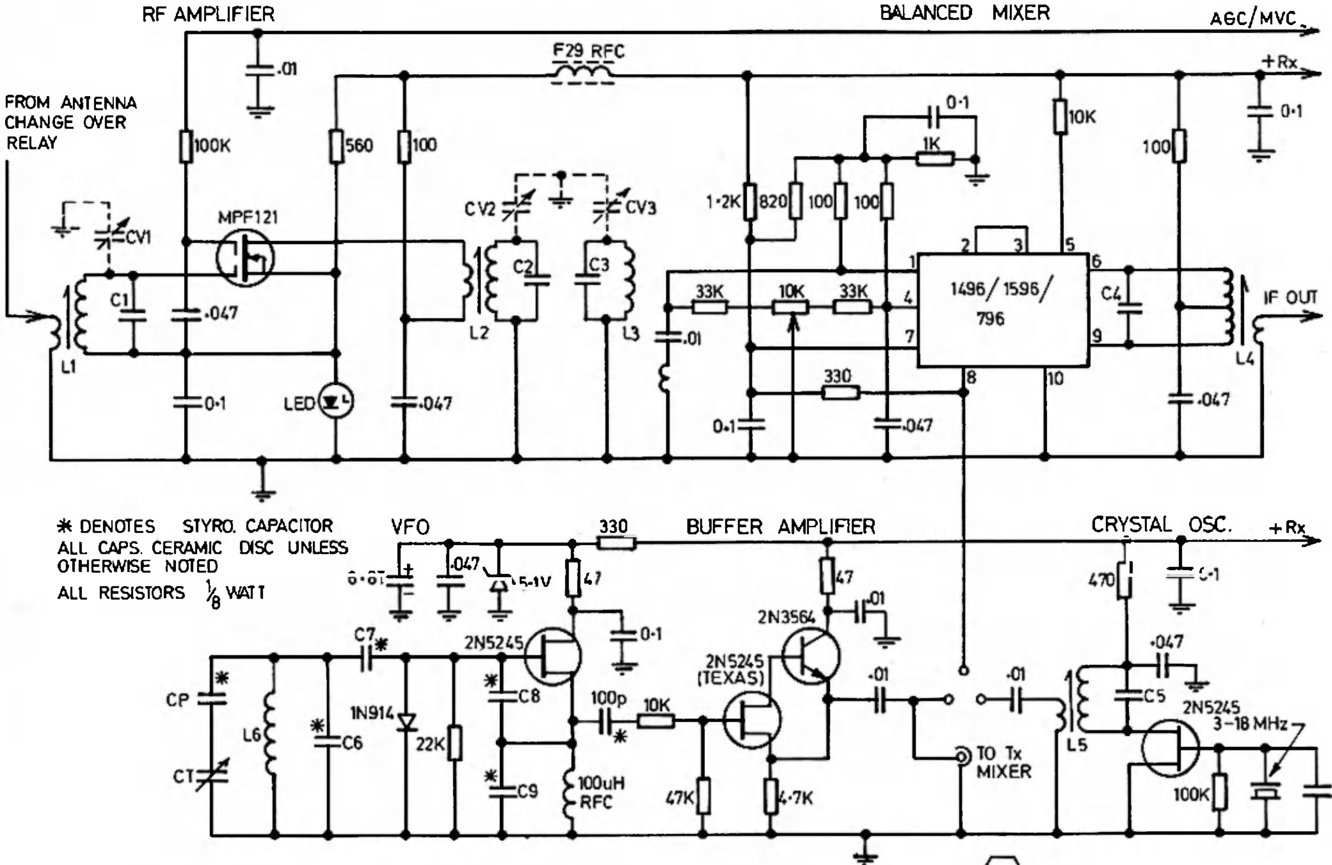


FIGURE 2 — UNIT A — CIRCUIT DIAGRAM

Since a dual gate MOSFET likes to see a low impedance drain load (it is only the gates which have high input impedance) link coupling is used to L2/C2. L2 is mutually coupled to L3/C3 and a further link on L3 provides the necessary low impedance output required by the signal ports of the balanced mixer.

(ii) The Mixer

The mixer is a Motorola 1496/1596 or its less costly Fairchild equivalent, the 796HC. Both are in TO5 10 pin packages. Other manufacturers market electrical equivalents that can be used provided they are pin compatible.

Oscillator feedthrough is minimal even with no variable balancing arrangement and there is no significant output at the fundamental of either input frequency. This characteristic makes for a clean, noise free output. The 10 k trimpot allows the device to be balanced for minimum oscillator feedthrough.

The output transformer L4 is bifiliar wound and is resonated by C4. A link wound over the centre of L4 provides a low impedance output.

As mentioned with respect to C1, both C2 and C3 can be wholly or partially replaced with an external variable capacitor if a "peaking" control is wanted or if a large signal frequency range is to be covered.

Coils L1, 2 and 3 are wound on Neosid 722/1 formers (obtainable from Neosid,

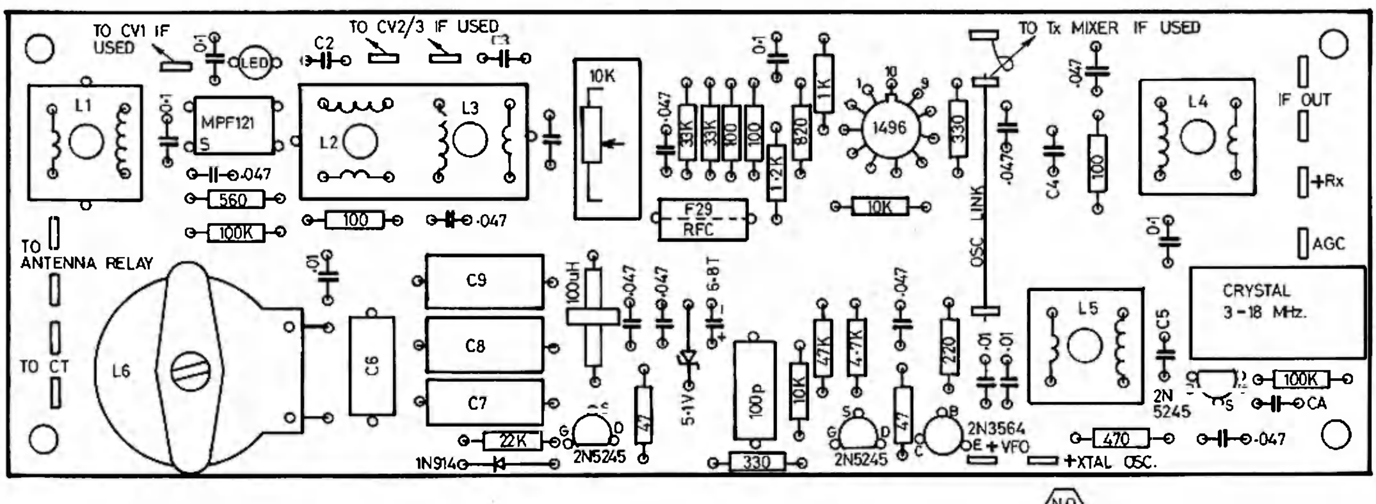


FIGURE 3 — UNIT A — COMPONENT LAYOUT

Dick Smith Electronics, WIA Components Committee and some supply houses) and use F16 or F29 self-locking tuning slugs. All coils use screening cans obtainable from the same sources.

L4 (at least at the higher IF frequencies) can also be wound on a Neosid former. However, at an IF of 455 kHz, the coil is a little difficult to wind and a standard 11 mm 455 kHz replacement type transistor broadcast transformer can be used instead. The PCB is laid to accommodate either type of coil.

If required, the RF stage and its associated components (including the 100 ohm HT decoupler and its associated 0.047 mfd capacitor) can be omitted. The drain end of the input link on L2 then becomes the antenna input and a wire across the two holes originally occupied by the 0.047 decoupling capacitor earths the other end of the link.

TABLE 2.1 — RF/MIXER COIL DATA

Freq. MHz	L1 - L5 Primary Turns	Link Turns	Wire Size A.W.G. En.	DIA. Ins.	Slug Type	C1-C5 pf
1.8	75	10	37	0.0045	F16	470
3.5	50	5	37	0.0045	F16	150
5.0	35	4	32	0.008	F16	150
7.0	30	3	32	0.008	F16	100
9.0	26	3	32	0.008	F16	100
10.7	20	3	32	0.008	F29	100
12.0	20	3	32	0.008	F29	82
14.0	20	3	32	0.008	F29	47
18.0	20	3	26	0.016	F29	47
21.0	20	3	26	0.016	F29	33
28.0	20	3	26	0.016	F29	15

Notes

(a) All coils close wound on Neosid 722/1 formers using specified American wire gauge (or closest SWG equivalent) enamelled wire.

(b) Links for L1, 2, 3 and 5 are wound over the "cold" or earthy end of the tuned winding.

(c) L4 is wound bifillar. For example, at 9 MHz L4 is two 13 turn windings or 26 turns total. The link is wound over the centre of the tuned winding.

(d) L4 for 455 kHz can be a centre tapped 10 mm broadcast replacement IF transformer.

(iii) The VFO

Using single conversion places some restriction on the VFO if reasonable stability is to be achieved and intermediate hetrodyning of the VFO to a high injection frequency is to be avoided.

Using the Amateur bands as an example, the following VFO ranges will be required for 160 metres through 15 metres at various IF frequencies.

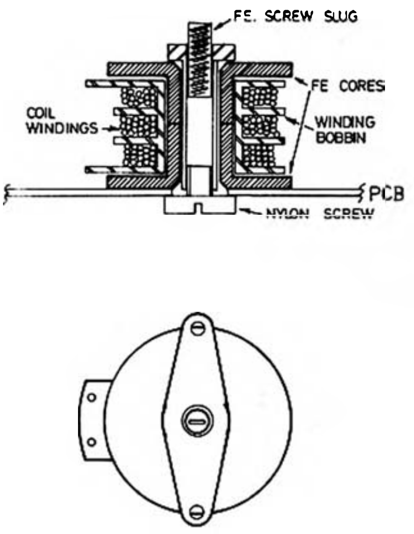


FIGURE 4
L6 COIL ASSEMBLY

TABLE 2.2

Band	Signal Frequencies MHz	I.F. MHz	VFO Frequency MHz
160	1.8-1.86	9.0	7.2-7.14
	"	10.7	8.9-1.84
	"	5.0	3.2-3.14
	"	0.455	2.255-2.315
80	3.5-3.7	9.0	5.5-5.3
	"	10.7	7.2-7.0
	"	5.0	1.5-1.3
	"	0.455	3.955-4.155
40	7.0-7.15	9.0	2.0-1.85
	"	10.7	3.7-3.55
	"	5.0	2.0-2.15
20	14.0-14.35	9.0	5.0-5.35
	"	10.7	3.3-3.65
	"	5.0	9.0-9.35
15	21.0-21.45	9.0	12.0-12.45
	"	10.7	10.3-10.75*

*To be avoided

Thus, in order to give as wide a choice of signal and IF frequencies as possible, the VFO circuitry used must enable frequency segments to be selected in the range 1.3-12.5 MHz. The circuit adopted is given in Figure 2 and component layout in Figure 3. Note that capacitors used in the oscillator proper (C6-C9 and the 100 pF output coupling capacitor) are styroseals and are so marked on the circuit diagram. The FET oscillator is a 2N5245 and has its collector supply regulated at 5.0 volts. The FET/Bipolar buffer provides both isolation and a very low output impedance. The Texas Instruments 2N5245 was used but other HF fets can be substituted provided they are pin compatible. The writer has used MPF102s and 2N3819s in this circuit but the board layout is specific to the TI2N5245 or the MPF102.

The coil form used is a Neosid (23-25 Percival St., Lilyfield, NSW 2040) Type A1 assembly. This assembly consists of a three section plastic winding bobbin enclosed in two mushroom shaped powdered iron shrouds. The core and shrouds fit over a threaded nylon cylinder containing a powdered iron tuning slug. The whole assembly is held together and to the PCB with a nylon bolt. See Figure 4.

The tuning capacitor CT is a 100 pF (nominal) variable. Either the Eddystone Type 585 or Jackson Brothers Type C804/100 pF are very suitable and are stocked by William Willis (77 Canterbury Rd., Canterbury, Vic. 3126).

The capacitor swings required to cover the Amateur bands are given in Table 3 and a styroseal capacitor (CP) is used to restrict the tuning range to that required. Note that both tuning capacitor and series padding capacitor are not on the PCB but should be firmly mounted close to it and the inter-connects kept as short and stiff as possible.

Table 4 gives the VFO coverage to be expected using various coil windings and resonating capacitors. This data will be useful if either a wide signal frequency range or frequency segments other than the amateur bands are of interest.

(iv) The Crystal Oscillator

To increase the flexibility of Unit A, on board provision is made for a simple FET crystal oscillator. It uses fundamental mode parallel resonant crystals. The board layout allows for either Style D or Style K

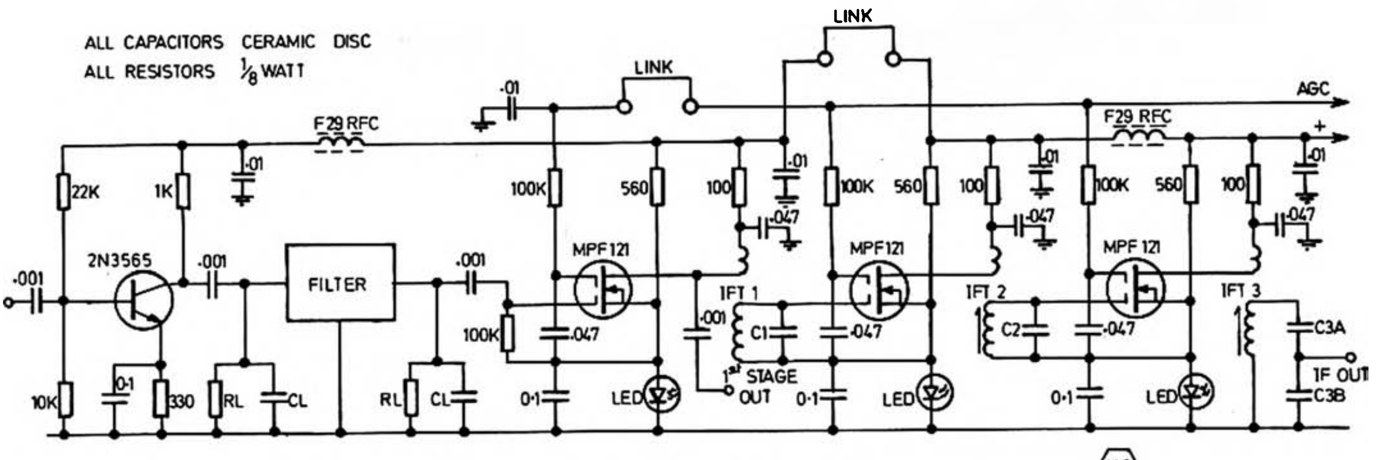


FIGURE 5 — UNIT B — IF FILTER AND AMPLIFIERS

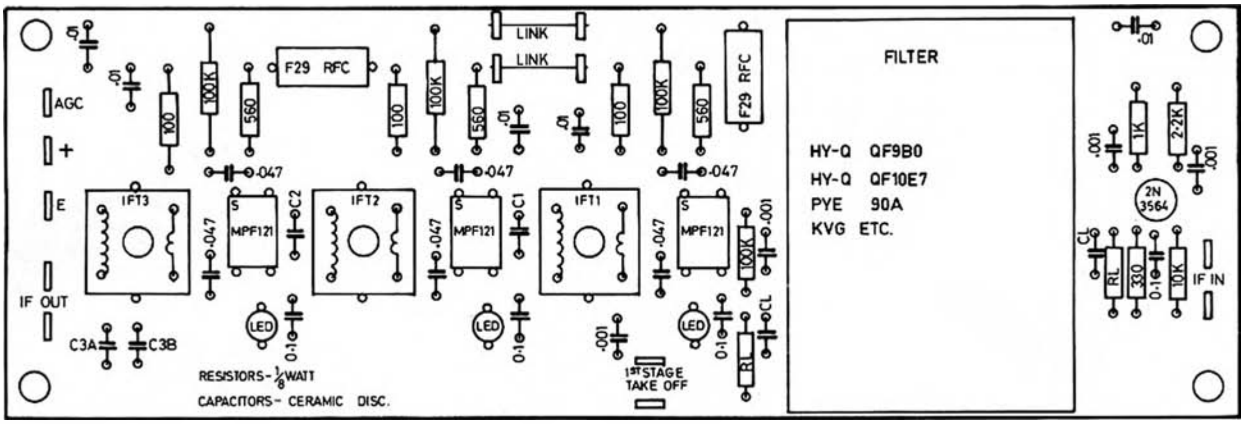


FIGURE 6 - UNIT B - COMPONENT LAYOUT

crystals and a fixed capacitor (CA) for fixed adjustment to the crystal frequency. CA may be replaced by a 3/30 pF trimmer for more precise adjustment of the crystal frequency if so desired.

L5 is resonated with C5 at the crystal frequency and the output link coupling uses, to the nearest turn, one eighth of the number of turns on the tuned winding. Representative coil/capacitor data is given in Table 2.5 below.

Having provision for a crystal oscillator means that the module can be used as an HF converter, the VFO not being used. Alternatively, both VFO and crystal oscillator can be used to provide tuned or fixed frequency operation of a receiver or transmitter. A third possibility is to use both VFO and crystal oscillator in Unit A, mix them together in the signal frequency mixer of Unit D (described later) to provide the higher injection frequencies needed to cover, say the 28 to 30 MHz band.

TABLE 2.5 — REPRESENTATIVE DATA FOR L5/C5

Crystal Frequency MHz	L5 Turns	L5 AWG	Core	C5
3	30	32	F16	330
6	30	32	F16	150
9	28	32	F16	100
12	20	32	F29	100
18	20	26	F29	47

2B — Unit B — SSB/CW/AM IF AMPLIFIER

The circuit diagram is given in Figure 5 while the component layout is given in Figure 6. Table 2.6 gives coil data.

A 2N3564 input stage is used primarily to provide an impedance match to the input of the filter. The stage does give a voltage gain of 2 or 3 at 9 MHz and somewhat more at 455 kHz.

Output from the filter is amplified by a three stage discrete component amplifier using MPF121s or equivalent dual gate MOSFETS. The three stages are identical and are AGC controlled.

As in the case of the RF amplifier in Unit A, the sources are kept at a constant voltage by using a LED as a low voltage zener and the signal gate returns being made to source and not directly to earth. Since this system allows stage gain to be reduced to zero by taking gate 2 to near earth potential, the AGC action is very much enhanced and is known to be in excess of 120 dB.

An offtake is provided from the drain of the first MPF121 to allow a double sideband signal from a balanced modulator to be amplified and stripped of one sideband before passing to a subsequent mixer to produce a signal frequency SSB output. Suggested off board switching to do this is given in Figure 4.

The PCB is laid out so that most of the popular filters on 5.0, 9.0 or 10.7 MHz can be used. The Hy Q filters type QF9BO (9 MHz) or QF10E7 (10.7 MHz) are available from their Australian makers at 10-12 Rosella St., Frankston, Vic. 3199 or their interstate agents. The board will also accept the KVG range of filters which are advertised in local journals as being available from overseas. Other filters such as the (now discontinued) Pye 90A will also fit the PCB but the Collins 455 kHz range of mechanical filters are too long to fit the board unless mounted vertically.

The two resistors marked RL and the two capacitors marked CL are normally specified by the supplier. The HyQ QF9BO requires terminating impedances of 500 ohms and 30 pF. The 1000 ohm collector load of the 2N3564 first stage is effectively in parallel with the input of the filter so that the actual value of RL put on the board will be 1000 ohms and CL will be 30 pF minus circuit strays or say 22 pF. The output CL will also be 22 pF but the output RL will be 650 ohms. Other terminating R and C values can be established bearing these points in mind. If a 455 kHz Collins mechanical filter is used both input and output CL will be 120 pF, no output RL will be needed and the input RL will have to be put IN SERIES with the 1000 pF coupling capacitor and not between filter input and earth.

For 5.0, 9.0 and 10.7 MHz IFs the interstage transformers may be wound on Neosid 722/1 forms. Coil and capacitor data is given in Table 2.6. For a 455 kHz strip, use may be made of either 7 mm or 11 mm replacement type transistor broadcast transformers. Those having a low impedance output link (i.e., white or yellow codes) are suitable. The PCB is laid to accept all three coil types.

If a commercial unit on 455 kHz is used for IFT 3 then it will have to be modified by removing its internal resonating capaci-

TABLE 2.3 — VFO CONSTANTS FOR AMATEUR BANDS

Band	Signal Freq. MHz	IF MHz	VFO Freq. MHz	L6 Turns	L6 AWG	CT	CP	C6	C7	C8	C9
						Capacitance in pF					
160	1.80-1.86	9.0	7.2-7.14	9	22	100	22	120	100	680	330
80	3.50-3.70	9.0	5.5-5.3	9	22	100	33	270	100	680	330
40	7.00-7.15	9.0	2.0-1.85	24	22	100	330	150	330	1000	1000
20	14.00-14.35	9.0	5.0-5.35	9	22	100	150	270	100	680	330
15	21.00-21.45	9.0	12.0-12.45	6	22	100	33	100	100	330	180

TABLE 2.4 — VFO CONSTANTS FOR WIDE TUNING RANGES

VFO Frequency Coverage MHz	L6 No. Turns	L6 AWG	CT (Roblan)	CP	C6	C7	C8	C9
				Capacitance in pF				
1.5-2.4	24	22	10-415	Nil	47	330	1000	1000
2.0-3.3	18	22	10-415	Nil	47	330	1000	1000
3.1-4.8	12	22	10-415	Nil	47	330	1000	1000
4.3-8.5	9	22	10-415	Nil	47	100	680	330
6.5-14.0	6	22	10-415	Nil	47	100	330	180

Notes

(1) Coil turns equally distributed in all three coil former sections.
(2) For wide band tuning C6 can conviently be a 60 pF trimmer.
(3) Coil inductance adjustment allows correction for normal capacitor tolerances.

tor and noting its value (usually 330 pF). The next highest value in the preferred range is entered on the board at C3A and a capacitor having about 8-10 times the value of C3A placed at C3B. It may be necessary to trim C3A a little if the tuning core will not peak the signal.

The chokes marked "F29" are simply Neosid 12 mm F29 tuning slugs with a single wire passing through the central hole. Output at low impedance is taken from the junction of C3A and C3B.

In conjunction with the product detector AGC and audio of Unit 3 the IF strip has a measured sensitivity of 3 microvolts for a discernible CW signal. Its AGC range is in excess of 120 dB.

TABLE 2.6 — COIL DATA

	IFT 1, 2, 3				
Frequency MHz	Primary Turns	AWG	Link Turns	C1,2,3A pf	C3B pf
5.0	35	32	9	150	1500
9.0	25	32	7	100	1000
10.7	25	32	7	68	680

Notes

(a) All coils are close wound on Neosid 722/1 formers.

(b) Links are wound over the cold or earthy ends of the tuned windings.

Section 2 — Unit C — AM/SSB/AUDIO/AGC

Figure 7 gives the circuit diagram covering all the functions available, while Figure 8 gives the component layout on the 6 in. x. 2 in. PCB.

Note that only those functions required need be incorporated, the components associated with unused functions simply being omitted.

Each on board function will now be separately described.

(i) AM Detector

A simple voltage doubler type of detector uses two germanium diodes. IF is fed to the diodes via the 0.1 capacitor and the demodulated output appears across the 22 k load resistor. This resistor is decoupled for RF, but not for audio, by the 100 pF capacitor in parallel with it. An 0.1 mfd capacitor takes the resulting audio to output on the PCB.

(ii) The Product Detector

A Motorola 1496/1596 or Fairchild 796HC TO5 IC is used in a configuration suggested by the manufacturers save that the biasing has been modified to allow a single HT supply rail to be used. Oscillator input is fed to pin 8 of the IC while the SSB or CW signal from the IF strip is fed to pin 1. Note that both these entry ports require a low impedance source. Oscillator input Vernier balancing is not used, approximate (and sufficient) balance being provided by the circuit shown. Audio output is well filtered before being applied to a 741 op amp.

As shown the 741 has a gain of just under 50 in order to supply sufficient drive to the AGC rectifier diodes. This order of amplification is in excess of that required to drive the LM 380 audio chip so that a dropping resistor is used in series with the 10 k audio volume control. The value of this dropping resistor is shown as 47 k in the circuit diagram but can be varied to suit other audio amplifiers, or other conditions, should it be necessary. The value of this resistor can be in the 10 k to 100 k range.

(iii) The BFO

This is a simple FET oscillator with provision for adjustment of the crystal oscillating frequency on to the correct portion of the filter slope. Either a USB or LSB crystal can be used but not both, unless external crystal switching is used. L7/C7 are resonant at the crystal frequency and coil and capacitor data are the same as those given in Table 2.6 except that the link coupling is about one eighth of the number of turns on the tuning winding.

Provision is made on the board for a separate BFO oscillator offtake so that its output can be used elsewhere — say, for example, to feed the transmit mixer of Unit D and/or the logic of a digital dial.

(iv) The AGC Generator

The full output from the 741 audio pre-amplifier is taken via the 0.1 coupling capacitor to a voltage doubler rectifier using two germanium diodes. The DC resulting from the rectification of the applied

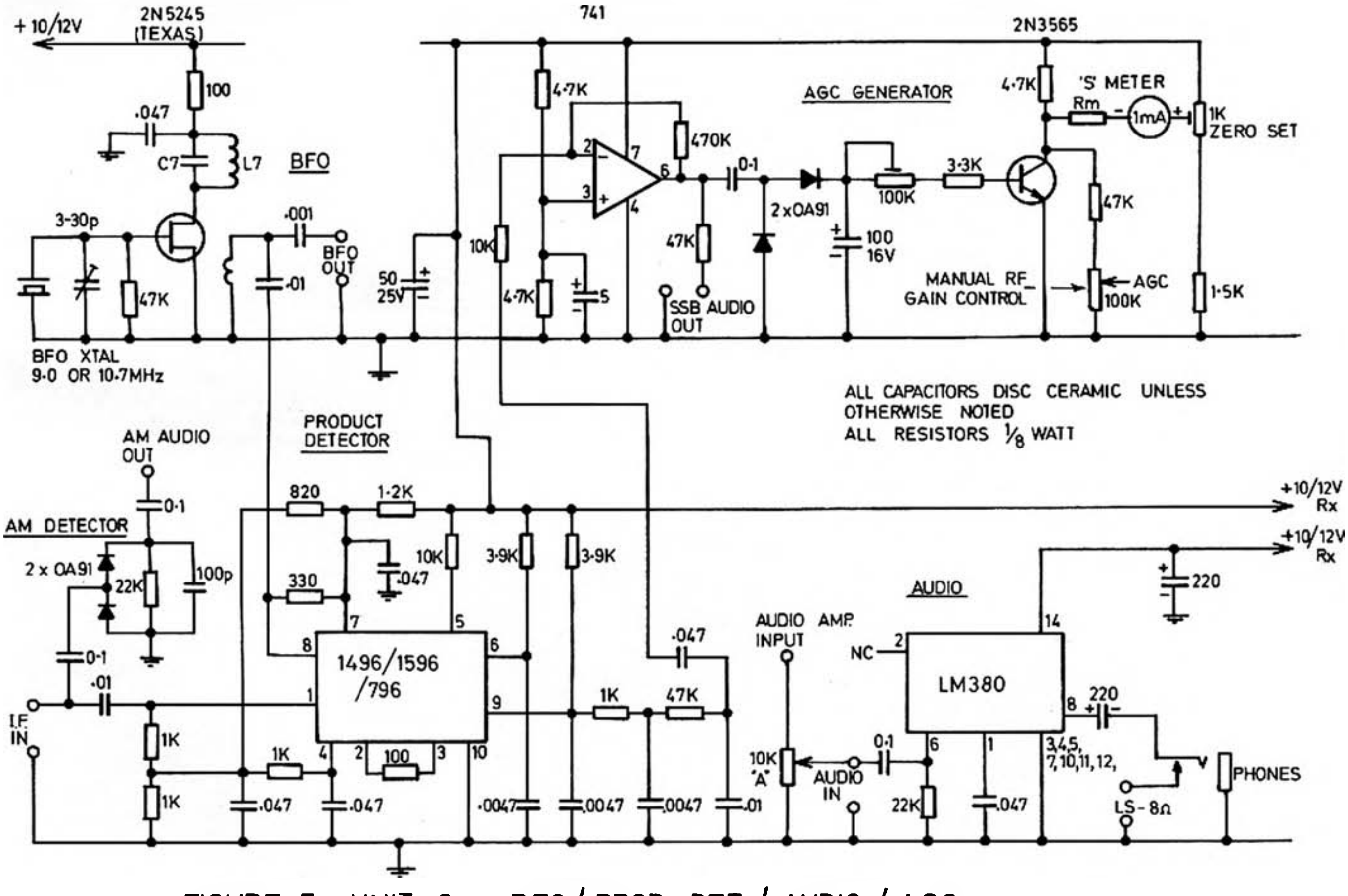


FIGURE 7 — UNIT C — BFO/PROD DET/AUDIO/AGC

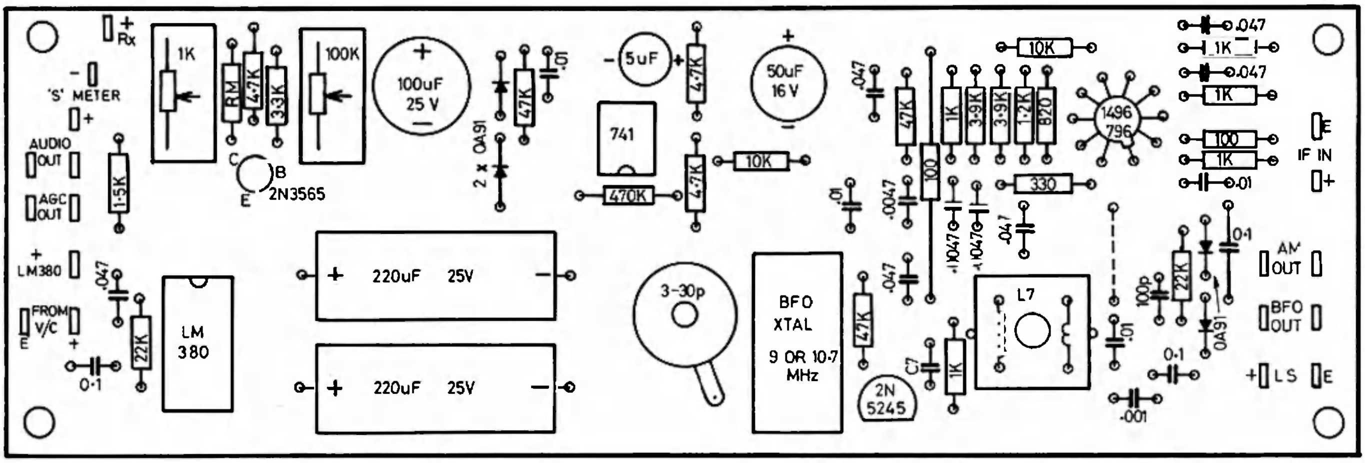


FIGURE 8 — UNIT C — BFO/ DETECTORS / AUDIO / AGC — COMPONENT LAYOUT

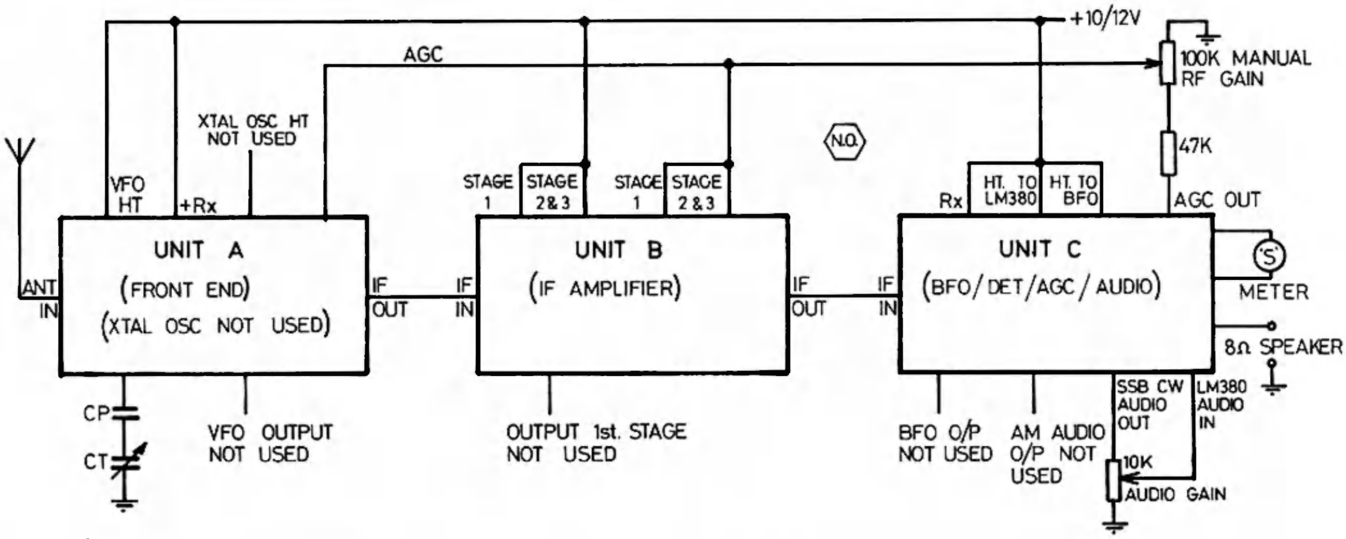


FIGURE 9 — CONNECTIONS FOR SINGLE BAND SSB-CW RECEIVER

audio is used to charge up a 100 mfd capacitor. The low impedance output of the 741 allows the capacitor to be charged quickly when the generator is *"hit"* with a sudden large signal and thus has a *"quick attack"* characteristic.

The charge on the capacitor is applied through a 100 k trimpot direct to the base of a 2N3565 transistor whose emitter is earthed and which has a 4.7 k collector load.

With no charge on the capacitor (i.e., no audio signal present) the 2N3565 is switched off and its collector assumes a potential near to the HT supply. The AGC line is taken from the collector so that the RF and IF controlled stages are at maximum gain.

When a signal appears, rectified DC progressively switches the transistor on, thereby causing the collector to assume a lower potential and thus reducing the gain of the controlled stages.

When the audio signal is removed (or varies) the 100 mfd capacitor discharges through the 100 k resistor and the emitter/base function of the 2N3565 giving a "slow decay" characteristic to the AGC. Note that with all of the trimpot in circuit the decay time is around 10 seconds. This decay time can be varied downwards by adjustment of the trimpot. With the trimpot out of circuit and only the 3.3 k fixed resistor in circuit the AGC decay time is a fraction of a second.

(v) **S Meter**

A 1 mA meter movement is used in a bridge circuit to indicate the voltage on the AGC line and thus the strength of the received signal. Resistor RM in series with the meter will vary according to the meter movement used but 4.7 k is a good starting point.

With no signal applied, the 1 k trimpot is adjusted to give a zero meter reading. RM is then chosen so that the meter reads, say, 70 per cent full sacle on what is judged to be an S9 signal. Or, of course, it can be chosen to give a meter reading that is socially acceptable to DX contacts!!

(vi) **The Audio Output Stage**

An LM380 IC is used to drive an 8 ohm speaker. Output will be dependent on the HT supply but at 10 volts around 500 mW can be expected at full drive. The HT feed point is kept separate so that a higher supply voltage than that used elsewhere in the module can be used to provide more audio output should it be required. However, at the lower supply voltages the chip needs no cooling and its current demands are not excessive.

The three modules so far described can be combined to make a single band SSB/CW receiver. Figure 9 shows the interconnections needed to do this.

Sensitivity is typically 0.2 micro volt for a very readable CW signal or a marginally readable sideband signal. AGC control is excellent and no problems have been encountered with the (average) 200 watt PEP signals put out by the dozen or so amateurs active on 20 metres who live within a mile radius of the writer's QTH.

Part III will describe the modules necessary to convert a single band SSB receiver into a single band SSB 25/30 watt transceiver. ■

Commercial Kinks

with Ron Fisher VK3OM

3 Fairview Ave., Glen Waverley, 3150

LET'S KEEP IT CLEAN!

No, I am not going to relate a few doubtful jokes; instead I think it's time we took a look at methods of cleaning up the dirty appearance of that pride and joy transceiver sitting over there on the bench.

It seems to be a sad fact of amateur life that our friend the average amateur operator never bothers to clean his rig. Mind you, he probably cleans his car with great care every weekend.

Deterioration in appearance of a modern amateur rig is a slow but sure process, much faster if you happen to be a smoker. Incidentally, having looked at dozens of receivers, transceivers and transmitters over the years, there is no doubt that a smoking amateur will have more trouble with his gear than his non-smoking compatriots. The by-products of cigarette smoke will firstly discolour the front panel, fog up the dial and meter faces, and finally work their way into valve sockets, relay contacts and even into the bearings of VFO tuning capacitor. It forms a sticky coating over valves and, in conjunction with dust, forms a substance that will reduce the efficiency of a final stage to a marked extent.

However, let's start at the beginning; the microphone. If you use a typical curly-cord type push-to-talk microphone, possibly the cord has stretched so that it is now a series of elongated curves instead of its original shape. First clean the cord with warm soapy water and an old soft tooth brush. Even if you are a normally clean type, the amount of dirt that comes off will amaze you. Now just rewind the cord back on its self turn by turn. This will re-tension the cord to like new condition. Incidentally, this operation can be carried out several times before the cord finally has to be replaced. As for the microphone, remove the insert and wash the case in soapy water, again using an old toothbrush to remove the dirt from all corners.

Now to the set. Remove the cabinet. Once again we will use the soapy water method but this time use a soft nail brush. This is very effective on crackle finish surfaces as even in very clean surroundings, dust will settle in to the minute indentations of the surface. Often a good wash is all that is needed to restore the finish to its original condition; however, if you are the fussy type, apply a small quantity of wax and brush it up with a white shoe type brush. One of the many aerosol furniture polishes such as *Mr Sheen* are easy to use. Now, if the cabinet has a smooth finish such as you find on Yaesu equipment, the lustre can be restored with an application of one of the auto polishes with a slight cutting action. Even one of the mild brass polishes is good. Finish off with wax and polish with a soft cloth.

For dusting the chassis and the components on it, a small paint brush is ideal. If you happen to have a harmonic at kindergarten, the round paint brushes used there fit well between closely packed parts. If the dust will not yield to a dry brush, apply a little carbon tetrachloride or some contact cleaner. If you have compressed air available, or even a blowing attachment for your vacuum cleaner, it is great for blowing dust from variable capacitors and other nooks and crannies.

The front panel is best attacked by removing the knobs and then cleaning with applications of spray wax, then finishing with a soft cloth. The knobs are often the dirtiest part of the front. While they are off, soak them in warm soapy water for a few minutes and then use the old tooth brush to remove the dirt.

While you have the knobs off it's a good time to check that the nuts that hold the various controls to the front panel are tight. If you carry out the above procedure every twelve months at least, it might save you buying a new rig—the old one will look too good. It will also improve the resale value to quite a marked extent. Try it and you will be delighted. ■

Newcomers Notebook

with Rodney Champness VK3UG

44 Rathmullen Rd., Boronia, Vic., 3155

BELONGING TO THE WIRELESS INSTITUTE OF AUSTRALIA

Should you belong to the WIA? Some will say — belong to that organisation? — not on your life; others will say that not to belong is sacrilege, you're letting the side down. Some people are very anti-Institute without cause, using a manufactured reason/excuse. There are others equally biased to the other extreme who believe that the Institute can do no wrong, and refuse to listen to reasoned argument about the deficiencies of the WIA.

It should be most apparent that with lack of willing people on Council, or on various committees, the system is not working as it should or could.

If you, as a newcomer, think that you have no right to stick your nose into the affairs of the Institute how wrong could you be. As a newcomer your view could be just what is wanted to get some line of action going in the right direction. Sometimes, if we have been close to something for a long time, we do lose our ability to be objective. We get in a rut and the system runs down. This is one of the reasons that some people use for not joining the Institute, or WIA or whichever term you wish to name our organisation. It is not a good reason to say "I won't join the Institute, because they do this that and the other wrongly". You should get in there and *CORRECT* what you think is wrong or at least give it a good try.

Many people ask, "What is there in the Institute for me?" If you are prepared to do nothing, ultimately there will be nothing for you — for instance possibly no bands to operate on. How come, you say. Simple. If you don't support the WIA, with its evident faults notwithstanding, we as a country will not have representation at Geneva in 1979. The commercial concerns — ever hungry for new frequencies to exploit — will be there and they will have done their homework well, and may be able to prove that the amateur bands are not being used, and that they (commercials) can use them *VERY* effectively. Is that what you want? If so, don't belong and don't help, and in a few years your expensive gear will have no value because you will not be able to use it.

There are many other reasons for belonging to the Institute not the least being that you receive the best amateur radio magazine in the Southern Hemisphere.

There are many other benefits not quite so obvious. Okay, you say. Why preach to me. Well, there are as many non-members as members, so why not try and get your friends to join. After all, why should they reap the benefits of what you are paying for, when it could mean that your subs could be lower for one thing.

I am most critical of some aspects of the operation and aims of the Institute, but you will notice I am still a member.

NOVICING

As I write this at the end of June, the Novice Amateur Examination has not been held — to the disappointment of 832 candidates throughout Australia — according to the Institute insert. No news at this time as to when the initial exam will take place, but possibly it will have taken place by the time this appears in print. In retrospect it may have been a welcome delay for some so that they could get their morse code up to scratch — the sample theory paper looks fairly simple so that may not be a worry to many, and the regulations exam is of the normal standard.

A 10 WATT NOVICE TRANSMITTER FOR 3.5 MHz

The series of articles on the novice transceiver will probably commence next month. The transmitter is described over two parts; the first part is the RF section complete to the point of operating on CW. It has a single valve, a 6GV8 a television vertical section type, with the triode as a Pierce oscillator feeding into the pentode as a class C power amplifier. For operator convenience the transmitter uses a semi-break-in method of keying — in other words as soon as you work the key the transmitter goes onto transmit cutting off the receiver; and when the key is released the transmitter changes back automatically after a short period to stand-by with the receiver operating. This is a much less tedious method of changeover than mechanically operating a switch. This requires

the use of two small transistors and a few minor parts. The transmitter is wired ready for the fitting of a modulator which is described in the second part.

The modulator uses a 6AU6 as the microphone amplifier and a 6BQ5 as the modulator valve. The circuitry is arranged so that the speech bandwidth is only from about 300 to 3000 Hz, with modulation over 100% in the upward direction and less than 100% in the downward direction — this stops splatter without dropping the effectiveness of the transmitter. Press to talk has been included for convenience and works in with the CW semi-break-in system. All the switching for the AM/CW changeover is included in the first part of the transmitter description. No power supply is shown in these articles, although a suitable one will be described at a later date. Power supplies generally are not a very complex item of equipment.

GENERAL

Very recently *David Down* received good news — he has passed his full amateur ticket — congratulations David. Incidentally, David is a relative newcomer. He also runs a Radio Club with a friend in one of the southern suburbs of Adelaide. David's address, for those who wish to write to him direct on matters pertaining to this column, particularly on those sections he has written, is as follows: *17 Brodie Crescent, Christies Beach, 5165*. There will be more of David's articles in the near future.

Thank you to those amateurs, amateurs to be and short wave listeners who took the time to write to me about the queries I had in the June issue of AR. Wherever possible the suggestions will be acted upon.

Are you looking around for a Novice transmitter or a Novice transceiver? Some of the old ex-service transmitters and transceivers may fit the bill — although you may need a bit of help to get them going properly. The following sets fit the bill for 3.5 MHz with little modification: No. 122, 3BZ, No. 109, Type A Mk3, Type 3 Mk2, ATR2 and No. 62. I am not saying that all of these sets are marvellous, but they require little modification if any. The following sets require modification for crystal control as well and are: No. 11, No. 19, No. 22, No. 22 English, FS6. These sets would have to be cheap to make it worthwhile. Other sources of transmitters and transceivers will become apparent as time goes by and I will endeavour to point you in the right direction. See you next month with the first part of the Novice transmitter. ■

Contests

with Jim Payne, VK3AZT

Federal Contest Manager,
Box 67, East Melbourne, Vic., 3002

CONTEST CALENDAR

AUGUST
- 9-10 European CW
- 16-17 Remembrance Day
- 23-24 All Asian CW
- 30-31 Seanet Worldwide Phone & CW

SEPTEMBER
- 13-14 European DX phone
- 20-21 Scandinavian CW
- 27-28 Scandinavian Phone

OCTOBER
- 4-5 VK/ZL Oceanic Phone
- 11-12 VK/ZL Oceanic CW
- 25-26 CQ WW DX Phone

NOVEMBER
- 8-9 European RTTY DX
- 29-30 CQ WW DX CW

REMEMBRANCE DAY CONTEST

As this was written before the rules for this year's RD Contest have been published I can only hope that by the time you, the contestants, read this at least 1,000 of you will have decided to spend some time on the air during the weekend of August 16/17 and subsequently send in a log. Collectively you will send a lot of paper to Box 7, East Melbourne so please take special care to prepare a face sheet as requested and attach it to your log. Last year quite a number of face sheets were omitted and this makes a great deal more work for the FCM. For example, if the section for which you have entered is not shown, i.e. phone, CW or open, each RST report may have to be perused to find out the section for which the log is entered. It will also be of great help if entrants who operate exclusively on 52 MHz and above will indicate this on the front sheet. Finally, good luck to you all and may the sun have the measles during this weekend.

ALL ASIAN DX CW

1000 GMT Aug 23rd to 1600 GMT Aug 24th

All bands 1.9 to 28 MHz. The contest call is CQ AA for non-Asian stations, CQ Test for Asian stations. OM stations exchange RST and operator's age. YL stations give RST and OO. Scoring is one point for each Asian station (except KA). Multiplier is number of different Asian prefixes worked on each band, using the WPX rules. Contacts between non-Asian stations do not score. Final score is sum of the contest points on each band multiplied by sum of multipliers on each band. The highest scorer in each continent will get a medal and certificate from the Minister of Posts and Telecommunications of Japan. Logs must reach JARL, Box 377, Tokyo Central, Japan, before 30th Nov., 1975. Results should be known about April 1976.

The following are countries in Asia:

A4X (Sultanate of Oman)	U18/UK8A-G.I.L.O. T-Z
A51 (Bhutan)	UJ8/UK8J.R
A6X/MP4D (United Arab Emirates)	UL7/UK7
	UM8/UK8M.N.
A7X/MP4Q (Qatar)	VS6
A9X/MP4B (Bahrein)	VS9M/8Q6
AC3 (Sikkim)	VU
AP (West Pakistan)	VU (Andaman & Nicobar Is.)
BV	
BY	VU (Laccadive Is.)
CR9	XU
EP	XV/3W8
HL/HM	XW8
HS	XZ
HZ/7Z	YA
JA/JE/JF/JG/ JH/JI/JR	YI
	YK
JD1 (Ogasawara Is.)	ZC4/5B4
JT	4S7
JY	4W
OD5	4X/4Z
S21 (Bangladesh)	7O (South Yemen)
TA	7O/VS9K (Kamarn Is.)
UA/UK/UV/UW9-0	8Z4
UD6/UK6C, D, K	9K2
UF6/UK6F, O, Q, V	9M2 (West Malaysia)
UG6/UK6G	9N1
UH8/UK8H	9V1
	1S9 (Spratly Is.)

A copy of the results will be sent to you if you enclose a self-addressed envelope and a reply coupon with your log. Reply coupons can be purchased at Post Offices.

MARTS SEANET WORLDWIDE CONTEST 1975

001 GMT 30th August to 2359 31st August

Information about this contest arrived from "Eshee" 9M2FK and the cover bore an instruction: "Smile B4 opening — Open B4 reading — Read B4 answering — Answer B4 long". One of the aims of the contest is to publicise the 5th SEANET CONVENTION to be held in Kuala Lumpur from Nov. 7-9, 1975. The contest is being held on Aug 30/31 which is Malaya's Independence Day. Phone or CW (no cross mode) may be used on all bands 160 thru 10 metres. Contest call is "CQ Seatest" for phone and "CQ Sea" for CW. Usual RS/T and QSO numbering.

Contestants in SEANET area (includes VK) score 1 point for contacts with other SEANET stations (except other VKs) and 2 points for contacts outside SEANET area. VK contestants use a multiplier of 3 for each country outside SEANET and 2 for each country within SEANET.

A separate log is required for each band and a summary sheet showing Band, Number of QSOs, Points, Multiplier and score. A description of the station and antenna is required together with the usual certification.

The highest VK scorer will receive a commemorative certificate of the 5th Seanet Convention. Worked All Malaysian Areas Award can be claimed by sending in a separate log sheet covering the required number of contacts i.e. ten 9M2, ten 9V1, one 9M6, one 9M8 and one VS5. Logs etc. to reach MARTS SEANET CONTEST CTEE, 201-C Jalan Pekeliling, Bukit Glugor, Penang, Malaysia, not later than 30th September. Results will be announced Nov. 8th.

Only one contact per band with the same station is permitted.

SEANET AREA COUNTRIES

A4, A51, A6, A7, A9, AC3, AP, BV, CR9, DU, EP, HL/HM, HS, JA etc., JD1, JY, KC6, KG6, KH6, KX6, P29, S21, VK, VQ9, VS5, VS6, VS9K, VS9M/8Q6, VU2, VU (Andaman, Nicobar and Laccadive Is.), XU, XV5, XW8, YB, YJ8, ZL, 3D2, 3B6, 3B8, 4S7, 4W1, 5Z4, 9M2, 9M6, 9M8, 9K2, 9N1 and 9V1.

EUROPEAN DX PHONE

0000 GMT Sept 13 to 2359 Sept 14th

See details as given for European CW in Amateur Radio, July, 1975. ■

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

The Editor,
Dear Sir,

This is International Women's Year, but where are all the VK YLs? It is elating to be told,

"You are my first VK YL", but this turns to embarrassment when asked,

"How many Australian YLs are there? We never hear them".

Well, where are they? We know they exist, so ladies show your faces.

Compare Australia to USA, New Zealand, or Germany — these countries have very active YL groups. They have YL clubs, special certificates for working YLs eg. DVCCYL, WACYL, and WARO awards, OM/YL contests, and special notes in amateur radio magazines.

What do we have to boast of — nothing! We don't even know how many YLs there are in Australia.

So ladies let us get together and do something to increase YL activity and interest in amateur radio. Let us at least know you exist, whether you have a call or not.

Here is a list of the YLs we know of (mainly with reference to the call book). Can you help us upgrade it.

VK1—YL.
VK2—HD, MI, MR, SU, AIA — Murial, APR, AOK — Hebe, BSB — Susan, AXS — Mona, BYL — Wendy.
VK3—HQ, KS — Mavis, KT — Brenda, VB — Clarice, YL — Austine, ADT, AGO, AYL — Norma, BAK — Vi, ZYX — Dawn, ZYL — Rhonda, BJB — Joan.
VK4—EQ — Evelyn, VV — Linda.
VK5—LM — Lorraine, YL, YW — Merna.
VK6—MH.
VK7—YL, LY — Anne, ZA.

Some further suggestions — how about our own VK YL award and a net ragchew session.

To the OMs, don't think this does not concern you. Give the ladies a go, encourage them to be interested in the hobby, let them know there are other ladies to talk to, invite them into the shack to have a little ragchew or at least a listen.

In conclusion to all, please help us let the world know we have women interested in radio. If you have some suggestions of how this can be done please let us know. All ideas are welcome.

73s, 88s, 33s (where appropriate)
Norma VK3AYL, Rhonda VK3ZYL,
SWLs Irene and Jenny.

The Editor,
Dear Sir,

Last week thirteen amateurs formed a local net in Sydney on the 10 metre band. 28.500 MHz was established as an all modes CW, AM, SSB calling channel for mobile, handheld and base station operators.

28.100 MHz was allocated as a secondary net so as to allow 11 metre novice operators who obtained their full licence to use both the 11 and 10 metre bands with little modification and no loss of their existing 11 metre band coverage.

These nets were situated so that not only local but also International contacts could be promoted.

In Sydney there are now two HF calling channels in use. The idea is, when you are in the shack, tune your HF set to monitor one of these channels. On 11 metres there is 27.125 MHz for all modes. On 10 metres 28.5 MHz is primary and, for those wishing to add 10 metres onto their 11 metre transceiver, 28.1 MHz is encouraged. Shortly, it is hoped that details of a third all-mode Sydney calling channel for 1.825 MHz in the 160 metre band will be available.

Amateurs in Sydney would like to encourage amateurs Interstate to adopt similar frequencies through their local WIA broadcasts and "on air" publicity so as to encourage Interstate contacts as well as promote the local coverage characteristics of these bands.

For the latest DX news, experimentation and local ragchew see you on the 160, 11 and 10 metre nets.

VK2BVS

The Editor,
Amateur Radio
Dear Sir,

Further to my letter regarding the marking of A.O.C.P. Examinations by the P.M.G.

I rang the Radio Branch in Melbourne the other day to inquire as to the progress of same and was told (by an obviously harassed female) that there would not be much chance of obtaining results until well after August . . .

This is a deplorable state of affairs. When I asked as to the reason for such a delay I was told that all Radio Inspectors were occupied on the new Novice Licensing.

Whilst I am all in favour of this licence I do consider that a full licence takes precedence. My interest in radio is slightly dampened.

Impatient prospective amateur,
T. J. Connell
P.O. Box 718, Madang, P.N.G.
3 June, 1975

Awards Column

with BRIAN AUSTIN VK5CA
P O Box 7A, Craters, SA, 5152

FROM QST, APRIL, 1975:

Announcement is hereby made of the availability of a new DXCC award and a new fee schedule for all DXCC awards.

The new DXCC award is for CW only. Applications for it will be accepted starting 1st June 1975. Credits for the CW DXCC must be for contacts made 1st January 1975 and after.

A new fee schedule for all DXCC awards and endorsements will go into effect starting 1st June 1975. All new applications for the DXCC award must contain $10 US (or 56 IRCs). This $10 will be used to return the applicant's confirmations by registered first class mail, the certificate, the DXCC lapel pin and handling. While applications may be made for any or all of the DXCC awards at the same time, the $10 application charge applies to each of the applications.

Each subsequent submission for endorsement (or completion of a new application) must contain a handling fee of $2 plus postage for the return of the applicant's confirmations.

The above charges apply to everyone. In addition, however, non-ARRL member applicants in Canada, the US and possessions (including Puerto Rico) must include an additional service charge of $5 for each new application and a $2 additional service charge for each endorsement application.

As of 1st June 1975 the application charge for the 5BDXCC will be $20.

WORKED ALL MALAYSIAN AWARD — W.A.M.A.

This award has been available from the Malaysian Amateur Radio Transmitters Society for some time, but in case of any of you haven't heard of it the opportunity is taken to announce the requirement again.

A WAMA Certificate will be issued to any ham that can prove he has established a two-way contact with the following call prefixes:

10 9M2 contacts with different callsigns
10 9V1 contacts with different callsigns
1 VS5 contact
1 9M6 contact
1 9M8 contact

Any special attachment like "All contacts by SSB", "All contacts on 80m SSB" etc. can be indicated on the certificate.

A list showing all contacts made, indicating callsign, date, time, mode and band, should be sent with the application. QSLs do not have to be included if the list has been certified by the local amateur society or two other amateurs.

The application should be followed by 5 IRCs to cover return postage.

Applications should be addressed to:
MARTS
PO BOX 777
KUALA LUMPUR, MALAYSIA

VHF UHF
an expanding world

with Eric Jamieson VK5LP
Forreston, S.A., 5233
Times: GMT

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4WI/1, Mt Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RTX, Devonport	144.900
P29	P29GA, Lae, Niugini	52.150
3D	3DAA, Suva, Fiji	52.500

These notes are being prepared whilst on holidays touring around Queensland, particularly around Cairns and Townsville, sampling some of the hospitality of the northern VK4 amateurs. Prior to leaving, Eddie VK4ZEZ advised of the operation of the 2 metre repeater in Townsville, call sign VK4RAT on repeater Channel 1. Service area extends as far as Alligator Creek. Eddie also mentions Mackay area calling frequency will be either Channel 40 or Channel 50. Rockhampton and South will be on Channel 40. So bear these channels in mind as you come up the Coast to Townsville. The inland roads are rather rough at present, and somewhat lonely, and of course, no amateurs!!

REPEATER NEWS

Now that repeaters and FM in general represent such a large portion of the operation on VHF of so many amateurs, it seems reasonable to give more space to their operations — particularly in the absence of much news from the tuneable end of the bands.

George VK3ASV mentions in a letter that the Victorian State Repeater Committee are fully organised, with Chairman Peter VK3BX, Vice-President Peter VK3ZPP, Secretary Ken VK3ZNJ, Publicity Officer George VK3ASV. The latest 2 metre FM repeater listings have been sent to AR by George, so will not be separately listed here. Here are a few items which should be of general interest also to those travelling interstate.

ALBURY-WODONGA — Excellent results using Ch 4 in simplex operation from Mt. Big Ben have been made. **MILDURA** — Channel 4 operation now satisfactory with installation of co-axial filter. **MT. WILLIAM** — Western Zone meeting decided to change from Ch. 1 to Ch. 7 to eliminate co-channel interference with Melbourne. **SWAN HILL** — Transmitter/Receiver is ready, awaiting licence approval. Probably Ch. 1. **MT. MACEDON** — Proposal to operate on Ch. 6. **LATROBE VALLEY** — VK3RLV on Ch. 2 has been resited to GLV10 Tower on Mt. Tassie, general upgrading of repeater and power increase to 20 watts. Identifier using FSK & MCW and timers to be fitted at same time. **EAST GIPPSLAND** — VK3REG — Ch. 3 equipment ready, solar cell power supply being tested. Proposed site Mt. Sugarloaf, 900 m a.s.l. Should provide quite good area coverage of Lakes area and Princes Highway. **MT. DANDENONG** — VK3RML on Ch. 1 now operates with a timer, time out "beep", and FSK identifier. Transmitter power reduced to 60W to help heating problems, receiver sensitivity improved.

OTHER AREAS — If other States repeater publicity officers would like to forward information in a style similar to that shown above, outlining brief points which should be of general interest, please let me have the notes by 28th of the month to allow for editing and inclusion in material for AR.

As mentioned previously these notes are being written on holidays. Information is somewhat scarce, so will ask you to bear with me until next time.

Before closing, two things come to mind. Firstly, congratulations to the South East Radio Group in Mt. Gambier for another excellent Convention in June. The other is the Moonbounce report from Illawarra Branch of WIA (VK2AMW). Construction of the new one kilowatt power amplifier for the transmitter has been completed and installed. A letter from F9FT requests special EME tests with VK2AMW. If something eventuates from this, a new area should be available to Australia.

That's all for now. Closing with the thought for the month: "The wisdom of the spoken word may well exceed the value of the person uttering them".

The Voice in the Hills.

20 Years Ago

with Ron Fisher VK3OM

AUGUST 1955

August 1955 and the era of the 6146 was with us. Actually Phillips had been running front cover advertisements for this new tube for the three issues prior to August. 'AR' introduced the 6146 with a reprint from QST, "120 Watts of Audio Without Driving Power" by George Grammer, W1DF. Two pages of 6146 data for all classes of operation followed. However with disposals 807s available at a pound each it was going to take a few years for the 6146 to take over.

"An Introduction to Two Metres" Robert Black VK2QZ took a lighthearted look at the problems of firstly finding the two metre band and then getting equipment going. Two cartoons, drawn by an unnamed artist, illustrated the article.

Interesting correspondence was going on in the pages of Amateur Radio regarding the proposal by the VK6 Division to restrict limited licence holders to associate membership. Both Gordon Weynton VK3XU and David Rankin VK3ZAO (now VK3QV) took up an opposing stand.

Back on the technical side, John Miller VK2ANF described the construction, calibration and operation of a vacuum tube voltmeter.

Wooden towers were popular twenty years ago. Ready made TV towers had not appeared on the scene. John Harlock VK6GU showed us his particular method for constructing a 42 foot lattice tower.

VK3AHH's DX notes reported that famous operator Bob Ford ex-AC4RF had been released from internment in Tibet and was now anticipating activity from VS6. Conditions on the bands were on the up and up with even a few reports of DX contacts on ten metres.

Hamads

- Eight lines free to all WIA members. $6 per 3 cms for other amateurs and SWLs.
- Copy should be in block letters or typescript, signed and forwarded to the The Editor, PO Box 150, Toorak, Vic. 3142.
- Excludes commercial advertising.
- Closing date for Hamads is the 3rd day of the month preceding publication.
- QTHR means the advertiser's name and address are correct in the current Australian Callbook.

FOR SALE

Conv. MTR 16 on 6 m, working, $26. Homebrew 2 m AM Tx 25W, needs xtl/VFO, $35. Part completed 3 band transceiver, beaut. VFO, dial, switching includes PSU and some parts, $30. 20-88 MHz v. accurate sig. gen., noise gen., xtl calib., $25. Many odd trannies, chokes, chassis, etc. Ask! Simon VK3ZUI, QTHR. Ph. (03) 92 3442 AH.

Vinten MTR13 with channel 1, and new dynamic mike, $55. Type 3 Mark 2 transceiver 160 to 20 metres, $50. VK3AHG, QTHR. Ph. (03) 288 2024 AH.

Transceiver and 24V power supply, Plessey model C13, 1.0 to 12.0 MHz in 1 MHz steps. Tx — AM/CW Rx AM/CW/SSB. $50.00. A. G. Lyall VK3ZTV 102 Seaford Rd., Seaford, 3198. Ph. (03) 786 5961.

400W Linear with P/S, uses 4C x 350A on 6m. 2.5/3.5 kV at 1 amp. 1 HP blower 800 CFM. Fully metered 3 in. Panel Meters. Reg. Screen and Bias Supplies. Extra Socket mounted for extra band. Spare 4C x 350A (new) 4C x 250B, 2 used. Will swap for early SSB Tx/Rx or sell $300 ONO. Could be modified to any HF band with any tube up to 4 kV rating. VK3ZAZ, R. S. D. Buninyong, Vic. 3357, Ph. 41 3777.

Thunderbird TH6 DXX Beam, tri-band, 6 el., excellent condition, little used, complete, $80, plus 50 ft tower, crank-up alloy, very solid construction. Own transport to be arranged, $100. Both items too large for new QTH. VK2BGL, 4 Buena Vista Rd., North Springwood. Ph. (047) 54 1096.

Swan 500C Transceiver with VOX, mike, heavy duty power supply, hand book, excellent condition, $375. VK2AYE, QTHR. Ph. (02) 528 8825.

TCA 1677 Low Band Transceiver complete with mike, plugs and circuit, not converted, good condition, $40. AWA BS-50C, 50 Watt base station and receiver — high band less some valves, otherwise complete, not converted, $40 ONO. VK3ALT, QTHR. Ph. (03) 277 2337.

Complete Service Manual for communication Rx R5223 model, T.C.A. Also includes two large internal and external circuit diagrams, for $15. P.O. Box 141, St. Kilda West, 3182. Ph. (03) 699 2400 A.H.

Swan 350, mint cond., $250, C/W manual and spare finals. VK2BTL, QTHR. Ph. (03) 20223, X 209.

Collins 75SI Rx, fitted with 500 H CW filter, mint condition, $425. BC221 AK freq. meter, incl. 240V reg. supply, 125 kHz to 20 MHz, excellent cond., $100 ONO. VK2AS, QTHR. Ph. (02) 467 1784.

FT200 and Duke 5 SSB Transceiver with PSU and mike, $300 ea. or $550 both, Will swap. Adam Kay VK2AXN. Ph. (02) 451 9570.

Hallicrafters HT-44 80 to 10m SSB Tx, complete with PSU (110V AC), manual, spare final tubes, 100W PEP, perfect cond., $200. Yaesu FT101B Transceiver, perfect cond., only 6 months old, $560. Set of Asahi whips, with bumper mount, 80-10 metres, $50. Lionel VK3NM, QTHR. Ph. (03) 88 3710 AH, (03) 329 7888 X 45/46 Bus.

Scope Soldering Iron with spare tips, $15 (with transformer). 1973 XA Falcon Car Radio, perfect cond., $50. TV Camera with tripod stand, 2 lens, very good cond., $200. 2 HT Holden Wheels (new) each $20. Lionel VK3NM, QTHR. Ph. (03) 88 3710 AH, (03) 329 7888 X 45/46 Bus.

Realistic DX-150A, inbuilt Hy-Q cal. G.C., $150. Variable Condensers, 50c per gang. Jeff L-30409 Ph. (03) 546 3940.

FTDX560, late model, immaculate cond., with silent fan, noise blanker, CW filter, spare final tubes, etc. $435 ONO. **FV401** external VFO, as new in carton, $90 ONO. **Magnum 6** RF Speech Processor, suit FTDX400, 401, 401B, 560, 570, FT101 & 101B, mint condition, $100 ONO. VK3ARZ, 12 Explorers Court, Vermont South. (03) 232 9492.

PROJECT AUSTRALIS

With DAVID HULL VK3ZDH

OSCAR BEACONS

The Oscar 6 and 7 beacons provide vital data on the spacecrafts health and are a necessary part of the housekeeping of the satellites. These beacons are placed on the edges of the transponder passbands, 29.45 MHz in the case of Oscar 6, 29.50 and 145.98 MHz for Oscar 7. Strong signals picked up by the satellite on the corresponding edges of the uplink passband will tend to interfere with these beacons by being re-transmitted on top of, or alongside, the beacons, causing reduced readability and consequent problems to command stations. The VK2 repeater on the old Chan. 4 frequency has caused problems with the AO6 beacon since its launch and from time to time several CW stations have tended to operate within QRM range of the beacons. This can be a particular problem with the RTTY telemetry of AO7. It should be pointed out that the spacecrafts have reduced receiver sensitivities on their bandpass edges and thus the stations using the edges are reducing their on-ground received strength by straying too far from the passband centre. VHF FM users' co-operation would be appreciated also in avoiding inadvertent QRM of Oscar 7's beacon on 145.980 MHz.

PREDICTIONS FOR SEPTEMBER 1975

OSCAR 6				OSCAR 7				
Date	Orbit No.	Time Z	Long °W	Date	Orbit No.	Mode	Time Z	Long °W
1	13153	01.13	70	1	3625	B	00.56	64
2	13165	00.13	54	2	3638	A	01.50	77
3	13178	01.08	68	3	3650	B	00.50	62
4	13190	00.08	53	4	3663	A	01.44	76
5	13203	01.03	66	5	3675	B	00.44	61
6	13215	00.03	51	6	3688	A	01.38	74
7	13228	00.58	65	7	3700	B	00.37	59
8	13241	01.53	80	8	3713	A	01.32	73
9	13253	00.52	64	9	3725	B	00.31	58
10	13266	01.48	78	10	3738	A	01.25	71
11	13278	00.48	63	11	3750	B	00.25	56
12	13291	01.43	76	12	3763	A	01.19	70
13	13303	00.43	61	13	3775	B	00.18	54
14	13316	01.38	75	14	3788	A	01.13	68
15	13328	00.37	60	15	3800	B	00.12	53
16	13341	01.32	74	16	3813	A	01.06	66
17	13353	00.32	59	17	3825	B	00.06	51
18	13366	01.27	73	18	3838	A	01.00	65
19	13378	00.27	58	19	3851	B	01.54	78
20	13391	01.22	71	20	3863	A	00.53	63
21	13403	00.22	56	21	3876	B	01.48	77
22	13416	01.17	70	22	3888	A	00.47	62
23	13428	00.17	55	23	3901	B	01.41	75
24	13441	01.12	69	24	3913	A	00.41	60
25	13453	00.12	54	25	3926	B	01.35	74
26	13466	01.07	67	26	3938	A	00.34	58
27	13478	00.07	52	27	3951	B	01.29	72
28	13491	01.02	66	28	3963	A	00.28	57
29	13503	00.02	51	29	3976	B	01.22	70
30	13516	00.56	65	30	3988	A	00.22	55

Magazine Index

With Syd Clark, VK3ASC

CQ March 1975
A Breakthrough in Simplifying Ionospheric Propagation Forecasts; Antennas, The Wideband 20 Metre Array; White House Rips off Amateur Radio; Alternate Sources of Power; Mixers and Local Oscillators for VHF Converters; VFO Design for QRP Transmitters; Docket 20282 and the Novice Licence.

HAM RADIO April & May 1975
Integrated Circuit Electronic Keyer; Microstripline Pre-amplifiers for 1296; Digital Touch-Tone Encoder; Direct Reading Capacitance Meter; Keyboard Morse Code Generator; Variable Crystal Oscillator; Wideband RF Amplifier; VHF Single Frequency Conversion.
Large Vertical Antennas; Log-Periodic Antenna Design; Phased Vertical Array; Open-Grid Parabolic Reflectors; Shunt-Fed Vertical Antennas; 1296 MHz Yagi Array; Measuring Complex Impedance with an SWR Bridge; Electrically Steered Phased Array; 80 Metre Bow-Tie Antenna; Low-Frequency Loop Antenna; Tilt over Tower.

QST April & May 1975
Simple RF Bridges; A Ten-Metre Swiss Quad — Missouri Style; Learning to Work with Semiconductors: Transmitter Design; Varicap Tune Your VFO; The Ultramountaineer; A Low Cost CW Identifier; The Lossless Radiator; A 160 Metre Receiving Loop; The ETO Alpha 374 Bandpass Linear Amplifier; HTACPS Put your FM Handytalkie to Work at Home.
A Parallel 4CX250B Amplifier for 144 MHz; A Convenient Stub-Tuning System for Quad Antennas; Learning to Work with Semiconductors Pt. 2; An Analog Computer Type Active Filter; Slow-Scan to Fast-Scan TV Converter Pt. 2; The City Slicker.

RADIO COMMUNICATION April 1975
A Caption Generator for SSTV; Reduction of an In-Band Spurious Emission in the Liner 2; Testing Fall-out Integrated Circuits; Radio Communications at Frequencies below 10 kHz; Taking the Radio Amateurs' Examination; Building Blocks for the Novice — Diodes.

Silent Keys

NORMAN ERIC MORTLOCK VK2PQ

Many VK and Overseas Amateurs will be saddened at the passing of 'NORM' MORTLOCK VK2PQ late of Randwick and Engadine, N.S.W., on 18th May, 1975 after a long illness at the age of 65 years.

Norm was a well known CW operator on most HF bands as well as a keen VHF 2 metre operator, where he helped many to the full licence with his CW practice sessions during the late 1960s despite his failing health and demanding occupation.

Norm had recently retired from the Department of Customs and Excise and prior to this appointment had been a Technician with the Post Master Generals Department.

Norm was a gentleman who was always ready with a helping hand or word; he will be sadly missed by his friends.

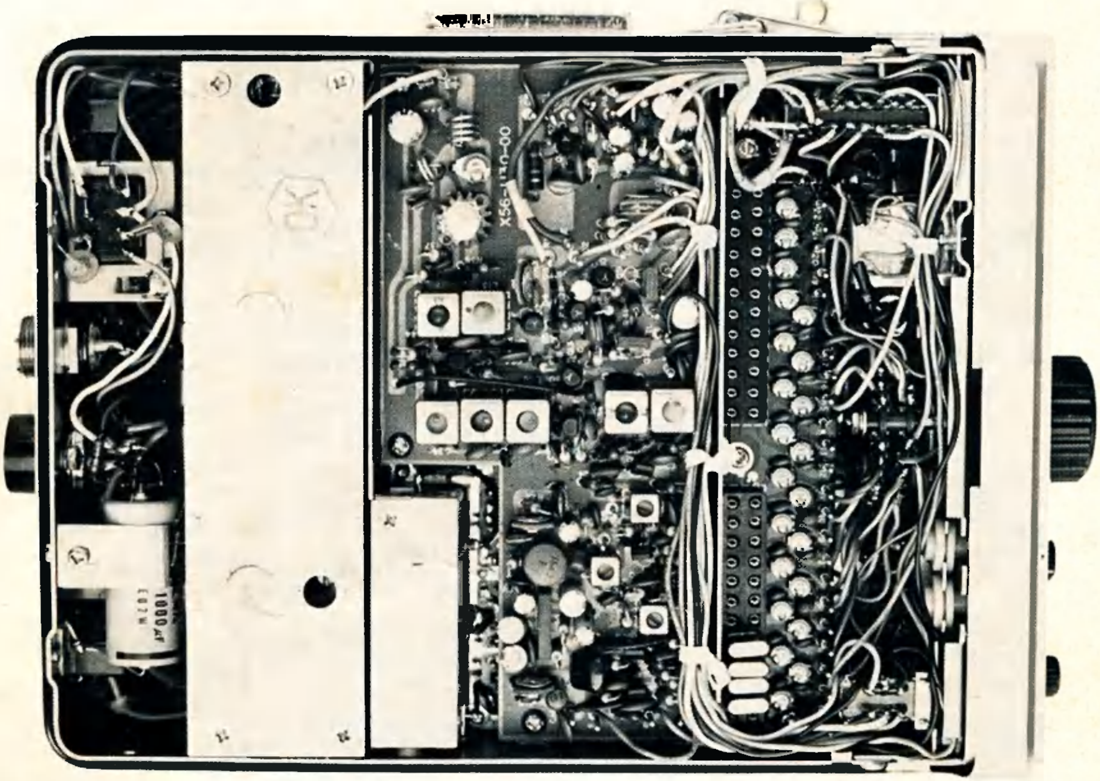
To his family we extend our deepest sympathy.

VK2ZDH

Mr. M. H. MEYERS	VK2VN
Mr. R. S. MITCHELL	VK2AID
Mr. G. WALKER	VK4BX
Mr. J. V. HUTCHISON	VK2JH

AUGUST 1975
VOL. 43, No. 8

amateur radio



VOL. 43, No. 9 SEPTEMBER 1975

CONTENTS

COVER PHOTO

A top view of the works of the excellent Kenwood TR-7200G 2 metre FM transceiver which is reviewed on page 13 of this issue.

PHOTO: KEN REYNOLDS

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

HAM RADIO SUPPLIERS

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AND DISPOSALS STORE:
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27 MHz TRANSCEIVERS AND ANTENNAS SUITABLE FOR NOVICE AMATEUR USE

SE501 23 CHANNEL TRANSCEIVER
5W AM, 15W PEP SSB, 12V DC operation **$195**

MIDLAND 13-870D 23 CHANNEL TRANSCEIVER
5 Watts AM, 12V DC Operation **$99**

CENTRE LOADED FIBREGLASS MOBILE ANTENNA AND BASE
43 in. long **$16.90**

¼ WAVE FIBREGLASS MOBILE ANTENNAS
With insulator and heavy spring base **$35**

PONY CB74A 6 CHANNEL TRANSCEIVER
5 Watts AM, PMG approved for 27.880 MHz operation. Fitted with 27.880 and 27.240 crystals **$105**

MIDLAND TWIN METER TYPE SWR BRIDGE AND POWER METER **$25**

COMMUNICATION RECEIVERS AND TRANSCEIVERS

KENWOOD MODEL TS520 AC-DC, 80-10 metre, complete with microphone **$550**

Matching External Speaker **$25**

KENWOOD TR7200G 2 metre, 22 channel, 12V DC operation, fitted with Ch. 1 and 4 Repeaters. 10W and 1W output positions **$235**

YAESU MUSEN FT101B AC-DC, 160-10 metre, complete with microphone **$585**

FT200 Transceiver with A.C. power supply **$400**

KEN KP202 hand held 2 metre Transceiver, 2 Watts output, fitted with xtals for channels 40 and 50, repeaters 1, 2, 3 and 4 .... **$150**

KCP2 Battery Charger for KP202 with 10 rechargeable Ni-Cad batteries **$35**

KENWOOD QR-666 general coverage, operates from 240V AC or 12V DC **$330**

BARLOW WADLEY XCR30 Mk II, all band coverage, AM, SSB, CW reception **$279**

POWER SUPPLY 240V AC — 13.5V DC at 3.5 amps regulated **$35**

WE ALSO KEEP A RANGE OF 27 MHz WALKIE TALKIES which are type approved by the P.M.G. for boating, bushwalking, etc.

THIS MONTH'S SPECIAL

PRECOR 4 BAND RADIO
AM-FM. AC/DC operation.
VHF frequency coverage is
56-217 MHz in 3 bands.
$49.50 plus pack & post

SCOOP PURCHASE

TRANSISTOR RADIO CIRCUIT BOARDS
IDEAL FOR HOME CONSTRUCTORS

Due to Tariff cuts on transistor radios, we can offer the Items below at this price. Most are in working order but no guarantees at these prices.

THOUSANDS AVAILABLE

AM 8 TRANSISTOR CIRCUIT BOARDS
All new parts. IFs, capacitors, resistors, etc.
$1.50 each or 3 for $3.50

AM/FM CIRCUIT BOARDS
10 transistors, all new. Ideal for use as FM tuner. 88-108 MHz.
$2.75 or 3 for $7.00

ALSO LARGE QUANTITY OF RADIOS
In various stages of manufacture. Some AC/DC models AM/FM etc. Speakers, cabinets, etc. Personal shoppers only.
From $3 each

TRANSFORMERS A + R TYPE 5509
Ex. equipment, but as new. Prl. 240V. Sec. 2 x 12.6V at 2.5A.
$8 each

"ZEPHYR" 2K ROCKING ARMATURE MICROPHONES
Desk Type with PTT key switch in base. Brand new.
$25

"PHILIPS" TYPE CONCENTRIC TRIMMERS
Threaded stud mounting, 25 pF. **75c**

BRAND NEW 4-TRACK STEREO CARTRIDGE PLAYERS
2-5 Watts per channel at 8 ohms, 12V DC operation. In sealed boxes.
$15 each

30 kHz M.E.W. Crystal Filters 10.7 MHz **$5 each**

2N3055 Transistors with insulating kit **$1.00**

Stolle 300 ohm Feeder with foam dilectric **15c yard**

58 ohm Coax Cable 100 yd. Rolls, ⅛" diam. .... **$12 Roll**

52 ohm Coax Cable ¼" diam. **45c yard, 50c metre**

Dow Key Coaxial Relays 48 Volt DC operation **$15**

Split Slator Capacitors with screwdriver slot drive, 9 pF-17 pF-25 pF. Brand new Eddystone type .... **$4.50 ea.**

Ex Army Headphones approx. 20 ohms impedance. New, in sealed boxes **$2.00**

3" Tape Spools .... **15c ea., $1.00 for 10**

2" Square Face 0-10 mA Meters, calibrate 0-60 .... **$3.**

Jackson Slow Motion Drives 6:1 ratio **$2.30**

New 240V AC Turntable Motors, 3 speed operation **$2.00**

MINIATURE SIEMENS RELAYS
4 sets changeover contacts, 6-12V DC operation. Type V23154. New.
$4 each

6 TRANSISTOR RADIO CHASSIS **$1 each**

TANK WHIP ANTENNAS
16ft., complete with base
$12

C45 TRANSCEIVERS
23-38 MHz, FM, with inbuilt calibrator, approx. 15 Watts output. With 24V DC PSU.
$49

C11 TRANSMITTERS
2-16 MHz, AM or CW, 50 Watts output, inbuilt 100 kHz crystal calibrator. Complete with 24V DC PSU.
$65

MAIL ORDERS WELCOMED. Please allow pack and post on items listed on this page. If further information required send a stamped SAE for immediate reply from the above address. Larger items can be sent F.O.B.

amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA, FOUNDED 1910

SEPTEMBER 1975
VOL. 43, No. 9
Price: 90 cents
(60c mail delivered to members)

QSP

There is no doubt the real concern for the WIA these days is to stay alive in the present financial situation.

Some may think the solution lies in returning to the beginning and starting all over again.

Others more realistically acknowledge the results of inflation and realise there can be no going back.

Yet again there is a growing number who see the necessity for the regrouping of the entire forces of the WIA.

Have we over-reached ourselves in providing the kind of service members expect but which many are unwilling to pay for?

What profit areas have been missed by the Federal Council to offset our losses?

Your executive knows there can be no going back. If the Institute is to continue the only way is to go forward.

Over half the costs of the Executive go into the production and distribution of the journal. What would the Institute be like without AR?

Certainly we could turn out a small semi-duplicated, cheap version of AR, but at this year's Federal Convention the matter was considered in depth and the Council were unanimous in their decision that it was essential for AR to continue in its present form!

Could we throw away our modest EDP system and go back to addressing plates? Let the divisions collect and account for membership dues?

Return to voluntary effort in maintaining membership records?

If anyone can come forward to do a cheaper and yet equally as good a job as our present EDP system we would like to hear from him at once.

We know a cheaper job could be done for a few hundred members, but we want something cheaper and better for the entire membership. We are still looking for it.

Did you notice that postages, wrappers and wrapping services, account for nearly one fifth of the costs of AR? Would it surprise you that you would get no change out of $1,000 for the cost of the postage and stationery bills for the subscription processing.

The Executive is well aware of the costs to members of the Federal organisation. It reviews these costs frequently and constantly seeks to do what has to be done as economically as possible.

There is no ready-made solution. No easy way out. Unless, of course, the Federal Council gives directions to abandon many of the things now expected of us.

D. A. WARDLAW VK3ADW
Federal President

RETURN OF 50-52 MHz

Work has begun by the VHF Advisory Committee in preparing a case for the return to amateurs of the 50 to 52 MHz segment of the 6m band as required at the 1975 Federal Convention. Work is being done in two phases. Phase 1 is aimed at achieving a shared band arrangement for amateurs operating beyond defined service areas of Channel O TV transmitters and Phase 2 aims at full restoration. Both of these objectives could take a long time in getting any results even assuming there is success in putting forward a strong enough case. The VHFAC now needs the maximum amount of information from amateurs on the co-channel operations of TV stations and other radio services in any part of the spectrum. Not only as affecting Australia but also overseas. Have you anything useful to offer about this? Do not delay — please write at once to "VHFAC, PO Box 150, Toorak, Vic., 3142", in confidence if necessary.

FRAGMENTATION

The editorial in QST for May '75 quotes "One characteristic of amateur radio that continues to cause us some concern is fragmentation, the splitting up of amateur radio into a myriad of narrow interests which sometimes divide us internally and weaken the strength and unity which we must display externally". W1RU writes that in one respect this fragmentation is healthy but what does weaken the image of amateur radio is the on-the-air intolerance exhibited by some amateurs for those who have different interests.

SOLOMON ISLANDS

VK3YQ whilst in Honiara, spoke with the P & T Controller who happens to the VR4AA. Visitors, he was told, could obtain an amateur licence on production of an Australian AOCP (or photostat of it) and payment of $12 per annum (minimum $3 per quarter). The amateur bands are stated to be the same as applicable in the UK and will probably continue after Independence (some time in the future).

NEW PREFIXES

Radio Communication, June '75, advises that the call sign block C7A-C7Z has been allocated provisionally by the ITU to the World Meteorological organisation.

IARU NEWS

April '75 QST advises that a revised Constitution of the IARU proposed by the RSGB has been adopted by the Union. The new Constitution recognises the existence of the regional IARU organisations. The necessary two thirds majority was achieved in voting for its adoption.

RECIPROCAL LICENSING

Break-In for May '75 carries official advice that reciprocal licensing of amateur radio stations now exists between France and New Zealand (including Cook Is., Nive and Tokelau Is.). So if you hear an F4AA/ZL1ZZZ you'll know what it's all about.

WIA NEWS

In July the Executive closely examined the expenses of the Federal body. The results appear elsewhere in this issue.

It is too early to say what the total subscription rates will be for each Division next year. Divisional activities are just as subject to inflationary pressures as are those of the Executive. It is at the Divisional level where more voluntary helpers working to sensible plans can effect greater savings than elsewhere.

At the Executive meeting in July David Rankin, VK3QV/9V1RH, the Secretary of the IARU Region 3 association, regaled the members with impressions from the Region 1 conference he attended in Warsaw during May. There is little doubt that the encouragement of the 'sports activity' of amateur radio in the USSR and Eastern bloc countries is likely to be very useful in the light of WARC 1979.

Work on uniformity of repeater conditions has continued. The Federal Repeater Committee in the person of John Harris, VK5ZRH came into action and work on 70 cm repeater parameters is obviously an early priority. The AARTG under Chairman Don Graham VK6HK was given the task of drafting suitable submissions to the authorities about RTTY.

The task of assisting with the revision of the PMG's Handbook was re-activated in advance of new regulations expected to become law perhaps later in the year. This work is in the capable hands of Geoff Taylor, VK5TY and Jack Martin, VK5EJ.

It was considered most important for the future of satellite operations in this part of the world that the Chairman of the Project Australis Group, Dave Hull, VK3ZDH should attend the Amsat experimeters meeting in Washington, USA in mid-March. The Executive funded his air fare after protracted negotiations failed to provide cash assistance from sources outside the WIA. All his other expenses were met out of his own pocket or through good friends, Amsat and others. The Executive sought financial assistance from Divisions and to date less than 20 per cent of the total has been raised. Thanks are given for the following —

VK7 — 50.00
VK1 — 34.50 (VK1WI 20.00, VKIVP 5.00, VK1ZT 4.00, VK1DS 1.00, VK1DA 4.00, VK1AH 0.50).
VK5 — 100.00

184.50

By the time this appears in print the 1975 WIA Call Book should have been available for about a month. Perhaps it should be emphasised that the call sign data derives from PMG Dept. not the WIA. For the first time the compilation of the Call Book was done outside Melbourne. It would be interesting to hear what the Group concerned thought about it all. Everybody involved with Call Book compilation should breathe a sigh of relief if next year's edition is done from EDP records. If this comes to fruition it is probable that WIA members will be designated with an asterisk and there should be less scope for error. Any WIA unfinancial would obviously not be listed as a member.

Another Customs problem arose in relation to frequency coverage of amateur band HF transceivers. The By-Law lists the bands available for use by amateurs in Australia whereas HF transceivers are manufactured for a world market. The whole question is under active negotiations with the appropriate authorities using the criteria prepared by the WIA last year for the Industries Assistance Commission.

The Key Section raised the question of a CW and telephony gentleman's agreement for the frequency bands to be used by Novices. This was referred to Divisional Councils for comments but it is obviously desirable that a decision should be reached before Novices are licensed.

Also as a result of WIA representations the necessity for ATV operators to obtain a special permit has been removed. With this change, of course, the —/T suffix disappears.

A letter explaining the objects and organisation of WICEN and advising that Brig Rex Roseblade, VK1QJ had been appointed Federal WICEN Co-ordinator was sent to the Minister for Defence.

The good offices of the PMG were sought to remove the ban on the Novice Examination deferred from 23rd June but no sign of any breakthrough was evident at the time this newsletter was written. ■

10 m BEACONS

From Radio Communication July '75 comes an interesting beacon list starting with 28.165 MHz for PY1CK in Rio de Janeiro and VP9BA in Bermuda. Then follows an 28.170 ZL2MHF in Wellington, 28.175 VE3TEN in Ottawa, 28.180 5B4CY in Limassol, 28.185 GB3SX in Sussex, 28.190 3B8MS in Mauritius and DL0IGI on 28.195.

NEW PREFIX

From IARU news in QST June '75 mention is made of a special Memorial Meeting early in July at Skapje in Southern Yugoslavia and in conjunction with this event YU amateurs will be using the special prefix YZ for the remainder of 1975.

SAFETY

QST June '75 mentions that a notice which would have exempted electronic pocket calculators from the general restrictions on the use of electronic devices in aircraft was withdrawn. It seems there were enough reports of interference to navigational aids and the like by some models of calculator aboard some aircraft, particularly light planes and helicopters.

Afterthoughts

EXPERIMENTERS DELIGHT — APRIL 1975

On the circuit diagram there is a capacitor value shown as 10 nanoF which should be 1 (one) nanoF (0.001F). It is in the pre-regulator control section. Ten nF make the response too slow and the power switch will run hot. Also the ripple on the linear pass transistors becomes too high on 200W out. A new mains switch has been fitted.

This is a dpdt switch, the spare section of which is used to discharge the PRIMARY STORAGE capacitor via 5 to 10 ohms, 5W, and, alsc, via the reverse protection diodes the other big capacitors, when the mains switch is switched OFF.

The reason for this modification was the discovery that upon switching off, the remaining stored energy would sometimes be fed through to the output and cause the volts to go high. That is due to the collapse of the references upon switch-off.

The reverse protection diodes must be fitted on both, the switching and linear pass transistors.

If your load is sensitive to small spikes (150 to 200 mV), then use a twisted pair of wires for connection to the supply and earth only at the mains earth terminal provided on the front panel. Watch earth loops through CRO and other gear.

Rolf VK5ZIE

MODIFYING THE TRIO JR60 RECEIVER

(By VK2AGJ)

A small gremlin has produced some errors in the process of publishing this article. Except for the points listed below, the circuit diagram is correct, and where any differences between the diagram and the text occur, it is the text which is incorrect.

1. Add a dot to 2N3819 BFO FET, lower 800PIV diode, converter heater switch and MPF105 mixer.
2. Add transistor type numbers to calibrator. 1st NPN ME2001, PNP 2N3638, 2nd NPN BC108.
3. Audio output capacitor is an electrolytic with the positive lead connected to the emitters.
4. 2N3638 audio amp is a PNP not NPN as drawn.

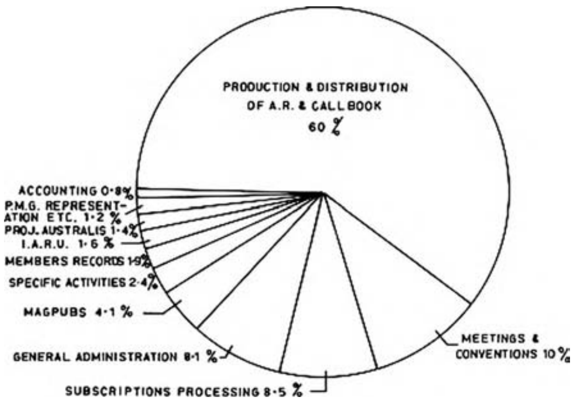
The author has subsequently found it necessary to fit a 4.7 uF filter capacitor to the negative supply to the RF gain control. ■

WHERE, OH WHERE DOES THE MONEY GO?

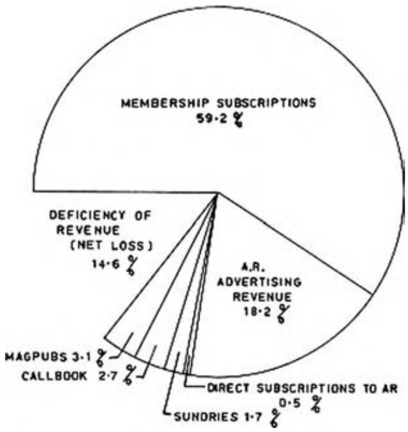
The Executive made an extensive in depth study of its finances as in July and came up with some interesting facts. These had long been suspected but never quantified.

The pie charts show the distribution of our financies as they appear at the middle of the current financial year.

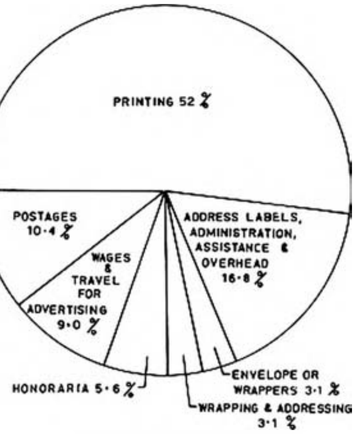
1975 EXPENDITURE
APPROX $66000



1975 INCOME
APPROX $56000



A.R. EXPENDITURE
APPROX $37000



AUSTRALIAN VHF/UHF/SHF RECORDS – JULY 1975

NEW SOUTH WALES

					km	miles
50/52 MHz	VK2ADE	to	VE7AQQ	8-4-59	11,778	7,320
144 MHz	VK2ATO/2	to	ZL2HP	2-1-66	2,344	1,457
432 MHz	VK4ZT/2	to	VK4KE/4	12-7-69	352	219
576 MHz	No claim					
1,296 MHz	AX4ZT/2	to	AX4NO/4	12-4-70	402	250
2,300 MHz	VK2ZAC/2	to	VK2BDN/2	19-5-73	159.9	99.4
3,300 MHz	VK2AHC/2	to	VK2SB/2ZND/2	10-2-74	59.5	37.0
*5,650 MHz	VK2AHC/2	to	VK2SB/2ZND/2	12-4-75	114.1	70.9
*10,000 MHz	VK2AHC/2	to	VK2SB/2ZND/2	12-4-75	114.1	70.9

VICTORIA

*50/52 MHz	VK3ALZ	to	XE1FU	1-5-59	13,545	8,418
144 MHz	VK3ZNC	to	ZL2HP	13-12-65	2,692	1,673
432 MHz	VK3ZYO	to	VK5ZDY	1-2-70	654	408.4
576 MHz	VK3AOT/3	to	VK3ZKB/3	11-4-71	237	147.5
*1,296 MHz	VK3AKC	to	VK7ZAH	17-2-71	439	273
*2,300 MHz	VK3ATY/3	to	VK3ZHU/3	6-12-74	210.5	130.8
*3,300 MHz	VK3ZGT/ ZGK/3	to	VK3ZDQ/3	14-12-63	101.4	63.0
5,650 MHz	No claim					
10,000 MHz	No claim					

QUEENSLAND

50/52 MHz	VK4ZAZ	to	K6ERG	16-3-58	8,536	5,305
144 MHz	VK4ZAZ	to	VK7ZAH	1-1-67	1,910	1,187
432 MHz	VK4KE/4	to	VK4ZT/2	12-7-69	352	219
576 MHz	No claim					
1,296 MHz	AX4NO/4	to	AX4ZT/2	12-4-70	402	250
2,300 MHz and above	No claims					

SOUTH AUSTRALIA

50/52 MHz	VK5KL	to	W7ACS/KH6	26-8-47	8,626	5,361
*144 MHz	VK5BC	to	ZL2HP	23-12-65	3,149	1,957
*432 MHz	AX5ZKR	to	AX7ZRO/7	15-3-70	776	482
*576 MHz	VK5ZJL/5	to	VK5QZ/5	28-12-69	314	195
1,296 MHz	VK5ZSD	to	VK3ZHU/5	28-9-69	121	75
2,300 MHz	No claim					
3,300 MHz	No claim					
5,650 MHz	No claim					
10,000 MHz	VK5CU/5	to	VK5ZMW/5	30-12-71	95.7	59.5

WESTERN AUSTRALIA

50/52 MHz	VK6BE	to	JA8BP	30-10-58	8,833	5,490
144 MHz	VK6KJ	to	VK3AOT	1-2-70	2,441	1,517
432 MHz	VK6ZDS	to	VK6LK/6	25-4-66	106	66
576 MHz	VK6ZDS/6	to	VK6LK/6	15-12-63	163	101
1,296 MHz and above	No claims					

TASMANIA

50/52 MHz	VK7LZ	to	JA9IL	3-12-59	8,788	5,462
144 MHz	VK7ZAH	to	VK4ZAZ	1-1-67	1,910	1,187
*432 MHz	AX7ZRO/7	to	AX5ZKR	15-3-70	776	482
576 MHz	No claim					
*1,296 MHz	VK7ZAH	to	VK3AKC	17-2-71	439	273
2,300 MHz and above	No claim					

N.B.—Australian records are marked *

AUSTRALIAN EME RECORDS

144 MHz	VK3ATN	to	K2MWA/2	28-11-66	16,761	10,417
1,296 MHz	VK3AKC	to	W2NFA	6-10-73	16,713	10,385

AUSTRALIAN ATV RECORDS

432 MHz	VK7EM/T	to	VK3ZPA/T	13-12-72	413	256.6

QSP —

Postmaster-General,
Adelaide, SA 5000
30th July, 1975

Mr. P. D. Dodd,
Secretary,
The Wireless Institute of Australia Executive,
P.O. Box 150,
Toorak, Vic. 3142

Dear Mr. Dodd,

I have received your letter of 25.7.75 on behalf of The Wireless Institute of Australia concerning the deferment of the first Amateur Radio Novice Examination.

Industrial action was taken by the Professional Radio and Electronics Institute over organisational proposals and this matter is currently in the hands of the Public Service Board.

I have already initated action which I hope will lead to an early settlement of this dispute.

Yours sincerely, R. Bishop

Postmaster-General,
Canberra, ACT 2600
30th July, 1975

Mr. P. D. Dodd,
Secretary,
The Wireless Institute of Australia,
P.O. Box 150,
Toorak, Vic. 3142

Dear Mr. Dodd,

I refer again to your letter of 9th June, 1975, on behalf of the Wireless Insiltute of Australia, concerning the delay in finalising the results of the examination for the Amateur Operator's Certificate of Proficiency held in February, 1975.

I agree that despite the intensive efforts of staff employed in the area, the results of the February examinations were not despatched as early as usual.

It should be noted, however, that several factors have contributed to the delay. In the main these are the current shortage of competent staff and the significant increase in the number of candidates who sat for the examination. These were further compounded by the need to divert staff from the marking of examination submissions to prepare the first examination for the Novice Amateur Operator's Certificate of Proficiency, which as you know, was scheduled to be held in late June, 1975.

Action is in hand to secure additional staff to overcome the difficulties being experienced in the examination area and it is expected that the position will improve in the near future.

Your suggestion concerning more modern methods of setting and marking examination papers has been read with interest and it is opportune to mention that for some time now, multi-choice type question papers have been included in examinations for one of the commercial operators' certificates, to supplement normal essay type papers set for the radio theory sections. You may not be aware that use of the multi-choice type of question paper has been extended to the theory section of the Novice amateur examination. I feel that this style of paper will greatly assist in minimising delays in the return of examination results to the candidates.

My officers are interested in using multi-choice type questions in the full Amateur examination and will be studying this matter when the staffing situation permits.

Yours sincerely, R. Bishop

ORIGINAL TECHNICAL ARTICLES

The Publications Committee recently discussed the copyright of articles in AR in the light of reprints being done by overseas magazines on a reciprocal basis. Where the author does not specifically reserve copyright in his own name and includes this with his article reprints in sister society journals would continue as in the past. If other publications request permission to reprint, the request will be referred to the author concerned before agreeing to the request. In the past year or two many AR articles have been reprinted in overseas amateur magazines and due acknowledgements had been credited. AR is exchanged on a reciprocal basis with most of the world's major amateur publications and it is most encouraging to note how carefully it is read and reviewed.

1975 CALL BOOK

All being well the call book should be available by the time you read this. The price will be $1.50 and it will contain some extra material not included in previous issues. Remember one thing — the call sign data is that which was provided to us by the PMG's Department. Do not write to the Institute saying your address or other details are incorrect in the Call Book or are not included.

FRAGMENTATION

"Indeed" — says the writer of the editorial in QST May '75 — "one characteristic of amateur radio that continues to cause us some concern is fragmentation, the splitting up of amateur radio into a myriad of narrow interests which sometimes divide us internally and weakens the strength and unity which we must display externally."

NOVICES AS WIA MEMBERS

Are very welcome indeed. The 1972 Federal Convention Motion 72.17.04 set out the policy that Novcie Licensees may be admitted as Associate members. Some people believe this would be correct for Novices under the age of 16 which is of course the minimum age limit for other amateur licences. Perhaps some WIA Divisions might even now be looking at their Constitutions relating to membership and voting qualifications apart of course from the ACT Division where their Constitution is of more recent date than the uniform divisional constitutions still in use elsewhere. Novices who are students or even pensioners could presumably qualify for the lower subscription rates but what about those in between?

RADIO GHOSTS

Reach out the trip and breaker, James, and turn the lights to 'low'
We'll watch the pushpull finals cool — see how their anodes glow.
And whilst they lose their rosy state, revert to black and grey
They'll mirror distance conquered, oldtimers gone away.
Ere Ohm's Law meant a thing to you, ere the Q code felt your hand
to vanquish isolation, be it seawise, air or land
I've warmed to friendly handgrips by morse from men allied
To "fingertalk" with kindred when the wireless world was wide.
In retrospect I'm frozen in my pipedreams as they pass
Harold from St. Lucia, his sets' panels made from glass
With Alf his fervent cobber whose fetish was 'lo-loss'
His tuners self-supporting, devoid of bolt or boss.
Here's Longreach Bill his morse a treat to copy as he raced
His "skeds" with me a jousting-ground for learners as we paced:
And Harold from Rockhampton, phlegmatic on the key
Our weekly "meet" a tonic from "GE" to seven three.
Hail Andy from Mareeba, your signal's faint tonight
With Leighton at the Brisbane end they held the circuit tight
When once a cyclone struck the coast near his North Queensland Town
'Twas Andy with his two-watt rig who poured the story down.
A keening alternating current note, nine hundred cycles sweet
Comes up to strength and calls me in — the morse is clipped and neat.
Ray Loving of the Eastern Moon's tied up in Panama
Tonight he'll toast old friends he says in a favoured Yankee bar.
Six weeks ago across my log his name was duly signed
Below a Kiwi's off a tramp: both callsigns underlined.
A singing crystal note swells up above the crowded band—
I reach across the narrow Strait — grasp Watto's eager hand.
There's Norm from Perth Westralia. He never seems to tire.
At twelve my time he'll go on shift, controls trains on the wire.
"We're one fifty north of Alice" comes the tap tap faint but clear
Tis Arthur from his mobile home. Been on the road a year.
The Lottery Goddess smiled on them and beckond them away
From Melbourne with its sleet and noise, they're gone a year today.
Friend Trev from Bathurst pipes "GE" in a ringing crystal sound
Piezo-electrics bow to Trev — how many has he ground?
James old man my pipe is cold. They're passing by me still
Helene from Invercargill, Maree from Broken Hill
I'll bide a while, the moon rides high, the Taylor Range stands plain
A halliard flog against a mast — the chime whistle of a train
Cuts frostily across the morse of men whose "fists" I knew
I'll turn my own ham license in, next month its falling due
Few "morse men" are no longer "it" — the present ham it seems
Won't "fingertalk" for pleasure, let the oldsters have their dreams.

MAT O'BRIEN ex VK4MM

Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

KEN ANTENNA REPAIR

This is a suggestion for those in possession of the Ken KP202 using the standard but "Fragile" quarter wave whip.

If you are unlucky enough to break the whip (it usually breaks right at the plastic insulation bushing), a repair can be made by knocking out the centre pin and inserting a nail in its place. The nail is forced into the hole until it can go no further. Be sure the nail is long enough to make contact with the terminal inside the Ken's antenna connector. If it is too long it can, of course, be trimmed back. The whip is then gently forced into the plastic until it touches the head of the nail and is then fixed into position with a suitable adhesive.

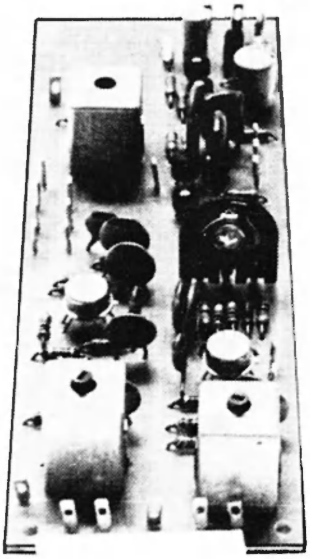
JOHN WICKHAM VK3YJW

AMATEUR BUILDING BLOCKS

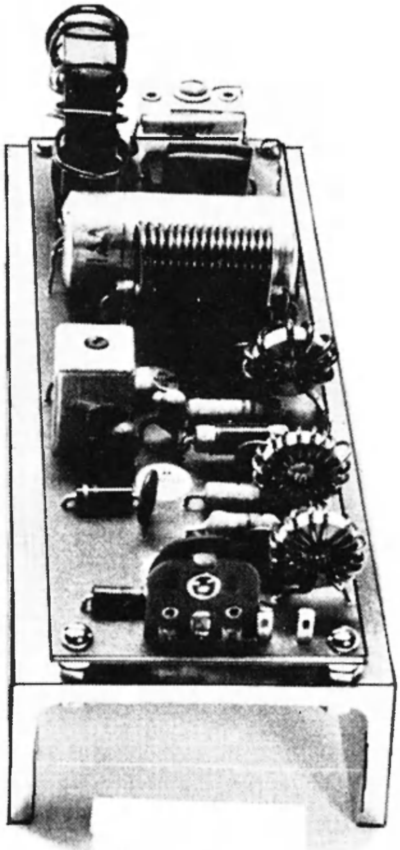
PART THREE

H. L. Hepburn VK3AFQ
4 Elizabeth St., East Brighton, 3187

The third part of this series of articles describes a module to generate a low level sideband signal and a single band linear amplifier to raise this low level signal into the 25/30 watt region.



UNIT D



UNIT E

Section 2 — Unit D —
BALANCED MODULATOR/SIGNAL MIXER
Figure 10 gives the circuit diagram of the four functions involved while Figure 11 shows the component layout on the 6 in. x 2 in. PCB.

(I) THE MICROPHONE PREAMPLIFIER
Input from a 2000 ohm dynamic microphone is filtered for RF by the F29 RFC and associated capacitors and is amplified in a 2N3565/2N4249 NPN/PNP feedback pair. A 22k on board trimpot (or panel mounted pot) provides control of the audio level into a 2N5245/2N3565 FET/Bipolar pair having a very low output impedance to feed the signal ports of the balanced modulator via a 10 mFd electrolytic. This capacitor is connected between two PCB stakes so that easy access to the board for audio is available and allows the balanced modulator or the pre-amplifier to be used separately if desired.

THE BALANCED MODULATOR
As for the receiver mixer in Unit A and the product detector in Unit C, use has again been made of the 1496/796HC type of device.

Audio is fed to pin 1 while pin 8 receives input either from the auxiliary BFO crystal oscillator offtake in Unit C or from the crystal oscillator provided on the board under discussion. If used as part of a transceiver the BFO injection can come from the receiver but if the module is used as part of a separate sideband generator the on board oscillator can be used.

Balancing to give minimum oscillator feed-through is by means of the 22k trimpot between pins 1 and 4. In the layout used, output at the BFO frequency is some 50 dB below the input level at 9 MHz.

L8 is bifilaı wound and is resonated by C8. A link in L8 gives a low impedance DSB output which normally goes to a filter to strip off the unwanted sideband and further reduce the carrier level.

For best operation the BFO input should not exceed 60 MV RMS while the audio input should be below 300 MV RMS.

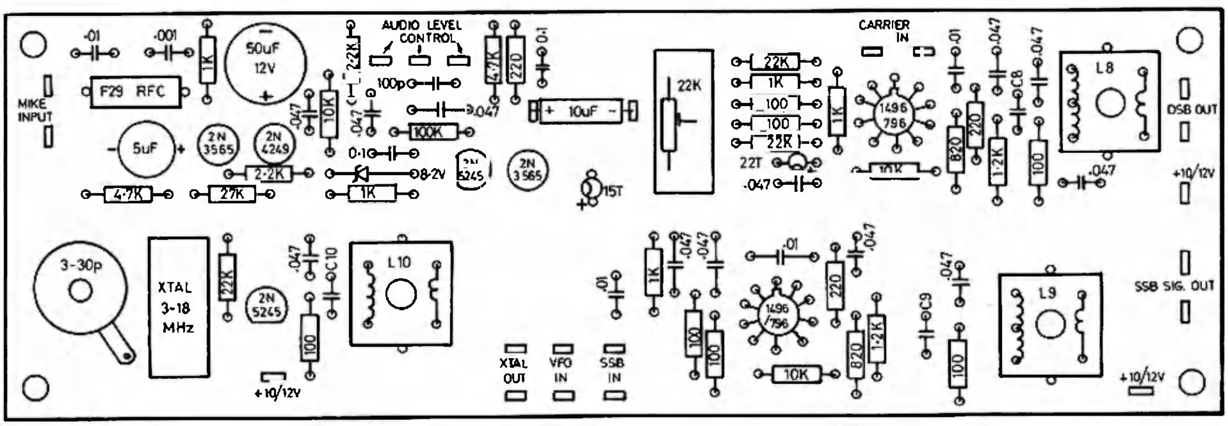


FIGURE 11 — UNIT D — COMPONENT LAYOUT

AT DICKS PRICE YOU CAN AFFORD THE ULTIMATE!
HY GAIN TH6DXX
$225.00 (p&p freight on)
FIXED STATION 4-BAND TRAP VERTICAL 4BTV
Covers 10, 15, 20 and 40 metres with single setting for whole coverage. Optional extra 80V resonator. No switching, no matching and only one feeder. Low SWR (only 1.6 : 1 at band edges). HD low loss brackets, solid fibreglass traps. 21.5 ft long and weighs 15 lb. Mounts on vertical support up to 1½" OD
$98.50 (p&p freight on)
RM80 resonator for above $26.50
Selecting the right antenna is essential for efficient operation of any communications set up & its worth remembering that often the antenna represents only a very small proportion of the cost of a link, yet it has the greatest effect on overall performance!
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LISTENER 1 "V" TYPE ANTENNA
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LOOK AT OUR PRICE
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You'll have fun & save money!
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KENWOOD TS520 SSB TRANSCEIVER
Month after month Kenwood is proving to be even greater value. With thousands of units now on air all over the world, the famous Kenwood quality and value speak for themselves. SSB and CW on 80 through 10 metres built in A.C. and 12V D.C. power supply, VOX, RIT, noise blanker and all other features you want . . . . all for $550.00 (plus freight on)
KENWOOD TS900 DELUXE SSB TRANSCEIVER
QST wrote: "The only transceiver superior to the KWM2". USB, LSB, CW, FSK on 80 through 10 metres, with 300 watts PEP on SSB. Coming complete with power supply, speaker unit, the TS900 has been designed and built for serious enthusiasts. There are just too many features to describe. $800.00 (plus freight on)
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$300.00
KEN KP202:
$150.00
KEN KCP-2 BATTERY CHARGER:
$30.00
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STOP PRESS..... Revolutionizing ham radio - the all new YAESU FT101E available soon!
Why listen to Station WWV? Build your own time standard from our digital clock kit. Operates from 240 volts A.C. or use our Quartz Crystal module kit for 9 to 15 Volts D.C. operation.
NEW LOWER PRICES FOR OUR DIGITAL CLOCK KIT (over 1500 sold)
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Post & Packing 50c each
DICK POWER SUPPLY
Input: 240V AC
Output: 12V DC 3A
Surge 5A
$32'00 (P & P $1.00)
And now...
BIG DICK POWER SUPPLY
Many people have been asking for a bigger supply than our popular Dick. So here it is. Two ranges 0-12V-24V with a max current of 1.5A. 3 transistor 7 diode circuit with meter readout of Voltage & Current. Voltage selector & variable control. Measures 18.5 x 10.5 x 8.5 cm, weighs 1.5 kg (its that well made!) Specially designed for instrument supply & the service bench. Fully regulated. Simply connect leads directly into Big Dick or mount & connect terminals supplied. Value at
$39'50 (P & P $3.00)
WB200 G.D.O.
Still only $142.00 (P & P $1.75)
ECM1021 CONDENSER MICROPHONE OMNI DIRECTIONAL
Frequency response 20-18 KHz impedance 600 Ohms supplied with windscreen, 10 ft. cable and press to talk switch. Only
$20'00 (P & P 75c)
Ideal for amateur use
HI-MOUND HK705 MORSE KEY
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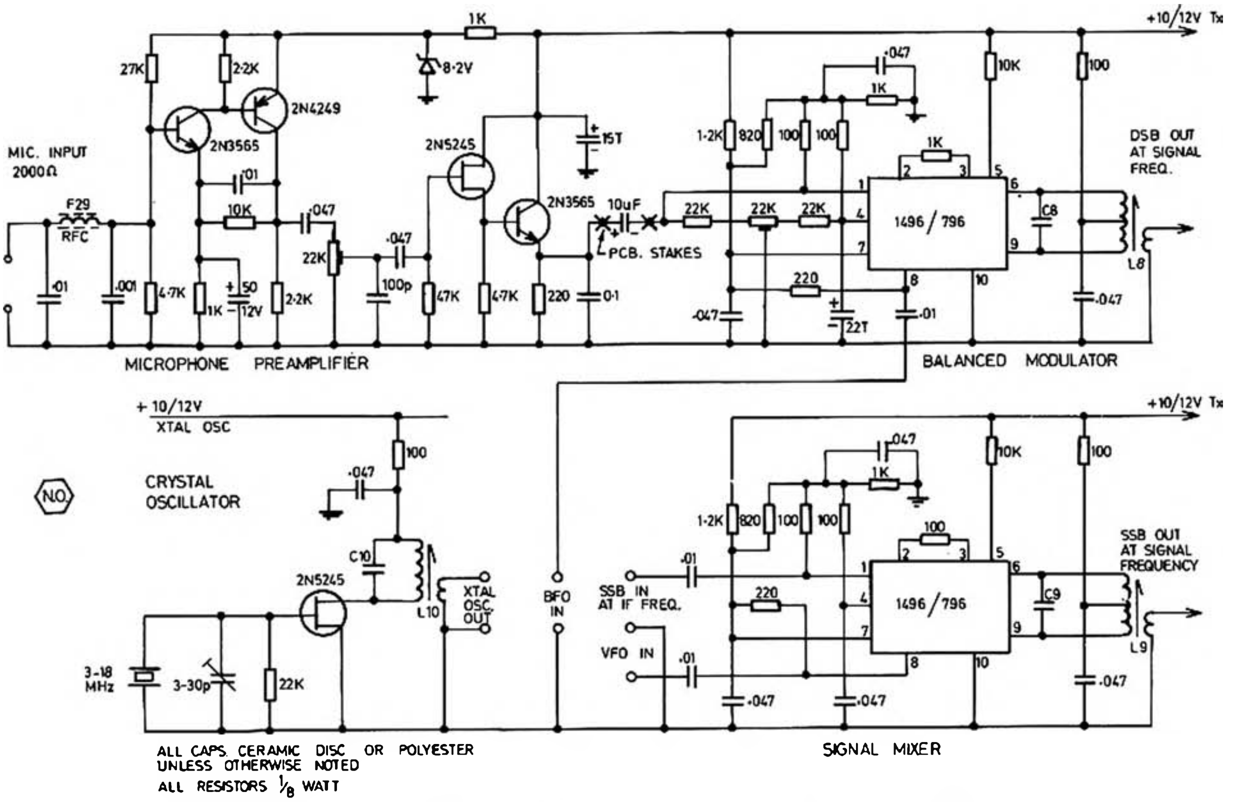


FIGURE 10 — UNIT D — BALANCED MOD. / CRYSTAL OSC. / SIGNAL MIXER

Table 2.7 below gives coil and capacitor data for L8/C8 for the most popular IF frequencies.

(iii) THE CRYSTAL OSCILLATOR

The crystal oscillator provided on the PCB of Unit D is exactly the same as that provided in Unit A. Coil and capacitor data for L10/C10 is the same as that given in Table 2.5 for L5/C5.

As indicated in (ii) above, the function can be used to provide the carrier input (at IF frequency) for the balanced modulator if it is not available from other sources.

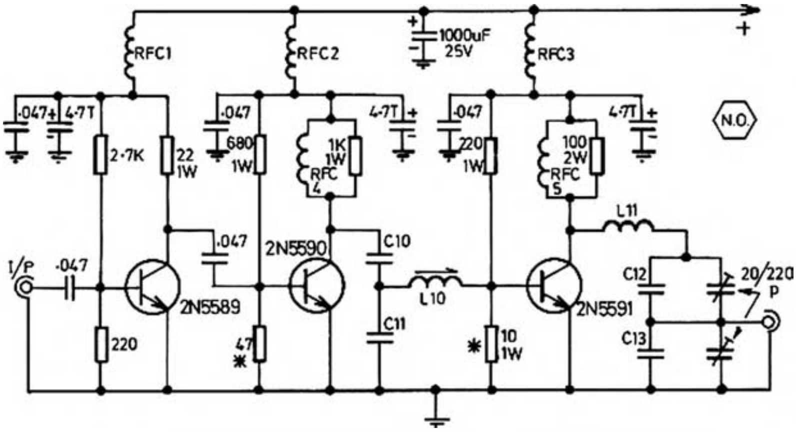
Alternatively it can be used in conjunction with the balanced signal mixer where a fixed frequency from the crystal oscillator can replace the VFO input to the signal mixer to provide a fixed, single frequency output.

If neither of the above facilities is required the crystal oscillator components are simply omitted.

(iv) THE SIGNAL MIXER

After DSB has been generated in the balanced modulator and one sideband removed in a suitable filter the resulting SSB (usually at the IF frequency) has to be heterodyned to the required signal frequency.

The signal mixer is designed to do this. The oscillator input (pin 8) is fed with the



✱ MAY NEED ADJUSTMENT TO SET STANDING COLLECTOR CURRENT TO 25mA.

FIGURE 12 — UNIT E — 25/30 WATT LINEAR

TABLE 2.7

Freq. MHz	L8 Primary turns	L8 Link turns	AWG	Slug	C8-pF
5.0	18 + 18	9	32	F16	150
9.0	13 + 13	6	32	F16	100
10.7	10 + 10	6	32	F29	100

Note to Table 2.7:
Coils are close wound on Neosid 722/1 formers — links are wound over the centre of the tuned winding.

TABLE 2.8

Freq. MHz	L9 Tuned Winding	L9 Link	AWG	Slug	C9
1.8	37 + 37	15	37	F16	470
3.5	25 + 25	10	37	F16	150
7.0	15 + 15	6	32	F16	100
14.0	10 + 10	4	32	F29	47
21.0	10 + 10	4	26	F29	33
28.0	10 + 10	4	26	F29	15

Note to Table 2.8:
All coils close wound on Neosid 722/1 former. Link is wound over centre of tuned winding.

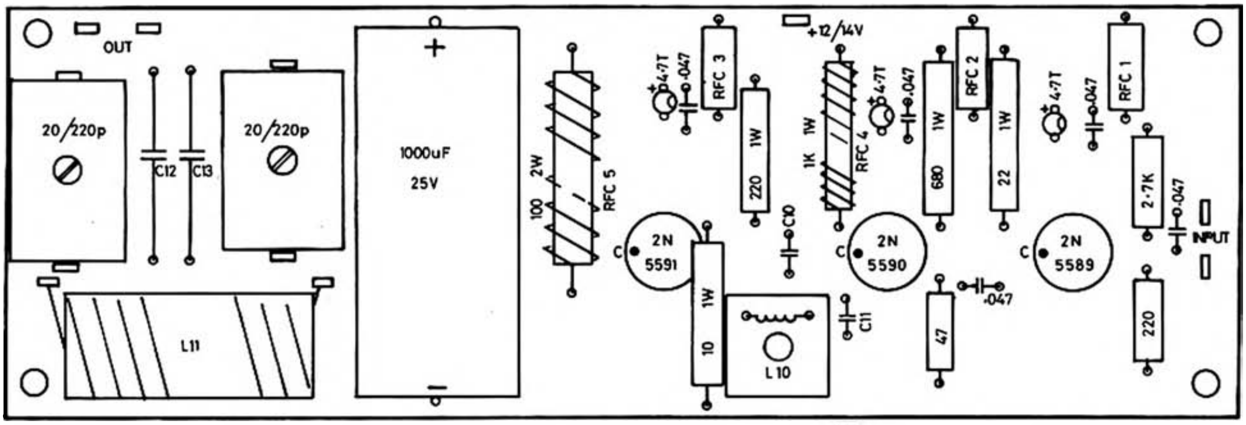


FIGURE 13 — UNIT E — COMPONENT LAYOUT

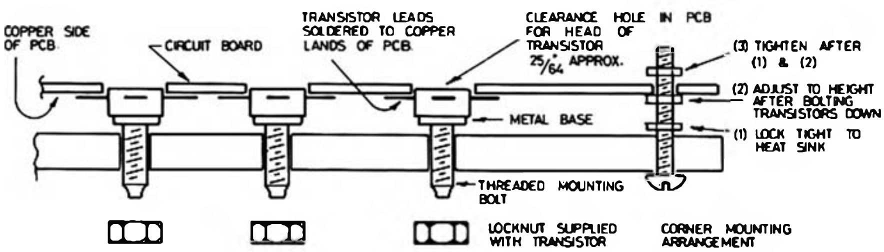


FIGURE 14 - UNIT E - MOUNTING METHOD OF P.A. TRANSISTORS

VFO (for variable tuning) or a crystal oscillator in the VFO range (for fixed, single frequency output) while the signal input (pin 1) takes low level SSB at the IF frequency. The output tuned circuit L9/C9 is resonant at the required signal frequency. Note that L9 is bifilar wound.

For best operation the VFO input should not exceed 100 mV RMS and the SSB input should not exceed 300 mV RMS. Under these conditions around 100 mV RMS at signal frequency should be obtained from the output link.

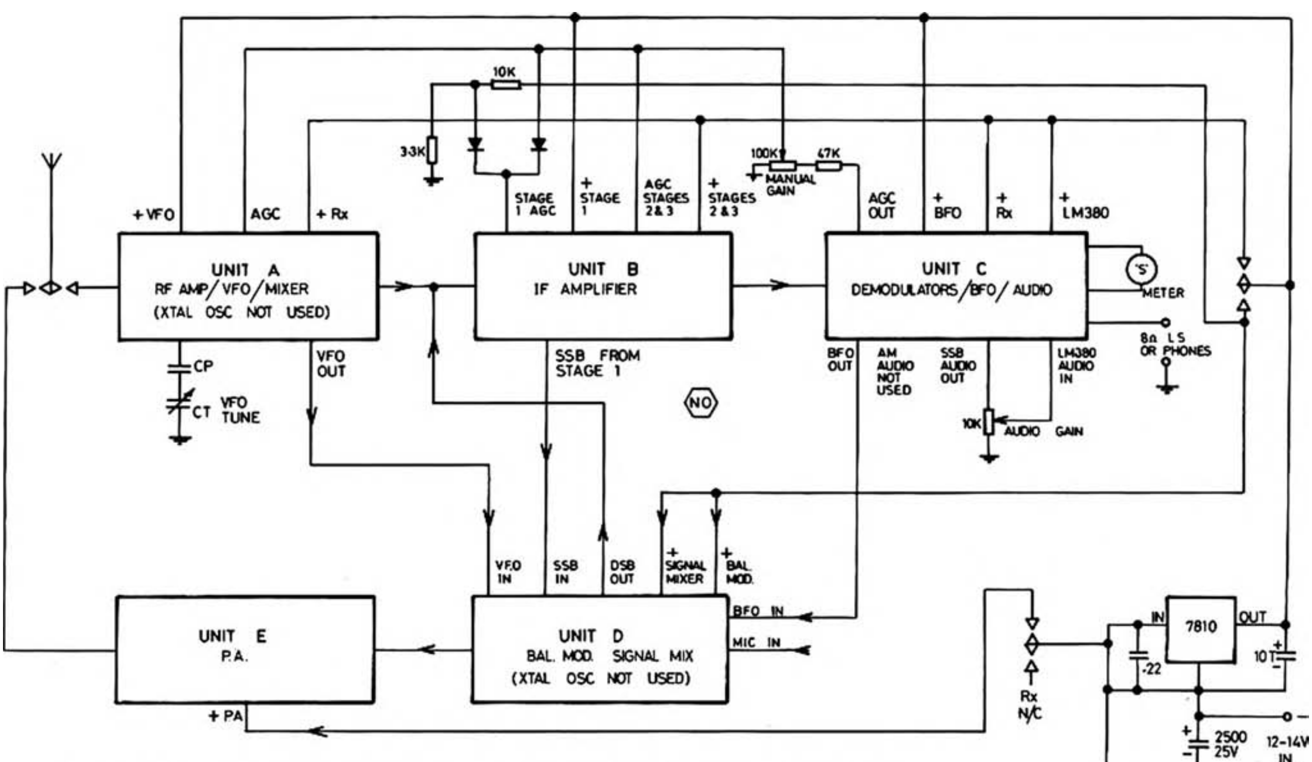


FIGURE 15 — SUGGESTED USE OF MODULES AS SINGLE BAND TRANCEIVER

Table 2.8 gives coil and capacitor data for L9/C9.

Section 2 — Unit E —

LINEAR AMPLIFIER

This is a single function module providing linear amplification of signals over any one amateur band or other narrow frequency spectrum up to 30 MHz.

With a 13.6 volt supply, a 60 mV RMS input gives 30 watts RMS output into 50 ohms.

Figure 12 gives the circuit diagram while Figure 13 shows the parts placement on the 6 in. x 2 in. PCB. Figure 14 shows the method of mounting the three transistors on the PCB and (very necessary!) heat sink.

Table 2.9 gives the values for the tuned circuit constants for the amateur bands whilst Table 2.10 gives the results obtained at 7 MHz with one of these modules.

Use has been made of the widely available 2N5589/90/91 series of power transistors. These are available from Dick Smith in Sydney or Radio Parts in Melbourne.

A 2N5589 is used as a class A resistance coupled amplifier to feed a 2N5590, this latter device being coupled to the 2N5591 output transistor via a tuned network comprising L10, C10 and C11. The output tuned network is L11, C12 and C13 with 20/220 pF Ducon ceramic trimmers across the fixed capacitors for "set and forget" adjustment.

The standing current for the 2N5589 amplifier should be around 100 mA with a 13.6 volt supply and no signal input. The 2N5590 and 2N5591 operate in Class B and the bottom base bias resistor values shown in Figure 12 may need adjustment to ensure that each stage draws in more than 25 mA with a 13.6 volt supply and no signal input. It is essential that a good heat sink be used — the simplest being a 6 in. length of 2½ in. x 1½ in. x ¼ in. thick "U" channel aluminium extrusion.

If a finned heat sink is used the flat centre channel will have to be at least n. wide to accommodate the PCB. The U" shaped extrusion has proven quite adequate in service and has the advantage of taking up the minimum cabinet space. The method of mounting the transistors to the PCB and the joint assembly to the heat sink is shown in Figure 14.

Figure 15 suggests one method of connecting Units A to E to give a single band tuneable SSB transceiver. Its physical form is left to the builder but a few comments are in order.

For all except the PA board, the HT supply is set at 10 volts using a 7810 or equivalent three terminal regulator. Note that the 0.22 mFd and 10 mFd tantalum capacitors are mounted as close to the regulator as posible.

It is assumed that a PTT microphone is used and that the appropriate signal and power changeovers are done by a relay operated from the PTT switch on the microphone. This is easier, but by no means obligatory, since the change from Tx to Rx and vice versa can be done using an appropriate rotary switch. Note that AGC to the first stage comes from the normal AGC line during receive but is replaced with a fixed voltage on transmit, with the two silicon diodes acting as gates to pass the appropriate supply.

Use of a normal mechanical dial is assumed and its form is left to the constructor. In a later article it will be shown how a digital dial can be fitted.

Before describing the digital units it is proposed to cover the FM and VHF modules and the next article will cover the two units involved.

BUILDING BLOCKS
Most general components can be obtained from the VK3 Disposals Committee at P.O. Box 65, Mount Waverley, Vic. It is hoped that arrangements will be made for the Committee to provide all but filters and crystals. In the meanwhile printed circuit boards can be obtained from the author.

TABLE 2.9 — P.A. COIL AND CAPACITOR DATA

Band	C1/C2 pF	L10 Turns	L10 AWG	Slug	L11	RFC5	C12 pF	C13 pF
160	470	50	32	F16	24 t. 16 AWG 1⅛" ID 8.8 uH	16 t. 16 AWG ½" ID 2 uH	1000 + 20/220	4400 + (2-2200)
80	220	45	32	F16	18 t. 16 AWG 1" ID 4.4 uH	10 t. 16 AWG ½" ID 1.0 uH	560 + 20/220	2200 + 20/220
40	100	25	26	F16	16 t. 16 AWG ½" ID 2.2 uH	14 t. 16 AWG ¼" ID 0.5 uH	220 + 20/220	1000 + 20/220
20	47	20	26	F29	10 t. 16 AWG ½" ID 1.1 uH	8 t. 16 AWG ¼" ID 0.25 uH	100 + 20/220	470 + 20/220
15	33	16	26	F29	14 t. 16 AWG 5/16" ID 0.7 uH	7 t. 16 AWG ¼" ID 0.2 uH	47 + 20/220	330 + 20/220
10	22	12	26	F29	15 t. 16 AWG ¼" ID 0.55 uH	5 t. 16 AWG ¼" ID 0.15 uH	33 + 20/220	150 + 20/220

NOTES TO TABLE 2.9

(a) Coil inductances are approximate only.
(b) Coils L10 are close wound on Neosid 722/1 formers.
(c) The fixed parts of C12 and C13 are silver mica or Ducon 100 volt Type LRJ.
(d) RFC1 and RFC2 consist of 18 turns of 20 AWG enamelled wire wound on a ½" OD F25 Neosid toroidal core Type 4327R/F25/EC.
(e) RFC3 consists of 10 turns of 16 AWG enamelled wire wound on a ½" OD F25 Neosid toroidal core Type 4327R/F25/EC.
(f) RFC4 for all bands consists of 20 turns of 20 AWG enamelled close wound on the body of a 1.0 K 2 watt resistor.
(g) For 160 meters L11 can consist of 11 turns 16 AWG wound on a Ducon Q2 toroid 1⅜" OD x ¾" ID x ⅜" thick. The turns are spread over ¾ of the core.

TABLE 2.10 — POWER AMPLIFIER PERFORMANCE

2.10.A Vcc = 13.0V f = 7.07 MHz		2.10.B Vcc = 13.0V Drive = 60mV RMS		2.10.C f = 7.07 MHz Drive = 60mV RMS		
Drive mV RMS	Output Watts	f MHz	Output Watts	Vcc Volts	Total Current Amps	Output Watts
60	30	4.90	0.3	13	3.6	30
40	26	5.61	1.0	12	3.4	25
30	23	5.98	2.0	11	3.1	21
20	15	6.39	5.0	10	2.6	15
10	4	6.64	10.0	9	1.6	6
5	1	6.91	20.0	8	0.3	0.4
		7.0	26.0			
		7.07	30.0			
		7.15	28.0			
		7.43	20.0			
		7.54	10.0			
		7.78	5.0			
		8.16	2.0			
		8.54	1.0			
		9.14	0.3			

NOTES

2.10.A Vcc was set at 13.0 volts. Input frequency was set at 7.07 MHz (mid band) and output noted at various drive levels.

2.10.B Vcc was set at 13 volts and drive was set at 60 mV RMS. Output was noted at band centre and the frequency/output relationships established either side of this frequency.

2.10.C Maintaining a constant drive level and frequency, the feed voltage was varied and output and total current noted. ■

VICOM INTERNATIONAL PTY LIMITED Manager: Peter Williams

New! IC-202

144MHz SSB CW 3W TRANSCEIVER

ARRIVING SOON!

ICOM

This military style portable rig has just come off the ICOM production line and will soon be released for export. With 66 semi-conductors it produces 3w pep or 3w for cw in the range 144-145 MHz. Power is optional external 13.8V dc or internal nicads (UM-2).

$8.50 pr (\$1 P&P)

WIA Band Plan Xtals for IC22A/IC21A
Repeaters 1-7
Anti-repeat 1-7
Simplex: 20, 28, 32, 37, 38, 40, 49, 50, 51, 52, 53, 61, 63.

IC22A
DV21

The IC22A now comes complete with 6 channels from the WIA band plan and the VICOM 12 month warranty. Featuring solid-state T/R relay, PA protection and 5 helical resonators this popular mobile rig is the biggest seller in Australia in the Amateur 2 meter line. Price \$210 plus freight. Extra crystals \$8.50 pair.

The DV-21 PLL Digital VFO can be easily interfaced with the IC22A or IC21A or any rig with 44-45 MHz rx and 18 MHz tx. The VFO runs from either 13.8V dc or 240V ac and can scan either empty frequencies or those being used. In addition 2 programmable memories for favourite channels can be selected. Price \$285.

DV-21 COMBINATION DEALS:

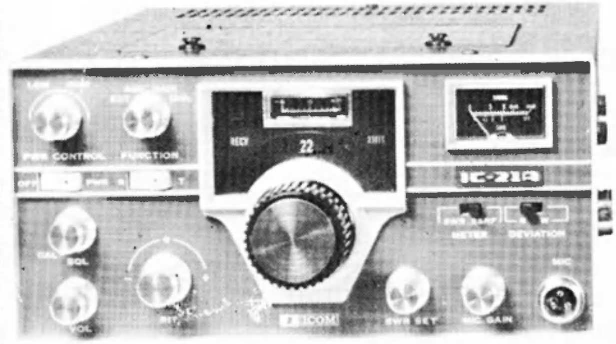
IC22A plus DV21	\$450
IC21A plus DV21	\$570

IC-3PA 13.8V dc power supply has been designed for the IC22A/30A/60 series. Price \$78.

2 METRES SSB

SSM-EUROPA B transverter \$224
YAESU FT220 ssb-cw-fm solid state transceiver. incl. mod to use fm repeaters.
TRIO TV-502 transverter \$243.

WHY NOT JOIN THE GANG ON 2 METRES?



THE IC21A is the 10w base station or mobile (146-148 MHz) with variable power control, adjustable deviation, 24 channels, built-in discriminator meter, S meter, SWR meter, PA protection, modular circuitry, runs from 13v DC or 240v AC. Complete with three channels. Price \$298

Monita-mini MR2 minature 2m fm receiver with 12 channel positions. This palm size receiver has double conversion 455/10.7 IF and a sensitivity of better than 1 uV for 20 dB QS. Price \$98 includes charger (crystals extra).

NOTICE: Transmitting equipment is not sold to persons who do not possess the appropriate licence.

PROFESSIONAL QUALITY 2M FM RECEIVER MODULE ... Ideal as an auxiliary monitor for the shack or to keep the XYL posted (perhaps not a good idea!) this kit comes complete with a single channel oscillator and a premium grade 11 element it ladder filter. The price of \$69.50 includes predrilled fibreglass pcb. all components, it crystal, filter, instruction manual. Add \$1 P & P.

Features:

- outstanding selectivity, 90dB adjacent channel rejection
- 7.5 MHz bandwidth
- 0.1uV squelch sensitivity, 0.3-0.5 uV for 20dB
- 1 watt audio output
- solid design, fully-shielded coils, stable cascode circuitry — no neutralisation required.

\$69.50

WHAT THIS WORLD NEEDS IS A GOOD \$25 SCANNER KIT! Here is our new 4-channel scanner board. It is small sized, includes LED indicators which mount in small holes added in your front panel. Two or more boards can be ganged for eight or more channels. Unit can be used with any AM or FM receiver or transceiver with squelch and electronically switched crystals. Oscillator circuits with directly switched crystals can be easily adapted. Price \$25 for the kit, including undrilled pcb, all components, instructions, LED indicators. Add 60c for drill bit and \$1 P & P.

KEN KP202 handheld 2 watts. Incls 4 chs (1-4-40-50), \$150.
Charger and nicads \$32
Trio 7200G 10 w incl 2 chs Special \$210
SEWIA SV-230 mobile rig, runs 25 watts! Price: \$210, includes 3 channels, mic, cables and mobile mounting bracket.

2 Meter Power Amps:

For Kens (2/25w)	\$65
UHF Services Power Brick (10/50w)	\$89
Power Band (10w/50w)	\$85

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AN AR SPECIAL — REVIEW

KENWOOD TR7200G 2m Transceiver

Kenwood is the export name of equipment manufactured by the Trio Electronics Group of Tokyo, Japan. They are of course well established in the amateur communications field with several models of both HF and VHF gear available on the Australian market at the present time. The TR7200G is the first piece of two metre FM equipment marketed here, although their earlier TR7100 was sold in large quantities in both Japan and in the United States under the SBE label. The current 2 metre models are marketed in the USA under the Drake label.

Kenwood is handled in Australia by the Weston Electronics Company at North Rocks NSW. The unit used in our review was supplied to us by Ham Radio Suppliers of 323 Elizabeth Street, Melbourne. Details of price and delivery can be obtained from them or by reference to their advertisements in this magazine.

The TR7200G has much in common with other 2 metre FM rigs available at the moment, but as we will see, the Kenwood has many features that are both unique and interesting.

It is, of course, fully solid state and uses a total of 37 transistors, 2 FETs, 1 IC, and 24 diodes. Both dimensions and weight are slightly greater than other sets tested in the past, however it still rates as a very compact unit. It measures 180 mm wide x 60 mm high x 240 mm deep or in old terms 7-1/16" x 2-3/8" x 9-7/16". Weight is 2.5 kg which is approximately 5.5 lbs.

The appearance of the Kenwood is quite outstanding with the front panel finished in silver and light grey, with a satin chrome surround. Knobs are flat black and the cabinet is finished in a fine black crackle. The front panel is resplendent with a multitude of indicator lights which warn of any change from normal operation. Their functions will be later itemised.

As with all its contemporaries, the TR 7200G has provision for 22 channels plus an external VFO input. The optional external VFO is pictured in the advertisement brochure and is designated as VFO 30. Apart from this, no mention is made as to how it operates, nor have any apparently made their way to this country. The set is supplied with crystals for repeaters one and four. Crystals for other channels can be supplied on order from Ham Radio Suppliers, however, correspondence with Weston Electronics in Sydney indicates that they have only heard of repeater channels one to four and simplex channels 'A', 40 and 50. It would appear though that in the future they might investigate the possibility of importing additional channels.

The mobile mounting bracket has provision to take a small padlock to frustrate the efforts of any would-be thieves. The transceiver slides in and out quite easily and can be adjusted to four different angles of tilt.

The Kenwood operates from a nominal 13.8 volts DC and is rated to deliver 10 watts output to a 50 ohm load in the high power position and 1 watt in low. Power selection is by a front panel push button with visual indication provided by a colour change in the illumination of the meter. The channel selector is clearly numbered 1 to 22 plus VFO. Position 1 can be selected by pressing the *"Call Ch."* button regardless of the actual channel selected. At the same time a small panel light indicates that the *"Call"* position has been selected.

Accessories supplied include a good quality dynamic push-to-talk microphone, mobile mounting bracket, DC power cable with in-line fuse, external speaker plug (3.5 mm), chrome stand leg for home station use and an assortment of nuts, bolts and washers for attaching the mobile mount.

TR 7200G CIRCUIT DESCRIPTION

Starting with the receiver, a normal double conversion system is used with 10.7 MHz and 455 kHz IF frequencies. The front end uses a 3SK41 in both the RF stage and first mixer. Ceramic filters are used at both IF frequencies with the 455 kHz filter having a bandpass of 20 kHz at the 6 dB points. The receiver is thus a little more tolerant with high deviation signals than are most of its competitors. All of the receiver stages with the exception of the audio end are supplied with 8.3 volts from a series regulator stage. Returning to the front end, the first conversion oscillator starts off with crystals in the 15 MHz region. These operate in a parallel resonant circuit with about 40 pF across each crystal. Perhaps due to this higher than normal capacity, receiver stability is excellent. Output from the last multiplier stage is monitored with a transistor driving a LED indicator. This is situated in the dial and meter escutcheon and gives an indication that the channel selected has a receive crystal installed. It would also of course fail to light in the unlikely event of a fault in the crystal or multiplier stages.

Transmitter circuitry commences at 12 MHz, again with about 40 pF across the crystals. The only IC in the TR7200G is used as the microphone amplifier and speech clipper stage. In a system similar to that used on the receiver, the output of the last transmitter doubler stage is monitored with a DC amplifier and transistor switch to operate the *"On Air"* light on the front panel. This will then only come on when the transmitter is actually delivering drive to the final stages. An elaborate protection system is provided for the final stage. This is actuated by a high SWR sensing circuit. The low power setting is variable over a wide range as it operates the same voltage regulating system used to provide the high SWR protection.

Another feature that appears to be quite unique to the Kenwood is a built-in public address system. A special socket on the rear of the set can be connected to an external speaker, then with the receiver squelch turned fully counter-clockwise, the microphone amplifier output is switched to the input of the receiver audio stage. At the same time the internal speaker of the Kenwood is disconnected. As well as the external PA speaker socket a normal receiver external speaker socket is situated on the back panel.

THE KENWOOD TR7200G ON THE AIR

The transceiver is mooth to operate. The channel selector knob is relatively large and rotates with a satisfying clunk. When the rig is turned on with the push-on, push-off volume control, the channel selector and meter are illuminated and providing a receive channel is selected, the red LED indicator will also come on. The escutcheon is covered with a darkly tinted glass so that it is difficult to see which

channel is selected when the set is off. When in the high power position, the meter illumination is white, in low it turns green. With the green call channel light and the orange on air light the Kenwood can be a very colourful sight. Receive audio quality at first appeared to lack low frequency response; however, after use in high noise situations, this turned out to be a decided advantage. When first put on-air, reports indicated considerable roughness.

Investigation revealed that the microphone gain control was full on. Reducing this to the half way point cleaned up the audio.

Squelch control operation was smooth and progressive. However, when set close to the mute point, it was noticed that when external electrical noise such as from other cars at the traffic lights, the mute would open. This proved to be the only annoying feature of the set. I have checked with other TR7200G owners who report the same problem.

THE TR7200G ON TEST

Our usual series of tests were carried out.

Transmitter power output was checked with 13.8 volts applied. A Hewlett Packard 432A thermo-coupled power meter was used. On high power 12 watts exactly was delivered and on low power 1 watt. Current drain was 2.9 amps and 1.35 amps respectively. Current drain on receive rather depended on how many of the various indicator lights were on. We recorded the following; Muted: 375ma. Muted low power selected: 500ma. Muted, low power and call channel: 550ma. Receive with normal volume 450ma, and with full volume 600ma. Transmitter deviation was set at 10 kHz. Figures obtained on receive sensitivity were excellent. The mute opened at .1uV

Quieting at .5 uV —27 dB
1 uV —33 dB

Signal to Noise Ratio .5 uV —33 dB
1 uV —40 dB

The meter readings on receive were calibrated against the signal generator.

Meter	Input
2	.5 uV
3	1 uV
5	1.6 uV
7	2.0 uV
8	2.5 uV
9	3.1 uV
10	5.0 uV

Receiver audio output was measured on steady tone and at the onset of audible distortion was 1.5 watts. This meets the specification. A Marconi signal generator was used in the above tests. No further comment is needed as these figures are the best obtained in this series of reviews.

INSTRUCTION BOOK

The book is well written in so far as operation of the set is concerned. From a service point of view it leaves a lot to be desired. Only a circuit diagram is included. There are no printed board layouts or alignment instructions.

In regard to service, Weston Electronics advise that "Our Company is able to provide full service support and the supply of spare parts to our authorised dealers".

CONCLUSION

An excellent performer in all respects except the mute sensitivity to external noise. Crystal availability could be a problem but Ham Radio Suppliers can obtain crystals at around two weeks delivery for $10 per set. ■

VK2AVA MESSAGE

With the wide choice of amateur transceivers available these days, many need unbiased advice.

In the 10 to 80m coverage range, if economy is important, one cannot pass up the YAESU FT/FP200 combination, an excellent buy and performer. But if mobile use is considered, forget it as the DC 200 supply then needed will bring it into the TRIO KENWOOD TS-500 price range, which is the next recommended choice. It has a better receiver, solid state, AC/DC supply built-in, excellent finish and don't overlook the pair of 6146-B genuine transmit output tubes.

The UNIDEN 2020 will soon be popular, it has so many extra features for so little more money.

Next comes the YAESU FT-101-E if 160m coverage essential and if one likes speech-processing or -clipping, personally I do not like it and don't particularly look forward to more abuse with excessive speech processing on our bands.

If HF bands mobile operation is the sole interest and also small physical size, look for the SWAN 40m monobanders first, most mobile work is done on 40 metres anyway. Much dearer but with all HF bands coverage and small physical size is no doubt best provided by the ATLAS transceiver range.

Deluxe transceiver quality and performance, but only for AC power base-station use, is offered by the TRIO KENWOOD TS-900 and further the DRAKE TR-4-C or COLLINS KWM-2 or even SIGNAL ONE CX-7/11 if money is no concern!

For VHF FM operation there is such a multitude of good choices that economy and value of crystals supplied should be considered. For SSB VHF work there are some transverters available for use with HF transceivers. I do not recommend the SSB-FM combination transceivers for 6 or 2 metres, the SSB and FM sections of the bands are too far apart in frequency to provide optimum performance on both in one set. The small ARGONAUT is a nice source to drive a VHF transverter.

The next matter to consider is the antenna, even with a better than average location a lot depends on the care taken in the radiator department. Here again the choice is almost embarrassing, from the simple homemade wire dipoles to the mono- or multi-band verticals, junior or senior multi- or mono-band Yagis or multi band Quad arrays. Forget about the G5RV dipole, there are different and better ways to string up a multiband dipole in a restricted space, even on 80 meters with only 100 feet between supports, an open wire tuned feeder dipole with an antenna matchbox will radiate many times better.

¼ wave verticals, mono- and multi-band ones, are only half the radiating system, the other part has to be formed by a counterpoise, consisting either of a good conductive soil with some ground rods or a large number of radial wires or a bonded metal surface. DX coverage on 40 and 80 meters is best done with a good ¼ wave vertical ground-plane.

Rotatable Yagis and Quads require mostly towers and rotators and HF beams are only safe with a HAM-II rotator. All together one can spend much more on a tower, rotator and beam than the most expensive transceivers cost. For low power and lighter towers and masts, a junior tri-band 10/15/20 metre TH3JR is the choice, but still needs a HAM-II rotator in most locations. Other tri-band Yagis, even the senior TH6DX included, are still compromises on 15 and 20 metre bands if compared with the performance of mono-band Yagis. The exception is the tri-band QUAD because it has full-size elements on each of its bands. That is almost the sole reason why Quad antennas outperform Yagis, it is unfair to compare them with tri-band Yagis. But Quads are more difficult to erect and require stronger supports, as towers cannot be guyed up to their tops with Quads. A lot of hard work and time in assembly, choice of materials and tuning-up plus problems of future repairs can be saved by choosing the sturdy Hy-gain Quad antenna.

However nothing can outperform on 20 metres the 4-element monoband Hy-gain 204-BA, the so-called TIGER-ARRAY. There are a few 40m Yagis in use down here, mostly of reduced size with some sort of loading of the elements, but most are homebrew. Anybody requiring advice on reduced size 40m Yagis can ask for my own, frequently frustrating experiences with 40m beams.

Arie Bles.

All prices quoted on the adjacent page are net SPRINGWOOD, N.S.W. on a cash with order basis, sales tax included in all cases, but subject to changes without prior notice. No terms nor credit nor COD facilities, only cash and carry, no exceptions. All-risk insurance available for 50 cents per $100-value, minimum insurance charge 50 cents. Allow for freight, postage or carriage, excess will be promptly refunded. Mary & Arie Bles.

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HIGH PERFORMANCE 2m PREAMPLIFIER AND CONVERTER

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With rising activity among SSB stations in the lower part of the two metre band, and the availability of high performance VHF MOSFETs, VK4CCR decided to build a better front end for his two metre transverter. The project started off with a preamplifier, which is described first.

PREAMPLIFIER

The MOSFETs selected, because of their ready availability and low cost were the MPF1000, or the equivalent 3N210. These devices are capable of 15dB gain and better than 2dB noise figure at 150MHz. The first circuit tried was the one shown in Fig 1, but it proved disappointing mainly due to the difficulty in optimising the source impedance seen by the FET. The tapped coil method will work if you are able to determine the Q and coupling coefficients between the two sections of the tapped coil, but this poses problems at VHF, and is difficult to repeat on a production basis.

The 3N210 will only give minimum noise figure for a signal-source impedance of 375 ohms and a drain current of about 10 mA. The circuit in Fig. 2 is the one finally used as it allows continuous adjustment of the source and load impedances. C1 and C4 match the input and output impedances, while C2, L1, and C3, L2 tune to resonance. C1 and C4 could be made fixed values, but it was considered desirable to leave them variable to compensate for different antenna and load impedances. For those who wish to use a fixed input capacitor, the equations in Fig. 3 should help.[1]

The values of L and C2 are determined by the bandwidth, i.e. QL at 144 MHz. It should be noted that Qm and QL are two different quantities.

Construction

The coils should be at least ⅛ in. above the board, and all of the RF conductors should be short and wide to minimise stray inductance. A small shield placed across the FET will prevent possible instability. Do not remove any more copper from the circuit board than necessary.

Alignment

The preamplifier may be tuned by using an S meter, or receiver quieting as an indication, but slightly better noise figures will be achieved if a sensitive audio voltmeter is used to detect maximum recovered modulation from a good signal generator. Using a tunable audio filter and a millivolt meter noticeably less gain is achieved than by tuning to an S meter, but a better noise figure results.[2] The only difference in adjustment between the two methods will be slightly different positions for C1 and C2.

Performance

The new preamplifier was compared with an optimised 3N140 preamp. The 3N210 provided a SINAD figure (measured on a noise and distortion meter) of 12dB from a signal input at least 6dB below that required for the 3N140.

TWO METRE CONVERTER

The converter, Fig. 4 (which followed the preamplifier project) was required to be easily adaptable to any IF from 6MHz to 30MHz. An outboard oscillator was to be used, eliminating the risk of feedback between the front end and oscillator, which experience had shown to be a problem, and enabling the existing transverter oscillator to be used. The injection should be 1 volt to gate 2 of the MPF121 mixer for best results. The mixer load is the only tuned circuit which needs changing for different intermediate frequencies. After much thought, it was decided to incorporate an IF amplifier with a 16:1 broadband balun for output matching, and variable gain to prevent overload of the following receiver. Some IF gain was thought worthwhile as the FT200 tends to lack sensitivity on 28 MHz.

The balun was set up on a HP 250B receiver bridge to ensure broad band operation. It will, if constructed as in Fig. 5, give a flat response from 6MHz to 50MHz. If a 200-300 ohm output impedance is desired, the tap should be across two coils instead of one used for 50 ohms. The core used is available from the VK3 components division.

Construction

The same method of construction is used as for the preamplifier, and the board will accept a 3N140 or MPF121 mixer. The oscillator injection must be via coaxial cable, or there is likelihood of instability in the front end.

Alignment

The IF gain pot should be set initially for maximum gain, as indicated by a rise in

$$Q_m = \left(\frac{R1}{R2} - 1\right)^{1/2}$$

$$C1 = \frac{10^6}{W\,Q_m\,R2}\ \text{pF}$$

$$QL = \frac{f_o}{BW}$$

$$L = \frac{R1}{2\,W\,Q_l}\ \text{uH}$$

$$C2 = \frac{10^6}{W^2\,L(\text{uH})} - C_{in}\ \text{pF}$$

Qm = matching network Q
R1 = desired source impedance seen by the FET
R2 = 50 ohms
W = 11
fo = MHz
BW = MHz

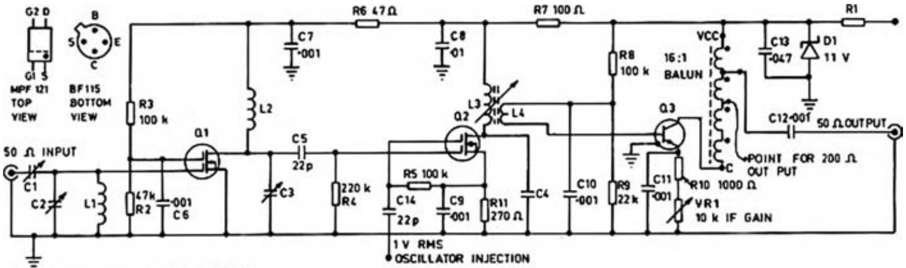
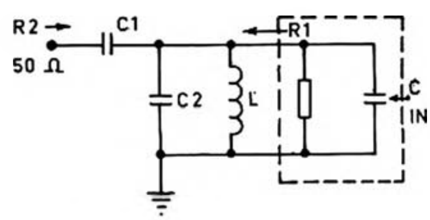


FIG 4 TWO METRE CONVERTER



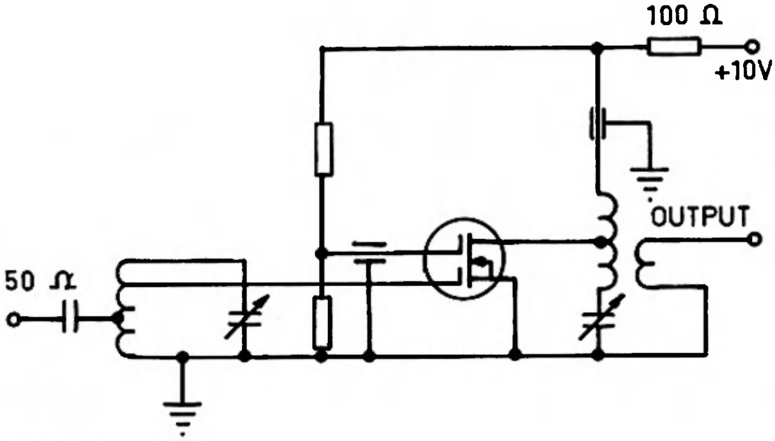


FIG 1 FIRST PREAMPLIFIER

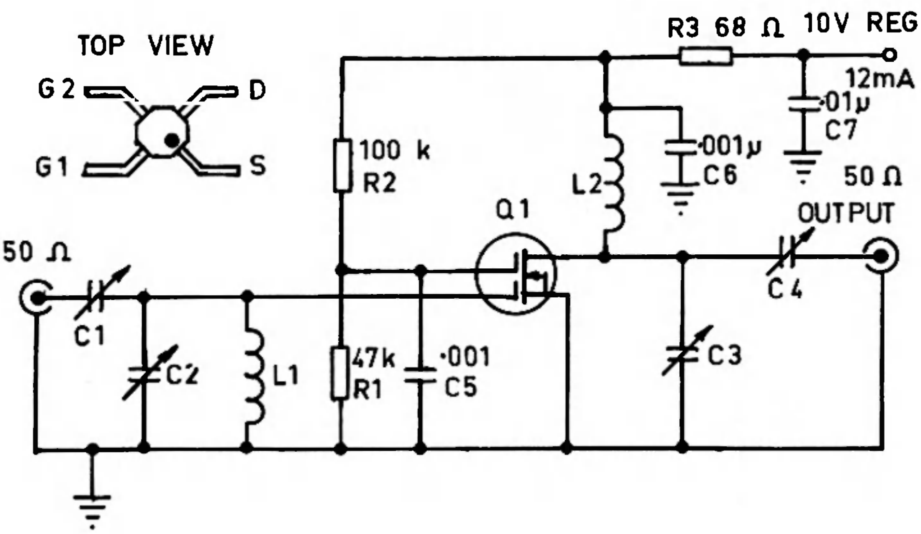


FIG 2 LOW NOISE TWO METRE PREAMPLIFIER
C1 - C4 Philips T20 2-20 pF (Green case)
L1, L2 5 Turns 16g ·2" ID ·6" long mounted 1/8" above board.
Q1 MPF 1000 or 3N210 (Motorola).

noise output. A strong signal will be detectable through the converter and the IF transformer should be tuned up first. The front end tuning is as for the preamplifier. After tuning is completed, the receiver should show several S points of noise. If not, go back and check the balun wiring. Several people have come to grief in this area already! Set the IF gain pot back until antenna noise in the absence of QRM lifts the S meter about S1 to S3, as this seems best. An AM signal generator can be used to find the optimum setting, by measuring S+N/N ratio.

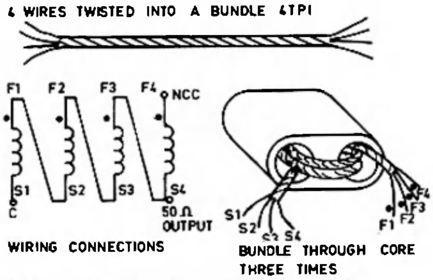


FIG 5 6-50 MHz BROAD BAND BALUN

Performance

A HP8654A signal generator with a 20 dB pad was set for 40% AM, and the sensitivity measured. At 0.2 uV the S+N/N ratio from the FT200 on AM position was 8 dB. The generator has very low leakage, and the attenuator was recently calibrated, so the figures are assumed to be accurate. On-air testing verified that the sensitivity and noise figure were good.

CONCLUSION

The two circuits described here are not one-off types, difficult to duplicate, or using hard-to-get components. Approximately 10 preamplifiers, and five converters have been constructed so far, and all have come up to expectations. The Ipswich and District Radio Club will make kits available, either in basic form or fully assembled and tuned, if there is sufficient interest. Enquiries should be addressed to the club, c/o 20 PEACOCK ST, LEICHHARDT, 4305.

REFERENCES

1. Transistor Circuit Design; Texas Instruments Inc. High Frequency Designs, p324.
2. Semiconductor Noise Figure Considerations. Motorola, AN-421.

TWO METRE CONVERTER

C1-C3	2-20 pF Philips T20 (Green case).
L1-L2	5T 16 gauge, 0.2 in. ID, 0.6 in. long, mounted ⅛ in. above board.
Q1	3N210, or MPF-1000 (Motorola).
Q2	MPF-121, or MPF-131.
Q3	BF115 or BF167.
R1	To drop supply to zener voltage, which should be between 10V and 12V (an 11V zener is shown), at 35 mA.

All IF coils are wound with 30 B&S enamel wire on a Neosid former with an F16 slug. The former is mounted in a can for shielding.

IF	C4	L3	L4
22-33 MHz	27 pF	15T 0.16" long	2T over centre of L3
17-25 MHz	27 pF	23T 0.25" long	3T
12-18 MHz	27 pF	27T 0.29" long	4T
8-12 MHz	39 pF	42T 0.23" long 2 layers of 21T	5T
7-10 MHz	39 pF	52T 0.28" long 2 layers of 26T	6T
5-7 MHz	39 pF	69T 0.25" long 3 layers of 23T	8T

BALUN CONSTRUCTION

The balun core used is the larger of the two sizes commonly available, being 14mm x 14mm x 7mm. Four strands of 26B&S enamelled wire are twisted in a hand drill, four turns per inch, for 5¾ in. The twisted bundle is wound through the core three times, so that the start and finish of the windings protrude from one end of the core. The protruding ends are untwisted and labelled start, S1, S2, S3 and S4, then finish, F1, F2, F3 and F4. The wiring diagram shows the connections of these wires. Make sure that the wiring diagram is rigidly followed, or the balun will not work.

■

MODIFICATIONS TO CARPHONE for use with 2 Pole - 6 Position Switch

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In March and April 1971, "A Transistorised Carphone" appeared in AR and proved very popular. This modification is a method of earthing one side of the crystal in the carphone.

The circuit used series mode crystals in the transmitter and incorporated a bipolar transistor whose junction varied as the audio, in series with the crystal, and thereby produced an FM signal. This idea is excellent and very linear, but the use of an exotic switch to open both sides of the crystal was used.

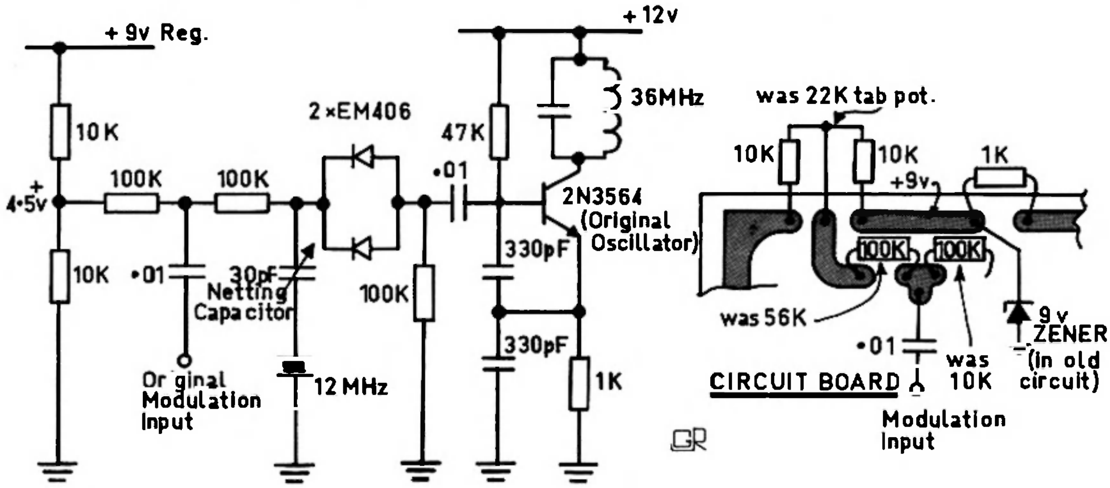
This modification entails the use of a silicon diode and thereby does away with one switching system.

All components can be fitted on the original board and can be completed in one evening. The idea of using a reversed diode to FM an oscillator is quite old, and therefore no originality is claimed for this circuit. The diode is reverse biased to 4½ volts, and a good swing on modulation is obtained. The crystal is placed on frequency by the 30 pF "netting trimmer". The original audio control in the modulator can now be used to set deviation.

Modification to the printed circuit board entails replacing the 22K pot with 2 x 10K resistors, and substituting a 56K and 10K with a 2 x 100K resistors. The extra 100K can be placed under the board and soldered.

Removal of the bipolar modulator transistor and associated components leaves ample holes for the new modifications.

The modifications have been used in my carphone for six crystals and all crystals net without difficulty. This idea also cuts out stray capacitance inherent with the original two switch idea. ■



HORIZONTAL TO VERTICAL THE EASY WAY

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Amateurs who wish to transmit on the 160 metre band are usually faced with an immediate problem; what to use for an antenna?

The majority of operators use some sort of horizontal antenna for the HF bands (at least on 80 and 40 metres). This is usually a dipole of sorts ("Straight" variety, G5RV, trap dipole etc.). Even if an ATU is used for matching such an antenna on 160 metres, horizontal polarization is not very effective on this band. (See AR May-Sept. 1971 for John VK3ACA' excellent discussion of this topic). The best solution is to use the existing horizontal antenna as a *top loaded*

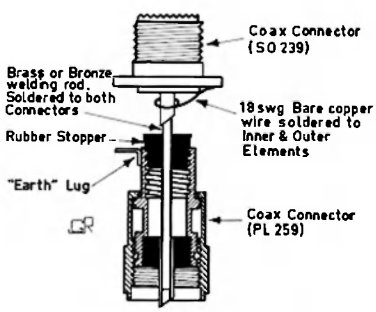

Fig. 1

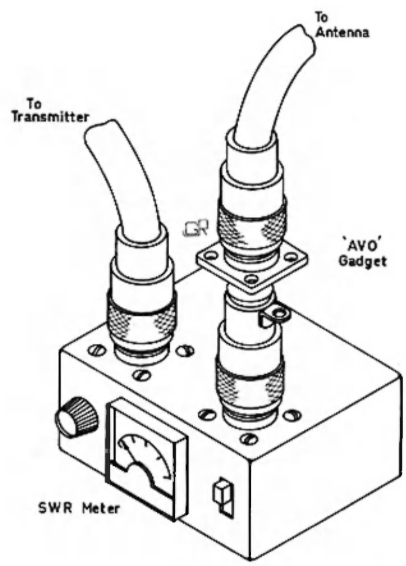

Fig. 2

vertical by joining the feeders at the station end. This is often done by the use of clips, a very untidy and unworkable arrangement.

The little gadget, shown in cross section in Fig. 1, overcomes these problems. The diagram is self explanatory. A male and female coax connector are used to convert a coax feeder into a single wire by joining the inner and outer conductors at the female socket. The best position to use this device is on the antenna side of your SWR bridge (Fig 2). Simply unscrew your antenna, insert the device in series and reconnect. You now have a "vertical" antenna and you can use the "Forward" position of the SWR meter for tune up purposes and to continuously monitor relative output.

NOTE — SWR measurements made with this arrangement may be meaningless. The meter is only used as a relative output indicator.

If this "shorting device" is used in conjunction with an ATU it may be inserted at some convenient point to do the same job. My G5RV will load "as is" on 160 metres so I used it as shown in Fig 2.

Needless to say a good earth connection is essential with such a vertical system.

Finally, a word about the point of connection of the earth wire. I found that the best output was obtained (as judged by the "S" meter of other operators) if the earth connection was made right at the antenna connector (shown as "earth lug" in Fig 1) but this is a point for experimentation by the individual amateur.

See you on 160 metres. ■

TRAP DIPOLE FOR 80 AND 40 METRES

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Described is a trapped dipole arrangement which is inexpensive and easy lo construct. This antenna is suitable for those who have space limitations and difficulties in erecting a full size 80 metre dipole.

The ends of the antenna may be bent without loss of signal, and tests on 80 metres have confirmed this.

Tuning the 40 metre section makes no difference to the operating frequency of the 80 metre section, and vice versa.

METHOD OF CONSTRUCTION

(1) Connect a short length of antenna wire to each side of an insulator, say 16 gauge, about 8 in. long.

(2) Space wind 20 gauge wire 20 turns (as a start), connect 47 pF across coil, coil diameter 2 inches, coil length 2¼ inches.

(3) Grid dip to 40 metres at required frequency of operation, say 7080 kHz. Construct both coils exactly the same, slip coil over insulator, insert capacitor inside, give coil several coats of coil dope, fix insulator with epoxy cement.

(4) Drill a small hole in bottom of Pill Box, insert antenna wire, drill hole in lid, insert other antenna wire, screw on lid, cement around wires.

(5) Connect to dipole, raise to operating height, check SWR of 40 metre section first.

(6) This can be done by the same method as described in the article "20 MX Quad Tuning made Simpler" previously published, using the same GDO and Bridge. *Note:* Most antannae can be tuned using this method.

(7) If the GDO *reads lower* in frequency (that is the dip in SWR meter) the 40 metre section must be cut shorter, say a few inches at a time, until the dip on the bridge meter occurs at the same frequency to which the trap is tuned. If the dip occurs at a higher frequency, the 40 metre section must be made longer.

(8) The same procedure is then carried out on the frequency required for 80 metre operation. Trim the 20 ft. sections.

Note: These tests must be made at normal operating height.

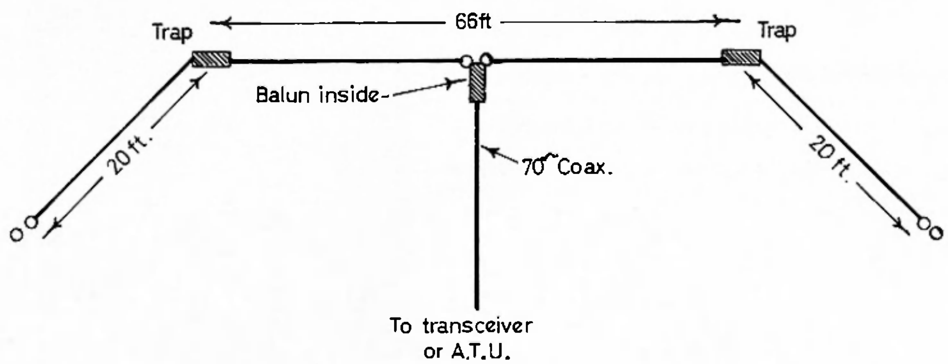
CONCLUSION

This antenna has been in operation for 2½ years and used at least twice weekly on both the 80 and 40 metre bands.

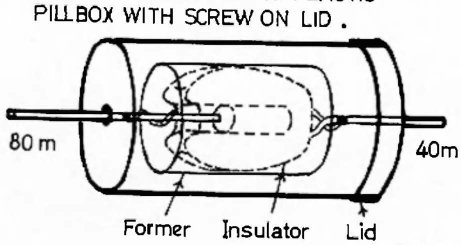
A recent inspection found the traps to be in excellent condition.

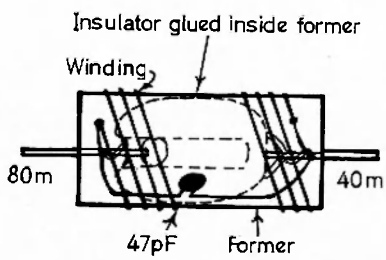
Comparison tests with this antenna and a G5RV have shown equal performance. ■

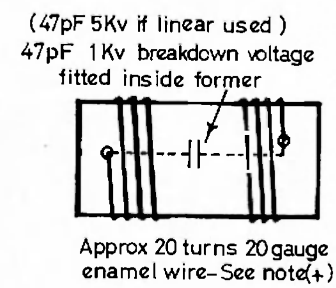
TRAP DIPOLE 40-80 METRES.



TRAP IN WEATHER PROOF PLASTIC PILLBOX WITH SCREW ON LID.







Newcomers Notebook

with Rodney Champness VK3UG

44 Rathmullen Rd., Boronia, Vic., 3155

A NOVICE TRANSMITTER — PART 1

Originally it had been intended that the description of the transmitter would only take two months in the magazine but to do the job properly it appears that as many as four months of description will be necessary. It is intended that this series of articles should not only be a constructional article, but indicate to you what the purpose of each component is and so give you ideas for your own projects in the future. Additionally, it is hoped that the detailed descriptions will assist you when you sit for the full amateur ticket.

This month the circuit diagram for the CW part of the transmitter is shown, along with a detailed parts list, and expected voltage and current readings in various parts of the transmitter. Most components can be varied in value by up to 50% in either direction, but it is preferable to use the values shown so that there is no problem getting the transmitter to function correctly. The only ratings that should not be reduced are the voltage and wattage rating of components. Those with sufficient experience will find enough information in this first part to build the transmitter successfully. Those with little experience should wait for a couple of months before starting to build the transmitter.

Next month a detailed description will be presented of how the transmitter works.

The voltages to expect at various points in the transmitter are as follows with a 310 volt supply on AM and a 330 volt supply on CW.

6GV8	plate AM	CW	screen AM	CW	cathode AM	CW	Grid
Pentode	245	290	130	150	11.5	14	1.5 mA
Triode	180	180	—	—	6	6	not measured

DC control line 16 volts unloaded, 12 volts loaded.

Component List for 10 watt 80 metre Novice Transmitter (RF Section) —

R1 — 39k ohm ½ watt resistor, grid leak for crystal oscillator.

R2 — 22 ohm ½ watt resistor, parasitic suppressor on crystal oscillator.

R3 — 820 ohm ½ watt, cathode bias resistor, protective bias and isolator preventing RF going along keying lines.

R4 — 22k ohm ½ watt, part of plate load for oscillator triode.

R5 — 27k ohm ½ watt, grid leak resistor for power amplifier.

R6 — 1k ohm ½ watt, grid drive is measured across this resistor.

R7 — 100k ohm ½ watt, part of voltage divider to limit cathode voltage on key up conditions.

R8 — 220 ohm 1 watt, protective cathode bias and CW timing resistor.

R9 — 270k ohm 1 watt, part of voltage divider to limit cathode voltage during key up conditions, works with R7.

R10 — 22k ohm 1 watt, screen voltage dropping resistor, sets screen voltage and controls plate current indirectly.

R11 — 82 ohm 1 watt, parasitic suppressor allied with RFC2, acts to damp any spurious oscillations.

R12 — 100 ohm ½ watt, metering resistor in plate circuit of the PA.

R13 — 6k ohm ½ watt, exact value of this meter multiplier is determined as per the text.

R14 — 10k ohm ½ watt, portion of charging circuitry of semi-break-in keying system.

R15 — 1k ohm ½ watt, part of TR1 collector load, emitter resistor for TR2.

R16 — 1.5k ohm ½ watt, as for R15, plus acts to speed up relay pull in time.

R17 — 100k ohm ½ watt, TR1 base discharge resistor, forms delay circuit with C12.

R18 — 47K ohm ½ watt, supplies HT to crystal oscillator in netting position, see text.

R19 — 440 ohms 2 watts, 2 x 1 watt 220 ohm resistors in series, to drop HT so that transmitter is not over power on CW.

R20 — 22 ohm ½ watt, part of DC smoothing circuit of 12VDC relay and semi-break-in supply.

C1 — 33 pF mica, ceramic or styroseal, part of feedback network for crystal oscillator. Can be varied slightly to swing the frequency a small amount.

C2 — 0.004 uF polyester or styroseal, 160 volts working, cathode RF bypass.

C3 — 440 pF mica, styroseal or ceramic, DC isolating capacitor for crystal.

C4 — 10 uF 100VW electrolytic, part of CW timing circuit, as well as audio bypass for modulated DC current through valve.

C5 — 0.0047 uF polyester or styroseal, 160VW, RF cathode bypass.

C6 — 0.001 uF 630VW polyester, ceramic, styroseal, screen bypass for RF but too small for audio bypassing, so that screen swings with modulation.

C7 — 0.001 uF 630VW polyester, styroseal or ceramic, RF bypass on plate circuit of PA. Works in conjunction with RFC3.

C8 — 0.001 uF mica or similar, 600VW, RF coupler to tuned circuit, stops DC from being applied to these RF components.

C9 — 15-415 pF large size tuning capacitor, single gang, relatively wide plate spacing required so that flashover does not occur. Single gang needed but dual gang from old radio suitable. Tunes circuit to resonance.

C10 — 900 pF twin gang miniature tuning gang, solid or air dielectric, acts as transmitter loading control.

C11 — 560 pF mica or styroseal, used as additional loading capacity for 50 or 75 ohm loads (aerials).

C12 — 1-2.2 uF 16VW electrolytic capacitor, part of semi-break-in timing circuit.

C13 — 0.01 uF low voltage ceramic, polyester, acts as RF bypass on heater line.

C14 — 470 uF 16VW electrolytic capacitor, main reservoir capacitor on relay power supply.

C15 — 25-50 uF 160VW electrolytic capacitor, final smoothing capacitor for relay power supply.

D1 — OA91-EM401, 50 mA 50 volt diode, time constant charging diode.

D2 — OA91-EM401, 50 mA 50 volt diode, transient suppressor.

D3 — EM401, 1 amp 100 volt silicon diode, half wave 12V DC power supply rectifier.

V1 — 6GV8 television vertical valve, used as crystal oscillator and power amplifier.

TR1 — BC108 or similar small signal silicon NPN transistor.

TR2 — 2N3638-AC128, medium signal PNP silicon or germanium transistor. Used as switch to apply actuating voltage to the relay.

Relay — Small relay with 4 sets of changeover contacts with a coil resistance of at least 50 ohms and designed to work on 12 volts. Used to changeover functions of equipment from receive to transmit and vice-versa.

L1 — 21 turns of enamelled wire on a 1¼ in. diameter former with winding 1¼ in. long. Gauge of wire 18 to 26 B & S. Tank circuit for transmitter.

RFC1 — Small 1 to 2.5 mH choke with 1 to 3 pies, part of plate load of the crystal oscillator.

RFC2 — 7 turns of wire wound over R11, as a VHF parasitic suppressor.

RFC3 — 2.5 mH 4 pi choke 60 mA rating, part of plate load for the PA, also isolates RF from HT DC circuits.

RFC4 — 1 pi 1 mH choke, used as a DC return if C8 should break down.

J1 — 6.5 mm stereo socket, used as the key jack.

P2 — 6.5 mm stereo plug, used as the key plug.

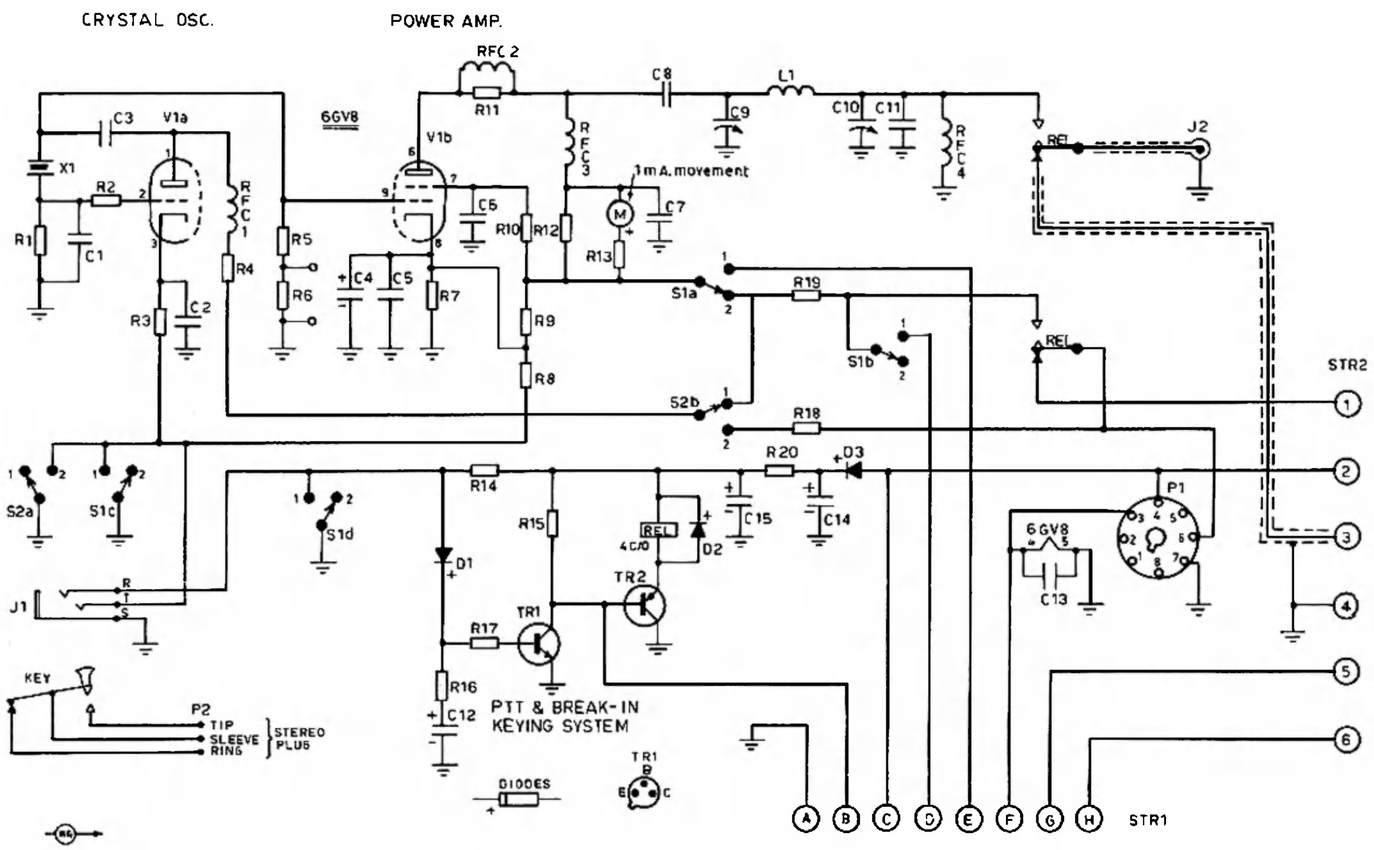
P1 — Octal plug, used on the end of a four core lead to supply voltage from the power supply to the transmitter.

J2 — Aerial socket, Belling Lee or similar.

S1 — 4 pole 2 position single bank switch, Oak or similar, used as the AM/CW mode switch.

S2 — 2 pole 2 position rotary, slide, or toggle switch, preferably the latter due to its snap action. Used as the netting-normal switch.

M1 — 1 mA full scale deflection meter, approx. 2 in. diameter, used to meter PA plate current.



10 WATT 80 METRE NOVICE TRANSMITTER

X1 — FT243 or HC6/U crystal for the 80 metre band. A suitable crystal socket is also required.

Knobs, nuts and bolts, terminals, wire, a metal chassis and miscellaneous other pieces are required such as a 9 pin valve socket. ■

OVERSEAS PUBLICATIONS SUBSCRIPTIONS

- Inflation may cause subscription rates to rise at short notice but here is the latest list:

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†Please ask for membership form.

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Commercial Kinks

with Ron Fisher VK3OM

3 Fairview Ave., Glen Waverley, 3150

LOOKING AT THE FT101B

Over the last couple of years this column has mentioned the 101 on only one occasion. A lot has been written on the 101 series, mainly in the American Fox Tango club news letter and of course quite a few articles in Amateur Radio from time to time.

A couple of months ago I decided to take the bull by the horns and buy a 101B to see for myself just what should be done and, for that matter, what could be done without digging into the works too far. Just prior to this I received a letter from Bruce Mann VK3BM with a few of his ideas on the 101B.

So for the next couple of months, Commercial Kinks will take a hard look at the 101B and hopefully present a few simple ideas that can be incorporated by any owner.

BIAS SETTING

Firstly over to Bruce for his ideas:—

The final bias setting has to be changed whenever the set is changed from AC to battery operation. The potentiometer was inaccessible both with the set in the car and on the home station console. The internal biaspot. was disconnected and leads brought out to an external potentiometer. The existing wiring is well by-passed so there is no problem with instability.

NOISE BLANKER

The blanker in the more recent models of the 101 and also the 101B are factory adjusted by means of an internal potentiometer, to give blanking of spiky noise peaks without appreciable reduction in audio level.

The older models did considerably reduce the audio if worthwhile noise reduction was achieved, however I found that on the models I have had that excellent noise reduction, even of background noise and continually rumbling static, can be achieved by advancing the threshold adjustments, but at the expense of audio gain. To make full use of this advantage in operation it was necessary to bring this control outside the cabinet. In the late model 101 that I had, the noise blanker was quite a complicated affair rather haywire and spread out on top of the VFO housing. It included three or four small coils in cans, six transistors and some diodes. Earlier models had the blanker in the same position but it was much simpler. In my latest FT101B/2 the blanker is on a plug in circuit board towards the rear of the chassis. In this the potentiometer is of 10K ohms with one side earthed. In the FT101 referred to earlier the pot is 2.2K ohms and earthed through a 3.3K ohm resistor. The noise blanker circuit of the earlier 101B appears to be the same except for the change of one transistor type number. The two external pots, one bias and one blanker, were mounted on a small panel flush with the front panel and attached to the small screw half way up the side of the cabinet. Two tiny holes were drilled in the cabinet to pass through some fine gauge hookup wire.

Bruce finishes with a comment that the earlier FT101's were unstable when used with a linear amplifier but that the latest 101B is quite stable under all conditions.

Now one small idea of my own. I found the receive audio of the 101B rather hard with a predominant high in the response. After a period of listening the sound became rather fatiguing. I took the opposite approach to previous authors in this magazine who found bass response attenuation suited their ears. I connected a 64 mFd electrolytic capacitor across the external 5 in. by 7 in. speaker. The high frequency hiss was gone and the sharp edge was removed from noise pulses. Try it — no internal modifications are needed.

Next month I will show two methods of reducing distortion on local signals, a problem that seems to effect some 101B owners but strangely not others. However there is no denying that this problem exists. ■

VHF UHF an expanding world

with Eric Jamieson VK5LP

Forreston, S.A., 5233

Times: GMT

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RTX, Devonport	144.900
3D	3DAA, Suva, Fiji	52.500

There has been quite a bit of pruning and resultant up-dating of the beacon list this month. The VK2 beacons have apparently been off the air for some time, as also has the P29GA beacon. They have now been removed from the listing. Confirmation comes from Terry VK8ZCB that the Darwin beacon VK8VF has not operated since cyclone Tracy on Christmas Day, not even for test purposes. The Darwin Club is still awaiting reconnection of the AC mains to the beacon site, plus repairs to the building, keyer and antenna system. None of these beacons will be re-listed until definite information is received that they are operating.

I am back home again after a month's holiday, including a stay in sunny Queensland, and right at the top end in Cairns at that. Met a few of the boys. In Townsville spent an evening with Eddie VK4ZEZ and George VK4GS; down the coast a bit further hunted up Ross VK4RO at Ayr. At Rockhampton went hunting for my old friend Lance VK4ZAZ, found him just ready to catch a plane to Townsville, so missed on that one. Next in line was another well known acquaintance, Lindsay VK4AAL (ex-4ZIM). I spent a very enjoyable evening there, especially drooling over the mass of JA QSL cards he has, a drawer full in fact! Oh, to live in VK4 when the DX is around! Further down worked quite a number of the Brisbane boys on Ch. 1 repeater and on simplex Ch. 40 and 50. Whip to whip over 38 miles quite a good haul, even able to do it with 1 watt! Silence then till we got to Mildura when a number of the VK3 boys were worked via their Ch. 4 repeater. A few bits of information were picked up on the trip as follows:

Ted VK4YG in Cairns said there is now an interest being taken on 6 and 2 metre operation in the New Hebrides, call area YJ8. Ted also mentioned the Cairns boys were investigating the possiblity of a 28 MHz beacon as a lead-up to band conditions on 6 metres . . . On the Island of Guam ex-VK4IK, Laurie now with a KG6 call sign is operating on 144.100 SSB with 1 kW, beaming south at 0900Z daily. He apparently is also trying to put a signal to any of our Ch. 1 repeaters. Perhaps the southern operators should be turning their 6 and 2 metre beams to the north and north east more often than previously. VK4 should be in the box seat for both Guam and the New Hebrides.

NEWS FROM JAPAN

Two letters are to hand from JA land. They contain some items which should interest, so I have picked these out. They both come from Yoshiyuki Abe JA1PLI in Tokyo. He reports last season 6 metre conditions were rather quiet in Japan, only three times worked KG6, and sometimes heard TVQ-O on 51.750 MHz. Normally they would expect to work HL9WI and HM1GO, but nothing. In June this year JD1 and JA8 both worked to KG6 (Guam) on two occasions. On 4th July Yoshi and another amateur heard KG6APP on 50.117, this being the Guam beacon, 2500 km from Tokyo, but no replies to their 300 watt signal. He has worked 50 VKs, covering all areas, but mostly VK4 and VK8. He uses a 4CX350F with CW and SSB, and will have a new beam up about September.

Yoshi's second letter gives a full listing from his own call book of 6 metre DX stations worked over the past 4 years, and it makes fascinating reading. Apart from a multitude of VKs, exotic call signs include KX6HK, ZK1AA, VS6DA, DU1ZAI, KR6CR, 5W1AR, KR8GV, HL9WI, KH6GRU, LU1MBJ, KL7HAM, HM1BB, VK9ZAP, C21AA, KC6AO. In addition, he heard Ws and ZL. Additionally, other areas to be worked from Japan during cycle 20 included XW8, W, JD1, KW6 and KG6R. This gives us in VK some idea of the spread of 6 metre activity throughout the Pacific area, and probably indicates we should all be doing a lot more listening and perhaps calling to the north and north east.

It would appear the JA stations are showing quite a lot of interest in working VK, particularly the lesser worked areas such as VK5, VK3 and VK7. When VK is not available to them, they operate their band along these lines: 50.000 to 50.100 CW; 50.100 to 50.250 SSB; 50.300 to 50.900 AM; and 51.000 and up for FM. Yoshi advises the beacons JA1IGY on 52.500 in Tokyo and JD1YAA on 53.110 (Marcus Is.) are currently not operational, and possibly they may not be on again for this year.

It is interesting to hear from interested operators in other countries, and I will do what I can to foster interest in Japan to keep them, and others in the Pacific through them, looking this way when conditions are suitable. In addition to writing perhaps I should be doing something more on HF to stir up further interest.

MID-WINTER DX

Kerry VK5SU sends along his usual interesting snippets of his doings on VHF. Of special interest is the prolonged reception of VK5VF, on 144.800, which was audible at varying strengths, day and night, from about 5-6-75 to 14-6, a longer period than when heard during the height of the summer season. The VK5 Ch. 4 repeater is often available. A subsequent letter mentions a 6 metre opening on 28-6 from 0153Z when Wally VK2ZNW, ex-VK5ZWW (believe he was asked to leave VK5!) at Orange was worked. Up to 0230Z worked VK2ZNS, VK2ZND and VK2HZ. Rod VK2BQJ, then climbed on the bandwagon with a 5 x 9++ signal to make his presence felt. Even had time to sneer at my 2½ elements at 80 feet! The same day VK2ZZU and VK2YO were also worked, plus VK2ZMW at Coonabarabran S7 on 52.525 FM. All other VK5s were resting.

Kerry mentions the 10 metre band in his letter, advising of a net in Sydney on 28.500 MHz, instigated mainly by VK2BVS it seems. On what appeared to be a dead band recently he gave a call on that spot and was answered by VK2IN R3 S0. Again tried 28.5 during the above mentioned 6 metre opening and worked VK2NT and VK2AAB at S 4/5. So with the ZLs placing a beacon on 28.170 MHz, 10 metres might be looked at more frequently as a guide to what may come on 6 metres. A closer study of the relationship between contacts on that band and 6 metre activity could be indicated. Thanks Kerry.

SIX METRES AGAIN

Joe VK7ZGJ in his notes in "Q.R.M." indicates there is still some meteor scatter activity. On 22-6 at 2245Z he heard Wally VK2ZNW calling CQ via this mode. Call signs were exchanged, taking about 15 minutes to complete. Half an hour later Wally was S9+ for about 3 mins. and three short overs were exchanged. Subsequently the band opened to VK2 and VK4 with signals peaking 5 x 9 for about an hour. Further reasons why we should be looking at 6 metres other than in the summer time.

3.3 GHz RECORD

From "Break-In" June 1975 comes a report of a new New Zealand long distance record, established on 3.3 GHz between Mt. Murchison and Mt. Ruapehu, a distance of 238 miles. It has not as yet been confirmed as a world record, though it could well be as the previous best appears to be 24 miles established by W6IFE/6 to K6HIJ/6 on 18-8-70.

It was on Sunday, 2-2-75 at 2240Z when the record was established between ZL2THW and ZL2TSM with copy 5 x 5 peaking to 5 x 9, power 60 milliwatts. Congratulations boys. They were not content to take 3.3 GHz gear to their respective mountain sites, but each party took along 80 metres SSSB. 2 metres SSB/AM/FM, also 432 MHz, 1296 MHz and 10000 MHz! That's dedication for you!

MOONBOUNCE REPORT

Lyle VK2ALU reports in "The Propogator", monthly newsletter of the now newly named "Illawarra Amateur Radio Society" that work continued throughout the month on completion of transmitter modifications and adjustments, during which much was learned about UHF cavity type high power amplifier operation, including the effects of this level of RF power on substances such as epoxy resin and nylon. They do not last very long at all, especially if in the stronger areas of the electrostatic field. Teflon or porcelain, and possibly fibreglass, are about the only insulating materials which will last in the 600 watts of RF output power they are now getting, from about 1000 watts input. It is hoped this 3 dB increase in transmitter power on 432 MHz will help in achieving contacts, together with an expected improvement from the new receive system input coax filter which has been silverplated. Thanks Lyle. Anyone else any EME news?

FM REPEATERS

I was interested in a brief comment Eddie VK1VP made to me in a letter regarding repeaters, prompted by the letter I published by Don, VK3AKN in July. "Repeaters have been established for the prime purpose of increasing the communication range of mobile VHF stations. To my knowledge no applications for a repeater licence have stated that it is mainly for home to home communications, but as you know, most of the repeaters, maybe except some metropolitan ones, handle primarily base to base traffic. What about linear repeaters for other modes of transmissions? It seems that in most amateur minds and also on the licensing authorities mind repeater means FM repeater!" Thanks for the comment Eddie, I am sure the points are very valid. Additionally, the repeater represents a means of establishing an initial contact with so many monitoring the frequency, but all too frequently once contact is made stations well within the range of one another by a direct path refuse to vacate the repeater channel for another simplex or vacant repeater channel, and continue to occupy the channel for long periods. Those who do this are either very inexperienced or selfish. Diversification by various operators would ensure they had either additional channels available, or they could do as I and some others do, go down to the tuneable portion of the band and occupy some portion of that, instead of everything being conducted in the FM portion.

Whilst in the area of Canberra, the latest issue of their newsletter, "Forward Bias", indicates increasing interest in 2 metre operation. Apart from the long distance operators who have been around for a long time, there are now VK1AOP, VK1RY and VK1LF who own FT220 transceivers (SSB, CW, FM on any part of 2 metres). Good to see the spread of operating capability and it is hoped there are still some VHF operators in Sydney interested in working Canberra. Perhaps VK5 and Canberra should be trying for that elusive contact more often?

Other news remains a bit scarce at it always does at this time of the year, and I have not been back long enough for much to happen. So we will close at this point with the thought for the month and start preparing for the "RD" Contest. "Criticism, like rain, should be gentle enough to nourish a man's growth without destroying his roots".

The Voice in the Hills

Contests

with Jim Payne, VK3AZT
Federal Contest Manager,
Box 67, East Melbourne, Vic., 3002

CONTEST CALENDAR

SEPTEMBER

13-14	European DX phone
20-21	Scandinavian CW
27-28	Scandinavian phone

OCTOBER

4-5	VK/ZL/Oceania phone
11-12	VK/ZL/Oceania CW
12	RSGB 21-28 MHz phone
18-19	RSGB 7 MHz DX CW
25-26	CQ WW DX phone

NOVEMBER

1-2	RSGB 7 MHz phone
8-9	European DX RTTY
9	Czechoslovakian DX
29-30	CQ WW DX CW

EUROPEAN DX PHONE

0000 GMT Sat. 13th Sept. to 2400 GMT 14th. Rules same as for European CW in July issue of Amateur Radio.

SCANDINAVIAN CONTESTS

1500 GMT Sat. to 1800 GMT Sun. (see Contest Calendar). Non-Scandinavians call CQ SAC on CW and CQ Scandinavia on phone. Bands 3.5 through 28 MHz. Non-Scandinavians work only Scandinavian stations once only on each band in each contest.

Scandinavian prefixes are LA, LJ, LG (Norway) JW (Swalbard) JX (Jan Mayer) OH (Finland) OHO (Aland Islands) OJ0 (Market Reef) OX (Greenland) OY (Faroe Islands) OZ (Denmark) and SM/SK/SL (Sweden). Usual RS/T report and QSO numbers commencing 001. Multipliers limited to 10 per band (from above prefixes) and one point each completed QSO. Certificate to best VK log. Logs to show date, GMT, station worked, number sent, band and mode of NEW multiplier. Separate logs for each band not permitted but summary sheet must show total score each band, final score, call sign, name and full address. These 1975 contests arranged by SARL Finland, Postilokero 306, 00101, Helsinki 10, Finland.

VK/ZL/OCEANIA CW AND PHONE

See Amateur Radio, June 1975.

1975 BARTG RESULTS

A copy of the results received from Bill VK5WV shows that Chris, VK6CT finished 49th in the contest with 29,376 points and Ron VK5RY was 66th with 12,896 points. Bill mentioned that he will return to RTTY activity shortly, with some different gear.

WPX RULES

These rules were referred to in the rules for the 16th All-Asian DX contest and several VK amateurs have asked for details. Up to date I have been unsuccessful in trying to obtain this information, so if you have details, could you forward a copy to the FCM, C/- Box 67, East Melbourne, please.

RSGB 7 MHz DX 1975

CW 1800 GMT 18 Oct. 1975-1800 GMT 19 Oct
Phone 1800 GMT 1 Nov 1975-1800 GMT 2 Nov.

Usual RS/T and QSO numbering. VK stations score 50 points for each QSO with British Isles plus a bonus of 20 points for each British Isles numerical prefix G2, 3, 4, 5, 6 and 8; GI2, 3, 4, 5, 6 and 8; GC2, 3, 4, 5, 6 and 8; GD2, 3, 4, 5, 6 and 8; GM2, 3, 4, 5, 6 and 8; GW2, 3, 4, 5, 6 and 8. Note that stations using GB prefixes do not count for bonus points. Certificates are issued to VK stations who submit a log with not less than 10 contacts. Entries to HF Contests Committee, C/- BAZLEY, G3HCT, Brooklands, Ullenhall, Solihull, West Midlands, England and must arrive before 15th Dec for CW and 29th Dec for phone.

RSGB 21/28 MHz PHONE

This is a 12-hour contest from 0700 GMT to 1900 GMT on Sunday 12th Oct 1975. Usual RS/QSO number. Contacts may be made once with same station on each band. VK stations claim 3 points for each completed QSO with G stations (see list above for 7 MHz contest). Final score is total number of points multiplied by total number of British Isles prefixes worked on each band. Entries to reach G. Andrews, G3MXJ, 18 Downsview Cres., Uckfield, Sussex, England before 8th Dec 1975.

RECEIVING SECTION OF VK/ZL FOR '75

1. The rules are the same as for the transmitting section, but no active transmitting station is permited to enter this section.

2. The contest times and logging of stations on each band per week-end are as for that transmitting section except that the same station may be logged twice on any one band — once on phone and once on CW.

3. To count for points, logs will take the same form as for transmitting, as follows: Date, time in GMT, call of station heard, call of the station he is working, RS(T) of the station heard, serial number sent by the station heard, band, points claimed. Scoring is on the same basis as for transmitting section and the summary should be similarly set out with the addition of the name of the S.w.l. Society in which membership is held if a member.

4. Overseas stations may log only VK/ZL stations, but VK receiving stations may log overseas stations and ZL stations, while ZL receiving stations may log overseas stations and VK stations.

5. Certificates will be awarded to the top scorer in each overseas scoring area and in each VK/ZL call area provided that at least three entries are received from that area or that the contestant has scored 500 points or more.

73s, VK6NE

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

The Editor,
Dear Bill,

I was recently asked by a primary school teacher about assistance with a very basic radio course she wished to offer for some 6th grade boys. I gave her what ideas and suggestions I thought appropriate about her intended course, and later had the thought that maybe a retired amateur operator in the area may like to offer his services to the school concerned to give the kids some technical (but not too involved), assistance. I would say that the time commitment would be minimal but the benefits to the kids and teacher would be very great. The work would probably centre on assistance with actually getting the kids' crystal sets and basic Rxs going with perhaps some basic theory from time to time.

The school concerned is: Koonung Heights State School, Belmore Road, Box Hill North, 89 7081. This might be a way to keep another retired amateur operator off the streets?

73, Graeme Scott, VK3ZR

The Editor,
Amateur Radio,

H.R.P.P.R.C.
P.O. Northampton,
via Western Australia

Dear Sir,

It is with much pleasure that I advise you of the formation of the Hutt River Province Principality Radio Club. (The Hutt River Province seceded from the Commonwealth of Australia on the 20th of April, 1970).

As the Province grows rapidly and interest in Amateur Radio being high, the formation of an organisation to foster all interests in radio and its technology was essential.

Although the organisation is in its infant stages amenities include electrically noise free location, 100 foot tower, TH6DXX antenna, and some associated equipment.

Any Amateur contemplating a visit to the Province, which is only 350 miles north of Perth, will be made most welcome and invited to "hook up" his gear and work the fantastic DX that is available.

Yours faithfully,
R. A. McINTYRE,
President

The Editor,
Amateur Radio,

W. J. Mordue, British Embassy
No. 1 Ichiban-Cho, Chiyoda-Ku
Tokyo 102, Japan.

Dear Sir,

Thought that the enclosed cutting from the local newspaper, the Mainichi Daily News, may be of interest to you or the readers of Amateur Radio.

JAPAN HAS MOST DXERS

The number of licensed amateur radio operators in Japan reached 286,247, or the equivalent of the population of Takamatsu last March, out-numbering their counterparts in the United States by nearly 10,000, it was learned Monday.

There are 14 times as many hams in Japan as in West Germany, the third largest nation for Amateur Radio operators.

Ham stations among TV, radio and other commercial wireless communication stations authorised by the Posts and Telecommunications Ministry ac- acount for 25 per cent of the total, it is said.

Ministry officials said the sharp increase in the number of hams reflects the spread of scientific knowledge in Japan. Simplification of the licensing examination system also has helped to boost the number of hams in all age brackets, they said.

The officials said the amateur radio boom in Japan was traceable to the fact that the average Japanese today has enough money to spare. A radio capable of transmitting over a radius of 100 kilometres costs between 60,000 and 70,000 Yens, and advanced communications equipment capable of reaching overseas stations costs between 170,000 and 1 million Yens.

The boom, they cautioned, was also giving rise to a number of inexperienced hams who cause jamming of TV and radio broadcasts and other commercial communications.

Lack of discipline on the part of some hams, such as bugging of police communications, was also pointed out by the public relations official of the Japan Amateur Radio League (JARL) founded in 1926.

JARL reports a rise in the number of physically handicapped persons who have taken up Amateur Radio and said it is compiling a textbook in braille.

Yours sincerely,
BILL VK6JM

IARU NEWS

In Radio Communication of June 1975 the IARU Region 1 HF band plan is detailed. It is perhaps useful to compare this band plan with the official WIA "gentlemen's agreement" HF band plan in use for many years.

We use 3.5 to 3.535 MHz for CW only whereas they recommend 3.5 to 3.6 MHz, presumably because their band extends all the way from 3.5 to 3.8 MHz whereas ours stops at 3.7 MHz. Their RTTY channel is 3.6 MHz + or —20 kHz whereas ours is 3.62 MHz. Their recommended SSTV frequency is 3.735 MHz.

On 40m they recommend 7 to 7.04 MHz for CW only (ours is 7.0 to 7.3 MHz) with 7.04 MHz, the same as ours, for RTTY (+ or —5 kHz). Their SSTV is on 7.04 MHz as well.

For 20m the frequencies coincide with ours for CW only (14.0 to 14.1 MHz) and RTTY (14.09 MHz + or —10 kHz). SSTV is 14.23 MHz.

On 15m the CW only portion is the same as ours (21.0 to 21.15 MHz) but the RTTY frequency (+ or —20 kHz) is shown as 21.1 MHz against our 21.09 MHz. 21.34 MHz is the recommended frequency for SSTV.

The CW only portion of 10 metres is the same for both (28.0 to 28.1 MHz) but they have a RTTY frequency of 28.1 MHz (+ or —50 kHz) whereas we have none and they fit their beacons into the recommended segment of 28.2 to 28.25 MHz. Their SSTV frequency is 28.67 MHz + or —5 kHz as applies to all their SSTV channels. 29.4 to 29.55 MHz is their recommended downlink of amateur satellites.

Of course, all the remaining portions of each band in both cases can be used by CW and telephony stations. It is interesting to note they recommend 3.5 to 3.51 and 3.79 to 3.8 MHz as reserved for inter-continental working.

The article which is written by G2BVN, the R1 secretary, says there was considerable discussion concerning electromagnetic compatibility of electronic entertainment equipment and it was agreed to set up a working group between conferences for which the RSGB will act as convenor. Pressure on manufacutrers is considered to be essential and a report was made that one maker already markets an "interference free" television receiver.

Another item considered that the International Beacon Project is a valuable way in which radio amateurs can participate in serious scientific work.

In relation to the 70cm band plan some changes were made firstly to align as far as possible the 432 to 433.5 MHz segment with the 2m band plan (thus easing the problem of memorising the plan) and secondly to make provision for a repeater scheme contained within the band 432 to 438 MHz — this is the only 70cm allocation available to a number of R1 member societies. Their scheme defines an input/output separation of 1.6 MHz and has a marked similarity with the current 2m scheme. Inputs are in the band 433.0 to 433.225 MHz and outputs 434.6 to 434.825 MHz (1.6 MHz higher).

Band plans were also discussed for the 23cm band (1296 to 1298 MHz) to align with the 2m plan. Unfortunately France has lost her allocation in the region 1296 to 1298 MHz due to Government action — "a note of warning to all member societies" is the comment by the writer G3FZL.

Among the "other" matters discussed was an exchange of experience with linear translators which are currently in operation in Austria, Czechoslovakia, West Germany and Holland. Typical of these is DB0VU which has an input on 432.6 MHz, an output on 145.4 MHz, and a bandwidth of + or —16 kHz. Very successful operation was reported both with this and other linear repeaters, it being found that the predominant mode of transmission through the repeater was SSB.

Magazine Index

With Syd Clark, VK3ASC

BREAK-IN May 1975
Hong Kong Conference Report; Kit Set Assembly; A FET GDO/Wavemeter; Z Match or Triband Coupler; A Top-Cut Filter for Your Transmitter; Notes on the Wellington Walkies.

CQ-TV May 1975
This is a publication especially for the ATV fan. It is published in England and deals with Slow-scan on the HF bands and CCIR standard transmissions on VHF/UHF. A Modification to the Sony TV9-90UB; An IC Scan Failure Protection Circuit; An Image Orthicon Camera; Circuit Notebook No. 21 (Regular feature) this month — Motor Control Circuits.

CQ April 1975
Inexpensive Surplus 160/80 Metre VFO Controlled CW Transmitter; My Audio Transducer; Amateur Radio — The "Invisible Man"; The Venus Scientific Slow-Scan TV Equipment; Antennas, Reader Response and 80 Metre Antennas; An Introduction to Active Filters; An RF Transistor Tester; Receiver Updating Circuits, QRPP; VFO Design Notes; The Best Amateur Band for You; How to Pass Multiple Choice Test When you Don't Know the Answers.

CQ May 1975
The Wonderful HRO Receiver; The Atlas 210 and 215 Transceivers; 1974 CQ World-Wide DX Contest-Phone Results; Operating RTTY on Two Metre FM; Standing Wave Ratio; Frequency Pre-Scalers; Driver-Final Design Notes; Seanet Convention; The AN/ARC-44 Transceiver.

BREAK-IN June 1975
3.3 GHz Long Distance Record; CQ Nine Cms; Sealed Nicad Batteries; Masts Again.

MOBILE NEWS May 1975
Membership report; The Hamburg Relay; The Renault 16TL (Suppression techniques).

RADIO COMMUNICATION May 1975
Dealing with Interference Problems; Interference — The Social Aspect; Going QRT; TV Masthead Amplifiers and their Problems to the Amateur; Who Pays the Price; Investigation by the Post Office of Radio and Television Interference from Amateur Transmitting Stations; Interference Problems in 1973; Determining Azimuth and Elevation for Oscar Satellites; The W2AU 1:1 Balun; RSGB Interference Survey; Building Blocks for the Novice.

RADIO ZS May 1975
Series of profiles of SARRL presidents; An Old Timer Remembers; A Foundation Member Reminisces; A 9 dB Gain Co-linear Antenna System (Looks like 144 MHz but, is not stated).

Y.R.C.S.

with Bob Guthberlet

Methodist Manse, Kadina, S.A., 5554

Do you remember my last AR Notes in which I asked for opinions on certain suggestions and my challenge for answers? Would you be surprised to know that I received one answer? But what happened to the replies from the VK 3, 4, 5, 6, 7 State Supervisors? This brings me to a further question — are YRCS Notes read? And how the heck am I to furnish news about the activities of clubs, etc., if the Supervisors maintain silence?

Have received a copy of the Minutes of the SA YRCS Annual Meeting from the new secretary, Maxine McEvoy. Thank you, Maxine, and welcome to the YRCS Lib movement. The meeting was held at the WIA Headquarters in SA with an attendance of VIP's from the WIA SA Division.

Bert Groves, Editor of "Zero Beat" reported the healthy state of the magazine finances, largely due to a donation from the defunct Elizabeth Club. However, Bert indicated the inevitability of a price increase. Club reports showed increased interest and activity. A resolution to the effect that present Lecture Notes no longer be used in SA because they were totally inadequate, was carried unanimously. Allen Dunn, Federal YRCS Education Officer and Phil Emery, State YRCS Examiner will co-operate to ensure exams are based on the new Syllabus. Will all State Supervisors please take note of the above resolutions? (For information only).

A suggestion has been made that we should extract the best circuits from "Zero Beat" and publish same in collective format. This is a good idea, and, perhaps club leaders may have suggestions to offer. How about it, chaps?

NSW State Supervisor, Rex Black reports that Blue Mountains Branch of WIA has started an Outreach Programme to make the local citizenry aware that Amateur Radio is functioning in this area. Rex mentions having been asked by a Government Department to run a vacation course in Amateur Radio from August 25th to September 5th. This is a Pilot course and could lead to operating courses in other centres. As I have mentioned before, publicity is an important factor in YRCS progress, and I would recommend to all club leaders and supervisors that they approach local news media for coverage.

Did you take note of the item in the July 1975 WIANEWS regarding Novice Licenses? I quote, "Novice Licenses would be issued for a year at a time and would not ordinarily be re-issued for a third year. The first exam was designated easy so as to allow a standard to be established for the future. The review in 5 years obviously will show where changes are needed." Unquote. YRCS could save the PMG time and expense with the following suggestion: that the Radio Branch grant exemptions in Novice Theory for YRCS candidates who pass to YRCS Senior Radio Certificate (Stage 2); in Morse Code receiving and sending for YRCS candidates who gain the YRCS Radio Telephone and Wireless Telegraphy Certificates; in Regulations for holders of the YRCS R/T and W/T awards.

To close in the words of Channing: Every man is a volume, if you know how to read him.

Intruder Watch

with Alf Chandler VK3LC

1536 High Street, Glen Iris, 3146

Notwithstanding the international agreements on frequencies, non-amateur stations will be heard in the exclusive amateur bands from time to time. There is, unfortunately, an "escape clause" in the Radio Regulations to the effect that an administration may assign any station to any frequency provided that no interference is caused to any station of another country operating in accordance with the allocations table.

In other words, if amateurs fail to object to interference from non-amateur stations in the amateur bands, the administration concerned is justified in feeling that it is complying with the regulations.

Accordingly many amateurs are participating in the WIA Intruder Watch spending two or more hours a week looking for intruders, establishing the fact that interference is indeed being caused by these stations, and reporting the facts to WIA Intruder Watch. The various reports are matched up and the consolidated report sent through the appropriate government channels. At worst, a record of disregard of agreements can be built up, to be used as "ammunition" against the offending government at the next international conference. Often the reports by amateurs to the WIA result in removal of the station.

The XYL and self are enjoying the hospitality and privilege of travelling through the USA. We have met my long-known friend and fellow intruder watcher Bill Conklin, K6KA in Los Angeles, and intend visiting ARRL HQ to meet Dick Baldwin, W1RU ex-Intruder Watch Co-ordinator and now General Manager of the ARRL and his staff. We have been given VIP treatment wherever we have visited and enjoy meeting the people and viewing the scenery through the country.

On my return I shall continue my co-ordination of Region 3 and endeavour to arrange IARUMS throughout the Region. In the meantime I wish my stand-in and VK3 co-ordinator, Ivor Morgan VK3XB every success in his endeavours. ■

LARA

LADIES AMATEUR RADIO ASSOCIATION NEWS

The Ladies Amateur Radio Association has been formed. During this year several women, both licensed amateurs and SWLs, met to discuss the role of women in amateur radio and the means by which they could increase female participation in what has been, until now, a predominantly male activity. Notes were prepared for the VK3 Sunday morning broadcast with the intention of ascertaining the extent of Victorian women's interest in a ladies amateur radio group. Simultaneously, letters and questionnaires were sent to many licensed lady amateurs all over Australia asking for support and ideas for forming a nationwide association.

LARA aims to increase women's interest and active participation in all areas of amateur radio. It is no longer acceptable for women to be locked out of the shack or left to watch cooking demonstrations and throw radios at conventions and rallies. Admittedly there are some wives/girlfriends who will never be more than casually interested in their OM's hobby, but for those who would like to join in, LARA plans a wide range of YL and YL/OM activities.

For those ladies who have (or have access to) a full call, a regular sked is held on Monday nights at 8.00 pm EAST on 3650 kHz + or — QRM. The first sked was held on the 21st of July and YL operators from all over Australia took part. It was a very promising beginning. Those YLs who have not yet taken part are very welcome to come up on air and add their voices to the growing number of YLs meeting regularly for a chat in this way.

LARA also plans to establish an award known as "The LARA Award". This award will differ from most in that unlicensed YLs as well as all licensed operators will be eligible to work towards it. Details will appear in a future issue of AR. YL activity on national field days and at state conventions is planned and organisers of these events are urged to get in touch with LARA in order to discuss YL activity on these occasions.

VICTORIAN DIVISION NEWS

As LARA began in Victoria, activity has largely been confined to that state and so, in this issue of AR LARA (Vic.) news has been included to illustrate what can be done in other states. At the WIA (Victorian Division) council meeting held on July 10th, council members voted in favour of LARA becoming an affiliated body of that division and a motion was passed by the Vic. Div. Annual General

Norma VK3AYL, President of Victorian Division of LARA.

Meeting expressing wholehearted support for the aims of LARA.

The first General Meeting of the Victorian Division of LARA was held on the 26th of July and Ms Norma Boyle VK3AYL was elected President. A provisional constitution was adopted and a temporary committee formed. It was suggested that LARA hold classes in elementary radio theory for YLs to assist them to obtain AOCP, AOLCP, or Novice qualificatiins. This is to be discussed at future meetings. A sked for Melbourne YLs was organised and takes place every Tuesday at 8.30 p.m. Call in is via VK3RML.

Details of the first LARA YL/OM foxhunt on August 3rd were finalised. These foxhunts are family affairs, a barbecue being held at the conclusion of this one. A perpetual trophy has been donated and the name of the YL on the winning team will be engraved on the trophy. LARA hopes to hold several hunts each year. LARA will also be sending members to the VK2 South West Zone convention in October to compete in the contests and publicise LARA in NSW.

One of LARA's initial achievements has been the formation of a crystal bank. This involves building up a stock of crystals so that anyone who needs crystals for a short period will be able to borrow from the bank. Novices in particular will be helped by this scheme since operation under a Novice licence has to be crystal controlled. Many people have generously donated crystals to the bank but more are needed before the bank can start to operate. If you can help with crystals please contact R. Roper VK3YFF, 15/10 Brook St., Hawthorn, Vic. 3122.

Anyone interested in joining LARA and helping us grow can get in touch with the Secretary (Vic.), Jenny, and she will send information and membership forms on request. Jenny's address is: The Secretary (LARA), Ms J. Roper, 15/10 Brook St., Hawthorn, Victoria 3122. ■

20 Years Ago

with Ron Fisher VK3OM

SEPTEMBER 1955

With commercial television just around the corner, the Institute was carrying on a continuing battle with the PMG for the issue of Amateur Television Transmitting licenses. According to the Editorial page of September 1955 Amateur Radio, this had been going on for the last nine years with the same answer every time. "Certain investigations have been made, but it is necessary to make further investigations after which the Institute can expect a reply to its representations".

Television was very much in everyone's thoughts and so, of course, was that great unknown, TVI. Who Will Be on the Air When TV and TVI is on? Hans Ruckert VK2AOU showed how TVI occurs, how to recognise and cure it, and how a modern transmitter should be designed to eliminate harmonic radiation.

In a later issue, Hans fully described a transmitter following the principles he had set out.

The Legendary Don Knock VK2NO described his Triple Conversion Amateur Band Receiver. It was based on two Command Receivers and a crystal controlled converter for each band. Don stated that he got his inspiration from the Collins 75A series receivers.

Noticed in this issue is my first attempt at Amateur Radio journalism, a 7Mc Mobile Converter.

Transistors were on the way. Philips had a full page advertisement for the OC72 which included a circuit for a push pull audio amplifier with OC71s in the driver stages.

Reading through the VHF notes, it was obvious that this was the era of the 288 MHz modulated oscillator. 7193s in push pull and the like. I am not sure how we found the band, or remained in it, but it was good fun just the same. ■

Book Review

THE RADIO AMATEUR'S HANDBOOK

Writing a factual book review in a few short sentences is quite difficult and we are perhaps fortunate that the publishers have, over the years, refined their comments about their publication in a manner difficult to improve upon. We therefore reproduce below, their remarks which are correct in every way.

"The 1975 edition of THE RADIO AMATEUR'S HANDBOOK keeps pace with the latest technical developments, while retaining a solid foundation of fundamental theory and practical techniques for radio communication. Revised and updated information is included in the areas of receiving techniques, transmitter design, antenna construction, and portable/emergency-powered apparatus, among others.

The technical staff of the American Radio Relay League has assisted Bob Myers W1FBY, in the preparation of the 1975 edition. Like its predecessors, the 52nd edition of the Handbook places the emphasis on proven designs and practical information of a how-to-do-it nature. Noted for its technical accuracy and clarity of description, the HANDBOOK appeals to beginners and advanced amateurs alike.

Among the new construction projects included are a 160 metre amplifier, a solid-state single sideband/CW exciter, a direct-conversion portable receiver for 20 and 40 metres, a transverter for 160 metres, a 10/15 metre preamplifier, a Unimatch antenna coupler and a 5-element triband quad."

This year the ARRL has chosen to print the latest edition of the Handbook upon a poorer quality paper than has hitherto been their practice. This reviewer feels sure that this will not detract from the usefulness of the publication and that the price has been kept at an irreducible minimum.

Review copy supplied by ARRL. Copies available from advertisers.

VK3ASC ■

Trade Review

MULTI-TAPPED POWER TRANSFORME

Ferguson Transformers Pty. Ltd. have released two new multi-tapped transformer additions to their line of 20VA and 40VA low height transformers. These transformers will be useful for providing a range of output voltages.

Both bridge, centre tapped full wave, and half wave circuits can be used. Both provide a maximum voltage of 18 Volts and the windings can provide 1.11 amps. for the 20VA type, and 2.22 amps. for the 40VA type.

On test, the sample transformers were quiet and provided the rated outputs without excessive heating. The windings are tapped at 4.5, 6, 7.5, 9, 12, 15, and 18 volts.

Connections are made using shrouded quick connect leads which were supplied with the transformer.

The 20VA Transformer is Type PL1.5 — 18/20VA.

The 40VA Transformer is Type PL1.5 — 18/40VA. ■

IONOSPHERIC PREDICTIONS

WITH LEN POYNTER VK3ZGP

From September onwards the Ionospheric Predictions will return to AR and I trust they will be of interest to those who have missed them. I also hope to be in the position to offer further information to those who are following the Solar Flux and other Indices.

LATEST SUNSPOT INFORMATION

December 1974 Predicted 29. Mean 20.4 R6 (six monthly smoothed) 25.4 June 1975 (Predicted April '75) was 17. Provisional mean 11.4 Predictions in June '75 for the next 6 months, July 9, August 8, September 7, October 6, November 5, December 4. Informed opinion suggests that March 1976 will see the minima. IPS advise that 2 spots of the new cycle have been noted; however it is still too early to recognise them due to the extremely slow decay of cycle 20.

Our problem with the predictions is the tremendous amount of data portrayed in the computer printout from IPS and the space available in AR. Initially I will try to cover two areas, Eastern Australia based on Canberra, and Western Australia based on Perth. If any correction factors imerge I will mention them.

For September the picture is not bright. With the predictions generally based on a low SSN there is not much consolation to offer. Conditions will vary daily. Around the 17th September should prove difficult if old Sol keeps up his antics.

Generally: 21 MHz should be watched from 2100-0400 across the Pacific and 0400-0500 from Japan across to Middle East and Africa.

14 MHz will be unpredictable. Generally, signals will range from poor to good depending largely on conditions; you will have to be there when it's good. Daytime across the various paths will be variable.

7 MHz from 0400-1000 Europe LP. North Central, South America and Pacific areas. 1000-2200 Middle East Europe SP. West Africa SP, South Africa, Japan, at variable levels.

From Perth 14 MHz, 0400 Africa, 0700-0900 North America, West Africa LP, 1000-1200 Europe LP, America East Coast 1200-1500, 7 MHz could be interesting 0700-0900, West Africa LP, 0900-1700 Pacific America West Coast, New Zealand 1600-2300, Middle East, South America, South Africa.

Next month I hope to include 80m in the summaries. DX is being worked on 80 and 160m if you know when and where to watch and listen for the experts. Being patient will pay off. Best of luck till next month.

Zurich figures courtesy Dr. Waldmeier, Swiss Federal Observatory, Zurich. Prediction from IPS, Sydney. All times Universal Time. ■

PROJECT AUSTRALIS

WITH DAVID HULL VK3ZDH

OCTOBER PREDICTIONS

OSCAR 6
("On" Days Only)

Date	Orbit No.	Time Z	Long °W
2	13541	00.50	64
4	13586	00.45	62
5	13579	01.40	76
6	13591	00.40	61
9	13629	01.29	74
11	13654	01.24	72
12	13666	00.24	57
13	13679	01.19	71
16	13716	00.15	55
18	13741	00.09	53
19	13754	01.04	67
20	13766	00.04	52
23	13804	00.53	65
25	13829	00.48	63
26	13842	01.43	77
27	13854	00.43	62
30	13892	01.33	74

OSCAR 7

Date	Orbit No.	Mode	Time Z	Long °W
1	4001	B	01.15	69
2	4013	A	00.15	53
3	4026	B	01.09	67
4	4038	A	00.08	52
5	4051	B	01.03	65
6	4063	A	00.02	50
7	4076	B	00.56	64
8	4089	A	01.51	77
9	4101	B	00.50	62
10	4114	A	01.44	76
11	4126	B	00.44	60
12	4139	A	01.38	74
13	4151	B	00.37	59
14	4164	A	01.31	72
15	4176	B	00.31	57
16	4189	A	01.25	71
17	4201	B	00.24	56
18	4214	A	01.19	69
19	4226	B	00.18	54
20	4239	A	01.12	68
21	4251	B	00.12	52
22	4264	A	01.06	66
23	4276	B	00.05	51
24	4289	A	01.00	64
25	4302	B	01.54	78
26	4314	A	00.53	63
27	4327	B	01.48	76
28	4339	A	00.47	61
29	4352	B	01.41	75
30	4364	A	00.40	60
31	4377	B	01.35	73

■

QSP —

R.D. TROPHY

VK5 reckon they will once again retain the R.D. Trophy this year. It is very interesting to receive news that the trophy was in Darwin when Cyclone Tracy struck. It was recovered from under tons of rubble from VK8HA's place. The trophy was damaged but has now been repaired and re-plated, with the exception of the shields, in gold — so writes the VK5 Federal Councillor Ian Hunt, VK5QX. He says it looks extremely good and the change will serve to mark yet another event in the history of the trophy and also Amateur Radio. ■

Hamads

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

FOR SALE

Lafayette HA800, $110 ONO. FG Rods, solid 9/16 to ¼ inches, 10 feet long, $5 each. VK4WR, 6 Olive Ct., Nambour, Qld. 4560.

Yaesu FTDX100 with AIWA mike and SWR/power meter included. Has had very little use, is in first class order and gives excellent performance, $350 the lot. Contact VK2AOR, L. J. Sparke, P.O. Box 102, Adamstown, NSW 2289.

Yaesu FT620 6m Solid State SSB 12V/240V inbuilt. As new, few months old, in shipping carton, with manual, $370 or best offer. VK5ZTS, 5/11 Wakefield St., Kent Town, SA, 5067.

Geloso 222 Tx 70W AM, CW 80-10m, good condition. Geloso 209 Rx SSB AM, CW 80-10m fair cond., will sell separately, best offer. VK2ADZ, 28 Probert Ave., Griffith, 2680. Ph. (069) 62 3718.

Swan 350 SSB Transceiver with Swan power supply, mic. and two spare PA tubes, excellent condition, $285. DC supply for above, $40. H. Bone VK4NX, QTHR. Ph. (075) 38 1615.

Shack Clearance — complete equipment of the late Jack 2JH sold for the estate. Swan 350, "Communications Eight" Rx, 6m, 2m, 432 equipment, Tx and Rx, Converters, Test instruments, Multimeters, grid dippers, Frequency meters, Power-Match with accessories, AWA Universal Bridge, Phones, Microphones and many more items. No reasonable offer refused, ring Prof. Felser VK2ZGF (02) 221 1655 for inspection.

Hallicrafters HT37 Tx, 70/100 watts SSB AM CW, MOX/VOX, 80-40-20-15-10.2-6146 final with 500W 240-110 transformer, OK, 20 and 80 needs adjustment other bands, $140 ONO. National HRO Rx old timer, good order, all coil boxes 0.5 to 30 MHz, in current use, $30 ONO. A. M. Doble VK3AMD, QTHR. Ph. (03) 57 4610.

Geloso Tx—G4/228 with PSU and matching speaker, mike and manual, 80-10m SSB AM CW, as new, $275. E. Wookey, 158 Kilgour St., Geelong, 3220. Ph. (052) 21 2674.

Sharp CBT72Q, 12 Ch., 27 MHz Transceiver, complete with xtals, mic., aerial, plus roof rack mount, ideal for the mobile lot, $100 ONO. Ronn McDougall VK2BPA, QTHR (new book). 3/16 Murray St., Waverley. Ph. (02) 387 3055.

FT/FP200. Very good condition, extra 28.0 to 28.5 MHz crystal fitted, spare set PA tubes, complete with microphone, cables, manual, in original pack., $330. VK2BHS, QTHR. Ph. (047) 51 3534.

WANTED

Ham Radio, January 1974. To complete collection. M. E. Hood VK1ZME, Box 572, Woden, ACT 2606.

Hustler 4BTV Vertical 80 to 10 metres. VK3SX, QTHR. Ph. (03) 82 2152.

Crank-up Tower Hills 57 ft. or similar, Receiver Marconi or similar. VK2SI, 12 Ruswell Ave., Warners Bay, 2282.

Xtals for new amateur, fundamental frequencies of 80, 40 or 20 metres (CW section of band), for homebrew CW Tx. VK6WT, 105 Daglish Street, Wembley, WA 6014.

Manual for Palec Model VCT-2 Valve Checker and Multimeter, or opportunity to copy. D. L. Robinson VK3ALD, QTHR. Ph. (03) 63 0481.

Trio 9R-59DS Circuit Diagram, handbook; also TCA 1674 FM maintenance handbook or circuit diagram, modifications for 2 metre operation. P29ZMJ, PO Box 2237, Konedobu, Papua-New Guinea.

QRL? If not, QSX 52020 for first 2½ minutes each five minute period from 0800 Sundays. I will QSW first 2½ minutes then QSX last 2½ minutes. QSN and QSL, VK2ZNW, Box 1117, Orange, 2800.

WANTED

175 kHz Tapped Osc. Coil, Barlow-Wadley XCR-30 receiver. Jeff L-30409. Ph. (03) 546 3940.

Stolle Ant. Rotator. Price and availability to VK5XR, QTHR. 22 Pine St., Peterborough, SA, 5422.

Awards Column

with BRIAN AUSTIN VK5CA
P O Box 7A, Crafers, SA, 5152

AUSTRALIAN DXCC

Phone		**CW**	
VK6RU	319/351	VK3NC	268/297
VK4KS	314/333	VK6RU	266/295
VK5MS	313/343	VK4VX	263/268
VK6MK	306/333	VK3YD	258/281
VK3AHO	304/326	VK4TY	253/272
VK2APK	300/313	VK3TL	248/260
VK4VX	300/304	**Open**	
VK4PX	294/301	VK6RU	319/351
VK5AB	291/314	VK4KS	315/339
VK4UC	288/293	VK4SD	314/335
VK4FJ	287/314	VK2APK	311/329
VK3JW	283/290	VK2VN	311/336
CW		VK2EO	306/335
VK3AHQ	308/331	VK4VX	306/312
VK2QL	299/328	VK6MK	306/333
VK3YL	294/317	VK2SG	301/311
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NEW MEMBERS			
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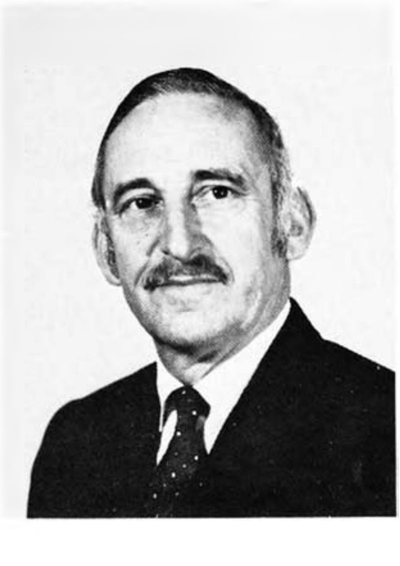
VK2EB	108/110	VK3ZU	
VK3WU	105/105	now VK2QC	100/102
VK3AYF	104/106	VK2BRK	99/103

MORRIE MEYERS VK2VN

With the sudden passing of Morris Henry Meyers O.B.E. on Tuesday June 10th the amateur movement and the WIA lost a member who followed the Amateur Code and Spirit to the letter and did much to ensure that the amateur service was well respected in the general community. Morrie was first licenced in the early thirties and was active in most contests. He was also a top runner in the WIA DXCC open section, with well over 300 countries. His skill as a gifted CW operator was acknowledged by his election to the Fine Operators Club and the A1 Operators Club, selective groups of the world's finest radio operators. His immaculate C.W. was a reflection of everything he attempted and he attacked problems from a grass roots level with energy, determination, confidence and tenacity, supported by an astute mind and a sound technical understanding. He also conquered much through



sheer personality — with charm, understanding, tact and compassion — amply illustrated by his popularity and his bridging of the generation gap with so many friends amongst the "Z" calls. His cheery voice and his warmth of friendship and comradeship will be greatly missed — no less his intelligent interest and constructive contribution to amateur activities at all levels. A Past-president of the NSW Division and past-member of the Federal Executive, he served the WIA over a period of 30 years. Morrie was a complete radio amateur.

As a member of the RAAF Wireless Reserve, along with many other amateurs, he was called up in September 1939. He saw service on the mainland and in forward areas, in the Borneo landing and in New Guinea and the Pacific. He was commissioned in 1941 and rose to the rank of Wing Commander, was mentioned in despatches and awarded the Order of the British Empire. In the post war years he often led the RAAF Signals contingent in the Sydney ANZAC Day March.

For 25 years he was a member of the Radio Sub-committee of the NSW Bush Fire Council. He was also a member of the Quarter Century Wireless Association and the Institution of Radio and Electronics Engineers Australia.

His intense interest in communications led to a highly successful career with Qantas where, as Communications and Electronics Manager he was to work in a significant and complex field at a time of major expansion. Through this activity he served on many Advisory Boards at International level. A task with the Government of Thailand extending over 20 years is worthy of special note. From his regular overseas trips he made numerous friends in professional and amateur circles and continued the communications link. In latter years he became a keen bowler and qualified as a national umpire.

Morrie was an exceptionally fine man and citizen, with a great depth of faith and a strong grasp of the basic essentials. He was a deacon of his church and he enjoyed the warmth and security of his family and his home. May the tributes, the many friends and the wide representation, including the numerous amateurs who attended his funeral on June 13th, be a comfort to his widow Gwen and daughters Elizabeth and Rosemary, and may happy memories abound for them, his many friends, and the amateur fraternity, for this unique silent key.

SK

Silent Keys

Mr. M. F. TIERNEY	VK2RT
Mr. A. E. BROWN	VK5ZL
Mr. C. J. W. COOK	VK5ZN
Mr. H. L. FOGG	VK6HF
Mr. H. W. A. HAWKINS	VK2YL

ARNOLD HOLST VK3OH

On Wednesday July 30th, one of Australia's Amateur Radio Pioneers died. Arnold's licence is dated 1913; this makes 62 years of amateur radio. In the 1914-18 World War, Arnold was a radio operator and a tribute comes from his friends in The Mesopotamian Units Association. They are going to miss him at this year's "get-together".

Arnold was known throughout the world for his CW activities with his HF beam from his residence at 10 Flintoft Ave., Toorak. When the first Russian Satellite was launched, Arnold was reported in the "stop press", because he had the resourcefulness to tune in the "beeps" on his HF receiver. This and many other events colour the amateur radio side of Arnold; and then there is his fame as a painter.

He was a member of The Australian Institute of Accountants and The Stock Exchange of Melbourne. He enjoyed a game of tennis.

Arnold's brothers Hector and Otto caught the radio "bug" by taking an early interest in his work and operated the famous top amateur station, 3BY Melbourne, on the broadcast band up until the commencement of the 2nd World War, when once again in the Holst radio history, operations had to cease for a war.

It will take us some time to get used to his absence. In November he would have been the grand age of 78 years.

IVOR MORGAN VK3DH

VICOM INTERNATIONAL PTY LIMITED Manager: Peter Williams

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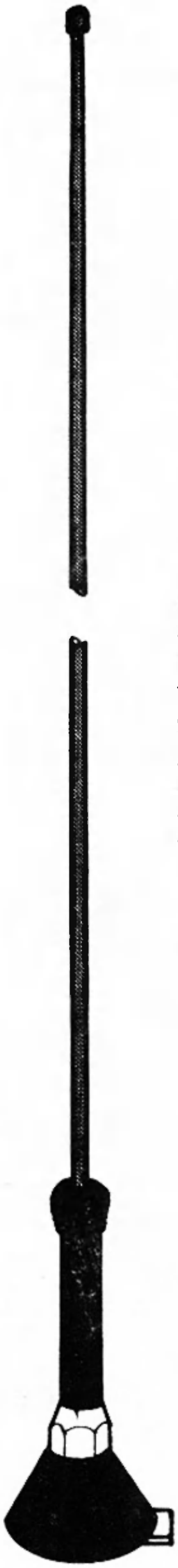

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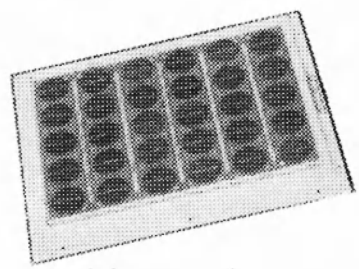

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amateur radio

VOL. 43, No. 10 OCTOBER 1975

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COVER PHOTO

Major Darryl Slade, Ops Officer 2 Sig Regt, Corporal Robert Linton, and Sergeant Barrie Edwards, both of the Radio Troop, discussing plans for the erection of antennas for AX3SIG. See story on page 4.

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

amateur radio

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QSP — *ONE WIA*

We often hear the question, "why are there two WIA offices in Melbourne when one should be cheaper and more efficient?"

In order to refresh memories and bring newer members up to date, may we go back in history a little. In the late sixties it became obvious that the Institute was not able to cope with the increasing complexities of amateur radio unless paid assistance at a high level of competence was made available. This does not reflect on the paid divisional staffs in VK2 and VK3, who could handle the administrative work, under voluntary officers. They could not, however, deal on the technical level with more information that has arisen from more countries in the ITU, IARU and the administration that goes with advancing techniques; such as EME Amateur TV Satellites and Repeaters etc. For voluntary officers, the amount of reading material was simply more than could be digested, so essential work was not done. Thus newer techniques were essential, and must be developed if Amateur Radio is to justify the frequency space it now has. Newer countries' administrations without the background of the development of radio by amateurs are simply unimpressed by need for the spectrum resource that we hold, if we just use the frequencies for ragchewing.

Federal Council authorised Executive to proceed with the appointment of a suitably qualified officer, and in addition it would be responsible for the publication of "Amateur Radio", centralised membership records and "Magpubs". Arrangements were made with VK3 for Executive to rent space in the VK3 rooms at Victoria Parade.

Executive VK2 and VK3 divisional officers agreed on the appointment of the present Secretary Manager, and he commenced duties at Victoria Parade in early 1971.

It was quickly found that he was overworked, voluntary officers who had done a fine job for the Institute felt that the Secretary/Manager was better informed on day-to-day matters by the nature of his work, and consequently passed their duties over to him as quickly as possible. In addition, having to supervise the VK3 division office, led to conflicts between executive and the division, and accordingly the Secretary/Manager had to deal directly with VK3 members, who called for QSL cards and publications, but felt that they should talk to him. Naturally, this was a "not unpleasant" past time, and no doubt good PR but it led to him having to work at night on Executive work.

During 1972 we received the first EDP centralised records, and those who have dealt with initial EDP programmes know the bugs and frustrations in getting them operational. The WIA programmes were no exception, and making them work added to the conflict that had been developing with VK3 Council.

It quickly became evident at this stage that the activities of division executive must be physically separated, as the joint operation was about to break down. Accordingly, Executive moved to Toorak, despite the seemingly increased costs that would be incurred.

This separation has certainly improved relations with VK3, and has led to a better definition of duties between executive and divisions. The Executive office is now free to pursue the objectives of council and executive, and now has the same relationship with VK3 as it has with other Divisions.

This is a somewhat simplified explanation of the past, but now what of the future? We are not sure that costs necessarily would be cut by sharing the same or adjoining office space. Because of the nature of the activities, the VK3 council would need to adopt a "strong line" to prevent the Executive office from appearing to take over the Division. Executive would not want this, but the fact of full time availability of Executive staff would give this appearance, and this would lead to conflict again as in the past. Historically, Australia is a country where "State's Rights" predominate, and the Institute is no exception.

I would like to suggest that we give consideration to a better administrative concept of the Institute. This could well take the form of regions. Radio waves do not respect "State Rights" and a group cutting across state borders may be more appropriate e.g. Brisbane and the Gold Coast, Albury-Wodonga, Mildura-Broken Hill and border areas of South Australia. Groupings such as these could be more efficient and productive of amateur radio activity and development, than the existing capital based divisional arrangement.

The EDP is now proving very effective on the records side, and we aim to improve the accounting as finance becomes available and could well provide the administrative base for future development.

Members should discuss the future of the Institute between themselves and at meetings, so that we can have fruitful discussions and motions at the Federal level on what our development over the next few years should be. We now have a suitable base, let us develop it in the interests of all.

K. V. ROGET VK3YQ
Hon. Federal Treasurer

WIANEWS

Executive have been looking into ways and means whereby properly qualified amateurs could take their part in assisting the Regulatory and Licensing authorities in amateur examinations.

Attempts to persuade the authorities that amateurs should themselves conduct the simpler exams have proved as unsuccessful as in numerous other countries.

Equally unsuccessful were attempts to secure exemptions — particularly in Novice exams — on the grounds of passing other equivalent (or better) examinations such as might be passed by Y.R.C.S. candidates of a suitable standard.

The future problems of shortage of funds granted to Government Departments, the fact that difficulties may arise for holding certain exams at country post offices (vide Aust. Post now being a separate entity) and the concentration of staff in the capital cities are very real problems.

The Institute therefore has considered that a submission should be made for full licensees in certain country areas and possessing such professional qualifications as for example, enables them to perform duties under the Evidence Act, should be put on a register for supervising or invigilating amateur examinations in country areas not directly served by staff of the Regulatory and Licensing Branch.

It is hoped that such amateurs would be willing to undertake these responsible duties acting in accordance with sealed instructions. Such places as Alice Springs, Kalgoorlie and Launceston spring to mind but there are obviously many others.

It appears to the Executive that it could be quite some hardship to expect students applying to sit the Novice Exam for example, to travel long distances for one or two days to attend centres in the main cities. Some alternative seems highly desirable in the light of the greater numbers likely to be interested in the Novices exam quite apart from those in distant places wishing to sit other amateur examinations.

Representations along these lines have therefore been made but it could be some time before any decision is forthcoming. At least the amateur service recognises the problems and is actively pursuing ways and means to have them overcome.

The projected use of Divisional rooms wherein to hold the June Novice examination certainly came as a recognition that the Institute can render assistance. Everything is being done diplomatically to have the knot untied which caused the first Novice exam to be deferred. Whether or not the industrial dispute can be resolved by the Government by the time this appears in print remains to be seen.

That first Novice exam was so near and yet now appears as far off as ever it was. Let us hope that industrial dispute is resolved before it spreads further afield as now appears to be a possibility. (The August exams also have been deferred because of the extension).

The disposal of the funds collected for amateur Cyclone Tracy victims has been passed across to the Darwinites for their views although one suggestion was the purchase of a transceiver for the Darwin Radio Club.

Jim Payne's duties at work and at home have so increased that he has been compelled with regret, to give up being Fed. Contest Manager, although he will handle the administrative work of the 1975 R. D. Contest all being well.

FCM's work is very time consuming and a replacement is being arranged as soon as possible in VK3 where the Contest Committee has some time to remain before passing in rotation to the next Division (VK2).

Another vacancy on the books is Federal EMC Co-ordinator.

The savage increases in postal charges gives food for thought and ways to economise.

AR seems "safe" until February 1, 1976, after which we might pay a cent or two more depending on gross weights.

Sending out subscription notices and later on the final notices will hit hard. There'll be very little change, if any, outlay $1000 on postages alone unless we could dispense with the final notices. This is a Divisional matter.

Magpubs will be hit with increased parcel rates which will have to be passed on. By the way new lists should be ready when you read this. Send for one right away, but PLEASE send a self-addressed stamped envelope. Only about 5 letters can now be sent for a dollar.

If members would kindly send self-addressed stamped envelopes with their enquiries this would help enormously in keeping costs down.

Another area of possible economy looked into was the wrapper or envelope for AR. For technical reasons we cannot use plastic envelopes. Equally we can find no way of having the wrapper stapled to AR as an 'outside cover'. We are left with the present envelope system of returning to the old wrapper around a folded AR. Since the final costing differentials are not too great, it has been decided to stay with the present envelope system. Presentationally it is a better system also.

Would you really like a bumper issue of AR for December? This could become a certainty if enough advertising comes forward. ■

GOLDEN JUBILEE 1925-75 OF THE ROYAL AUSTRALIAN SIGNAL CORPS

To celebrate the above Jubilee, the RACS will establish an Amateur station to operate world-wide from the Watsonia Barracks, Macleod, Victoria, from November 3, 1975, to November 10, 1975, inclusive.

A special call sign AX3SIG has been allocated for this occasion.

The station will operate on all of the most popular Amateur Bands. Modes will be, 1.8 MHz using 150 watts input on AM, and 3.5, 7.0, 14.0, 21, 28 MHz using 400 WATTS PEP *UPPER SIDE BAND* (in all cases). In most instances the station will operate essentially on phone, however, there will also be CW operation included, and it is also hoped to provide RTTY facilities (this detail was not confirmed at the time of printing). 2Mx FM Simplex and repeater operation will also be a feature of the celebrations.

The station will operate 24 hours daily for the entire period.

A special QSL card is to be printed and inwards QSL cards may be sent to the VK3 Inwards Bureau or direct via QSL Manager VK3ZA, C/o Box 134, Mt. Eliza, Vic., 3930.

PUBLIC DISPLAY

On the weekend November 8 and 9, 1975, the station will be on display to the general public at the School of Signals within the barracks.

A museum of Service Radio and communications equipment will be displayed, and it is anticipated that the Governor General will be in attendance to officially open the museum.

A REQUEST FOR ASSISTANCE

To assist the Royal Australian Corps of Signals, establish the museum, amateurs and SWLs are asked to either donate or loan the museum suitable items of ex-service equipment for the display.

If you can help in this regard please contact Lieutenant Colonel John Bennett (VK3ZA) in the first instance by telephone (03) 787 1325 or letter C/o Watsonia Barracks, Victoria. Please note that freight on equipment donated or loaned will be paid for at the army's expense. Please act *now* if you can assist. ■

QSP

MORSE TAPES

A note from the WIA NSW Division tape service advises that C90 morse code cassettes are available (2 cassettes covering introduction, then 5, 6, 7, 8, 9, 10 wpm) on maximum two months loan at $3.00, plus, $5.00 deposit, plus, $1.00 extra for Interstate posts (prices subject to change). This charge also appears to cover 5" reels at 3¾ ips, lectures on 7" reels are also available as well as slides. The address is Mr. K. Black, P.O. Box 43, Erskineville, NSW., 2043. Phone (02) 516 3673 AH. Prices are subject to change without notice.

METEOR SCATTER LINEAR

Steve Gregory VK3ZAZ
Gear Avenue, Mt. Helen, Vic. 3354

After a season of sporadic "E" DX, it has been discovered that a few extra watts is most effective to work anything going. However, of the multitudes of stations worked during 1973-1974, only a few have been heard during the winter months, and these few all ran high power.

To embark on the project of a high power linear amplifier, it is first necessary to pass on a common warning. The tube used operates at voltages which can be deadly, and your equipment has to be designed properly so that *NO* contact with high voltage can occur. Use safety enclosures for all high voltage circuits and terminals, use a substantial bleeder to ensure instantaneous bleed-off the capacitor reservoir voltages, and if you *must* operate with RF and probe the caged area, have another person present during that time. Remember at 2000 volts and 1 amp, you do not get a second chance.

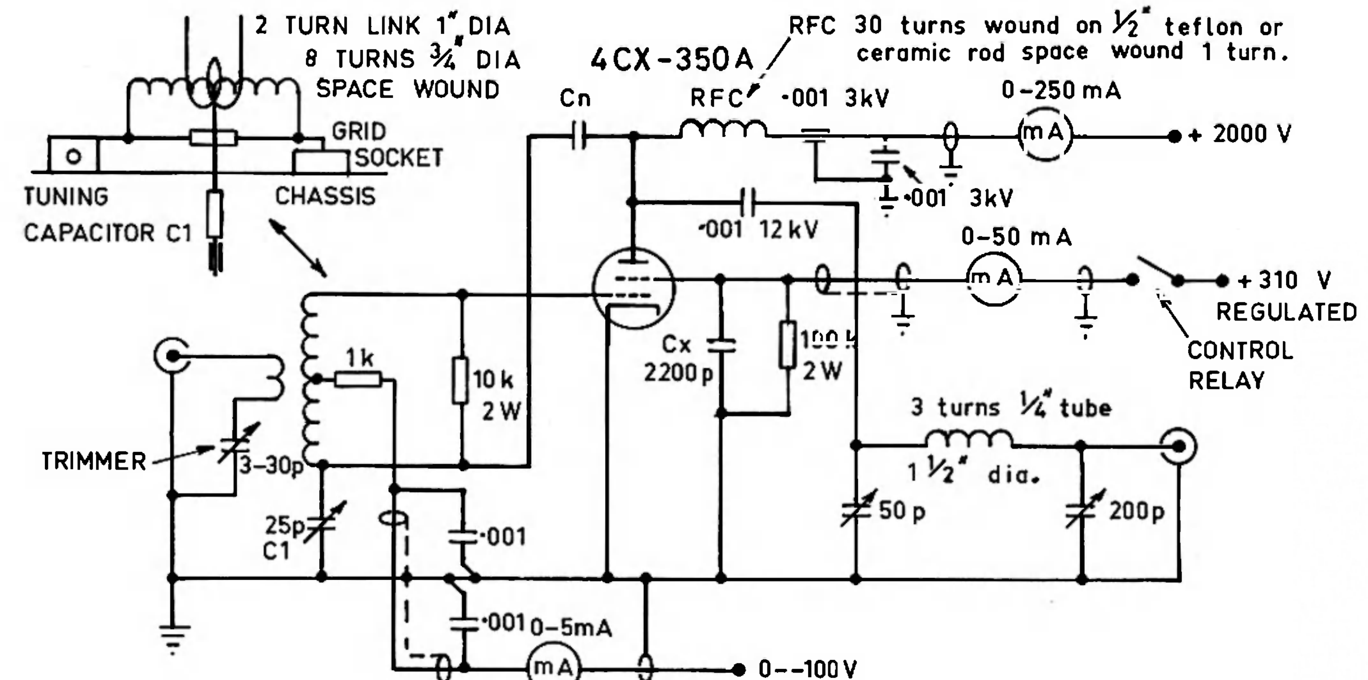
In this project the choice was the Amperex 4CX-350A external anode tetrode, but the mechanical layout caters for 4X150 or 4X/CX250 tubes also. The reason behind the choice was a higher available plate dissipation and the linear design characteristics of this model.

Greater flexibility will be obtained by use of the other tubes mentioned, especially should AM or FM operation be contemplated.

On the subject of the socket, it is essential to obtain the correct socket for the application, and in this case an EIMAC SK-600 series with an EIMAC SK-606 chimney will ensure correct air-flow and circuit stability.

COOLING

Sufficient forced air must be provided



Cx built into valve socket.

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Model TS-520 AC-DC transceivers all-band	$530
Model TV-502 2 Mtr transvertor for TS-520	$200
QR-666 all-band coverage receiver 170 KHz-30 MHz	$300

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Model YC-355-D digital frequency counters 0-200 MHz	$250
SPECTRONICS DD-1 digital counter for FT-101-B-E	$150

All UNIDEN, TRIO-KENWOOD & YAESU MUSEN transceivers come complete with original English manuals, all crystals for all available bands and a P.T.T. dynamic microphone.

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for the anode, base seals and body seals to be maintained below the rated values.

Plate Dissipation	Air Flow (CFM)	Pressure Drop
200 watts	5.0	0.52 in.
250 watts	6.4	0.82 in.
350 watts	7.8	1.12 in.

The blower selected in a given application must be capable of supplying the desired air-flow at a bank pressure equal to the pressure drop shown.

For reliable long-life, the cooling air-flow must be maintained during stand-by periods, when only heater volts are applied.

The rated filament voltage is 6.0 volts and should be maintained as close as is practical. Short time variations ±10% will not damage the tube, but variations will occur in performance. To minimize variations, try to hold the level within ±5%.

If you are unsure of your operating conditions, then contact the suppliers of your tube for application ratings or write to the author for possible assistance.

DESIGN

Reference to RSGB and ARRL publications have no real design parameters because each user had his own way of putting things together.

Commencing with the grid input stage, the RSGB idea of a grid swamping resistor and a tuned circuit to give the required impedance match for the driving amplifier was used.

An 820 ohm resistor was the starting value and after neutralisation, this value was increased to 10,000 ohms with no decrease in stability. A sure fire test for your amplifier is to run it in idle conditions and swing the grid and anode tuning through the entire range. You should be able to carry out this action without any signs of movement from any meters.

Second stage of construction was the final tank circuit, starting with the RF choke. This little coil of wire is the secret behind the success or failure of any output stage. After reference to a section devoted to these devices in the ARRL VHF Handbook, a ½ in. diameter ceramic former was chosen, and space wound with 30 turns of 20 gauge enamelled copper wire not the enamel that turns to flux with temperature. The high RF voltage across this choke and the circulating currents cause heating and high stress, so by space winding on a good quality former (teflon or ceramic reliability may be ensured.

The coupling capacitor from the anode is a .001-12,000 volt epoxy set unit available for approximately 80 cents plus tax from trade television outlets. Why 12,000 volts? Read on for the explanation.

The pi-section output is conventional with a choice of capacitors to give a good tuning and loading range. The coil is simply 3 turns of ¼ in. copper tubing wound a 1½ in. steel pipe and then stretched out to 2 turns spacing to resonate at 52 MHz.

Back to the grid circuit; a lead was connected from the opposite end of the grid coil and routed through the chassis toward the anode. Here was the first trick for young players that you find no reference to in any books.

The screen ring of a 4CX tube sits a little above the chassis and it seems that the little bit of grid wire prefers to look at the screen rather than the anode. The remedy for this is a small brass shield approximately ½ in. high and 3 inches long curved to match the circumference of the tube, and fastened to the chassis about ¼ inch away. The neutralizing lead is brought through behind this shield and placed in the proximity of the anode ring. The connection to the anode ring was made around the large fenced area with a small brass tag, and held in place by a standard 1¼ in. radiator hose clamp. *(Other constructors may prefer to use finger stock if they are fortunate enough to have some—Ed.)*

To neutralise the amplifier, apply sufficient drive to be detected with some type of RF probe in the tank circuit (no filaments, and of course *NO HV).*

Use a pair of snippers to clip the neutralising wire until *NO* output is discernable in the tank circuit. Check that it is neutralised for well over 500 kHz of operating range.

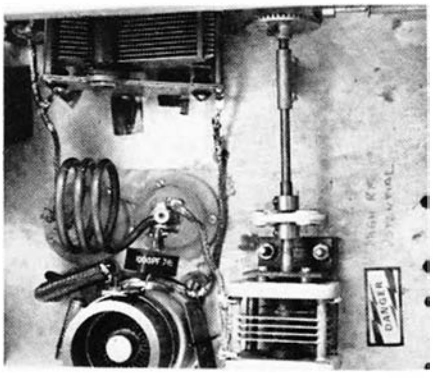
The amount of wire past the shield will be around ½ in. and about the same distance from the anode, ½ in.

FIRING IT UP

The use of a mains variable transformer is very desirable, and in the author's case a switchable decade-screen supply was used and the screen voltage was run up in 10 volt steps. Remember, screen volts with no plate volts will destroy these tubes in less than the time it takes to manually turn the screen supply off, so the inclusion of a control relay, that removes screen volts should the anode volts fail, is highly desirable.

Firstly, check that you have adequate grid control voltage, and that the control that varies this will give you a full range, say —100 to 0 volts.

Apply some plate volts only, with no screen volts. With 2000 volts applied, as you vary the grid bias, around 3 or 4 mA of plate current will flow at zero bias. If that happens you are able to control the electron flow and at least the tube is behaving like a tetrode. At this stage the author's original .001-5000 VW coupling capacitor disintegrated. So the initial check at high volts is a good test of your insulation characteristics of chokes, filters etc. This experience caused the author to select a more conservative rating for the next capacitor.



Tank Circuit of 4CX350A with thermal inertia bronze collar fitted to improve thermal efficiency.

A point here is that some surge protection is desirable when coming to the high voltage switch-on. A 500 watt radiator resistor on a 4 second time delay relay was used. This relay can also be overridden and the tube run on low power with only 1500 volts applied to the anode. At high power, 2400 volts is used which is 100 volts less than the maximum rating.

With maximum bias applied, activate screen and plate volts, and set the standing plate current at 100 mA, which is the manufacturer's recommendation. Apply drive, and load and tune for maximum power output.

A word on negative screen current for the uninitiated.

The electrons dislodged as secondaries by arriving primaries will be accelerated away from the screen causing a net reduction in the measured screen current. It is possible to have more low energy secondaries leaving the screen than primaries arriving, and when this occurs the current is negative.

An important consequence of this is the need to provide a stabilised low impedance screen power supply which can tolerate the negative current and still control the screen. A zener diode is the ideal method, but for shunt resistance methods, 40 mA bleed per tube is recommended.

Secondary emission varies from tube to tube and in the author's case —4 mA occurs at 150 watts carrier. Increasing the drive further, the current starts to increase to a value of 20 mA maximum at 310V DC regulated, for 250 watts carrier output.

On two tone test at 350 watts PEP out, a similar figure occurs of +27 mA.

The rest of the project is really up to the individual, and power supply design is arbitrary. The author used 866A rectifiers because they are still only $1.00 each and you could blow up a lot of those before you would equal the 22 diodes, capacitors and resistors necessary for solid state. If you do not have a filament transformer rated at 5 volts 10 amps plus a DC rating of greater than 2000 volts, then the cost of that would make a string of diodes in a stack most desirable.

A 5-25 H swinging choke was used with choke input from the rectifiers. The filter capacitors were 3000 volt block oil filled.

The bias is regulated and taken from the junction of an OA2, OB2 combination from the supply line of —200 volts. Grid current in this type of tube is *"verboten"* and should be avoided at all costs. To drive the amplifiers to full output takes less than 1 watt from the QQEO3/12 amplifier in the transverter.

It is recommended that a minimum of 30 seconds elapses before applying high voltage after filaments are activated.

(A further precaution that may need to be observed is the provision of a Relay System with a switching sequence that switches on bias, anode and screen supplies in that order after the 30 second warm up—Ed.) ■

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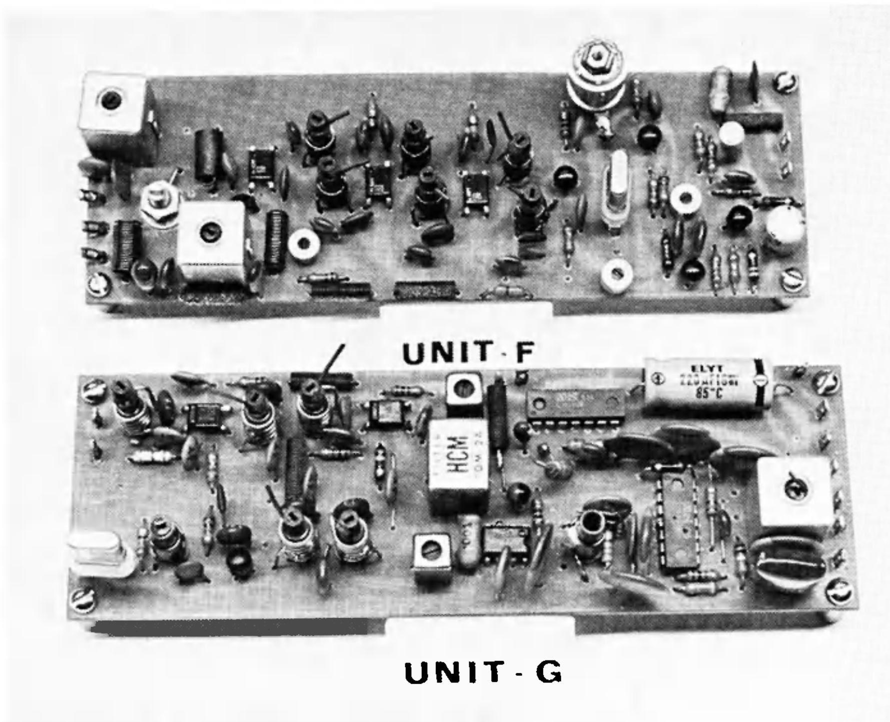
AMATEUR BUILDING BLOCKS

PART FOUR

H. L. Hepburn VK3AFQ
4 Elizabeth St., East Brighton, 3187

Having deall with the essentially HF modules, attention is given in this article to the basic requirements for VHF FM transmission and reception. Circuits, layouts and other data are given for low power transmitters and physically small receivers which can be steered on to any frequency between 50 and 150 MHz.



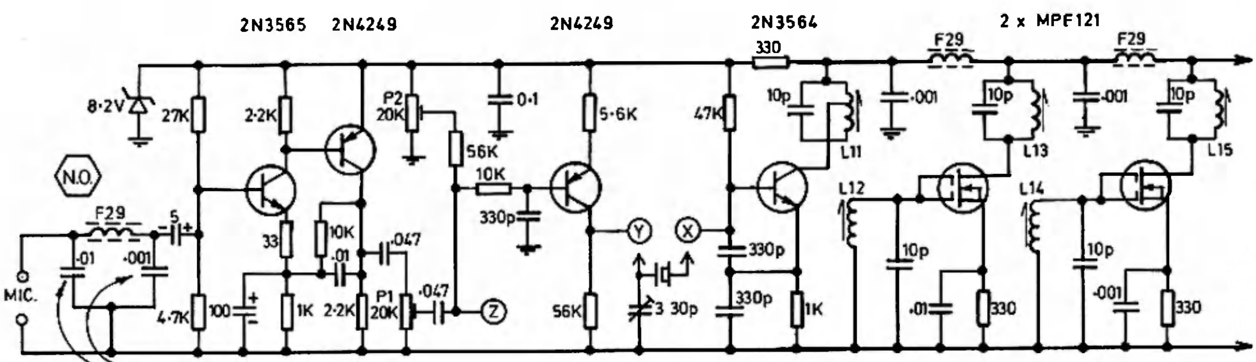
PHOTOS BY KEN REYNOLDS VK3YCY

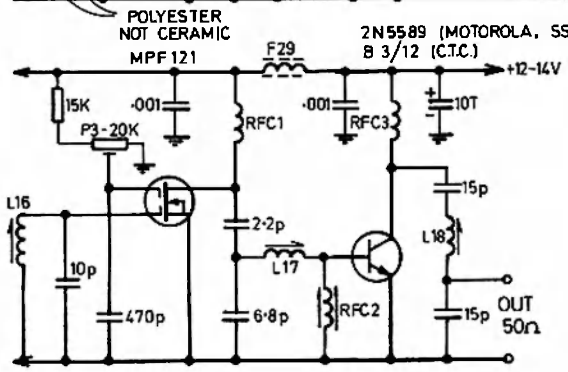
Section 2 — Unit F —

2 WATT VHF/FM EXCITER

This module is a very flexible unit which can be used to provide up to 5 watts (according to frequency) of modulated or unmodulated output on a single channel anywhere between 50 and 150 MHz. The coil data given in this section is specific to 146 MHz and 52 MHz but simple modification to the tuned circuits enable the module to be used anywhere between these frequency limits.

The basic design is not new, having originally been described by VK3ZBJ and the writer in the April 1971 issue of AR. Its inclusion in this series of articles is in deference to continuing interest in the original design. Four years' experience with the "1971" carphone transmitter has led to the beleif that a physically smaller unit which incorporated the driver stage as part of the exciter proper would be advantageous, as would the ability to vary the output. The module now described can be used as a low power FM transmitter, or the modulator section can be omitted and





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CRYSTAL FREQUENCY = $\frac{\text{SIGNAL FREQUENCY}}{12}$

CRYSTAL TYPE – HY-Q TYPE PDD CALIBRATED WITH 25pF IN SERIES

FIGURE 16 – UNIT F – VHF 1-2 WATT EXCITER — CIRCUIT DIAGRAM

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2 Mx ⅝ wave ground plane, 3.4 dB gain, radiation length 4 ft.

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MODEL 215

2 Mx 15 el. yagi, 17.5 dB gain, boom length of 28 feel. Front-to-back ratio 25-30 dB.

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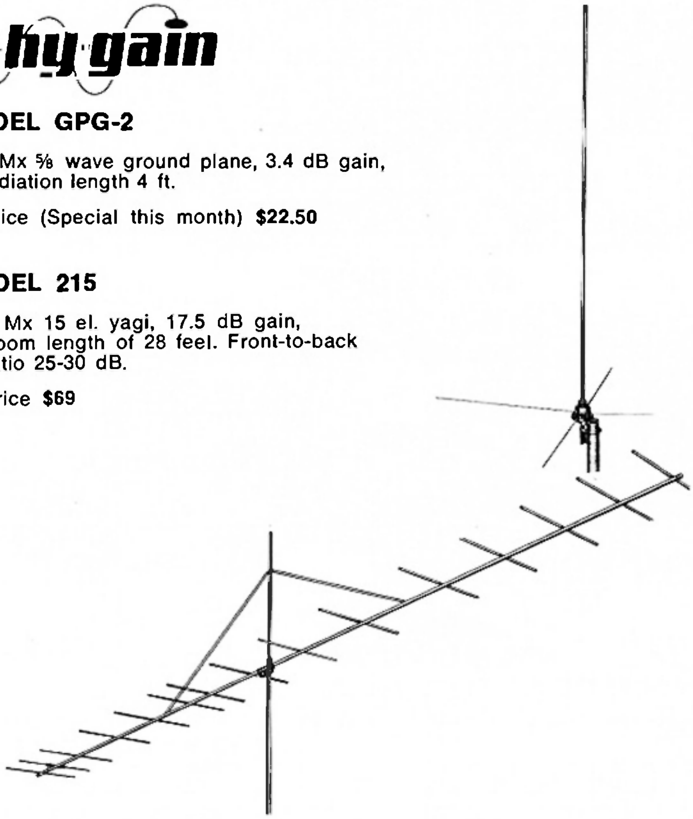

MODEL 28

2 Mx 8 el. yagi, 14.5 dB gain, front-to-back ratio 20-25 dB, boom length 14 ft.

Price **$38**

MODEL 64B

6 Mx, 4 el. yagi, 12.7 dB gain, boom length 12 feet.

Price **$48**

MODEL 66B

6 Mx 6 el. yagi, 15 dB gain, boom length 24 ft. Front-to-back ratio 20-25 dB.

Price **$79**

Cush Craft

MODEL ARX-2

2 Mx colinear, 3/2 wave lengths in phase, provides 6 dB of gain over a ¼ wave whip. Length 9 ft.

Price **$40**

MODEL ARX-450

70 cm colinear, 3/2 wave lengths in phase, 6 dB gain over a ¼ wave whip. Length approx. 3 ft.

Price **$35**

MODEL AR-6

6 Mx, ½ wave ringo, 3.75 dB gain over a ¼ wave whip. approx. length 9 ft .

Price **$33**

MODEL CR-1

10/11 Mx, ½ wave ringo, 3.75 dB gain over a ¼ wave whip, approx. 17 ft. long.

MODEL A144-7

2 Mx 7 el. yagi, 11 dB gain, boom length 8 feet.

Price **$23**

MODEL A144-11

2 Mx 11 el. yagi, 13 dB gain, boom length 12 ft., front lobe ½ power points at 42°.

Price **$32.50**

MODEL A430-11

70 cm 11 el. yagi, 13 dB gain, boom length 5 ft.

Price **$23**

MODEL A50-5

6 Mx 5 el. yagi, 9.5 dB gain, 12 ft. boom.

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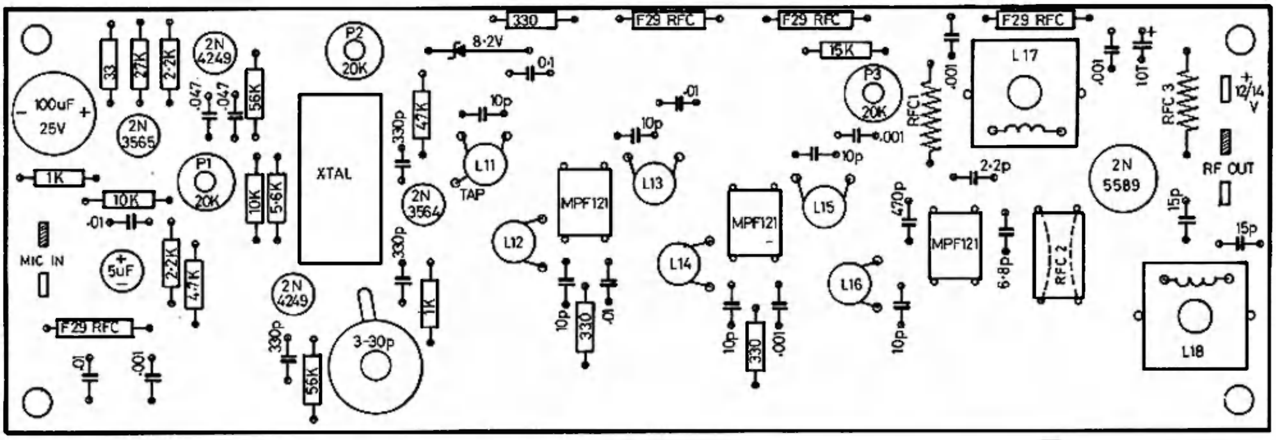
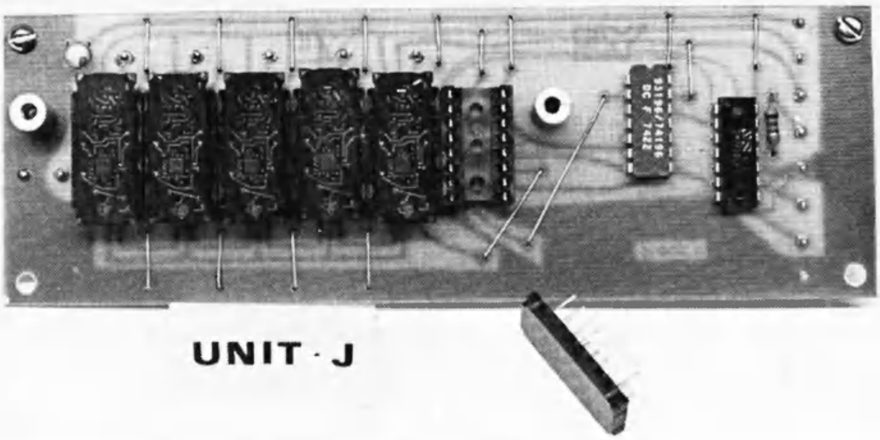


FIGURE 17 — UNIT F — 2 WATT VHF EXCITER — COMPONENT LAYOUT



the RF section used as a local oscillator generator for transverters. The circuit diagram and component layout are given in Figures 16 and 17. Table 2.12.1 gives coil data for 146 MHz; Table 2.12.2 lists coil data for 52 MHz.

The audio section consists of a 2N3565/ 2N4249 microphone pre-amplifier driving a 2N4249 modulator. On board is a pre-set modulation level (or deviation) control and a pre-set linearity control which also acts as a coarse frequency adjustment. Final adjustment to operating frequency is by means of a 3/30 pF trimmer.

The 56K modulator collector load is in parallel with the 3/30 pF trimmer. A variation of the bias on the base of the 2N4249 modulator (caused either by adjustment of P2 or caused by audio from the microphone pre-amplifier) reflects a capacitance change across the 56K resistor. Since this

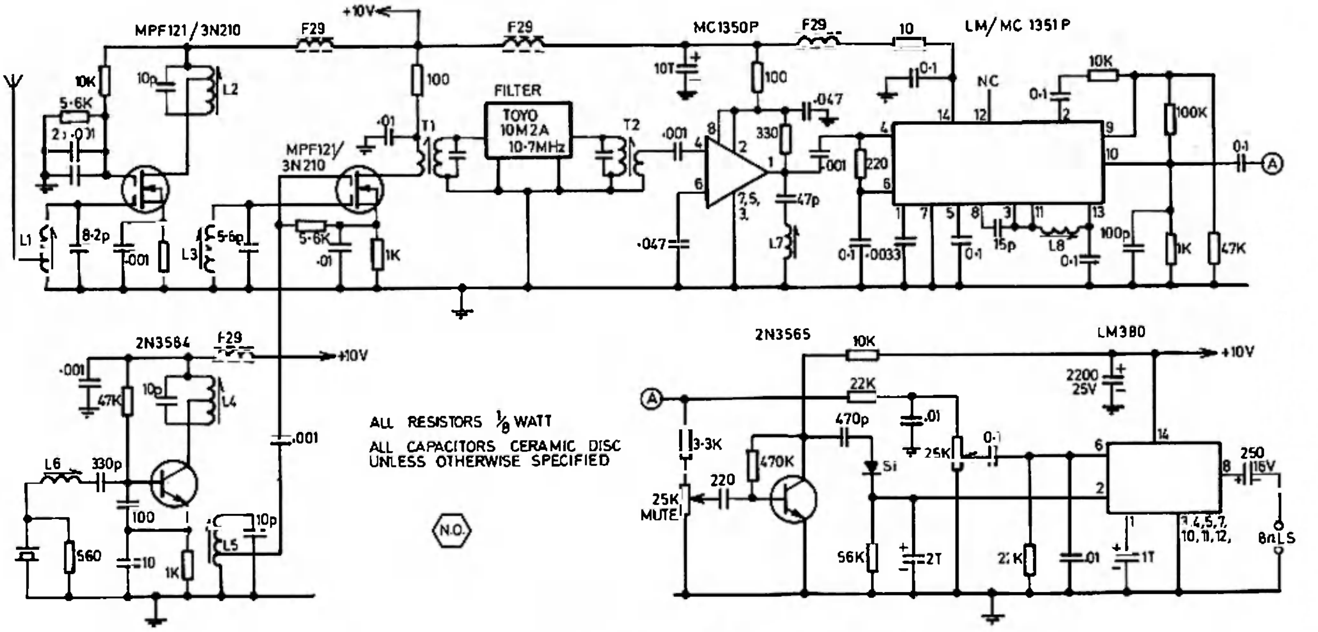


FIGURE 18 — UNIT G — VHF FM RECEIVER — CIRCUIT DIAGRAM

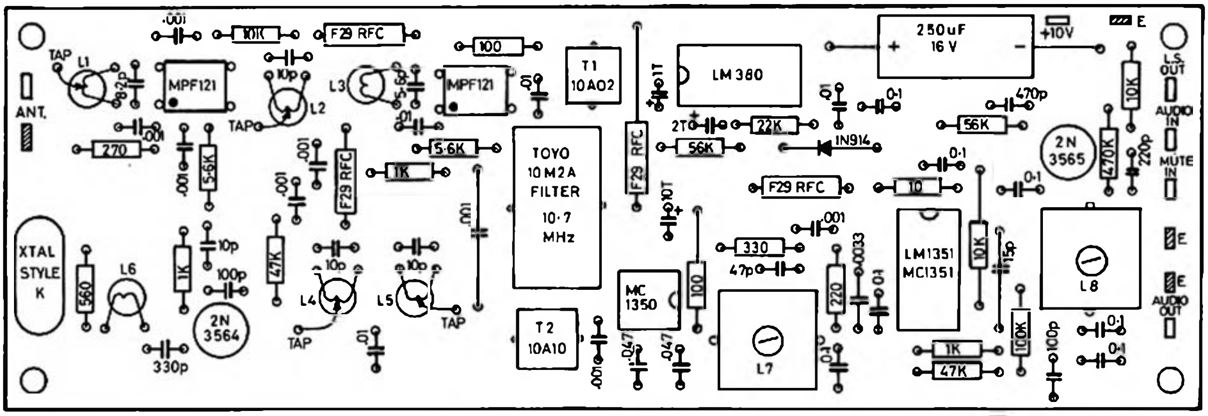


FIGURE 19 – UNIT G – VHF FM RECEIVER – COMPONENT LAYOUT

(varying) capacity is effectively in series with the crystal it induces a change in oscillation frequency. Modulation is pure FM and thus the deviation obtained is a function only of audio drive level. This is in sharp contrast to the more widely used phase modulation system where deviation is a function of both audio drive level and audio frequency.

The crystal oscillator uses a 2N3564 in an oscillator/tripler arrangement, L11 and L12 being resonated at three times the crystal frequency.

The crystal oscillator is followed by two MPF121 doubler stages so that L13 and L14 are resonated at six times crystal frequency and L15 and L16 are resonated at twelve times crystal frequency. Note that the output frequency is always twelve times crystal frequency.

The third MPF121 acts as a straight signal frequency amplifier whose gain is controlled by varying the potential applied to gate 2. A pre-set potentiometer (P3) is provided on the PCB but it may be replaced with an off board control or an off board switched resistive network should this be required.

TABLE 2.11.1

Coil Data — 2 Metre Transmitter

L11	— 18 turns 26 AWG Enam. close wound on Neosid 722/1 Former. Tapped at 7 turns from supply end. F29 Slug.
L12	— 18 turns 26 AWG Enam. close wound on Neosid 722/1 Former. F29 Slug.
L13/14	— 9 turns 22 AWG Enam. close wound on Neosid 722/1 Former. F29 Slug.
L15/16/17	— 4¾ turns 20 gauge tinned copper wire spread over 3/8" on Neosid 722/1 Former using F29 Slug.
L18	— 5¾ turns 20 gauge tinned copper wire spread over 3/8" on Neosid 722/1 Former using F29 Slug.

(a) The chokes marked "F29" are single wires through a Neosid F29 Tuning Slug.
(b) RFC 1 — 12 turns 22 AWG Enam. wire wound 1/8" ID Former (drill shank) and spread to a length of ½".
(c) RFC 2 — is a Philips 6 hole ferrite bead No. 4312/020/31550. Two wires are passed through two of the holes and are effectively in parallel.
(d) RFC 3 — 6 turns 20 gauge tinned copper wire on 1/8" drill shank and spread to a length of ½".

The third MPF121 is shunt fed via RFC1 with two capacitors and L7 providing the matching to the base of the 2N5589 transistor. The base choke (RFC2) consists of a Phillips Type 4312/020/31550 6 hole ferrite bead with single wires through two of the holes (for 146 MHz) so that they are effectively in parallel. This arrangement provides a choice of very low Q and other ferrites — such as the Neosid F29 tuning slugs — should not be used since they give a choke with a very high Q. Several cases of transistor failure or faulty operation have been traced to use of improper ferrites for the base choke.

It is also important to note that the crystal (which may be either Style D or Style K) should be specified for parallel operation and should be calibrated with 25 pF IN SERIES with the crystal. Failure to specify this method of calibration invariably leads to an off channel output frequency. Use of HY Q Style K Type PDD crystals is strongly recommended. The method of calibration should be specified on the order. If an FM exciter is required, then the complete unit is built. If only an unmodulated output is required then all components up to Point Y are omitted. The microphone pre-amplifier can be used independently by omitting the 2N4249 FM modulator and its associated components and taking off audio (at high impedance) from Point Z on the circuit diagram.

Setting up is simple. The unit is terminated into a 50 ohm wattmetter and power applied. P1 (the deviation control) is set to zero and P2 set to half scale. P3 (the output level control) is set to give maximum voltage on gate 2 of the MPF 121 amplifier.

A 10 volt meter is placed across the 330 ohm source resistor of the first MPF 121 doubler and the cores of L11 and L12 adjusted for maximum meter deflection. The voltmeter is then transferred to the source resistor of the second MPF 121 doubler and the cores of L13 and L14 adjusted for maximum deflection. With the voltmeter still across the source resistor of the 2nd MPF 121 doubler the cores of L15 and L16 adjusted for a dip in the meter deflection. L18 core is set full in and L17 core adjusted to give discernable output into the wattmeter load. All cores are then adjusted for maximum output starting with L18 and going back to L12. The core of L11 is set midway between the two points of its travel where the final output drops to zero as the crystal goes out of oscillation.

TABLE 2.11.2

Coil Data — Component Modifications for 6 Metres

L11	— 20 turns 26 AWG Enam. close wound on Neosid 722/1 Former. Tapped 6 turns from HT End. F29 Slug. Resonated with 100 pF instead of 10pF.
L12	— As L11 but no tap. Resonated with 100pF.
L13/14	— 15 turns 23 AWG Enam. close wound on Neosid 722/1 Former. F29 Slug. Resonated with 33 pF instead of 10 pF.
L15	— 10 turns 22 AWG Enam. close wound on Neosid 722/1 Former. F29 Slug. Resonated with 10 pF.
L16	— As L15 but resonated with 15 pF.
L17/18	— 8 turns 22 AWG Enam. close wound on Neosid 722/1 Former. F29 Slug.

(a) Chokes marked "F29" are single wires through a Neosid F29 Tuning Slug.
(b) RFC 1 — 20 turns 26 AWG Enam. close wound directly on to a Neosid F29 Tuning Slug.
(c) RFC 2 — 5 turns 26 AWG through Philips No. 4312/020/31550 "6 hole" ferrite bead.
(d) RFC 3 — 20 turns 23 AWG Enam. close wound 3/16" ID air cored.
(e) Other changes —
  (i) The two 330 pF capacitors in the oscillator are replaced with 820 pF.
  (ii) The capacity between the third MPF 121 drain and L17 is increased to 6.8 pF.
  (iii) The capacity between L17 and ground is is increased to 22 pF.
  (iv) The capacity between the 2N5589 collector and L18 is increased to 47 pF.
  (v) The capacity between L18 and ground is increased to 47 pF.

Note that the crystal frequency is still signal frequency divided by twelve and that the crystal must still be calibrated with 25 pF in series.

Section 2 — Unit G — VHF FM RECEIVER

In the preface to this series of articles (AR August 1975) the brief description of the FM receiver implied the use of a double conversion IF block similar to the circuit described in 1971 for what has become known as the "VK3" carphone. In the intervening period a complete redesign has

been undertaken aimed at simplification, size reduction and lower cost. The design now presented achieves these objectives.

Figure 18 gives the circuit employed while Figure 19 gives the placement of the components on the 6 in. x 2 in. circuit board used. Table 2.13.1 gives coil data for 146 MHz while Table 2.13.2 gives coil data for 52 MHz.

A fixed gain MPF 121 or equivalent dual gate protected FET is used as an RF amplifier which is coupled through L2 and L3 to gate 1 of a second MPF 121 (or equal) used as a mixer.

The oscillator section uses a 2N3564 in an oscillator/tripler arrangement. If used at 146 MHz coils L4 and L5 are resonant at the injection frequency, this being 10.7 MHz less than the signal frequency of interest. Output is taken from a tap on L5 via a 1000 pF capacitor to gate 2 of the MPF 121 mixer.

At 146 MHz the crystal frequency is:

$$\frac{\text{Signal frequency} - 10.7 \text{ MHz}}{3}$$

Use of the Hy Q Style K or Style D Type DS is recommended. L6 is slug tuned and affords a simple method of trimming the injection frequency to its correct value.

If used at 52 MHz the crystal frequency is given by the expression:

$$\text{Signal Frequency} - 10.7 \text{ MHz}$$

At 52 MHz the oscillator is used direct and does not triple. Accordingly coils L4 and L5 and their associated capacitors are omitted. A wire link is used to bridge the two holes previously occupied by the 10 pF resonating capacitor of L4 and a second link (under the PCB) connects the emitter of the 2N3564 oscillator to the "L5" end of the 1000 pF capacitor feeding gate 2 of the MPF 121 mixer.

TABLE 2.13.1

Coil and Capacitor data for 2 metres.

L1	— 4¾ turns 20 gauge tinned copper wire spread over 3/8" on a Neosid 722/1 former using an F29 slug. Tap is 1½ turns from the earthy end of the coil.
L2	— As L1 but tap 2¼ turns from the HT end of the coil.
L3	— As L1/L2 but no tap.
L4	— 5¾ turns 20 gauge tinned copper wire spread over 3/8" on Neosid 722/1 former using an F29 slug. Tap 2¼ turns from HT end of coil.
L5	— As L4 but tap 2½ turns from earthy end of coil.
L6	— 10 turns 22 AWG enamelled wire close wound on Neosid 722/1 former. F29 slug.
L7	— 10 turns 22 AWG enamelled wire space wound on Neosid 722/1 former to length of 3/8". F29 slug.
L8	— 60 turns 36 AWG enamelled wire close wound on Neosid 722/1 former. F29 slug.

Note that T1 and T2 are supplied with the filter.

TABLE 2.13.2

Coil and Capacitor data for 52 MHz

L1	— 12 turns 22 AWG enam. close wound on Neosid 722/1 former. F29 slug. Tapped at 3 turns from earthy end. Resonated with 10 pF.
L2	— 12 turns 22 AWG enam. close wound on Neosid 722/1 former. F29 slug. Tap at 5 turns from HT end. Resonated with 10 pF.
L3	— As L2 but no tap.
L4/5	— Not required.
L6	— 12 turns 22 AWG enam. close wound on Neosid 722/1 former. F29 slug.

In the next issue it is intended to describe the digital modules.

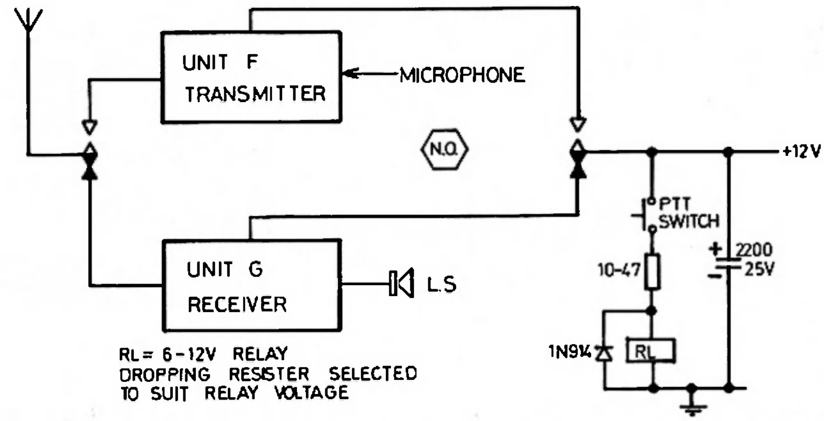


FIGURE 20-INTERCONNECTING UNITS F & G FOR TRANSCEIVE

Output at the IF of 10.7 MHz is taken from the mixer drain via T1 to the Toyo 10M2A filter. Output from the filter is coupled via T2 to a Motorola MC 1350P minidip amplifier. The filter and its associated transformer are marketed by R.P.G. Agencies of 54 Looker Road, Montmorency, Vic. 3094. The transformer marked 10A02 is used for T1 and that marked 10A10 as T2.

The 1350P amplifier has a gain of around 45 dB at 50 MHz. Such gain in a small space did produce a problem in a developmental model since sufficient 45 MHz energy from the oscillator was picked up by the MC1350 input and after amplification, was sufficient to quiet the MC1351 demodulator. This problem was overcome by use of a series tuned trap (L7/47 pF) at the output of the MC1350. In use the core of L7 is adjusted for maximum noise in the absence of any signal.

Further amplification, limiting and demodulation is done by a National LM 1351 or Motorola MC 1351 14 pin D.I.L. device. Since the 1351 operates direct on 10.7 MHz the need for a conversion stage with its associated crystal and components is avoided. L8 is the coincidence detector coil. No resonating capacitor is needed for L8.

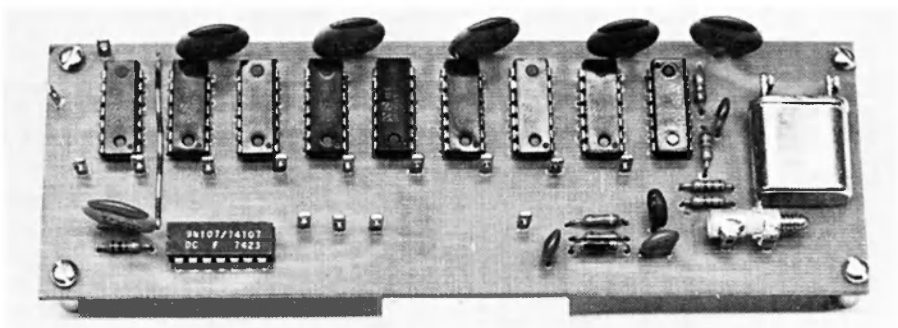
The audio output of the 1351 (Point A on the circuit diagram) splits two ways.

The first branch goes via a 3.3K resistor to a 25K "C" taper pot which acts as a mute threshold control. The small value of the 220 pF capacitor to the base of the 2N3565 noise amplifier discriminates against the lower audio frequencies so that only the "hiss" noise is amplified. The amplified noise is rectified, filtered and applied to Pin 2 of the LM380 audio amplifier. The 2.2 MFD tantalum electrolytic at this point provides a small measure of mute delay. When a quieting signal is received there is no output from the 2N3564 noise amplifier and the 0.12 volts (or more) required to mute the LM380 disappears and the mute is lifted.

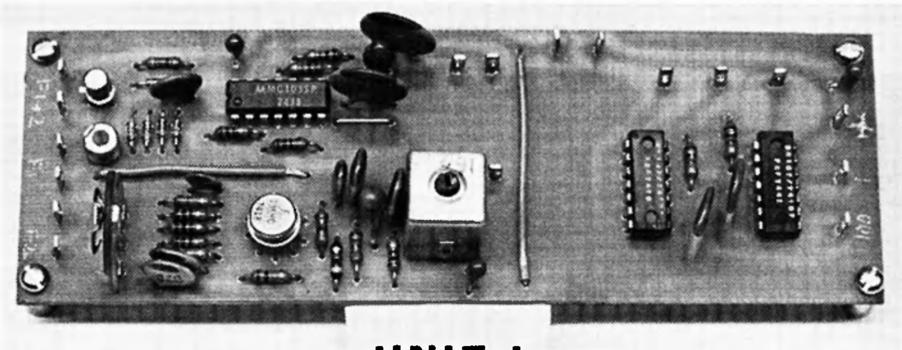
The second branch of the audio circuitry goes via the 22K fixed resistor to the 25K "C" taper audio level control. This control is capacitively coupled to an LM380 audio amplifier which provides about 1 watt of output to an 8 ohm speaker.

Note that the 22K resistor and 0.01 MFD capacitor associated with the audio level control are not on the circuit board. The 0.01 MFD capacitor is soldered direct across the two outer lugs of the control while the 22K resistor is used to connect the potentiometer to the appropriate point on the PCB. Similarly the 3.3K resistor is used to connect the audio output point on the PCB to the mute control.

Note that the receiver is designed to operate from a nominal 10 volt supply.



UNIT-H



UNIT-I

Whilst the receiver will, in fact, operate quite satisfactorily over the 8-14 volt range the 10 volt design centre was adopted to allow use of a simple regulator between the normal mobile supply of 13.6 volts and the receiver. In a mobile environment such a regulator has been found necessary to prevent direct modulation of the LM380 audio device by ignition spikes appearing on the vehicle supply lines. Alignment is best done using a signal generator having a reliable attenuator.

With no signal input the core of L7 is adjusted for maximum noise — indicating that any oscillator feed through is not quieting the 1351 demodulator.

A large signal is now applied to the antenna input and the core of L4 adjusted until a signal of some sort is heard.

When the signal has been identified the signal generator input is reduced until the signal is barely audible and the cores of T1 and T2 adjusted for maximum signal. The cores of L5 and L4 are peaked followed by L3, L2 and L1 in that order, reducing the signal generator output after each adjustment. The alignment process should then be repeated using the minimum discernible input from the generator.

With an off air signal (of known and reliable frequency and audio quality!) the cores of T1 and T2 are adjusted for best sounding audio. The core of L8 is adjusted to minimise ignition noise.

The front end, or converter, section of the receiver can be used on its own as a VHF converter. To do this replace the primary link coupling of T1 with a 100 microhenry R.F. choke. Output is taken from the mixer drain via a 220 pF (or thereabouts) capacitor. This coupling method provides a broadband output although some gain is sacrificed in so doing. Similarly the back end of the receiver can be used as a 10.7 MHz FM IF strip. In this case all components prior to T1 are omitted — including the dropping resistor supplying HT to the link winding of T1. The (originally HT) end of T1 input link is earthed and input applied to the end of the link originally connected to the mixer drain.

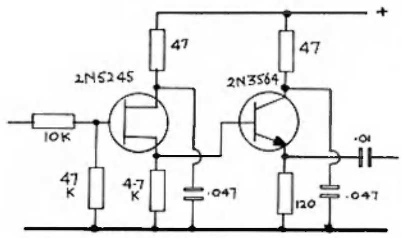
To be continued

AMATEUR BUILDING BLOCKS ERRATA

(a) **Figure 2 — Unit A — Page 15 — AR August 1975:**
VFO buffer amplifier should have been as shown on attached diagram.

(b) **Figure 5 — Unit B — Page 18 — AR August 1975:**
First IF amplifier shown as 2N3565 should be 2N3564.

(c) **Figure 6 — Unit B — Page 19 — AR August 1975:**
Resistor in top right hand corner shown as 2.2k; should be 22k.



AVAILABILITY:
Printed circuit boards and/or components for the modules described in the "Amateur Building Blocks" series of articles can be obtained from the WIA, VK3 Components Committee, P.O. Box 65, Mount Waverley, Vic. 3149, or UHF Services, 129 Tennyson St., Elwood, Vic. 3184. Enquiries should be directed to these suppliers. A stamped, self-addressed envelope for a reply would be an appreciated courtesy.

CW Netting The Transceiver

Goffrey Thompson VK3AC
78 Illawarra Road, Hawthorn, 3122

Listening on a number of occasions to the CW net which is attracting many CW ops to the 7 MHz band on Sunday mornings, I have been struck by the number of stations which call the control station well off frequency. In fact recently, of more than 20 callers, only two or three were accurately netted with the control.

It was also puzzling why several stations were calling 1.6 kHz or so higher than the control station frequency and well outside the range of a CW filter excepting for the clicks. However, this was obviously a result of zero-beating the transceiver on its USB listening frequency with the control station. This resulted in a transmission 800 odd Hz higher than the controller's frequency, who, if he was transceiving, would be listening on a frequency 800 Hz or so lower than his transmitting frequency, thus producing a separation of 1.6 kHz.

The problem for the transceiver operator is that netting must remain guesswork since there is no way in which he can zero beat another station without some external aid such as a separate monitor receiver.

This problem has been overcome by a very simple measure taken when using an FTDX401 and also an FT101.

To implement the idea however, a second receiver or a frequency counter will be needed temporarily, to set up the method which consists simply of providing a side tone with which the beat note of the incoming signal can be instantly matched.

The FTDX401 and most modern transceivers transmit on three frequencies for each dial setting depending on the position of the mode switch, namely LSB, USB and the CW/Tune position. The AM position also operates on the offset frequency which is approximately 800 Hz higher than the USB listening frequency in Yaesu transceivers.

If you have not done this before, I would suggest that you listen to your rig and note that the USB and LSB carriers are 3 kHz apart, the USB carrier being 3 kHz lower in frequency than the LSB carrier. The CW carrier will be found about 800 Hz higher than the USB carrier, which is on the normal CW listening position. By doing this, you will gain some idea of just what the relationship is between the CW signal and the listening mode.

Obviously, if we can beat the incoming signal to the same audio frequency as the difference between the USB and CW frequencies of our particular rig, our CW transmission will be zero beat with that signal.

Of course, the clarifier could be used to guess this difference, but unless one is blessed with *"perfect pitch"*, it is not possible for the average person to carry the memory of a particular pitch for any length of time without some error when trying to repeat it. If we could, then there would be no problem, but in the absence of *"perfect pitch"*, the simple solution is to use a side tone oscillator which matches the offset frequency. The FTDX401 already has this oscillator.

In the 401 I have reduced the pitch of the side tone oscillator from 1000 Hz to 750 Hz until it matches exactly the offset frequency. A couple of dits on the key when tuning to the station to be called enables the two tones to be matched in a second or two and you can be confident when you call you will be well within the CW filter of the other fellow and pretty close to being zero beat with his transmission.

The question of standardising all offset frequencies has been raised, but this does not enter into the matter, since each individual operation will match the incoming signal to whatever the offset frequency happens to be on his particular transceiver. The task of the CWN control operator would certainly become a little less arduous.

The FTDX401 uses a parallel capacity with its own trimmer across the USB crystal to achieve the CW offset and put the carrier into the SSB filter pass-band. These capacities are transistor-switched into circuit by the mode switch when it is switched to the CW, Tune or AM positions. Note that after having set up the matching side tone frequency, any alteration to the USB carrier crystal trimmer will change the offset CW frequency on the 401. Make sure the rig is well warmed up before checking the offset frequency and matching the side tone. Drift is sufficient to reduce accuracy, but the amount will be insignificant compared with the *"guesswork"* method of netting by clarifier and straight listening.

The method has been incorporated in my 401 and all that was required was one fixed capacitor from the junk box.

The same method can be applied to the FT101, but with the 101 I am using I simply changed the fixed pitch of my Autronic keyer monitor oscillator to match the offset frequency of 750 Hz. This meant one more fixed capacitor from the junk box to bring the pitch down from 1034 Hz to 750 Hz. If your keyer has a pitch adjustment on its monitor then there will be no need for any components at all with the exception of a borrowed monitor receiver.

Of course, it is important to ensure that the 101 is initially correctly adjusted so that it transmits and receives SSB on the listening frequencies. These can be different if voltage adjustments are incorrect and this fault would make it difficult to apply the matching tone idea with any accuracy.

While on the subject of CW, it should not be assumed that a commercial rig will be without its keying faults. Clicks, thumps and poor notes can be experienced when using the sideband rig for CW. So if you have another receiver and have never listened to your CW, take a look at the keying characteristics and check for faults.

Transistor switching can often reduce key clicks, but additional keying circuit filtering will be needed in most cases. The FT101 keying was vastly improved with the addition of a 2 mfd capacitor across the key outlet from the rig and a 300 ohm resistor in series with the keying circuit. This eliminated thumps.

The 401 with its tube complement required slightly different treatment since it keys a number of stages together with the PA stage. Clicks and thumps were eliminated by connecting a 2 mfd capacitor in series with a 500 ohm resistor across the key outlet of the rig. The keyer was connected across the capacitor with a 250 ohm resistor in series with the keyer. The result was an excellent shape to the keyed CW and the eliminating of the clicks and thumps. Viewing CW from this rig, John VK3IQ reported that on this CRO, the keying pattern matched exactly the recommended shape published in the ARRL Handbook. This unsolicited comment came before I had mentioned to John that I had been playing around with the keying circuit.

In connection with the idea discussed above for netting the transceiver, a couple of friends in VK2 have adopted the idea with success. One said during a QSO that it would be a bit of a bore to have to build an oscillator to get the tone required, so in fun I suggested that he get a Swanee whistle and tune this to match the G sharp above the seventh octave of C on the pianoforte. He took this seriously, having been through the Conservatorium of Music, made himself a pipe resonant at the difference frequency of his rig and by blowing his whistle and beating the incoming signal against it, zero beats the incoming signal with his own transmitted CW. To beat it all, another VK2 who has been caught with the same problem, twangs his guitar string which he has tuned to the difference frequency, or I should say the offset frequency of his particular rig.

One final word about SSB rigs and CW. The recent interest in QRP has raised the problem of poor tone. On those transceivers which depend, like the 401, on the unbalancing of the balanced modulator, instead of the switching in of another xtal as with the 101, tone can deteriorate with very small amounts of carrier insertion. One possible solution to this is to alter the bias pot on the rig to beyond cut off of the PA stage. This will require more carrier insertion and will very likely improve the note.

Happy netting with the CWN. ■

Magazine Index

With Syd Clark, VK3ASC

QST July 1975
HF Discone Antenna; Receiver Dynamic Range; Crystal-Controlled SSTV Sync System; Monolithic Crystal Filter; Learning to Work with Semiconductors, Pt. 3; RIT for the HW-7.

RADIO COMMUNICATION June 1975 & July 1975
The GM3OXX Portable 3CM Transceiver; Building Blocks for the Novice; Microwaves; Report of the IARU Region 1 Conference.

Bulletin Reflections. Pat Hawker talks at length about the RSGB over 50 years; Switched Polarization Cubical Quad; A Simple Pre-Scaler for 145 MHz; Building Blocks for the Novice. ■

QSP

UNLICENSED TRANSMISSIONS
Recent copies of the local Rockhampton daily contain news of three persons appearing in the Magistrates' Court on charges under the Wireless Telegraphy Act. One of the persons was committed to the District Court for sentence and the other two were convicted, one being fined $50 or three weeks in jail on each of the two charges of possessing radio transceivers for the purpose of transmitting and receiving messages without being authorised under the Act, and the other was released on probation for two years on two charges of maintaining a station for transmitting and receiving radio messages without being authorised under the Act. The newspaper reports also contained a statement by one of the accused that "he didn't have the time to do exams or try". This person was stated to have used the call signs KT153 and 9QJL.

ANOTHER ANGLE
QST July 1975, gives a quote of the month "Amateur Radio doesn't measure its success by volume of traffic, gross revenue, or audience, but simply by how well it has served humanity", and goes on to ask what part have you played in the success of Amateur Radio.

LICENCE FEES
"The DOC in Canada has increased the annual licence fee for Canadian amateurs from ten dollars to thirteen dollars per year". QST July 1975. ■

VICOM

Peter Williams VK3IZ
Manager

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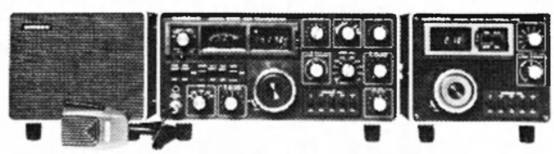

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COAX SWITCHES (2 & 6 pos)	CS-2A CX-6A(A) CX-6A(B)	52 52 75	to 300MHz to 500MHz to 500 MHz	1.3:1 1.3:1 1.3:1	23.00 54.00 54.00
TRAP DIPOLES	III-N	52	7 to 28MHz	1.2:1	33.00
	AL48DXN	53	3.5 & 7MHz	1.2:1	33.00
	AL24DXN	52	7& 14MHz	1.2:1	26.00
	A-4VPN	52	3.5MHz	1.2:1	26.00
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A SIMPLIFIED METHOD OF MORSE CODE MESSAGE GENERATION

L. H. Vale VK5NO
5 Carlton Road, Gawler, S.A. 5118

This article describes a method of reducing somewhat the complexity of morse-code message generators, particularly in the area of the diode matrix, and describes a tail-ender now in use employing the system.

The normal scheme of message generation is to generate a train of equally spaced intervals with an oscillator (the bit generator), and to provide digital circuitry to form an output signal only during the equally spaced intervals necessary to form the desired message. In Fig 1, this has been illustrated for formation of the letter V and a subsequent letter space. A digital counter is made to count the equally spaced intervals (bits) and during bits 1, 3, 5, 7, 8 and 9, diodes are so connected as to key the transmitter.

We can assume that the number of diodes is a measure of the complexity of the coding circuit; in any case the effort required to redesign the coding to fit a new message, and to put the changes into effect, or to design a switching circuit to enable alternate messages, is directly proportional to the number of diodes or other coding elements used, that is the number of -its during which action needs to be taken.

It can be seen from Fig 1 that, in the case of the letter V and its subsequent space, that the proportion of bits during which action is taken to the total number of bits is 50%. This ratio is approximately true for all morse code messages. The coding method described significantly reduces this percentage; it is possible only because of the unique timing relations existing in the standard telegraphic code (herein loosely termed "Morse" code).

If we compare a string of dots with the letter V plus space, as in Fig 2, one can see that they differ only during bits 8 and 11. Therefore, if we start our process by producing a string of dots, we need only take action to invert it during these two bits; this immediately reduces the number of diodes required to one third of that normally required. Fortunately, the string of dots is already available in the usual message generator at the output of the first

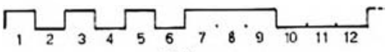


FIG.1.

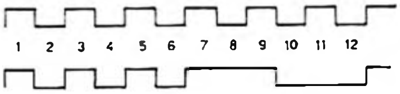


FIG.2.

counter stage, and the inversion can be accomplished by an exclusive-OR gate, or some similar circuit which acts as an inverter when the second input is at (1) but is non-inverting when the second input is (O), or vice-versa.

The reduction by two thirds of the bits during which action needs to be taken is generally the case with this system but varies, of course, with the particular message required.

Action is required to be taken during the centre bit of a dash, the centre bit of a letter space, and twice during a word space, so if the total of dashes, characters and word spaces in a message are added, the result is one more than the number of diodes (or other devices used in coding) required.

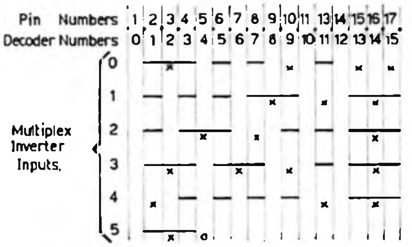


FIG 4 Coding of "DE VK2AHM".

An example of the use of the above simplification method is a tail-ender recently made to send the message DE VK2AHM. A push-button initiates the sequence and a pair of relay contacts close during the sequence to switch the transmitter on.

In the message there are 10 dashes, 8 characters and one word space, so the number of bits in which action is required is 18. A 1 of 16 decoder and an 8 bit multiplexer are used. The total number of diodes required in the matrix is 18, and modifying the sequence is simple. The total number of bits available for the sequence is 128 which is more than enough for any amateur call. There are 84 bits in the required message, counting a first starting (switching on) bit.

Fig 3 is a circuit diagram of the tail-ender. U1B and U1C form a latch which, when triggered by pushing the start button, applies positive voltage to initiate the unijunction clock oscillator Q1 and, via U1D and Q2, to pull in relay RL, which switches the transmitter on.

The clock pulses from Q1 drive dual flip-flops U6 and U7, and the Q outputs of these flip-flops code the inputs to the decoder U4. A string of clock pulses from Q1 therefore has the effect that the outputs of the decoder each go low in sequence from 0 to 15 (pins 1 to 11, 13 to 17) during the periods between clock pulses, and repeat this sequence as long as there are clock pulses. The output (QD) from U7 also clocks another dual flip-flop U8 which clocks single flip-flop U9 to provide three more Q outputs, QE, QF and QG to code the control inputs of an 8 input multiplexer U5, which switches each of the inputs in turn to the output Y. Therefore, at any time in the sequence, only one output of U4 is low, and only one path is complete through U5. DTL inverters in U2 connect to each of the six U5 inputs so that the addition of a diode between an input of U2 and an output of U4 will cause the corresponding output of U2 (and input of U5) to go high during the period when that output of U4 is low.

Before starting, when the flip-flops are set at zero, the O output of U4 (pin 1) is low and the O input of U5 (pin 4) is connected to Y as there is no diode in position O to O in the diode matrix, therefore the O input of U5 and Y will both be low.

To clarify the description of the sequence, we should look first at the diode matrix for DE VK2AHM (Fig 4) and the method of deciding where to connect the diodes.

The first step is to lay the required message out in sequence on graph paper which has the same number of squares in a horizontal row as there are outputs in the decoder (in this case 16), and number the columns in decoder output numbers and pin numbers (in this case for the 74154). The required message is then laid out with correct spacing on the squares, using exactly 16 bits per row, as shown, starting at the start of decoder output 1.

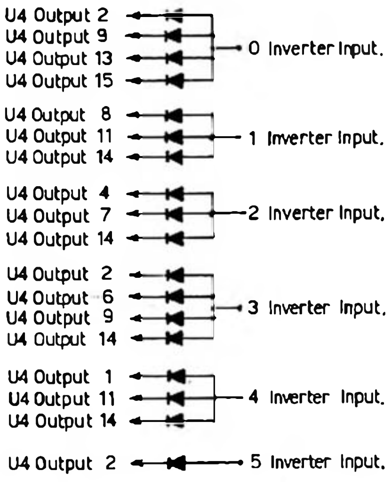


FIG.5. DIODE CONNECTIONS FOR DE VK2AHM

Then mark with a cross the bits during which an inversion is required — that is, the centre dots added to form dashes, and the dots removed to form spaces.

Firstly, it can be seen from the graph layout that in this case there is a total requirement of 84 bits, which is well below the total of 128 bits available with a 16 output decoder and 8 input multiplexer. The 85th bit turns the tail-ender off.

Secondly, it will also be seen that diodes are required at the following positions on the first row: (2-0), (9-0), (13-0) and (15-0). These diodes are therefore connected with cathodes going separately to the required U4 outputs and anodes going in common to the input of the inverter whose output is connected to the O input of U5. Repeating this performance on the other rows we finish up with the diode matrix as shown in Fig 5.

Following the logic through, it will be seen that when there is no diode present in the matrix, that is during all bits in the first row, except bits 2, 9, 13 and 15, the base of Q3 is taken negatively by U3B (W is an output of U5 complementary to output Y) whenever QA goes high. This produces the required string of dots. During a bit such as 2, when a diode is present,

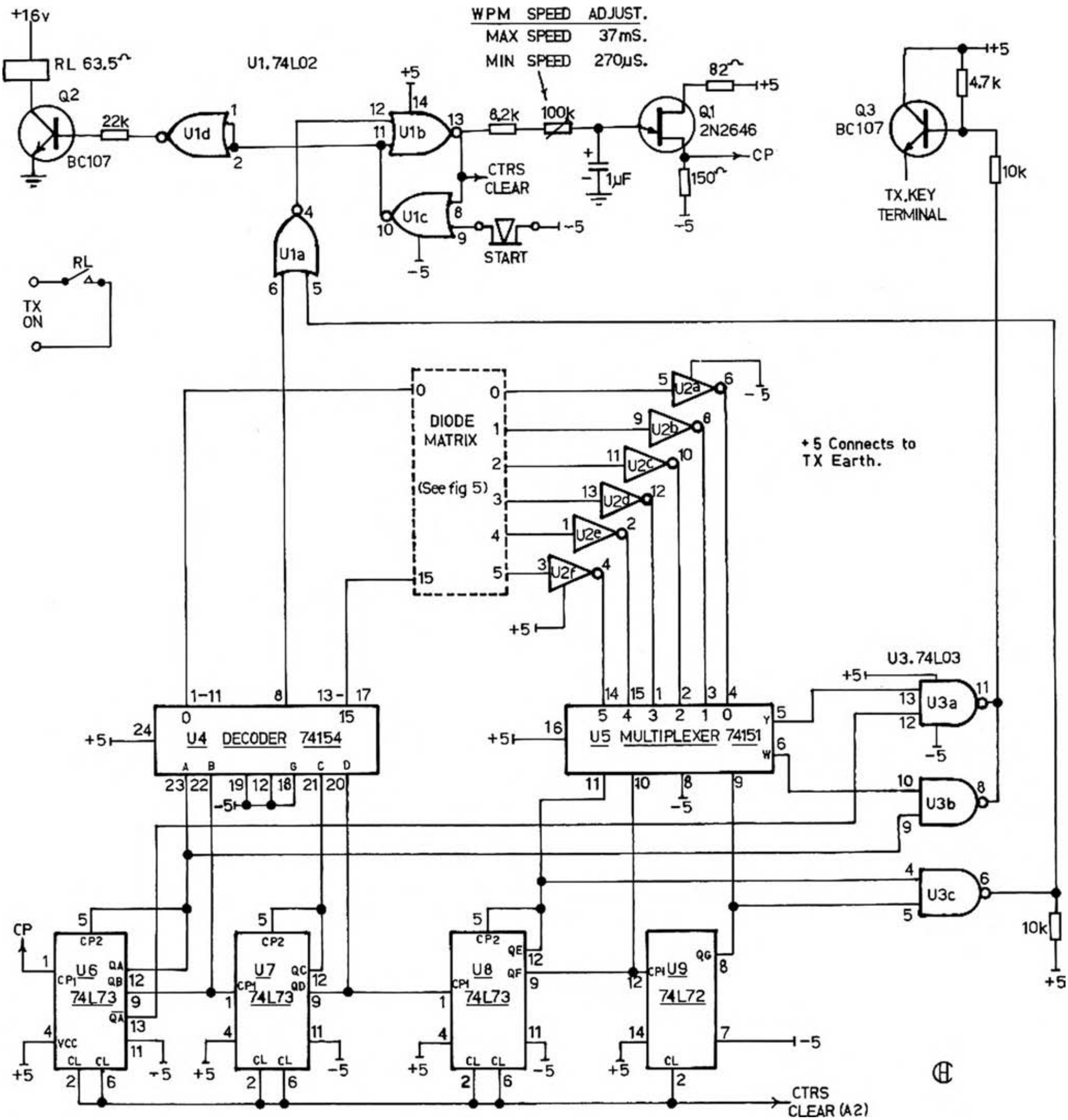


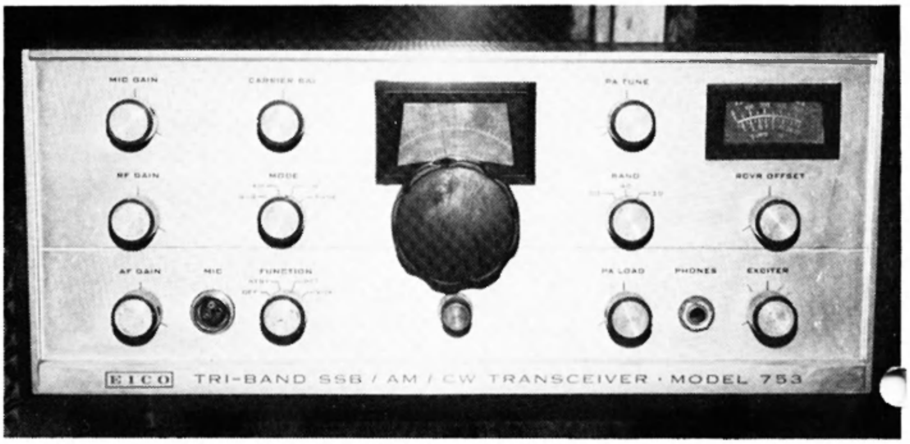
FIG. 3. TAILENDER CIRCUIT DIAGRAM.

U3A is enabled instead of U3B, inverting the process; so that the availability of complementary outputs from both U5 and U6 enable U3A and U3B to perform the inverting function instead of an exclusive-OR gate.

The end-of-message function is performed as follows: U3C output goes low when both QE and QG outputs of U8 and U9 respectively are high (on row 5), when this condition coincides with a low on output 4 of U4, the output of U1A goes high, unlatching U1B and U1C, which stops the sequence, and drops out the relay, taking power off the transmitter, and resetting all the flip-flops to zero. By choosing the correct combination of U8 and U9 outputs to determine the row of the "stop" bit and the U4 output to determine the position in the row the sequence can be stopped as required.

This tall-ender is built on perforated board and enclosed in a die-cast box. The unit keys an FI DX400 transmitter and has been in operation since late 1973. ■

Improving The 'EICO 753' on 14 MHz



Alan Shawsmith VK4SS
35 Whynot Street, West End, Brisbane, 4101

The EICO 753 Tri-band transceiver might be described as a popular, low cost, utility type set. The writer has owned two such units and found their performance quite satisfactory, except that the gain, sensitivity, and S/N ratio on 20 metres is below that on 80 and 40 metres. The manual gives the sensitivity as 1 uV for 10 dB S/N, however better than .5 uV on 80 and 40 metres is claimed by a USA magazine which put the set on test.

If DX is your main interest, an improvement on weak 20 metre signals can be obtained by the following very simple and almost instant modifications. In brief, proceed as follows—

Remove ground wire between RF valve 6BA6 V16, pin 2 and ground. Remove resistor R61 from pin 1 of V16 and connect it to pin 2 of V16. Wire a .02 disc ceramic by-pass condenser from pin 2 of V16 to ground. Wire a 1 meg. resistor between pin 1 of V16 and ground.

On the tag strip associated with the wiring for the VFO tube 6EH7 V11 (or solid state modified VFO) remove the 27K resistor R56 and replace it with a small 1 mH RF choke. Remove the 47K resistor R53 and replace it with a 4.7K resistor.

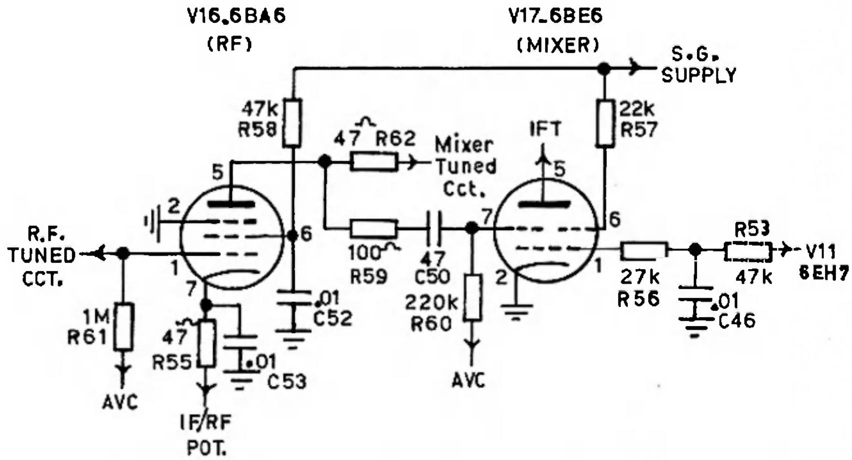
These changes should result in maximum RF gain on weak signals and better first conversion efficiency. Tagging the AVC line on to the suppressor grid, pin 2 of RF tube 6BA6, does not result in any increased pumping or blocking as might be supposed.

It is common practice to tie both the IF and RF gain to one variable control and designate it on the front panel as RF gain. This makes for easier operation by virtue of only one knob. However, in the case of the EICO on 14 MHz, there is a point reached when this control is advanced towards maximum, where the internal noise and signal, increase at the same rate. This is because of excessive and unnecessary gain through the IF strip where much of the noise is generated.

Better S/N ratio and greater flexibility on the weaker signals can be obtained if the IF and RF gains are manipulated separately. This means an added knob on the front panel. It can be done without spoiling in any way the aesthetic or symmetrical appeal of the panel, by installing a suitable 10K RF control potentiometer in the place at present occupied by the PHONES. The speaker jack, at rear, is suitable for phones, as it is on the same circuit, 3 ohms. If the set is used exclusively for CW, the RF pot can be installed where the MIKE GAIN is now placed. (Do not cut the leads to the MIKE GAIN: simple let the pot rest loose in the set — you may want to restore it).

However, as a temporary measure, the effect of this modification can be gauged without changing anything at all. Simply disconnect, at the RF GAIN pot, the cathode lead from the RF tube 6BA6, V16, and earth it. This will allow maximum gain through the tube. Previously weak signals required the RF gain to be ¾ or more advanced. Now it will be found only necessary to advance the gain 1/3 to ½ and the receiver noise, previously audible, will now be virtually nil. If you favour CW DX and happen to live in an area where there is no blocking from nearby stations, this modification could remain as a fixture.

Selectivity in the EICO 753 is up to manual specifications. In fact, the 30-1 fine control of the main tuning is too coarse for comfortable handling of weak sigs. Fine



RELEVANT PART OF THE ORIGINAL CIRCUIT OF "EICO 753."

trim is usually done with the RX-OFFSET. But again, this control is too coarse and would be improved by the introduction of a small 3-1 or 5-1 vernier. This is something the owners of the set can ponder on.

The transceiver's IF strip is at 5.2 MHz. In common with some makes, it is prone to outside QRM, at this frequency. There will be times when a strong modulated signal breaks through and renders the set virtually useless. It matters not if the antenna is selective with co-ax feed, or a random wire with an ATU. Fortunately, it is easily cured. In an earlier issue of "AR", a suitable trap for this type of QRM was described. It is effective and can be constructed and tuned, in a matter of minutes. The simplest way is to use wire of sufficient gauge to be self-supporting. Wind 12 turns at about ¾ in. diameter and spaced about 1½ in. long. Solder the ends to a heavy duty .001 uF condenser and insert in the co-ax line, at the set. Now, with a screwdriver short out a turn, or two, or fraction thereof, until the offending signal is at a minimum. Enclose trap, at leisure, in small metal box and re-trim coil.

A final comment, on the transmitting section — the PA. If there is a tendency to instability, reset the neutralizing condenser as per manual instructions. If the trouble still persists, connect to the junction of R110 and the long wire leading from it, a .01 disc ceramic to ground. The output of the PA on 14 MHz is likely to be about 10% below that of the other two bands: this seems to be mainly in the set design. However, increasing the coupling condenser C97 between driver tube V15 and PA V13 by as much as 3 to 5 times in capacity should result in an increase in output of about 5%. Do not forget to re-align tuned circuits L10, L11, L12.

A short perusal of the circuit manual will show that these modifications for improving the EICO 753 are simple and virtually self-explanatory. The S/N improvement is quite noticeable and brings the performance on 14 MHz closer to that pertaining on the other two bands. It is also an easy matter to restore the changes to "as-was", in a matter of minutes. ■

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Try This

with Ron Cook VK3AFW and Bill Rice VK3ABP

LAMPS AS INDICATORS

In addition to its role as a power on indicator, or dial illuminator, the humble light bulb can be of great use as a cheap indicator of current, voltage or power.

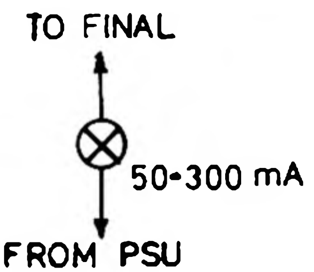
Light bulbs can be powered by DC, AC or RF and provide highly visible indications.

A light bulb in series with a transmitter final provides both a dip indicator and a fuse in case of overload.

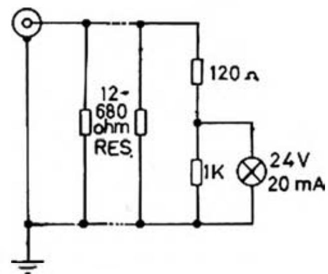
In the aerial circuit, a combination of light globe and resistors can provide a means of indicating antenna currents.

Other uses are in wavemeters and as a power indicator for a dummy load.

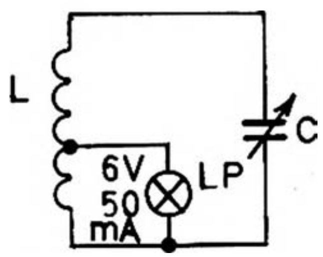
Gil Sones VK3AUI



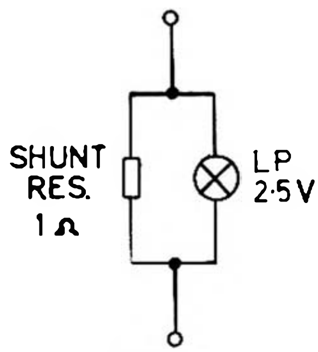
CURRENT INDICATOR AND FUSE



DUMMY LOAD POWER INDICATOR



INDICATING WAVEMETER



RF CURRENT INDICATOR

QSP

BEWARE OF NICAD MEMORY

Just a reminder if you have NiCad batteries in your walkie talkie or other portable appliances. They have a "memory" such that if you run them down just a little bit then recharge, they start believing that is all they should put out and will go dead long before you expect them to. The solution — periodically discharge them then give them a full charge. From 'Collector & Emitter', June 1975.

USA 70 CM BAND

Ham Radio, June 1975, contains references to more threats to the 420-450 MHz band from 20 KW ERENS (Extended Range Electromagnetic Navigational System) transmitters with a range of 250 miles in Dallas on 430 MHz and new ones projected on Cape Cod and Montauk Point L.I. The comment is, "If permitted, these pulsed navigational systems would make a large portion of the 420-450 MHz band practically unusable".

QSL MANAGER FOR VK CONTACTS

A note from VK5BS QTHR, advises he handles QSL cards for VKs contacting ZK1CV, ZK1BS and VK5BS/YJB.

CONTEST LOGS

Sound comment seen in the write-up of the 1974 CQ WW DX contest results column in CQ for June 1975 — "Stop breaking my heart. Stop recopying your logs. Every year I see log after log with 500 to 3000 contacts recopied — by hand. It ain't necessary. Honest. Use carbon paper or make a photocopy. Rewrite any illegible calls in the margin 'Contests' are supposed to be fun and recopying logs ain't fun. Besides, recopying logs can introduce errors no matter how careful you are".

WARC 1979

CQ June 1975 quotes introductory remarks by A. Prose Walker (chief of FCC amateur and CB Division). Chairman of the Amateur Service Working Group's Conference on May 8, at FCC HQ in Washington as follows — "This could be a golden opportunity for Amateur Radio. We're in a position, hopefully, to shape Amateur Radio for the remainder of the century and well beyond. Our goal is to do everything possible to strengthen Amateur Radio's position at the 1979 Conference. Our task won't be an easy one and no one can guarantee that we will succeed. That's why we are here today . . . to get things started in the right direction, and to give it our best." ■

NEWCOMERS NOTEBOOK

with

Rodney Champness VK3UG
and David Down VK5HP

A NOVICE TRANSMITTER — Part 2

Receivers of many types are available fairly readily to do the job of receiving a Novice will require. It doesn't matter that it will tune the broadcast band as well as the International Broadcasting Short Wave transmissions, as long as it does cover the Novice sections of the bands that you are interested in.

However, the transmitter is a totally different proposition. It must be Crystal Controlled or have a Frequency Synthesiser (expensive) or a variable Crystal Oscillator, and the bands that you are interested in are only 3.5, 21 and 27 MHz so the transmitter does not need to cover other bands. Most commercially available transmitters cover several more, and also are much higher in power than the 10 watts Output allowed on constant carrier modes, or the 30 watts Peak Envelope Output Power allowed in the Side Band modes. It is with these things in mind that the transceiver to be described came into being. It does transmit AM/CW with an output of 7 watts and 10 watts respectively. It only transmits on 3.5 MHz. The receiver is for the same band and can receive AM/CW/SSB and with careful tuning FM, and follows at the end of the transmitter articles.

This month the Radio Frequency side of the transmitter is described. It would be possible to get on the air with just this section if you wish to work on CW exclusively. The valve used in this transmitter is a television vertical oscillator triode and pentode power output; it performs equally well in the role of crystal oscillator and PA output. Throwouts from TV sets sometimes work quite satisfactorily in this transmitter long after their useful life in a TV is over. An approximate chassis layout will be given in a later article as well as information on how each section works together.

The 6GV8 triode is connected as a Pierce oscillator with no tuning. Feedback to maintain this oscillator working is obtained from C1 and the distributed capacity between the plate of the valve and other circuit components to earth (cathode). The plate load of this valve consists of RFC1 and R4 as well as R5, R6 and the diode load formed by the grid-cathode circuit of the pentode output section. The oscillator will provide about 1.5 mA of grid drive to the output stage.

The drive to the grid of the power amplifier causes the grid to conduct on each half cycle. The voltage at pin 9 is calculated by multiplying grid current in milliamps (I) x the resistance in the grid circuit in kilohms (R) and this will equal the bias at the grid (E) in volts. I x R = E I = 1.5 mA, R = 28K ohms, therefore 1.5 x 28 = 42 volts, and this is the negative bias on the grid of the power amplifier. The valve is being run in Class C2 and is normally biased well beyond cutoff. The cutoff point for the pentode section of a 6GV8 is less than —42 volts that the grid has on it normally. The output of the triode oscillator, however, causes great variations in the instantaneous grid voltage and at times it is driven into grid current — in other words the grid goes positive relative to the cathode. It must go positive otherwise no grid bias will be developed.

The power amplifier stage has protective cathode bias with the resistor R8 between the cathode and earth. Should the drive from the oscillator disappear for any reason the output stage and the oscillator stage will be protected for a short period by their respective cathode bias resistors. I don't recommend that you operate the transmitter without drive for a period of more than about a minute as the power amplifier stage will have its plate dissipation rating exceeded. On AM this works out to 10 watts, I (.040) x E (250) = 10 watts. The plate dissipation of a 6GV8 pentode is 7 watts. When the transmitter is putting out RF energy into the aerial, 7 watts of the energy flowing through the plate circuit of the 6GV8 is fed to the aerial and only 3 watts heat up the valve, so it is safe from damage.

The resistors and capacitors in the cathode circuit of the two valve sections need special comment as they do several jobs. R3 and R8 provide cathode bias for both sections. To key this transmitter in the CW mode the key is placed across the terminals marked tip and sleeve of socket J1. Consider that the key is at rest. The voltage at pin 3 and pin 8 will be determined by the voltage divider formed by R7 and R9 and gives a voltage of about 100 volts plus at these points effectively cutting off both valve sections. The key is now depressed and the bottom ends of both R3 and R8 are earthed. The voltage at pin 3 decreases to normal operating voltages for the oscillator from the 100 volt hold off bias in about 10 microseconds. The oscillator therefore starts to work quickly. However the time constant for the components in the cathode circuit of the power amplifier is very much longer. For the purpose of this exercise we will assume that the formula T (time in seconds for discharge or charge of RC circuit from 10 percent to 90 percent charge and vice-versa) = 2.2 x C (Capacity in Farads) x R (resistance in ohms) is the correct one. For proper shaping of the CW keyed waveform, it is necessary to switch the transmitter on and off slowly. Slowly is a relative term and for CW wave shaping this is of the order of 5 to 20 milliseconds. Now to calculate our particular circuits time constant — T = 2.2 x C (10uF = 10/1,000,000 farads) x R (220 ohm). T = 5 milliseconds. This means that the transmitter will not be up to full power for approximately 5 milliseconds after switch on. When the key is lifted the reverse action occurs except that the charging current for the cathode capacitors comes via the plate circuits of both valve sections and the cut-off procedure is much slower and could easily equal 20 milliseconds. Therefore the attack characteristics of the network are faster than the decay characteristics, and regrettably with this simply CW key shaping circuit these slight limitations must be accepted. The oscillator is fed in parallel when the key is lifted so the oscillator remains in operation until about the time the output section ceases to operate. On AM, C4 also acts as the audio bypass for the modulator audio, so therefore does two jobs. C5 and C2 are only for RF bypassing. R8 is the power amplifier cathode biasing resistor as well as the timing resistor for the CW wave shaping circuit. R7 and R9 are purely to act as a voltage divider so that the cathode bias on the two valve sections is approximately 100 volts, so cutting off the two sections with key up in the CW mode.

The screen circuit of the output section has the normal bypassed screen voltage dropping resistor. The value of R10 depends to a certain extent on the total supply voltage to the valve, and will be lower in value if the power supply voltage is lower than indicated in this particular instance, and conversely it will be higher in value if the supply voltage is higher than specified in this article. If you want a little more output with the voltage specified on the supply lowering this resistor will increase the output so that it exceeds the Novice level, and maybe, if you don't take care, the valve could quit on the job.

The plate circuit is the usual pi-coupler output system which is quite popular in modern HF transmitters. R11 and RFC2 form a parasitic oscillation suppression circuit, designed primarily to suppress VHF parasitics. R2 in the grid of the triode oscillator performs the same function quite effectively. The HT voltage is shunt fed via an RF choke RFC3 via metering resistances R12, R13, and M1, RFC2 and R11. C7 is an RF bypass capacitor of value such that it bypasses the RF but has little effect on the audio from the modulator. C6 in the screen circuit serves the same purpose. RFC3 blocks most of the RF in the plate circuit from being wasted in the HT supply circuit of the transmitter or from causing all sorts of miscellaneous transmitter ills. C8 passes the RF energy to the pi-coupled output tuned circuit. Note that from the plate pin of the output stage to the junction of RFC3 and C8, RF and DC are coursing down the one lead together. The choke and capacitor separate these two components and this in reality is a basic filter network. The RF having passed through C8 encounters the tuned circuit. The values of C9, C10, C11 and L1 are optimised so that not only will the circuit tune to 3.5 MHz, but will present the correct load impedance to the output valve section and to the 50 or 75 ohm aerial system. The correct ratios of the component values ensures that the transmitter tunes correctly, loads correctly and has minimum spurious output. The spurious output is —39 dB relative to the carrier level, this is better than some very well known and respected amateur transceivers, in fact it would not be hard to better this figure with slight additional complexity.

An interesting observation was made during the period whilst various LC ratios were being tried in the output of the transmitter. At one stage about 50 per cent more inductance than currently used was in circuit. This caused the output of the transmitter to peak off to one side of the dip in plate current. An old crystal for a frequency of about 2/3rds the frequency was inserted, and it was found that the peak output occured when the plate current dipped at resonance, as observed on the watt meter and the plate meter. This seemed strange so the formulae used to calculate the inductance/capacity values were rechecked and it was found that one factor had been overlooked in the calculations. When this factor was incorporated, it was found that the inductance to use was less than before. A new coil was wound and wired in. Now the transmitter output range tuned such that maximum output occured at plate current dip, when on 3.5 MHz and did not tune properly on the frequency where it was previously tested. There is possibly a small point to be considered here although an important one — the transmitter will tune correctly if the tuned circuits match the output stage and the load impedances at the frequency of operation. If your transmitter does not appear to give maximum output near or on the bottom of the valley of the plate current dip it could mean the circuit LC ratio is wrong. Other problems could be that the stage needs neutralising or that it is on the verge or occasionally going into parasitic oscillation.

RFC4 is not really needed, in fact you can remove it and no trouble should occur ever — but, it is possible to kill yourself if you do leave it out. The purpose of RFC4 is to act as a DC return should C8 breakdown and place HT on the aerial line. In most cases no harm will come to anything if the majority of aerials are insulated from earth. Woe betide anyone who touches such an aerial if this capacitor fails as it could be the last thing they do. 300 volts DC with a larger filter capacitor behind it could be fatal. RFC4 acts as a short circuit for the HT voltage and static build up too, so that the power supply fuse blows to alert the operator that something is wrong.

There are two manually operated switches on the transmitter, and these switches function so that the transmitter is set up for AM or for CW, S1, and to actuate the netting function, S2. Switch S1 is shown in the CW position 2. In this position S1a switches the plate circuit HT supply via 19 and the HT relay contacts. In position 1, it switches the HT line to the modulated HT line via the modulator. S1b is open circuit on the CW position and switches HT voltage to the modulator and PA valve when in the AM position. S1c is open circuit on CW but grounds the cathode resistors of the RF valve sections when in the AM position. The morse key goes across the switch contacts in the circuit. S1d is open circuit on the CW position, but the back contacts of the morse key keep this line shorted to earth whenever the key is not being used. If this complete line has both short circuits removed from earth the semi-break-in keying system will start to work, but that is further on in the article. In the AM position, this line is earthed and the semi-break-in circuit cannot work.

S2 is shown in the normal position. S2a is shown with no short on the cathode lines of the two valve sections so that the AM/CW switch can operate independently. S2b is switched so that the oscillator receives its voltage via the same path as the output stage when on CW. When the switch is thrown to the netting position, the cathode circuits of both valves are completed to earth and the oscillator receives HT via R18 so activating the oscillator without the output stage operating. The value of R18 is adjusted such that the oscillator puts a good strength signal into the receiver when you are netting to your transmitter; without being so strong as to swamp the receiver or be so weak that it is almost impossible to hear below static crashes, signals, etc.

The circuitry which comprises the two transistors TR1 and TR2 is the circuitry used for the Press To Talk (PTT) function on voice and for the Semi-Break-In function on CW. This is a very simple circuit which works quite effectively. It does just the same job as one seen in an American article with a fraction of the parts count. This particular transmitter/receiver function changeover system was described in The *Radio Bulletin* the journal of the *Eastern and Mountains District Radio Club* for December 1974. The author always abhorred the drudgery of manual changeover from transmit to receive and vice-versa on CW, and this particular little circuit is the result. It has features which are quite important if the first character of any string of characters is not to be clipped — as several transmitters do.

You will note by checking the circuit that the morse key is wired so that the back contact is used in addition to the normal keying contact. As you commence to operate the morse key the earth on the back contact is broken several milliseconds before the keying contact is earthed. During this time, current flows through R14, D1 and R17 to turn TR1 on, as the earth on R14 is removed. The current into the base of TR1 turns it on hard which causes the base of TR2 to be drawn towards the collector voltage which is at earth potential. This causes TR2 to also turn on hard and in so doing it pulls in the relay in its emitter circuit, which changes over the equipment from receive to transmit. This changeover occurs in the time it takes for the key to unearth the back contact to the time the keying contact is made. This is only a few milliseconds, and these few milliseconds are sufficient time for the relay to operate and change the equipment over from receive to transmit. However, when the key is released the relay would immediately drop out so causing quite a bit of mechanical noise in the set. The components R16 and C12 function to keep the transmitter in the ready to transmit condition for a period that is governed by the value of C12. C12 is normally in the range 1 to 2.2 uF and these values will give a hold time for the semi-break-in system of ½ to 1 second before the relay releases. With a 12 volt DC supply R16 must be of such a value that about a volt or two is dropped across it if C12 were shorted out with the key depressed. R16 is in series with C12 so that as soon as the earth is removed from R14, etc., enough voltage is developed across R16 and fed to the base of TR1 to cause it to saturate, despite the momentary apparent short circuit across C12 as it charges. The inclusion of R16 means that it is not necessary to worry about the delay that would have been caused to the operation of TR1 because of the charging time constant of R14, D1 and C12. This worked out to be a delay of at least 3 milliseconds. This amount of delay combined with the response time of the relay could mean that the first character sent may well be clipped. A 3 cent resistor prevents this.

When the key is released the short is re-applied to R14. D1 isolates C12, R16 and R17 so the charge on C12 supplies base current to TR1 for about ½ to 1 second keeping it saturated, in turn TR2 as well and the relay operated. After a period, the voltage on C12 drops to a level that will not keep base current flowing in TR1 and it ceases to conduct, likewise TR2 has no base current supplied, ceases to conduct and the relay releases and the equipment is back on receive — until the key is again pressed.

D2 functions only as a transient suppressor so that TR2 is not damaged. D3, C14, R20 and C15 form a rectifier filter system from the 12 volt AC filament line. Nominally the output from this half wave rectifying system is 12 volts DC but with no load this does creep up to about 16 volts. The regulation on this line is not particularly important as long as the DC is reasonably well filtered.

At this stage I will not be giving you a layout for the transmitter, but recommend that you read Newcomers Notebook for March and April 1974, which goes into design and layout of equipment. A layout suitable for the complete transceiver will be published in a later issue, complete with photograph.

STR1 is a 8 or 9 tag terminal strip, and the points labelled are as follows — A = chassis earth, B = Press to talk (microphone line), C = 12.6 volt AC heater line, D = High tension line to the modulator, E = Modulated high tension line from the modulator to the PA stage, F = 6.3 volt AC heater line, G = Receiver HT earthing line, used to prevent accoustic feedback when changing over from transmit to receive and vice-versa. It may not be necessary, H = Audio monitor line from the modulator output transformer.

STR2 is a 6 to7 terminal strip (or a multi-pin socket, if the receiver is mounted on a separate chassis to the transmitter). The points are labelled as follows — 1. Receiver HT if taken from the transmitter supply. 2. 12.6 volts AC for heaters if taken from transmitter supply. 3. Receiver aerial terminal. 4. Chassis and shield earth. 5. See G of STR1. 6. See H of STR1.

The plug P1 is connected to the power supply, pin 3 supplies 6.3 volts AC for heaters, pin 4 supplies 12.6 volts AC for heaters and relay supplies, pin 6 supplies HT at approximately 300 volts DC positive and pin 7 is the common earth return for the various supply voltages.

Hopefully you will not have much trouble in understanding the whys and wherefores of this transmitter. The tuning of the transmitter in use is simplicity itself. Plug a crystal in for 80 metres, set C9 and C10 to maximum capacity and with a dummy load/indicating wattmeter or aerial attached, turn the transmitter HT on. A reading between 40 and 60 mA will be indicated on the plate current meter. Rotate C9 towards minimum capacity and the plate current should reduce and then rise again as you go through resonance of the final tuned circuit. C9 should be adjusted so that the plate current reads in the middle of this dip. Your wattmeter should show a reading of a few watts on its meter. If the meter dips below 40 mA on AM or 50 mA on CW rotate C10 about 30 degrees and redip the plate current with C9. Alternately adjusting C9 and C10 should give you the plate currents specified or if you are using your wattmeter, adjust the transmitter tuning for maximum output, which should be about 7 watts on AM and 10 watts on CW. However, on some aerials particularly if reactive, the tuning may be odd to say the least and in these circumstances an aerial tuning unit may be required.

Should you get no dip in the plate current, check that the oscillator is in fact working by measuring the voltage across R6 — this should be about 1.5 volts with positive to earth. If this is not so check your valve, circuit wiring; and the crystal too, if you have another. Check the voltages around the stage too. If you still have troubles and can find no drive voltage, it is suggested that you approach an amateur with more experience than yourself for a helping hand. It the drive is okay check that the plates of C9 and C10 are not shorting. If they are — like one of the ones used in the prototype — you will have to use a little gentle persuasion by gently bending the moveable plates so that they do not short throughout their rotation.

The meter M1 is a 2 inch square meter marked "Advance" and is calibrated 0-60. This was most convenient as a maximum plate current of 60 mA in the off tune condition was expected. R13 and M1 form a 0-6 voltmeter across R12. It is necessary to vary the value of R13 until a total current drain of 60 mA flows through the network R12, R13 and M1. To calibrate this meter accurately it is suggested that a multimeter be wired in temporarily in series with this combination and set to an appropriate meter range. It is then easy to adjust R13 for a reading on M1 which corresponds to the multimeter current reading.

The semi-break-in section of the transmitter should give no trouble, and any problems are likely to be wiring errors such as connecting the transistors incorrectly into circuit, or incorrect wiring of the mode switch that the short is not removed in the CW position.

This part of the article is already lengthy so it is not possible to give a chassis layout this month. It will, however, follow shortly. It is suggested that a chassis of at least 8 inches x 5 inches x 2 inches be used to construct the transmitter on, and preferably a bit larger to allow plenty of room for some layout mistakes.

Next month the modulator. ■

Commercial Kinks

with Ron Fisher VK3OM

3 Fairview Ave., Glen Waverley, 3150

This month we shall continue our look at the FT101 and in particular the 'B' model. Talk to a 101 owner and more often than not, the subject of overload by strong local signals will come up. The interesting thing is that often the 101 owner doesn't know what front end overload is. I well remember when I did the review of the 101B that appeared in February 1974 Amateur Radio, that front end overload was something I was looking for but did not find. Why are some 101Bs not subject to this trouble? Well at this point of time I don't know the answer. Have you any thoughts? However for those who do have trouble in this regard here is a simple cure. As I have not tried this out myself, there is no guarantee of instant success. The originator of the idea is Jack Taylor VK3NS.

Simply locate the 100K ohm resistor feeding the second gate of the 3SK40M RF stage (R5) and remove it from the board. Now replace it with a 5.6 volt zener diode. A small ¼ watt type is quite OK. That's all you need do. According to those who have tried this, stations as close as a few hundred metres are now clean copy without the need to use the RF attenuator. Another method that seems to have originated from several sources is to use a uA 741 IC to amplify the AGC voltage to the RF stage. This method was described by Arn, VK5XV, in the South Australian Wireless Institute Journal of April 1975. It has also been published in the Fox Tango Newsletter and is also the subject of a future article for this magazine.

While on the subject of AGC and the 101B, I find the action a bit on the fast side. Some additional capacity across the AGC line improves matters and I have found that ten uF with a two thousand ohm resistor in series, connected from either pin 13 of the IF board, or pin 9 of the RF board to ground is ideal. However as AGC decay time is very much a matter of opinion, you should try different amounts of capacity. With smaller amounts of capacity the series resistor should be reduced in proportion.

The FT101B VOX adjustment has been covered in this column in the past, but VOX operation still remains a problem. As the setting of the controls is very critical, it follows that many amateurs just will not bother to use VOX at all. This is a pity as the intelligent use of VOX is one of the real benefits of the sideband mode.

However, things can be improved to a very large extent by a simple change. If the source of transistor Q5 (an MK-10D FET on the audio board PB-1315), is connected direct to ground instead of through the resistor thermistor network, the adjustment of VR3 will become much less critical. Satisfactory operation should occur with VR3 set to about half resistance. Many operators find that the VOX delay is a bit short so while you have the audio board out, replace C23 a .1uF with a .33uF of the same physical type and there will be delay to spare.

Commercial Interest: I am at the moment checking out a G3LLL RF clipper on an FT101B and hope to have a full write up on this unit in print very soon. With the release of the 101E, RF clippers are very much in the news. I hope to be able to write up the 101E in comparison with the B model soon also. ■

Afterthoughts

VK/ZL CONTESTS, RESULTS FOR 1974

Corrections (from Jack White ZL2GX)

Individual Band Scores:

15Mx/Phone	VK2APK	5815
	VK4VU	5430
	VK2XT	5355

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers

The Editor,

Dear Sir,

On behalf of the Light Car Club of Australia, Experts Trial organisers, I wish to thank those who participated and who did a remarkable job under the prevailing conditions.

The standard of operation was high ensuring the complete safety of competitors in this highly competitive event. Saturation penetration into the bush by station VK3AWI resulted in complete coverage of 1200 square kilometres of dense bush and range. Nine control stations manned posts up to 7.30 a.m. on Sunday 10.8.75 after being placed at 3.00 p.m. Saturday 9.8.75.

A big thank you especially to Bob VK3UW who provided equipment and running gear on behalf of the Army, including a 50 foot tower, freshly painted and equipped with 4000 watts of floodlighting. Power sources were a Lister 25 kVA and a smaller VW powered 10 kVA generator also courtesy of the Army.

Thank you to the stations who gave up their time and provided the equipment on loan for use at Graytown.

Thank you in alphabetical order: VK3s IZ, MK, UW, VL, AFR, ALS, AMH, AUQ, AUR, BMA, BMD, CCT, YAY, YBC, YFF, YFL, YHR, YID, YJE, YJT; ZAC, ZLK, ZLP, ZMM, ZRS, ZUP, ZVD, ZYG, John Longeru and Jenny Roper (LARA).

Steve Gregory VK3ZAZ

VHF UHF
an expanding world

with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RTX, Devonport	144.900
3D	3DAA, Suva, Fiji	52.500

A letter comes from Colin VK8CM with some interesting information about VK8VF, the Darwin beacon, and could do little better than let you read that rmation as it comes.

Pre-cyclone, the 6 metre beacon at VK8VF was delivering 25 watts from a solid state transmitter. It was keyed by a digital device which at that time, was arranged to encode the simple ident. signal with which we were all familiar. However, the keying system was designed and built to transpond i.e. it was capable of listening to an incoming signal and transmitting a signal report, after a suitable listening pause. Final development, in the hands of Doug, VK3UM, (ex VK8KK), Barry, VK8ZCF and Colin VK8CM, was at the stage of refining the necessary analogue-digital converter, and the provision of suitable voltage levels out of the Rx strip with a sufficiently linear response. The intention was to commission a system whose responses were of instrument quality, so that it could be used by serious amateurs and professional services as a measurement tool in propagation studies. It is easy to make a device which merely responds to the presence of a signal. Accurate measurement is another thing altogether.

"We can assume, I think, that the gear suffered one or more lightning-strikes during the cyclone. As well, the block-house in which the beacon is installed is less than 100 metres from the sea, so that we were not surprised to find the equipment full of sand, fine gravel and salt. The solid state transmitter was washed off and cleaned up and when voltage was applied it fired up without trouble. This must be a tremendous tribute to the workmanship of Peter VK5PV, who built it during his residence in Darwin. The keyer did not escape so lightly. Most of the ICs remained intact, but the keying-matrix and line-drivers feeding the matrix were largely wiped out. On the thousand-plus diodes in the matrix, somewhere between a third and a half did not survive.

"The antenna survived reasonably well. It consisted of stacked turnstiles on a pipe mast. The mast was destroyed, but the lower turnstile was intact, together with the insulator-mounting block assembly for the upper one. The Darwin Club has obtained a 30 foot triangular tower, which will be fixed to the block-house roof, and the turnstile array re-assembled on a pipe-mast fixed to the top of the tower. Coverage should improve, since the array will be some 25 feet higher than before.

"To get the beacon on the air, it has been decided to reinstate the old code-wheel keyer, driven by an NDB nav-aid motor and gear train. Since this can be made operational quite quickly, it is probable that the beacon can be re-commissioned during October/November 1975.

"Trevor, VK8ZTW has completed a 2 metre beacon and is presently 'boxing it up'. This will be installed and keyed by the same system.

"The transponder concept has not been abandoned. Some re-design work has been undertaken by VK3UM and once the design is finished, a suitable PCB will be made by Colin, VK8CM and construction and assembly carried out. A reasonable estimate for re-commissioning of the transpond function would be, I think, mid-1976.

"Potential VHF activity in Darwin is not too good. As far as I know, only Barry, VK8DI and myself have 6 metre gear. I have no antenna, and no place to put one, in my present temporary quarters. The 2 metre FM net is still functioning, but is a little short of 'subscribers'. However, the Radio Club is full of vigour, and I am sure these problems will soon rectify themselves".

Many thanks, Colin, for that information; I am sure the VHF boys throughout Australia will await the re-commissioning of your beacon with interest, and we all wish you well with your re-establishment programme. I note with some excitement the establishment of a 2 metre beacon in Darwin in the future, and there will be plenty of others who will get excited, particularly if eventually some operators at your end will be able to transmit CW and SSB on 144 MHz. How soon before someone has "WAS" on 2 metres?

EME REPORT

Via "The Propogator" comes the report that QSL cards were exchanged between VK2AMW and VE7BBG confirming their EME contact on 12.7.75, this being the first UHF contact between VE and VK and also the first 432 MHz EME contact between these two countries. A second contact was made with VE7BBG on 3.8.75, signals peaking to 6 dB above noise. VK2AMW received 0-Rs from him. VK2ALU and VK2ZEN got out of bed early for this test, which started at 2030Z.

SSB signals were heard in the noise immediately after the contact with VE7BBG on 3.8.75, but could not be deciphered. The Drake 2B receiver used as the IF channel is not basically designed for SSB, and copy of this mode would probably be better on a more up-to-date SSB receiver.

That covers the Dapto Moonbounce report, but what about you other guys around the country who work EME. Surely you all haven't stopped? A report for inclusion in these pages from all the EME operators and intending operators from time to time would spread the area of interest. What about it chaps?

THE FM CHANNELS

In a very roundabout way a letter has arrived on my desk detailing some information on the state of the art in regard to repeaters in Western Australia, an area which does not receive much publicity (whose fault?), and also an area which has little information going east to west. However, Will VK6UU writes to fill in the gaps for the moment, and the following is a condensation of his long letter.

Three 2 metre repeaters are at present in use in VK6, with another installed awaiting a licence. Perth city uses Ch. 1 on an escarpment 1200 feet a.s.l. and 25 km SE of Perth, ideal for coastal working, but limited to about 60 km inland. Runs 25 watts, MCW ident, call sign VK6RAP, and time out set for 5 mins.

Albany uses Ch. 2 operating from Mt. Barker 1400 feet a.s.l. and 50 km north of Albany. Coverage is 100 km radius, and runs about 40W. Callsign VK6RAA. A Ch. 4 repeater is installed at Wagin, 200 km south of Perth, location 1300 feet a.s.l. providing circular coverage of 70 km. Runs 12 watts, call sign VK6RAW.

Three other repeaters are planned, the one awaiting licence is on Ch. 2, located at Wireless Hill, 10 km south of Perth, 300 feet, a.s.l., and will fill in the blank spots of Perth Ch. 1. Another site under discussion is at Mt. Wells, 110 km SE of Perth, and another at Bunbury 200 km south of Perth.

Will makes a plea for increased information on the areas of coverage of the various repeaters throughout Australia, and suggests a suitable map in AR could help the various travellers whether they go east or west, north or south. What do you think George, VK3HV (ex VK3ASV)?

While still on the subject of repeaters, there are an interesting few lines in "Forward Bias" by Andrew VK1DA, and they are worth 'repeating' here.

"A complaint heard recently was that there is little activity on 2m FM channels. Yet seldom do I hear anyone calling CQ. Saying 'VK1XYA mobile listening on channel' is NOT an acceptable form of calling CQ.

"Pressing the button for half a second and hearing the repeater ident is NOT an acceptable way to use the repeater. Unmodulated carriers, while legal on some bands, are downright ANTI-SOCIAL when transmitted on net channels.

"If you expect people to monitor the repeater channel and reply to your calls, don't drive them mad with repeater idents caused by your button-pushing without ident. My reaction to blips is that they are transmitted by flips.

In other words, the absence of intelligence on the carrier implies the absence of intelligence in the operator. SO — always announce your call sign . . . if wanting a contact, call CQ . . . if testing, say so, and TRY and avoid prime channels". Food for thought, eh?

And might I add my own comments: Don't forget to leave a 3 second pause between overs to allow someone with an urgent message to get through, or to quickly call someone else. Also, many long conversations are carried out between metropolitan stations via the repeater — wouldn't it be courtesy to go to some other channel to conduct such conversations, or better still, why not shift down to the lower end of 2 metres or go to 6 metres. It's just as easy there for stations almost with line of site as so many are in the cities, anyway, there's always a case for making more use of the tuneable portions of 6 and 2 metres. Don't be selfish!

FATHER AND SON TEAM

A word of welcome to David VK5KK, who received his full call sign just in time for his 16th birthday on 17th August. Congratulations on such a fine effort, David, and I know from personal contact you will be a very valuable member of the amateur fraternity. David operates on both HF and VHF which is what we like to see. David is the son of Keith VK5SV, who also changed his call recently from that of VK5ZMK, at Wasleys. Keith has been known for years for his whopping big signal on 6 and 2 metres, and despite the full call, still plans to operate VHF as well. This father and son team celebrated their new call signs by really getting into the recent RD Contest, and between them notched up 1570 points for VK5. Truly valuable people to have around, and we wish them both a very happy period combining HF and VHF.

METEOR SCATTER

Being little to report on 6 and 2 metres this month, which isn't unusual, I feel the several paragraphs of Joe, VK7ZGJ, in "QRM" on the subject of meteor scatter should be of interest, as it refers to meteors and why you have to get up so early in the mornings for best results.

"Meteors are small bodies, most of which orbit the sun. Their orbital velocity lies between 11.3 km/s (minimum velocity for a solar orbit) and 72 km/s (the velocity required to escape solar gravity). The measured mean velocity is 40 km/s. On the other hand, the orbital velocity of the earth is approx. 30 km/s.

At 0600 local time at the point of observation, the orbital velocity of the earth is directed towards the zenith, and the relative velocity of the earth is directed towards the zenith too, and the relative velocity of meteors in relation to the atmosphere lies between 41 and 102 km/s with mean value of 70 km/s. At 1800 local time at the point of observation, the orbital velocity of the earth is directed towards the nadir, and some metors are unable to catch up with it, while others arrive at velocities between 0 and 42 km/s, with a mean value of 10 km/s. Therefore, the number of meteors encountered and their velocity are considerably greater at 0600 than at 1800.

The deceleration of meteors by the relatively low layers of the atmosphere produces intense heat, which causes their combustion at a greater height and more rapidly if their initial velocity was greater. The combustion products are ionised and form a meteoric trail that is capable of reflecting radio waves. Very thick trails can be seen with the naked eye at the moment of their formation, meteoric ionisation occurs at altitudes between 80 and 100 km, with a maximum ionisation occurring immediately after the trail formation altitudes between, has been formed; the trail then begins to expand and to diffuse outwards. Its electron density decreases and it is no longer capable of reflecting high frequencies.

At the same time, the trail is distorted by atmosphere disturbances. In the case of a large meteor, the head of the trail reflects a considerable amount of energy. Because of the motion involved, this reflection occurs with a change in frequency due to Doppler effect. Waves reflected by the head of the trail interfere with those reflected by the body of the trail, thereby ascends again. On 52 MHz it sounds like a 'ping'. Now you know why one carries out meteor scatter contacts at such an unearthly hour". Thank you, Joe.

THE VK5 VHF GROUP FIELD DAY

OBJECT

The object of the field day is to encourage the use of portable mobile operation in South Australia and Australia on bands allocated for VHF use (52 MHz above).

DATE

Saturday and Sunday 6th and 7th December, 1975.

DURATION

Section 1—24 hours duration from 0600Z on Saturday 6.12.75 to 0700Z Sunday 7.12.75. A break from 0300 to 0400 on Sunday 7.12.75.

Section 2 is a 6 hour duration and has two Sections of each 3 hours. First section 0000Z to 0300Z. Second section 0400Z to 0700Z.

DEFINITIONS

Portable Station

Portable stations must not be established on site with any equipment 24 hours prior to the start of the field day.

All power used for the operation of the station, must be delivered from an external power source, other than the normal electricity supply mains.

Mobile Station

Must operate with equipment fitted within or on the vehicle, this includes antenna systems, power etc.

If a normally mobile station operates from a stationary location, the station will be classed as being a portable station for scoring purposes.

Fixed Stations

May only contact Portable or Mobile stations. Fixed station to fixed station contacts cannot be claimed for scoring.

Single operators will compete against other single operators — they will not be required to compete against multi-operator stations.

Multi-operator stations are permitted, but only one operator may operate at any one time for the purpose of scoring, i.e. it is not permitted to have a contact in progress on more than one band at a time.

SCORING

Score 1 point/2 kilometres but for those contacts greater than 1000 kilometres 1 point/10 kilometres additional to the above.

Oscar Scoring is by equivalent Direct distance (see general note).

For contacts on:

- 6 metres multiply distance score by 1
- 2 metres F3 multiply distance score by 1
- 2 metres other modes multiply distance score by 3
- 432 MHz multiply distance score by 4
- 576 MHz multiply distance score by 5
- all above multiply distance score by 6

For Oscar satellite:

multiply distance score by 2

GENERAL

Any station may be worked more than once on the same band provided that a period of two hours has elapsed. However cross band operation is permitted and is deemed as a separate contact and subject to the two hour rule. Thus you may work a station on a band then work that station cross band. To work again the same procedure two hours must elapse again.

Operation via EARTHBOUND repeaters or translators for scoring is not permitted, but they are allowed for liaison to establish other contacts.

No cross band operation on frequencies of 10m and 2m (i.e. Oscars mode A frequencies, etc.) are allowed although full Oscar facilities are to be encouraged.

All stations must operate within the terms of their licence.

Stations working the 24 hour duration are also eligible for the 6 hour duration. Stations working the 6 hour duration may submit logs for either or both, first or second sessions of the 6 hour duration. The 24 hour duration stations are not eligible for either first or second sessions of the 6 hour duration separately but if submitting section 2 log must be for full 6 hours.

LOGS

(1) Mark clearly which Section or session you are competing in.

(2) A copy of your log will be required for scoring purposes and must contain information such as —

Time: in GMT.
Location of station worked.
Frequency/bands used during the field day.
Modes of operation used during the field day.
Log/QSO are as five figure group (or 6 with CW) of RS(T) and a contact number commencing at 001 and increasing by one number per contact.

The VHF Group Committee are the judges. The judges' decisions are final and no correspondence will be entered into.

Send your logs with an attached note giving details of:

Station location, equipment used, number of operators, points claimed, sections and/or sessions entered, and signed by the holder of the callsign of the station. Any constructive suggestions for improvement to the Contest will be welcome.

All logs to be received no later than 5.1.76, to be sent to:

Mr. J. INGHAM VK5KG
37 Second Avenue
Sefton Park, SA 5083

That will have to do for this month. Closing with the thought for the month: "Conceit is God's gift to little men".

The Voice in the Hills ■

Contests

with Jim Payne, VK3AZT
Federal Contest Manager,
Box 67, East Melbourne, Vic., 3002

CONTEST CALENDAR

October

4-5	VK/ZL Oceanic phone
11-12	VK-ZL Oceanic CW
12	RSGB 21/28 MHz phone
15-16	YL Anniversary CW party
17-19	Scouts Jamboree
18-19	RSGB 7 MHz CW
25-26	CQ WW DX phone

November

1-2	RSGB 7 MHz phone
6-7	YL Anniversary phone party
8-9	European RTTY DX
9	Czechoslovakian
8-9	ARRL CW sweepstakes
22-23	ARRL phone sweepstakes
29-30	CQ WW DX CW

YL ANNIVERSARY PARTY

CW 1800 GMT Wednesday to 1800 GMT Thursday. Phone 1800 GMT Thursday to 1800 GMT Friday.

Thursday is 36th YLRL contest for YLs only. Contacts with OM stations do not count. All bands. CW & phone are separate contests (see contest calendar). Scoring is one point per QSO between stations within an ARRL section, and between DX stations. Two points if between DX and ARRL section stations. Same station can be worked only once. Multiplier is number of ARRL sections and DX countries worked. Also a low power multiplier of 1.25 if input is 150 watts or less, 350 PEP on SSB.

1st, 2nd and 3rd in VK get certificates. Two gold cups for winners phone and CW contests. Also a plaque for highest combined CW/phone score. Logs to Myrtle Cunningham, WA6ISY, 1105 East Accasia Ave., EL SEGUNDO, CA 90245 by November 24.

CQ WW DX CONTEST

Frank W1WY advises that there are no changes to last year's rules.

REMEMBRANCE DAY CONTEST

No doubt as I write these notes many other hams or their XYLs perhaps, are writing up their contest logs. About 120 had arrived by Friday (August 22) and there are some fine scores. However, some country members have complained bitterly and the following letter explains the situation.

"Dear OM,

Once again the RD is over. I must wish you all the best with your job.

Last year I wrote and protested over the discriminatory nature of rule 5 (e). I must once again take up the cudgel on behalf of the country operator. I understand the reasoning behind all of these rules I think but do believe that these 'concessional' rules should be grouped in their own section.

Consider the position of myself and — both of us country stations. 52 MHz is a no-no, except under inversion conditions. 7 MHz sometimes opens for a couple of hours to the city, certainly not at that time of night. For all practical purposes the situation on 21, 27 and 28 MHz is the same as applies on 52 MHz, none.

Which leaves us 1.8, I ask you, what chance does a country (distant) station have of being heard in the city (and that is where the numbers are) between 0300 and 0759? Try it sometime.

To reiterate; I can appreciate the reason for inclusion of the above, but give us country blokes a chance. We'd like to win the contest too.

PS. You will notice I went to bed between 1710 and 2015. If you don't know why, after reading the above, I have been wasting my time."

Fair enough, but the RD as I understand it is a team effort within each call area, and the main idea is to permit and promote every opportunity for making QSOs. There is another contest for individual effort and for contestants having the necessary interest, and competence, perhaps a remote country QTH may provide some advantage. **Anyway, one cannot please everybody and the RD rules and scoring are too complex already.**

The VE/W contest rules may be a pointer to a suitable alternative and therefore are reproduced here:

CW — 0000 to 2400 GMT Sat. Sept. 20. Phone — 0000 to 2400 GMT Sun. Sept. 21.

The VE/VOs will be working the W/Ks in the "General" portion of the US bands in this one.

This year's contest is divided into two classes, CW and phone, with separate operating times for each. Therefore each is logged separately.

Only 18 hours total operating time may be used in the 24 hour period of each contest. The minimum off period is 15 minutes, which must be shown on log.

The same station may be worked on each band for QSO and multiplier credit. There two types of entries, single and multi-operator.

Exchange: RS (T), year first licensed and QTH, ARRL section for W/K, geographical areas for VE/VO (9 provinces plus Nfld., Lab., Yukon, N.W.T.).

Scoring: Two points per QSO, VE/VOs use US ARRL sections worked on each band for their multiplier. W/Ks use Canadian areas, (max. of 13 on each band). In addition, a multiplier of 10 has been instituted for W/Ks to equalize the W/VE scores. (QSOs x area multiplier x 10 = Final Score.

Awards: Certificates to the top scorers in each class in each section if there are at least 3 entries for that section (Min. of 25 QSOs).

Summary and check sheets are a must as is a declaration that all rules and regulations have been observed. A dupe check sheet is required for logs with 200 or more contacts. Reduction of claimed score by 2 per cent or more because of duplicate contacts and etc may mean disqualification.

Fred, VK3ARK, wrote that he enjoyed the 1975 contest and commented "that with a bit of luck we would get our 1000 logs". Roy, VK4RU, has sent a check log, all CW, for 92 contacts. Glen, VK2AGM, asked "what happened to the VK8s this year? Maybe they were around but I only worked two". Here is a completely acceptable comment, "Sorry I didn't get more contacts but I had to work most of the night and day. I enjoyed the couple of hours available". That came from the Rev. Ron, VK3AIS. Finally, a comment from Wayne, VK4AXJ, who claims 332 points for 50 CW contacts. "My first contest. I have only had a licence this year. I share my father's station, his call is VK4XJ. I am 15 years old". A certificate for a fine effort will reach you shortly, Wayne.

Next years RD? Peter, VK3QI, concluded his interesting letter "...but the problem of novices is a ripper which I would not have for all the tea in...". ■

BERU CONTEST RESULTS

The news that the 1975 Contest would be the last under the then existing rules prompted a large number of VKs to take part, in conditions that could only be described as fair and to send in logs, 26 in all.

Results were:

Placing	Call	Score
16	VK3MR	2902
23	VK2BPN	2520
29	VK4XA	2256
38	VK7CH	1728
43	VK3ZC	1470
44	VK7BC	1465
51	VK6RU	1350
52	VK2BJL	1319
58	VK2VN	1240
68	VK5BO	1005
77	VK2NS	821
79	VK4KX	795
81	VK7RY	775
85	VK4MY	645
87	VK2IV	638
88	VK3XB	635
92	VK5KJ	560
94	VK5KL	550
96	VK2HC	505
97	VK3YD	445
102	VK4AK	330
104	VK5RG	255
105	VK5KO	240
106	VK2HW	215
109	VK3RJ	100
112	VK5HO	25

AUSTRALIAN AWARDS

Snow Campbell VK3MR wins the silver medallion for the leading VK, while F. E. Nicholls, VK7RY, takes out the bronze medallion for middle placing in the VK field.

The great majority of entrants expressed opinions against any significant changes to the contest, and although no firm decision for 1976 has been made, there may yet be little change from the very satisfactory competition rules and scoring system of the past ■

Awards Column

with BRIAN AUSTIN VK5CA
P O Box 7A, Craters, SA 5152

YO AWARDS PROGRAMME

Romanian Radioamateur Federation displays an interesting awards programme. YO awards are issued for different modes: CW, AM, SSB, RTTY or mixed and for different bands as well: 3.5, 7, 14, 21, 28 MHz, any combination being considered as a separate award. Valid contacts after 23rd August 1949. The application which is of GCR kind (no cards are needed) and a fee of 7 IRCs or the equivalent foreign currency ($1.00) should be mailed to Romanian Radioamateur Federation, P.O. Box 1395, Bucharest 5, Romania.

"YO-BZ" YO — BALCANS ZONE OF PEACE

This award is issued for working radio amateur stations from LZ, SV, TA, YO, YU, ZA as follows:

Class of the award	Number of countries
I	4
II	3
III	2

"YO-DR" YO — DANUBE RIVER

This award is issued for working on two bands different stations located in countries along the river Danube: FR of Germany, Austria, Czechoslovakia, Hungary, Yugoslavia, Bulgaria, Romania, USSR as follows:

No. of QSOs from each country worked	2
No. of YO QSOs	3

At least 3 QSOs out of the abovementioned contacts must be with stations located in cities just on the Danube river.

"YO-20Z" YO — ZONE 20

This award is issued for working countries located in zone 20: Bulgaria, Greece, Cyprus, Israel, Jordan, Lebanon, Romania, Syria and Turkey, as follows:

Class of the award	Number of countries
I	6
II	4
III	2

In all cases Romania is obligatory to be among the worked countries.

"YO-25M" YO — 25 deg. MERIDIAN

This award is issued for working the following countries situated on the meridian 25 deg. East: Norway, Finland, USSR, Romania, Bulgaria, Greece, Libya, Arab Republic of Egypt, Sudan, Centrafrican Republic, Zaire, Rwanda, Burundi, Zambia,. Rhodesia, Botswana, Republic of South Africa, as follows:

Class I	12 countries
Class II	8 countries
Class III	5 countries

In all cases Romania is obligatory to be among the worked countries.

"YO-45P" YO — 45 deg. PARALLEL

This award is issued for working the following countries situated on the parallel 45 deg. North: USA, Canada, Is. of St. Pierre and Miquelon, France, Italy, Yugoslavia, Romania, USSR, Peoples Republic of Mongolia, Peoples Republic of China, Japan, as follows:

Class I	8 countries
Class II	6 countries
Class III	5 countries

In all cases Romania is obligatory to be among the worked countries.

Any further information will be supplied by the Romanian Radioamateur Federation.

Please note that the recent increases in Postal charges make it very difficult to keep the Awards programme going without subsidy.

Accordingly, return postage with all correspondence would be appreciated.

If registration of cards is required, a sufficient remittance must be included with the cards to cover the cost, otherwise ordinary mail will be used. ■

QSP

WISDOM

Three tidbits adopted from ARNS, June 1975. "In almost every QSO truth is the first victim". "They always say there is nothing busier than an idle rumour. Speaking of an idle person there is always.." "If you are studying for your AOCP remember that hard work never killed anyone; on the other hand resting didn't either". ■

MOST MODERN DAY TRANSCEIVERS need a proper termination of 50 ohms in order to function satisfactorily. The KW E-Z MATCH is designed to transform a high impedance or mismatched transmission line to 50 ohms resistive. The circuitry and components used allow this to be done with a minimum loss. Modern transmitters and transceivers will meet their spurious and intermod specifications only if worked into a proper load. A Low Pass Filter is almost useless for harmonic reduction if it is not terminated in a proper impedance.

KW E-Z MATCH $67.80

The KW E-Z Match will match 30-2500 ohms on 20, 15 and 10 metres and 30-1000 ohms on 80 and 40 metres. Impedances outside these limits can also be matched depending on the magnitude of the reactive component. Transmitters with power inputs as high as ½ KW PEP can be used if the natural SWR is less than 1.8:1 on a 50 ohm line. For high impedance and end fed antennas the safe maximum transmitter input power is 350 watts PEP. The limitation is basically one of peak RF voltage and is dependent on the reactive component of the load. Tuning is simple and straightforward. Connections are provided for balanced feeders to the antenna and a UHF coaxial connector (S0239) for input. There is also provision for mounting an additional coax connector when the antenna feedline is coaxial.

KW-107 SUPERMATCH $187.50

The KW 107 SUPERMATCH combines the features of the famous KW E-Z Match, the KW Antenna Switch, the KW Dummy Load and the KW103 SWR/PWR Meter. Plug-in binding post connectors are provided for balanced feeders, as well as 2 SO-239 connectors for coaxial feed lines. Transmitters with power inputs as high as ½ KW PEP can be used if the natural SWR is less than 1.8:1 (50 ohms line). For high impedance, end fed antennas, the power input should be limited to 350 watts PEP. The proven KW E-Z Match circuitry is used in the SUPERMATCH and will efficiently match complex antenna fed impedance from approximately 30 to 2500 ohms on 20, 15 and 10 metres, and 30 to 1000 ohms on 40 and 80 metres. A small adjustment in feeder length will usually allow a match to be made.

Also available: KW-160 160m Matcher, KW-109 High Power Supermatch, KW Co-Ax Switch, KW 5-Section Low Pass Filter, KW Dummy Load, KW-2000E Transceiver 160-10m (2 only to clear, $490), KW-1000 Linear Amplifier 80-10m, $475.

All prices include Sales Tax. Freight extra. Prices and Specifications subject to change.

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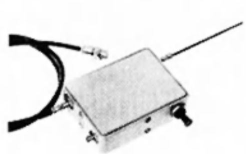

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CRYSTALS AS USUAL

THE MORSE CODE MADE EASY

An album of three Records produced with Ivan R. Hodder by the Flight Training Centre (Aust.) Pty. Ltd. Revolutionises the learning of Morse Code—all you need is the family Record Player!

The F.T.C. course has discarded the old, now outmoded system of learning the Morse Code by visual means alone. Those learning the Code by this method rarely progressed beyond five words per minute. This course is designed to teach aural recognition of the symbols—as the student will hear them in actual use.

The symbols are always transmitted at the same speed—otherwise their aural characteristics alter—and only the spacing between groups slowed down or speeded up as the student gains proficiency.

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He hears an oscillator signal for the first time only after becoming proficient at six words per minute using the "singing" technique. He then starts at four words per minute, working back up to and beyond the six words per minute already achieved.

Proof of the efficiency of the system is the large increase in passes by those who have used it.

PRICE:
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Key Section

with Deane Blackman VK3TX

Box 382, Clayton, Vic., 3168

I promised some time ago to match the article on Russian morse with one on Japanese morse, and here it is.

The way in which the Japanese write their language, and hence send it by telegraphy, differs very considerably from English. The difference is much more than is apparent from the very unfamiliar script, and an understanding of the nature of this difference is necessary to realise the basis of the Japanese telegraph code.

The real language of any race is its spoken language. The business of writing it down, although of incalculable value for transmitting information between people separate in space or time, is secondary. The way in which different languages have elected to write down their spoken words varies greatly. All European languages now use the system of a small set of characters (the alphabet, so called in English) each representing roughly one sound. These characters are divided into two classes, called vowels and consonants. The pronouncable bits of words, the syllables, are then generally represented by consonant-vowel combinations of these characters (letters).

However natural this may seem to speakers of English (and it certainly is a very efficient method (of writing) there are other means of putting on paper the spoken words of a language. The opposite extreme to English is probably represented by Chinese. Roughly speaking, in Chinese there is a separate "letter", a little picture called an ideograph, for each word required. The inherent difficulty of this scheme for English, which boasts of half a million words, is clear. There are far fewer words in Chinese, but there are still over 20,000 ideographs. Even a moderately educated person will not know all of these in the same way as even a moderately well educated person will use, perhaps only a tenth of the words available to him in English. One advantage of the ideograph system is that, being quite unrelated to the phonetics, although I may sound the word which I associate with a particular ideograph quite differently from you the meaning of the symbols remains the same for both of us and we can write to one another even though we may not be able to talk to one another. This situation is quite familiar. If I send "QSL 599", the other chap will read that in his own language, even though I think of it as having the English meaning "I acknowledge receipt of your report RST 599".

In part, Japanese is similiar to Chinese in its script. Written Japanese does represent the spoken language by ideographs, only some of which have the same meaning in Chinese.

In part, though, Japanese has broken away from this system and in its writing uses as well as the ideographs, a form of syllabic writing. In syllabic scripts, of which Japanese is not the only example, the sounds which in English we would represent by the letter combinations "TA", "TE", "TO" etc. are each represented by a single special symbol of their own. English has almost no examples of such usage, and perhaps the only one which is not confusing is the use of "&" for "AND". Japanese, like English, has five vowels and a dozen or so consonants so it is clear that there will be quite a number of symbols needed to represent the various sounds. In fact there are in Japanese nearly 80 different sounds.

−·− ワ WA	··· ラ RA	·−− ヤ YA	−··− マ MA	−··· ハ HA	·−· ナ NA	−· タ TA	−·−·− サ SA	·−·· カ KA	−−·−− ア A
·−··− ヰ WI	−−· リ RI	~~·− イ (I)~~	··−·− ミ MI	−−··− ヒ HI	−·−· ニ NI	··−· チ CHI	−−·−· シ SHI	−·−·· キ KI	·− イ I
~~··− ウ (U)~~	−·−−· ル RU	−··−− ユ YU	− ム MU	−−·· フ FU	···· ヌ NU	·−−· ツ TSU	−−−·− ス SU	···− ク KU	··− ウ U
·−−·· ヱ WE	−−− レ RE	~~−·−−− エ (E)~~	−···− メ ME	· ヘ HE	−−·− ネ NE	·−·−− テ TE	·−−−· セ SE	−·−− ケ KE	−·−−− エ E
·−−− ヲ WO	·−·− ロ RO	−− ヨ YO	−··−· モ MO	−·· ホ HO	··−− ノ NO	··−·· ト TO	−−−· ソ SO	−−−− コ KO	·−··· オ O
·−·−· ン N									

TABLE 1

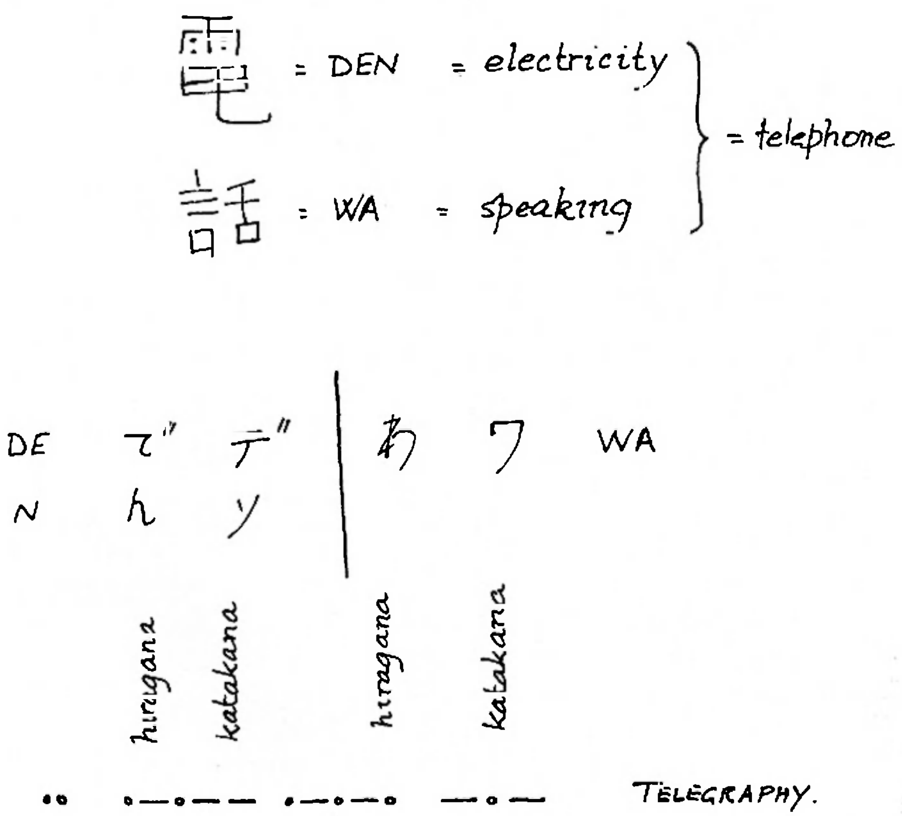


FIGURE 1

·· ″	パ PA	バ BA	ダ DA	ザ ZA	ガ GA
··−−· °	ピ PI	ビ BI	ヂ JI	ジ JI	ギ GI
	プ PU	ブ BU	ヅ ZU	ズ ZU	グ GU
ッ (TSU)	ペ PE	ベ BE	デ DE	ゼ ZE	ゲ GE
|	ポ PO	ボ BO	ド DO	ゾ ZO	ゴ GO

TABLE 2

If you look at a bit of Japanese writing, then, you will see a mixture of ideographs and of words "spelled" out in syllabic form. The symbols representing the syllables the Japanese call the "KANA". There is more than one Kana. The one which has become generally used since 1945 is called the Hiragana (for -gana read -kana), and is a sort of Japanese cursive script. The kana I am going to describe here is a rather more formal script, called the Katakana, and is used for domestic telegrams and other purposes.

The Japanese have economised somewhat, in order to reduce the number of different symbols in the Katakana, by a ruse. There are 48 basic Kana which represent the sound of the English letters W, R, Y, M, H, N, T (usually), S, and K with the five vowels A, E, I, O, and U. Plus the vowels themselves and the isolated letter N. Each of these sounds (consonant plus vowel, and the single ones) has a separate character to represent it. I will mention the complication associated with "T" in a moment. There are a further 25 sounds to be represented, being those of P, B, D, Z (or sometimes T) and G combined with the five vowels. These sounds are represented by adding to one of the 48 basic Kana one or two diacritical marks — either ", which is called the Nigori, or by °, which is called the Hannigori.

If you are still with me the two tables which show the basic Kana (table 1) and the modified Kana (table 2) may be less puzzling. Laid out there, in my inexpert script, are the 73 members of the Kana and some added marks.

Given this method representing the language it is of course natural to develop telegraph characters to stand for the Kana. The dash-dot equivalents of the basic 48 Kana are included in Table 1. With 48 characters to be represented instead of 26 in English, the number of units (dashes or dots) in each character is on average more. The additional Kana in Table 2 are sent by using a special code symbol for the diacritical mark in conjunction with one of the basic Kana from Table 1. I would guess that the mark is sent first.

It is pretty obvious how the above system operates with hand keying, though clearly both parties have to know it. I understand that teleprinters which operate in the Kata Kana are widely used, certainly for internal telegraph traffic and for all I know, for diplomatic traffic also. But the recognised alphabets for the international circuits are the morse familiar here (not the American variety) and an agreed Roman alphabet (the one in which this is written) for use on teleprinters. The Kana symbols can be represented as combinations of Roman letters as I have done in the tables, so that a text written in the Kata Kana can be transliterated into Roman letter pairs and these sent by the standard teleprinter. The Japanese call this representation of their language "Romanji". To illustrate the various methods of writing I have described, figure 1 shows the word "telephone" written in Japanese in four different ways — ideographically, using the Kata Kana, using the Hiragana, and finally in Romanji. The two syllables, incidentally, mean "electricity" and "speaking". Hence "telephone".

To clear up a couple of details I skipped over, the preferred forms of "Ti" and "Tu" are "Chi" and "Tsu", these representing the sounds better. For the same reason "Si" is represented by "Shi" and "Hu" by "Fu" and the forms "Wi", "We" and "Wo", I think are out of use. The forms 'Ya" etc. make combination symbols with other Kana — but perhaps that is getting a bit away from the problems of telegraphy. You will notice, though, that the letters "L", "Q", "V" and "X" do not appear at all in the language. The absence of "L" especially makes the representation of words like "Ireland" difficult. In Romanji, "Ireland" becomes "A-I-RU-N-DO".

On the distinct, though apparently related, problem of transmitting Chinese by telegraphy, I have not a great deal of information. So far as I have been able to determine, Chinese ideographs are represented by numerical groups and it is these groups which are transmitted. One informant told me that it is not necessary for you to do this — at least for telegrams. You hand in your text in ideograph form, and the post office staff convert it into numbers from a standard lexicon they have. I suppose the staff at the other end write it back into ideographs for your addressee.

Many people have helped me with material for this article. In particular VK3IZ, VK3TJ, Peter Hocker of the Law School at Monash University, and the American Cryptogram Association, to whom I extend my thanks. ■

20 Years Ago
with Ron Fisher VK3OM

OCTOBER 1955

Horizons Ahead: The editorial page of the October 1955 issue of Amateur Radio made the rather startling suggestion that perhaps we should be looking towards space for our future communications. Of course artificial satellites were still in the realms of science fiction, so the moon was the suggested medium. A few Australian amateurs have in the interim been succesful in doing just this. Satellites however have made the job easy for the average amateur. What does the next twenty years hold in store for us. In 1955 most amateurs were thinking of more immediate problems like TVI. Hans Ruckert, VK2AOU, gave us food for thought with his article. A Transmitter, with Low Harmonic Output. Hans used high selectivity and double tuned circuits between all stages.

The Extended Lazy H Antenna: Wal Salmon, VK2SA, showed how to modify an extended double zepp to give more gain as well as multiband operation. Of course Wal is still producing new ideas on antennas as reference to recent issues of AR will show.

Band Spreading and all That: A down to earth article on coil calculations winding and determining the right amount of coverage for your favourite amateur band. V. J. McMillan VK2AWN showed just how it could be done. Skeleton Slot Antennas were very much the in thing and Don Knock, VK2NO, followed up an earlier article with more application ideas.

The Geloso Pi-Coupler Tank Coil was the subject of a Trade review. No doubt hundreds of these were used in transmitters with the companion VFO. The idea of using VOX with an AM transmitter seems strange, however it was tried with some success. N. L. Southwell, VK2ZF, showed how any relay controlled transmitter could be VOX controlled with anti-trip and all.

The A 11 Models Exhibition held every three years in the Exhibition Buildings Melbourne was an ideal place to demonstrate Amateur Radio to the public. A full description of the 1955 WIA stand complete with photo appeared in the October 1955 AR.

Robert Black, VK2QZ, presented some statistics on the incidence of BCI in the Sydney area, and in so doing formed a few conclusions on how we might fare when television was with us.

Note that I received my first mention as a member of the Technical staff of AR. Apart from a few years around the mid 1960's I have been at it ever since. ■

Trade Review

Scalar Distributors Pty. Ltd. have announced the availability of 4 channel low loss transmitter combiners which allow simultaneous operation of four transmitters into a single broad-band antenna. They are available in frequency ranges from 145-174 MHz and 450-512 MHz. The power limits are around 125 watts with a minimum frequency separation of 30 kHz (VHF) and 75 kHz (UHF).

Also available are new style 2100 series switched RF attenuators. The new series provide switched attenuation from 1 to 100 dB in steps of 1 dB. Models operate from DC to 250 MHz with either 50 or 75 ohm characteristic impedance.

Full descriptive literature is available. ■

IONOSPHERIC PREDICTIONS

WITH LEN POYNTER VK3ZGP

In presenting the predictions for October, I am trying a new format that hopefully will give both Eastern and Western path openings, comprising both first "F" layer and mixed first and second mode. The lower symbol being Eastern VK, the upper symbol being the Western VK predictions. I am hoping with the small print to achieve semi-bar type lines to enable some ease in reading.

For this month we will try to show some interesting path openings, and introducing 80m to the list for those interested. All times are universal times.

At this period of the cycle "The crystal ball" is the order of the day. It being almost impossible to be even marginally correct. The daily sunspot variations are rising significantly at the time of writing. The July mean of 28.3 will probably be endeeded by August, early August the solar flux reached 125 and slowly subsided to around the high 70 mark.

For those following the solar flux and "A" index ex WWV, and keeping records, it might pay to arrange your records in solar rotation periods. The sun rotates approximately every 27 days. Period 1943 starts on September 30, period 1944 on October 27. From your records it is handy to see the recurring events and be in the position to take advantage of the good periods and watch TV or take the YL or XYL out in the bad periods.

Latest Zurich Observatory figures show July prov. mean of 28.3. First smoothed mean for January '75 as 23. Predictions up to December '75 have been raised approximately 4 points. Informed opinion still rates March '76 as the bottom, the way the trend continues they could well be right.

There is quite a deal of comment around the world regarding the large quantity of geomagnetic storms over the past two years. From my short records it certainly shows. The almost monotonous rise and fall of solar activity and particle radiation has its inevitable effect on DX over past year.

At the time of writing, "The giant X-ray" source observed by satellite and noted in the press has been detected in VK, however no significant change has been noticed in propagation conditions to date.

I would be pleased to have any comments from those who use the predictions as to their accuracy, and to the method of presentation. More so, I would be most interested to hear from DXers who note any abnormal behaviour of any of the bands at any particular time. It will greatly assist me collate conditions against my indices. I am slowly building up quite elaborate records of solar flux and the "A" index. The latter from three sources, namely WWV, locally from Melbourne and the world mean.

When charted along with the daily sunspot number, the whole effort looks worthwhile, however I only have one avid worker feeding back band conditions. I hope by the end of this year to have some worthwhile contribution to the do-it-yourself, prediction expert.

Just a word in closing, October looks interesting as there could be some 28 MHz openings and perhaps 21 MHz could show some life. Try giving a call when the band appears to be dead. The other guy could well be tuning. It's surprising how much DX has been worked on an otherwise dead band. Don't forget, your comments please.

NOTES:

Each column:

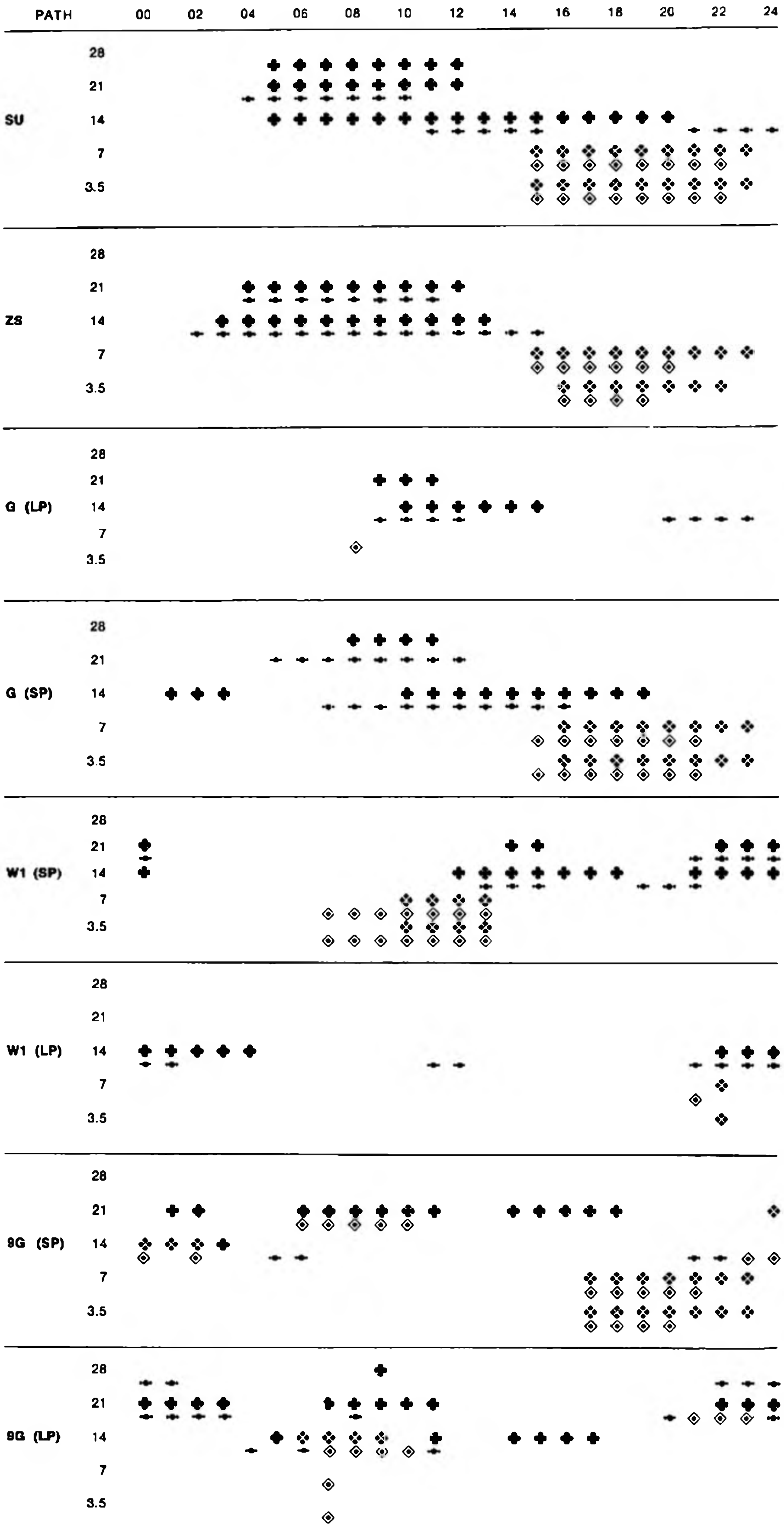
Upper row ✚ or ✥ from Western VK

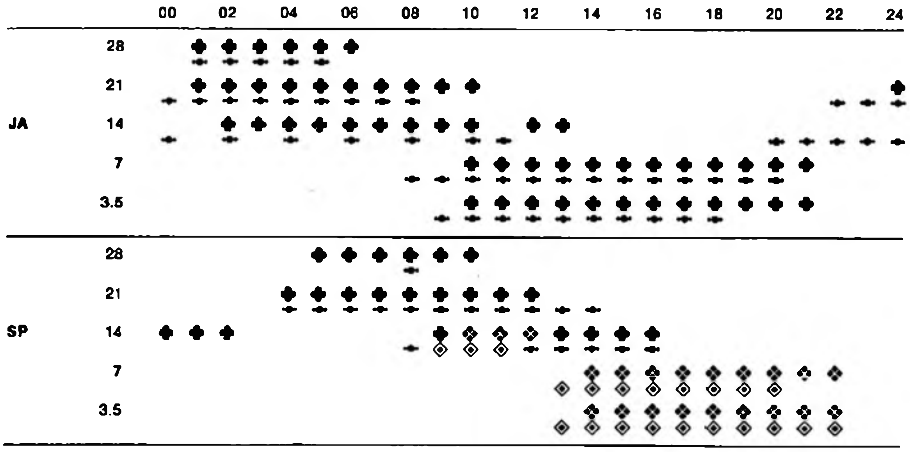
Lower row ━ or ◈ from Eastern VK

✚ or ━ — possible on some days, but not more than 50 per cent of the month.

✥ or ◈ — possible on at least half of the month using first and/or second F modes some days will be the best times only.

Predictions courtesy I.P.S. Sydney. ■





LARA

LADIES AMATEUR RADIO ASSOCIATION NEWS

Since the first LARA article appeared in last month's issue of AR, state LARA groups have flourished in VK4 and VK5. It is hoped that notes from these two groups will appear in next month's AR. Interest in other states has steadily increased, and LARA will be truly Australia-wide within the next few months.

LARA skeds are becoming very popular with licenced lady amateurs and SWL's, however we have been informed that in one or two cases we have been guilty of "ungentlemanly" behaviour by holding LARA skeds on a frequency and at a time when it is normally used by another net. We apologise for any inconvenience LARA skeds have caused.

The skeds are held at; 8.00 p.m. EAST, Monday evenings on 3650 kHz plus/minus QRM and 11.30 a.m. EAST, Sunday mornings on 7065 kHz plus/minus QRM.

VICTORIAN DIVISION NEWS

The second General Meeting of LARA (Vic) took place on August 23, 1975. It was decided at the meeting to produce a quarterly LARA (Vic) newsletter to be sent to all LARA members and interested groups. The newsletter will contain a message from the Victorian President, editorial comment, news of future LARA events, proposed LARA involvement in amateur activities such as conventions and rallies, a calender detailing future LARA fixtures, details of the following three general meetings, membership forms and articles of general interest.

To meet general administrative expenses and the cost of the newsletter, an annual membership fee of $2.00 will be levied from each member. If the newsletter is not required (as in the case of an associate member whose wife/girlfriend is a full member of LARA (Vic) the annual membership fee will be $1.00.

The LARA foxhunt held on August 3, was a great success. Congratulations to Irene Robinson and OM for a series of hair-raising hunts and to Jean Truebridge and team member VK3 YAP for their excellent effort in winning. The next LARA foxhunt will be held on October 26. Details may be obtained from the secretary.

A delegation of LARA (Vic) committee members will attend the South West Zone convention over the weekend of October 4/5, and the Warrnambool Hamfest over the weekend of November 1/2. Ladies interested in LARA in those areas are welcome to come and have a chat to us about LARA and find out "what's in it for them".

For any information on Lara activities contact The Secretary, C/o 15/10 Brook St., Hawthorn, Vic., 3122. ■

QSP

WARC 1979

"North Atlantic would like to increase the international BC allocations between 3 and 27 MHz by another 7 MHz at the forthcoming world conference.. That's more than twice they're presently allocated". Ham Radio, June 1975. ■

Hamads

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
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- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.
- The current WIA Callbook is the 1975 edition.

FOR SALE

FT200 Transceiver and power supply, 12 months old. Condition and function equal to new, has permanently attached blower for cooling final stage, $370 ONO. V. Kerr, Box 237, Charleville, Q. 4470.

2M FM Carphone Rx. AR model — wired, tuned; all. case, incl. spkr. and IF xtal, $59. Also 2M FM Rx in parts, no case or spkr., $47. Variable PSU 0-15V, 1A, regulated, fully metered, $18. Power transf., 18V at 10A, $18. 2M ¼W mobile whip, $4. L30174. P.O. Box 1, Ferntree Gully, 3156.

Complete Service Manual for the R5223 and AR88 Communication RX, includes circuit diagrams and full information, $15 each. P.O. Box 141, St. Kilda West 3182, Vic. Ph. (03) 699 2400 A.H.

Swan 500 Deluxe 5 Band Tx, 480 watts PEP plus PSU/speaker unit, VGO, includes translstorised VOX/BK CW adaptor, upper/lower SSB xtal calibrator, mic., CW sidetone facility added, $350. T. Foster, VK3GM, QTHR.

Robot SSTV Monitor and Camera, complete with lens, tripod, cables, manuals, as new condition, $547. VK3CR, QTHR. Ph. (03) 772 4039.

Heathkit Model SB220 10-80m linear amplifier, $400. VK2AQW, QTHR. Ph. (02) 449 3538.

Equipment Rack, 5 ft. high, standard 19 inch mounting, 15 inches deep, $8. VK2AAB, 28 Redgrave Rd., Normanhurst, 2076. Ph. (02) 487 1428.

SWR Meter, Hansen, as new $10. Home brew solid state oscillator, all bands 1.8 MHz to 29.7 MHz, $12. Home brew GDO 200 kHz to 300 MHz accurately calibrated, $25. 27 MHz valve transmitter and converter with xtals, no modulator or power supply, $15. VK3AOH, QTHR. Ph. (03) 49 6224.

Power Transformer for FT-200, brand new, cost $66, sell best offer plus freight ex Alice Springs. VK8FB, Yuendumu via Alice Springs, 5750.

Yaesu FL200B Tx, FR100 Rx, complete 80m-10m station. Excellent condition, $325. VK3AQL, QTHR, Post Code 3149. Ph. (03) 277 5623.

Heath HW 32, $100. 27 MHz T/R AC or DC, $50. 144 MHz AM Tx 25W, xtal of VFO, $60. MR10B Hi Bnd., $30. MR20B Hi Band, $48. MR10B Lo Bnd., $30. Plessey B47 T/R 23-38 MHz, $60. 3" CRO, $15. 432 ATV Tx Color Mod. & Sub Carrier Unit, $90. Paton VTM, $40. VHF Sig. Gen. 80-220 MHz, $40. W. War II Mine Detector, antique, $30. No reasonable offers refused, VK2AJY, QTHR.

Silent Keys

M. F. TIERNEY	VK2ZRT
D. W. BRIDGE	VK6NW
C. T. RYLATT	VK2BIC

FT101B, hardly used, complete with SP101 matching speaker, handbook, microphone, etc. $500 ONO. Yaesu FR50B ham bands only receiver, with handbook, brand new, $200 ONO. Ph. (02) 371 7681 A.H.

Yaesu FT100, mint condition, less than 50 hrs. operation, $330 or near offer. VK3ASC, QTHR.

40 ft. Oregon Mast, 4 in. x 4 in. at base, tapers towards top, any offers. Delivery can be arranged. VK2DT, 2 Patya Close, Epping 2121. Ph. (02) 868 1131.

Yaesu FT401, spare finals, Yaesu desk mic., plus Spectronics digital frequency display, $500 the lot. Eric Bierre VK2BEK. Ph. 358 3491, Sydney.

SB-33 Single Sideband Transceiver, translstorised, except for driver and two output tubes, 200 kHz on 15, 20, 40 and 80m — 240V to 110V transformer, microphone & manual, $220.
Pye Lynx translstorised TV Camera with 1 in. Vidicon and full service manual, no lens, $120.
TV Projection Unit, Schmidt mirror system and 2 in. picture tube, $20. R. Nell, VK3ZAN, 11 Xavier St., Oak Park, 3046.

FTDX 400 TXCR, mint condition, excellent performer mic. fan, and handbook, spare 6KD6s, $360. Home brew PS, unused, all new parts, 500V 300 mA, 280V, 255V reg 150V reg., $40. SCR 522 Tx for 2m, $15. VK3ZB, QTHR. Ph. (03) 45 2295 A.H.

Galaxy V Transceiver, 80m-10m, complete, very comprehensive metered protected power supply, VOX, xtal calibrator, mic., spare tubes, CKT, handbook, $380. Philips 1677 Transceivers, 2m converted, Ch 1, Ch 4 xtals, CKT, handbook, mic., cradle, cables, $100. Identical unit, unconverted, as above, complete, all 2m coils etc., $80. VK3BCL, QTHR. Ph. (03) 49 4246.

WANTED

Morse Keys, homebrew or commercial, hand, "bug" or electronic, any type from early telegraph to present, any condition. Write VK4SS, 35 Whynot St., West End, Brisbane, Qld. 4101.

Blower Fan for Yaesu FT101. Please write by airmail to T. Connell, P.O. Box 718, Madang, P.N.G.

Butterfly Capacitors for 2 and 6 metre transmitters (valve) and 6LQ6 valves. Bob Black VK2BBR, P.O. Box 349, Lismore 2480. Ph. (066) 21 4384 Bus.

IT'S ON AGAIN !

THE WESTERN ZONE ANNUAL CONVENTION

1st and 2nd NOVEMBER, 1975 at WARRNAMBOOL

- ☐ *Trade Displays by many leading Dealers*
- ☐ *Fox Hunts, Tx Hunts*
- ☐ *Old Timers' Contest*
- ☐ *Bill on The Hill Awards*

and other ridiculous fun and games, for all ages and sexes.

SEE YOU THERE

Bookings and further information (S.A.E.) to:

"Convention Secretary"

DAVID BEVAN VK3AGB

134 Princes Highway West Warrnambool 3280

Enclose $5 per adult Booking Fee.

OCTOBER 1975
VOL. 43, No. 10

YAESU

MINI-MOBILE/BASE STATION FT-75B

FT-75B. High power, for General use.

FT-75BS. Low power, for Novice use.

FT-75B, inc. one crystal for each band 3565, 7085, 14,200, 21400 28550 kHz, mic. & inst. book **$268**

FT-75B, inc. crystals for 3565, 7085, 14200, 21175, 27125 kHz, mic. inst. book **$258**

FV-50 optional VFO **$65**
FP-75B or **BS,** AC PSU **$68**

DC-75B or **BS** DC PS, inc. mobile mounting bracket **$74**

COMPACT 120 WATT thru 10 METRE TRANSCEIVER

Even the compact and sports car enthusiast can enjoy all band, SSB mobile operation, with the FT-75B "Mini-Mobile" transceiver. Features in one compact case are a 120 Watt transmitter with provision for three, variable crystal controlled frequencies on each band; as well as provision for external VFO operation.

The FT-75B is all solid state except for the final and driver stages and includes a built-in noise blanker and squelch circuit for quiet channel monitoring. The compact and squelch low stand-by current drain of only 300 mA., give the FT-75B the flexibility required in even the most demanding, compact installations.

The FT-75BS has one final tube removed and PS transformer tapped to reduce power to approx. 30W PEP output. When full call is obtained the set can be re-modified back to original condition.

TECHNICAL DATA — FT-75B

GENERAL

Frequency Range: 80 M 75 KHz segment within 3.5–4.0 MHz, 40 M 100 KHz segment within 7.0–7.5 MHz, 20 M 150 KHz segment within 14.0–14.5 MHz, 15 M 240 KHz segment within 21.0–21.5 MHz and 10 M 400 KHz segment within 28.0–30.0 MHz.
Mode: Upper Sideband for 20, 15 and 10 meter bands. Lower Sideband for 80 and 40 meter bands. CW for all bands.
Frequency Control: Crystal control VXO with 3 channels per band.
VXO Coverage: ±3 KHz for 80 M, ±3 KHz for 40 M, ±3 KHz for 20 M, ±5 KHz for 15 M and ±6 KHz for 10 M.
Antenna Impedance: 50 Ohm unbalanced.
Circuitry: 16 Transistors, 7 FET, 23 Diodes and 3 Tubes.
Power Requirement: External power Supply FP-75B for 100/110/117/200/220/234 V AC, 50/60 Hz, or DC-75B for 13.5 V DC.
Size: 210(W) x 80(H) x 300(D) m/m.
Weight: 3.8 Kg.

RECEIVER

Sensitivity: 0.5 μV for 10 dB Noise plus Signal to Noise Ratio on 14 MHz for SSB and CW.
Selectivity: 2.3 KHz nominal bandwidth at 6 dB down, 4.5 KHz at 60 dB down on SSB and CW.
Harmonic & Other Spurious Response: Image Rejection better than 50 dB. Internal Spurious Signal below 1 μV equivalent to antenna input.
Automatic Gain Control: AGC threshold nominal 1 μV. Attack time 5 millisecond and release time 1.5 seconds.
Audio Output: 2 Watts at 4 Ohm impedance.
Audio Distortion: Less than 10% at 2 Watts output.

TRANSMITTER

Input Power: 120 Watts PEP on SSB and 100 Watts on CW at 50% duty cycle. (Slightly lower on 10 meter.)
Microphone: 50 K Ohm dynamic type.
Carrier Suppression: −40 dB.
Sideband Suppression: −40 dB.
Spurious Radiation: −40 dB.
Distortion: −30 dB.
Frequency Response: 350 to 2700 Hz ±3 dB.
Final Tube: 12GB7 x 2.

ATTENTION! Yaesu Co. have advised a correction to the specifications of their YP-150 advertised in Sept. AR. The upper frequency of the YP-150 is 200 MHz, not 500 MHz as originally stated.

All prices include S.T., Freight extra. Prices and specifications subject to change. **90 DAY WARRANTY**

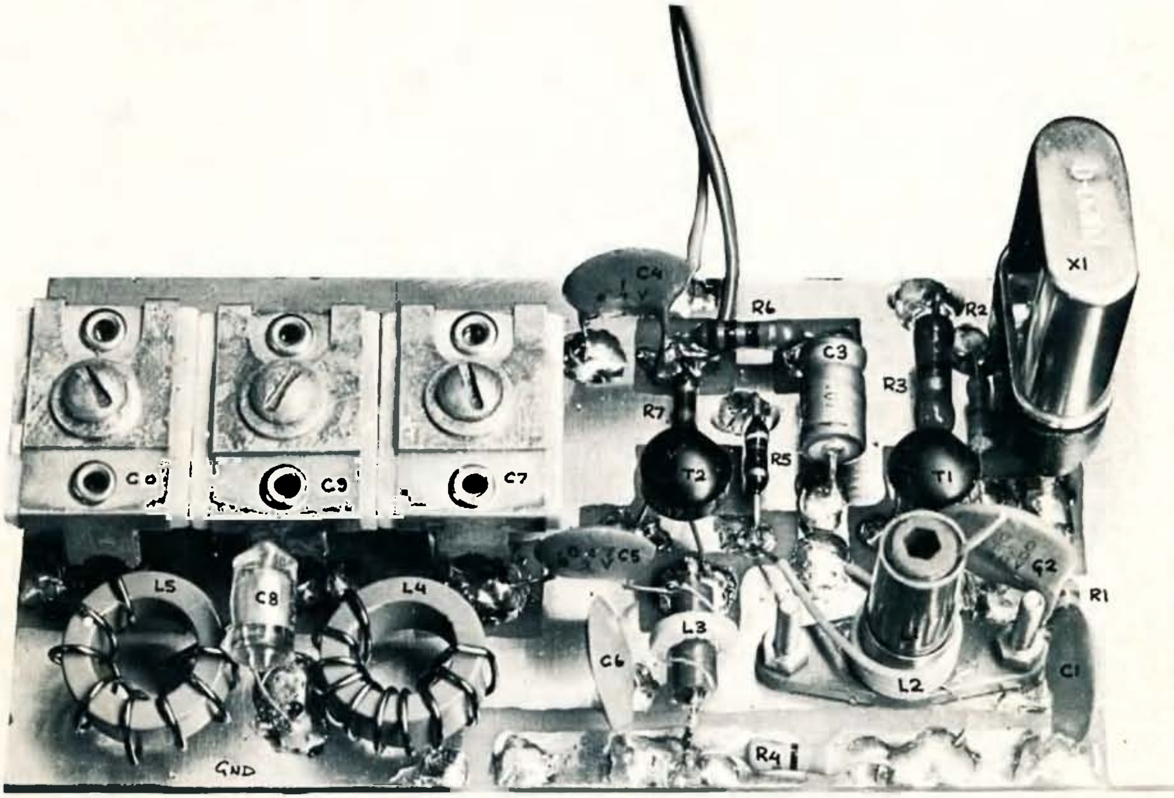
bail

ELECTRONIC SERVICES

60 Shannon St., Box Hill North, Vic., 3129.
Ph. 89 2213

QLD. MITCHELL RADIO CO., 59 Albion Road, Albion, 4010 Ph 57 6830
N.S.W. STEPHEN KUHL, P.O. Box 56, Mascot, 2020 Ph Day 667 1650 A.H. 371 5445
S.A. FARMERS RADIO PTY. LTD., 257 Angas Street, Adelaide, 5000 Ph 23 1268
W.A. H. R. PRIDE, 26 Lockhart Street, Como, 6152 Ph 60 4379

amateur radio



VOL. 43, No. 11 NOVEMBER, 1975

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COVER PHOTO

A simple, 10 x 5 cm CW Transmitter for 7 MHz. See article on page 15.

Photo: M. Crarey

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA, FOUNDED 1910

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QSP — TRADING

A long letter from a keen member in Townsville was referred by the Editor (to whom it was addressed), on his return from holidays, to the Executive.

In brief the letter suggested that the Institute should engage centrally in trading. To provide working capital contributions should be sought from members or debentures issued. At an average of $20 per member the total should reach about $90,000. The trading to be on a fully commercial basis dealing initially in amateur equipment with possible expansion at a later date into other electronic and similar fields.

This is not the first time such an idea has come up for consideration. Many Divisions have been active for a long time in limited trading activities confined to members. Surplus gear has been handled over the years but this has dwindled. Attention has therefore been directed more and more towards components and kits designed for home construction use.

A natural extension would have been a central WIA agency to handle these things but many factors prevented this from happening. Several Divisions have done very well out of their own "disposals" activities. Only in the last four years has there been a formal central organisation by Constitution.

Everything of common concern to the Institute was, and still is, controlled by the Federal Council comprising one representative from each fully autonomous Division managing State affairs.

Before the present era of inflation, coming so soon after establishing the central organisation, there was little need for large sums of money to offset costs of a non-Divisional nature.

The climate was right for normal trading companies to sell amateur requirements according to the needs of the times. There are now many outlets for amateur requirements to cater for the appliance user as well as the home constructor. In fact there are some grounds for believing that competition today has depressed the net profit margins quite considerably. A new entrant into this field must more than ever before acquire and stock the right goods at the right price for re-sale on the one hand at a competitive price and yet on the other to make reasonable profits to keep going.

If central trading were to be approved by Federal Council it would have to be done for Constitutional reasons as a separate commercial enterprise under close control and proper management. These and other requirements need not be beyond attainment.

However, the outlook for launching such a project differs according to the viewpoint be it Melbourne or Perth or Cairns or elsewhere. As is to be expected in this specialised field the largest cities seem to be well catered for although mail order business exists but increases prices and creates other problems.

It could be thought that amateur gear could be bought much cheaper if we had our own trading company but accountants demand satisfactory profits not solely to ensure adequate returns on capital.

A most detailed analysis would be absolutely essential. The Institute would have to look for an assured net profit of at least $15,000 or $20,000 after tax, staff wages, and general overheads have been paid. A few thousand dollars once every few years would not be worth the effort. To achieve such a return the annual turnover might well have to be $200,000 or more if the store has to be competitive.

The Executive would not be daunted if Federal Council decides that trading must be begun. There are ample resources available to draw on expert advice at all stages particularly to determine the viability of such a project in the beginning. It is recognised that some regular source of income is needed to keep subscription rates from getting out of hand. Many other Amateur Radio societies face this same problem.

However, an answer must be found to another equally important question. What other areas should be explored to achieve a reasonably viable source of subscription subsidisation? Such as doubling our membership, expanding "Magpubs" activities, setting up a credit union, and so on.

The Executive. ■

CUSTOMS DUTIES

Remember how the Institute's Executive went to work in the past few years to gain duty free admission for transceivers? And were successful.

The draft report on telecommunications equipment by the Industries Assistance Commission has now come to hand.

Section 2 of the report deals with interests covering aerials and radio telegraphic and radio telephone aoparatus including mobile transceivers, communications receivers, HF transceivers and the like. Two sub-paragraphs of section 2, 8 in the Report acknowledged requests for duty free entry being made in relation to amateur radio equipment by the Wireless Institute among others. The next sub-para reads:—

"Some of the abovementioned products already enter under by-law. The Commission considers that the remaining requests for duty free entry of specific items would be more appropriately dealt with through the by-law system".

Page 13 of Appendix 4 to the Report adequately summarises the original Institute's submissions under Tariff Item 85.15.9 as follows:—

(a) The admission of all transceivers of a kind designed for and solely capable of use on amateur frequencies as a permanent measure — no certification, no security, no statutory declaration; applicable to new and used transceivers, for HF, VHF/UHF/SHF, commercially built or home constructed, through all ports, commercial or private imports, for re-sale or own use, as freight or in baggage and

WIANEWS

At the time of writing the burning question is still the industrial dispute which has caused disruption in the examinations area. A copy of letter 320/5/101 of 22nd September received from the Postmaster-General is published elsewhere in this issue. This was in response to a telegraphic protest sent to the Minister by the Executive when it became known that the August exams also came under the ban.

It is too early to expect that the last award handed down by the Arbitration Commission will or will not cause the door to be opened for the successful conclusion of the dispute.

Information available to the Executive indicates that meetings between the PMG's Department and all interested parties have been held on several occasions but so far without success.

The Executive is very well aware that 'outsiders' could create additional problems if they are seen to seek direct intervention but the situation is under constant review in the light of developments. This sounds all very wordy but the old adage about 'fools rushing in where angels fear to tread' was not coined for nothing.

September seems to have been a month of information flowing in for consideration of action to be taken after receiving comments from Divisions.

One such item was a letter from the Secretary of the Radio Frequency Management Division of the PMG's Department advising that the call sign block RAA to RZZ has definitely been allocated for use by any amateur repeater or beacon.

The previous allocation of the blocks RSA to RTZ solely for amateur beacons has now been rescinded — see AR Dec., 1972, p.21.

This whole question came to the fore last year when one Division required that repeater call signs should be made available so as to identify the geographical location or service areas of each repeater. As a result of this the Executive supported the request. The previous restriction of call signs for repeaters deriving from the block RAA to RAZ has thus gone overboard and presumably repeater owners can now request their own geographical call sign even if it falls within the RSA to RTZ block. Presumably the same will apply to beacons.

It is believed that the PMG's Department will have reserved the right to allocate any call-sign in the RAA to RZZ block for any other amateur use in line with the general conservation of call letters.

Another letter from the same source dealt with repeater conditions in reply to a preliminary letter from the Executive on this subject back in May. A couple of quotes from this letter might be useful. Quote number 1 — "The Department has always been happy to consider representations from your Institute and I have no doubt that this cordial situation will continue in the future". Quote number 2 — "The Department does not propose to impose unnecessary rules on the Amateur Service but, provided they are framed within the current licensing conditions, no objection in principle is seen to additional rules being devised and applied by amateurs for operation of their services".

Yet another letter from "Central Office" clarifies the procedures to be followed by "C" calls operating in different states. It is now clear that if the owner of a "C" call registered in one State visits another State for a period not exceeding 5 days all he has to do is to change the numeral in his call sign and of course abide by paragraph 120 in the Handbook. Thus if VK3CDZ goes to Canberra for a couple of days at a time he uses the call sign VK1CDZ and not VK3CDZ/VK1 as would be customary for normal series call signs. Letter RB4/8/1 of 8-9-1975 refers.

A letter from the Minister for Defence confirms that the NDO and Directors of State/Territory Emergency Services have been advised of the name and function of the Federal WICEN Coordinator (Brig. Rex Roseblade VK1QJ) and asked to ensure cooperation with WICEN.

Peter Brown, VK4PJ, donated a cup designated the "Contest Champion Trophy" and the rules for this annual award have been received but await adoption. Peter suggested the first "period should be 1st October, 1975 to 1st October, 1976 and the Federal Contest Manager should take into account the highest aggregate scores obtained in the 1975 VK/ZL contest, the 1975 Ross Hull, the 1976 John Moyle Memorial NED and the 1976 R.D. Contest.

It is unfortunate that the draft rules arrived too late to be included in October AR and equally unfortunate that the office of F.C.M. is under change. In any event they must be considered and adopted as early as may be possible. The handsome trophy donated by Peter is held by the Executive and awaits its first annual owner hopefully before the end of 1976.

The Federal President is scheduled to meet Mr. F. Green, the Head of the PMG's Department, later in October at which a number of high level administrative arrangements are to be discussed. Obviously the IARU related Motions from the 1975 Federal Convention concerning W.A.R.C. 1979, legislation affecting the amateur service, examinations, licence fees and frequency management are likely to be items at the top of the list.

Also at this time of the year Divisional Councils will be seriously considering their subscription rates for 1976. The Executive have done their homework and concluded that the Federal element of the 1976 Full and Associate Members' subscriptions should indeed be recommended as the $14.50 adopted at the 1975 Federal Convention. Out of this amount $7.20 will be the direct cost of AR plus 30 cents for the IARU contribution.

Finally, it might be appropriate to mention that October was the 3rd birthday of OSCAR 6. Congratulations to everybody concerned with this amateur satellite and all amateur satellites. ■

effects; end-user criterion inapplicable.

(b) Transmitters and transverters of a kind designed for and solely capable of use on amateur frequencies.

(c) R.F. Linear amplifiers for amateur bands only. (Note — these appear to be covered by By-law already).

(d) Communications receivers designed for use and capable of use only on amateur frequencies.

(e) Amateur band, Ancillary equipment for use with such transceivers, transmitters and receivers — e.g. outboard VFOs, tuning units, etc. Would negotiate on separate power supply units which are of a kind manufactured domestically and similar items.

(f) Items normally supplied with each piece of apparatus (e.g. microphone ordinarily sold as part of transceiver).

1. WIA (Wireless Institute) accepts the need to foster and encourage local industry but the amateur market is so selective and of such small proportions that the importation of amateur equipment not designed for use on other frequencies and not readily and cheaply convertible should enjoy duty free concessions.

2. Certain items for use by amateurs already appear to enter under by-law — e.g. Aerial rotators, monoband and multi-band antennas, HF Vertical antennas, LP Filters, antenna couplers. Some articles classified under other Tariff headings.

3. Readily understood, easily administered and positive identification at time of import are criteria greatly to be recommended in this somewhat technical field.

4. WIA happy to assist in any way and to provide definitions where desired. Would agree to importation of "difficult" items under statutory declarations for amateur end-usage.

After receiving and considering any further submissions it is assumed the draft report will become, after any amendments and additions, the final Report which will be submitted to Government in due course. Whether or not the Government will accept the recommendations of the final Report will of course remain to be seen.

BURMA

"The authorities in Burma have prohibited everything that has the slightest thing to do with Amateur Radio. Even the import of radio parts is on the black list. So if you write to an Amateur in Burma do not use his call sign. In some cases it is known that the Amateur landed in jail because of supposed activity". The World Radio News, June, 1975.

WICEN NETS—VK6

VK6AN writes that visitors to VK6 may be interested to note that the best frequencies for contacts with WICEN operators in VK6 are 3.6 MHz daily at 00.00 Z, 7.1 MHz daily at 04.30h Z and Ch 1 is monitored at all times. At 02.00h Z Sundays there is a WICEN callback after the VK6 broadcast; frequencies are 3.6 or 7.1 depending on band conditions. The other daily monitoring frequencies are given as 14.106 at 03.00h Z, 7.078 at 08.30h Z, 146.00 MHz FM nightly as well as 52.656 MHz in most areas most of the time Ch 4 is monitored in the Narrogin-Wagin area and Ch 2 in the Albany-Mt. Barker area.

TRANSCRIPT OF ADDRESS BY THE PRIME MINISTER OF AUSTRALIA, THE HONOURABLE E. G. WHITLAM, Q.C., M.P., OPENING THE 1975 REMEMBRANCE DAY CONTEST ON 16th AUGUST, 1975

"I am honoured by your Institute's kind invitation to declare open your 1975 Remembrance Day Contest.

It is right that we should remember the amateur radio operators who laid down their lives for Australia during two world wars.

This occasion has taught me a little more about your useful and remarkable hobby. Perhaps the word 'hobby' is a misnomer for such a varied leisure activity. Your contacts as radio operators are truly world-wide. As amateurs you have been experimenting for many years with your own satellite and communicating with other amateurs as far afield as Africa and Japan. With the next generation of amateur satellites you will be able to contact your friends much further afield in the U.S.A. and elsewhere.

In these days of developing communications Australians can pick up their telephone for discussions with people round the globe at any time, but the process is expensive. It is surprising indeed that you in your shack can talk at almost no cost with old friends and make new ones anywhere in the world. You are truly private ambassadors for Australia and I have no doubt that the wide network of amateur radio communication makes a valuable contribution to international understanding.

I commend your work in providing communications with stricken areas and your ability to move into action quickly in a national emergency. My colleague, Senator Bishop, the Postmaster-General, assures me that every possible facility is given to amateurs involved in emergency traffic. I believe the use of amateur satellites for communications in emergencies will be more fully exploited.

At present you have training classes for your members, particularly in Youth Radio Clubs, and I hope you will try to widen your educational programmes and bring knowledge and experience of your existing work to the widest possible audience.

Young people today with their natural interest in scientific knowledge and advancement would want to know more of your work and how they may participate in it.

I have much pleasure in declaring open the Wireless Institute of Australia 1975 Remembrance Day Contest". ■

THE NORTH QUEENSLAND CONVENTION

London has its Changing of the Guard.
Melbourne has its Moomba.
And Townsville —
it has its Radio Convention
which is better still.

You who weren't there missed out on a great time while the lucky ones who did attend had a ball.

Occurring during the bleak southern winter month of July, it provided a very enjoyable escape for those that came, for the daytime weather was fine and sunny and the nights mild. The only unfortunate thing is that it occurs only each second year — but perhaps that's a good thing as it allows new ideas to be thought up and plenty of planning to be made by visitors.

The programme of events took second place to the renewal of old friendships and the kindling of new ones.

This is the true meaning of Convention — where souls of a like nature convene. As a result Amateur Radio has received a valuable 'Shot in the Arm' by the efforts of the Townsville Amateur Radio Club in North Queensland.

VK4ZEZ.
Townsville Amateur Radio Club
Publicity Officer ■

AOCP EXAMINATIONS

The following letter was received in response to a telegram sent by the WIA.

320/5/101

Postmaster General
Canberra, ACT 2600
22 September 1975

Dear Mr. Dodd,

I refer to your recent telegram concerning the postponement of the August examination for the Amateur Operator's Certificate of Proficiency.

The industrial dispute which has so far prevented this examination from being held, concerns staff classifications. The parties involved in the dispute are the Australian Public Service Board, the Staff Association representing the officers of my Department who conduct examinations and, to a lesser extent, my Department.

Attempts to reach a solution to the dispute are being pursued as expeditiously as possible. Noting, however, that certain instructions have been given to staff by their Association, it would be pointless to attempt to re-schedule the examination until the difficulty is resolved.

The dispute has already been widened to include other examinations conducted by my officers and I am loath to initiate any action which could precipitate further disruption of my Department's activities.

I regret that some inconvenience was caused to candidates but I am sure you will appreciate that the postponement is outside the control of my Department.

You may be assured that following settlement of the dispute, the earliest practicable date will be selected for the examination and all candidates advised accordingly.

Yours sincerely,
R. Bishop

Mr. P. B. Dodd, Secretary,
The Wireless Institute of Australia,
P.O. Box 150, Toorak, Vic., 3142 ■

HISTORY OF SOUND AND MOVIES

In a recent letter from Jim Davis, registered SWL and future novice licensee of 55 James St., Latrobe, Tasmania, comes news of a rather unusual sideline.

Jim has obtained and fully restored equipment to depict the History of Sound and Movies.

The attached photograph gives a brief idea of some of the equipment on display.

This includes the 1916 Telefunken Spark transmitter/receiver used by the Navy during World War 1 at Currie, King Island, TRF Battery Receivers, 'all electric' sets of 1928 vintage, one of the first Erams Record players with automatic changer, an 1893 Edison Projecting Kinetoscope and many other items from the early days to the present time.

The museum is on display in Jim's private Cinemascope theatrette in his new home at the above address. Jim states that visitors to 'the shack' would be most welcome. ■

AMATEUR BUILDING BLOCKS

PART FIVE

H. L. Hepburn VK3AFQ
4 Elizabeth St., East Brighton, 3187

DIGITAL MODULES

This final part of the Building Block series covers the predominantly digital functions. Three such modules are presented — a crystal clock pulse generator, a gating and control unit and a display or indicator unit.

Section 2 — Unit H — CRYSTAL CLOCK

This unit is a comprehensive crystal clock and divider chain which produces accurately controlled timing pulses between 10 MHz and 0.025 Hz. The module can be used for a variety of purposes including control of a counter or timer, production of frequency markers and to act as a standard in the digital stabilisation of a VFO.

The circuit diagram is given in Fig. 21 while the component layout is given in Fig. 22.

A 10 MHz crystal oscillator is formed using two gates of a 74 HOO or 74 SOO quadruple NAND array, the remaining two sections being used to buffer the output. The oscillator is followed by eight 7490s in the divide by ten mode and outputs taken after each stage so that a total of nine decade outputs are available ranging from 10 MHz down to 0.1 Hz.

Also on board, but divorced from the main divide chain, is a 74107 dual JK flip flop. This chip enables any one of the main decade outputs to be further divided by two and/or four so that, if required, outputs down to 0.025 Hz, or one pulse every 40 seconds, are available.

Note that each output from the dividers is capable of driving another eight 7400 series inputs so that, for example, the 100 pps output could be used to drive external logic and at the same time could be routed through the 74107 to provide 50 Hz and 25 Hz as well. The only forbidden interconnection is to join two outputs together.

While a trimmer is provided on the board to adjust the crystal to its correct operating frequency it is often worthwhile to be able to do this adjustment from a remote point — say a front panel control. Provision is therefore made on the board for a BA102 varactor diode and its associated decoupling components. The only off board control is the potentiometer and associated 3.3K fixed resistor. It should be stressed that the supply to the potentiometer, and thus to the varactor diode, should be very well regulated or else the facility will degrade the stability of the oscillator. The value of the control voltage is less important than its stability, any value between 10 and 15 volts being satisfactory. If this external control facility is not required the components are simply omitted.

The accuracy of the clock is a direct function of the crystal used. If the accuracy requirements are modest (say 1 part in 100,000) then a low priced crystal can be used. Short term accuracies of the order of 1 part per million can be obtained using a Hy Q Delta GF crystal which is more expensive but which has been designed to have minimum change of frequency with temperature in the 15-25 deg. C region. For greater accuracy, a crystal oven and a crystal designed for the oven temperature are necessary.

With the exception of the varactor supply (if it is required), the whole module is powered from a 5 volt regulated line. Use of a LM 305K (National) or 7805 (Fairchild) monolithic regulator is advised and these are freely available at a modest cost from most supply houses. Note that if these regulators are used then an input capacitor of 0.1 or 0.22 mFd and a 4.7 or 10 mFd tantalum capacitor should be fitted right at the regulator using the shortest possible leads.

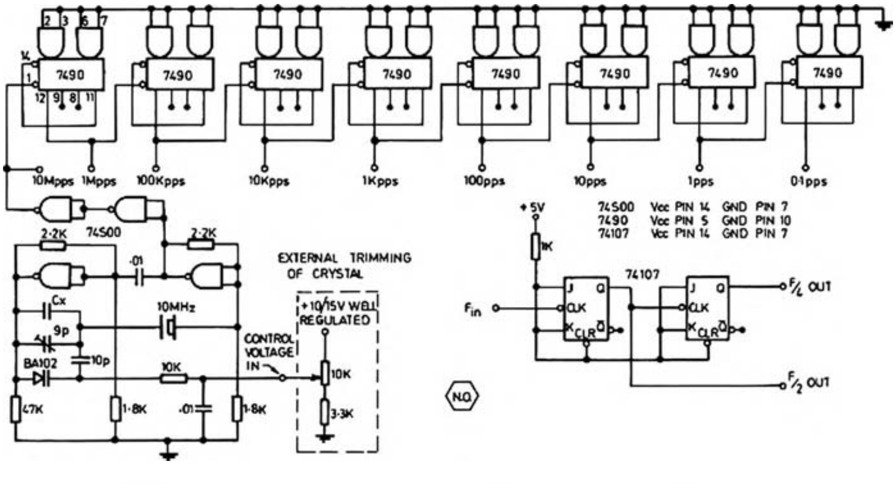


FIGURE 21 — UNIT H — CLOCK OSCILLATOR AND DIVIDERS

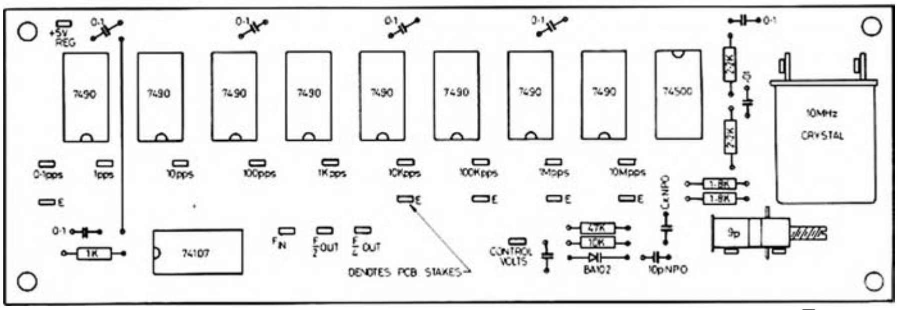


FIGURE 22 UNIT H CLOCK OSCILLATOR AND DIVIDERS COMPONENT LAYOUT

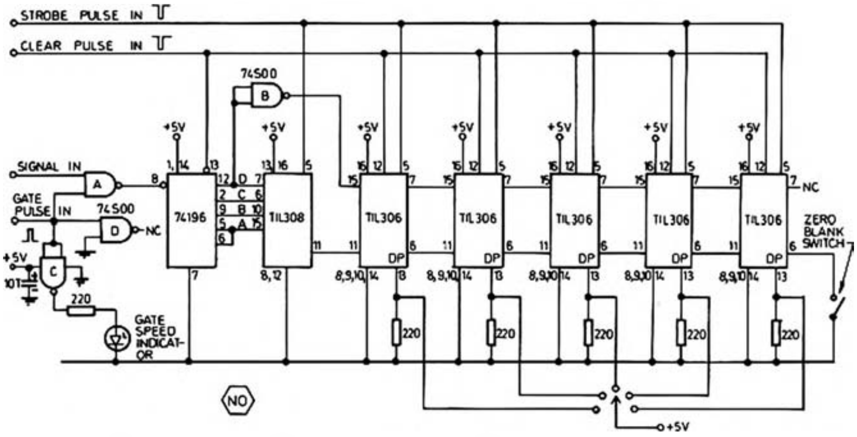


FIGURE 23 - UNIT I - 40MHz 6 DIGIT DISPLAY - CIRCUIT DIAGRAM

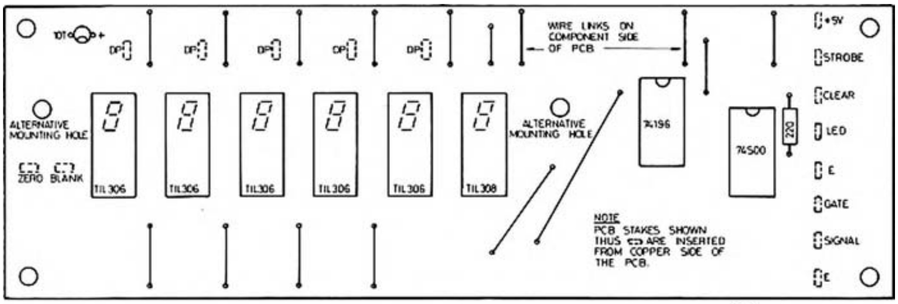


FIGURE 24 - UNIT I - 40MHz 6 DIGIT DISPLAY - COMPONENT LAYOUT

If the full range of output down to 0.025 Hz is not needed then the decade dividers (7490s) after the lowest required frequency are omitted. For example, if only a 100 kHz signal is wanted then only dividers 1 and 2 are used and dividers 3 to 8 omitted.

Section 2 — Unit I —
GATING AND DISPLAY UNIT

The proliferation of opto-electronic devices over the past two or three years has been rapid. Whereas in late 1972, when the writer was designing a counter (later described in AR), the only easily obtainable display was the incandescent filament 3015F. At the present time this type of display has been superseded by a wide variety of LED based readouts which vary in size, format and drive requirements. Most decade display units published in amateur literature have been made up of four separate ICs (divider, latch, decoder/driver and readout) each requiring a relatively large PCB to mount them and some sort of base in which to plug each decade board. More recently devices containing all the functions combined into one 16 pin DIL case have become available, notably the Texas Instrument TIL306/308 series. Use of these 'combined' displays has much to recommend it since the total area of PCB required is considerably reduced, the labour of wiring up has been significantly lowered and the volume of a complete display has been cut to under a quarter. Total cost (as distinct from chip cost!) has also been reduced. Thus the writer has designed the display unit now presented around the TI devices. They are stocked by the Radio Parts Group, 562 Spencer Street, West Melbourne, Vic. 3003.

The TIL306, which is a seven segment, two bars per segment, LED decade divider, latch, decoder and readout with a LH decimal point option, has one minor limitation in that the maximum operating frequency of the decade divider is 18 MHz. However this is only a problem in the right hand (or least significant figure) display and when it is desired to read a frequency to the nearest Hz.

In order to overcome this frequency limitation a TIL308 is used in the first stage. This is a TIL306 without an inbuilt decade divider, the division being done outside the chip using a high frequency divider such as the 74196 to give the display a 50 MHz capability. This is the approach adopted as reference to the circuit diagram (Fig. 23) will show. The signal gate is on the display board and uses a 7400 (for inputs up to 20 MHz) or a 74 SOO (for frequencies up to 40 MHz). Only five inputs are required:

1. 5 volts 1 amp well regulated HT.
2. Signal — amplified and squared so as to be TTL compatible.
3. A negative going strobe pulse.
4. A negative going clear pulse.
5. A positive going timing pulse.

All the required inputs, except the 5 volt regulated supply, are produced by Unit J which is the next (and last) unit described in this series of articles.

Only two of the four gates of the 7400/74 SOO are essential to the display proper so use is made of one of the spare gates (Gate C) as a buffer/driver for a gate speed LED which can be mounted remote from the display on some other part of whatever cabinet is used. This gate speed indicator is purely optional.

The incoming (TTL compatible) signal (from Unit J for example) goes to one input of Gate A, with the timing pulse from the control unit being applied to the other input of Gate A. When the timing pulse is high, Gate A passes the input pulse to the display. When low the signal pulses are not passed.

The pulse train passed by Gate A to the display enters a 74196 50 MHz decade divider. The binary outputs are taken to the TIL308 for decoding and display. The D output is inverted by Gate B and applied to the input of the first of five TIL308 decades.

The facility is provided to blank out all zeros showing on the left hand side of the display. Preferences for this type of zero blanking seem divided so that an external switch is suggested to allow the facility to be used if desired. One point in favour of zero blanking is the reduction in the overall current demand of the display.

No specific decimal point switching is given since the exact format will depend on the use to which the display is put. The circuit diagram (Fig. 23) shows that it is necessary to take the DP pin 13 low to extinguish it. This can be accomplished by permanently wiring a 220 ohm 1/8th watt resistor between the DP pin of each of the five TIL306s and earth. Applying 5 volts regulated (either directly or via a multi-position rotary switch) will cause the DP to light up. Note that if the DP pin connection is left 'floating' (i.e., not connected directly to earth or to earth via a low value resistor) then it will remain alight.

It is strongly recommended that 16 pin IC sockets be used to mount the TIL308 and the TIL306s and that the devices themselves not be soldered directly into the board. Sockets leaving a space between the back of the TIL306/308 and the centre of the socket are recommended to allow a free flow of cooling air over the displays.

Components are mounted in the usual fashion on the non-copper side of the board, but the PCB stakes shown in Fig. 24 are inserted from the copper side of the board, since it is this side which is accessible when the board is in place on the panel.

Board mounting details are given in Fig. 25.

A separate PCB stake is provided for each TIL306 decimal point. The DP outlets and their associated 220 ohm resistors are wired as dictated by the DP switching used.

The physical and electrical format used for this display board makes it extremely flexible. The display will continue to operate even if the TIL308 is not in place, although of course it will have ten times less readout resolution. Similarly successive left hand TIL306s can be removed without causing the display to stop operating. The practical minimum number of displays is probably three. Since the clock module (Unit H), the display module (Unit I) and the processor module (Unit J) have so many options, the ways in which they can be combined together are also many.

The writer is prepared on receipt of a stamped addressed envelope) to give interconnection and switching information where the enquirer has a specific end use in mind.

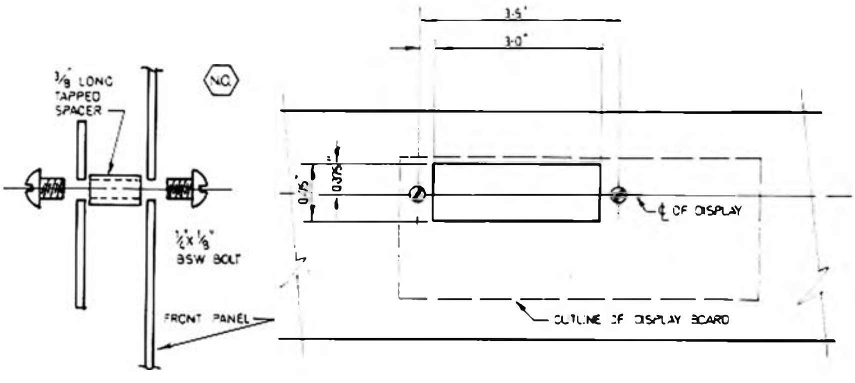


FIGURE 25 — DETAIL OF DISPLAY MOUNTING USING ALTERNATIVE MOUNTING HOLES

Deluxe Mobile/Base Station FT-101E/EE — *from Yaesu Musen Co. of Japan*

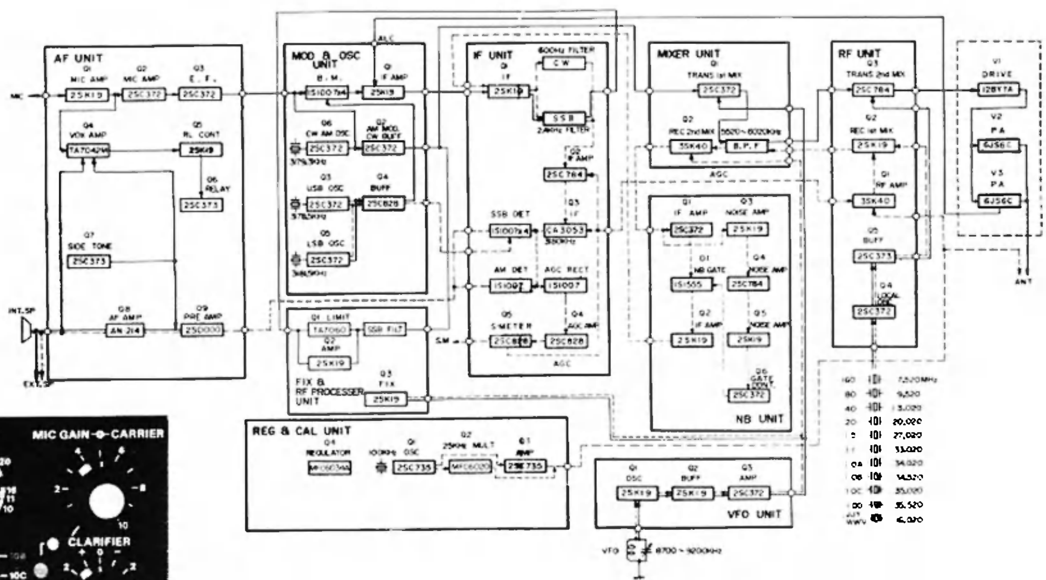
E MODEL with RF PROCESSOR $698

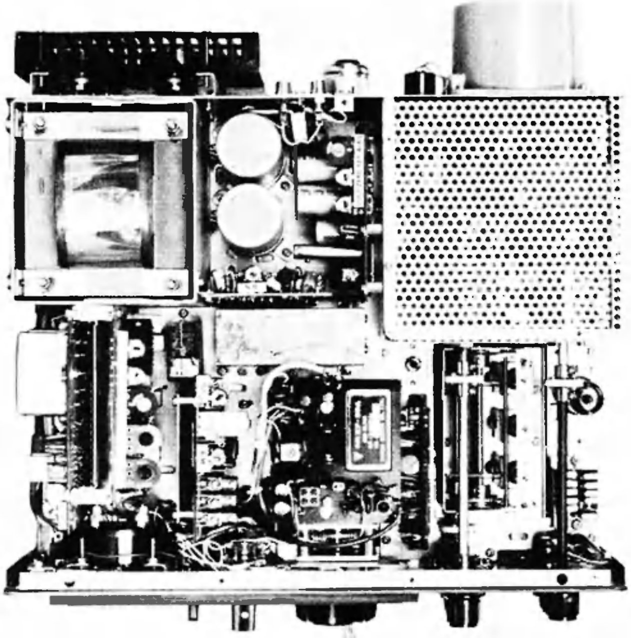
EE MODEL without RF PROCESSOR $651

RF SPEECH PROCESSOR — $70 plus P & P

Solid State 160 thru 10 Meter Transceiver

The world's number one transceiver now offers even more value and performance in one, compact, thirty pound package. An effective, RF Speech Processor is a built-in integral part of this exciting transceiver. Now you can realize that extra talk power to cut through the pile ups - without the addition of a linear amplifier. Except for the final and driver stages, the FT-101E/EE features the latest in solid state technology, incorporating time proven, plug-in "computer type" modules for unparalleled reliability and servicability. New lever type switches offer easier operation. Here is a complete radio station designed to go anywhere-ideal for todays active amateur. Just add an antenna and 12 VDC or 100-234 VAC for instant operation on 160 thru 10 meters. The FT 101E/EE is another step forward in amateur communications from the world's leader in communications equipment. YAESU- The Radio Company.





Built in R.F. Speech Processor

FEATURES

- ★ Built-in AC & DC power supplies
- ★ Built in RF-speech Processor for increased talk power (E model only)
- ★ 260 Watts PEP SSB, 180 Watts CW, & 80 Watts AM.
- ★ Factory sealed, solid state VFO for optimum stability and accurate 1 KHz readout
- ★ Effective Noise Blanker, threshold adjustable, for elimination of noise spikes
- ★ Built-in, fully adjustable VOX
- ★ Automatic break-in CW operation with sidetone
- ★ Selectable 25 KHz and 100 KHz calibrator
- ★ ±5 KHz receiver clarifier w/separate ON/OFF switch
- ★ Built-in WWV/JJY reception
- ★ Heater switch to shut off final tubes for conservation of current drain.
- ★ Reliable easy to operate lever panel switches
- ★ Adjustable carrier level for tune-up and novice operation
- ★ Built-in speaker
- ★ High-Q, permeability tuned, RF stages to provide the performance required even in base station operation
- ★ Includes dynamic, hand-held type microphone
- ★ Indicator lights for internal VFO and clarifier operation
- ★ Eight pole SSB filter for unparalleled selectivity on today's crowded bands
- ★ All mode operation — SSB, CW & AM
- ★ Built-in internal crystal control provision and Dual VFO adaptor.
- ★ Complete line of compatible accessories for flexible station design (CW filter, ext. VFO, ext. speaker, mobile mount, 6 m transverter, monitorscope, digital readout adaptor)
- ★ English language factory instruction manual with full circuitry, AC and DC power cables, all connectors.

TECHNICAL DATA

GENERAL

Frequency Range: 1.8-2.0 MHz, 3.5-4.0 MHz, 7.0-7.5 MHz, 14.0-14.5 MHz, 21.0-21.5 MHz, 27.0-27.5 MHz, 28.0-30.0 MHz all full transmit and receive. WWV 10.0-10.5 MHz (receive only). One auxiliary 500 kHz segment is available except for IF and VFO frequency range. Heterodyne crystal for 1.8-20 MHz is available optionally. (NOTE: All our sets include this crystal).
Mode: Selectable USB, LSB, CW or AM.
Frequency Stability: Within 100 Hz during any 30 minute period after warm-up. Not more than 100 Hz with 10% line voltage variation.
Calibration Accuracy: 2 kHz maximum after 100 kHz calibration.
Backlash: Not more than 50 Hz.
Antenna Impedance: 50 to 75 ohm unbalanced nominal.
Circuitry: 40 Transistors, 3 Integrated Circuits, 38 Diodes and 3 Tubes.
Power Requirement: 100/110/117/200/220/234 V AC, 50/60 Hz, 350 Watts maximum, or 13.5 V DC nominal, 5 A for standby, 0.5 A for receive (Heater OFF) and 20 A for transmit.
Size: 340(W) x 153(H) x 285(D) m/m.
Weight: 15.9 kg. (Shpg. wt.: 20 kg.).

RECEIVER

Sensitivity: 0.3 uV for 10 dB Noise plus Signal to Noise Ratio on 14 MHz.

Selectivity: 2.4 kHz nominal band-width at 6 dB down, 4.0 kHz at 60 dB down on SSB, CW and AM. 600 Hz nominal bandwidth at 6 dB down, 1.2 kHz at 60 dB down with optional CW filter.

Harmonic & Other Spurious Response: Image Rejection better than 50 dB. Internal Spurious Signal below 1 uV equivalent to antenna Input.
Automatic Gain Control: AGC threshold nominal 3uV. Attack time 8 milli-Second and release time 1800 milli-second.

Audio Noise Level: Not less than 40 dB below 1 watt.
Audio Output: 3 Watts to internal or external speaker at 4 ohm impedance.
Audio Distortion: Less than 10% at 3 watts output.

TRANSMITTER

Input Power: 260 Watts PEP on SSB, 180 Watts on CW at 50% duty cycle and 80 Watts on AM except for 160 metre. Slightly lower on 10 metre).
Microphone: 50 K ohm dynamic type.
Carrier Suppression: —50 dB.
Sideband Suppression: —50 dB.
Spurious Radiation: —40 dB.
Distortion Products: —30 dB.
Frequency Response: 350 to 2700 Hz ±3 dB.
Final Tube: 6JS6C x 2.

All prices include S.T., Freight extra. Prices and specifications subject to change. **90 DAY WARRANTY**

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S.A.	FARMERS RADIO PTY. LTD., 257 Angas Street, Adelaide, 5000	Ph 23 1266
W.A.	H. R. PRIDE, 26 Lockhart Street, Como, 6152	Ph 60 4379

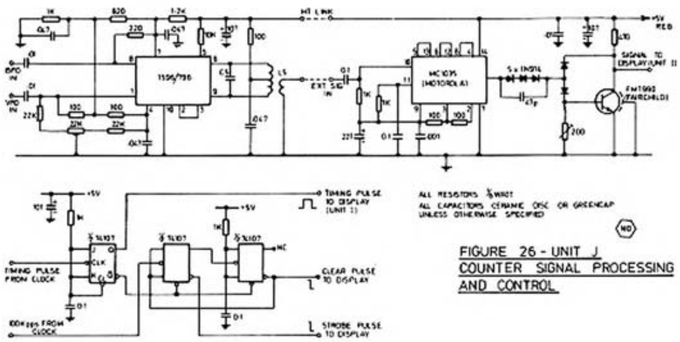

FIGURE 26 - UNIT J COUNTER SIGNAL PROCESSING AND CONTROL

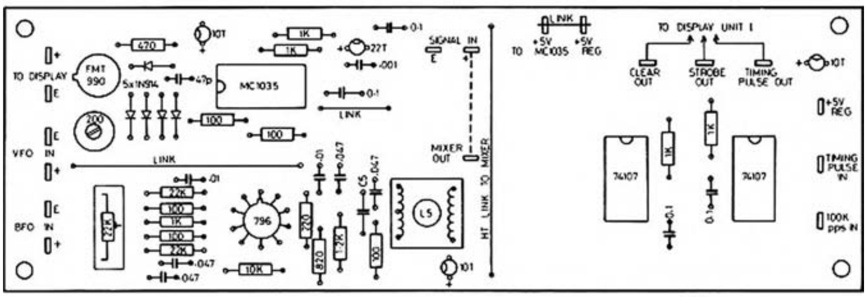

FIGURE 27 - UNIT J - COMPONENT LAYOUT

Section 2 — Unit J —
SIGNAL PROCESSING AND CONTROL

This module has three functional roles. In the first place it acts as a signal shaper accepting a low level (better than 30 mV RMS) signal and after amplification and squaring, outputs a TTL compatible waveform to drive the six digit display of Unit I.

Secondly it generates the necessary gating strobing and clearing commands so that the display unit may be used as a counter and finally, the module provides a mixing facility so that, say, the BFO and VFO of a single conversion Rx/Tx can be combined to re-constitute the signal frequency and allow it to be displayed in the form of a 'digital dial'.

Fig. 26 gives the circuit diagram of the three functions involved, Fig. 27 gives the component layout on the 6 in x 2 in circuit board, while Fig. 28 shows how Units H, I and J can be interconnected to make a 30/40 MHz digital frequency meter or a digital dial display.

The signal processor uses a Motorola MC 1035P triple line receiver. The circuit is the same as that used in the DFM described by the writer in AR (1973). In spite of much experimentation with other, and simpler, signal processors the original circuit is still considered to be the most flexible, especially at higher frequencies, and has thus been retained. The input impedance is approximately 1000 ohms and sensitivity is better than 30 mV RMS from 100 Hz to 40 MHz. Occasionally some low frequency instability is encountered and can be cured by additional decoupling of the bias supply (Pin 9) with about 2000 mFd. A response down to 10 Hz can be obtained by increasing the size of the two 0.1 mFd capacitors associated with Pins 10 and 11 to 1.0 mFd or larger.

The control circuitry is, again, essentially that used in the 1973 counter except that 74107 dual JK flip flops are used in place of 7493s, and the omission of the strobe buffer/inverters. These buffer inverters were originally needed to provide the positive going strobe pulses required by the 7475 latches used, but the TIL306 devices now used require a negative going strobe pulse which can be obtained direct from the control flip flops.

Two inputs to the control section are needed:

(a) A fixed 100K pps from the crystal clock of Unit H.

(b) A timing pulse from the crystal clock of Unit H. If the modules are to be used only as a digital dial then this timing pulse can be fixed at 10 pps or 1/10th second. If the modules are to be used also as a counter then switched selection of 1.0, 10, 100 and 1000 pulses per second from the clock is recommended, giving four sampling periods of 1.0, 0.1, 0.01 and 0.001 seconds.

The three outputs from the control section (gate, strobe and clear pulses) are connected direct to the corresponding inputs of the display module (Unit I). If types of display other than the TIL306/308 are used then it may be necessary to invert and/or buffer the clear and/or strobe pulses. Otherwise the TTL outputs from the control section are compatible with most other displays in current use.

The third on board function is a mixer, the purpose of which is to combine two inputs to give an output which is at signal frequency, and which can thus be processed and displayed (in conjunction with the crystal clock and the display unit) in the form of a digital dial.

The modules A through E (in previous issues of AR) describe single conversion receivers and/or transmitters. The incoming signal is either added to or subtracted from the VFO frequency to produce a fixed IF frequency. At zero beat (for AM) or with intelligible speech (for SSB) this IF frequency is exactly equal to the BFO input. Thus all that is necessary to reconstitute the signal is to add or subtract the VFO to or from the BFO.

As an example consider a signal on 14.1000 MHz and a VFO set at 5.1020 MHz. The resultant IF is 8.9980 MHz — the normal USB BFO crystal frequency.

To reconstitute the *ACTUAL* signal frequency it is necessary only to add the 8.9980 BFO frequency to the VFO on 5.1020 MHz to get 14.1 MHz.

The necessary mixing is done in a Motorola 1496/1596 or Fairchild 796 HC in exactly the same way as this device was used in earlier modules. The output tuned circuit is on the required signal frequency. The data for coil LS and resonating capacitor CS is the same as that given in Table 2.8 in the September 1975 issue.

Note that in a single conversion system the transmitter output is the algebraic sum

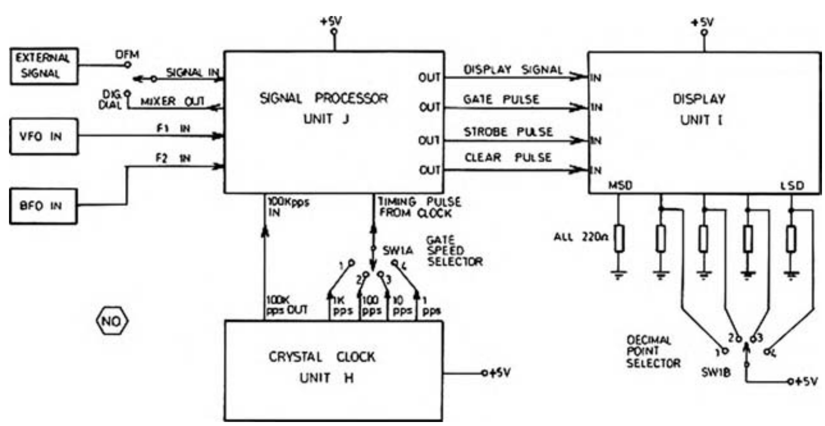

FIGURE 28 - INTERCONNECTIONS FOR A 6 DIGIT 40MHz DFM AND DIAL

of the BFO and VFO frequencies and thus, for a transmitter only, the mixer is probably redundant. However, if the mixer is in use to reconstitute the frequency of a received signal then its use also to display the transmitted signal seems logical and avoids switching when changing between the receive and transmit modes. Where a 'clarifier' is in use then the frequencies of the transmitted signal and the received signal are not necessarily the same and use of an available facility to show the difference seems warranted.

Since only around 30 mV RMS is all that is required as input to the MC 1035 signal processor, the demands on the 1596/796 mixer are minimal and it can conveniently be powered by the same 5 volt regulated supply that is used by the rest of the on-board logic.

Links and PCB stakes are used so that the mixer, or the signal processor, or the control section can be used separately if so desired. Although provision is made on the board to balance out residual carrier (the two 22K fixed resistors and the 22K trimpot between Pins 1 and 4 of the 1596/796) this facility may not be strictly necessary when there is a large difference between the BFO/VFO and the mixer output frequency.

During the development of the three digital modules the writer had some doubts about putting them into the same cabinet as the transceiver proper. However (and rather surprisingly) no desensitisation of the receiver was noted and the system has been used several times since with no problems. ■

SOLAR FLUX, SUN SPOT CYCLE, AND THE DXer

Frank Hine VK2QL
30 Abbotsford Rd., Homebush, NSW 2140

For those amateurs who wish to keep the chart in March 1975 AR up to date, the following are the smoothed mean values issued since my article was prepared —

May 1974, 36.4; June, 36.2; July, 34; Aug, 33.1; Sept, 32.1.

I have gathered some additional information which may be of assistance to those who have shown interest in my previous brief reference. WWVH gives the solar flux number and other propagation information in its broadcast on their 5 MHz transmission at 45 minutes past the hour and this possibly suits the VK boys better than WWV. I get a good signal from them round 0745Z.

One interesting thing has emerged in the almost daily check I make, and that is the variation in the signal from WWV as against WWVH. One particular day WWV was better than WWVH.

It now transpires that the information broadcast by WWV & WWVH has been included at the request of radio amateurs.

To date there has been no further sunspots of the new cycle reported and the latest "guess" is the bottom will not be reached until early 1977. Whilst my previous article mentioned my records go back to 1954, this was used for the purpose of the exercise only, whereas in fact they go back to 1750.

For those who remember the magnificent band conditions we experienced in 1958, they and others may be interested to know the nearest previous high sun spot peak occurred in 1778 when the sunspot number was in the region of 158. The next highest number did not occur until 1946, when the peak was in the region of 156, followed by the best ever in 1958, that cycle being numbered 19. I will be referring to cycle numbers again later. The last cycle, No. 20, reached 119 (see March AR table), which was similar to 1917. The 1928 cycle, 16, only reached a peak of 80. After the peak of 1778, cycle 3 mentioned above, each cycle was less until the two lowest numbers occurred in 1804, and 1816 when the peak of only approx. 45 was reached. The next cycle, No. 7 in 1830 only peaked at 65. The bottom between cycles 5 & 6 and 6 & 7 reached approx. zero. So . . ., if sunspot activity follows its previous pattern after a good cycle, amateurs are going to have to work hard for real DX, especially DXpeditions, and to help them know what to expect, keep a close watch on flux numbers etc. from WWVH and also the sunspot numbers.

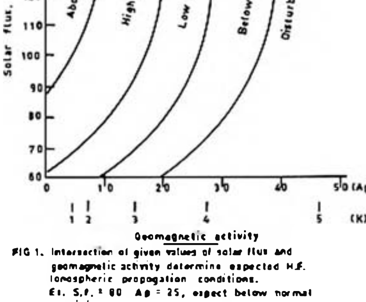

FIG 1. Intersection of given values of solar flux and geomagnetic activity determine expected H.F. ionospheric propagation conditions.
Ex. S.F. = 80 Ap = 25, expect below normal conditions.

In Fig. 1 is reproduced a graph which was in an article written by W3ASK in March '75 CQ.

By use of this graph in conjunction with the reports given over WWV/WWVH, the DXer can get some idea of the propagation conditions he may expect. The graph has now caused me to keep in my daily records, the index as well as the flux number. The K index varies from 1 to 9, the higher the value, the greater influx of solar particles, which in turn causes weaker signals.

Solar flux indicates the degree of ionisation in the earth's atmosphere and the K index measures the activity of the earth's magnetic field or any possible magnetic disturbance.

In general, the higher the value of solar flux and the lower level of magnetic activity, the better the HF bands will be for DX, and the reverse if the flux number is low and the magnetic activity high. During April a Solar flux number of 67 was recorded.

Use the following procedure in applying the use of Fig. 1. Assume that WWVH broadcast reports a solar flux number of 80 and a K index of 2. The intersection of these values within the area defined as "high normal" is the result, and it could be worthwhile to expect some reasonably good HF DX. If a flux of 70 is reported with a K index of 5, one may as well be in the garden or watching TV or doing that job that has been outstanding for years.

Use the same method of application to the graph, if instead of the K index you have an A index figure, e.g. Solar flux of 70 and A index of 5 or less, the band is worth watching.

The diagram and detail shown in Fig. 1 can be put to use by the VHF fraternity who are interested in DX. When the flux reading, and the A index figures take the propagation conditions into the below normal or disturbed area, there is a good chance that unusual propagation may occur on the 50 and 144 MHz bands. As Auroral conditions usually accompany radio storms, they could produce some sporadic-E ionisation. Accordingly, there is good reason for the VHF operator to daily check the WWV/WWVH broadcasts. Waiting for the information over the VK2 broadcast will be useless; the information must be obtained daily and checked against Fig. 1, as VHF operators are aware that they have to watch the band for the openings. The use of the information from WWV/WWVH could be very helpful, so it could be that an amateur who uses the HF and VHF bands, may not have to be occupying himself in some other chore, after all.

However, as IPS have told me, there is still a lot to be learned on what goes on in the ionosphere and things happen which are completely unexpected and nothing appears on the scientific information available to indicate what is happening. Such an occurrence was on April 17. It is a long time since I have heard the band full of European signals on 14 MHz short path in the mornings, yet when turning to that band at 2100 GMT, it was full of them and one only had to send a callsign and they were at you like a swarm of bees. Yet the flux number was only 69. I only wish now I had kept a record of the A index for that day. By 2200Z, the band had changed and the US stations were coming through full bore. Next day flux was 68 but not a sign of a European.

In respect to the A index, the following applies: Figs. 100 to 400, impossible conditions; 30 to 40, poor to fair; 15 to 30, fair; 0 to 15, good to excellent.

For those who may not be aware of this, over the weekly broadcast by the VK2 Division, as well as the recent introduction of the flux figures for the preceding week, the IPS provide information of what transpired in the past week and what may be expected in the week to come, such as 'a recurrent disturbance is due to start on a certain date' or may be a sun spot has appeared, or flares occurred on certain times of a particular day.

WWVH, after giving the flux number, give the sunspot activity, index etc at the current time and then a forecast for the next 24 hours, but not all amateurs have the equipment to cover WWV/WWVH, so the next bet is the VK2 broadcast.

It is well that amateurs be aware of the difference between a sunspot and solar flare. Solar flares do not always occur near sunspots, and they occur only in the day time. A flare causes greater absorption and may be accompanied by emission of solar particles or so-called 'magnetic storm particles' and these arrive at the earth one to two days after the occurrence of the flare and hence we have the magnetic storm, ionospheric storm, etc.

The most prominent occurrence with this type of storm is a reduction in the MUF and an increase in the absorption, which in effect means a narrowing of the useable number of DX bands, so 3.5 and 14 MHz can be affected. During recent months, the most reliable band for DX has been 7 MHz, but even it has shown adverse propagation at times. The areas worst affected at this time are the Geomagnetic poles and auroral zones.

For those who have just started their 'DX careers' and are somewhat disheartened when they hear old timers talking about the DX they have worked and the newcomer has never heard such a station, they can take some heart from the knowledge that a sunspot cycle rises much faster than it falls. Just think of a graph and the leading side is much steeper than the falling side, so once we do reach the bottom of the present cycle, No. 20, you can watch the DX come back again. But if we are in for another small cycle it won't be too good.

I am fortunate in having, due to my fellow 'student' of sunspot activity, K4GSU, obtaining it for me, a copy of some 'good gen' from the US Dept of Commerce. There is far too much to include in this article, but if any one is interested, they can write to:

US Department of Commerce,
National Bureau of Standards
Boulder,
Colorado USA 80302;

and ask for their literature NBS special publication 236 and a copy of the paper by K. D. Boggs, Ionospheric Forecaster, Spectrum Utilisation Division.

One final word. Most of the information promulgated by WWV/WWVH is for the North Atlantic area, but can be put to good use by radio amateurs in Australia. ■

LOUDSPEAKERS AS MICROPHONES

Alan Renton, VK4AZ
The Manse, 13 Herbert St., Proserpine, Qld. 4800

Recently I was given for my junk box a dynamic microphone which had been through a cyclone. I salvaged the transformer and was interested to see that in conjunction with loudspeakers from both valve and transistor radios, the resulting combinations were quite sensitive microphones.

Then I decided to see whether I could dispense with the microphone transformer and instead use the output transformer, that had originally taken the output of a 6V6GT, coupled to the loudspeaker of a mantel radio. The loudspeaker was an ancient 6 inch 3.5 ohm Rola.

Using this loudspeaker plus its own transformer as a mike, I connected it to a Philips (valve type) tape recorder. The sensitivity was very much greater than the rather high quality dynamic mike that I normally use. Indeed, we were able to get quite good recordings of frogs, crickets etc., from the window of the house. The quality of the reproduction was reasonably good.

Later I disconnected the loudspeaker plus transformer from the tape recorder and connected a 20k ohm per volt multimeter across the transformer. I was able to get an output of one volt by speaking into the loudspeaker in a reasonably loud and low tone of voice.

Then I tried using the combination as the microphone for my FT200 transceiver. I adjusted the ALC so that its output was comparable to the usual dynamic mike.

Two amateurs, one in South Australia and one in Southern Queensland gave me reports comparing the loudspeaker with the dynamic mike. The VK5 reported that the speaker was slightly more bassy but that it would serve very well as a stand-by mike. The other amateur actually thought that the speaker gave an improved performance.

The speaker was not in an enclosure and even had a 1½ inch long tear in the diaphragm!

Perhaps the above may be of use to young amateurs with strained finances or to any who might be looking for a very sensitive microphone at short notice. ■

QRP CW RIG FOR 7 MHz

Drew Diamond VK3XU
55 Winbirra Pde., Ashwood, 3147

Presented here are all the details of a simple low-power CW transmitter for the experimenter. Interstate contacts have been made with this transmitter and an ordinary Inverted-Vee dipole antenna. Power output is about 500 mW into 50 ohms from a 12 volt supply. The transistors used are cheap (about 40c) and readily available. The power supply used is two 509 lantern batteries connected in series to produce 12 volts.

The photograph shows the form of construction used, a small fibreglass board

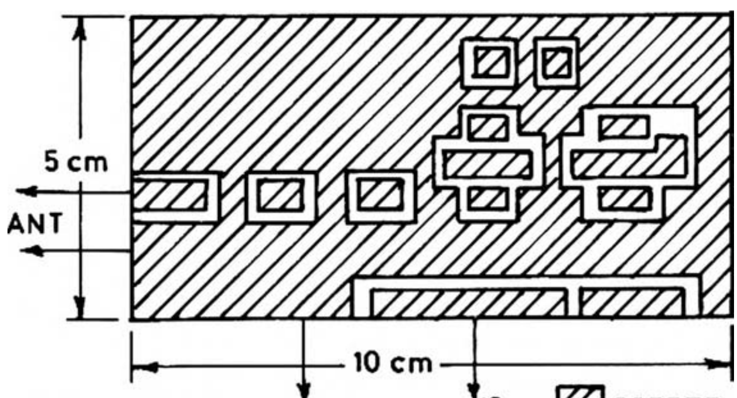

FIG 2 PC BOARD

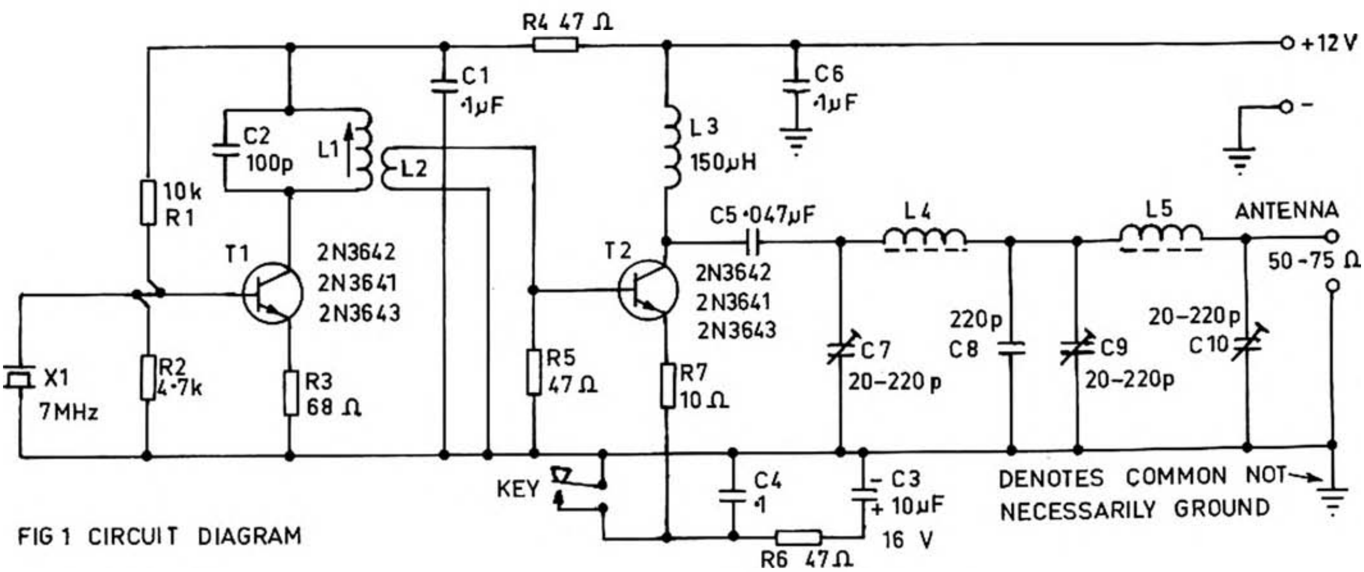

FIG 1 CIRCUIT DIAGRAM

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Peter Williams VK3IZ
Manager

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WHY 11 GOOD FEATURES BECOME 11 GOOD REASONS WHY YOUR NEXT (OR FIRST) HF RIG SHOULD BE A "2020"

		UNIDEN 2020	BRAND A	BRAND B
1.	Air cooled final	Yes	Yes	Yes
2.	Transmitting tubes in final (6146B)	Yes	No	Yes
3.	CW filter as standard	Yes	No	No
4.	Regulated screen voltages for stable operation of final	Yes	No	No
5.	Independent rf circuits for Tx and Rx	Yes	No	No
6.	Dual RIT control 5kHZ or 1kHZ	Yes	No	No
7.	Slow/fast AGC switch	Yes	No	yes
8.	PLL VFO for excellent stability and tracking linearity	Yes	No	No
9.	Noise Blanker for pulse type noise	Yes	Yes	Yes
10.	Hybrid dial with digital analog read-out	Yes	No	No
11.	RF amp and fan switchable when receiving only — as desired	Yes	No	No

* The 12th feature is the price — $550!

SO WHAT's WITH THE PLL BIT?

We have taken an output frequency of 7MHz as an example and the relevant frequencies to eventually generate 7MHz are shown on the diagram.

1. The 9.138 MHz signal from the VFO is fed into the mixer in the PLL system. Here it is mixed with the 5.838 MHz signal from the VCO (voltage controlled oscillator) to produce an output frequency of 6.7MHz.
2. The 6.7MHz signal is passed to the programmable divider where it is divided by 67 to produce a 100 KHz signal which is passed to a phase detector (P/D).
3. In the phase detector the 100 KHz signal is compared with another 100 KHz signal derived from a highly stable 10MHz crystal oscillator.
4. The output from the P/D (an error voltage if one exists) is then fed back to the VCO to lock it precisely to 15.838 MHz.
5. This output of 15.838 MHz is fed to the local oscillator mixer where it is mixed with 29.025 MHz from the band oscillator circuit.
6. This produces a 13.187 MHz signal which is then fed to the transmitter or receiver mixer where it is mixed with the ssb signal generated at 6.187 MHz to produce the final output of 7MHz.
7. For other bands, a different band oscillator crystal is used, and to generate the 100 KHz segments within a band, the program on the divider is altered so that the divider's output is still 100 KHz.

Thus the 2020 has the stability of the 10MHz reference oscillator.

So much for the example given: of somewhat more practical interest is the sequence of events if the tuning knob (VFO) is turned — a reasonable state of affairs if we are going to tune the band! The following explanation also applies if the VFO or VCO tends to drift.

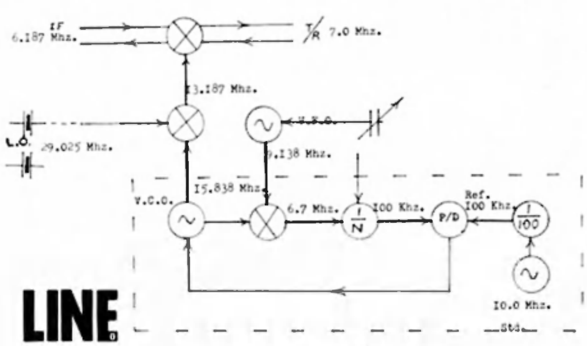
When the VFO frequency is varied, the programmable divider is presented with a frequency other than 6.7 MHz. Hence its output will not be exactly 100 KHz.

This produces an error voltage from the P/D which shifts the VCO such that a difference in frequency between the VCO and the VFO is exactly 6.7MHz. Naturally all this takes place with the speed and agility of a startled gazelle! i.e. instantaneously. For other bands, different local oscillator frequencies are employed, and a different frequency is presented to the divider. However the principle is exactly the same as described above.

...... Peter Williams, VK3IZ

The 2020 does not have 160 metre coverage but there is some scope to bring a little "do-it-yourself" back into the shack — why not make a transverter — connections for transverter operation are on the rear panel.

LINEAR AMP? Keep posted on a matching linear for early release in 1976.



Bands (meters)	Frequency (MHz)	
80	3.5 — 4.0	
40	7.0 — 7.5	
20	14.0 — 14.5	
15	21.0 — 21.5	
10(A)	28.0 — 28.5	
10(B)	28.5 — 29.0	
10(C)	29.0 — 29.5	
10(D)	29.5 — 30.0	
11	27.0 — 27.5	Receive only
WWV	15.0	Receive only

Tubes	6146B	2
	12BY7A	1
Transistors		52
FETs		16
ICs		18
Diodes		154

THE UNIDEN LINE

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VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM VICOM

10 x 5 cm. The components are soldered to the copper side of the board and drilling is unnecessary. Coax to the antenna connector is soldered to the left hand side of the board shown on the photograph. Tag board construction or matrix will also yield satisfactory results if circuit board working facilities are not available.

The toroidal coil formers used at L4 and L5 are not easy to obtain, as it is necessary to order a minimum quantity of ten from the supplier. (I bought a number of these formers for this project and will be pleased to post a pair to any intending constructor for the price I paid, 40c plus postage please.)

Any active 7 MHz crystal in the CW band (7000 to about 7040 kHz) may be used at X1. Operation of the crystal oscillator can be checked before the components of the output stage are soldered into place. Tune the station receiver to the crystal frequency and adjust L1 for maximum signal consistent with re-starting of the oscillator with removal and re-application of the 12V supply. The components of the output stage can now be mounted into place.

To test the completed circuit, connect a 6 volt, 100 mA lamp across the output, or better still, a 56 ohm 1 watt resistor and X10 probe and CRO, with a bandwidth greater than about 10 MHz. With the key circuit closed, adjust L1, C7, C9 and C10 for maximum output. The lamp should glow at almost full brightness when the circuit is operating correctly. The character of the keying may sound a little chirpy with the lamp load, but that is because the load variations of the lamp are reflected through the output stage to the oscillator. With a pure load (resistor or antenna) there is no chirp and keying sounds quite good.

If you have been using high power and feel you need a little adventure, this little QRP rig may provide it. ■

A WIDEBAND RF TRANSFORMER

Ivan Huser VK5QV
5 Mugford St., Mount Gambier, SA 5290

A transformer suitable for matching the input of a passive grid linear amplifier to a transmitter or transceiver.

If one looks at the circuit diagrams of passive grid linear amplifiers it will be seen that the input swamping resistor is generally in the order of 300 ohms. Thus, if fed by coax directly from a transmitter or transceiver, a mismatch will occur with a resultant high standing wave ratio between the two units.

This problem can be overcome by using an RF transformer having a 2:1 turns ratio (4:1 impedence ratio) between the input socket of the linear amplifier and the swamping resistor in the tube grid circuit.

If 75 ohm coax. is used, a swamping resistor of 300 ohms will give an SWR of 1:1 on all bands. For 50 ohm coax. a 220 ohm resistor should be used.

FIG . 1.

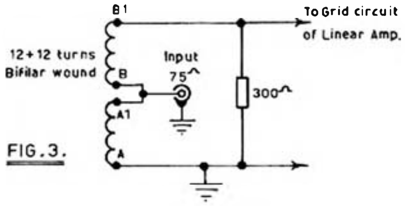


FIG.3.

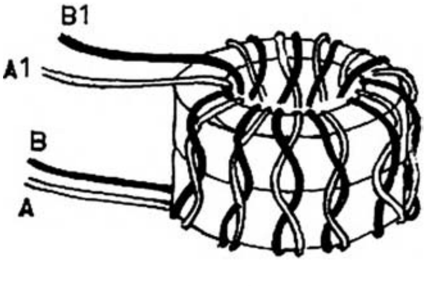


FIG.2.

The construction of the transformer is quite straightforward. The original was wound on two Ducon Q2 ferrite rings having an outside diameter of approximately 18 mm stacked one upon the other.

Two lengths of 7/.0076 PVC hook-up wire were twisted together to give about two twists per inch length as shown in Fig. 1. The twisted pair was then wound tightly around the toroid to give ten or twelve turns (see Fig. 2). The exact number of turns does not appear to be too critical.

If two different coloured wires are used, it becomes a relatively simple task to connect the transformer as shown in Fig. 3. It should be noted that this transformer is *NOT* a balun since both the input and output are unbalanced. Although not tried on 160m, I can see no real reason why it should not work satisfactorily on this band also.

Mounting and/or potting of the transformer is left to individual tastes.

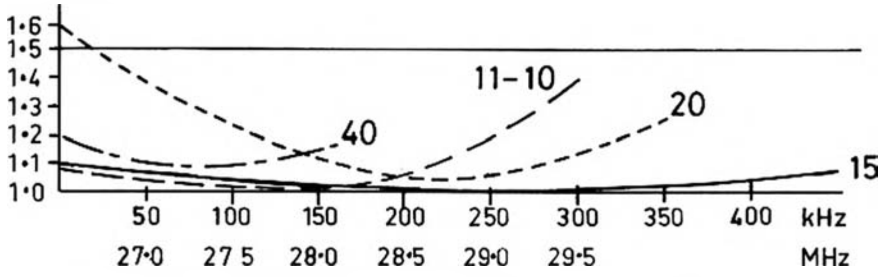
This transformer would be quite suitable for use with the G2DAF/VK5MS linear amplifier described in the May 1974 issue of Amateur Radio. ■

OPTIMISE YOUR 14AVQ

Hans Smit VK2BHS
9 Moore Cres., Faulconbridge, NSW 2778

The ubiquitous 14AVQ trapped vertical antenna can be optimized for operation on five Australian bands quite easily with two simple modifications.

1. Shorten the distance between the 10 metre trap and the 15 metre trap to 5½ inches. This involves cutting about 2 inches off the connecting tube and about 1 inch off the bottom of the 15 metre trap.
2. Lengthen the top section to allow it to be adjusted to 78 inches. Insert an extension piece (flat ½ inch plated steel bent at each end and drilled, about 4 inches long) between the top section and the capacity hat. Bend the three aluminium wires up, to add a further 5 inches of height to the antenna.



Now adjust the antenna, using the key letters for dimensions referred to in the instruction leaflet. A — 29 in, B — 7½ in, C — 12 in, D — 5½ in, E — 12 in and F — 78 in (plus the additional 5 in. gained by bending up the capacity hat wires).

Make sure that the ground system is effective. If you have a flat steel roof, as is the case at this QTH, solder all the sheets together with short lengths of braid or thick wire.

The following SWR curves were obtained with the bottom of the antenna mounted 6 in. above the flat steel roof. ■

NEWCOMERS NOTEBOOK

with

Rodney Champness VK3UG and David Down VK5HP

A NOVICE TRANSMITTER — Part 3

THE MODULATOR

The transmitter has been designed so that the modulator can be added at any time to the basic CW transmitter. The modulator described in this article is capable of putting out about 6 watts of audio which will modulate a transmitter with a DC input of 12 watts to the plate and screen of the output valve. However, the DC input to the final consists of the DC used in the screen as well as the plate circuit. The DC used in the screen can be as high as 20 per cent of that used in the plate circuit.

The modulator can therefore not be expected to modulate a transmitter with more than about 10 watts plate input. The modulator is capable of modulating the carrier to 120 per cent in the positive direction and 85 per cent in the negative direction, which means the transmitter is more effective than some other transmitters of considerably higher power.

The audio quality of the modulator is quite satisfactory and the distortion figures come out at 8 per cent, which is quite acceptable for a piece of equipment in this category. A ceramic microphone is used to maintain the overall speech quality. The frequency response of the modulator has been tailored to be substantially flat from 300 Hz to 3000 Hz and is down by about 6 dB at both of these points relative to 1000 Hz response. The components responsible for the speech frequency shaping are C14, C15, C16, C17, C18, C19, C20, C22, R18, R23, and R24. For example C14 and C15 have opposite effects on the frequency response of the particular stage — C14 with R18 acts as a low pass filter attenuator, whilst C15 with R20 acts as a high pass filter and attenuates frequencies below about 300 Hz. C14 also acts as an RF bypass in the front of the modulator.

Valve stage V2 amplifies the weak signals produced by the microphone by about 300 times and then applies these to the modulator output stage V3. These voltages are built up in this stage to approximately 500 volts peak to peak, enough to fully modulate the RF section of the transmitter. All the DC valve operating parameters were extracted almost entirely from the various valve data books; the signal coupling components are the things which were calculated for this particular amplifier/modulator requirement. The modulation transformer is a push-pull speaker transformer of the cheaper replacement type rated at about 5 watts. Approximately 300 volts DC is placed on the plate of the 6BQ5 modulator valve. When it is driven by the 6AU6 the plate current is made to fluctuate at an audio rate. When the input voltage to the grid of the 6BQ5 is swung in a positive direction, this causes the plate current to increase because the valve has less bias. As this action is occurring at an audio rate the transformer T1 acts as a choke at audio frequencies preventing the valve from drawing much more current than normal, and by so doing the plate voltage drops to a low value — theoretically to zero. However, when the drive from the 6AU6 is in a negative direction, the valve will tend to cut off and T1 again acts as an audio choke but in this case it tries to maintain the current drawn by the 6BQ5 at a constant rate so the voltage at the plate end of the transformer increases to something like 600 volts.

This swing from zero volts to 600 volts at the modulator plate end of the transformer does not in fact occur if the modulator valve is to be operated in Class A1 which it is in this transmitter. The voltage swing is limited to 60 volts DC to 540 volts DC, which works out to a swing of ± 240 volts about the 300 volts DC at the plate of the modulator. If the swing is only 240 volts either side of the resting DC voltage, it is necessary for the transmitter RF section to be supplied only with 240 volts DC HT voltage otherwise 100 per cent modulation will not occur. The DC voltage must be swung between zero and twice supply by the modulator audio output, and this is approximated in this transmitter. To accomplish this it is necessary to drop the HT voltage on the RF output stage to 240-250 volts and R28 does this. The 480 volts peak to peak audio must not be attenuated by R28 so C22 bypasses this resistor to make sure the peak audio is applied to the final RF valve. T1 is a 1 to 1 speaker transformer. The DC currents in T1 are in opposite directions so their magnetising currents largely cancel and T1 does not become magnetically saturated. The secondary winding on T1, the normal speaker winding of 3.5 ohms, is used for monitoring purposes in the companion receiver section.

Some may think that the relay shown in the circuit diagram of the modulator serves no useful purpose — but it does. In conjunction with R27 the relay shorts out the electrolytic capacitors in the modulator and receiver on changeover from transmit to receive and vice-versa. If these capacitors are not shorted out on changeover enough charge will be left in them to cause both transmitter and receiver to operate momentarily together and probably cause some acoustic feedback. The time for C21 to discharge through R27 is of the order of 0.1 milliseconds with a value of 10 uF for C21. The momentary discharge current through the relay contacts and the resistor is of the order of 2.5 amps. Without the resistance the relay contacts could easily weld themselves together, so it is not recommended to delete this seemingly insignificant resistor. It may be that in some cases this anti-acoustic feedback circuit is not required.

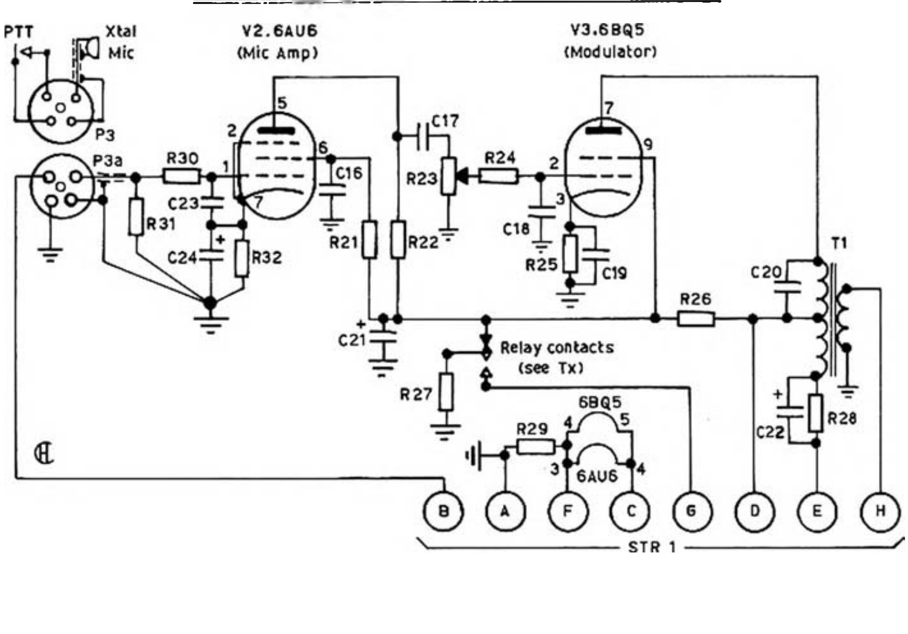
Press-to-talk facilities for the transmitter are extended via the microphone to the plug and socket and then to relay control circuitry which has previously been described. At this juncture it is probably advisable to point out that the terminal strips labelled STR1 in the transmitter and modulator circuit diagrams are meant to mate, i.e. A connects to A, etc.

The voltages which will appear in the modulator are tabulated below:—

Valve	Cathode volts	Screen volts	Plate volts
6AU6	+1.5	+55	+45
6BQ5	+6.8	+250	+300

These voltages are subject to variation due to component variations, supply voltage variations and individual valve variations, but are near enough for practical purposes.

MODULATOR FOR 10 WATT TRANSMITTER.



The next two months should finish the transmitter description, and will include a practical chassis layout, any modifications to the transmitter which may improve its performance, or extend it, and a simple aerial tuning unit which may be useful.

COMPONENT LIST FOR MODULATOR OF THE 10 WATT 80 METRE NOVICE TRANSMITTER

R21 — 1M ohm ½ watt, screen voltage dropping resistor.
R22 — 0.47M ohm ½ watt, plate load resistor, valve output voltage is developed across this resistor.
R23 — 1M ohm potentiometer, gain control for the modulator. A fixed resistor can be used here if R24 connects to C17. This is the grid return resistor.
R24 — 100k ohm ½ watt, grid stopper and part of audio low pass filter.
R25 — 135 ohm 1 watt (2 x 270 ohm ½ watt in parallel) cathode bias resistor.
R26 — 10k ohm 1 watt, HT decoupling and voltage dropping resistor.
R27 — 100 ohm ½ watt, used to discharge receiver or transmitter HT line to earth when particular section switched to stand-by. Value not at all critical, up to 1k ohm satisfactory.
R28 — 1k ohm 3 watt wire wound resistor or 3 x 2.7k ohm 1 watt resistors in parallel. HT voltage dropping resistor for PA valve.
R29 — 39 ohm (2 x 82 ohm 1 watt in parallel or a 6.3 volt 0.15 amp pilot lamp). Used to balance the voltage across the series-parallel valve heater network.
R30 — 100k ohm ½ watt, grid stopper and portion of audio low pass filter. Also acts as a suppressor to RF voltages and currents being impressed on the grid of V2 and so causing audio distortion.
R31 — 2.2m ohm ½ watt, grid return resistor for V2 and load for the high impedance microphone.
R32 — 2.2k ohm ½ watt, cathode bias resistor for V2.
C16 — 0.022 uF 400 volt polyester or similar capacitor. Screen bypass, value helps with the shaping of the modulator audio passband.
C17 — 0.001 uF 400 volt polyester or similar, coupling capacitor from V2 to V3, acts to restrict the low audio frequencies passing through the modulator.
C18 — 390 pF ceramic disc capacitor, used for frequency shaping, restricting the passage of highs through the modulator.
C19 — 5 uF 25VW electrolytic, cathode bypass, used to attenuate the lower frequencies.
C20 — 0.01 uF 400 volt polyester or similar, used to attenuate the higher audio frequencies, can be omitted from the circuit with no problems.
C21 — 4 uF to 24 uF 350VW electrolytic, HT bypass to prevent feedback in the modulator and reduce hum on the modulated signal.
C22 — 4 uF 160VW electrolytic, passes audio around DC dropping resistor R28, improves modulation percentage of the transmitter, also restricts the passage of the lower audio frequencies.
C23 — 390 pF ceramic disc capacitor, used for audio frequency shaping and bypassing of RF induced into the first audio stage from the transmitter.
C24— 1 uF 10VW electrolytic, cathode bypass for V2, aids in attenuating the lower audio frequencies.
J3 — 5 pin miniature socket for the PTT microphone.
P3 — 5 pin miniature plug to suit above.
XM1 — Crystal, ceramic or high impedance dynamic microphone with press-to-talk facility.
V2 — 6AU6 high gain sharp cut-off pentode valve.
V3 — 6BQ5 high gain audio output valve.
T1 — 10k ohm plate to plate replacement push-pull speaker transformer. Exact impedance not over important.
REL — See transmitter details in September issue.

Miscellaneous hook-up wire, tag strips, solder, shielded cable, nuts and bolts, valve sockets, metal for chassis and brackets, labels and paint, also required. ■

20 Years Ago

with Ron Fisher VK3OM

NOVEMBER 1955

'Nation Shall Speak Peace Unto Nation'. The late Don Knock VK2NO suggested that perhaps instead of super power broadcasting stations taking up shortwave space, more frequency space should be handed over to amateurs so that the youth of all nations could do just this.

From the technical point of view, the November issue belonged to Hans Ruckert VK2AOU. Part two of 'A Transmitter With Low Harmonic Output' plus 'Anti TVI Filters for the Amateur Transmitter'. Hans showed how to design and align low pass filters suitable for connection in the output coax line of a typical amateur rig, plus information on the design of AC line filters.

Back in 1955, VHF receivers did not usually include automatic band scanning. However, not to be outdone, Dr. H. A. F. Rofe VK2HE attached an AGC controlled motor to the tuning dial of his receiver. The whole thing was described in an article entitled 'A VHF Automatic Tuner'.

Most amateurs give little thought to lightning protection until it is too late. An article reprinted from QST gave examples of just what should be done to avoid serious trouble.

An interesting account of the formation of a communications net for the marathon events of the forthcoming Olympic Games showed just what could be achieved with two metre gear at the time. I am not sure if the net actually operated during the games or not.

If you follow the Hamads column try a few of these from November 1955. An AR7 complete for $70. Or how about an RAAF scope for $30. No, well perhaps you could be tempted with five 826 tubes at $2 each. ■

IARU NEWS

Word has been received that the Minutes of the Region 3 Hong Kong Conference have been completed and are on the way to us by sea mail. All the more important items are likely to have been dealt with already at the 1975 Federal Convention.

The NZART Golden Jubilee will be marked next year by a Conference in Auckland. The dates are 4th to 7th June, 1976.

If any amateur has plans to visit New Zealand "some time or other, maybe next year", or indeed intends to visit Kiwiland next year anyway, the provisional programme certainly caters for all tastes. A world renowned Scientist will be a guest lecturer, there are social evenings and luncheons, a mobile rally, fox hunt, coach tours around New Zealand before and after the conference, and even a creche for children.

With the recent devaluation of the New Zealand dollar this is certainly a popular holiday area nowadays. When you have a willing band of New Zealand amateurs ready to assist with advice and organisation for a bonus such as this Convention it is difficult to see how anyone could pass up this golden opportunity for a most congenial and economical break from everyday chores.

The oldies are to be catered for as at least 7 of the original founders of NZART are expected to be present. Marion Lister writes that youth will also be catered for as well as VHF. Repeaters will be in operation, she says, so take the hand-held transceiver with you for which a licence is necessary. Take photocopies of your licence and arrange for forms to be completed in advance.

Accommodation etc. will be through Avis Ltd. and it seems that Air New Zealand will also take bookings and arrange group tours.

If you are interested in this once in a lifetime scoop why not get further details by writing to Marion Lister, ZL1BKL, the organising secretary at P.O. Box 23-680, Papatoetoe East, Auckland, New Zealand.

All the above information kindly provided by David Rankin, 9V1RH, Region 3 Secretary. ■

Commercial Kinks

with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley, 3150

This month it's back to the FT200. It seems incredible that modifications keep coming in for this rig. I often wonder where it will finish.

John Adcock VK3ACA has come up with improved CW performance for the FT200.

"I would like to offer some simple methods of improving the usefulness of the FT200 on CW. These modifications may be equally applicable to other transceivers.

The FT200 falls short of my idea of a good CW rig in the following ways.

1. The final was designed for class AB1 operation and therefore is inefficient on CW.

2. There is no netting facility when using a separate CW receiver, and

3. It is impossible to zero beat when transceiving. This is because the transmitted carrier is shifted inside the band pass of the filter on transmit but on receive the beat frequency is not shifted.

Consider the first point. In the CW position the final is operated under 'saturation' conditions and the input to the final is excessively high.

The plate current can be reduced by reducing the loading. Under this condition there is a tendency for the tuning capacitators to flash over. A common modification is to reduce the drive in which case the final will operate correctly in class AB1. This will reduce the plate current but the efficiency is very low.

The method suggested here is to increase the bias on the final. This will reduce the plate current and allow the final to operate in class C at the same time. This can be done by adjusting the bias resistor VR 103. However it is now necessary to readjust the bias resistor each time one returns to SSB. The best solution is a second bias adjustment. This is done by placing an extra resistor VRx in series with the bias line (see Fig. 1). Here a 50k variable carbon pot appears to be satisfactory. When the resistance of VRx is increased the voltage bias to the final will rise.

Ideally this resistor should be switched in with the function switch in the CW position only. Unfortunately I have not discovered a simple method of doing this.

The pot VRx can be mounted at the right hand end (viewed from the back) of the row of pots. By carefully following the wiring it is necessary to run only a few

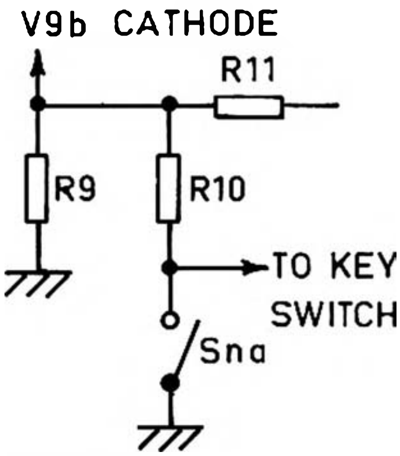


FIG 1b

short lengths of wire to the printed circuit board.

To operate the new facility, when in the transmit CW position with the key down, rotate the new pot until the plate current is at a satisfactory value. 250 mA gives 150 watts input (do not hold the key down too long). When returning to the SSB position rotate the new control to the zero resistance position.

The second and third modifications are now considered. The switch Sn in Fig. 1a and 1b is a netting switch and the switch Ss in Fig. 2 is a shift beat frequency switch. These were mounted to the right (above and below) of the mike gain control at the right hand side of the panel. Time and space do not permit a detailed description of the physical wiring except to say that it is not difficult to place.

The switch Sn was an NKK Sb2061 DPDT press button type. Ss is an NKK SPDT toggle with only one pair of contacts used. The purpose of the net switch is to turn on the transmitter except for the final and thus provide a carrier for netting in an adjacent receiver. Sna will operate the relay system to turn the receiver off and turn the transmitter on. Snb maintains the maximum blocking bias on the final. There should now be ample carrier for netting a second receiver.

The switch Ss will cause the carrier crystal to shift in the receive position as well as the transmit, with the function switch in the CW position only. When tuning in CW, the clarifier can be left off or in the O

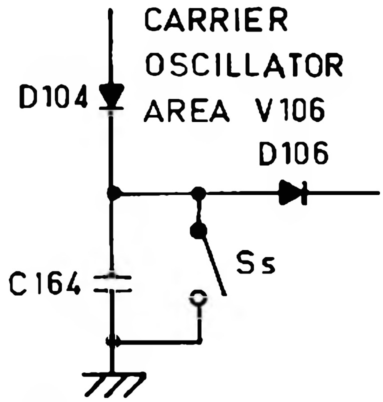


FIG 2

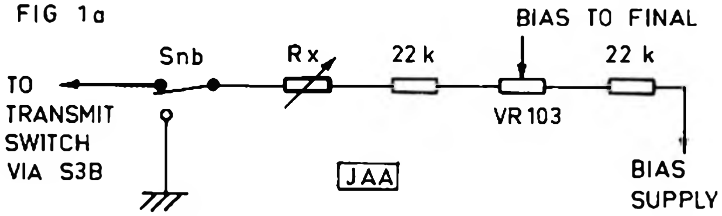
position and the incoming signal set to zero beat. Now the clarifier can be adjusted to the desired pitch. The switch Ss can now be left on or off as desired. The transmitted signal will now be zero beat with the received signal.

Some thoughts in the use of the switch are as follows. Using the switch is the only way you can be sure your transmitted signal is zero beat with the incoming signal. In the on position it does allow the CW to be copied at a lower pitch than is usually possible. This is sometimes an advantage under QRM conditions.

There is some feed-through from the beat oscillator to the AGC detector and this will cause a small shift to the "S" meter and some de-sensitising of the receiver. This may be undesirable on weak signal bands such as 21 and and 28 MHz. Also the switch should not be used when receiving SSB and transmitting CW.

Since all these modifications are independent of each other, any one or all can be tried". ■

FIG 1a



Sn = DPDT PRESS BUTTON CHANGE OVER SWITCH

BOOK REVIEW

GUIDE TO AMATEUR RADIO' by Pat Hawker G3VA

It is my pleasure to review the 16th edition of Guide to Amateur Radio which has just been published by the Radio Society of Great Britain.

The highly readable text is supplemented throughout by extensive use of diagrams, photographs and tables, making the book one of the most compact reference sources on this subject available. Naturally the book is intended for interested people in Great Britain but most of the text is applicable to Australia. The chapter titles are (1) This is Amateur Radio; (2) Getting Started; (3) Communications Receivers; (4) Amateur Transmitters; (5) The Licence Examination; (6) Operating an Amateur Radio Station; (7) Workshop Practice; (8) Amateur Radio Equipment; (9) The RSGB and the Radio Amateur.

The only sections not applicable here are Chapters 5 and 9 and in the latter, WIA can be nearly written in, in place of RSGB. The Licence exam is significantly different here in Australia. Chapter 7 is one of the best I have read on Workshop Practice. All in all I could not do less than recommend it to those who read, and those who should read. **Newcomers Notebook.**

Rodney Champness VK3UG ■

SPECIAL ACTIVITY STATION

ZS4BD writes that the special call sign ZS4OIL will be activated to celebrate the 25th anniversary of South Africa's oil-from-coal plant at Sasolburg.

Contests

with Jim Payne, VK3AZT
Federal Contest Manager,
Box 67, East Melbourne, Vic., 3002

1975 REMEMBRANCE DAY CONTEST RESULTS

	a	b	c	d	e	f
VK5 & 8	218	843	26	1642	63338	18140
VK4	128	781	16	1755	55421	10838
VK7	44	238	18	842	11830	3029
VK1	29	126	23	855	8355	2778
VK2	89	2220	4	1361	30519	2596
VK3	89	2122	4	859	23346	1838
VK6	74	526	14	1265	25838	1629

a—Logs received d—Average top 6 logs
b—Licences e—Total score
c—Logs/Licences % f—Trophy score

DIVISIONAL SECTION LEADERS' SCORES ARE SUBJECT TO FURTHER CHECKS

In the following detailed scores the first figures are the points scores and the second are contacts made.

STATE SCORES

VK1

Phone

VP	627	298	ZAR	182	182	ZBL	62	62
FT	582	280	ACA	182	100	ML	51	51
MF	436	208	ZMV	179	179	GB	36	13
LF	418	183	YR	174	165	ZWP	19	19
AH	275	160	ZJJ	146	146	ANR	18	18
WI	262	206	ZT	114	61	CR	16	14
RH	254	142	ZPH	73	73	PM	11	11
OJ	240	121	ZVT	69	69	JG/P4	38	16

Open

AOP	1338	538	EP	941	476
DA	1208	528	ED	390	201

CW

VK	52	8

VK2

Phone

RG	1568	619	AJL	219	83	ZSG	70	70
XT	1266	473	BMX	213	86	BGS	66	28
AJY	896	348	JP	203	84	BJK	64	23
[illegible]	873	300	BWT	195	66	CF	58	22
[illegible]	770	305	AGM	179	67	AWX	57	57
[illegible]	750	265	RU	174	40	ABC	52	29
ATT	658	248	PT	154	46	RL	52	28
BMT	416	198	AMT	153	57	QC	51	25
RP	400	161	ASJ	142	54	YDO	39	39
OW	375	152	IN	125	35	JF	39	20
OH	351	152	BSG	121	47	AFA	38	10
BDB	328	140	BNR	101	52	BNI	23	7
ASH	312	100	JX	82	36	ADL	19	11
BNS	297	120	ZCT	80	80	AEC	16	7
RJ	291	126	BHD	80	20	LE	12	12
ALZ	285	100	AIB	77	33	AAC	12	12
AIM	282	101	ZVN	76	76	ZVY	9	9
NZ	251	176	ADZ	73	28	YDT/		
UJ	237	104	AAI	72	31	P4	119	119
PN	231	81	FJ	71	31			

Open

BO	1571	469	AFG	567	265	HZ	148	30
DM	1156	419	BLK	484	133	AJQ	146	30
AHM	1082	396	PU	341	104			
CAX	958	296	HQ	201	59			

CW

CX	1392	240	TR	564	110	BET	182	29
GR	1214	219	VM	559	100	ZC	132	30
QL	892	150	BHO	538	110	IV	124	41
BNL	876	155	JY	382	81	AXK	74	10
HW	782	120	KM	306	51	WE	72	17
XQ	656	112	ADR	200	25	BBB	56	10
YB	606	108	II	194	45	AND	30	9

VK3

Phone

HT	975	534	ANP	230	123	NV	76	29
AYF	924	521	ZD	213	106	QZ	75	36
DF	868	492	AIZ	190	78	AYP	71	31
CX	801	411	ZMP	184	185	ZOQ	70	70
OK	781	408	VO	180	82	ALL	67	24
ADW	650	325	YIG	178	178	SX	66	45
RV	599	266	BCH	173	100	AL	60	18
BKW	598	426	EF	155	82	AJP	55	31
AQZ	566	330	AAJ	148	80	ZJS	52	52
AMK	555	272	ZLW	138	138	APV	47	20
LP	514	263	YBZ	136	136	HE	41	26
ARY	512	248	YIE	136	136	RN	36	19
YQ	488	214	ASN	128	71	AJ	31	23
ALK	423	250	YF	125	69	KS	30	10
AXV	416	200	WM	124	56	AGD	28	18
SR	413	206	ZND	116	116	AXU	28	14
QG	364	170	ZBY	115	115	ZVN	18	18
SM	331	151	RF	110	38	AVO	17	17
XF	316	160	BJM	108	108	HZ	17	14
AIE	308	174	WT	105	37	ZZU	15	15
BEK	307	307	ARO	103	49	BCZ	11	7
ABP	240	115	AIS	96	55			

Open

WW	808	412	AKS	387	191	UV	188	111
AYL	740	384	XB	358	125	LV	157	114
GX	717	501	PR	353	131	EZ	57	28
CM	532	135	ARS	259	118	AJA	22	13
AUQ	395	252	VF	227	88	ALS	16	9

CW

KF	554	128	APN	208	62	AMD	114	25
FC	536	152	TX	203	80	NK	72	43
DG	224	98	ARK	146	42	RJ	22	11

VK4

Phone

ZQ	2273	805	FE	356	146	FX	81	28
FH	1493	540	OX	329	114	PU	77	30
YS	1254	446	JG	337	115	HZ	77	27
LB	1117	422	RP	327	87	ZCG	75	75
VV	1073	464	CZ	310	109	NS	71	39
NY	1068	454	HB	306	110	LA	71	17
ZT	1014	350	OB	298	100	RL	68	42
DO	953	356	LW	293	116	ZLD	65	65
MM	950	371	NQ	288	83	EH	65	56
LP	914	320	IJ	281	140	ABR	60	30
PX	908	317	CW	276	103	HD	59	16
EZ	857	309	CY	273	100	ZPG	57	57
LZ	848	303	AQ	252	101	FU	54	28
KW	843	331	IC	238	84	QT	47	23
BR	819	360	GM	234	124	CR	46	18
MW	734	242	ZBV	211	211	ZDC	45	45
OW	731	400	ZGR	196	196	PV	42	16
TE	707	250	ZRF	193	193	SN	33	10
LE	688	227	DK	187	61	PM	28	14
VU	657	302	BG	184	48	MJ	23	12
PJ	643	266	ZSH	168	168	XZ	23	9
AAL	541	177	WIG	166	73	HX	21	15
JP	515	126	VS	143	65	GT	21	11
UU	511	137	UG	113	24	ZTJ	20	20
AAU	504	147	ZJC	105	105	AZ	16	7
ABJ	474	211	DZ	89	37	ZAF	13	13
QO	473	181	ED	87	29	XY	10	10
ZB	471	153	HW	85	25	ZMI	9	9
TK	428	198	XN	85	20	DV	8	8
FN	428	174	ZNI	84	84	XT	6	6
KZ	415	141	ZTD	83	83	BC	5	5
FQ	408	153	ZCL	81	81			

Open

UR	1834	511	LT	1236	293	HJ	411	154
UX	1763	628	AAR	1219	400	UA	394	94
RH	1596	469	CCR	686	306	FJ	290	68
AAT	1373	439	PS	517	176	RF	144	50
HE	1353	344	DI	482	180	II	16	5
YG	1273	405	WL	472	105			

CW

ABA	1574	270	AXJ	332	50	NJ	103	42
KX	1188	190	SO	268	46	CN	68	9
GH	692	129	AAF	248	38	SF	40	12
XA	618	124	PB	238	47	AW	50	8
HH	414	63	PN	200	31			
XJ	356	51	OK	150	31			

VK5

Phone

QX	1732	741	AD	232	169	KF	63	20
BI	1504	555	XU	228	81	BF	61	30
SU	1428	516	XI	227	86	YR	67	67
EN	1297	511	KH	222	75	ZPP	60	60
BW	1239	468	HN	217	110	TU	59	59
DV	1124	513	RI	210	74	NT	58	16
NB	995	588	ZAQ	203	203	PB	57	33
CU	987	430	ZAW	200	200	ZLK	54	54
FT	967	364	CL	200	79	MT	54	31
NZ	936	424	ZPJ	197	197	MG	54	25
ZT	920	427	DK	189	83	WH	54	24
NX	884	409	FQ	179	61	GD	54	20
WV	861	318	SC	177	57	HD	53	17
KK	850	460	ZLH	173	173	ZNN	51	51
FD	793	317	ZAC	167	167	WS	42	17
QV	788	299	OC	166	51	XN	40	10
HI	781	250	IL	163	58	WA	39	15
KR	756	360	FL	159	46	ZPW	36	36
ZZ	752	271	NF	156	53	GY	35	11
SU	724	386	ZQ	153	99	EU	34	29
KG	707	303	OZ	151	58	ZJJ	33	33
WI	668	319	PO	150	68	CA	33	12
LL	658	247	ZGP	150	150	ZBM	31	31
BQ	657	256	ZJP	148	148	ZGZ	30	30
ZK	655	316	MA	145	50	ZMR	30	30
CY	636	255	ZMH	139	139	ZEE	29	29
US	613	212	QP	137	119	DO	29	11
ZB	529	174	TO	130	57	WG	29	10
DI	516	161	ZJB	129	129	PN	28	11
EF	505	179	ZBU	120	120	ZTX	27	27
LN	492	200	ME	120	50	ZSJ	26	26
SS	468	162	TW	120	49	KS	26	17
WR	450	225	VB	116	30	ZKT	24	24
WB	435	265	DF	107	30	PI	22	17
VT	429	189	LC	106	31	SE	21	21
ZDD	378	378	ZLA	105	105	FH	21	7
YW	373	181	OW	104	34	WM	20	11
EJ	371	160	RR	103	37	ZR	18	11
NN	367	143	GX	102	102	OE	18	10
RV	352	134	XV	101	30	YY	16	11
LP	330	123	SD	94	36	GJ	16	7
ZBI	329	329	GO	93	40	QI	16	5
NA	326	174	FA	90	35	ZTT	15	15
MF	323	112	GF	85	29	ZGS	13	13
ZCF	313	313	ZG	83	26	FO	13	9
ZSA	310	310	ZKK	82	82	ZAS	12	12
ZAJ	293	293	GN	80	29	AG	10	10
ST	288	155	ZJA	79	79	JF	10	10
CH	287	102	QH	75	46	ZIG	9	9
KT	280	138	IM	75	30	GZ	8	8
TY	277	120	AC	75	22	ZNJ	8	8
ZVQ	265	265	ZAP	73	73	ZFM	8	8
ZU	257	81	FZ	70	70	ZFJ	7	7
ZWR	255	255	ZIB	68	68	ZJV	6	6
WN	245	100	ZBC	66	66	TQ	6	6
YH	233	100	GL	65	65	ZLO	5	5

Open

RG	1736	640	AX	422	158	LU	123	33
IF	1097	428	FH	408	108	ML	53	28
MM	851	304	LQ	379	139	ZS	98	55
LM	803	301	EM	298	222	JT	96	45
RY	548	172	PX	249	150	OT	55	12
NJ	430	158	HM	236	60	DS	49	15
PK	426	126	AWI	170	131			

CW

NO	1339	244	NM	410	84	FY	140	21
LI	856	155	KJ	400	78	HO	100	26
DL	856	154	FG	287	63	KU	100	22
HP	836	148	MD	286	54	UE	76	12
SW	886	154	RX	212	30	KY	48	10
OR	874	156	XD	196	31	JG	32	7
MY	696	136	FM	194	41	LB	20	7
KL	598	104	QR	176	30			
QQ	582	111	AU	152	27			

VK6

Phone

KG	1762	712	HA	509	340	WL	239	117
KW	1455	581	FP	464	185	DO	230	102
CF	1011	391	CO	421	143	BV	218	101
DA	1003	496	AN	383	226	DY	214	120
AO	788	316	MR	367	210	LV	214	114
VP	613	240	MO	335	101	LG	204	168
ZZ	607	169	DG	334	137	DD	186	100
OR	569	223	EG	269	116	TX	183	63
BD	513	239	EB	246	112	DX	161	110

ST	160	69	PS	95	89	CN	40	40
MF	135	56	HU	88	88	DZ	40	19
MB	127	60	OR	88	88	XX	37	12
AV	108	40	SH	88	88	CD	30	11
ZIW	104	104	ZDA	70	70	WD	18	10
BY	104	75	ZLR	65	65	MM	7	7
ZHJ	103	103	ZJD	63	63	GV	7	7
PL	102	102	KC	58	22			
GL	98	40	RH	58	58			

Open

ED	1233	405	QJ	392	100	EJ	91	23
MA	1112	290	HX	326	75	KB	86	30
FI	1021	344	RU	315	89	HD	28	10
ZE	711	200	HK	297	108	CT	24	5
PN	477	182	RL	250	61			
WA	423	151	TU	203	72			

CW

WT	882	175	HQ	590	122
AQ	834	164	ZO	210	44
RS	756	150	OH	188	35

VK7
Phone

JV	874	359	ZMM	98	98	KS	50	50
TT	637	309	PS	96	82	AI	40	12
MX	599	239	ZMC	88	88	KK	65	34
KH	438	178	ZGJ	87	86	ZAK	32	32
SF	437	209	AW	86	49	DK	25	9
GW	379	102	AX	80	43	ZFR	22	22
DW	368	110	AB	80	34	JD	13	10
AK	187	60	BJ	68	42	CF	12	8
BM	183	100	IL	67	21	ZDF	8	8
JU	168	95	CT	64	23			
JA	161	44	ZWX	51	51			

Open

BC	1393	468	RH	572	309	PF	331	105
CIC	643	175	ZZ	466	100	AL	266	67

CW

RO	876	181	JB	206	50	ZO	66	24
HE	676	141	GV	190	27			
CH	500	70	YL	82	19			

VK8

Phone

FB	1804	699	AS	1648	667	CEG	79	39

Open

ZZ	1033	203

CW

HA	456	78

P29

Phone

WB	1502	392	MJ	1389	358	DM	801	210

Open

EJ	97	26

ZL

Phone

1BKX	990	269	2AUS	1241	323	3ABC	379	103
1AQO	375	136	2GJ	518	141	3BK	134	40
1AGO	313	84	3SZ	843	231			

Open

1ACL	1413	304	3GG	700	156
1GO	1049	156	4IJ	225	58

CW

4BE	976	131

RECEIVING

VK2	G. W. Parish	352	158
VK3	L 30042	644	157
VK4	L 40539	1023	420
	L 40502	575	192
	L 40506	441	162
VK5	R. C. Whitford	1726	682
	L 50805	1276	369
	L 50122	262	122
	N. Dobson	248	77
	R. Warrington	31	31
	L 50096	8	8
VK6	M. Byrne	1543	433
	J. Byrne	757	247
	M. Long	119	119
	L 60213	41	20
VK7	P. J. Hall	1010	430
ZL	2-129	554	141

CHECK LOGS

VK	3ARK
	XZ
	4RU
	5HW
	5JX

REMEMBRANCE DAY CONTEST NOTES

At the time of writing this there are numerous piles of logs stacked on the living room table. North Melbourne has just won the Victorian League Football Premiership, I have completed the move to QTH to Yarra Glen, the foundations for the new house were poured this morning and consequently there should be some time now to allot to the FCM's duties.

The comments which accompanied many of the logs reveal the very wide opinions concerning the essential conditions for a radio contest. Eric VK5LP commented "A truly excellent contest, conducted in a very gentlemanly manner, therefore it is a pleasure to operate".

Stan VK3AYF wrote that the contest gets better every year. VK3WW commented, "Congratulations on the new rules and am sure this will be the best ever for participation and pleasure". Harry VK4KW earned a good score and apologised, "Hope that you can copy this log OK as I am writing this in bed in hospital after an operation".

Murray VK4KX wrote among other interesting matters, "Congrats on the new rules, i.e. Rule 5 (scoring), b, c & d. Although not much help at present, could become very useful later on in sunspot cycle when the higher frequency bands come good". However a VK6 commented, "I was, as usual, looking forward to a busy contest weekend but, on reading the rules decided that the RD was now ridiculous. Simplicity must be the word for any contest if you want participation to increase. I am sure that the casual operator who may decide to have a bit of a go would have been put off by the complexities. If this is the sort of rules we can expect in the future I for one have submitted my last RD entry". A VK4, whose CW is impeccable, commented, "Your rules do not distinguish between the efforts made by those who put in 24 hours on the air, on 5 bands, both phone and CW, and those who merely listen in for ten minutes, so long as they both put in a score. You have created a contest which tries to be everything to everybody and which turns out to be nothing for anyone. Minimum effort by a maximum number does not make an interesting activity. I suggest that the RD contest is not a contest at all but merely an activity. Should its name be changed? You have set out to attract quantity participation, and you have succeeded. More incentive please, or nothing". Sam VK2BVS sent a long and very thought-provoking letter which among many other items suggested two types of calls. Call "CQ Contest" to indicate that you are working to maximise your score and want only short contacts or "CQ Friendly Contest" if you want prolonged contacts. Your comments will be considered, Sam.

Peter, who operates from a country QTH, expressed the views of many country amateurs when he wrote: "I wish to protest about the recent changes in the RD contest as set out in the July issue of AR. I feel that the rule changes are totally discriminating against the country operator to the extent that the chances of a country operator winning a particular section of the contest especially in Vic. or N.S.W. are nigh impossible given approximately even operators. The introduction of the VHF contact rule was moving in this direction especially when you consider the number of VHF operators within the capital city areas, but the doubling up of contacts on the LF bands is just too much"!

Thanks for this most informative letter, Peter. Kerry VK5SU wrote that 20 m was best at his location, "Only one QSO on 15, that being to P29, nil on 10 or above".

VK3AIE (formerly VK8AZ) said he found the contest as much fun in Melbourne as in Darwin. 10 metres did not seem to be open anywhere. He listened quite a few times but nothing heard. Jack VK2CX reveals the real ham spirit in his comments, "I always enjoy any of the Australian contests, and I always take part in any contest just to repay my contribution to any country that takes part in any of our contests". Jack continued that particularly in the CW section of the RD the bands are dead between 2 and 8 a.m., and perhaps a break of 6 hours should be mandatory.

Probably the youngest contestant was Nigel Dobson of Fulham, S.A. who submitted an SWL log. Nigel is 12 years old. Another 15 year old, VK5KK D. Minchin, only had his call for 3 days prior to the RD. Dad had to share his gear while junior scored 850 points! And finally a few words about Victor R. P. Cook, VK5AC, who has been licensed for 63 years. In 1912 he was XVN, and as a foundation member of the WIA he must be among, if not the oldest, of the cat's whisker winders who sent in logs for this contest.

It is now obvious that the RD rules need a thorough review. The scoring takes into consideration the theoretical likelihood of making easy QSOs with the call areas with the most licensed amateurs. The results for many years past show that this does not occur. VK6RS Ron has spelt it out, "I do. think the latest scoring table is very equitable, but biased against us over here. We have always had to give away many more points than we could possibly score, but this time it is much worse. I worked all comers as I should, and made 368 points, or as it was CW exclusively, 736. To gain these points I had to give away 703 or CW 1406. To give a VK2 five points to receive 2 means that for 37 stations worked I received 74 points and gave 185 away".

If you have ideas on the matter how about writing to the Editor of AR. Please do not write to the FCM as in the past some correspondents have complained when their views have been published in our magazine, and consequently suggestions received by the FCM cannot be made widely known. All that is wanted are a few simple rules!

CONTEST CALENDAR

Nov. 8/9	European RTTY Contest
Nov. 9	Czechoslovakian
Nov. 8/9	ARRL CW Sweeptakes
Nov. 22/23	ARRL Phone Sweepstakes
Nov. 29/30	CQ WW DX CW
Dec. 6/7	ARRL 160 metre
Dec. 13/14	ARRL 10 metre

Czechoslovakian Contest
0000 GMT Nov. 9 to 2400 GMT Nov. 9th.
Rules remain unchanged. Phone and CW. World wide contest with Czech stations having additional value. Exchange RS(T) plus 2 figures indicating your ITU zone. One point per QSO, 3 points if with Czech station. Contacts with own country permitted for multiplier credit but have zero QSO point value. Multiply total by sum of ITU zones worked on each band for final score. Mailing deadline Dec. 31st to Central Radio Club, Box 69, 113 27 Praha 1, Czechoslovakia.

CQ WW DX CW
0000 GMT Sat. Nov. 29 to 2400 GMT Sun., 30th Nov.
No changes to rules. Suggest see magazine for details. Logs to reach CQ WW DX Contest, 14 Vanderventer Ave., Port Washington, L1, N.Y., USA, 11050 by Jan. 15, 1976. Essential you show CW on envelope. ■

DX ITEMS

VK2BVS reports there is a 160 m net on 1.825 MHz after the VKZ Sunday morning broadcasts and, also via VK2BPX, that ZL2IG and ZL2ABF transmit on 1.884 MHz and listen for VK stations on 1.825 MHz at 21.45h EAST. Also that YJ8AM was worked on this band as well as VK3QI/VK8. CW is monitored continuously on 27.125 MHz to provide a link-up between operators on 10, 11 and 160 m nets. Several active stations on 28.5 MHz were also reported including HL9TG, VK6MB and a P29.

VHF UHF
an expanding world
with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTT, Mt. Mowbullan*	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.850
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RTX, Devonport	144.900
3D	3D3AA, Suva, Fiji	52.500
ZL1	ZL1VHF, Auckland	145.100
	ZL1VHW, Waikato	145.150
ZL2	ZL2VHP, Mt. Stewart*	52.500
ZL2	ZL2VHF, Wellington	145.200
ZL2	ZL2VHP, Palmerston North	145.250
ZL2	ZL2VHP, Palmerston North*	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

* denotes change.

Some alterations to beacon listings this month. For a start the Mt. Mowbullan beacon is operational again with its new call sign VK4RTT using 20 watts of FM.

In a letter from Selwyn ZL2BJO comes news of the first ZL beacon on 6 metres, ZL2VHP, and I note they have had the very good sense to put it where we might hear it, namely on 52.500 MHz. The beacon runs 10 watts output with horizontal polarisation, keying 800 Hz -ve FSK. The antenna consists of crossed dipoles at 35 feet on Mt. Stewart, which must be somewhere near Palmerston North. Reports are requested from anyone hearing any of the ZL2VHP beacons, of which there are three listed herein, details to Selwyn Cathcort, ZL2BJO, 406 Featherston Street, Palmerston North, New Zealand. Their 70cm beacon has also been given a listing.

Other points of interest in Selwyn's letter concern VHF Field Days as follows: Sunday, 16/11/75: 2200 to 0200 GMT, 6 metres only. Saturday 6/12/75 0400 to 1000 GMT all bands; Sunday 7/12/75 1800 to 2400 GMT all bands.

QUEENSLAND NEWS

Very pleased to receive some news this month on activity in VK4, firstly from Noel Lynch VK4ZNI who is Secretary of the Brisbane VHF Group, who sent notes prepared by their President, Dave Laurie VK4DT, which are as follows:

General: The Brisbane VHF Group has about 50 active members and holds general meetings on the fourth Thursday of each month. All visitors welcome to the Club Rooms in the Oakleigh Scout Grounds off High Street, Dorrington. The Club has active 70 cm and Repeater Committees and runs a very successful fund raising venture.

52 MHz Band: There are about 25 stations active mostly using low to medium power SSB. Activity is mostly limited to Sunday mornings when many stations are on 52.050 and 52:100 MHz. Many stations will be active again this Christmas, particularly when you can hear their "beacon" TV station TVQ0. Many stations also monitor 52.525 MHz FM as a guide to band conditions.

144 MHz Band: About 40 stations are active on the lower end of this band using a mixture of SSB and AM. (VK5 stations might note this amount of activity and take heed . . . 5LP). The main calling frequency is 144.100 MHz and a call there during the evening will result in a QSO. Several stations are capable of working through Oscar 6, several more building equipment.

On the "push-button" frequencies, Channel 40 and 50 are the most popular with activity by about 100 stations spread evenly between them. Two repeaters (Ch. 1 Mt. Tamborine and Ch. 3 Ipswich) are currently in operation, and two others (Ch. 2 Toowoomba and Ch. 4 Mt. Glorious) have licence applications pending.

432 MHz Band: About 12 stations operate using SSB, FM and AM. The Brisbane VHF Group is holding a series of lectures aimed at increasing interest and activity on this band. Another 20 members are commencing construction of a 70 cm converter as a Group project.

The Group's 70 cm Committee is also engaged in the construction of an unattended 70 cm beacon transmitter. The project is about 60% complete, and a licence is soon to be applied for, and the aim of the beacon is principally to aid members to tune up their converters. A lot of interest is being expressed in 70 cm repeaters in S.E. Queensland, and the Group will be active in the bandplanning area.

Conclusion: The Group is encouraging increased activity on these three bands and in the future will be setting its sights on higher bands.

Thanks chaps for your notes of interest. Will be pleased to hear from you again.

Whilst still in Queensland, John VK4UI sends news of some of the work of the Gold Coast Radio Club at Southport. He reports the new mast for the repeater on Mt. Tamborine has been erected, but not yet completed. The new high gain aerial systems have still to be attached, and secured against storm damage. When the VHF repeater is completed, work will commence on a U.H.F. Repeater Project for 432 MHz using the same site and mast. They have been fortunate through the good services of John Willis VK4WN of Willis Communications, Brisbane, in securing a complete transmitter/receiver for the U.H.F. Repeater. Good luck fellas.

REPEATER USER GROUP

While we still seem to be on repeaters, I note with interest the setting up of such a group in VK6 (from the VK6 VHF Group Newsletter) for the maintenance, and financial operation of the repeaters, so anyone who uses repeaters under the control of the Group are considered members, for which a fee of $4.00 p.a. is expected. This seems fair enough, and I note a similar line of thinking is being undertaken in VK5 from notes in the VK5 Journal.

In VK5 there has already been some help with finance from members, plus some who are not members of W.I.A. — for best reasons known only to them — so it only seems logical where considerable running costs are involved that these costs should be shared by all users, not those who contribute as W.I.A. members. Unfortunately this comment won't be read by those mostly to whom it is directed, the non-members, so members should take up the issue with those who subscribe nothing.

Talking of running costs, I see an interesting comment in a letter published in "QRM" from Northern Tasmania, that over in Botswana in Africa where Chris VK7UX happens to be, the power charge is 15c per Kw, with the exchange rate being the same as the $A. It may pay you to take your own alternator if going there.

E.M.E. REPORT

Still no one writes except the Dapto N.S.W. Group, so I can only presume all others scheduling EME are satisfied to the limit or don't have the time to write, which is a pity. However, Dapto reports:

"EME tests scheduled for 9/8/75 with K2UYH, W1SL and VE7BBG, but they could not get on. However, W3CCX called us and was worked for our first contact with them. The second test period for 9/8 was a European CQ period. Called by F9FT and had our first contact with him. PA0SSB also called us but we missed out on a contact due to the moon getting too low. He had a good signal. We were also heard by G3LTF.

"F5SE (2nd op. of F9FT) has since advised the point to point distance between us is 16821 Km which is just 100 Km short of our record with G3LTF. He also provided details of several interesting extra galactic radio sources, some of which are in our window. As they emit a constant signal they can be a useful reference for calibration purposes. F5SE has derived a formula for their use and has asked us to check it on certain sources accessible only in the southern hemisphere. F9FT has a big signal which peaked to 10dB over noise for a short period.

"We have now had 432 MHz contacts with six different stations in four countries (but no VK contacts yet!!). With our higher power output we hope for several more contacts over the next few months as 6 contacts in 5 years effort probably does not seem a lot!

VK5 ACTIVITY

As you guessed, there is not a lot to report, but it is noted that Keith VK5SV has been hearing the Mt. William repeater on Ch. 1 occasionally; not strong on 10/9 0230Z. Tues. 23/9 Keith worked VK5ZWP at Cleve on the West Coast via the Ch. 1 repeater. Also heard VK3VL and VK2YAH who was at Swan Hill . . . Meteor scatter contacts are being made again. Old Wally VK2ZNW (ex-5ZWW) made it to Peter VK5ZPW with good signals on 23/9. Peter is now using a pair of 6146B's and has a potent signal. Good work chaps. A few changes are likely to be made at this QTH (5LP) which then might allow me to send a M/s signal over to Wally, even the Baron of Oyster Bay, Rod VK2BQJ might show interest also!

VK5 CONTEST

A reminder of the VK5 VHF Group Contest over the weekend of 6th and 7th December. The 6 metre band will be open to the Eastern States during that period so some good contacts should ensue. Appears a number of stations and groups are likely to be going out on to their favourite mountains, and it will be as well to remember the ZL's are also going out onto their favourite mountains the same weekend.

Two metres will be available again this year in December so get the gear ready, contacts are being sought in Brisbane and Sydney from VK5. And there does not seem to be any reason why good conditions should not prevail to VK6 on 2 metres in the New Year period. You see!

S.M.I.R.K.

In the June 1975 issue of these notes, I outlined what SMIRK was (Six Metre International Radio Klub) with No. 1 SMIRK being Ray Clark, of San Antonio, Texas, U.S.A. Through the medium of Peter, VK6ZDY, comes some further information from Ray, and the following has been selected as likely to interest those who read these columns. The information has been edited where necessary to make concise reading.

The main information comes as of 29/8/75 which would be towards the end of the Northern Hemisphere Es season, and some very good contacts had been made considering we are down at the bottom of the 11 year cycle. K7TUO and K7GWE worked KH6EQI in Hawaii, and Ray remarks that is the first honest-to-goodness contact to KH6 he knows of in the past few years. The rest have been third and fourth hand reports. VE1, VE2 and VE3 in Canada were worked, also C6A, TG9KJ, KP4, XE1, XE2, T12NA and YV5RA have been heard or worked.

VE1ATN on 50.056 is a beacon station, while F08DR is still active on 6 metres in Tahiti. KZ5WA should be on 50.110, also HP1XDC. On Swan Island HR6SWA should be using SSB on 50.110, and HC8GL also on. Guam has more than one beacon, listen for KG6JDX on 50.105 and KG6APP on 50.150. K2IRT/KG6 runs a beacon on 50.098 and listens on 52.150 or 52.050. (That last bit is interesting to us . . . 5LP).

Across the Pacific in Japan, Ray advises quite a lot of 6 metre activity, though six metre stations have had their power cut back from 50 to 20 watts since June due to the QRM caused by the mass of JA stations in operation. Stations to listen for are: JD1YAA beacon on 50.110. K2IRT/KG6, KG6APP, KG6JDX, HL9WI, HM1GO, HM1FM (on FM), JA0QKM/JD1, HM1EJ, KG6JCM, VS6AI, VS6BE, JE3DGJ/JD1, KG6JFT, KG6JFR and VK4IK/KG6. Bill KX6HK is now in U.S.A. on 6 metres in New England, having left the Marshall Islands. A new station on is HL9VP.

That about covers the best of the information, but it is very interesting. Those of you sufficiently interested will be able to get out your prefix lists and maps and pin-point where some of these stations are located. With so many people now owning FT620's with their capability of tuning effectively down to 50 MHz, it would be a good idea for the keen DX-er to purchase the extra crystals to give the full coverage from 50 to 54 MHz. I have the full range in my FT620 and with the facility of being able to quickly peak the front end of the receiving section, adequate sensitivity is available over the full range. Bear in mind also our antennas will still have some useable gain down to 50 MHz despite being cut for 52 MHz due to the slower taper off in performance of a yagi as the frequency is lowered away from the resonant point. The

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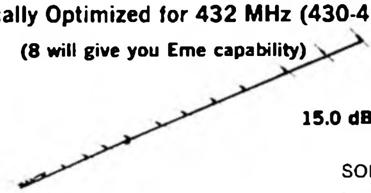

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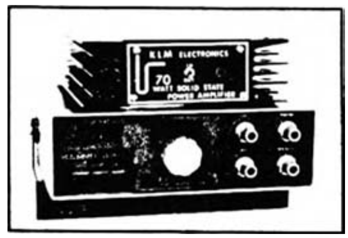

BOOKS OF INTEREST FOR AMATEUR OPERATORS

HANDBOOK OF TRANSISTOR CIRCUITS (Allan Lytel)	**$7.60**
ALL ABOUT CUBICAL QUAD ANTENNAS — 2nd Ed. (William I. Orr)	**$5.65**
FINGERTIP MATH (Edward M. Roberts)	**$2.95**
THE COMPLETE SHORT WAVE LISTENERS' HANDBOOK (Hank Bennett)	**$8.05**
TRANSISTOR EQUIVALENTS (De Muiderkring)	**$5.95**
RCA SOLID STATE — 1975 DATABOOK SERIES —	
SSD-201C Linear Integrated Circuits Selection Guide/Data	**$4.50**
SSD-202C Linear Integrated Circuits Application Notes	**$4.50**
SSD-203C COS/MOS Integrated Circuits	**$4.50**
SSD-204C Power Transistors	**$4.50**
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reverse is true for the W stations whose antennas will lose efficiency faster on coming up to 52 MHz, but then they run more power as a rule.

With the slow rise out of the low part of the cycle from now onwards, and with so much better equipment now in use, every possibility exists for trans-Pacific contacts to take place before too long. And we must remember the Americans are now more interested in working us, and are aware of our 2 MHz difference in frequency, which did not seem to be the case in general during the last sun-spot peak. Also do not overlook the fact that if you have a full call, then be set up to use CW on 52 MHz when that elusive or exclusive DX comes through; get set up now.

Peter VK6ZDY adds a little information himself. He mentions the Perth beacons at Bickley have their antennas mounted at the 130 foot level on the Channel 7 TV mast, the 6 metre beacon running with 23 watts out and the 2 metre 10 watts out.

Peter advises no TEP heard or worked from Perth for 1975 so far, so conditions are really at a low ebb. He will be set up before Christmas for high power 2 metre operation, so maybe the Perth barrier can be broken this year, and take the prizes away from the Albany area.

My thanks go to George VK3HV for the receipt of a very well set out Repeater Directory covering all States 146 and 435 MHz. Information will be drawn from this as required.

Can I get up on my large soap box again with a plea to users of the FM section of the 2 metre band to help us to retain the lower section of 2 metres by becoming operational there as well. I have no objections whatever to FM and/or repeater operation by anyone, but I am afraid for the safety of 144 MHz, especially here in VK5 where the operation is almost nil, but hundreds of stations operate on 3 or 4 FM channels. Or don't you care?

Closing with the thought for the month: "Let us not look back in anger, nor forward in fear, but around in awareness".

The Voice in the Hills. ■

LARA

LADIES AMATEUR RADIO ASSOCIATION NEWS

LARA has been growing steadily over the last few weeks. As well as this, LARA has started to develop various projects which members have suggested. Some of these are for the benefit of amateur radio in general and not just the YLs. Other projects are designed to help YLs just starting off in amateur radio since it is difficult to start from scratch, as many of us are doing.

Events such as YL/OM foxhunts are designed to be family events with everyone participating (as well as being good fun!) The spectacle of YLs standing around bored, or staying at home on field days, might just disappear if these events can continue.

Weekly skeds on 80m are now uniting YLs all over Australia, with occasional visitors also appearing on the nets. We all know how lonely it can feel to be a YL in what is, somewhat overwhelmingly, an OM field. Our first skeds were quite funny with a few 'rookie' operators being 'mike shy' but getting together with other YLs for a chat is a very rewarding experience. We all have to start somewhere and the YL skeds are a friendly atmosphere for getting your feet wet. YLs who don't yet have licences also join in these skeds as guests on OM's calls (with supervision). This allows us some access to the bands and is a great incentive for getting one's own call. More YLs are being seen at WIA and club classes and we will have some brand new YL calls after the 'next exams'.

Possibly as YL amateurs become more numerous the PMG will desist from addressing their communications to 'Dear Sir'!

One LARA project which has been getting off the ground in VK3 is the crystal bank. This is a scheme whereby donated crystals are loaned to amateurs, over a certain period, for a small fee. This should cover running costs and will allow purchase of additional crystals when demand exceeds supply. Some crystals will be offered for sale or exchange from time to time to allow updating of the available range. We will be keeping as large a range of amateur band crystals as possible with any amateur eligible to borrow. When Novice calls are introduced we will be able to help these operators to get on the air with crystal controlled rigs. The establishment of crystal banks in other States would be a move to be considered by clubs and groups as this is a realisation of the amateur spirit of helping the beginner.

For the future, LARA is planning to start a YL award with conditions similar to those of other awards, the difference being that both licensed and unlicensed YLs will be able to enter. On an international level LARA has contacted the ZL YL organisation, WARO, and helpful suggestions from this established group were much appreciated in getting LARA on its feet. ZL operators have been heard on the VK nets and hopefully, some events and skeds will be organised between the two Associations.

LARA in VK3 is planning some local events such as foxhunts and YL events at club and Zone field days. The social side will be organised with meetings to bring the group together and other events in store.

LARA in VK3 can be contacted via the WIA Victorian Division or you can join in the weekly skeds held on Monday nights at 8.00 pm EAST on 3650 kHz (and on Tuesday nights a 2m FM sked for Melbourne YLs starting on Channel 1). ■

MAGAZINE INDEX

with Syd Clark, VK3ASC

BREAK-IN August 1975
A 6 Metre Transverter for the FT101; A Battery Saver for the Wellington Walkie; Making Printed Circuit Boards; Converting the Pye Commando to 80 & 40 Metre Operation; T.R.I.C.O.; Sock It to Me; A High Performance VHF Converter.

RADIO COMMUNICATION July
Bulletin Reflections; Switched Polarization Cubical Quad; A Simple pre-scaler for 145 MHz; Technical Topics deals New Graphic Symbols; Wavechange switching with Diodes; Variable Power Supply; More on Cathode Impedance & Class C; PA0KSB Phased Locked VFO; VFO Stabilized by PAL Delay Line; Single Sideband CW; Building Blocks for the Novice.

September
Subjective Selectivity and Stereocode; 2m SSB Transmitter using the FR400SDX VFO; GB310W a 10 GHz Bracon; TT: Home Office TVI Statistics; Class E High Efficiency Amplifiers; Delay Line Oscillators; The G3ULR PALO; Elastic Aerial Supports; Audible Output from Digital Instruments; Third Method SSB — A Warning; Long Delay Echoes Unheard; A Teleprinter Message Generator; Cumulative Index 1970-4.

MOBILE NEWS July
What shall we do with the Profit; Subscription Renewals; Maurice Margolis Award; TRIO TR2200 Transceiver Reviewed.

RADIO ZS June
Lightning Research; First Steps (50 years afterwards); Go and Take that Test.

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PROJECT AUSTRALIS

With DAVID HULL VK3ZDH

APOLOGY
Due to an unfortunate delivery problem the notes for October AR never made it. Our apologies to all those who rely on the orbit predictions.

OSCAR 6 BIRTHDAY
The 15th of October marked the third birthday for the first of the two present operational satellites, Oscar 6. The fact that the satellite was designed for a life of 12 months speaks well for the care devoted to its design and construction. Something should be said also for the persistence of the ground command stations since this satellite requires orbit by orbit attention.

PHASE III FREQUENCIES CHOSEN
Advice has been received from Dr. Karl Meinzer of AMSAT-DL regarding the final choice of the uplink — downlink bands for Oscar 8. It may be remembered that during the March satellite conference in Washington the author put forward the view that VK would prefer 2 metre uplink and 70 cm downlink as being the reverse of Oscar 7. This was very much a personal appreciation of what was suitable for VK, there being no time to refer this back to the WIA. Subsequent correspondence to me on this question backed my stand I am glad to say.

It has now been decided to fly a primary repeater using these frequencies (2 m up to 70 cm down) and if time permits a second repeater of reverse frequencies will also be flown, to be time shared as usage dictates. Australis' regards these decisions as being most suitable for the next satellite and is happy that the question has been resolved to the benefit of all concerned.

NOVEMBER PREDICTIONS

OSCAR 6
("On" Days Only)

Date	Orbit No.	Time Z	Long °W
1	13917	01.29	73
2	13927	00.28	58
3	13942	01.23	72
6	13979	00.18	55
8	14004	00.13	54
9	14017	01.08	68
10	14029	00.08	53
13	14067	00.58	65
15	14092	00.53	64
16	14105	01.47	78
17	14117	00.47	62
20	14155	01.37	75
22	14180	01.32	74
23	14192	00.32	59
24	14205	01.27	73
27	14242	00.22	56
29	14267	00.17	55
30	14280	01.11	69

OSCAR 7

Date	Orbit No.	Mode	Time Z	Long °W
1	4389	A	00.34	58
2	4414	B	01.28	72
3	4414	A	00.28	56
4	4427	B	01.22	70
5	4439	A	00.21	55
6	4452	B	01.16	68
7	4464	A	00.15	53
8	4477	B	01.09	67
9	4489	A	00.08	52
10	4502	B	01.03	65
11	4514	A	00.02	50
12	4527	B	00.58	64
13	4540	A	01.50	77
14	4552	B	00.50	62
15	4565	A	01.44	76
16	4577	B	00.44	60
17	4590	A	01.38	74
18	4602	B	00.37	59
19	4615	A	01.32	72
20	4627	B	00.31	57
21	4640	A	01.25	71
22	4652	B	00.24	55
23	4665	A	01.19	69
24	4677	B	00.18	54
25	4690	A	01.12	67
26	4702	B	00.12	52
27	4715	A	01.06	66
28	4727	B	00.05	51
29	4740	A	00.59	64
30	4753	B	01.54	78

DECEMBER PREDICTIONS

1	14292	00.11	54
4	14330	01.01	66
6	14355	00.56	65
7	14368	01.51	78
8	14380	00.51	63
11	14418	01.41	76
13	14443	01.36	75
14	14455	00.36	60
15	14468	01.30	73
18	14505	00.25	57
20	14530	00.20	56
21	14543	01.15	70
22	14555	00.15	54
25	14593	01.05	67
27	14618	01.00	68
28	14630	00.00	51
29	14643	00.55	65

1	4765	A	00.53	63
2	4778	B	01.48	76
3	4790	A	00.47	61
4	4803	B	01.41	75
5	4815	A	00.41	60
6	4828	B	01.35	73
7	4840	A	00.34	58
8	4853	B	01.29	72
9	4865	A	00.28	56
10	4878	B	01.22	70
11	4890	A	00.22	55
12	4903	B	01.16	68
13	4915	A	00.15	53
14	4928	B	01.09	67
15	4940	A	00.09	51
16	4953	B	01.03	65
17	4965	A	00.02	50
18	4978	B	00.57	64
19	4991	A	01.51	77
20	5003	B	00.50	62
21	5016	A	01.45	76
22	5028	B	00.44	60
23	5041	A	01.38	74
24	5053	B	00.38	59
25	5066	A	01.32	72
26	5078	B	00.31	57
27	5091	A	01.25	71
28	5103	B	00.25	56
29	5116	A	01.19	69
30	5128	B	00.18	54
31	5141	A	01.13	68

Please Note: Oscar 7 should stay on mode A through Jan. 1 in order to resume odd day mode A even day mode B during 1976. ■

LIONS INTERNATIONAL
VK4CW has sent a photocopy of a letter from Lions International advising he obtained first place internationally in the 1975 Hunting Lions in the Air Contest whilst VK5ZX secured 4th position. This contest he says is held annually over the 2nd weekend in January using the top 25 kHz of most bands.

YRCS

with Bob Guthberlet

31 Bandon Terrace, Marino, S.A., 5049.

The story is told of a preacher who was asked to conduct a service in a small church set amidst the scrub in the Adelaide hills. Arriving several minutes before the appointed hour he decided to make an inspection of the property. The outside appearance suggested a poverty stricken congregation, but inside the furnishings indicated that the people valued their place of worship. In the porch he noticed a small table covered with a green balze cloth and on it a small wooden box with the word "Donations" printed on the lid. As a friendly gesture he opened the box and placed a two shilling piece therein. With the arrival of the congregation the service commenced and at the conclusion, an elderly steward approached the preacher, and after thanking him, requested that he accept a donation to help defray travelling expenses, pointing out that they kept a small box in the porch for such purpose. Somewhat non-plussed the visitor kept silent. In the porch the box was duly opened; "Sorry, Sir", said the steward, "there's only two shillings here, but it may help a little".

Arriving back home the preacher told his family of the incident and how he received the money he had put into the box, whereupon his young son said, "Dad, don't you think if you had put more in you would have got more out?"

Far be it for me to moralise on this story — I leave it to your imagination, but if your club, or as a State Supervisor your YRCS affairs are not ticking as they should, perhaps you should ask yourself the pertinent question: "Don't you think if you had put more in . . . . etc. etc".

Received a letter from VK6 a few days ago informing me that Norm Hyde has resigned from the position of State Supervisor. Thanks, Norm, for your help to YRCS. Now for a few excerpts from that letter which does not auger well for the future of the Scheme in the West. Quote, "The Hamilton Hill S.H.S. Club had the Science Master changed so the ham in charge of YRC was denied access to the Club transceiver which is part of the Science room facilities". Unquote. Here's the next one: "Another S.H.S. Club has a FT101B but it is not allowed to put up any aerial. It has to be put up by the Public Works Department who are not interested". Unquote. The final quote: "Each High School is under the jurisdiction of its Head Master and each one has different ideas". Unquote.

One can only hope that those responsible for this Gilbertian situation know what they are doing to youth. On many previous occasions I have appealed to State WIA Divisions to get right behind YRCS but with limited response. Why is it that State WIA Councils will not foster the very means whereby they could increase local membership. May I suggest to all State WIA Presidents that they include, at least once a quarter the following question on their agenda: "What more can we do to promote the cause of YRCS in this State?"

And, I would like a few angry replies from those who are really interested in the welfare of young persons. Maybe, too many amateurs are filling the ether with nonsensical jabble as they twiddle the knobs on the little black boxes, and showing little or no concern for the generation which hasn't any encouragement to follow them, but probably will, despite the lack of support.

Awards Column

with BRIAN AUSTIN VK5CA

P O Box 7A, Crafers, SA 5152

WORKED ALL SM 2 (WASM 2) AWARD

The award is available to licensed amateurs. Contacts after 1-1-1953 are valid. QSL cards must be submitted with the application along with a check list showing full details of the contacts. The award is available for all CW, all phone and mixed modes. The fee for the award is 7 IRCs. The address for applications is:

K. O. Friden,
P1, 325 Olivstrand,
260 90 Bastad,
Sweden.

Stations require confirmed contacts with each of the 25 laens (countries):

A	Stockholm-Stad	SM0
B	Stockholm lan	SM0
C	Uppsala	SM5
D	Sodermanland	SM5
E	Ostergotland	SM5
F	Jonkoping	SM7
G	Kronberg	SM7
H	Kalmar	SM5, SM7
I	Gotland	SM1
K	Blekinge	SM7
L	Kristianstad	SM7
M	Malmohus	SM7
N	Halland	SM6
O	Goteborg och Bohus	SM6
P	Alvsborg	SM6
R	Skaraborg	SM6
S	Varmland	SM4
T	Orebro	SM4
U	Vastmanland	SM5
W	Kopparberg	SM4
X	Gavleborg	SM3
Y	Vasternorrland	SM3
Z	Jamtland	SM3
AC	Vasterbotten	SM2
BD	Norrbotten	SM2

1976 SUMMER OLYMPICS AWARD

A certificate to honor the 1976 Summer Olympics will be awarded to licensed amateurs who comply with the following requirements:

Amateurs must work 5 Montreal Island station

Contacts must be made between 1-8-1975 and 31-7-1976, any mode.

Send $1 or 5 IRCs and a copy of your log containing date, time, station worked and operator, mode, frequency, received signal report, sent signal report. No QSLs required.

Send applications to:

Secretary, Westminster Amateur Radio School,
Box 323,
Montreal Int'l Airport, A.M.F.
P.Q. Canada.

WORKED ALL ZS

The award is available to licensed amateurs.

Contacts on and after 1-1-1958 are valid. Claims which must be sent by registered post, must be accompanied by proof in the form of QSL cards or letters and sent to the sponsor.

Endorsements are given for all CW or all phone if the QSL cards etc. clearly indicate the mode used. The fee for the award is 50 cents (South African currency). The award is, however, issued free to members of SARL. The address for applications is:

Awards Manager,
South African Radio League,
Postbox 3911,
Cape Town,
Rep. of South Africa.

Requirements: 100 QSL cards or other proof are required as follows:

ZS1	16
ZS2	10
ZS3	3
ZS4	10
ZS5	16
ZS6	45

IONOSPHERIC PREDICTIONS

WITH LEN POYNTER VK3ZGP

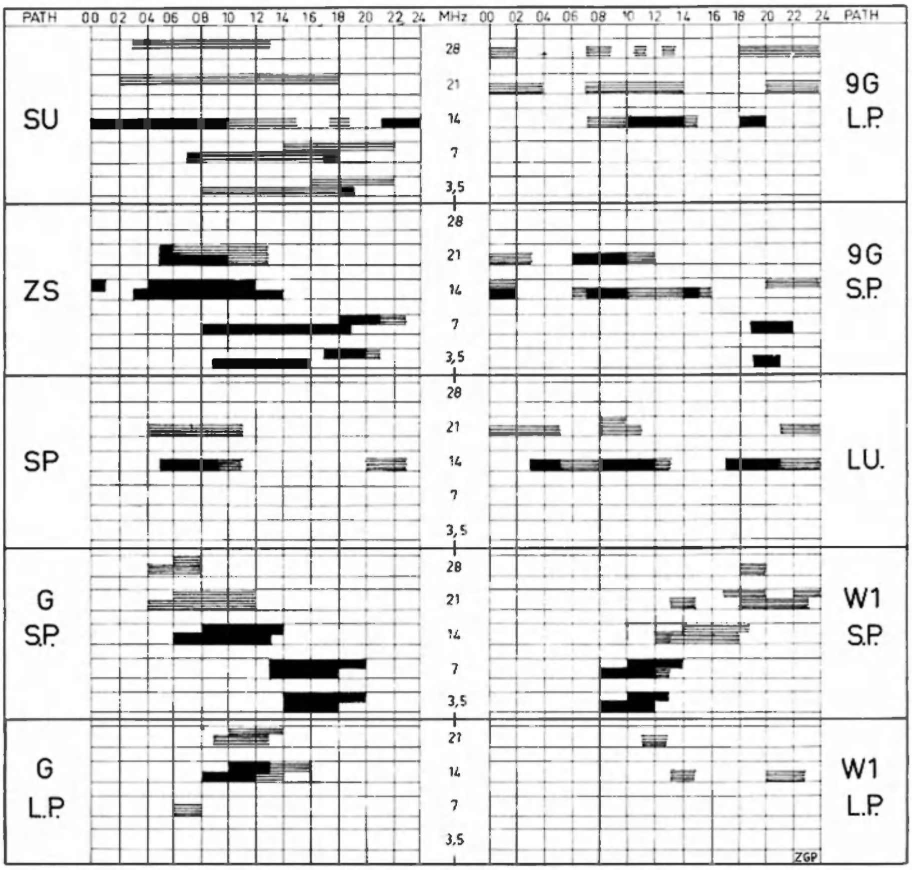
All times are UTC. Predictions courtesy of Ionospheric Prediction Service, Sydney. Sunspot Information: Dr. Waldmeier, Swiss Federal Observatory, Zurich. Geomagnetic Planetary Indices· Institut fur Geophysik, Gottingen, Germany. K indices Local: Toolangi Geomagnetic Observatory, Melbourne.

I trust that last month's effort will not have been in vain; somehow I was out in proportion and caused much confusion. This month I have tried a form of bar chart. Each block indicates paths eastwards and westwards. The top portion is based on Perth, the lower portion based on Canberra.

To read: The black portions are based on predictions for time of year, etc., when the path would normaly be open. The striped portions indicate openings that could occur with abnormally good conditions.

In retrospect, July, August, September has shown a slight upward trend in sunspot activity with a distinct peak during the first week in August, and is now settling down again to normal in the latter part of September. Solar activity in the terms of Solar Flux has lifted since the April, May, June low. Geomagnetic disturbances have noticeably less activity, averaging two per month but only of moderate activity and lasting three or four days.

If you are following WWV K index at +14 mins, it has been noted that a period of good conditions exists just prior to a rise in the K index. So the qualification 'tending to rise' will indicate a period of unsettled conditions to follow. During August and September some good openings occurred on 1.8 and 3.5 MHz, 7 MHz has improved, whilst 14 MHz has produced some fine openings across all paths within the predicted times. 21 MHz has shown some promise, but not quite across to Africa yet. 28 MHz has been very patchy with just a few



North-South openings of short duration observed.

Smoothed Sunspot Number (R6) for February 75 was 22.2. The August mean was relatively high at 39.3 (July 28.3, June 11.4). The predictions for smoothed numbers to February 76 have risen slightly, no doubt as a result of the July, August highs. They now run (July 75) Sept 15, Oct 13, Nov 12, Dec 10, Jan 9, Feb 8.

Looking back to Frank Hines VK2QL summaries of monthly means sometime back, a low of 3.4 in April 54 and 9.7 in Oct 64, then looking at June 75 at 11.4, we could almost be bold enough to say we are at the bottom six months. March/April 76 still looks a reasonable target for the crystal-ball gazers. Here's hoping.

Hope you are still trying correlation of the indices. Should anyone require copies of July, August indices, or any month onwards, a SASE with a 9 x 4 envelope will provide you with a copy. QTH is okay in any call book since 61. ■

Afterthoughts

ADDITIONS TO RULES FOR VK5 FIELD DAY

Additional rule No. 1:
Contacts via Oscar Satellite may contact each station every pass.

Additional rule No. 2:
Cross bands points multiply by points of highest band used.

Additional rule No. 3:
Mark logs stations either multi-operator or single operation for purpose of scoring.

Hamads

- **Eight lines free to all WIA members. $9 per 3 cm for non-members.**
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.
- The current WIA Callbook is the 1975 edition.

FOR SALE

Mobile HF Ant. Mounting Base, CW heavy duty spring and integral 50 ohm ½" coax (approx. 10 ft.). New — still in carton (Belling Lee). $20 or offer. Phone Ron VK3CN (056) 55 1929. 26 Radovick St., Korumburra, 3950.

Collins 75S1 Receiver, fitted with Waters rejection tuning, mint condition, $350. VK4VK 6 Tosti St., Sorrento, 4217. Ph. (075) 38 4164.

Drake Complete Station, R4B Rx, T4XB Tx, MS4 speaker, all as new, $695. VK3OM, QTHR. Ph. (03) 560 9215.

Frontier 1200GT Transceiver, $150. SR550 Star Rx (amateur bands only), $95. VHF Pye Overland (not converted), $20. VK2ALK. Ph. (02) 528 7967.

6M-SSB-Heath SB110A SSB/CW transceiver with HP23 AC PSU and port. beam, 180W PEP Tx — 0.1 uV Rx sens., $330. Heath HP 13A 12V DC/DC PSU, $35. 2M Poly-Comm 144-148 AM/CW tuneable transceiver with inbuilt Rx VFO and Tx VFO or ext. xtal, squelch, noise blanker, AC/DC PSU inbuilt. Copies FM FB excellent for mobile or base, $135. All units in mint cond. with manuals and cables. VK3BGW, L. Kubis, QTHR. Ph. (03) 232 6528 A.H. or (03) 699 2011 bus.

Pye Base Station PTCA703, 3/20 final 53.032 MHz and PTCA116 Mk III mobile unit. Both in going condition. $34 ONO. VK3YFB, QTHR. Ph. (03) 758 1738.

Comm. Rx TCA R5223. 14 tubes, 29 bands, xtal locked dual conversion, hi stability, new, never in service. Sell 80 or trade VHF gear. A. L. MacFarlane, Lardner Rd., Warragul, 3820.

Carphone STC 131, solid state except 2 valves in Tx — 25W — fitted with chan. 1, 4, 40 & 50, $75. VK2AVQ, QTHR. Ph. (02) 88 2359.

1 kVA Powamac, 3 hp B & S, $160. VK3VK, QTHR. Ph. AH (054) 23 7213.

Swan 400, excellent condition, external power supply, spare set tubes, microphone, manual, $325 ONO. Noel Hill VK1NH, 50 Hicks St., Red Hill, Canberra. Ph. (062) 95 0992 pm only; (062) 41 1000 bus. hours.

Hallicrafters SR150 Transceiver, 80-10m, works well all bands, new PA tubes, complete with home brew PSU, $300 ONO. VK3ZU, QTHR. Ph. AH (03) 560 5136.

FTDX 400 SSB Transceiver, 80-10m, in excellent working condition and appearance. Complete with SP400 matching speaker unit, handbook and spare valves, $400. VK5GV, QTHR. Ph. (08) 262 5152.

Hallicrafters HT32A, xtal filter Tx, 80-10m, 100W PEP, SSB, CW, AM, very good condition, with manual, $165. **Hallicrafters SX101A Rx,** 80-10m, 30.5 MHz, converter channel, SSB, AM, CW, variable selectivity, very good condition, with manual, $200. Both units and "Slidup" auto trans., $360 ONO. VK3HZ, QTHR. Ph. (03) 56 5088.

Advance type D1D VHF sig. gen., 10-300 MHz fund sine, SQ. CW, calib., xtal, VM accurate calib. dial and atten. cables and term. Weight 38 lbs., mint cond., $260. VK2ZRD, QTHR, but post code 2082. Ph. (02) 456 1577.

Yaesu FT200 and FP200 PSU. Offers wanted for these and sundry components. All must be sold on behalf of the estate of the late R. N. Buzacott VK3AUB. VK3VF, QTHR. Ph. (03) 723 3554.

12V to 240V 50 Hz .5A Converter, 125 VA regulated and protected. Fully solid state DC Electronics Model 100. Can be slaved to other units, $60. VK5TT 3 Ilford Street, Vale Park. Ph. (08) 262 5313, ext. 2387, bus. hours.

Fibreglass Guy Line, 5000 lbs tensile, 60 cents per metre, also 7/18 galv. strand, two tons. VK4WR, 6 Olive Court, Nambour, 4560.

FT501, just 8 weeks old, complete with matching power supply, digital readout, etc. Immac. cond., must sell, $500 ONO. M. Hardy, VK2AAM, Newcastle. Ph. 20321 bus. hours.

40 ft Oregon Mast, 4 x 4 at base, tapers towards top. Any offers, VK2DT, 2 Patya Close, Epping, 2121. Ph. (02) 868 1131 — delivery can be arranged.

Collins R391/URR Receiver, .5-32 MHz in 32 bands. See AR articles, $400. **Hewlett Packard 524B** freq. meter, 0-100 MHz, 8 digit readout, $120, good cond. with manuals. J. G. MacIver, VK4JE, QTHR. Ph. (072) 80 4020.

Communication Rx type R5223, covers 1.5 MHz to 30.5 MHz in 29 switched bands. BFO noise limiter, inbuilt PSU for 230/110 or 24V DC, inbuilt speaker, with all leads, headphones and complete service manual, tested overall on all ranges 2 uV for 10 dB S/N. Unit is similar to the 51J series of receivers, $200. C. Cook VK3ZBD/T. Ph. (03) 89 2117 (AH).

TCA1676 Hi-Band TXCR, unconverted, $25 ONO. **Power Transformer,** 500V CT to 3000V CT at 100-500 mA, cheap. Large numbers Rx and Tx tubes, cheap. Parts and CROs for SSTV, all types of meters. W. H. Ross VK3UT, QTHR. (055) 69 5220.

Barlow-Wadley XCR30, Rx 500 kHz - 30 MHz, $200. **Yaesu Musen FV101,** VFO, $90. **Swan 140 Transceiver,** converted to 80-40-20 TOPAZ 12V supply, HB AC supply, heli whips, etc., $200. VK3PZ, QTHR. Ph. (03) 288 1047.

Collins 30L-1 Linear Amplifier, in immaculate condition, with manual, $400. Ian McCosker VK4PF, P.O. Box 274, Surfers Paradise, Qld. 4217. Ph. (075) 38 5487.

SELL Handbook for CE type SC6B single channel VHF R/T equipment, $10.00 plus postage. **WANTED** Handbook of service instructions for sweep generator AN/TRM3 and manual for Micovac VTVM type CT54. VK4ZTJ. Ph. (072) 88 6343.

SR550 Hamband Rx, $70.00. R. Davies, Box 909, Orange, 2800. Ph. (063) 6082 bus. hours. or (063) 6072 AH.

Multi-7 two metre transceiver, complete in original carton, fitted with Repeater channels 1, 2, 3 & 4, Contra Repeater channels 1, 2, 3 & 4, plus simplex channels 37, 40, 43, 50 and 51. Exchange for FT75 outfit. Cash adjustment. VK4UX, QTHR.

Heathkit Oscilloscope Model 0-12-U, response to 6 MHz. New BWD CR tube and Mu-Metal shield fitted, good order, price $90 ONO. Heath-Kit Electronic Switch to suit above, response to 100 kHz, good order, price $30 ONO. Ric Hill VK3RC, QTHR. Mia Mia Road, Broadford. Ph. Broadford 359 (STD 057842211 to exchange).

Silent Keys

It is with deep regret that we record the passing of—

R. N. BUZACOTT VK3AUB

New UR67 Coax Cable, 50 yard roll, $25, plus freight. Max VK4DA, QTHR. Ph. (074) 63 3524.

QSTs, professionally bound, light blue with gold lettering in sets of six, Jan-June 1968 to Jan-June 1975, i.e. 15 in all. Roth Jones, 1 Albert Rd., Melbourne, 3004.

WANTED

May 75 issue of RSGB Radio Communication. My copy lost in mail. Write Ron VK3CN, 26 Radovick St., Korumburra, 3950.

FTV-650 or similar 6 metre transverter. VK4VK, 6 Tosti St., Sorrento, 4217. Ph. (075) 38 4164.

Antique Amateur Radio Gear, pre-1935, prefer in restorable condition, your price paid. VK3OM, QTHR. Ph. (03) 560 9215.

Control Unit for Low-Band AWA MR10A. VK3ZTA, QTHR. Ph. (03) 560 1157 AH.

Xtals for Novice to Be. 10500 KC, 17500 KC, 245 KC. Also 80m fundamentals, 3.525 to 3.575 MHz Wes L60236, 118 Huntriss Rd., Doubleview, 6018. Ph. (092) 46 3008.

Roller Inductor (approx 28 uH), suitable ARRL Transmatch. Also require transmitting type variable capacitors (a) two gang, 200 pF per section; (b) single gang 350 pF, willing pay any reasonable prices. VK3LJ, QTHR.

Help — poor student trying to get on 160m. Needs QB3/300 or QY3/125. Sam VK2BVS, VK2BGV, QTHR. Ph. (02) 407 1066.

Mast, tilt-over and/or crank-up. Also rotator and 20 metre beam or tri-bander. Mal Sinclair VK2BMS, QTHR. Ph. (02) 407 0261 bus. hours or (02) 95 2362 AH.

20, 40 and 80 metre coils for AR7 Communications Receiver, push-in type coils, approx. 11 inches long, 2 inches wide. Write to P.O. Box 85, Umina Beach N.S.W.

SWAN

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Would the Holders of the following Swan Amateur Radio Equipment or any persons knowing of such Equipment please contact the advertiser at their earliest convenience. This Notice is in the best interest of all persons concerned.

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NOVEMBER, 1975
VOL. 43, No. 11

amateur radio

SPECIAL – 65th ANNIVERSARY ISSUE

VOL. 43, No. 12 DECEMBER, 1975

CONTENTS

COVER PHOTO

Amateur radio has come a long way since the WIA was founded in 1910. We now have news broadcasts on TV. Tom VK7TM and Brian VK7RR check the program before the first TV news broadcast. See story on p.5.

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

amateur radio

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The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying any reason.

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COUNTING OUR BLESSINGS

Despite inflation and a whole host of problems the Institute is very much a going concern.

We are proud in having one of the best amateur radio journals in the world.

Our membership is on the increase. Not as much as we would like but nevertheless it is increasing.

At the Federal level there has been intense activity during the year. Several benefits have been secured for amateur radio in Australia as a whole and more are under negotiation.

Your watchdogs are keen and active. The many volunteers managing your affairs at the various levels are by and large deep thinking, hard working, and blessed with much common sense and sound judgement based upon a wide knowledge of amateur affairs.

Sure, there is scope for improvement. This can only happen if members, or groups of members, communicate their problems. If any cause is right, and if enough members keep pushing for it, something good will eventuate. Your administrators of amateur radio cannot work in a vacuum. They need to know about problems. Despite a very high volume of trivia and routine matters which cannot be ignored, there is an amazing number of important items which get extensive consideration and for which positive action is initiated. There is a very real grading of priorities, a very real feeling of facing facts.

There is ample scope for the views of minorities to be discussed. In all organisations there are people who single-mindedly exert immense pressures to have their own (frequently parochial) views adopted for one reason or another. This Institute is no exception. As often as not these people spoil their own cases by over-emphasis and extremes of pressure. Sometimes their efforts prove harmful to the public image of amateur radio particularly if the media becomes involved.

Fortunately the backbone of amateur radio is based on good sense and tolerance.

Fortunately we can count our blessings in possessing great stores of these commodities. Even if they do remain silent or apparently silent.

We need all the backing we can get for the years ahead — especially WARC 1979. Happily there is now a great awareness in amateur ranks of what WARC 1979 could do to us. Happily we are not alone in the world. We support the IARU and it supports us.

Count your blessings that amateur radio world-wide is alert to the dangers ahead. We do not intend amateur radio to fizzle out as a spent force. Preparations to join battle are progressing well. With the full support of every amateur we can emerge triumphant into the closing decades of this century.

A Very Merry Christmas and Prosperous New Year to you all.

D. A. WARDLAW VK3ADW, Federal President ■

EXECUTIVE OFFICE

The Executive Office will not be open between Christmas Day and 19th January 1976. Mail business as usual, however.

SUBSCRIPTIONS

Some members are asking why should they have to send their subscription payments to the Executive Office in Melbourne. "Why can't we pay our Division?" they ask. The answer is quite simple — centralised accounting to save money. Our EDP system calculates the subscriptions payable and prints out the notices ready for enveloping and posting. It also takes care of address changes and the printing of the AR address labels each month so that all the address changes go through into all the systems including subscription notices at the specified date. The EDP also automatically does a number of other things including a call book listing, listings by post codes as well as the accounting area. Details of all payments received go into the computer on the subscription notices which you return with your payment so that firstly you will continue to receive AR and will not have your address label suppressed because of being unfinancial, and secondly your computer records will be ready for the following years subscription listing. As a result of all this the Divisions no longer have to calculate, write out, despatch and record subscription details because the Executive office is geared to handle all this on a bulk basis. If temptation proves too great and you happen to pay into your Division this only introduces complications, possible delays, double handling and extra accounting and other work for which the Division might find it difficult to cope. The centralised system is working pretty well so please comply with the instructions printed on the subscription notice and **PLEASE REMEMBER** that this year because of the increased postal charges your subscription notice could well be endorsed **"FIRST AND FINAL NOTICE".** It will therefore be better to pay early and avoid the disappointment of being automatically removed from the listings because of being unfinancial. And finally a reminder that if you need a receipt please ask for one and send a SASE with your request. Always make sure you cross all cheques etc. because in past years a few have gone astray in the mail. If you do not receive April AR this is usually an indicator of something having gone wrong. ■

DARWIN APPEAL

As stated on p.3 of AR for Aug. '75 the Darwin Appeal has now closed. The donation of $600 shown as from the Geelong Hamfest Society in fact derived from a social function excellently supported by the amateurs in the area and further afield.

The total amount collected amounts to $1084.38. The previous total as published was augmented by the following donations:—

VK2AKY	$10.00
VK2 Division	$100.00
VK3AT	$10.00

The question of the disposal of this Fund has been under active discussions and investigation. A result of which, the Executive, on the advice of the

WIANEWS

At the time of writing it is known that everything is ready for the Novice Licensing Exam due to be held on the third Tuesday in November. Whether or not the examination can in fact be held is unknown since no news has come to hand that the industrial dispute has been settled.

Criticisms have been levelled at the Institute that the tenure of the Novice Licence to two years was a deep dark plot laid by those in charge of Institute affairs. It appears to be alleged that this fact was hidden from the membership.

Readers are requested to turn to page 7 of AR for May 1973 as a starting point. The penultimate paragraph in the letter reproduced on that page is self-explanatory. This letter arose out of negotiations with the PMG's Department conducted by the Executive following the mandate given at the 1972 Federal Convention.

The 1972 Federal Convention crystalised thinking in relation to Novice Licensing, a subject which had been under discussion since the 1950's and which had finally led to the commissioning of an investigation into the matter late in 1970 and early in 1971. The investigation was carried out by a committee under the chairmanship of Mr. Rex Black, VK2YA and a lengthy Report containing this committee's deliberations and recommendations had been submitted a few days prior to the 1971 Federal Convention — so late that the Convention considered such an important matter could not receive that amount of close study and informed discussion that it rightly deserved — hence the delayed decision.

It is interesting to observe that the Novice Licensing Investigation Committee's Report specifically stated "That Novice Licences should be issued on the basis of LIMITED TENURE". The commentary on this recommendation read:—

"It is suggested that applicants for Novice Licences should be permitted to hold the original licence for one year with provision for renewal for a limited period only, except in exceptional cases in which special reasons for further renewal would be subject to consideration by the Licensing authority; the principle of the Novice Licence concept is based on its being an introductory form of transmitting permit, another avenue of entry into the Amateur Service, another means whereby enthusiasts may proceed to AOCP status. The Novice Licence should NOT be regarded as an end in itself but merely the first step towards qualified amateur operator level. This principle follows the American pattern and is strongly supported by the opinion survey conducted by this Committee. In America the tenure period is two years. Formerly it was 12 months only, but the increased period was introduced in 1968. Under the original one-year tenure period it was found that 50 to 60 per cent of Novices proceeded to General Class, which equates to the Australian AOCP. No figures are yet available to show the effects of the two year tenure period".

Although all systems are go there are still no Novice licences in existence with their 3 letter "N" calls.

Equally, nothing has come forward from any of the Divisions of the Institute to discuss any alterations to the Novice Licensing arrangements let alone proposing any amendments to the conditions.

It is interesting to observe that discussions are proceeding at the present time to formulate a 'gentleman's agreement' on band sharing as exists for the HF bands as separating phone and CW segments of the bands. Since Novices would be able to use telephony as well as telegraphy and since a part of each segment in two out of the three HF bands allowed to Novices is within the CW portions of those bands it is obvious that band sharing arrangements are necessary to avoid chaos both for the Novices and other users as well. A decision on this must emanate from the Federal Council but it would not ordinarily be necessary for this to lie dormant until the next Federal Convention in May 1976.

During October the Federal President held discussions with the Secretary to the PMG's Department together with Mr. H. Young Assistant Secretary of the Radio Frequency Management Branch of the Department.

High on the list of items discussed was the Institute's request for proper representation in all areas affecting the amateur service leading up to, and at, WARC 1979. It was understood that Australia is beginning to swing into action for this important conference and strong submissions for the amateur service to be involved were noted by the officials. Many will remember that after enormous efforts the late Mr. John Moyle was officially appointed as an amateur observer with accreditation as a member of the official Australian delegation to WARC 1959 at Geneva.

Other matters brought up by the Federal President included representation on any frequency management or planning committee, an active interest in any impending legislation affecting the amateur service, arrangements for future call books, examinations in considerable depth in relation to all the various problems which arise, Intruder Watch follow up, reduced licence fees for pensioners and disabled persons, and delays in obtaining replies on amateur matters.

Immediate answers to all these matters cannot be expected. However, these are things of prime importance and no lack of follow-up action will occur. ■

W.I.A. South Australian Divisional Council propose to inform the Darwin Amateur Radio Club that the monies collected for the Darwin Appeal Fund will be made available for the establishment of the most suitable radio installation for the Club subject to proper accounting for the monies expended.

1976 SUBSCRIPTION RATES

At the time of writing (late Oct.) all the rates are not yet known. Here is a list of those that are known:—

Div.		$
VK1	One rate	20.00
VK2	Full member	$20.00
	Associates	$18.00
	Pensioners	$10.00
	Students	$10.00
	Family members	$10.00
VK3	Full members	22.00
	Associates	19.50
	Students	13.00
	Pensioners	13.00
VK4	Full city	20.00
	Full country	18.50
	Assoc. city	20.00
	Assoc. country	18.50
	Pensioners	13.00
	Student grade discontinued	
VK5	Full central	20.50
	Full country	19.00
	Assoc. central	19.00
	Assoc. country	19.00
	Students	9.00
	Pensioners	9.00
	Jr. student	2.00
VK6	Full	20.00
	Associate	19.00
	Pensioners	12.00
	Students	12.00
VK7	Full	17.00
	Associates	17.00
	Students	10.00
	Pensioners	10.00

Joining fees

VK2		$2.00
VK7		1.00
	Federal dues for 1976	14.50

(AR 7.20, IARU 0.30, other 7.00)
(The full dues are levied against all full and Associate members)

1ST JOTA CONFERENCE

The Report of the first Jambouree-on-the-air Conference was held in Lillehammer, Norway as part of the 14th World Jambouree on 1/8/1975. About 60 delegates from 22 countries attended the formal sessions under the joint chairmanship of Les Mitchell, G3BHK and Len Jarrett, HB9AMS. In his historical review G3BHK said JOTA began in 1958 although many earlier ties between the two interests had occurred going back to 1912. Radio Scouting, he said, grew out of JOTA and several Scout Associations had incorporated radio into Scout activities including fox hunting and kit building. One of the problems was that few, if any, JOTA stations were heard from the developing countries yet these countries were the very ones clamouring for more and more commercial frequency space. As they usually had no national amateur radio organisation they fully supported any international move to reduce the bandwidths available to amateurs. Amongst other items the Conference felt the need for a Scout Radio Handbook containing material about radio scouting not available elsewhere.

PR WORK

"Awareness — specifically, the public's awareness of amateur radio — will play a large part in the future of amateur radio. In today's world of political realities, a concerted effort is needed to aggressively boost the image of amateur radio in the public's eye". Opening remarks of editorial, August '75 QST.

MULTI-CHOICE EXAMS

Aug. '75 QST contains information that the Canadian Dept. of Communications have introduced new multiple choice type examinations for prospective Canadian amateur and advanced amateur radio class operators.

PROVOCATION OF THE MONTH

Nobody under 30 reads AR. ■

THE FIRST WIA SUNDAY BROADCAST ON ATV

A BLOW BY BLOW DESCRIPTION

Tom Moffat, VK7TM
7 Shannuk Dr., West Hobart, 7000

On Sunday morning, October 5, 1975, the VK7 Wireless Institute Southern Branch transmitted what is believed to be the first ever divisional broadcast on Amateur Television. Here's how it came about:

May, 1975:
The idea germinates. Over the past several months Tom VK7TM had built up an ATV transmitter. It worked very nicely, but there was one problem — nobody to work on ATV in Hobart. Winston VK7EM, had been on ATV from the Northwest Coast, along with Tony VK7AX; and a few others had ATV transmitters under construction. But they are not within UHF range of Hobart, and several mountain ranges separate us.

In an effort to stir up some ATV activity in Southern Tasmania, the WIA Disposals group, under Andrew VK7AW, put up about 20 ATV converter kits and started selling them around Hobart. We were soon at the stage of having 20 receiving stations but still only one transmitting station. So the idea was born: why not start transmitting the weekly WIA broadcast on ATV, in the hope of encouraging more general activity on ATV?

The Tasmanian Division, WIA, duly dispatched a letter to the PMG Radio Branch, asking that the UHF TV channel be added to the list of WIA broadcast frequencies.

Response was not immediate. Apparently no one had proposed running a Sunday broadcast on ATV before, in any part of Australia. We were going to be first, so we kept quiet about it, and waited.

Sept. 11, 1975:
We are told approval for the ATV broadcast is granted. This is an unexpected surprise. In Tasmania the Sunday broadcast origination point rotates around the state on a three week cycle — one week Hobart, the next Launceston, the next Devonport or Ulverston, and then back to Hobart. Hobart's next turn is Sept. 14, only three days away. We will never make that — VK7TM's TV transmitter is in 10 pieces after some unsuccessful modifications. It is decided to set the target date for three weeks further on — October 5.

Sept. 29:
The ATV transmitter is now back together and working nicely, but we have discovered another problem. As well as broadcasting on ATV, we have to provide a service on 80 metres to parts of the state out of range of our UHF ATV. But 80 metre SSB coming from the same shack as ATV works its way up the camera cable and modulates the ATV transmitter. It is right in the middle of the video passband. So the 80 metre transmission has to come from somewhere else.

Andrew VK7AW, was in on the planning of this broadcast from the start. He was going to be the original announcer. But a few days ago his wife Judy presented him with a baby boy, their first.

So we had decided to keep out of Andrew's hair, and leave him to his nappy changing. But now he is needed, badly. He has a good 80 metre SSB transmitter and an ATV converter. We plan to broadcast from VK7TM on ATV only, get Andrew to pick it up off air, patch the speaker of his TV set to the audio input of the SSB rig, and re-transmit the audio.

This sounds like an easy thing to do, but in this case it will not work. There is a big hill between the VK7TM and VK7AW QTH's, and our 15 watts of ATV just won't penetrate it. Andrew gave his converter a good tweak and crawled all over the roof of his house trying different aerial positions. But all he got was a very snowy picture and noisy sound, not fit for re-broadcast. The path just was not there.

Sept. 30:
Brian VK7RR, has volunteered to be the 'newsreader' in place of Andrew. Tonight we are going to try a dry run. First we have to set up some big TV studio lights that mysteriously turned up during the week. Then we set Brian in the 'hot seat' and hit him with a couple of thousand watts of light. As he sits and roasts under the lights we juggle the light positions, his seating position, and camera angles to try to get a professional effect. Satisfied, we shut the whole lot down and retire to Tom's lounge room for coffee, and to discuss how we are going to achieve that 80 metre re-broadcast now that the test with VK7AW has failed.

Oct. 1:
The night of the W.I.A. Branch meeting at the Prince of Wales Hotel, Hobart. Still nobody to do the 80 metre re-broadcast. Sitting at the other end of our table is Peter VK7PS, with his hand wrapped around a glass of beer. Now there is a possibility — he has got an ATV converter and can transmit 80 metre SSB. We put the hard word on him and he agrees to give it a try. So we set up a test later in the week to check the ATV path.

Oct. 3:
Peter lives on Mt. Nelson, and has a near line-of-sight path to VK7TM. He receives the ATV picture and sound virtually noise free. His 80 metre SSB is good and clean and doesn't interfere with the ATV reception. Peter says he will arrange a TV to

SSB audio patch, to try out the next day. We shut down for the night.

Oct. 4:
Peter has constructed a TV set to SSB rig patch, complete with level adjustment and equalisation. He hooks it up, we give a test call on ATV, and he re-broadcasts on 80. We receive it off 80 and record it on a casette. On playback it sounds tremendous. Peter has done a good job, and one more worry is over. Then Peter announces he may have to work on Sunday morning and may not be able to get home to operate his equipment. Panic again.

Oct. 5, 0800 AM:
The Big Day. Turn all VK7TM equipment on for a final test. No smoke, everything looks OK. Pace up and down for a while, have another cup of coffee.

0830 AM:
Brian VK7RR, is supposed to be here, but he is not. Call him on two metres Channel B. No answer, but Mike VK7FB, comes up. He will do the Hobart relay on Channel B and 52.525. We ask him to advise listeners that we will begin transmitting ATV test pattern at 0900 for final converter tweaking.

0845 AM:
Call Peter VK7PS, our 80 metre relay. He doesn't answer, so he must be working. This means our 80 metre relay, the link with the rest of the VK7WI network, has fallen through. It looks like we will have to scrub the ATV for the week and originate on 80 ourselves, voice only.

0850:
"VK7PS listening Channel B". He is on the way home, taking an early 'lunch break'. We have got our 80 metre relay back again. Another crisis over.

0855:
VK7AX calls on 80 with some last minute news from the North. We ask him to hang on for a few minutes, Brian is on the way and will take it himself, since he is the one who will be reading it.

0857:
VK7RR arrives. He climbs over all the camera and audio cables to the 80 metre rig to talk to Tony. Just as he is getting seated his foot catches the mic cable, pulling the whole ATV transmitter off the bench. It is left dangling by its power cable. Disaster again. But not quite — a quick check-out proves it is still working O.K.

0900:
Brian calls Tony on 80 metres. At the same time we hit the switch putting the ATV test pattern on air. A loud buzz comes from the 80 metre rig — the ATV is overloading it. We kill the ATV again and ask VK7FB to announce that the test pattern will be slightly delayed.

0905:
Brian and Tony are finished, so we fire up the test pattern. Brian moves into the 'hot seat' and once again we check lighting. There is a bit of flare coming off Brian's forehead, so his wife Sue moves in with some make-up. She smears his face with cream, followed by brown facial powder. Brian's not too happy about this, until we remind him that it is common practice in every TV studio.

0915:
The make-up is finished, and Brian is going over his notes. Tom is going over the transmitter yet again, and finds the linear is getting hot. He arranges a tangi heater set to 'cool' to direct its air flow on the linear's heatsink and all is well. Test pattern looks good coming off air.

0920:
Peter VK7PS, advises all his gear is running and asks for a sound test. We plug in the microphone, get Brian to count, and Peter patches it through to 80. Mike, VK7FB, takes the cue and patches 80 through to the VHF network. This results in great squeals of feedback from the VHF rigs in the 'studio'. We are lucky we tested it before VK7WI 'officially' went to air. Anyhow, everything works.

0927:
Checklist — Lights on, vision on, transmitter on, blower on, sound off, VHF rig speakers off, all kids, dogs, etc. out of shack. Everybody ready? Yes!

09:29; 45:
Fade test pattern to black. Tell Brian to stand by. Sue removes the test pattern and stand while Tom wheels the camera back into position for the opening shot. Turn sound on.

0930:
Fade up picture and cue Brian. Picture is out of focus and Brian looks a bit startled. But Australia's first W.I.A. broadcast on TV is underway.

0935:
Brian's initial nervousness is gone, the camera is back in focus, and everything looks good. We forgot to start the audio casette recorder on the 80 metre receiver. Missed the first five minutes. But now it is running.

Brian has got through the opening remarks and a few meeting announcements, and launches into a report on the history of WIA broadcasts in VK7. We did not know he was going to do this. It is a bit of a surprise but it sounds tremendous and certainly fits the occasion. And he is not even looking at his notes. He has memorised the whole thing and delivers it looking straight into the camera.

0940:
Brian's going so well we must do something to make the production match the content. So we try a few tracking shots — wheeling the camera closer and further from him to give a variety of aspects. But the floor is uneven and each time the camera is moved it looks like our 'studio' is hit by an earthquake. As well the wheels squeak.

0945:
Time for a few photographs. Tom grabs the film camera and shoots off a whole roll of film, of the whole set-up, from all angles.

0959:
Brian is finishing up. Perhaps we will try one more spectacular camera shot. As Brian closes, Tom pulls the camera back to get a wide shot of the whole studio. But the camera rolls over his foot causing another 'earthquake'. The camera ends up pointing at the ceiling, so there's nothing left to do but fade out and be done with it.

1000:
Cut the main power switch to the transmitter, and breathe a sigh of relief. Now to take the callback on 80 metres and see what they thought of us.

The Result:
The callback indicates we had about four TV viewers, which is better than nothing. We had more than the usual number of listeners to the re-broadcast on 80 metres and VHF. Most commented on Brian's ability to produce something different (the historical report) and wanted to hear more of the same.

The Future:
Now that we are over the initial hurdle, we hope to produce most broadcasts originating in Hobart on ATV. This might not be possible, since a lot more people are involved in a TV broadcast than in a voice-only version. Hopefully the Oct. 5 effort will cause a few more people to get their converters going, increasing our viewing audience considerably. Although we had expected no opposition from the 'professional' TV stations, they must have heard what we were up to, because for the first time this year a commercial TV station was on at 0930 in the morning, carrying the Bathurst 1000 motor race. They probably got a few more viewers, because they've got colour, and we haven't. (Yet).

The Equipment:
Camera: Ikigami vidicon camera type VR621.
Microphone: Electrovoice studio type.
Lighting: Mole-Richardson variable spot-flood.
Transmitter: 10 mW exciter, sound and vision, solid state, similar to one described in VHF Communications, Feb. and May, 1973.
Linear: Four stage, solid state, 15 watts average power output.
Aerial: Discone (AR April, 1973).
Frequencies:
Vision carrier 426.25 MHz.
Sound carrier 431.75 MHz. ■

Afterthoughts

A simplified method of morse code generation . . . October, page 20.

(i) Q3 is *not* a BC107 as was labelled in the schematic but is a 2N4249, which is a P.N.P., and should be connected with collector to the key terminal, and emitter to +5.

This will only handle a key-open voltage of 60 volts, which is ample for the transmitter it was used on (FLDX400). If a transmitter with a higher key-open voltage is keyed, a higher voltage transistor is necessary, or a shunting resistor must be used to reduce the open-key voltage.

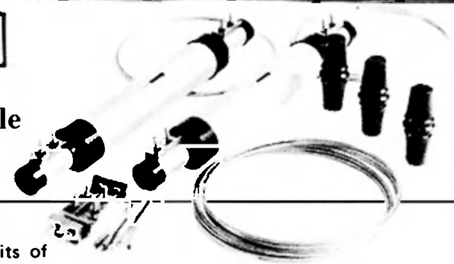
(ii) The type of U2 is not mentioned — for the circuit shown, the extendable hex inverter Fairchild 9935 was used. The other manufacturers have equivalents.

The use of a DTL device among TTL's is a bit odd, but there is no functional equivalent in TTL. ■

RAIC ANTENNA BY VICOM

Now appears in a completely new style

LOADED DIPOLE



AL-48DXN and AL-24DXN

Equipped with the new traps that combine the merits of linear loading and colinear loading.

Wire and wire locks ... 52S type
Hardware (screws, nuts, washers) ... stainless steel

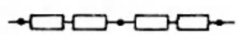
New Deluxe series, designed for easy installation rather than for additional shortening.
Almost no need of adjustment for any band. May be mounted in non-standard configuration.

Midy-V N

Model	Description	Impedance	Freq.	Power	VSWR	Overall Length	Net Weight
AL-48DXN	New Deluxe type, Duoband Loaded Dipole	52 ohm	3.5, 7MHz	2KW PEP 1KW CW	Less than 1.2/±80KHz	28m	1.2Kg
AL-24DXN		52 ohm	7, 14MHz	do	do	14m	900g
AL-15DXN		52 ohm	21, 28MHz	do	do	6m	870g
Midy-II N	New Deluxe type, Multi-band Loaded Dipole	52 ohm	3.5, 7, 14MHz	1.5KW PEP 750W CW	Less than 1.3/±50Hz	23m	1.4Kg
Midy-III N		52 ohm	7 ~ 28MHz	2KW PEP 1KW CW	do	14m	1.4Kg
Midy-V N		52 ohm	3.5 ~ 28MHz	1.5KW PEP 750W CW	do	23m	2.2Kg

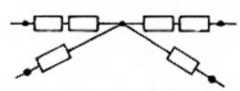
ANTENNA STYLES NEW DELUX TYPE

AL-15DXN
AL-48DXN, AL-24DXN



Midy-II N

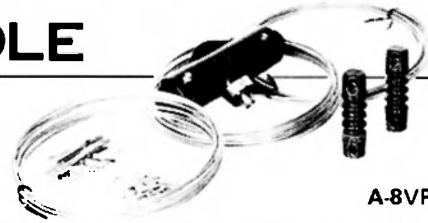
Midy-III N



Midy-V N

CENTER-LOADED DIPOLE

By the use of center loading coils the length of the antenna is shortened to 55% at 3.5MHz and to 60% at 7MHz. Being center loaded, it suffers less influence of adjacent metalic objects than other types of antennas.



A-8VPN

Model	Description	Impedance	Freq.	Power	VSWR	Overall Length	Net Weight
A-4VPN	Center-loaded Dipole	52 ohm	7MHz	600W PEP 300W CW	Less than 1.2/±38KHz	12m	570g
A-8VPN		52 ohm	3.5MHz	do	do	22m	800g

COAXIAL SWITCHES

Model	Description	Impedance	Freq.	Power	VSWR	Dimensions	Net Weight
CX-2A(A)	Coaxial Switch	52 ohm	Up to 300MHz	500W PEP 250W CW	Less than 1.3/170MHz	80x60x40mm	250g
CX-2A(B)		75 ohm	do	do	do		
CX-6A(A)		52 ohm	Up to 500MHz	1.5KW PEP	Less than 1.3/400MHz	(round) 85x70mm	
CX-6A(B)		[redacted]	do	do	do		

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DON'T LET ITS SMALL SIZE FOOL YOU. The Atlas transceiver is packed full of the most advanced, state of the art engineering, and provides unequaled performance in both transmit and receive modes. There is no other transceiver on the market with as many outstanding superior features, regardless of size.

SEVEN POUNDS OF DYNAMITE!

NEW ATLAS 210x/215x SPECIFICATIONS

GENERAL: Frequency Coverage with Internal VFO: 1800-2000 kHz. (Model 215x only), 3500-4000 kHz. 7000-7500 kHz. 14,000-14,500 kHz. 21,000-21,500 kHz. 28,400-29,400 kHz. (Model 210x only). Note that the 10 meter band may be easily owner adjusted to cover any 1000 kHz segment.

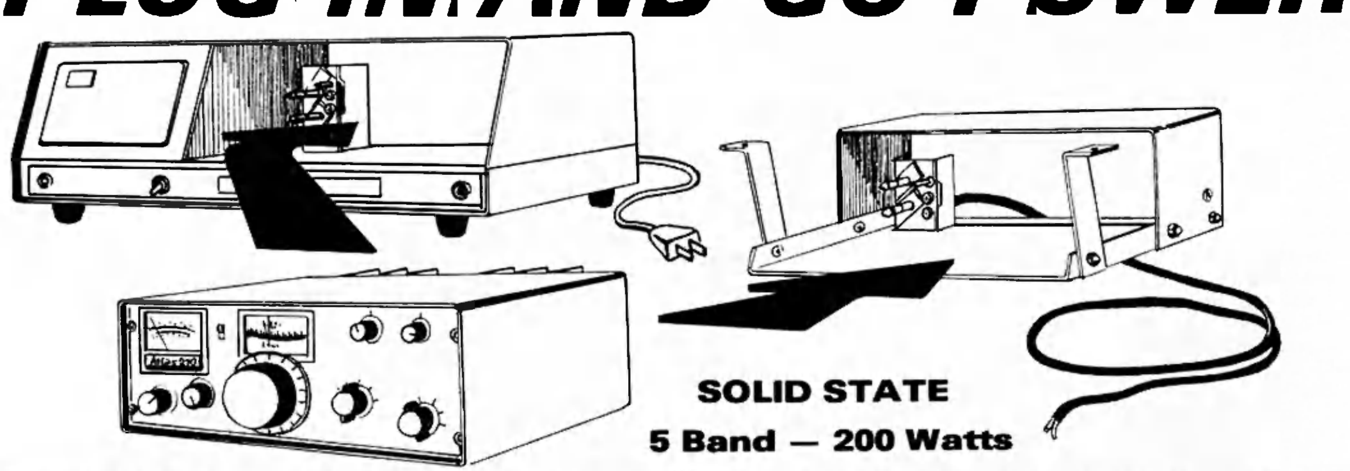
Frequency Control: Highly stable VFO common to both receive and transmit modes. Tuning dial calibrated in 5 kHz increments with 1 kHz increments on skirt of tuning knob, except on 10 meters where increments are 10 kHz and 2 kHz, respectively. Tuning rate is 22 kHz per revolution. **Frequency Stability:** Less than 1 kHz drift during first 30 min. (2kHz max. on 10 meters). Less than 300 Hz per hour after 30 min. Less than 100 Hz shift from 11 to 14 volts supply. **External Frequency Control:** Rear socket provides for plug-in of external VFO or crystal oscillator for separate control of transmit and receive frequencies, or for network and MARS operation. **Frequency Coverage with Crystal Oscillator:** (1800-3000 kHz, model 215x only), 3300-4600 kHz, 6900-8000 kHz, 13,800-14,900 kHz, 20,600-21,600 kHz. 27,500-30,000 kHz. (Model 210x only). **Completely Solid State:** Includes 4 I.C.'s, 18 transistors, 32 diodes. **Modes of Operation:** SSB with selectable sideband, and CW. Normal sideband position is LSB on 160, 80, and 40 meters, USB on 20, 15, and 10 meters. Automatic off-set frequency on CW transmit. **Modular Construction:** Plug-in PC boards for R.F., I.F., and audio circuits. **Plug-in Design:** Rear connectors are designed so transceiver plugs into Mobile Mounting Bracket, or AC Console. Connectors are standard: SO-239 coax. antenna jack, 1/4 in. diam. 3 circ. jacks for Mic. and external speaker or headphones, 1/4 in. diam. 2 circ. jack for CW key, 9 pin Noval sockets for Ext. Osc. and Aux. Linear control. **Power Supply Requirements:** 12-14 volts D.C., negative ground only. Terminal P1 is high current circuit for power amplifier, 16 amps. peak in transmit mode. Terminal P2 is low current circuit for receiver and low level stages, draws 300 to 600 ma. in rec. and trans. modes. **Finish:** Vinyl covered aluminum cabinet, black. Anodized aluminum panel. **Dimensions:** 9½ in. (24.1 cm) wide, 3½ in. (8.9 cm) high, 9½ in. (24.1 cm) deep. **Weight:** 6 lbs. 14 oz. (3.1 kg) net. 8 lbs. 6 oz. (3.8 kg) shipping.

MODEL 210x or 215x With Noise Blanker $695

RECEIVER SPECIFICATIONS: **Circuit Design:** Direct conversion of signal to 5520 KHz I.F. using double balanced diode ring mixer, providing exceptional immunity to overload and cross modulation. **Sensitivity:** Requires less than 0.4 microvolts for 10 db signal-plus-noise to noise ratio, 160 through 15 meters. Less than 0.6 microvolts on 10 meters. **Selectivity:** Crystal ladder 8 pole filter. Bandwidth: 2700 Hz at 6 db down, 4300 Hz at 60 db, and only 9200 Hz at 120 db. Ultimate rejection greater than 130 db. 1.6 shape factor. **Image Rejection:** Better than 60 db. **Internal Spurious:** Less than equivalent 2 microvolt signal. **AGC:** Audio output constant within 4 db with signal variation from 5 microvolts to more than 3 volts. **Overall Gain:** Less than 1 microvolt for 0.5 watts audio output. (CW carrier, 1000 Hz heterodyne.) **Audio Output:** 2 watts at 10% distortion, 300 to 3000 Hertz, plus or minus 3 db. **Internal Speaker:** 3 in., 4 ohm, .68 oz. magnet. Rear jack permits plug-in of external speaker or low impedance headphones. AC console automatically disconnects internal speaker and connects front facing speaker. Plug-in Mobile Mount provides for automatic connection of external speaker if desired. **Meter:** Reads "S" units from 1 to 9, plus 10 to 50 db. **Calibrator:** Provides calibration markers at 100 KHz increments on tuning dial. **Dial Set:** Permits adjustment of dial scale calibration.

TRANSMITTER SPECIFICATIONS: **Circuit Design:** Broadband design eliminates transmitter tuning. Single conversion produces minimum spurious mixing products. 2 section low-pass filters on each hand provide excellent harmonic and TVI suppression. ALC with panel adjustment. Infinite SWR protection. **Frequency Control:** Internal VFO automatically transmits exactly on receive frequency. Rear socket provides for plug-in of external VFO or crystal oscillator accessory, (Model 10-X), for separate control of transmit and receive frequencies, or for network and MARS operation. **Power Rating:** 200 watts P.E.P. input, and CW input, (50 ohm nonreactive load, and 13.6 DC supply voltage) 160 through 15 meters. 120 watts on 10 meters. **Power Output:** 80 watts minimum P.E.P., and CW on 160 through 15 meters. 50 watts min. on 10 meters. **Note:** Ratings are at 13.6 DC volts to transceiver at full load. **RTTY/SSTV Power Rating:** Approx. 90 watts input, depending on heat sink ventilation. Small fan recommended. **Unwanted Sideband:** More than 60 db down at 1000 Hz audio input. **Carrier Suppression:** More than 50 db down. **Third Order Distortion:** Approx. 30 db below peak power. **Harmonic Output:** More than 35 db below peak power. **CW Transmit:** Manual send-receive. Semi-break-in with CW accessory installed in AC console. Automatic off-set transmit freq. **Transmit Control:** Press-to-talk with Mic. button, or manual transmit with panel switch. Automatic voice control when VOX is installed in AC console. **Microphone:** Dynamic or Crystal, high impedance. Requires 1/4 in. diam. 3 circ. phone plug. **Audio Fidelity:** 300 to 3000 Hz, plus or minus 3 db. **Meter:** Reads P.A. collector current, 0-16 amps. **Linear Amplifier Control:** Aux. socket on rear provides for keying of linear.

PLUG-IN-AND-GO-POWER



SOLID STATE

5 Band — 200 Watts

uniden 2020 PLL DIGITAL SSB TRANSCEIVER

* Phase Locked Loop circuitary for optimum stability
* Separate USB/LSB/CW 8-pole crystal filters as standard and no frequency change required when going from USB to LSB
* Maximum accessibility to plug-in PCB modules, even the front panel can be swung out for easy servicing. Full spares catalogue plus parts available.
* Pair 6146B's in final with screen voltage stabilisation for minimum distortion products and a very clean output signal
* 90 day warranty
* Price $570 including mic, cables, plugs, English manual

Mode of Operation;	LSB, USB, CW and AM
Input Power;	180 Watts DC INPUT SSB & CW 90 Watts DC INPUT AM
Carrier Suppression;	50 dB
Sideband Suppression;	50 dB at 1,000 Hz
Spurious Radiation;	Down 40 dB or more
Distortion;	Down 35 dB or more
Microphone impe-ance;	High
Modulation Method;	Balanced modulation (SSB) Low Power modulation (AM)
Transmitter Frequency Response;	300 to 2,700 Hz (down 6 dB)
Frequency Stability;	Less than 300 Hz drift in starting Less than 100 Hz drift or less after 30 minutes of warm up
Antenna Output Impedance;	50 – 75 ohms unbalanced
Receiver Sensitivity;	0.3μV S/N 10 dB (at 14 MHz) SSB/CW 1μV S/N 10 dB (at 14MHz) AM
Image Interference Ratio;	–50 dB and more (at 14 MHz)
IF interference ratio;	same as above
Receiver selectivity;	SSB/AM 2.4 kHz at -6 dB and 4.0 kHz at –60 dB CW 600 Hz at -6 dB and 1.5 kHz at -60 dB
Audio Output;	2.5 Watts or more (10% distortion at 4 ohms load)
Audio Output Impedance;	4 ohms
Power Source;	100/110/117/200/220/234 Volts AC 50/60 Hz 13.8 ±10% DC
Power Consumption;	AC: 350 VA at the maximum final input DC: 22A at the maximum final input. 7 A in receiving with final tubes heater "on" and 2A with heater "off"

Frequency Ranges;

Bands (meters)	Frequency (MHz)
80	3.5 — 4.0
40	7.0 — 7.5
20	14.0 — 14.5
15	21.0 — 21.5
10 (A)	28.0 — 28.5
10 (B)	28.5 — 29.0
10 (C)	29.0 — 29.5
10 (D)	29.5 — 30.0
11	27.0 — 27.5
WWV	15.0

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New! **IC-202**

144MHz SSB CW 3W TRANSCEIVER

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For the first time! PERSONAL/MOBILE/BASE 2M SSB.
There have been 2m ssb mobile/base units – large, weighty and expensive! Now from the best known and specialist VHF manufacturer ICOM, comes the IC-202 – small, light weight and only $199.

FEATURES:

* Coverage 144-145MHz:
  144.0 – 144.2/144.2 – 144.4 (crystals provided)
  Provisions for other crystals (200KHz per xtal).
* VXO operation giving 200KHz with excellent stability.
* pep output 3 watts.
* cw output 3 watts.
* RIT tuning ± 3KHz
* noise blanker.
* receiver sensitivity 0.5 uV (S+N)/N 10dB
* receiver selectivity 1.2 KHz – 6dB
  2.4KHz – 60dB
* aduio output 1 watt
* battery external supply 13.8V @ 15%. Provision for internal dry cells or nicads.
* Size 183 x 61 x 162 mm.
* mass 2Kg.
* current drain max ssb 540ma Tx, 90ma av Rx.

Complete with mic, manual, carry-strap, dry cells and the VICOM 12 month warranty.

$210

6 CHANNELS and 12 MONTH WARRANTY

IC22A

Features:

* solid-state T/R relay
* PA protection
* 5 helical resonators
* 10/1 watt

Complete with cables, mobile bracket, mic, manual and 6 channels from the WIA Bandplan.

The IC21A is the 10 watt base station or mobile (146-148MHz) with variable power control, adjustable deviation, 24 channels, built-in discriminator meter, S meter, power/swr meter, PA protection and modular circuitary . . . In addition:

* low intermod, due to MOS-FET RF amp and 5 helical resonators
* calibrate position netting switch allows the IC21A to listen to itself on simplex channels.
* The RIT control offsets the receiver frequency to bring in signals which are not properly calibrated
* runs from either 240V or 13.8V
* complete with mic, cables, manual, 3 channels and the VICOM 12 month warranty.
* PRICE: $298.

The DV-21 PLL Digital VFO is a unique synthesiser to complete your ICOM 2M station (it can also be interfaced with other rigs). Runs from either 13.8V or 240V and can scan either empty frequencies or those being used. In addition, two programmable memories for favourite channels can be selected. PRICE: $285.

DV21 COMBINATION DEALS:
IC22A plus DV21 $450
IC21A plus DV21 $570

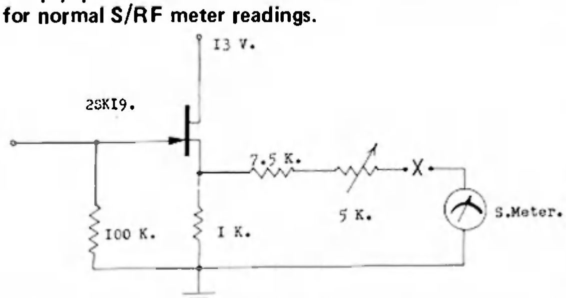
ICOM

The IC-501 ssb/am/cw transceiver is PLL VFO controlled and runs 10 watts. Separate filters for am/cw are built-in together with the internal ac/dc power supply. Covers 50-54MHz and price of $445 includes mic, cables and 12 month warranty.

The IC-60 has been designed along the lines of the successful IC-22A and runs 10 watts fm at 52.525 MHz. Includes mobile bracket, mic, cables, 2 channels and 12 month warranty, all for $235!

WHAT'S THE NEW CALL SWITCH FOR ON THE IC-22A?

No, we don't expect another band-plan conference for tone access repeaters, but ICOM kindly left the switch in for other uses as takes your fancy. We have been using it to switch in the S meter so that you can use it as a discriminator meter. The switch is inserted at point X. Simply press the switch to read discriminator and release for normal S/RF meter readings.



WIA Band Plan Xtals for IC22A/IC21A
Repeaters 1-7
Anti-repeat 1-7
Simplex: 40, 49, 50, 51, 52, 53,

$8.50 pr

IC-3PA

13.8v power supply for IC22A/IC60

PRICE: $78

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Trio TV-502 for TS-520 etc $243
QM-70 high pwr 10/2m cw/fm/ssb/am with input drive .5w for attachment to Uniden, FT101E etc $199
QM-70 solid state output 2w suitable for driving 6/40 .... $105
QM-70 70cm transverter 10/70cm 26w pep output $168

70cm

VICOM 90 DAY WARRANTY ON ALL NEW PRODUCTS

Seiwa SU-710 transceiver runs 10 watts at 435MHz, complete with mobile bracket, mic, cables etc and VICOM 90 day warr $278

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Yaesu YO-100 monitorscope $205
Yaesu YC-355D frequency counter $205
D-60 freq counter to 200MHz $360
Gilco 275 0-15MHz freq counter $210

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Kit for 2m fm — complete except xtal $70
MR2 2m fm mini receiver incl 4 chs $85
Drake SSR1 general coverage receiver $420

ANTENNA ACCESSORIES

Ham-11 rotator, 230V ac with indicator control units $168
Oskerblock SWR200 swr/pwr meter with ranges 2/20200/200w to 200 MHz $49
Leader LPM885 swr/pwr meter $78
ME-UHF swr/pwr meter 15/5w $69
Balun BL-50a 52 ohm $18
Balun BL-70a 75 ohm $18
CX-2A 20pos coax switch $23
CX-6A(A) 6 pos 52ohm coax sw $54
BTF-1 600 ohm balanced feeder $12
CO-AX RG58AU 45c per metre
SH-7E lightning arrestor $15
VICOM low-noise 2m preamp $19

HF TRANSCEIVERS (we have used gear too!)

Uniden 2020 80-11m transceiver, complete $570
Uniden external PLL FVO $105
Uniden matching sp aker $28
Yaesu FT101E 160-10m transceiver $689
Yaesu FV101E VFO for FT101E $102
Yaesu FL2100B linear amplifier $430
Kenwood TS-520 80-10m transceiver $590
Kenwood TS-900 — out of production
Atlas 210X 80-10m solid state mobile including noise blanker $695
Atlas AR-230 AC power supply $165
Atlas delux mobile mount (DMK) $55
Yaesu FT75B mobile transceiver $280
— FP75B AC power supply .... $7[illegible]
— DC75B DC power supply $75

2 METRES FM

IC-22A incl 6chs, 12 month warranty $210
IC-21A base/mobile 3chs, 12 month warr. $298
DV-2L PLL Digital VFO for above $285
Ken KP202 handheld incl 4 channels $150
Ken nicads and 230v charger $32

2 METRES SSB/CW

IC-202 portable, 3w ssb/cw $199
IC-201 base ssb/cw/fm $510
QM-70 solid state linear for fm/am/cw ssb/ at 2w(min) input for 50w rms out $102

antennas

NEW FM GAIN RINGO RANGER

The new Ringo Ranger ARX-2 2m omnidirectional offers 6dB gain over a ¼ wave whip. Features 3 half waves in phase and a 1/8 wave matching stub with an extremely low angle of radiation for better signal coverage. Tunable over a broad frequency range and perfectly matched to 52 ohm coax $35
Extension to old AR-2 .... $15

WHIPS

HF HUSTLER RESONATORS

Precision wound with optimised design for each band, adjustable tip rod for lowest VSWR and badn-edge markers:
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M25 Scalar 2m 5/8 fibreglass $16
M21 Scalar 2m ¼ s.steel $9
M60 Scalar 6m ¼ fibreglass $12
MGB magnetic base $33
1B Scalar standard base $5

ANTENNAE BY HY-GAIN

14AVQ 10-40m trap vert. $69
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203BA 20m monobander 4el $185

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Regulated DC power supply board up to 15v at 4 amps depending on transformer secondary and value of current sensing resistors on board $24

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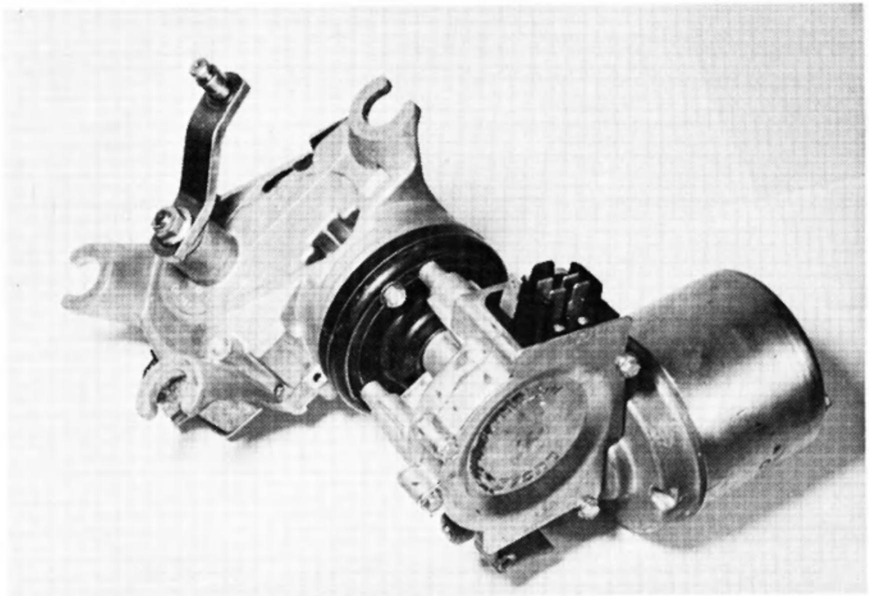
AN ANTENNA ROTATOR



Brian F. Lavery VK1ZBL
65 James St., Curtin, A.C.T.

The ability to operate a rotatable beam gives a great flexibiltiy in both the VHF/UHF region and the upper HF bands. Instead of paying a considerable sum of money for a commercial rotator, it is quite possible to build a modest unit without difficulty and for minimal cost. This article describes how to make such a unit. Position indication or automatic direction following is not described and is left to your own inventiveness. This device is not a complete rotator system. It is a slow motion drive unit, but of itself, it will not support a beam assembly.

The modern car windscreen wiper motor with its gearbox provides a suitable building block for making a home-brew antenna rotator. The permanent magnet motor can be reversed and the speed can be controlled by control of the supply voltage. The typical motor speed is 2000 RPM and the worm gearing gives a reduction of about 40:1. Two reductions in series yield an output of about 1 turn per minute, which is ideal for antenna control.

Second hand units are readily available from any car wrecker. The following constructional details are based on the Lucas link type permanent magnet motor. The Lucas designation is 13 AUW or 15 AUW, and was fitted to many cars built locally in the last few years. The 13 AUW and the 15 AUW come in several external configurations to suit the car models, and some have a piggy-back washer pump, but the internals are very similar.

In brief, two wipers are used. The motor of the first drives the two gear reductions in tandem. The coupling shaft is made up from the discarded armature shaft, and the jointing plate is made from the discarded motor yoke. The degree of weather seal obtained depends largely on the care taken with the jointing plate. If all goes well, the only new items will be a few short screws.

☐ Choose wiper No. 1 (at your friendly wreckers), Lucas type 15 AUW or 13 AUW. Try to get one with a flat metal blanking plate above the gear wheel, rather than one with a washer pump, or even with a shaft stub showing through. Get a model with three mounting legs arranged evenly on a circle 2.3 inches pitch circle diameter (not 2.8 inches).

☐ Choose wiper No. 2, again without a washer pump (although it is not so necessary in this case). The mounting feet configuration is not important, except that these are the final mounting points for the finished product.

☐ Open the gearbox or wheelbox of wiper No. 1. If only a washer type could be obtained, discard the pump assembly altogether and make up a replacement blanking plate from flat sheet. If the plastic pump cam interferes with the plate, break it away from the plastic wheel with a screwdriver.

☐ The plastic wheel must be removed intact from the output shaft to which it has been moulded (over a knurled end). Place the shaft in a 150 deg. C oven for some minutes, then apply a little workshop persuasion. Discard the shaft, but preserve its dished washer.

☐ It is best, but not essential, to remove the outer brass bush from where the discarded output shaft left the wheelbox. This reduces alignment complications later.

☐ You may prefer not to open up the motor itself. If you do open it, take care removing the armature shaft through the brush assembly. On reassembly, which is a bit tricky, taken even more care not to damage the brushes too much. If warranted, the brushes can be replaced by the ones from wiper No. 2. Use side cutters and soldering iron, but do not allow solder to wet along the pigtail thus stiffening it. Note how the

springs thread onto the pigtail a little, and check they seat squarely on the bakelite pips so they do not arch when compressed. If a third brush is fitted, it (the centre one) may be deleted. (The 180 deg. pair are for slow speed, the 108 deg. pair for high speed.) The dual speed option may be an advantage, however. If the armature is stiff after reassembly, short hammer taps near the bearings will help realign them.

☐ Put this unit aside, and dismantle wiper No. 2, motor and wheelbox. For neatness, and if necessary, make up a blanking plate to replace the washpump section.

☐ Do not lose the small ball from the end of the armature. Make up a jig, or use a vice and flat punch, to drift all the components off the armature shaft.

☐ The knurling must now be removed so that the shaft can pass through the bush remaining in wiper No. 1. A lathe will make short work of this, but a vice and file can be used if necessary. Do not damage the rest of the shaft.

☐ The spare plastic wheel should now be pushed onto the long shaft, so that the shaft protrudes perhaps 1/16 of an inch. *Loktite* may be used if required to ensure a tight fit.

☐ Break the brushgear out of wiper No. 2. Remove the appropriate wires.

☐ Place the new shaft into wiper No. 1 Electrically run up motor No. 1 in each direction in turn. Check that the parking and braking contacts underneath the wheel do not object to the wheel turning backwards from the original Lucas design. Modify or even remove if necessary. (You may find these contacts provide useful signals for your control system.)

☐ Repeat with the other wheel in unit No. 2. (Rotate by hand).

☐ Put the dished washer (concave to the wheel) and the little metal ball on the new shaft. Place the shaft in wiper No. 1, and cover with the blanking plate. The total washer compression is about .080 inch. Deform the plate (or shift the wheel on the shaft) to load the washer to about half its compression.

☐ If the correct wiper has been chosen for unit No. 1, a short section of the yoke (motor casing) from unit 2 can be used as a jointing section between unit No. 1 and unit No. 2. Place the two units together, joined by the new shaft. Check that the worm engages reasonably centrally with the wheel in unit No. 2, and measure the spacer distance to be made out of the yoke. It should be approximately half inch. Take care to cut the jointing piece quite square, otherwise the new shaft will not align correctly against the wheel. Cut a neat hole in the joint (after removing the unwanted rear bearing from it) to take the centre post of wiper No. 1. Drill 3 holes (at 2.3 inches diameter) to mount the legs of wiper No. 1.

(If a lathe is available, it will simplify cutting both ends of the jointing plate.)

☐ Find some screws to join up the two halves. Set the end float screw on wiper No. 2 to a nominally small clearance. (This screw will absorb small errors in jointing plate thickness.)

☐ Note that no matter where the holes are drilled in the jointing plate, unit No. 1 may be orientated within 30 deg. of any desired angle relative to the mounting position of unit No. 2.

(If by ill fortune your wiper No. 1 does not have the mounting feet as described, you will have to work out a jointing plate for yourself.)

☐ Finish assembling the whole unit, remembering that a spring washer goes under the crank lever on unit No. 2.

☐ Apply power to the motor terminals and check the operation in both directions. If desired, dismantle and lubricate carefully (one drop of oil for the porous bushes, a grease smear over the worms and wheels), unless of course you remembered this as you went. It would pay to devise suitable weatherproofing for all joints.

Some technical comments on this machinery. The motors are fairly sturdy, being of the order of 1/12th horsepower. The current consumption for this application should only be a couple of amps, as the load through two reductions should be light on the motor. The normal life of these motors is many hundreds of hours on load (continuous), so for this application they should last a long time indeed if kept corrosion free. The rated voltage is 13.5V, but for this application a variable voltage of say 4V to 16V could be used for speed control. Do not forget the inductive characteristics if you use some fancy control system. The motors will be an EMI problem. I have not tried to solve that yet.

On the mechanical side, there may be a risk of stripping the wheel teeth if a large antenna system is lashed in a storm. The best protection is to check that the alignment of the new shaft holds the worm firmly against the wheel teeth. There are two slightly different tooth forms for the worm and wheel, so the best advice is do not mix the two combinations you obtain in case you do in fact have different sets. (Both have a gearing ratio of 82:2.)

That's it. The direction control or direction indicator, and the coupling of the rotator described here to your array, are left to your ability and imagination. ■

Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

AN AUDIO FREQUENCY NOTCH/Q MULTIPLIER

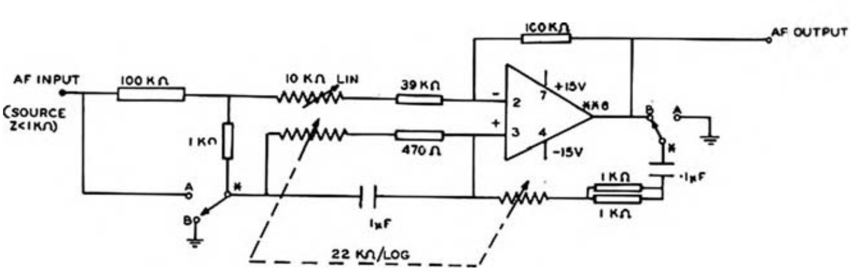
Alan Bolton VK5TT
3 Ilford St., Vale Park, SA 5081

Integrated circuitry has made many new circuit designs possible. The way things are going we will probably see a chip replace the circuitry inside TV sets. More modest advances are already present. High gain linear operational amplifiers mean active filters are convenient to make, particularly at audio frequencies. One application for this type of filter arises when trying to avoid interference from an adjacent carrier, or when trying to dig out a weak CW signal.

One advantage of an audio frequency notch/Q multiplier is that it is not necessary to distinguish between USB and LSB when tuning it. Also, the setting of the frequency potentiometer is directly related to the audio frequency. One disadvantage is that the notch does not filter out the AF harmonic distortion present in the detector. These harmonics should be relatively small at normal signal levels, particularly if a product detector is used.

The active notch/Q multiplier (see circuit diagram) is tuned using only two resistive elements. The ratio of these resistors effects the Q of the Q multiplier, making the use of high quality potentiometers an advantage. ■

AUDIO FREQUENCY NOTCH Q MULTIPLIER



* 2 POLE 2 POSITION SWITCH. POSITION A - NOTCH. POSITION B - Q MULTIPLIER
** LM 741 (PIN CONNECTIONS FOR 8 LEAD METAL CAN)

A TILT-OVER POLE

J. A. Gazard VK5JG
39 Glenhuntley St., Woodville South, SA 5011

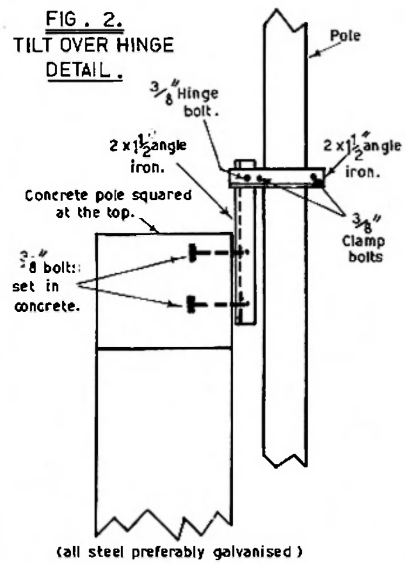
A tilt-over pole is worth consideration for supporting amateur antennas. It can be used to erect VHF directional arrays without the need to climb a tower to install and adjust. It solves the old problem of broken halyards and is much cheaper than a tower. If the stub pole is long and strong enough, guys may be dispensed with in most cases. Here is a description of a tilt-over pole erected by VK5JG.

Although a straight tree trunk (or surplus telegraph pole) of about 10" diameter would make an ideal stub pole, this is not easy to come by and deliver into a suburban garden. It was found convenient here to make the pole of reinforced concrete. The pole is set 5' into the ground and the diameter below ground is 15". Above ground the diameter is 11¼". This diameter happens because a 3' wide sheet of 24 gauge iron was rolled into an 11¼" diameter cylinder (½" overlap) and fastened with self-tapping screws to make the mould which was 4'6" long.

The pole is reinforced with 5 x ½" diameter rods set to give a minimum cover of 1" of concrete. The reinforcing rods can be held in position by fitting into 5 x ½" diameter holes drilled in an 8" circle in a flat piece of wood. One such piece can be set in the bottom of the foundation hole and left in the concrete, while one or more others are slid up the rods as the concreting progresses. However, if a welder is available it will be preferable to weld several ¼" diameter steel rings inside the 5 rod circle to make a rigid cage of the reinforcing steel instead of using wooden plates.

After the foundation hole was filled with concrete, the mould was placed around the protruding rods and rested on the top of the concrete and another 6" of concrete was poured into the mould. The mould and rods were then carefully set vertical and the concrete allowed to set. A week later the mould was filled to the top, then each

FIG. 2.
TILT OVER HINGE DETAIL.



week the mould was set up with the bottom 6" around the top of the previous pour and filled until the required height was reached.

Half inch steel climbing steps were fitted by setting ½" nuts in the concrete using the method shown in Fig. 1.

The stub pole at VK5JG projects 15' above ground. The tilt-over pole is 33' long and is a relic of the crystal set days of the 1920's. It had been rounded and tapered from a length of 4" x 4" oregon. The pole can be tilted as shown in the photograph and lifted up again in less than two minutes if guys are fitted and the lifting is done on a calm day. The pole is

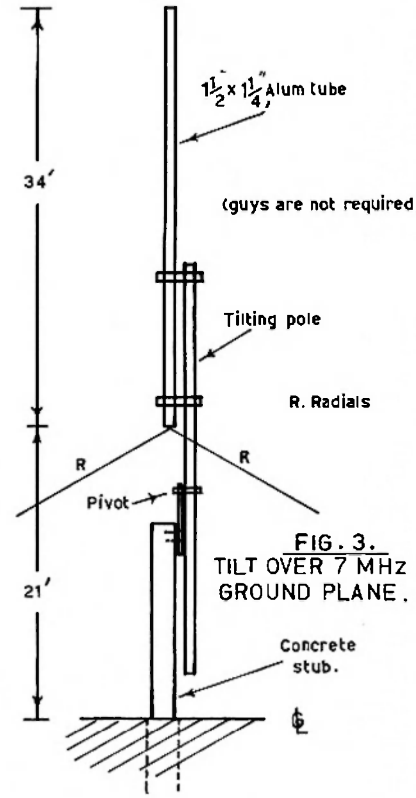


FIG. 3.
TILT OVER 7 MHz GROUND PLANE.

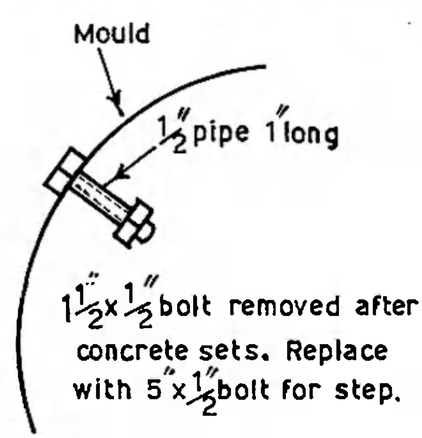


FIG. 1.
STEP HOUSING.

strong enough to support a light weight 14 MHz or 21 MHz beam though some difficulty would be experienced in handling the array onto the end of the pole in the tilt-over position. The attachment of the pole to the stub pole is shown in Fig. 2.

Concrete materials required for a 15' stub are:

Cement — 4 bags
¾" Screenings — 12 cwt.
Sand — 7 cwt.
½" reinforcing steel — 4 x 20'

The concrete stub pole is round. The wooden tilting pole is square for the bottom 5' but round for the remainder. The author's concrete pole differs at the top from the one sketched. It has a T head for an observation platform and is provided with sockets in this head so that other short masts can be attached if required.

Adhesion between pours is no problem. In reinforced concrete design the concrete is assumed to develop no tensile strength — only compressive strength. The reinforcing steel provides the tensile strength. Therefore adhesion across the pour joints is not essential.

However, to make a neat joint I reduced the proportion of stone in the mix for each first batch thus increasing the proportion of mortar and preventing the formation of unsightly air holes between stones at the joint.

The fifteen foot pole could have been cast in one pour but it would have required an expensive 15' mould, a vibrator for compacting the concrete at the bottom of the deep mould, and a 15' platform erected alongside from which the concrete could be poured.

With four foot pours I placed a ladder against a piece of timber bolted to the previous set pour in the step bolt poles and worked from this.

At present the pole is supporting a 7 MHz ground plane antenna as per Fig. 3. This was attached and erected single handed in about 2 hours. ■

WHAT'S INSIDE THE BATTERY

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No electronic component is taken so much for granted as the humble but very essential battery. Many hams know the workings of the most advanced solid state device but little about the most common type of cell. The purpose of this article is to uncover the mystery of the battery and to see what makes it tick.

1. ELEMENTARY CHEMISTRY

It is obvious that the knowledge of chemistry possessed by readers of AR will vary greatly, and this article is intended for all, so chemical reactions will be portrayed in words and pictures, that is in chemical names and chemical symbols.

Firstly a rapid coverage of elementary atomics. Atoms consist of one or more electrons whirling around a nucleus of the same number of positive charges; that is, each atom is electrically neutral. If an atom or group of atoms gains or loses electrons it forms a positive or negative ion.

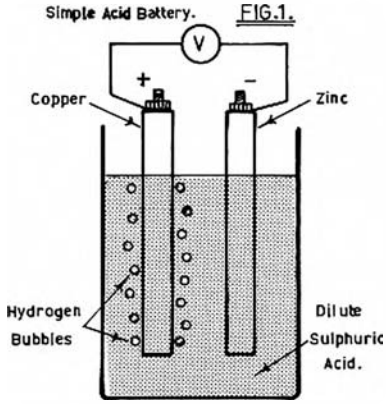
When a metal is dipped into a solution containing its own ions (one of its own salts), for example zinc in zinc Sulphate, positive ions of the metal leave it and pass into the solution. As defined in the previous paragraph these ions are metal atoms minus one or more electrons which remain on the undissolved metal so giving it a negative charge. Metals vary in this tendency, for instance Zinc tends to ionize more readily than does Copper and with the noble metal Platinum the tendency is almost non existent.

Under standard conditions each metal develops a characteristic voltage when in equilibrium concentration with one of its own salts. An electrochemical series can be established for example, Copper is more positive than Zinc which is in turn more positive than very reactive metals, for example Sodium.

A representative series would be:
Gold, Silver, Mercury, Copper, Hydrogen, Lead, Nickel, Cadmium, Zinc in order of decreasing positivity.

Note that Hydrogen appears in this series. As we shall see Hydrogen chemic-

Simple Acid Battery. FIG.1.



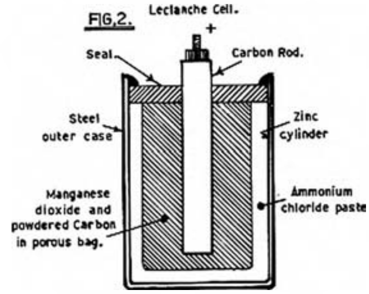
ally (but NOT physically) resembles the metals and the common mineral acids Hydrochloric and Sulphuric may be considered as 'salts' of Hydrogen. Expert chemists please note, this series is in reverse to that which measures the tendency of metals to lose electrons in a chemical reaction; there Sodium is highly electropositive and Copper only weakly so.

2. A SIMPLE PRIMARY CELL

A primary cell is one that has a single working life. It is ready to work as soon as its components are assembled and requires no initial charging current. Let us now consider the workings of a simple battery or cell.

A Copper rod and a Zinc rod are placed in a jar of dilute Sulphuric Acid (Fig. 1).

FIG.2. Leclanche Cell.



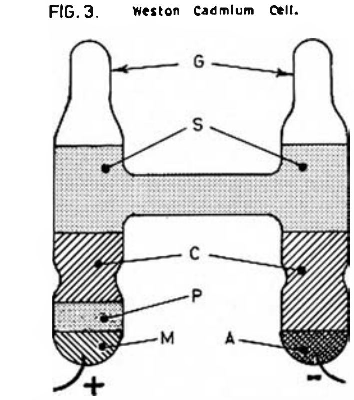
Sulphuric acid yields Hydrogen ions so we have Copper, Hydrogen and Zinc in order from our series. The Zinc rod rapidly loses electrons so the rod acquires a negative potential with respect to the electrolyte in its vicinity. For the Copper rod this tendency is much less, in fact it acquires a layer of Hydrogen ions from the electrolyte and becomes positively charged with respect to the electrolyte in its vicinity.

It is not hard to imagine what will happen if the rods are joined by a conductor or the voltage between them is measured. Electrons flow through the external circuit from the zinc to the copper rod.

The circuit is completed in the electrolyte, the loss of electrons from the zinc rod raises its potential so allowing more zinc ions to pass into solution. The electrons gained by the copper rod through the external circuit combine with the hydrogen ions to form hydrogen atoms which escape as hydrogen gas.

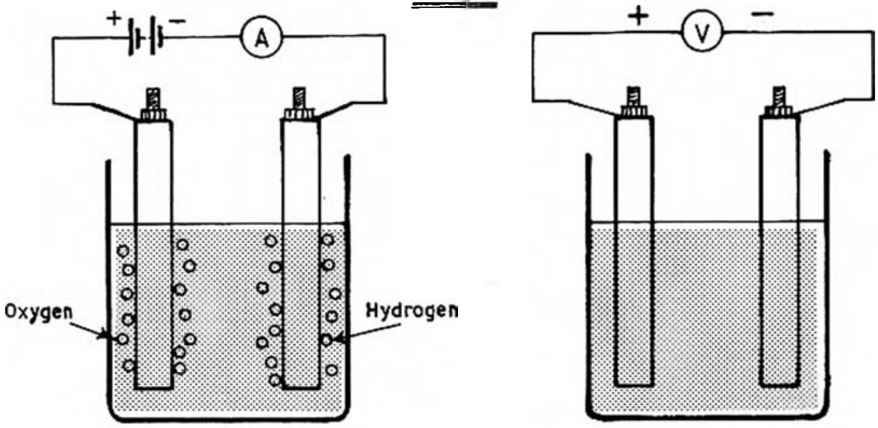
Experiment shows that a potential difference exists between any pair of dissimilar conductors (here copper and zinc) immersed in an electrolyte which reacts chemically with one of them. In our example this was zinc which, as discussed, loses some of its material as ions to the solution.

FIG. 3. Weston Cadmium Cell.



G. Glass container. P. Mercurous Sulphate paste.
S. Saturated Cadmium paste. M. Mercury.
C. Cadmium Sulphate crystals. A. Cadmium Amalgam.
± Platinum wires sealed through glass container.

FIG. 4.



Charge cycle

Discharge cycle

There is one great practical weakness to our simple cell. If the current through a small resistor joining the positive and negative electrodes is measured, it will be found to rapidly decrease to a low value and at this time many bubbles of hydrogen gas can be seen adhering to the copper rod. The cell is said to be in a polarized state. The effect is twofold:

1. The bubbles act as an insulating shield so raising the internal resistance of the cell.
2. The cell now acts a a hydrogen-zinc cell not a copper-zinc cell. This new system has a lower EMF. (This is predicted from our series, hydrogen is closer to zinc than copper is to zinc.)

If the layer of hydrogen bubbles is removed by a depolarizing agent the cell will continue happily as before.

Usually this agent adds oxygen to the hydrogen to form water.

Manganese Dioxide is often used.

3. PRACTICAL PRIMARY CELLS

Several types of cells will now be examined in the light of the two prerequisites already mentioned, two conductors in an electrolyte which reacts with one of them and a depolarizing agent if the evolution of hydrogen gas is involved. Although many common cells are called dry they are not really dry but moist. They contain no free flowing liquid however so can be used in any position without spilling.

(a) The Leclanche Cell

Fig. 2 shows this cell in section. The zinc container is the negative electrode and the carbon rod the positive one. The latter is surrounded by a mixture of Manganese Dioxide and powdered carbon in a porous sac, the space between this and the zinc being filled with an ammonium chloride paste.

Electrode reactions are briefly:

1. At the negative zinc—Production of zinc ions which pass into the solution leaving the electrode with excess electrons.
2. At the positive carbon — Ammonium ions react with and gain electrons from the manganese dioxide leaving it with excess positive charge.

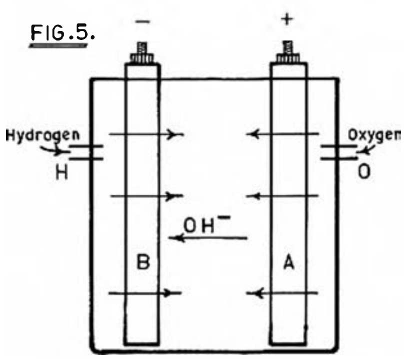
The exact chemistry of this cell is uncertain but when current flows a complex compound of zinc, chloride and ammonium ions is formed in the electrolyte.

Cells of this type have an EMF of about 1.5 volts and an internal resistance which rises with cell use very sharply, in fact near the end of its working life.

(b) The Alkaline Dry Cell

This cell differs from the Leclanche type in that a highly alkaline electrolyte, Potassium Hydroxide is used. Zinc reacts with this electrolyte so fulfilling our first battery requirement. Hydrogen gas is not formed so no depolarizer is needed. These cells have a lower internal resistance than the Leclanche cell and the EMF is about the same. They are very suitable for continuous use.

FIG.5.



(c) Mercury Cells

In mercury cells the negative electrode is zinc and the positive one is the mercury formed from mercuric oxide which is also the depolarizer. A strongly alkaline electrolyte of potassium hydroxide and zinc oxide is used. In use zinc ions enter the electrolyte (a familiar story by now) and displace hydrogen ions which move to the mercuric oxide. Here mercury ions are displaced and the hydrogen combines with the oxygen to form water. The mercury ions in turn accept electrons at the positive electrode (these have arrived via the external circuit), and become mercury atoms forming the prementioned positive electrode. These cells have a very long life and are very stable, so stable that they may be used as a voltage standard for instrument calibration, accurate enough at least for Amateur Radio purposes. Their terminal voltage is 1.35 volt.

(d) The Weston Cadmium Cell (NOT a NiCad)

This cell is included in the discussion only for interest. It is used as a source of standard EMF for calibration purposes, in particular 1.01864 volt at 20 deg. C. This cell is not to supply current as such, any current exceeding about one milliamp will ruin it. The positive electrode is mercury and mercurious sulphate paste and the negative electrode cadmium amalgam (a solution of cadmium in mercury) in saturated cadmium sulphate. The mercury gains mercury ions so becoming positive to the electrolyte, the cadmium loses ions and becomes negative to the electrolyte. Electrons flow through an external circuit from cadmium to mercury and to maintain equilibrium the cadmium continues to lose and the mercury continues to gain ions.

4. SECONDARY CELLS

Before examining specific types of secondary cells, a few words on how they differ from primary cells. Primary cells do not require charging to achieve a working condition, but when their active materials are exhausted they are discarded. Secondary cells do require an initial charge to achieve working condition in the reverse direction to their discharge current.

Some specific secondary cells will now be described:

(a) The Lead Acid Cell

The principle of the lead acid cell is shown by placing two lead plates in dilute sulphuric acid and connecting them to a source of DC, say four volts or so. Electrolysis proceeds, hydrogen is evolved at the cathode and oxygen at the anode. (Fig. 4). After some time the cathode is unchanged but the anode is covered with a chocolate coloured layer, Lead Dioxide.

If the charger is disconnected and a voltmeter is substituted it will be found that this plate is about 2.1 volts positive with respect to the uncoated lead plate, and that this cell will drive current through an external circuit until ultimately current will cease and both plates are covered with a white layer of lead sulphate. This cell can

FIG.6A.

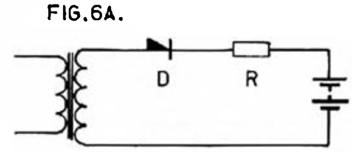
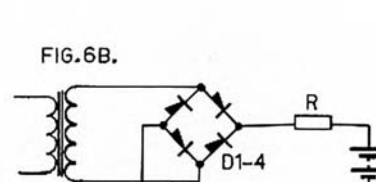


FIG.6B.



be charged again as in the original situation and recycled. This then is the principle of the lead acid cell. Originally they were made this way (the Plante Process). Today the original negative plate is lead and litharge or lead oxide and the positive plate is lead and red lead. When charged the litharge converts to spongy lead and the red lead to lead dioxide as in the original case.

During discharge lead sulphate is deposited and the sulphuric acid concentration and hence the density of the electrolyte decreases providing the familiar hydrometer test for state of charge.

The EMF of this cell may reach 2.2 volts, but drops quickly to 2.0 volts and remains steady till very near discharge. This cell has a very low internal resistance (about 0.005 ohm) permitting very large current drains, for instance to operate the starter motor of a car.

(b) The Nickel Cadmium Cell (The Familiar NiCad)

This secondary cell uses a highly alkaline Potassium hydroxide electrolyte. The positive and negative plates are of perforated steel: the positive one is filled with Nickelic oxide hydroxide and the negative one with finely divided metallic cadmium. During discharge the positive electrode is reduced to Nickelous Hydroxide and the negative one oxidized to Cadmium Hydroxide. During charging the changes are reversed. A fully charged NiCad has an EMF of about 1.3 volts but this falls to 1.1 as discharge proceeds.

5. FUEL CELLS

Electric cells make the energy liberated in a chemical reaction available as increased potential energy of electric charges at the electrodes. Cells must be either discarded when the supply of a reactant is exhausted (primary cells) or recharged from an external source (secondary cells). A fuel cell absorbs fuel continuously and produces a voltage as long as it is fed.

The operation of a fuel cell is the reverse of electrolysis. If you electrolyse water, that is pass a current through it, oxygen is liberated at the anode and hydrogen at the cathode as the hydrogen and hydroxyl ions react.

Fig. 5 represents a hydrox fuel cell. Here hydrogen and oxygen react and water and an electric current are produced. A and B are porous platinum or carbon electrodes into which hydrogen and oxygen gas are forced at H and O respectively.

The electrolyte is dilute sulphuric acid. This seeps into the electrodes and meets hydrogen at A and oxygen at B. In A oxygen atoms capture electrons from the electrode becoming oxygen ions. These ions then react with water to form hydroxyl ions which migrate through the electrolyte to B where they give up electrons and combine with hydrogen to form water.

Gaseous hydrogen and oxygen react very slowly at room temperature so hydrox cells operate at 200 deg. C and 400 p.s.i. Theoretically fuel cell efficiency is 100 per cent with 75 per cent being actually obtained. Steam driven generating plants typically operate at 25-30 per cent efficiency.

Other reactants have been used in fuel cells, for example methane, ammonia and hydrazine.

6. SOLAR CELLS

These are diodes made so that light may fall on the depletion layer of the PN junction. The incident light photons or 'bundles of energy' create many electron-hole pairs in this region which migrate in either direction under the influence of the depletion field. This means that the junction drift current exceeds the junction diffusion current and equilibrium is disturbed. This causes a nett EMF across the diode, the P type material becoming positive because of excess holes and the N type negative because of excess electrons.

7. THE CHARGING OF SECONDARY CELLS

This is a specialised subject in itself. Only one method will be mentioned here, that of constant current. This is not only the cheapest method (requiring only a transformer, diode and resistor) but also prevents the possibility of thermal runaway. The supply voltage is made much greater than the battery voltage and the current limited by a large amount of series resistance. A half wave rectifier circuit suffices for currents up to 0.5 amp (Fig. 6a) or a bridge rectifier (Fig. 6b) for greater currents. No filtering is required as the cells have a large equivalent capacitance. The value of resistance R is calculated by Ohm's Law using the desired charging current as the I value. An incandescent globe of the appropriate wattage makes an excellent resistor. The charging factor used is 1.4, that is 1.4 times the capacity removed from the battery must be replaced. The application of the recommended 10 hour rate for an overnight period makes for charging convenience.

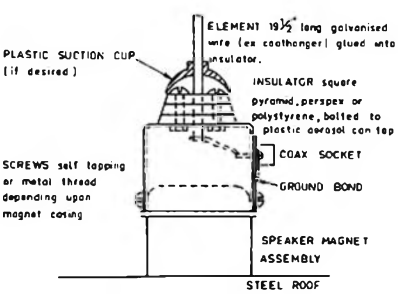
Well there we have it, the story of the cell or battery. This is of course a skimming of the surface of the full story but I hope it has put the more pertinent facts together and lifted the lid on a subject that gets very little coverage in the standard Amateur Textbooks. More detailed references can be given to any interested reader. ■

Try This

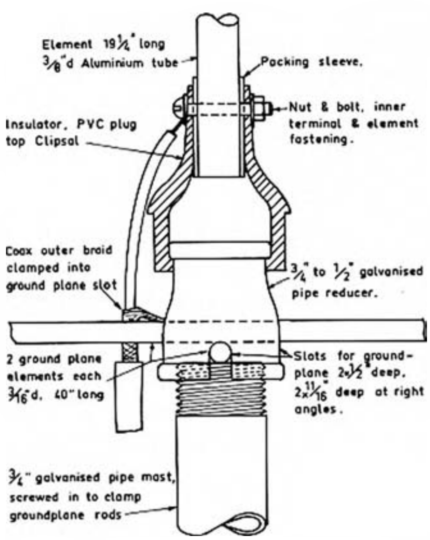
with Ron Cook VK3AFW
and Bill Rice VK3ABP

TWO SIMPLE ANTENNAS FOR TWO-METRE FM

Here are two different approaches to the problem of quickly and cheaply constructing simple quarter-wave vertical antennas suitable for working through your local repeater. Both use readily available "junk-box" materials. One is intended for mast-top mounting, the other has a magnet base to use on top of a car or, in the author's case, on the flat steel roof of the shack. Hopefully the drawings tell most of the story, but a few comments may help.



VK3WW SIMPLE MAGNETIC MOUNT ANTENNA



VK3AOD SIMPLE 2 METRE GROUND PLANE ANTENNA

VK3AOD Ground-Plane

1. The packing sleeve is necessary because the inside diameter of the plug-top sleeve is more than ⅜ inch.
2. The coax connections should be weather-proofed with at least PVC tape. With a little ingenuity it should be possible to run the coax up inside the mast, making weather-proofing much easier.

VK3WW Magnet Mount

1. The plastic suction-cup is a refinement, again for weather-proofing (and appearance), but is not really necessary.
2. Both speaker magnets and aerosol cans are made in a variety of sizes, so finding a matching pair should not be too difficult.
3. Some speaker magnets (notably ferrite, and old Alnico types using a ring magnet) are unsuitable as they are too hard to drill or tap. Even with soft iron cases, it is probably best to tap the holes (say ⅛ Whit or 4 BA) rather than use self-tapping screws, but the latter may do if the holes are only slightly less than clearance diameter. ■

A SOLID STATE 6 METRE SSB TRANSCEIVER

Peter Collins VK3ZYO
5 Van-Wyk Court, Springvale South, 3172

Here is a solid state transceiver for the VHF home brew amateur. If you cannot afford a commercial rig but have a yen for working 6 metre DX then this is the rig for you. Alternatively, if you own an HF transceiver and would like to build a modern transverter then the circuits in this article are just what you need.

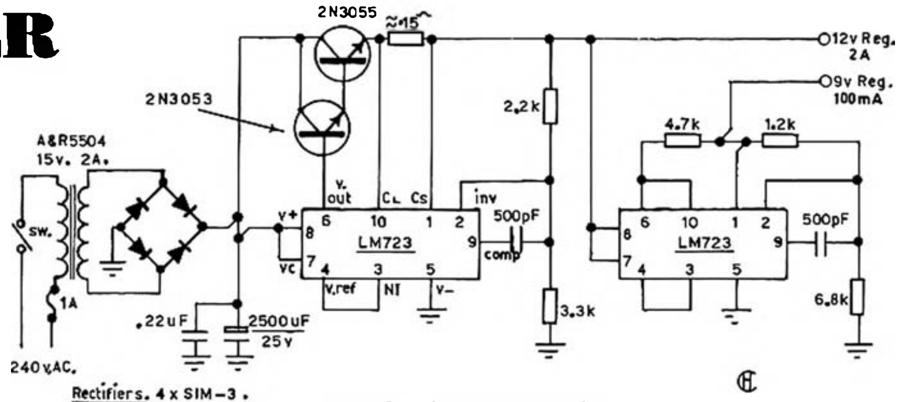


FIG.5. POWER SUPPLY.

This transceiver has evolved over a number of years; the original concept was to develop a solid state 3 to 5 watt SSB 6 metre transmitter. Having achieved this, it was a fairly simple task to add the receiver circuits, as only front end, IF, detector and audio stages are required.

FIG.1. DOUBLE CONVERSION Tx.

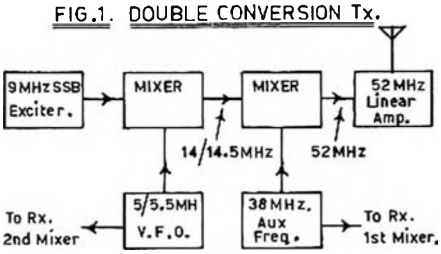


FIG.2. PREMIXING Tx.

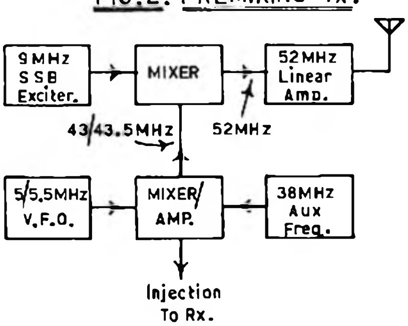


FIG.3. TUNEABLE IF. Rx.

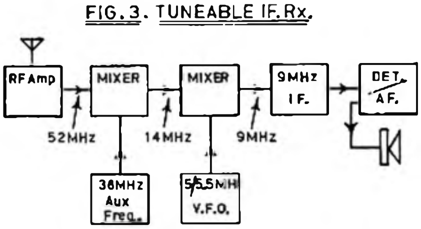
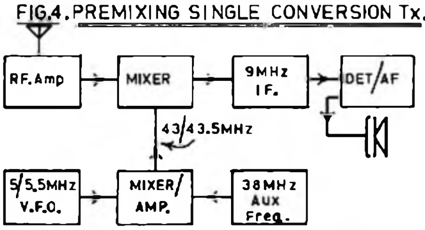


FIG.4. PREMIXING SINGLE CONVERSION Tx.



The transceiver uses conventional frequencies: 9 MHz filter, 5-5.5 MHz VFO, and a heterodyning frequency of 38.0 MHz.

Using these frequencies there are two ways to arrive at the final frequency of 52-52.5 MHz. The method usually chosen mixes the VFO and 9 MHz SSB frequency using the sum to obtain a 14.0-14.5 MHz SSB signal which is then mixed with the 38 MHz signal to obtain 52-52.5 MHz (see Fig 1). The advantage of this method is that the 14 MHz signal can be used for HF operation on 20 metres. The disadvantage of this approach is that it is virtually impossible to obtain a constant output over the 500 kHz range without an external tuning control. This adds to the complexity of construction as well as making operating more difficult due to the extra control requiring adjustment when changing frequency.

A more suitable approach when designing a transceiver specifically for one band VHF operation is shown in Fig 2. This arrangement allows the use of bandpass circuits which, at the higher frequency, allow the output to remain relatively constant over the required range.

A further advantage is realised when the receiver circuit is considered. (See Figs 3 and 4). The 14.0 MHz approach is shown in Fig 3 and uses the tuneable IF system commonly used in VHF receivers. This requires the use of dual conversion with its inherent problems.

The arrangement used in this design is shown in Fig 4 and uses a single conversion from signal frequency to a 9 MHz IF frequency. This is a more acceptable method as it eliminates one mixer, and mixers are the main cause of poor strong signal performance, cross modulation, etc. The use of a variable injection frequency for receive and transmit has been used with good success, as the bandpass cir-

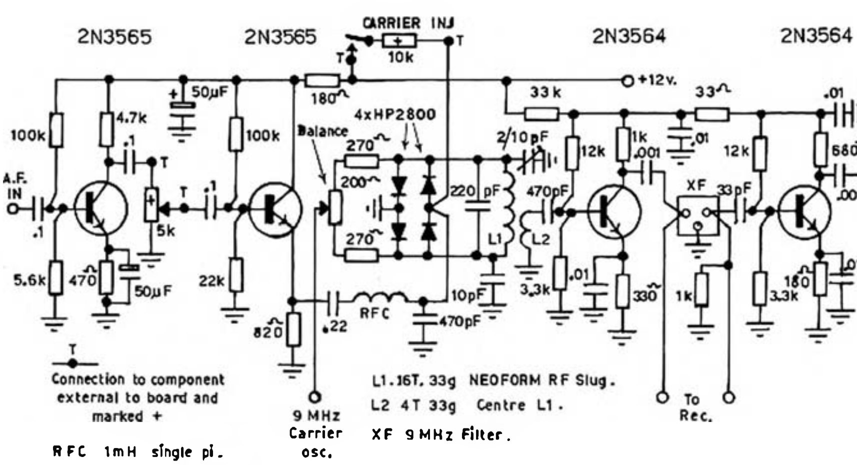


FIG.6. 9MHz. SSB GENERATOR CIRCUIT.

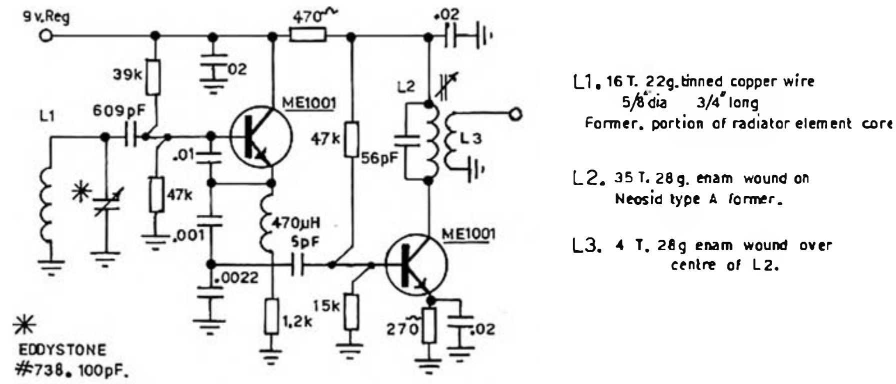


FIG. 7. V.F.O. CIRCUIT.

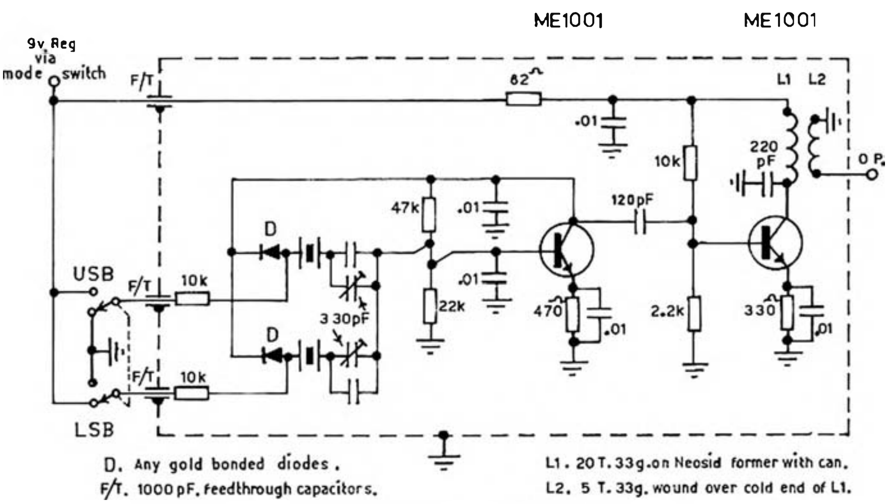


FIG. 8. CARRIER OSCILLATOR CIRCUIT.

cuits are capable of being adjusted, with the aid of a sweep generator, for reasonably flat response over a 2 MHz bandwidth. The inclusion of auxilliary frequency crystal oscillators, on 38.5, 39.0, and 39.5 MHz, in addition to the 38.0 MHz oscillator, extends the coverage to the full 6 metre band, 52.0-54.0 MHz.

CIRCUIT DESCRIPTION

Each of the following sub-titles designates portion of the circuit, each of which is built on a separate module/PCB.

POWER SUPPLY

The power supply is designed around two low cost 723 ICs, which feature excellent regulation with an internal current limiting facility. (Refer Fig 5). Although discrete components could be used it would not be possible to duplicate the performance without a considerable increase in size and cost. The 12 volt supply is capable of supplying the 2 amps which is required by the transmitter under full drive. Current limiting is commenced at a level slightly in excess of the required 2 amps. The 12 volt regulator IC drives a 2N3053 which drives a series pass transistor type 2N3055. The input/output differential of these ICs is approximately 3 volts, therefore the second regulated voltage must be at least 3 volts below the 12 volt rail. The 9 volt supply is current limited at 100 mA and supplies all the oscillators.

The mains transformer supplies 15 volts DC at 2 amps and employs 3 amp diodes in a conventional bridge.

SSB GENERATOR

The 9MHz SSB generator uses two 2N3565s which amplify the output from the dynamic microphone to the level required by the balanced modulator. The 9 MHz carrier input is permanently connected to the module. The carrier is suppressed by the balanced modulator which uses 4xHP2800 hot carrier diodes. This circuit provides excellent carrier suppression and stability. The DSB signal is then amplified by a 2N3564, the collector circuit providing matching to the filter input. Following the suppression of the unwanted sideband by the crystal lattice filter, the SSB signal is then further amplified by a 2N3564 linear amplifier. The output of the module being approximately 0.5 volts RMS. The filter used in this rig was from an FT 200; use of an alternative filter would require the use of different terminating components as recommended by the filter manufacturer.

VFO

The VFO used in this rig was described in AR June '70 and provides excellent stability with reasonably linear calibration. The VFO tunes from 5-5.5 MHz. The only modification made was the use of a PCB and alternative housing.

CARRIER OSCILLATOR

The carrier oscillator circuit allows the use of the crystals supplied with the filter. Other circuits would not allow the 9 MHz crystals to oscillate when pulled to the correct frequency. Although switching has been used for changing between USB and LSB crystals, the facility has not been incorporated in the receiver mode switching

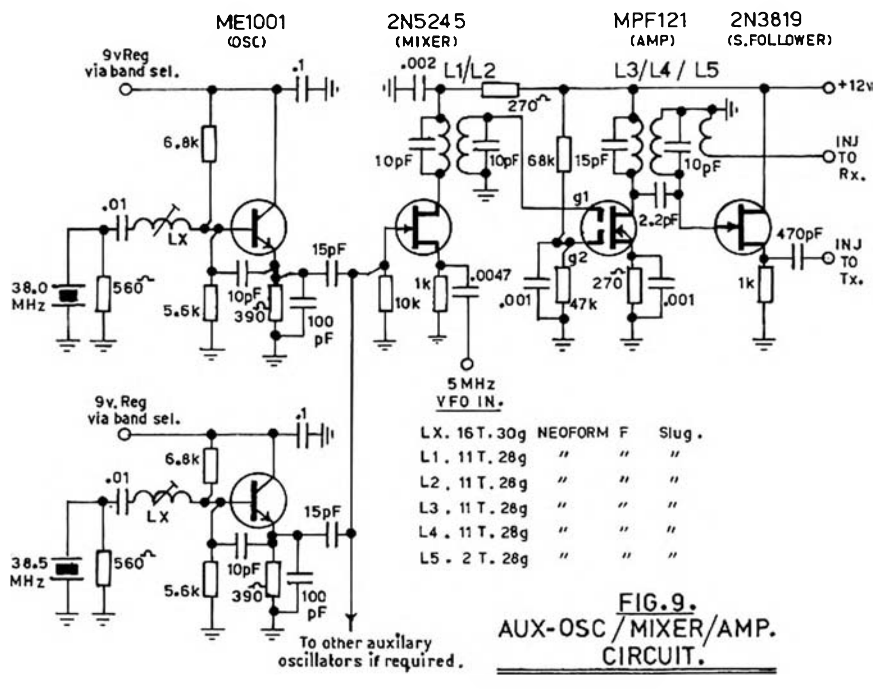
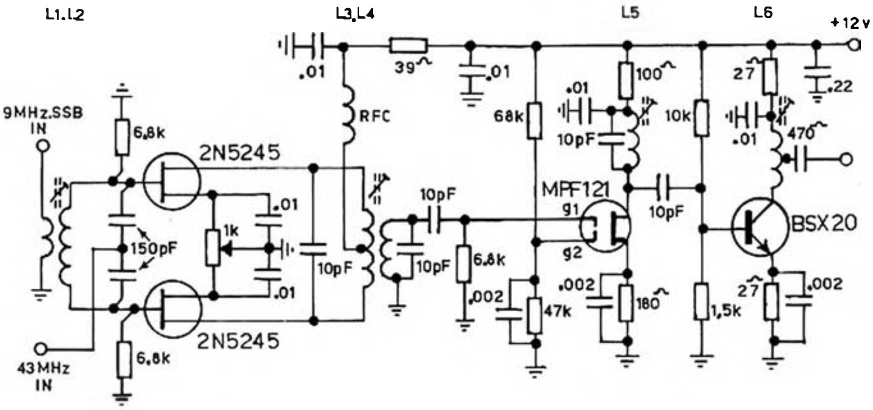


FIG. 9. AUX-OSC / MIXER / AMP. CIRCUIT.



L1. 5 T 33g B&S. over centre of L2.
L2. 32T 28g B&S. Neoform F12 Slug.
L3 12T 28g B&S (Centre tapped) Neoform F22 Slug. (Double Neo with L4.)
L4. 10T 28g B&S. Neoform F22 Slug. (See L3.)
L5. 8 T 24g B&S. Single Neo F22 Slug.
L6 10T 24g B&S Single Neosid F22 Slug Tap 4 T up from "cold" end.
RFC. F22 Neo Slug. 8T 33g through alignment slot.

FIG. 10. TX CONVERTER/AMPLIFIER CIRCUIT.

as it is not necessary for VHF use. The completed module is housed in a metal shield case to provide isolation, and therefore improved carrier suppression on transmit, and to prevent coupling into the receive IF. The carrier oscillator is also fed to the product detector for SSB demodulation. The output level is approximately 0.7V RMS.

AUXILIARY FREQUENCY OSCILLATOR/ MIXER/BAND PASS AMPLIFIER

This module contains two auxiliary frequency crystal oscillators at 38.0 and 38.5 MHz. The required oscillator is selected by the range selector switch e.g. — 52-52.5, 52.5-53.0 MHz. The output of the selected oscillator is fed to the gate of the mixer which employs a 2N5245 FET. The VFO output is fed to the mixer source. The mixer drain coil is tuned to the sum of the two frequencies and is mutually coupled to the coil in the gate of the subsequent stage. A dual gate FET is used as the amplifier. The amplifier tuned circuits can be tuned to cover a 2 MHz bandwidth and provide the variable frequency injection voltage for the receive and transmit mixers. The transmit mixer is supplied via a source follower to provide isolation between the mixers. The output level is approximately 0.3 volt RMS.

TRANSMIT CONVERTER/AMPLIFIER

The transmit mixer uses a pair of 2N5245 FETs in push pull configuration. The 9 MHz SSB signal is fed to the gates in push pull via the input transformer and the 43 MHz auxiliary frequency is fed to the gates in push-push. The DC balance can be adjusted by the potentiometer in the source circuit. The subsequent linear amplifiers amplify the 52 MHz signal to approximately 150 mW into 50 ohms.

TRANSMIT PA

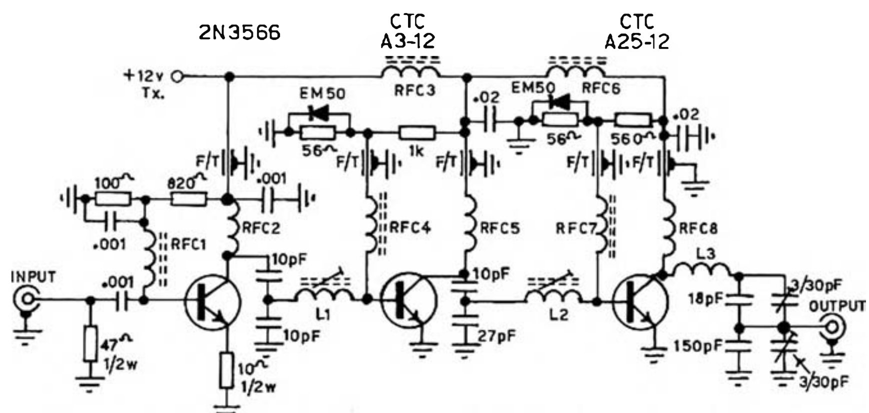
The 150 mW output from the converter/ amplifier is coupled to the base of a 2N3866. The standing bias of this stage is set by the base divider and unbypassed emitter networks. The collector coil of the amplifier is resonated by the two coupling capacitors which also provide impedance matching for the base of the following amplifier stage. The driver and PA transistors, CTC A3-12 and A25-12, are available from Varian. The bias arrangement used for these transistors is provided by forward biasing a silicon power diode through a series divider returned to the 12V supply rail. The resistor to ground provides protection if the diode goes open circuit. This system prevents the base/emitter junction from rectifying the drive voltage which results when a conventional divider is used. Interstage and output coupling values were arrived at by optimising the values and then substituting fixed equivalent values. The final can be driven to 24W input which results in an output of around 10W into 50 ohms.

Anyone experimenting with transistor linear amplifiers should remember that care must be exercised when experimenting with interstage coupling capacitors, as the base is not at DC ground as with class "C" amplifiers. A short between the collector of one stage and the base of the following stage will result in the transistor being bowled for a duck from the first ball — definitely not cricket. A wise precaution is to use a DC blocking capacitor when experimenting with variable coupling capacitors.

RECEIVER RF/IF and DETECTORS

The antenna input is tapped onto the input bandpass circuit, which is fed to gate 1 of an MPF121 RF amplifier. Gate 2 is connected to a voltage divider and the RF gain control which is returned to the AGC line. The RF amplifier drain and mixer gate coils form another bandpass circuit. The circuit for the mixer and source follower was taken from the VK3 VHF group 2 metre converter. This circuit was previously used in a home-brew 6 metre converter and handles the job very well in spite of TV Channel O's multi kW signal a couple of hundred kHz away. The variable injection voltage is fed to the source via the link coupling to the source coil. The output of the source follower is fed by a short shielded cable to the input of the 9 MHz crystal filter. The filter output is returned to the receiver board and feeds a three stage IF amplifier using MPF121 dual gate FETs. Interstage coupling is obtained by using bifilar windings, tuned by a capacitator across the secondary. These IF coils are constructed using Neosid formers and cans. The drain of the third IF amplifier is fed via an RFC and coupling capacitors to the AM and SSB product detector.

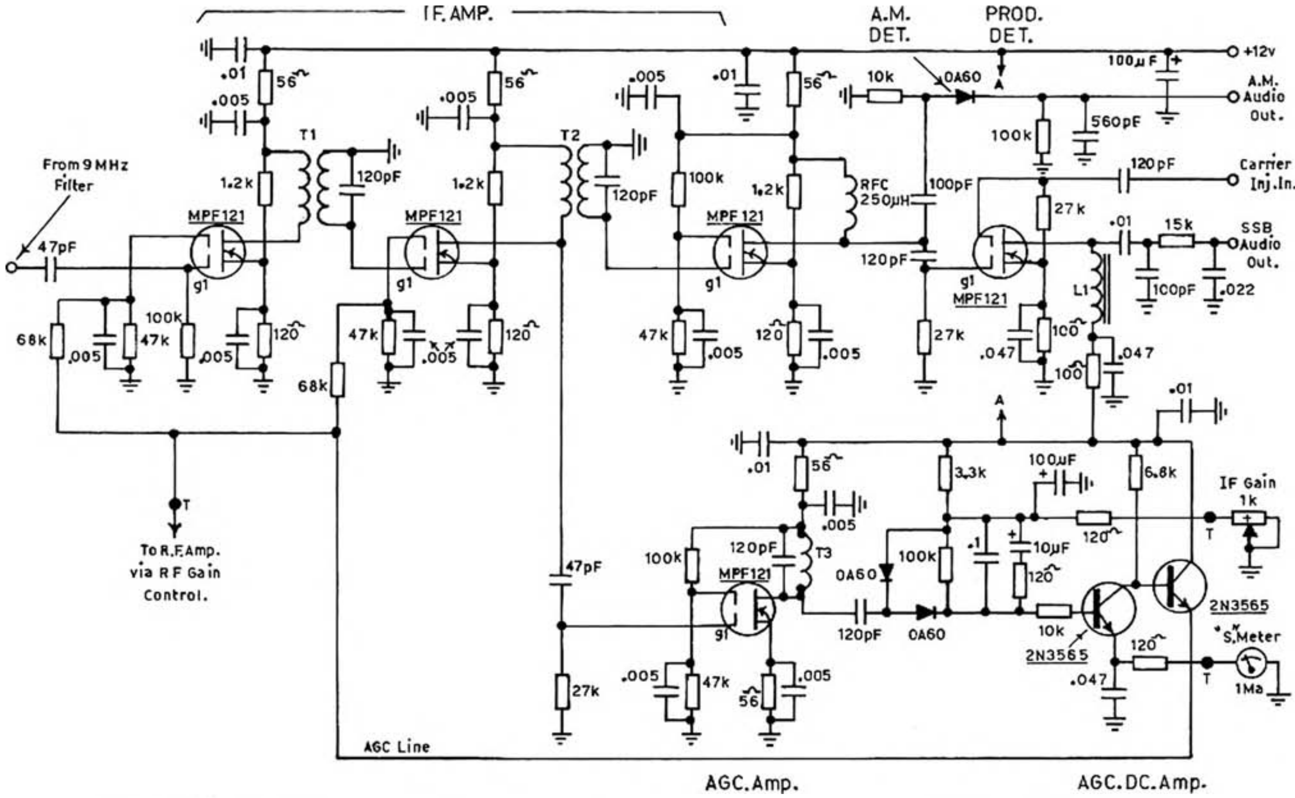
For improved AGC action, the source is fed via a voltage divider. The Gate 2 voltage of the 1st and 2nd IF amplifiers is supplied from the AGC line. The IF signal



RFC 1. 4T. 26g. Through 1/2 F 27 slug.
RFC 2. 6T. 18g. 1/4" dia
RFC 3,6. 2T. 26g. Through F27 slug.
RFC 5,8. 12T. 22g. 5/16" dia.
RFC 4,7. 4T. 33g through Ferrite Bead or 1/8" length of F27 slug.

"F/T" 1000pF Feedthrough capacitors.
L1. 8 T. 22g. NEOSID former F27 slug.
L2. 8T. 18g. " " F27 "
L3. 8T. 18g. 3/8" closewound.
NOTE.
ALL winding wire is "B&S".

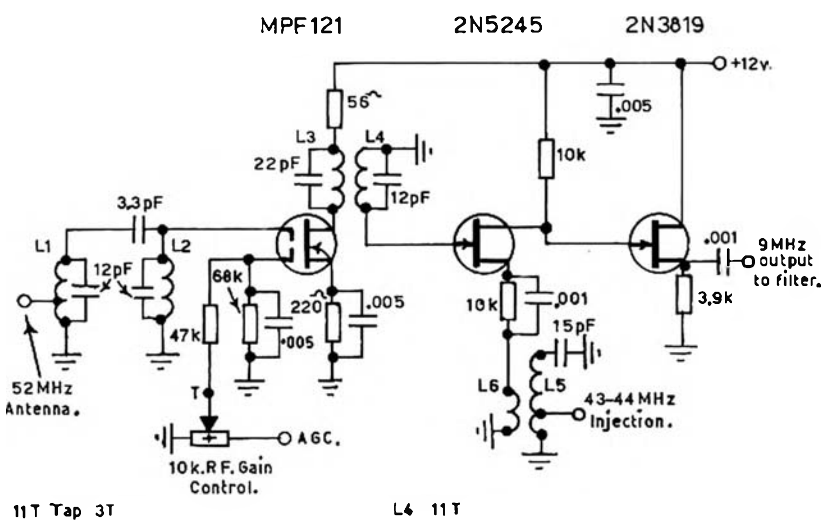
FIG. 11. Tx. P/A CIRCUIT.



T1/T2. 22T. 33g B&S Bifilar on NEOFORM.   T3. 22T. 33g on NEOSID Former.   L1. Transistor Radio Driver Transformer.

T See Notes Fig. 6.

FIG. 13. 9 MHz. I.F. and DETECTOR CIRCUIT.



L1 11T Tap 3T
L2 11T
L3 9T
L4 11T
L5 11T Tap 3T
L6 3T (spaced 3T from cold end of L5)

T See Fig 6 Notes.   ALL above coils use 26g wire

FIG. 12. RECEIVER FRONT END/IF/DETECTOR CIRCUIT.

is picked off from the drain of the second IF amplifier and feeds an AGC amplifier stage employing another MPF121 FET. The drain circuit feeds a voltage doubler rectifier. The DC output is fed to a DC amplifier via a network which determines the time constant of the AGC voltage and provides a means of controlling the bias to the amplifier via the IF gain control. The DC amplifier is biased at cutoff. When the transistor is driven, collector current flows causing the base of the following stage to vary until under full signal input the stage is cut off. The AGC line is 12V with no

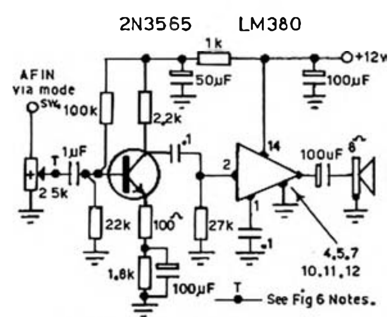
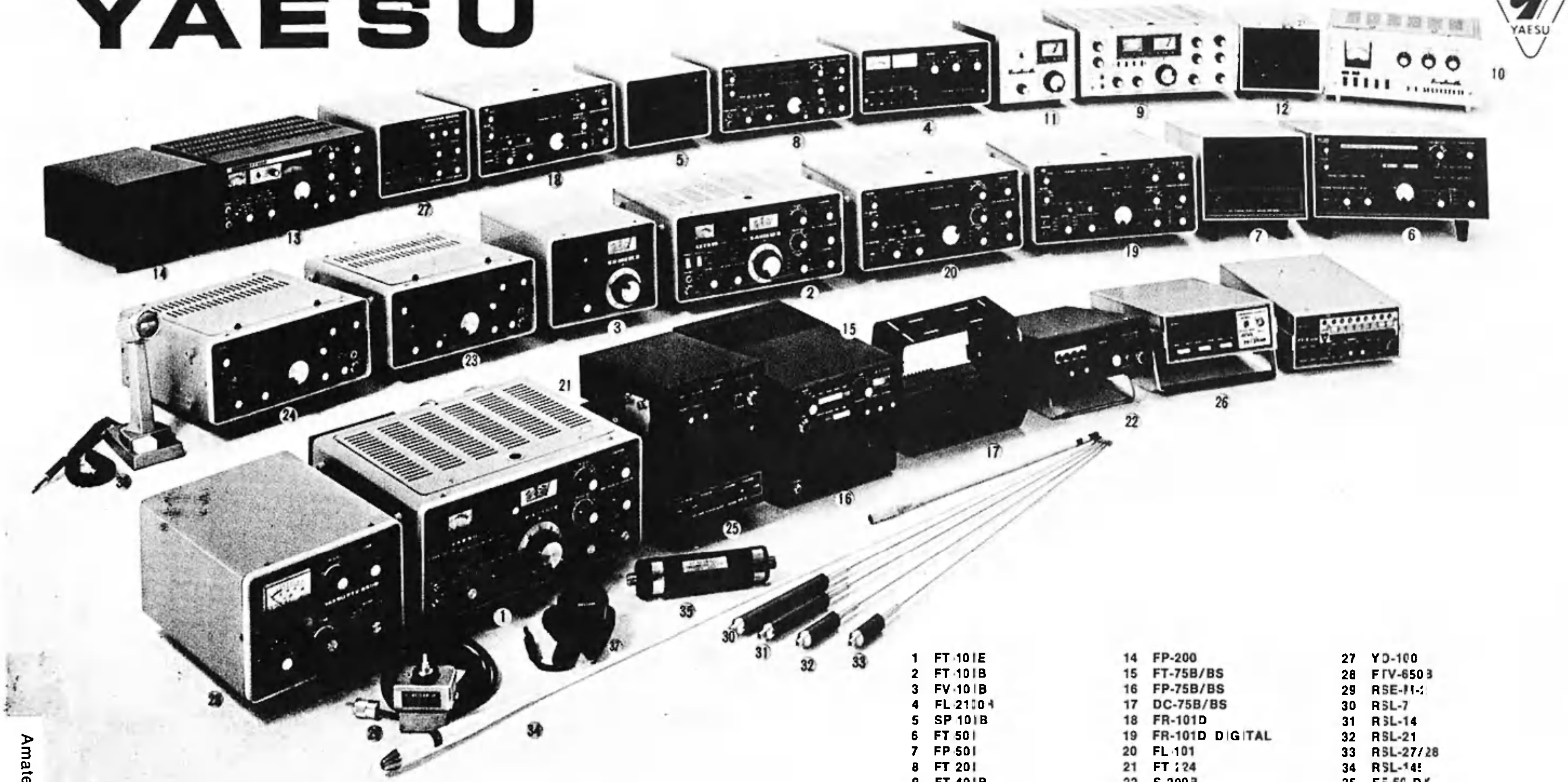


FIG. 14. A.F. AMPLIFIER.

YAESU



1	FT-101E	14	FP-200	27	YD-100
2	FT-101B	15	FT-75B/BS	28	FTV-650B
3	FV-101B	16	FP-75B/BS	29	RSE-M-2
4	FL-2100B	17	DC-75B/BS	30	RSL-7
5	SP-101B	18	FR-101D	31	RSL-14
6	FT 501	19	FR-101D DIGITAL	32	RSL-21
7	FP 501	20	FL 101	33	RSL-27/28
8	FT 201	21	FT 224	34	RSL-145
9	FT 401B	22	S 200R	35	FF-50-DK
10	FL 2000B	23	FT 220	36	YD-844
11	FV-401	24	FT 620B	37	YD-846
12	SP-401	25	FP 2		
13	FT 200	26	YC-355D		

NOTE: FT 201 now deleted. FT-101B replaced by FT-101EE and FT-220 replaced by FT-221. Most lines regularly imported.

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YAESU MEASURING EQUIPMENT

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YC-355D

200 MHz FREQUENCY COUNTER

YAESU offers the active amateur 200 MHz frequency counter at an affordable price. Every complete station should include this versatile counter. The YC-355D utilises advanced IC techniques and a dual range system to provide accurate 8 digit readout to over 200 MHz. Both MHz and KHz indications are selectable over this range. Built-in AC and DC power supplies enable complete portability and double-sided epoxy circuit boards ensure stable and accurate operation with reliability for years to come. The YC-355D is another YAESU product with optimum performance at a reasonable price.

$299

TECHNICAL DATA

Frequency Range: 5 Hz to 35 MHz or 30 to 200 MHz.
Accuracy: ± time base stability ± 1 count.
Display Digits: 5 digits.
Gate Time: 1 mill-sec. or 1 sec.
Indicating Time: 0.1 sec. or 1 sec.
Display Units: KHz and MHz.
Input Voltage: 20mV-20V p-p continuous (60V p-p for 10 sec.), 0.5-2V-rms in the range 30 to 200 MHz.
Input Impedance: 1m ohm or 50 ohm.
Input Capacities: 20 pF maximum.
Clock Crystal: 1 MHz.
Stability: ±0.0005% at 25°C, ±0.0025% at $-40°C.
Aux. 1 MHz Output: 5V p-p.
Operating Temperature: 0-40°C (approx. 30-90°F).
Power Requirements: 100/110/117/200/220/234 V AC 50/60 Hz or 12 VDC.
Size: 220 (W) x 80(H) x 27(D) m/m.
Weight. 3.5 Kg.

YO-100

MONITOR SCOPE

Now, you, too, can maintain the cleanest sounding signal on the band with the YO-100 Monitor Scope. Compatible with virtually all transmitters and transceivers, the YO-100 features wide range inputs for all mode monitoring — even RTTY. A built-in 1500/1900 Hz tone generator adds to the versatility of this station accessory. A full compliment of front panel controls allows operator control of all key adjustments. Complete your station with the versatile YO-100 monitor scope.

$195

TECHNICAL DATA

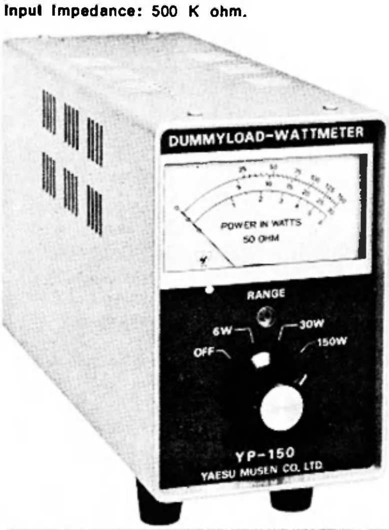
VERTICAL

Sensitivity: 200m V P-P/cm.
Frequency Response: 10 Hz to 40 KHz ±3dB 3180 kHz (455 kHz or 9 MHz inputs optional). Direct 10 Hz to 60 MHz.
Input Impedance: 500 K ohm.

HORIZONTAL

Sensitivity: 300m V/cm.
Frequency Response: 10 Hz to 16 KHz ±3 dB.
Input Impedance: 500 K ohm.
Sweep Frequency: 10 Hz to 10 KHz.

TWO TONE GENERATOR
Frequency: 1500 Hz and 1900 Hz.
Output Level: 50m V.
Power Requirements: 100/110/117/200/220/234 V AC 50/60 Hz.
Size: 210(W) x 150(H) x 290(D) m/m.
Weight: 6 Kg.



YP-150

DUMMY LOAD/POWER METER

The Model YP-150 can be used as dummy load and power meter within the frequency range of 1.8 MHz to 200 MHz. Three switch selected scales assure accurate power measurement in high and low power range. Built-in fan cools unit for stable measurement.

$88.50

TECHNICAL DATA

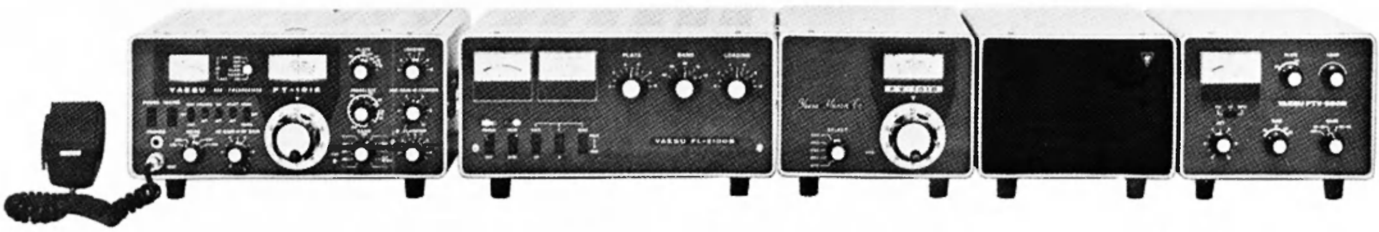
Frequency Range: 1.8 MHz-200 MHz.
Impedance: 50 ohm unbalanced.
Power Scale: 0-6 watts, 0-30 watts, 0-150 watts.
VSWR: Less than 1.2 at 145 MHz.
Maximum Error: Within 10% of maximum scale.
Size: 104(W) x 153(H) x 280(D) m/m.
Weight: 2 kg.

All prices include Sales Tax. Freight and Insurance extra. Prices and specifications subject to change.

BAIL ELECTRONIC SERVICES

ADVANCED AMATEUR COMMUNICATION EQUIPMENT
FROM THE WORLD LEADERS – YAESU

YAESU



FT-101E TRANSCEIVER: 160-10 Mx, SSB, AM, CW, PA two x 6JS6C, 260W PEP Input SSB. Built-in dual AC/DC power supply. **BUILT-IN RF SPEECH PROCESSOR.** Solid state except for Tx. PA and driver. IF noise blanker, FET Rx RF clarifier, built-in speaker. **$698.**

FT-101EE: Same as above, but without speech processor. **$649.**

M-101 MOBILE MOUNT for FT-101E. **$26.**

FT-200 TRANSCEIVER: 80-10 Mx, PA two x 6JS6C, 260W peak input SSB. Manual, PTT or VOX control, offset tuning, calibrator, operates from a separate power supply. **FP-200:** Yaesu AC power supply for FT-200, in matching cabinet with built-in speaker. Power supply and transceiver. **$448.**

FT-75B TRANSCEIVER: SSB and CW. VOX, noise blanker, squelch. Very small size, transistorised, a superb little rig. 80W PEP. Microphone and five crystals included. **$295.**

FT-75BS: Same as above, but low power for Novice use. Includes three crystals, 3565, 21175 and 27125 kHz. **$276.**

FP-75B/BS AC/DC POWER SUPPLY: 230V for FT-75B. Built-in speaker, power cable and plug. **$74.**

DC-75B/BS DC POWER SUPPLY: 12V for FT-75B. Includes built-in speaker, mobile mount, power cable and plug. **$80.**

FL-101 TRANSMITTER: Solid state 160-10m, PA two 6JS6C, all facilities. Companion unit to FR-101. **$515.**

FL-101 SPEECH PROCESSOR: For installation in the FL-101. **$52.75.**

FR-101D RECEIVER: All solid state, 23 bands inc. all amateur bands 160-10m plus 6 and 2m, FM, CW, etc. etc. **$723.**

FR-101D DIGITAL: Has all the options of the FR-101D as well as DIGITAL READOUT. **$889.**

FT-501 DIGITAL READOUT TRANSCEIVER: 80-10m, SSB CW, 500W peak input, Includes 2-speed cooling fan, noise blanker, clarifier, VOX and etc. Inc. matching AC PS. **$865.**

FL-2000B LINEAR AMPLIFIER: 80-10m tubes, two x 572B triodes in GG, twin fan cooled. **$435.**

FL-2100B LINEAR AMPLIFIER: Similar to FL-2000B, but styled to match FT-101E. **$435.**

FT-620B SIX METRE SSB AM, CW, TRANSCEIVER: 10W solid state, inc. calibrator and AM filter. **$468.**

FT-221 TWO METRE TRANSCEIVER: Features all mode operation — SSB/FM/CW/AM — with repeater offset capability. 144-148 MHz coverage using advanced phase-locked loop circuitry. **$588.**

M-620/221 MOBILE MOUNT for FT-620B and FT-221. **$26.**

S2000R TWO METRE SYNTHESISED FM TRANSCEIVER: 200 channels. 10W solid state. Simplex, repeater, and priority channel facilities. **$435.**

FTV-650B SIX METRE TRANSVERTER: Converts 28 MHz. SSB to VHF, and includes receiving converter. Primarily designed for coupling with Yaesu transmitters and transceivers. **$190.**

FTV-250B TWO METRE TRANSVERTER: TBA.

FT-224 TWO METRE FM TRANSCEIVER: 10W, 23 channels, PLUS one priority channel. Includes B, 50, and one repeater channel, installed (1, 2, 3 or 4). **$246.**

FT-2 AUTO FM TRANSCEIVER: Similar to FT-224, but with addition of automatic scanning facility, etc. Includes B, 50 and one repeater channel (1, 2, 3 or 4). **$398.**

M-2 AUTO MOBILE MOUNT, for FT-2 Auto. **$15.**

YC-355D FREQUENCY COUNTER: 200 MHz. **$299.**

YO-100 MONITORSCOPE: Matches the FT-101E, but can be used with other Yaesu equipment. (IF kits 455 kHz and 9 MHz optional extra). **$195.**

YP-150 DUMMY LOAD/POWER METER: For use over the frequency range 1.8-200 MHz. Three power ranges, 0-6W, 0-30W, 0-150W with built-in cooling fan. **$88.50.**

FF-50DX 3-SECTION LOW PASS FILTER for TVI reduction. **$29.50.**

F-101 FAN. $35.

MATCHING EXTERNAL SPEAKERS for FT-401, FT-101, FR-101. **$38.**

OPTIONAL CRYSTAL FILTERS. $45.

MATCHING VFOs: FV-401, FV-101B, FV-200, each **$120.** FV-50C (for FT-75B). **$71.50.**

YC-601 DIGITAL READOUT for FT-101E and FT-401. TBA.

YD-844 DESK MICROPHONE: Yaesu De Luxe PTT Dynamic type with stand. PTT switch. PTT also actuated when lifted from deck. **$39.50.**

RS SERIES HF GUTTER MOUNT MOBILE ANTENNAS: RS Base and Mast (doubles as ¼ wave on 2m). **$16.00.** Coil and Tip Rods: RSL-7, **$14.00.** RSL-14, **$13.00.** RSL21, **$12.** RSL-27/28, **$11.**

As the sole authorised Yaesu agent for Australia, we provide pre-sales checking of sets, after-sales services, spares availability and 90-day warranty.

Quote type and serial number of set when ordering spares. All prices include sales tax. Freight is extra. Prices and specifications subject to change without notice. Allow 50c per $100 for insurance.

BAIL ELECTRONIC SERVICES

COMPLETE RANGE OF ACCESSO

HIDAKA Cush Craft ASAHI ANTENNA

SCALAR ANTENNAS

HF MONOBANDERS

204BA, 4 element 20m. Beam	$194
203BA, 3 element 20m. Beam	$168
VS-20CL 3 elem. W.S. 20m beam, Inc. Balun	$154.50

HF DUO BAND

VS-22 3 element 15-11/10m	$118

HF TRIBAND BEAMS

TH6DXX, 6-element trap Beam	$248
TH3Mk3, 3-element trap Beam	$199
TH3Jr, 3-element trap Beam	$146.50
HY-QUAD 2-element Quad Beam	$225
VS-33 (Equiv. TH3Mk3) Inc. Balun	$179

NOVICE BEAMS

CB-3 3-element 11m	$47.50
CB-5 5-element 11m	$65.00
Long John 5-element (wide spaced) 11m	$87.50
Eliminator II, 2-element Quad. Sw'ble polarisation, 11m	$85.00
Big Gun II 4-element Quad. Sw'ble polarisation, 11m	$182.00
SDB-6 Stacked 6-el Beam (3 + 3)	$128.00

HF VERTICALS

VS41/80KR 10m thru 80m, Inc. 11m	$80
14AVQ, 10m thru 40m trap Vertical	$67.50
18AVT, 10m thru 80m trap Vertical	$98.50
12AVQ, 10m thru 20m trap Vertical	$48
18V 10m thru 80m base loaded Vertical	$35
18HT 10m thru 80m Tower	$275
VS-RG Radial Kit for VS-41/80KR	$22.50
Golden CLR-2 ⅝ wave, 11m heavy duty G.P. 4 dB	$59.00
CLR-2 ⅝ wave, 11m G.P.	$45.00
GPGP ¼ wave, 11m G.P.	$23.00
GOLDEN ROD ½ wave, 11m 3.75 dB	$35.00
CR-1 ½ wave Ringo, 11m 3.75 dB	$39.00

HF MOBILE WHIPS AND FITTINGS

HY-GAIN NOVICE MOBILE ANTENNAS

HELL CAT 3 35" Magnetic base, 11m	$33.00
AQUA CAT 108" Marine, 11m (no ground plane req'd.)	$69.00
HELL CAT 9. 58" Marine (no ground plane req'd.), 11m	$36.50
W-102 102" S.S. Whip	$15.55

SCALAR MOBILE WHIPS

M-22T ¼ wave 2m whip top	$5.95
M-25T ⅝ wave 2m whip top	$15.00
M27-R60T 5ft. 11m C.L. whip top	$18.90
M-35T 4.5 dB Gain, 435 MHz S.S. whip top with spring	$18.00
M.B. Standard base	$4.20
MAGBASE inc. 12ft. of RG-58/AU	$30.00

ASAHI

AS-303A HF Mobile Antenna set, centre loaded type 3.5-27/28 MHz, 400 W PEP, consists of common mast 4'6", telescoping to 2'6" for convenient stowage, five interchangeable loading coils with tip rods, and adjusting spanners inc., making a total height of approx. 7', with HD spring and ball mount. Beautifully engineered, feeds direct with 50 ohm co-ax. The complete set a steal at **$108.**

AS-NK matching SS Bumper Mount Adapter, for AS303A. **$14.**

MARK MOBILE

Helical:

HW-80-8 80m, 8 ft.	$49	HW-15, 15m, 4ft.	$24.00
HW- 80, 80m, 6ft.	$30	HW-11, 11m, 4ft.	$24.00
HW- 40, 40m, 6ft.	$28.50	HW-11, 11m, 6ft.	$25.50
HW- 20, 20m, 6ft.	$25.50	HW-10, 10m, 4ft.	$24.00

FITTINGS: (Suit all makes with ⅜" x 24 thread).

BPR, bumper mount	$15
BDYF, heavy duty adjustable body mount	$15
HWM-1, fixed body mount	$14
SPG, heavy duty spring	$11
SPGM, light duty miniature spring	$6
Asahi AS-KRB, flat roof mounting adapter for vertical trap antennas	$15
C30-32 Ball Mount & Spring	$18

VHF ANTENNAS

HY GAIN

23, 3-element 2m Beam	$18.00
28, 8-element 2m Beam	$38.00
215B 15-element 2m super-beam	$69.00
GPG-2 2m ⅝ wave ground-plane	$27.50
64B 4-element 6m beam	$48.00
66B 6-element 6m beam	$79.00

CUSH CRAFT

ARX-2 three half wave 6dB gamma loop matched vertical	$40.00
ARX-450, 435-450 MHz three half wave 6dB Ringo	$36.00
AR-6, 6m ½ wave Ringo 3.75 db	$36.00
A144-7, 7-element 2m Beam	$25.00
A144-11, 11-element 2m Beam	$35.00
A144-20T, 20-element 2m "Twist" Beam	$72.00
A50-3, 3-element 6m Beam	$37.00
A50-5, 5-element 6m Beam	$57.00
A430-11, 11-element 430 MHz Beam	$25.00

VHF MOBILE ANTENNAS

HY-GAIN

265 ⅝ wave Magmount for 2m, inc. co-ax	$41.00
270 Double stacked ⅝-wave fibreglass whip for 2m	$45.00
271 Mount for 270	$6.00

ASAHI

AS-2HR, ⅝-wave SS 2m gutter mount, inc. co-ax.	$45.00
AS-2P40 as above, but fibreglass whip	$36.00
AS-2HRF ⅝-wave cowl mount type	$42.00
AS-6RD 6m centre loaded SS whip with gutter mount	$22.50

BAIL ELECTRONIC SERVICES

)RIES FROM BAIL ELECTRONICS

HI-MOUND

SR

KW

STANDARD VHF TRANSCEIVERS

SR-C146A, 2m hand held 5 chan. 2W transceiver, inc. carrying case and 3 chs. $162.00

SR-C432A, 70cm hand held 6 chan. 2W transceiver, inc. carrying case and 1 chn (435 MHz) $239.00

SR-C430 70cm 12 chan. 10 watt mobile transceiver inc. 1 ch (435 MHz) $275.00

STANDARD ACCESSORIES

CMP08 Hand mic. for SR-C146A and SR-C432A $18.50

CAT08 Rubber antenna (helical) for SR-C146A $8.00

Heavy Duty Carrying Case for hand held units $13.50

AC Adapter and charger for hand held units $32.50

Mobile Adapter for hand held units $11.50

AC Charger only $9.00

BALUNS

HY GAIN

BN-86, broad-band ferrite Balun, 2 kW for Beams and Doublets $25.00

BN-27A as above especially for 11m $23.00

ROTATORS

CDR

Ham II, 230 V AC $189.50

CD-44 Medium duty rotator, 230 V $128.00

AR-22L Light, low cost rotator, 230 V $65.00

Cable, 8 Conductor, for Ham II CD-44 .... **75 cents yd.**

ANTENNA ACCESSORIES

HY GAIN

LA-1, Lightning Arrestor, for installation in standard 52 or 72 co-axial feedline, designed to Mil. specs. $39.00

LA-2, smaller size co-ax arrestor $8.75

421A, Power meter, 3-60 MHz, reads SWR, power on 10, 100 & 500 W scales, and AM modulation percentage. Especially made for Novice & Marine 11m use $48.00

421B, Similar to above but with 20, 200W and 2kW Scales $58.00

KW TVI filter 5 Section, SO-239 connectors. A superior job with excellent attenuation $48.00

Q CRAFT

Porcelain Egg insulators .... **20 cents**

WIDE RANGE of Co-axial cable and connectors in stock.

K-20 70 ohm Twin feeder .... **27 cents** per yd.

KW ELECTRONICS

Multi-band dipole traps with ceramic "T" centre insulator, 80-10m bands per pair complete with insulator $26.50

Co-axial cable switch, 3 positions $24.00

B & W

Co-axial cable switches, 5 position, Model 590G $25.00

SWR METERS AND DUMMY LOADS

Q CRAFT

SWFS-2, single meter type, combined SWR and FS meter, 50 ohms, inc. FS pick-up whip, size 5" x 2" x 2¼". 3-150 MHz, UHF connectors $16.50

SWR-2, dual meters, 50 ohms. Simultaneous reading of forward and reflected power, 5' x 2" x 2¼". 3-150 MHz, UHF connectors $24.00

SWR-200 large dual meters, switched 50-75 ohms, with calibration chart for direct power readings to 2 kW in three ranges. A very elegant instrument, 7⅝" x 2¾" x 3¾" $58.00

KW ELECTRONICS

Z Match Antenna Couplers, 80 metres to 10 metres. Beautifully finished in communication grey (see review "QST" July, 1972):—

KW E-Zee Match, screw terminals at rear, size 5½" x 6" x 12" $76.50

KW-107 Supermatch, as above with addition of SWR meter, power meter with large 50 ohm dummy load to read up to 1 kW PEP, UHF sockets at rear. A superb piece of equipment, 7" x 8" x 13" $209.00

KW-109 High power version of KW-107, larger condensers and coils $245.00

KW-103 SWR Power Meter uses toroidal coil pick-up for continuous operation 52 ohms 1 kW max. to 30 MHz SO239 UHF sockets very accurate $55.00

KW Dummy Load 52 ohm Air Cooled. Will handle up to 1 kW (ideal for use in workshop or field) $39.50

HEATH KIT

HN31 Cantenna Kit 1 kW oil cooled (oil not included) $31.00

OTHER ACCESSORIES

AT-3 RF actuated CW Monitor and **Code Practice Audio** Osc. uses 4 transistors, 2 diodes, with built-in speaker and tone control. Requires one UM3 penlite cell. In grey metal case, 2' x 3¼" x 3½" $16.00

EKM-1A Audio Morse CP Osc with speaker, one transistor. Headphone socket and tone control, requires one UM3 cell, in metal case 3⅝" x 2½" x 1⅛" $8.50

TC-701 Morse Practice Osc. with built-in key and spkr. Inc. battery and auxiliary earpiece. Copy of morse code on case. Two can be wired together to form a practice communication set $16.50

MC-701 Mic. Compressor, battery operated. Available with 4 pin mic. connector $45.00

MORSE KEYS

EK-108A Electronic keyer, super quality, IC with dot memory. Built-in monitor & paddle. Solid state "relay". 230 V AC $79.50

EK108D, DC, same as EK108A but takes 2 size 'D' cells $72.00

HI-MOUND

HK-701 De luxe heavy duty morse key. Heavy base. A really beautifully constructed and finished unit. Fitted with a dust cover, standard knob and knob plate $26.00

HK-708 Economy key, all black ABS resin base and chromed mechanism $9.95

HK-707, Similar to above but with dust cover and standard knob $15.00

HK-808, Commercial hand key with ball race pivots, heavy poly marble base and plastic dust cover $45.00

MK-701 Side Swiper key to actuate Electronic keyer $27.00

BK-100 (BUG) Semi-automatic bug key, full adjustable $35.00

MONITOR RECEIVERS

SC101, Automatic scanning receiver, 4 VHF chns., 4 UHF chns. RF stages, tuned to 146 and 435 MHz **$135,** Xtals extra.

MR-2, Mini Monitor. 12 ch. pocket receiver VHF. **$98,** Xtals extra

Also available: Equipment for novice and Marine use on 11m band. Antennas, beams, Walkie Talkies, base stations, and accessories. Digital clocks, SSTV, Generator noise filters.

Servicing facilities for all types of Amateur and Novice equipment. We check all sets before sale and provide a 90 day warranty.

All prices incl. S.T. Postage and freight extra. Prices and specifications subject to change without notice. Availability depends on stock position at time of ordering.

BAIL ELECTRONIC SERVICES

YAESU VHF FM TRANSCEIVERS FROM THE SOLE

FT-224

• 24 Channel FM Transceiver

Join the action on FM - the "Fun Mode". The FT-224 is an advanced, solid state transceiver, that features 10 Watts and 23 channel flexibility plus one priority channel, all in one compact package. The FT-224 includes a built-in tone burst for repeater actuation and three popular channels installed. Additional plus features includes automatic high VSWR protection of the final output transistor, and reverse power line polarity protection. The FT-224 comes complete with a built-in speaker, mobile mounting bracket, and dynamic microphone.

Sigmasizer-200R

• 200 Channel Synthesized Transceiver

YAESU now offers the FM enthusiast a complete, solid-state, 200 channel 2 Meter FM transceiver. The Sigmasizer-200R features advanced, synthesized circuitry for total repeater and simplex coverage of the 144 to 146 MHz or 146 to 148 MHz FM band. Frequencies are selectable in 10 KHz increments and front panel selectable ±600 KHz transmitter offset oscillators give complete flexibility for repeater operation. A built-in tone burst oscillator is included for activation of tone coded repeater systems. A priority channel may be preset for instant selection of

FT-221

• Solid State 2 Meter Transceiver with Versatile SSB/FM/CW/AM Operation

Features

* Complete 144-148 MHz coverage in 8 band segments
* Dual rate, concentric VFO dial drive with better than 1 kHz readout
* Built-in AC & DC power supplies
* SSB/CW/FM/AM operation
* Selectable ±600 kHz repeater offset
* Built-in VOX and break-in CW
* External tone input connector
* Built-in 100 kHz calibrator
* Built-in effective noise blanker
* Three way metering: S meter, power output, and FM discriminator
* 11 crystal channels per band segment = Total 88 channel
* SSB output 12 watts PEP
FM/CW output 14 watts
AM output 2.5 watts
* Built-in speaker

Prices include Sales Tax. Freight and insurance extra.

Prices and specifications are subject to change.

All sets are pre-checked before dispatch and are covered by our 90 Day Warranty.

AUSTRALIAN AGENTS – BAIL ELECTRONIC SERVICES

You, too, can enjoy the action on FM with your own FT-224.

TECHNICAL DATA

GENERAL

Frequency Range: 146 to 148 MHz.
Number of Channels: 23 plus 1 priority channel.
Mode: FM.
Frequency Stability: ± 0.001%.
Antenna Impedance: 52 Ohm unbalanced.
Circuitry: 30 Transistors, 23 Diodes, 4 IC, 5 FET.
Power Source: 13.5 VDC.
Power Requirement: 0.4 A receive, 2.2 A transmit (DC).
Size: 180(W)x70(H)x220(D) m/m.
Weight: 2.5 Kg.

RECEIVER

Sencitivity: 0.3 μV for 20 dB quieting
Selectivity: 15 KHz at 6dB, 25 KHz at 60dB.
Audio Output: 2.5 Watts at 4 Ohm

TRANSMITTER

RF Output Power: 1 or 10 Watts.
Spurious Radiation: -60 dB better than -60 dB.
Deviation: ±5 kHz nominal.

PRICE $246

FP-2

AC POWER SUPPLY FOR HOME OPERATION

The FP-2 can be used with the FT-224 or Sigmasizer-200R supplying regulated 13.5 V DC. Provision has been made for installation of optional colloid batteries which are automatically charged, and connected when the AC supply stops. The colloid batteries last approximately 10 hours. Contains a 80 x 120 m/m speaker.

Output: 13.5 V DC, 2.2 A maximum.
Power Requirement: 100/110/117/200/220/234 V AC, 50/60 Hz, 35 Watts.
Size: 160(W) x 120(H) x 230(D) m/m.
Weight: 4 Kg.

PRICE $69

your favorite channel. Automatic final protection against high VSWR is another total performance feature of this outstanding transceiver.

TECHNICAL DATA

GENERAL

Frequency Range: 146 to 148 MHz.
Number of Channels: 200 (10 KHz intervals) Simplex and ±600 KHz TX offset for Repeater operation.
Mode: FM.
Frequency Stability: ±0.001%.
Antenna Impedance: 52 Ohm unbalanced.
Power Source: 13.8 V DC (negative ground).
Power Requirement: 0.45A receive, 2.2A transmit.
Size: 220(W)x80(H)x230(D) m/m.
Weight: 3 Kg.

Sensitivity: 0.3 μV for 20 dB quieting
Selectivity: ±8 KHz at 6 dB, ±16 KHz at 60 dB.
Audio Output: 2 Watts at 4 Ohm

TRANSMITTER

RF Output Power: 1 or 10 Watts.
Spurious Radiation: -60 dB minimum.
Deviation: ±5 KHz nominal.

PRICE $435 (two only, special at $390)

TECHNICAL DATA

GENERAL

Frequency Range: 144.00 to 148.00 MHz in eight 500 kHz segments.
Mode: SSB (selectable USB or LSB), AM, FM or CW.
Frequency Stability: Within 100 Hz during any 30 minute period after warm-up. Not more than 20 Hz with 10% line voltage variation.
Calibration Accuracy: 1 kHz maximum after 100 kHz calibration.
Backlash: Not more than 50 Hz.
Antenna Impedance: 50 ohm unbalanced nominal.
Power Requirement: 100/110/117/200/220/234 V AC, 50/60 Hz, 100 VA maximum or 13.5 V DC, 3A transmit maximum (11.5 –16.5 V DC).
Size: 208 (W) x 125 (H) x 295 (D) mm.
Weight: 8.5 kg.

RECEIVER

Sensitivity: 0.5 μV for 10 dB Noise plus Signal to Noise Ratio on SSB/CW. 1.0 μV for 10 dB Noise plus Signal to Noise Ratio with 400 Hz 30% modulation on AM. 0.75 μV for 20 dB quieting on FM.
Selectivity: 2.4 kHz nominal bandwidth at 6 dB down, 4.1 kHz at 60 dB down on SSB/CW/AM. ±6 kHz nominal bandwidth at 6 dB down, ±12 kHz at 60 dB down on FM.
Harmonic & Spurious Response: Image Ratio better than 60 dB.
Audio Output: 2 Watts to internal or external speaker at 4 ohm impedance.
Squelch Threshold: Less than 0.3 μV.
I.F. Frequencies: SSB/AM/CW 10.7 MHz, FM 10.7 MHz and 455 kHz.

TRANSMITTER

Spurious Radiation: –60 dB.
Frequency Response: Balanced SSB 300 to 2700 Hz ±3 dB. Low power AM better than 60%. Variable reactance FM ±5 kHz maximum.
Carrier Suppression: –50 dB.
Sideband Suppression: –50 dB.

PRICE $588

signal input and almost zero under full signal input. With the gate 2 and source dividers values used, the resulting gate 2 voltages on the controlled stages will vary from about 4.5V with no signal to —1.2V under full input.

AM detection is accomplished by an envelope detector capacitively coupled from the drain of the 3rd IF amplifier. SSB demodulation is obtained by a product detector using another MPF121 dual gate FET. The 9 MHz carrier is fed to gate 2 and the IF signal to gate 1. The drain inductance is a transistor radio AF choke.

AF AMPLIFIER

The mode selector switch feeds the required detector output to the AF volume control which is then coupled to a 2N3565 AF pre-amplifier. The collector is capacitively coupled to the input of the I/C power amplifier (LM 380), which drives an 8 ohm speaker.

CONSTRUCTION

Construction will largely depend on personal ideas and preferences. The author used a Horward instrument cabinet type H84-12-VA which measures 12 x 8 x 4 inches. These neat cabinets have a heavy aluminium front and rear which double as heat sinks, the power supply 2N3055, transmitter driver, and P/A being mounted on the rear panel. A sub-chassis is fitted about 1⅜ in. up from the bottom to provide mounting of the modules etc. The following modules are mounted underneath; SSB generator receiver, front end/IF/detector, Transmit mixer and auxiliary oscillator/amp. The VFO and power transformer are fixed to the top of the chassis. Also mounted on the top but with the boards vertical are the AF Amplifier, power supply and Tx P/A boards. The modules mounted flat on the chassis are stood off by ¼ inch stand offs.

FINAL COMMENTS

It is not envisaged that this rig would be copied entirely as described, but provide ideas for anyone contemplating a similar project. Therefore a detailed alignment procedure is not included. However the following hints may be helpful.

Alignment of the bandpass circuits is best carried out using a sweep generator. Alternatively the alignment can be carried out by varying the VFO frequency and changing ranges, carrying out alignment for a constant output voltage. As it is becoming increasingly easier to obtain access to frequency counters, the adjustment of the crystal and VFO frequencies is best carried out by this method.

As the development of a large project such as this takes many years, new components become available which outperform others used in the early stages of development. A really dedicated experimenter would scrap circuits and components and start again! Fortunately, work on the receiver was not started before MPF121s became available, and no doubt more of these devices would have been used in other circuits had they been available earlier.

Finally, the author would like to thank those who made helpful suggestions during development, also the many who assisted during on-air testing. ■

FIXED CHANNELS FOR THE FT200

George Francis VK3HV
31 Donald St., Morwell, 3840

Here is an idea for FT200 enthusiasts. Fixed channel operation is often useful for:

(a) Regular net calling and listening, e.g., Zone nets, beacon frequencies, national calling frequencies.
(b) Civil Defence and Emergency use subject to approval by the relevant authorities).
(c) (Quick, accurate, eyes-on-the-road frequency changes while mobile — Ed.)
(d) Split frequency HF DX operation and VHF operation.

Although a fixed channel option kit can be purchased, readers may prefer to build their own unit for installation inside their FT200 (earlier models), or for mounting in an external case (later models). The earlier models had provision for selection of VFO or from fixed channels via a front panel switch but later models have an Internal/External VFO switch.

The circuit suggested (Fig. 1) is similar to that used by Yaesu and although not tested by the author, it would be easy to build and should not give any difficulties. The switch S1 may be the internal channel selector switch and one of the constructors choice. A swing of about 1 kHz when using the clarifier may be expected when using HC-6/U type crystals (parallel resonance).

To calculate the required crystal frequency, use the Difference Frequency Table.

Example 1. Required frequency 7099 kHz using LSB. From chart below the difference frequency is 2001.5 kHz, therefore 7099 — 2001.5 = 5097.5 required xtal. frequency.

Example 2. If 21420 kHz is required using USB, then 26498.5 — 21420 = 5078.5 kHz crystal required. Note bands 3.5, 21, 28, 29.5 use difference frequency minus required frequency. Bands 7 and 14 required frequency minus difference frequency. ■

DIFFERENCE FREQUENCY TABLE

Band	Normal	Rev	AM/CW
3.5	9001.5 (L)	8998.5 (U)	9001.5 (N)
7	2001.5 (L)	1998.5 (U)	1998.5 (R)
14	8998.5 (U)	9001.5 (L)	9001.5 (R)
21	26498.5 (U)	26501.5 (L)	26498.5 (N)
28.0	33498.5 (U)	33501.5 (L)	33498.5 (N)
28.5	33998.5 (U)	34001.5 (L)	33998.5 (N)
29.0	34498.5 (U)	34501.5 (L)	34498.5 (N)
29.5	34998.5 (U)	35001.5 (L)	34998.5 (N)

L — LSB
U — USB
N — NOR
R — REV

Frequencies in kHz

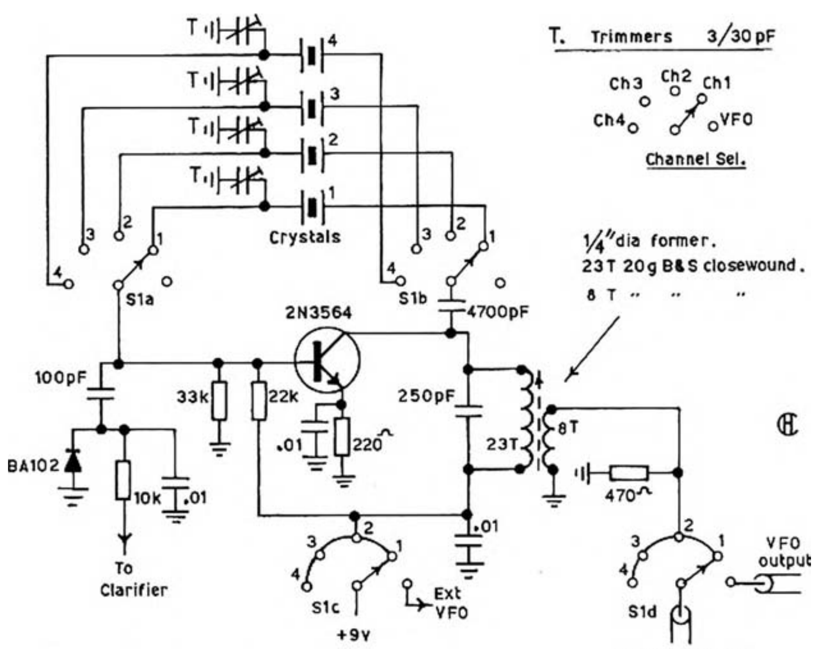


FIG.1. OSCILLATOR CIRCUIT.

A BEGINNER'S GUIDE TO THE 6 METRE BAND

Geoff Wilson VK3AMK
7 Norman Ave., Frankston, Vic. 3199

Firstly, what is the Six Metre Band? It is the lowest frequency VHF band available for amateur use and in VK at present covers 52-54 MHz. This is the upper half of the international 6 Mx band which is 50-54 MHz (as used in the USA, Japan, etc.).

Unfortunately at present the lower 2 MHz in Australia is part of TV channel 0. In New Zealand the 6 Mx band is from 51-53 MHz with the lower 1 MHz (50-51 MHz) forming part of their TV channel 1.

Being a VHF band it is different from the normal HF bands in that most of the time VHF propagation characteristics apply but it is also low enough in frequency to be influenced at times by the same factors which affect HF bands and this can produce extremely interesting VHF DX paths. Under the right conditions this can enable the Limited Licensee to work beyond VK which is normally impossible other than via Oscar on 2M.

Conditions vary considerably with the time of the year and the time of the sunspot cycle etc. but the constantly changing nature of the band is one of its most interesting aspects. There are probably more modes of propagation found in the 50 MHz region than on any other single Amateur band. From this point of view alone 6 Mx is a very useful starting point for anyone wishing to experiment with propagation or equipment.

This is one band where quite modest equipment can be very effective indeed, for example many JA stations are worked from VK (especially the northern areas such as VK4) and the power limit on the 6 Mx band in JA is 50 watts. Many of the JAs run 20 watts or less yet still produce strong signals even in the southern parts of VK when the band opens up. For working within VK even 5 or 10 watts is often adequate provided a good antenna is used but naturally higher power is helpful at times when conditions are difficult.

Currently the most popular modes used on the 6 Mx band are SSB (in the section 52.0-52.5 where tunable operation takes place) and FM (mainly on the internationally recognised frequency of 52.525). In addition there are other FM and AM net frequencies but these are used on a regional or local basis. At present there are no FM repeaters in VK on the 6 Mx band. Simplex FM operation while useful has definite limitations especially if the band opens and many stations want to work DX. It is preferable to be able to operate tunable equipment for DX working and SSB has now become almost the exclusive mode for this although a few AM and CW stations remain active too.

Equipment can either be built or purchased ready made. There are now a number of transverters available for use with commercially built transceivers used on HF, and separate 6 Mx transceivers are available. For those interested in building their own equipment a 6 Mx transverter is a fairly simple and very enjoyable project which any Amateur should be able to produce. Numerous good circuits are available in the various Amateur technical publications.

In most VK call areas beacons have been established on the 6 Mx band to study propagation and indicate band openings, especially in the more remote areas where local activity is not normally very high. (Refer to the "VHF UHF an expanding world" column for the current beacon list). In addition TV channels 0 and 1 in VK, and channel 1 in ZL, despite their higher ERP, are good indicators of likely 6 Mx openings.

The most common and possibly spectacular form of propagation found on 6 Mx is Sporadic E reflection. This carries the bulk of 6 Mx traffic within VK and peaks usually from November to January (summer DX "season") and to a lesser extent from May to July (winter DX "season"). It can and does occur at other times throughout the year, providing signals of varying strength, sometimes as good as summer peaks and others much weaker. Sporadic E signals are usually very strong (often DX signals will be stronger than even local stations within a mile or so) and the best skip is approximately 1,600 Km but it may be more and it can also be considerably less. These signals are reflected from clouds in the Sporadic E layer at a height of 60 to 100 Km above the earth and may produce a path giving single or double hop from the point of transmission to the point of reception. A typical opening would be from say Melbourne to Brisbane or Townsville around 10 am local time during December with signals peaking to S 9 plus. On this path it would be likely to open perhaps two days out of three at this time but the chances of this happening vary from season to season. The actual opening may last from a few minutes to several hours or more and may be repeated late in the afternoon or early evening. In the meantime the band may have opened to many other areas in a random fashion. Often a few watts is adequate to work these openings and all VK and ZL call areas as well as the closer Pacific countries can be worked on Sporadic E.

Other forms of 6 Mx propagation include:

Scatter

Forward scatter signals are scattered by the E layer giving paths up to 2200 Km or so *or* scattered by the troposphere at about 9 or 10 Km and giving paths up to 800 Km or so. Backscatter occurs where signals are reflected back into what would normally be the skip zone, this includes paths of 500 Km or less beyond the ground wave and short of the point where the sky wave returns to earth. Most scatter signals are weak compared with Sporadic E.

TEP (trans-equatorial propagation)

The typical path for this mode is Tokyo — Rockhampton etc. where seasonal propagation occurs between places roughly equally spaced either side of the magnetic equator.

F2

This mode provides the really long haul DX by multiple hop up to distances of almost 20,000 Km such as JA to LU etc mainly during solar peaks.

Auroral reflection

By aiming the antennas at each end at the southern polar regions signals can be reflected from auroras but, as these occur only basically in the higher latitudes on a regular basis during the sunspot peaks, the possibilities in VK are limited. Southern ZL is better situated for this particular mode which is usually characterised by rapid flutter or buzzing on the signals.

Meteor reflection

This mode depends upon ionized areas formed as a result of meteors striking the upper layers and reflects signals for periods from fractions of a second to half a minute or more.

Provided a stable transmitter and receiver is used in conjunction with an antenna having reasonable gain located well in the clear there is no reason why plenty of DX shouldn't be worked when conditions are right. A typical 6 Mx station today consists of a high frequency transceiver with an outboard transverter running about 50 watts PEP to a 5 element yagi about 10 Mx high.

Admittedly problems exist in Ch 0 TV areas, both with QRM from the TV transmitters and with TVI which, unlike HF TVI problems, has no simple solution. However, despite the TVI problem, Melbourne remains one of the most active areas on 6 Mx in VK and probably has more or at least as many stations active on the band as in Sydney where there is no TVI problem. Each TVI situation is different, depending upon local signal levels, antenna height above the surrounding houses, power level used etc. SSB has proved probably the best solution to TVI in as much as power levels can readily be reduced when conditions are good. This is much more desirable than running unnecessarily high power when the band is wide open, often 1 watt or less is sufficient to give very effective communication.

For those who have never operated 6 Mx

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why not give it a try? It can be a very rewarding, if at times frustrating, band. For those who may have operated on 6 Mx many years ago but closed down when TV started, how about building a transverter to use with your HF transceiver? There is plenty of room in which to operate as the CW/AM/SSB section on the low end is greater than the whole of the 20 Mx band. Most activity is found around the SSB calling frequency of 52.050 and a call on that frequency will bring a reply if anyone is about.

The 6 Mx band has the reputation of being the friendly band; most operators are only too willing to give any help or advice to the newcomer. Apart from having many enjoyable QSOs any additional stations active on the band will go a long way towards helping to retain what I consider to be our most interesting band. ■

A SIMPLE TOP BAND TRANSMITTER

J. Wallich (ex VK3ANY)
36 Darnley Gve., Gordon, 2072, NSW

This easy to build transmitter can be built from the average junk box in two weekends. Input power can be 10 to 20 watts depending on the power supply. This is adequate to give a large signal over hundreds of miles when conditions are reasonable, even with a modest antenna.

The transmitter uses conventional circuitry with valves throughout. The current drain is sufficiently moderate for the rig to be used as a mobile or portable station. As the individual constructor will want to use the components he has on hand, detailed constructional information is not given here.

This rig is used in conjunction with the transistorised top band receiver described previously by the author.

The VFO operates on 1.8 MHz and drives the final via an RC coupled buffer. Coils L1 and L2 are wound on ¼ inch diameter formers. They are therefore long coils. To achieve best stability of the VFO, a negative TC capacitor of 3 x 10 pF (C1) is enclosed in the coil can of L1. The constructor will find it fairly easy to select the right value by trial and error testing, using a hot soldering iron as a heat source. A very good degree of stability for this band can be achieved.

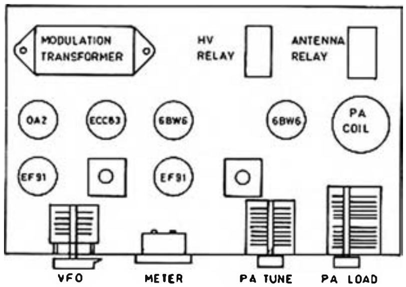

FIG 2 MAJOR COMPONENT LAYOUT OF TRANSMITTER

The VFO tuning capacitor C2 should be about 50 pF to cover the band. A slow motion drive is recommended.

The PA tank is wound on a 1¼ inch diameter PVC tubing obtained from a plumber. It consists of 24 turns of 20 B&S enamelled wire. C6 and C7 are padded with fixed value capacitors.

A crystal microphone is used to drive the speech amplifier V5. V4 runs in class A. The modulation transformer is a standard 10,000 ohm tapped secondary loud speaker transformer.

In conjunction with a whip antenna, this rig has given many hours of good service, both as a home and and portable station. ■

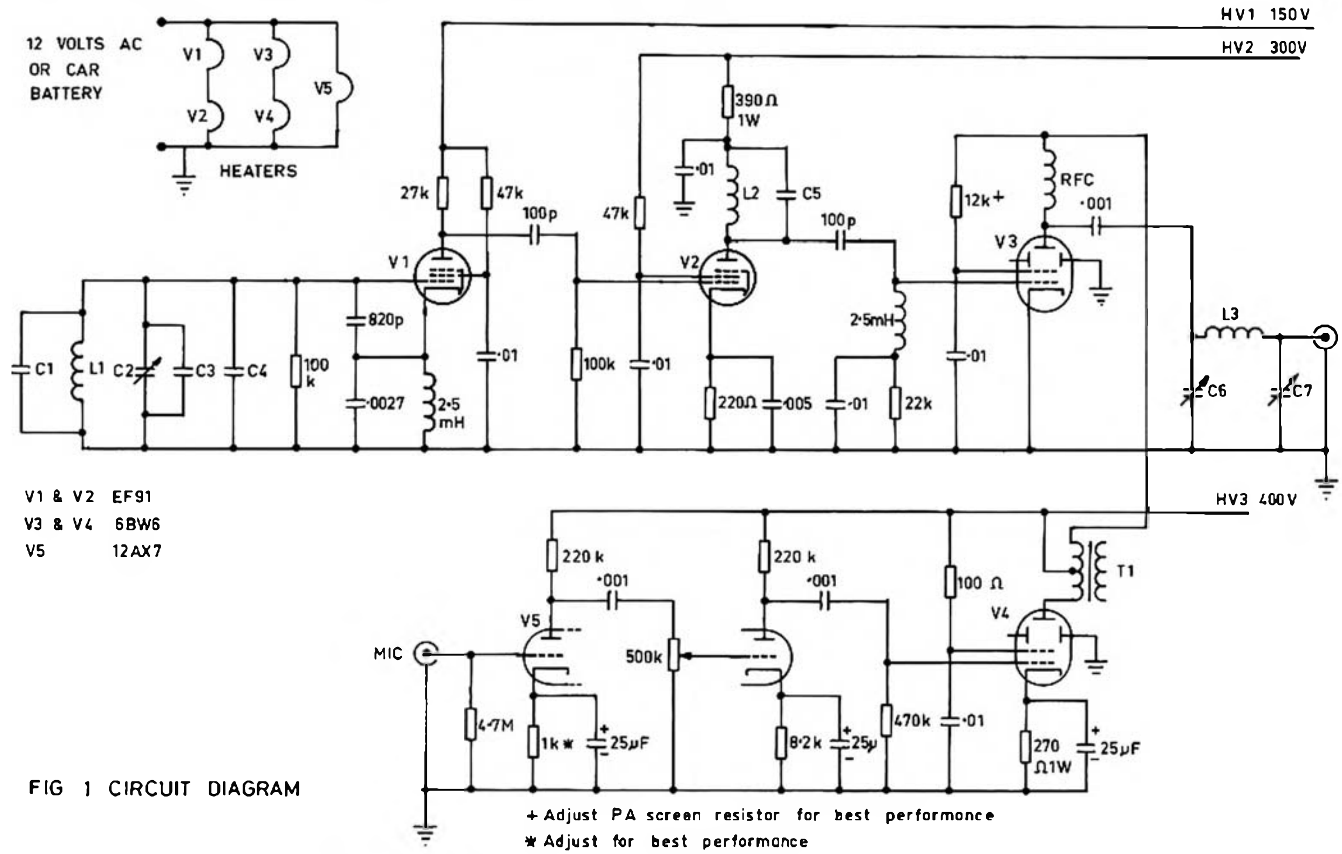

FIG 1 CIRCUIT DIAGRAM

THE GOLDEN YEARS OF AR IN VK

By OOTC No. 1823, Alan Shawsmith VK4SS
35 Whynot St., West End, 4101

Most of the OOTs who have been hams since what the Novice would call 'The Dream Time', i.e. fifty or more years ago, would say that their era, that of the Spark, was the Golden Age of Wireless. No one would argue this, or attempt to take from these pathfinders the romance and glory of their achievements. It must have been a fascinating period, indeed, when wireless and DX were being tried and proved for the first time.

However, there are OTs, rather than OOTs, who look back with nostalgia on the immediate pre-war years, i.e. 1930-39. They say that improved equipment, a big increase in the world-wide Ham population, good sunspot activity, fair-dinkum camaradie etc., all went to make AR a pleasant and interesting hobby; one which had none of the undesirable features of the modern 'rat-race'.

Again, some see the post-war II period as the all-time high. Sophisticated gear appeared, SSB, the rotary beam, the transceiver: a Contest Calendar and Awards Programme developed: IPS Charts came into being. The House of Hamdon extended its rooms, bringing with it new clubs and societies of diverse interests. Great migration occurred to the newly acquired bands of 15 and 10. Tremendous sunspot activity of 200 plus occurred in 1958/9, the like of which may not be seen again. All bands were wide open at S9 plus. Globe trotters Danny VP2VD, Gus W4BPD and Don W9WNV set up their gear at exotic spots and caused an all-time stir . . . . All this, plus a new official status — the tag of wireless experimenter, or hobbyist was replaced by "The Amateur Service".

Be all this as it may, it is not disputed that Australia has always been prominent in wireless experimentation. Even before WW1, telegraphists and others were endeavouring to send signals through space. However, it was not until the early 20s that licensed (the Government by this time had got into the scene) amateurs started to show themselves as a cohesive force, on the short wave bands. (They also played a tremendous part in the development of Broadcasting, which began about the same period — but that's another story).

These were the days of the now famous names of MacLurcan, Pike, Culliver, Howden, Hume, Elliot, McDowell, Coxon and others. To MacLurcan went the great honor of putting VK on the global DX map. In 1924, using only a few watts of power, he worked USA Ham Station 6EKY — a VK-W first. A few weeks later, he pulled another ace from the pack, by QSOing G-land on 20 metres. In the contact with 6EKY he is reported to have said "My hand trembled so much, I could hardly work the key".

From that time on, Hams, worldwide, showed how effective shortwave communication could be. MacLurcan continued on, working international DX whenever it appeared, until about 1928, when, like Alexander the Great who found himself with no more worlds to conquer, he pulled the big switch on DXing, as such. He had blazed the first trails and it follows that paths which lead to somewhere worthwhile soon attract many travellers. By 1930, SW-DX was commonplace.

It should be said here, that our Kiwi cobbers across the Tasman were right up with us as pathfinders. MacLurcan 2CM in Sydney, and Bell Z4AA in Waihimo, made the first VK/ZL QSO, early in 1923. In mid-1924, O'Meara 2AC Gisbourne, worked Brazzio of Argentina Sth. America approx. 10,000 km, to make the first ZL/SA International DX. Right on the heels of this, Bell Z4AA worked USA several times. In late 1924, he got through to UK to G2SZ on 90 Mx. Then Max Howden A3B in VK, QSOd G2OD a few weeks later.

For this writer, the Golden Age was that of the 1930s up to WWII. The hobby still had the "gone fishin" pace about it, which meant the quality of human relationship was better. Then, the esprit-de-corps prevailed: the bands were filled with personalities rather than with prefixes. As forty years have passed, one might naturally ask — "where are they Now?" Some, like old soldiers, have simply faded away: others, too many in fact, have made their last entry further up the log and moved to where all good Hams spiritually congregate — on a higher frequency. Many are still alive but only a few diehards are regularly on air.

Where now is Mr. DX (not Gus, W4BPD) of AC4YN in Lhasa, Tibet. Was his handle Stan? For many years, the only foreigner allowed into the Forbidden City: a trusted confidant of the Dalai Lama, until political unrest forced him to flee. In his era, Mr. DX was as famous and as sought after as Sir Gus was, at his peak. Working AC4YN was the pinnacle of achievement for the pre-war DXer.

Is the Voice of the Congo still making earthly noises? Stig, the affable priest signing ON4CSL, mostly on 10 Mx and dealing with a permanent pile-up. Another must, for the avid DX chaser.

PK6XX should be remembered by many in VK. An archaeological expedition in the Celebes; this station was on nightly, opening 807s and exchanging banter with all and sundry. Rag chewing, rather than QSOing.

Where is Scotty, XU8CR, in Shangai China? His regular signal at S9 plus, was impossible to miss. So was his brogue.

Pre-war, the American fone band was usually an unbroken wall of AM heterodynes, but a few calls, such as W6ITH, W6BKY and W6AM on the West coast, always managed to crash through loud and clear, no matter what the conditions. Of these, only W6AM is still fairly regularly QRV and he needs no comment, being a legend in his own lifetime.

And how many OTs recall these regulars of the 30s — EA4EO, I1ER, PY2CK, SP7DX, SP1AR, W1FH (the big sig), ZS2A (S9 on 7 MHz), ON4AU, G6LK, AC2RT, PK1DA, F8EX, ZL2GX (one time top of the DX world), KH6IJ and others too numerous to mention.

In the words of Shakespeare — "all the world's a stage and we are the players". The OTs were the first to be able to perform to a global audience and against the scenario of their period — but now, like all good actors, they have, in the main, spoken their last lines, done their last turn and retired to the wings. Many, in their own way, made their own particular valuable contribution to AR. Now, the new Ham with changed values and outlook is replacing them.

In the days of breadboard and busbar when rigs were xtal controlled and rocks hard to come by, the "modus operandi" was to send a CQ on your fixed frequency, say 14080 and then tune from 14000 looking for a caller. Imagine this procedure in a present day contest. Imagine too, completely homebrewing the Rx and Tx: winding all coils, trannies, resistors, making fixed caps out of fag foil, variable caps from scrounged aluminium plates, pots etc.: grinding xtals and so on. Parts were so scarce, it was a case of tackle these jobs, or stay off the air.

What of the shape of things to come; the 2000 A.D. operator? (assuming Hamdon survives). Proposals have already been put forward that will virtually end the theory and code test. Instead, the intending operator will simply buy his plug-in appliance rig, demonstrate he can use it by calling CQ into what is no longer a global village but a teeming metropolis and have his ticket issued on the spot.

Those against this say it will turn Hams into CBers, and not even glorified ones at that, as the standard of operating and ethics will immediately begin to fall. Those in favour maintain it is the only realistic approach. They point out that already the "guts" of a modern transceiver is simply a fog in the head of 90% of the operators.

Whatever does come about, it seems that the operator of the future will bear little resemblance to the OTs of the past and the word 'Amateur' is likely to become an issue in semantics.

AR's balmy days — the Golden Years when we never had it so good will be determined at some future date by Historians looking back. Maybe the best is yet to come in the expanding world of VHF — no one knows. But what is known to all — or should be — is that AR's fate hangs like Nebuchadnezzar's scales — precariously

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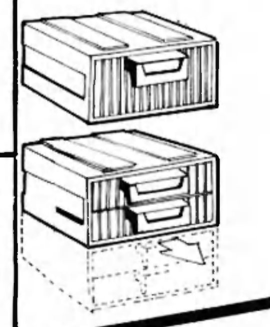

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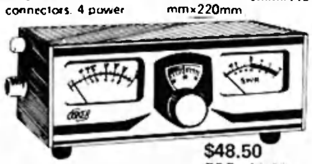

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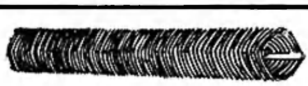

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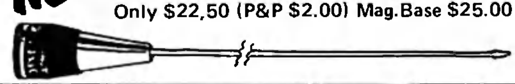

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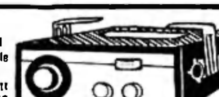

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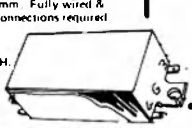

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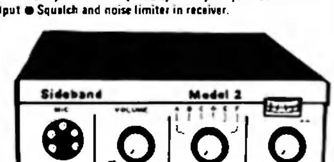

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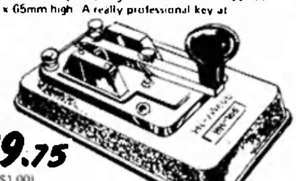

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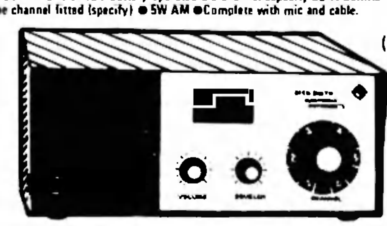

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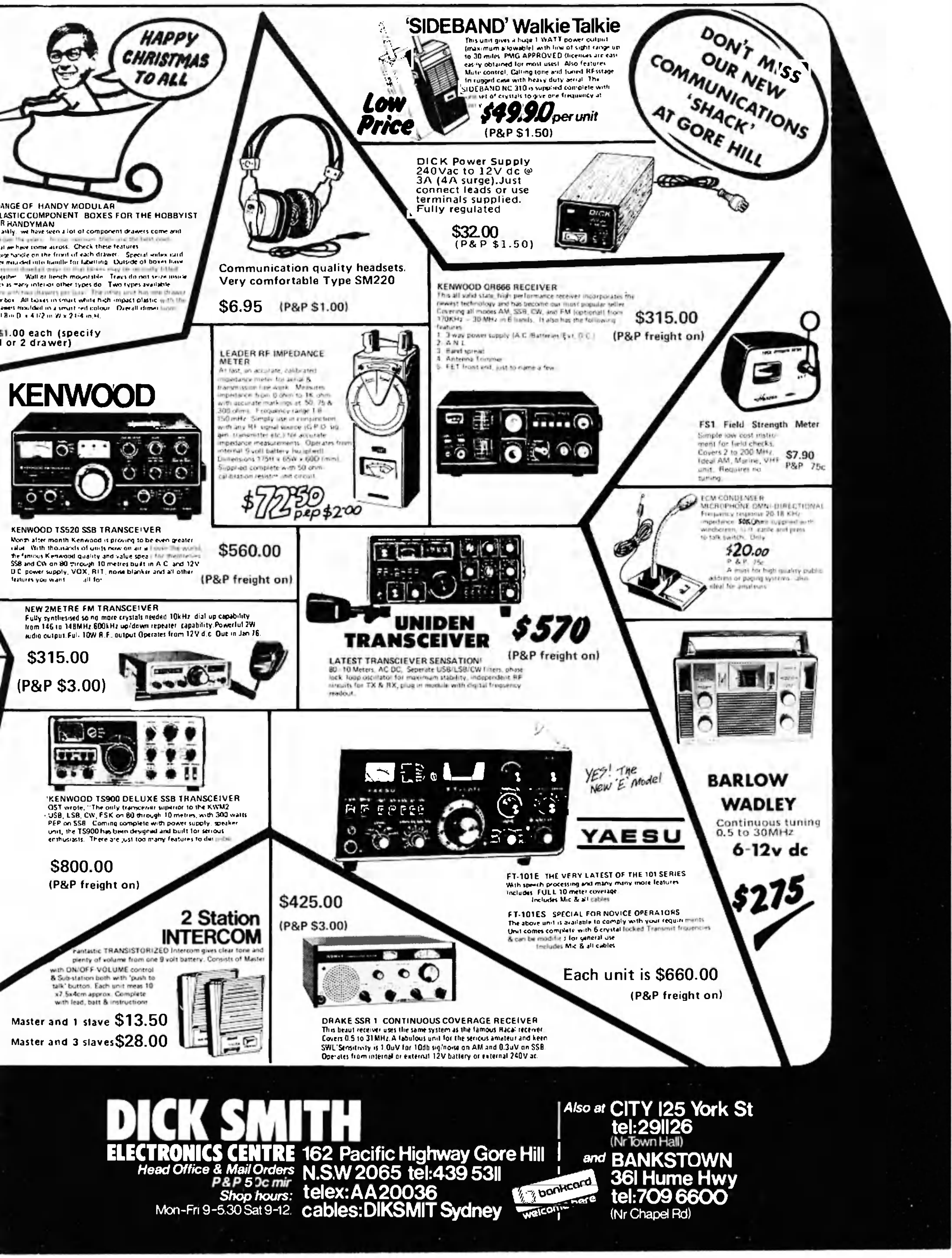
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in the balance. ITU 1979 will bring our moment of truth and our day of destiny. If the fates are kind, AR could go on to bigger and better things. If decisions go badly, then our service hobby could take a blow from which it might never recover. The only certainty is that every human activity faces abrupt and radical changes and AR can be no exception. It is wise to operate along the Confuscian maxim 'enjoy yourself, it's later —' and ponder on an observation by the late General D. MacArthur, who said 'there is no such thing as permanent security, only opportunity'. ■

EXTENDED USE FOR YOUR SWR BRIDGE

Geoff Wilson VK3AMK
7 Norman Ave., Frankston, Vic. 3199

One of the most useful items in any shack is the SWR bridge. This article shows how one unit can be used with many transmitters without uncoupling of co-axial cables.

Apart from its normal function the SWR bridge can also serve as a relative output indicator for transmitter tuning or carrier balance, etc. Where only one transmitter is used one SWR bridge is sufficient, but if more than one transmitter is used the need often arises to monitor outputs in several different lines. This can be done with one SWR bridge by changing it from line to line as required but at best this is inconvenient.

The other alternative is to purchase additional SWR bridges for each transmitter used but this becomes expensive and requires additional space in the operating area for each unit; much of the time the additional bridges remain unused.

Recently I wanted to monitor four different transmitter outputs but only one would be operational at any given time. These were (1) 160-10m from a HF transceiver (2) 6m from a transverter (3) 2m from a transverter (4) Provision for 70cm from a projected transverter. Having on hand a good reliable SWR bridge I decided to investigate ways of using this for all four applications.

The first thought was to switch the various lines but this had several drawbacks among which would have been the fact that only one could be used for receiving at any time. The usual SWR bridge consists of two main parts, a reflectometer unit in the antenna line and a suitably housed and scaled meter with calibration control and Forward-Reflected switching.

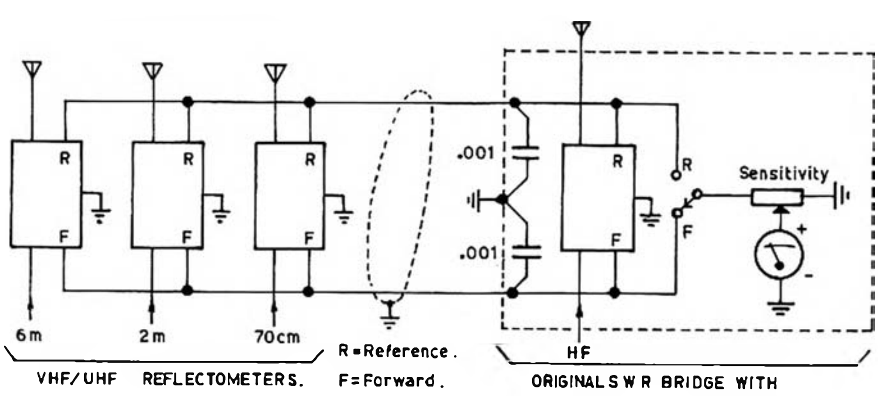
Although "S" meters are readily available from most sources it seems that calibrated SWR meters are all but unobtainable on their own, due no doubt to the fact that many makers of meters also produce SWR bridges. I therefore decided to use the existing meter and controls to cover all my needs. This had the extra advantage of not requiring any additional space near the equipment. The meter was a 200 uA type and sensitive enough to give full scale deflection with the commercial reflectometer on 80m so I left the co-ax from the H.F. transceiver connected to the SWR bridge.

Some time ago in "EA" printed circuit reflectometers suitable for VHF/UHF use were described (Electronics Australia, April, 1971). These were later made available through the WIA Disposals at a very reasonable price. I made up three of these units and placed one in each co-ax line from the VHF/UHF transverters and connected the outputs in parallel, i.e. each Fwd output connected to each other Fwd output and each Ref output connected to each other Ref output.

These outputs were then connected in parallel with that from the original reflectometer in the HF line. Now whenever a transmitter is operated the SWR bridge monitors each line and shows the SWR on the line in use, no switching or lead changing is required, the only variable being the setting of the sensitivity on the calibration control from band to band.

Another printed circuit reflectometer was also described in "QST" October, 1969, and this should also be suitable. Details of construction may be found by referring to the above articles which give adequate information to enable anyone to make their own.

The only modification made to the original SWR bridge was to add a polarized socket on the rear panel to connect the line from the external reflectometers to the internal circuit. There is no interaction between the units and it has performed quite satisfactorily for some time. The total cost involved has been only a fraction of what separate SWR bridges would have cost. ■



TECHNICAL CORRESPONDENCE

ST5 RTTY DEMODULATOR KIT

Since the article was written for AR (and published June '75), there has been a number of price rises and what with postage, the price of the Kit has had to be increased due to the above and the new prices are as follows below:—

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All prices include postage.

There will also shortly be available additional units for ST5 to add; AUTO-START/ANTI-SPACE FACILITY, also a 170 Hz, BANDPASS INPUT FILTER. ■

INDEX OF AR TECHNICAL ARTICLES

JANUARY 1971 — DECEMBER 1975

Have you searched for a Technical Article and could not recall the year it was published? Continuing with the 5-yearly lists published each December for the years 1955, 1960, 1965 and 1970, here is the 5-yearly list for 1975.

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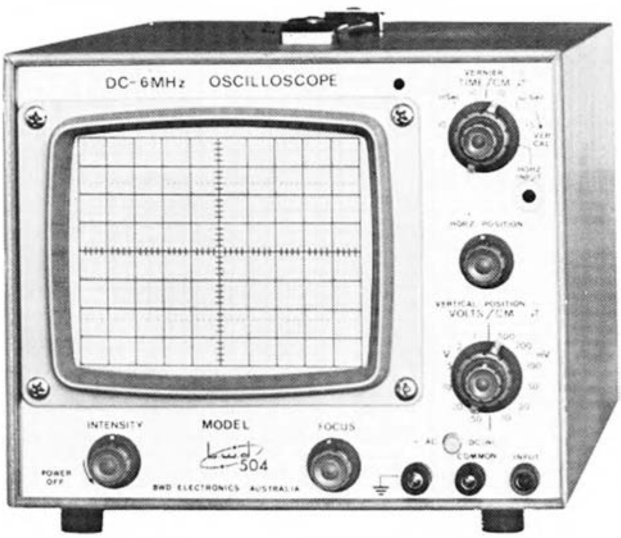

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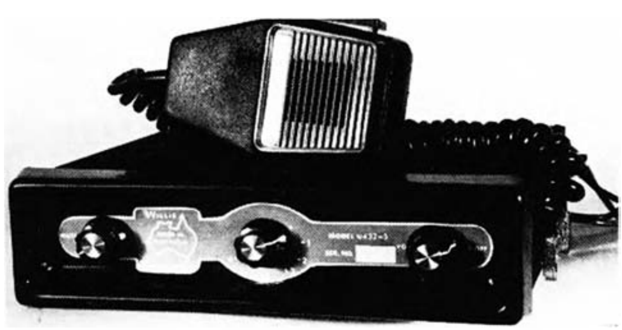

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NEWCOMERS NOTEBOOK

with

Rodney Champness VK3UG
and David Down VK5HP

LAYING OUT YOUR NOVICE TRANSMITTER (AND RECEIVER) — Part 4

The layout of most pieces of equipment is important if they are to perform satisfactorily. This transmitter is no exception, although it is not as critical as some pieces of equipment in this regard. You are referred to *Newcomers Notebook* for March and April 1974 which deals with the layout of equipment in general. The main points that must be considered with any equipment are (a) that inputs are kept away from outputs, and (b) that incompatible sections are kept apart. These points have been observed in the layout of this transmitter.

The original chassis size used for the complete transceiver was 11 inches by 8 inches and this has proved to be a bit cramped due to some necessary alterations to the original design. It is suggested that the chassis size be increased to 12 inches by 9 inches so that crowding does not occur. The depth of the chassis should be 2 inches. The exact layout in fractions of inches for the various components has not been done as it is expected that you will have slightly different components to the author which will require slightly different mounting positions to the originals. The author used radio and TV components salvaged from old chassis. The PA tuning gang is one section of a dual gang receiver tuning capacitor, the relay was from an old PYE Reporter transceiver, the PA tank coil former was a plastic pill bottle, the chassis for the transceiver was made from 20 gauge galvanised sheet steel.

The layout of the transceiver can be seen in Fig 1 as viewed from above the chassis.

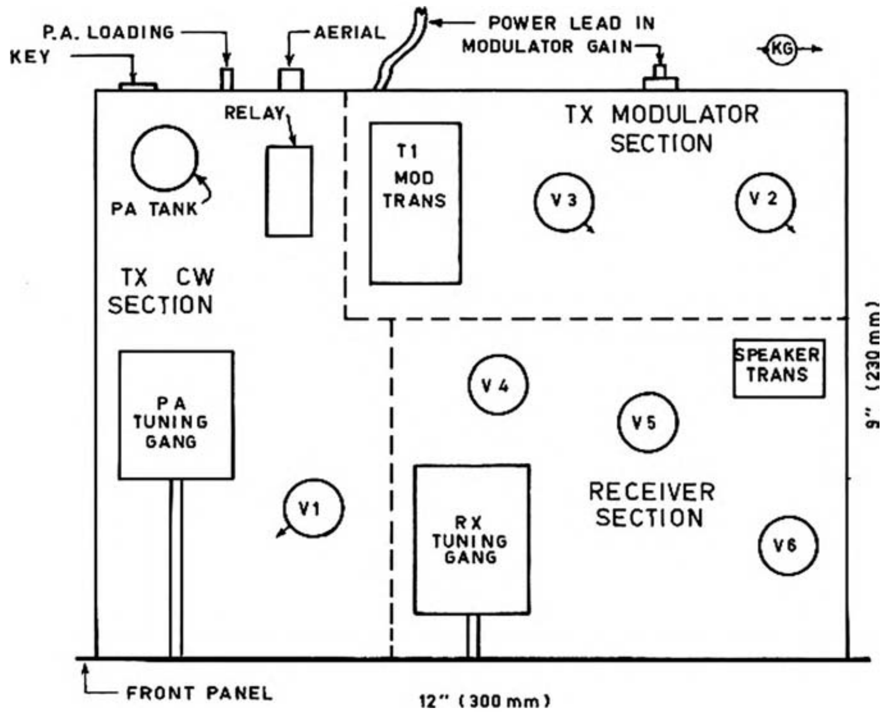

FIG. 1. CHASSIS LAYOUT

The dotted lines indicate the approximate extent of the below chassis wiring of each section of the transmitter. The small arrows pointing out of each of the transmitter valve location circles indicate the largest gap between pins on each of the valve sockets.

Fig 2 shows the front panel layout used with the transceiver. It will be noted that the front panel has a "margin" of ½ inch around it so that the complete unit can be mounted in an open fronted box using ½ inch timber such that this metal *margin* covers all of the wood of the box. On the bottom of the box rubber feet can be used such as available from Clark Rubber or two wooden runners can be glued to the bottom of the wooden case. It is desirable that a few holes of at least ¼ inch diameter be drilled through the bottom of the case for ventilation of the under chassis area of the equipment. A few holes can also be drilled through the chassis above heat producing components.

The back of the case should not be completely filled in; in fact the bottom 2½ inches should be open to allow ready access to controls and connectors on the rear apron of the chassis. The extra ½ inch allows inflow of cooling air and if a ½ inch gap is left at the top of the back as well, the hot air can be ventilated from the cabinet. This strip of wood on the back would measure about 12 inches by 2½ inches and could be 3 ply or masonite or other thin wood. In fact most of the cabinet (case) except the base can be made of quite thin timber if you have some wood working ability.

Some people may have a receiver and so will not be contemplating building the receiver section of this transceiver. The chassis can be correspondingly reduced in size or alternatively the transmitter power supply can be built on the section that was reserved for the receiver.

The power transformer should be located approximately where the receiver tuning gang is shown and orientated so that its laminations are at right angles to those in the modulation transformer, otherwise magnetic coupling between them could put hum on the transmitted signal.

During the next two months will be described a few minor alterations to the transmitter which will permit it to operate on 160 metres and operate with a separate receiver. A few minor component variations will also be mentioned.

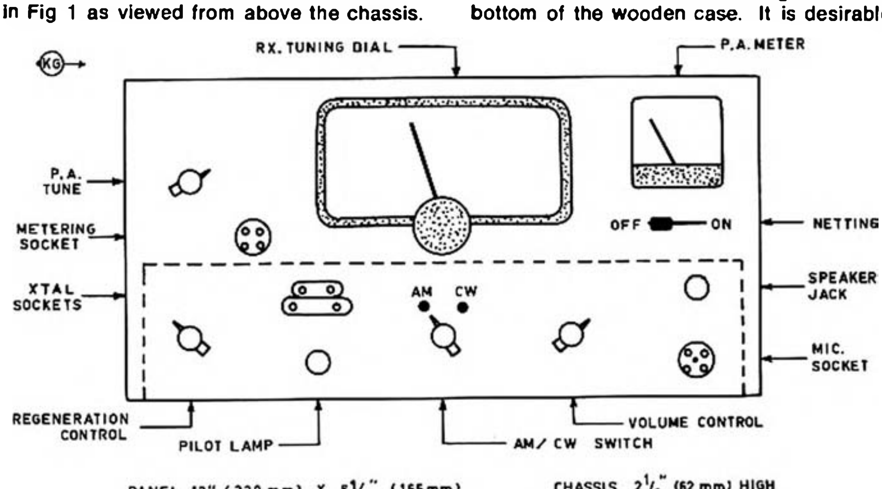

FIG. 2. FRONT PANEL LAYOUT

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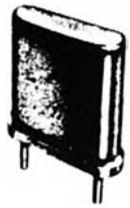

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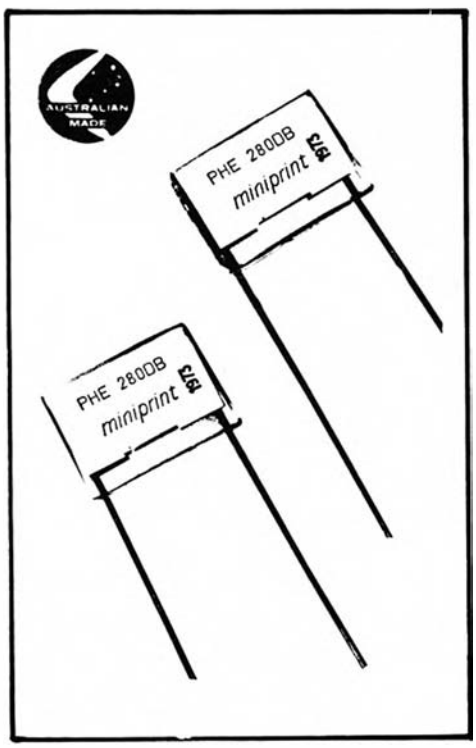

miniprint

AEE Manufacture a comprehensive range of professional and semi-professional capacitors in Australia. In the main these are of Epoxy Encapsulated 'Miniprint' design utilising metallized dielectrics. As the name implies 'Miniprint' capacitors are of small size and designed for printed circuit board insertion.

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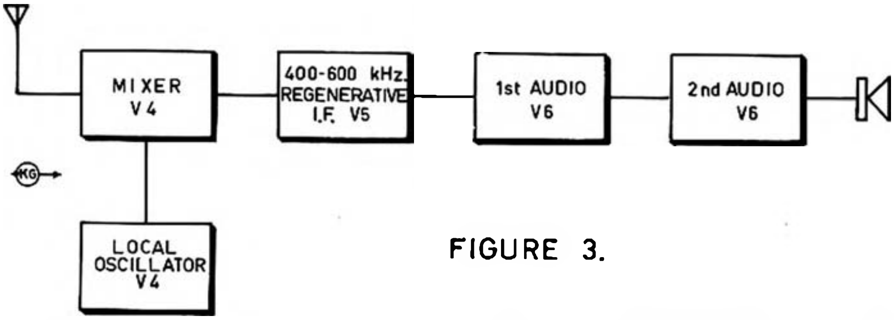

FIGURE 3.

NOVICE RECEIVER

It is not intended that the Novice Receiver will be described for a few months as a number of David Down's articles are waiting to be presented. However, just to satisfy your curiosity a very general description of the receiver follows. The receiver is a 3 valve superheterodyne using a regenerative IF stage. The mixer/oscillator can be 6BL8/6U8/12AH8/6AN7 etc., the IF is a 6BX6 or similar, the audio section can be 6BL8/6U8/12AT7/12AU7/6AB8 etc.

The receiver is not unduly complicated, although a number of problems were encountered when the author came to use some established designs described by well respected American and Australian magazines. The only relatively critical part of the receiver is the regenerative IF coil — the windings took some time to optimise for best performance. Fig 3 shows a block diagram of the receiver. ■

Commercial Kinks

with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley. 3150

MORE ON THE FT101

In the October issue I touched on several aspects of the FT101 and this has brought a response from two readers.

The first was from Harry Leeming G3LLL. Harry of course is the driving force behind the famous G3LL RF speech clipper designed to go with the FT101/B.

"I noted your report on the zener diode modification for the overload problem on the FT101. I have just run a quick trial on my own FT101, and it does work really well. At first it is deceptive as the signals which were previously S9 only read about S6 after the modification, and one is tempted to think that the sensitivity has been reduced. This is not the case however, as weak signals are just as strong and presumably the effect is caused (as is the cure) by the fact that introducing the zener doubles the AGC applied to the second gate of the first transistor. I think Jack Taylor should be congratulated on a very simple modification, which I have no doubt Yaesu will eventually get round to copying".

In the October issue I also published a hint on the 101 VOX. Roy Hartkopf VK3AOH had been having trouble with the VOX of his 101B and we had discussed the problems during a telephone conversation a few months earlier. Roy's letter makes interesting reading as he has come up with a new cause and solution to VOX problems.

"The key trouble is that it seems impossible to get information as to what is in the IC's especially the TA 7042M, and without this one is only guessing.

Anyway I finally decided to make a mock up socket and take the board out and have a thorough look at it. I eventually found that the key to the trouble is pin 7. This goes to the mode switch S2c and in the tune and CW positions it is isolated from earth. This is OK for the mic amp, but I cannot see why it should also disconnect the 470 ohm resistor from pin 6 of the IC as this is still used for the VOX. When it does this the threshold voltage on pin one rises by a couple of millivolts, enough to cause the sensitivity to change and the VOX to chatter. The answer is simplicity itself. Simply take the 470 ohm resistor off the pin 7 line and ground it permanently. The VOX problem entirely disappears. There is a handy earth run down the side of the board right beside the resistor and the change can be made in five minutes. I also suspect that this generally improves the VOX stability on all modes because the slightest noise on pin 6 (and it could be caused by the emitter current from the mic amp flowing through S2c), will change the VOX sensitivity. Why on earth Yaesu ever did this I cannot imagine. I think it must be the hangover from some previous design. Personally, I would be wary of grounding the source of Q5 as this could lower the efficiency without curing the basic cause. (Commercial Kinks October 1975).

I think changing C23 to .33 is a bit drastic. I changed it to .27 and found that plenty and I also changed C22 from .01 to .022 to match. I have not found any front end overload troubles but have not looked into this thoroughly.

A thing which annoys me is the fan running all the time on AC. Also the sidetone does not come on unless the heaters are on due to the fact that it is routed through S5b. So I removed the wires from S5b and permanently shorted them together and then ran a couple of wires beside the existing mains run back to the transformer. I connected the fan in series with this switch and now the fan goes on and off with the heaters and the sidetone is available without switching the heaters on.

I have also found the Yaesu XF3OB AM filter is physically and electrically compatible and I put this in the spare place where the CW filter normally goes. The improvement in the AM reception is unbelievable but some dicey rewiring of the mode switch is needed and I would not recommend it for the inexperienced".

I have visited Roy and heard the results of his modifications. They do indeed work well.

I was most impressed with the action of the AM filter and I think it would be very useful for those using the 101 on two metres with a transverter and of course for the 160 metre AM enthusiast.

This filter is available from Bail Electronic Services and is normally used in the Yaesu FR101 receiver. ■

PROJECT AUSTRALIS

With DAVID HULL VK3ZDH

NEW OPERATING AWARD

One of the subjects raised with Amsat during my Washington visit in March was the inequality of the ARRL satellite 1000 award. This award is quite difficult for a VK or ZL to achieve as the 2 or 3 present holders in VK will verify.

Joe Kasser, Amsats publicity chief, was at that time looking for suggestions on a reasonable level of achievement for Amsats own Oscar award and the opportunity was taken to include suitable clauses for VK and ZL.

The new Award will be available therefore for confirmed contacts with 6 Australian Call areas and 2 countries. Colin Hurst VK5HI has "volunteered" to handle the applications for the award for VK on behalf of Project Australis and certificates should be available from him shortly on receipt of the following requirements:—

(1) All contacts must have been made via an Oscar spacecraft using any valid legal mode of transmission.

(2) QSL cards or written confirmation of contact must be supplied and must show that the contact was via an Oscar satellite.

(3) All contacts must be made from the same QTH (or within 25 miles of a particular location).

(4) Sufficient postage must be supplied for the return of QSL cards and the certificate.

(5) The award is free to WIA members and available to non-members on receipt of the nominal fee of 1 dollar ($A1) (payable to the WIA).

(6) Endorsements for one mode transmission and additional countries (in groups of five) are available.

(7) Applications should be forwarded to Project Australis/Amsat Award Manager, Colin Hurst, 8 Arndell Rd., Salisbury Park, South Australia, 5109.

Please note there may be an initial delay whilst supplies of the certificates are obtained from the U.S.

ORBIT BOOKS FOR 1976

If you are sick and tired of wearing out your calculator working out Oscar orbits please note that orbit books listing all Oscar 6 and 7 orbits for 1976 are available from Skip Reyman W6PAJ, P.O. Box 374, San Dimas, California, 91773 for $U.S.3.00 (or 20 IRC's) post paid. If you want it in reasonable time I would recommend including additional IRCs and asking for Air Mail.

STANDARD ORBITS PREDICTION SHEETS

These standard orbits calibration sheets originally published in AR for Oct. '72, and reprinted last year, are still available. If yours is getting a little dogeared, or you've lost it and would like a replacement, send a medium sized stamped addressed envelope to Project Australis, C/o the call book address of David Hull VK3ZDH and we will be glad to send you another one (while stocks last).

We apologise for the lack of standard orbits data for January but the data was not to hand at this time. We hope to publish the data along with February as normal in January's AR. ■

20 Years Ago

with Ron Fisher VK3OM

Amateur Radio for December 1955 contained only one technical article, part three of Hans Ruckert's 'Transmitter With Low Harmonic Output'.

However it made up for the lack of technical articles with a superbly written story of the work going on at the Antarctic bases set up soon after the conclusion of the war. Naturally amateurs were well represented right from the beginning. Hans Albrecht VK3AHH told of the scientific aspect of the work in 'Science in Antarctica'.

Remembrance Day Contest results were eagerly awaited and December AR announced that 'South Australia Wins Again'. The top scorers State by State were: VK5MS, VK6RU, VK2AHH, VK3ATN, VK7PM, VK4PQ and VK9DB. VK5MS and VK3ATN scored the highest points with 1001 each.

Back to the Antarctic. Fifty Megacycles and Above reports that the Macquarie Island boys were ready to go on six metres. VK1ZM had been heard in New Zealand and VK1IJ was ready with an automatic keyer for his transmitter. In 1955 of course VK1 was used for the Antarctic, the ACT VK1 prefix had not yet eventuated.

December 1955 Amateur Radio also contained a ten year index of technical articles back to 1945.

Christmas 1955 saw the start of the Pan Pacific Scout Jamboree at Clifford Park some 25 kilometres north east of Melbourne. The WIA Federal Station VK3WIA was set up on the site. They had transmitters operating on 80, 40 and 20 into enormous V beams. I well remember that Christmas 1955 was one of the wettest on record and the Jamboree site quickly turned into a quagmire. However many overseas contacts were achieved from the WIA tent on top of the hill. ■

LARA

LADIES AMATEUR RADIO ASSOCIATION NEWS

This past month, LARA activities have been moving along at a great rate. The 80m skeds are being held each Monday night, still at 8.00 p.m. Eastern time (or summer-time), and with the DX season coming up, perhaps more interstate contacts will start. LARA notes are now heard on VK5 broadcasts as well as VK3.

LARA representatives at the N.S.W. South Western Zone Convention had the pleasure of doing an interview for Station 2QN, Deniliquin. This gave publicity to amateur radio in general and YLs interests in particular as organised YL activity is still fairly new on the bands. YL's also competed in the events held at the convention with moderate success.

The Jamboree of the Air was another event which LARA members joined in. Next time this comes around we hope to have more YL operators able to join in.

The LARA Victorian Division general meeting for October was held as an open meeting. With days like this and similar activities LARA hopes to develop a bigger group interested in YL activities. Guests were welcomed to the meeting and the famous "Great Foxhunt" film was shown.

Despite this earnest preparation by LARA enthusiastic hounds, the next LARA fox hunt, held 2 weeks later, was won by a newcomer to the field. (As fox on the next hunt, she won't be a beginner for very long). The day was a success as the organisers, with great intuition, picked the only sunny day in about 2 weeks of rain (flippers and snorkel are not usually regarded as necessary fox hunting requirements, but unfortunately some of the rain was still there).

November could be a fairly quiet month as far as LARA goes. Some members are pre-occupied with other fields of activity (such as examinations), so as a concession to this things such as the VK3 general meeting are being held later on in the month (this is on the 29th of November). December however should warm up a bit with Christmas activities and the Murray River Canoe Marathon in the New Year.

New members are able to contact LARA in VK3 via the Vic. Division Rooms and Myrna VK5YN and Linda VK4VV are people to contact in their respective Divisions.

YL's are welcome on the skeds at any time. The 80m sked on Monday night at 8.00 p.m. is on 3650 kHz and there is a VHF sked for Melbourne YL's on Tuesday nights on 2m FM. ■

Intruder Watch

with Alf Chandler VK3LC

1536 High Street, Glen Iris, 3146

It is October 20th, 1975, and I have recently returned from a wonderful four months tour of the United States visiting many Amateurs that I have worked over the years, among them being my old Intruder Watch friend Bill K6KA at La Canada in Los Angeles.

I must take this opportunity of thanking and congratulating Ivor VK3XB for the excellent job he did in his handling of I.W. Co-ordination while I was away. I only wish I had more like he and Murray VK4KX and Les VK2AFG, without whom the I.W. could not function. It is a great pity that more members cannot see their way clear to do something to help in this worthwhile endeavour because intruders are not getting any less.

It may be appropriate at this time to quote a section from QST of September 1975: "It seems to us", and I quote — "Sometime in 1979 members of the International Telecommunication Union (ITU) will meet in Geneva, Switzerland, for a World Administrative Radio Conference (WARC). This will be the first conference since 1959 at which the entire table of allocations, from 10 MHz to whatever the upper limit may be by then, will be under scrutiny. There have been far reaching changes in communications technique and method since 1959, and as a result there may possibly be some benefits for the Amateur service but there will also certainly be some heavy pressures. Whether we gain or lose depends in part upon how well we prepare ahead of time". (My underlining).

The Intruder Watch is one way to prepare, by pointing out to the conference the intrusions that commercials have made into our exclusive Amateur bands, but we cannot do this unless you, the active members, participate and furnish us with proof of their intrusions. I ask you, how about it? ■

IARU NEWS

The June-July 1975 Calendar of the IARU contains brief details and words of praise for the Hong Kong and Warsaw Conferences of Regions 1 and 3 respectively. The comments end with the words, "Regions 1 and 3 emerge from their triennial conferences with sufficient agreement on WARC strategy to permit the Union to move forward with its planning. Similar success at the Region 2 Conference next year (scheduled for April 11th to 15th, 1976 in Miami) will demonstrate that the future of amateur radio is in good hands in all three of the ITU Radio Regions".

The Region 2 Conference will be hosted by the ARRL and will take place during the Bicentennial celebrations in the U.S.A.

It is recognised that the overall amateur radio effort should be co-ordinated closely so as to ensure that everything required is accomplished and to avoid costly duplications of effort. Consequently the President of the IARU (Noel B. Eaton VE3CJ) has the intention of calling together representatives of the three IARU regions in Miami for the two days immediately following the Region 2 Conference. Observers from member societies would be welcome but regrettably no expenses can be paid.

It had been originally thought that a meeting of all IARU member societies would have been desirable in preparation for WARC 1979 but this idea was abandoned in view of sharply escalating costs of world travel being beyond the financial capabilities of the amateur radio community and the fact that the accord emanating from the two regional conferences held this year has reduced the need for such a world-wide conference.

On their travels to and from the Region 3 Conference the Union's President visited amateur societies in Japan, Philippines (PARA), Thailand, Sri Lanka, India, Pakistan and Iran before attending the Region 1 conference in Warsaw. Dick Baldwin, W1RU, of the ARRL concurrently visited amateur societies in Malaysia, Singapore and Jakarta as well as the Region 3 conference.

The IARU has never had an emblem but during the year one has been designed. It is considered useful in maintaining the Union's identity as WARC is approached.

Some details are given about the amateur participation in the 1976 Olympic Games in Montreal during July. The special station with the call sign CZ20 will be designed to give visitors the best possible impression of amateur radio.

JARL are quoted as saying that as the number of Japanese amateur stations amounts to nearly 300,000 of the volume of QSL cards which their bureau handles is so enormous that they can no longer handle cards for non-members.

The August 1975 list of IARU member societies has reached a total of 88. Only 13 of the countries are in Region 3 apart from the USA, UK and French overseas representation. This means there are a number of countries in Region 3 not represented at all for one reason or another.

Since many of these countries possess a vote in the ITU which has a membership approaching 150, readers can rest assured that this situation has been noted in relation to WARC 1979 and appropriate action is going on behind the scenes wherever this is possible.

It will also be noted from WIA News in this issue that all appropriate steps are being taken by the Institute with the Australian Government's preparations for WARC 1979 as required by the Federal Council at the 1975 Federal Convention acting upon the outcome of the Region 3 conference in Hong Kong.

If forethought is any criterion nothing is being left to chance. ■

YRCS

with Bob Guthberlet

31 Bandon Terrace, Marino, S.A., 5049.

BLIND BOY IN BURWOOD, SYDNEY NEEDS HELP

15 year old Gerald Cooke would like someone to start a radio club in his area. He and several of his friends want to get their amateur licence but need your help. Contact him at 11 Celbor St., Burwood.

DO YOUR ACTIVITIES CONSIDER OUR BLIND FRIENDS?

In the formation of the DX group in Sydney this was one sector of the community the groups aims identified as requiring a special effort. The N.S.W. Blind Society and North Rocks School for blind children was contacted and now at each monthly meeting several blind high school students meet at the W.I.A. and engage in SWL activities and novice classes organised by the group. They meet on the first Friday of each month at 7.30 p.m.

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SPECIFICATIONS

SB-104 SPECIFICATIONS — TRANSCEIVER SECTION — GENERAL OPERATION: Frequency Coverage: 3.5 MHz through 29.7 MHz amateur bands, 15 MHz WWV receive only. **Frequency Stability:** Less than 100 Hz/hr drift after 30-min. warmup; less than 100 Hz drift for ±10% change in primary voltage. **Modes of Operation:** Selectable upper or lower sideband (suppressed carrier) and CW. **Readout Accuracy:** Within ±200 Hz ±1 count. **Audio Frequency Response:** 350 to 2450 Hz ±75 Hz (6 dB bandwidth). **Dial Backlash:** 50 Hz max. **Phone Patch Impedance:** 4 ohm output to speaker; high impedance output to transmitter. **Power Requirements:** 13.8 VDC nominal (max. 16 VDC) at: Receive: 2 amp. Transmit: low power: 3 amps.; high power: 20 amps. **TRANSMITTER: RF Power Output: High Power** (50 ohm non-reactive lead). SSB: 100 watts PEP ±1 dB: CW: 100 watts ±1 dB. **Low Power SSB:** 1 watt PEP (minimum); CW: 1 watt (minimum). **Output Impedance:** 50 ohms, less than 2:1 SWR. **Carrier Suppression and Unwanted Sideband Suppression:** 55 dB down from 100 watt single-tone output at 1000 Hz reference. **Harmonic Radiation:** 45 dB below 100 watt output. **Spurious Radiation:** —50 dB within ±3 MHz of carrier; —60 dB farther than ±3 MHz from carrier, except —40 dB at 3.39 MHz on 80 meter band. **Third Order Distortion:** 30 dB down from two-tone output, reference at 100 watts PEP. **Transmit/Receive Operation:** SSB: PTT or VOX; CW: Keyed-tone VOX or manual. **CW Side-Tone:** Internally switched to speaker or headphones in CW mode. Approximately 700 Hz tone. **Microphone Input:** High impedance with a rating of —45 to —55 dB; approx. 25K ohms to match Heath desk-type microphone. **RECEIVER — Sensitivity:** Less than 1.0 microvolt for 10 dB signal-plus-noise-to-noise ratio for SSB operation. **Selectivity:** 2.1 kHz minimum at 6 dB down, 5 kHz maximum at 60 dB down. (2:1 nominal shape factor). **CW Selectivity:** (with accessory CW filter) 400 Hz at 6 dB down; 2 kHz max. at 60 dB down. **Overall Gain:** Less than 1 microvolt for 0.5 watt audio output. **Audio Output:** 2.5 watts into 4 ohms, 1.25 watts into 8 ohms, at less than 10% THO. Low impedance headphones (4-8 ohm). **AGC:** Less than 1 millisecond attack time; switch selectable 100 μsec. and 1 msec. release, and OFF. **Intermodulation Distortion:** —65 dB min.; typically —57 dB with noise blanker. **Image Rejection:** —60 dB min. **IF Rejection:** —60 dB min. **Internally Generated Spurious:** Below 2 microvolt equivalent antenna input, except at 3.65, 3.74, 14.24 MHz and 21.2 MHz. **MECHANICAL — Front Panel Controls/Switches:** AGC — Off, Slow, Fast; AF Gain; Microphone Jack; Headphone Jack; Main Tuning; Mic/CW Level; Vox Gain; Vox Delay; Band Switch. **Pushbuttons:** ALC (Meter); 13.8V (Meter); Relative Power (Meter); 100 Hz (Disable); Noise Blanker (On/Off); LSB (Mode); USB (Mode); CW (Mode); Tune; Hi/Lo (Power Select); VOX (On/Off); PWR (On/Off). **Rear Panel Controls/Sockets:** Anti-Trip; Sidetone Level; Linear Amplifier ALC Input; Phone Patch Input; Phone Patch Output; Key (CW) Input; Speaker (4 ohm) Output; Spare (2); Receiver Audio Input; VFO Input; VFO Output; IF Output; Driver Output; Ground Post: Power Plug; Accessory Socket (includes relay output); Antenna Input; Receiver Antenna Input; Common/Separate Antenna Switch. **Dimensions:** 5¾" H x 14 15/32" W x 13⅞" D. (Less knobs, feet and connectors). **Weight:** 20 lbs.

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DRAKE

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R4C Amateur **RECEIVER** covers HF ham bands plus any 15 x 500 kHz ranges between 1.5 and 30 MHz except 5.0 to 6.0 MHz. **$640.** (Transceives with T4XC.)

SSRI Synthesised communications **RECEIVER.** Provides continuous coverage 500 kHz to 30.0 MHz for AM-USB-LSB reception. Operates from AC Mains or internal batteries. **$425.**

TR4C sideband **TRANSCEIVER** full amateur band coverage 10 through 80 metres. **$630.**

T4XC sideband **TRANSMITTER** full amateur band coverage 10 through 80 metres plus 160 metres accessory crystal plus 4 fixed frequency positions. **$609.** (Transceives with R4C.)

MN4 and MN2000 MATCHING NETWORKS — enable Feedline SWRs of up to 5:1 to be matched to the Transmitter. Built-in Wattmeter. MN4 handles 200 Watts. MN2000 handles 1000 Watts continuous and 2000 Watts **PEP**. MN4 **$115,** MN2000 **$230.**

TV — 42 — LP FILTER for Transmitters below 30 MHz — 100 Watts continuous. **$11.50.**

TV — 1000 — LP FILTER — 1000 Watts continuous to 30 MHz — 100 Watts continuous to 6 metres. **$22.50.**

TV — 300 — HP FILTER — TV Sset protection from transmitters 6 — 160 metres. **$9.00.**

TV — 3300 — LP FILTER 1000 Watts continuous to 30 MHz with sharp cut off above 30 **MHz. $24.00.**

RP500 — Receiver **PROTECTOR** for Receiver front end protection from close proximity high power transmitters. Less than 0.5 dB Insertion Loss to 30 MHz. **$77.00.**

W4 WATTMETER/SWR METER 2 — 30 MHz with 200 Watt and 2000 Watt ranges. **$65.00.**

WV4 WATTMETER/SWR METER 20 — 200 MHz with 100 Watt and 1000 Watt ranges. **$78.00.**

AC4 POWER SUPPLY for mains operation of TR4C or T4XC. **$175.00.**

DC4 POWER SUPPLY for battery operation of TR4C or T4XC. **$187.00.**

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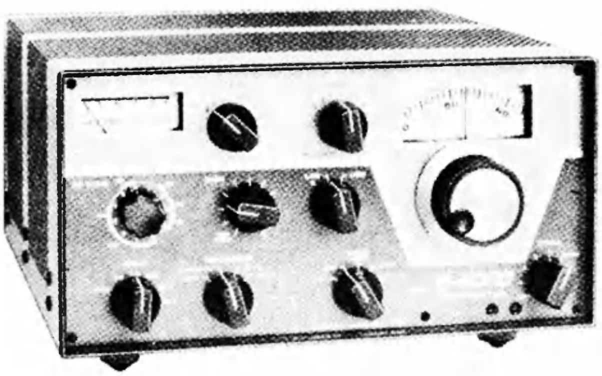
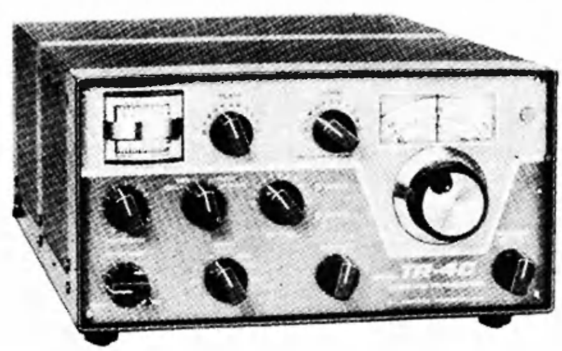


T4XC TRANSMITTER



TR4C TRANSCEIVER

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ADELAIDE — 42-6666
BRISBANE — 36-5061
WELLINGTON, N.Z. — 69-7566

YRCS LUNCH TIME RADIO CLUB NET ON 27.125 MHz

Meets each Monday noon till 2 p.m. Summer conditions should bring in many Interstate contacts and amateurs on the band are always welcome to join in. High school students on the net are Roger VK2BEQ at Mosman, Peter VK2BWR at St. Ives, and Barry VK2FP at Bexley. Also on the net are VK2YY Sydney Technical College, VK2BUV University of N.S.W. and VK2BSU Sydney University.

THIRD PARTY NEEDS AT LEAST ONE MONTH FOR P.M.G. APPROVAL

So the University of N.S.W. Amateur Radio Society is hoping to combine community service with traffic handling training for its members as part of a request for communications for the Australian Tennis Federation.

AMATEUR RADIO DEMONSTRATION AT NORTH RANDWICK HIGH SCHOOL, SYDNEY

Together with details on how to set up a YRCS Radio Club has resulted in boys and girls joining together to form a novice training club.

POLICE BOYS CLUB IN NORTH SYDNEY NEEDS HELP

They have many keen boys anxious to get on the air and need help in forming radio activities. Contact Sergeant Beacroft, Falcon St., Crows Nest, 2065.

DID YOU KNOW?

A booklet is available which outlines how you can set up a club, what YRCS is and how it can help you, as well as an outline of YRCS and Novice Licensing, and how to become an instructor in the YRCS. Write to the Supervisor in your State. They are: VK1 (A.C.T. Division), Box 1173 Canberra City, 2601; VK2: R. C. Black, VK2YA, 10 David St., East Springwood, 2777; VK3: F. H. Whittom, VK3BAN, 204 Churchill Ave., Braybrook, Victoria, 3019; VK4: P. C. Aldred, VK4CA, 15 Monmouth St., Morningside, 4170; VK5: G. Preston, VK5PI, 13 McGowan Rd., Para Hills, 5096; VK6: W.I.A. (W.A. Division), G.P.O. Box N1002, Perth, 6001; VK7: R. K. Emmett, VK7KK/T, 111 New World Ave., Trevallyn, Tasmania, 7250.

Contests

with Jim Payne, VK3AZT
Federal Contest Manager,
Box 67, East Melbourne, Vic., 3002

CONTEST CALENDAR

December

6/7	Tops 3.5 MHz CW
6/7	ARRL 160 metre
13/14	Spanish CW
13	Ross Hull commences
28	Hungarian

SPANISH CW CONTEST

2000 GMT Dec. 13 to 2000 GMT 14th. All bands 3.5 through 28 MHz. Usual RST and start 001. Contacts with EA stations score 2 points. Each EA call district is separate multiplier. Final score is total QSO points times the sum of multipliers from each band. The same station may be worked on each band for QSO and multiplier credit. Include summary sheet with your log. Entries to U.R.E. CONCURSO INTERNATIONAL, PO Box 220, MADRID 4, SPAIN by 14th Jan. 1976.

TOPS CW 3.5 MHz

1800 GMT 6th Dec. ends 1800 GMT 7th Dec.

Annual contest of Tops CW Club. Frequency between 3.5 and 3.6 MHz. DX on the low end. Exchange RST report only. Contacts with own country score 1 point, stations on same continent 2 points, other continents 5 points. Each call area in W/K, VE/VO, PY, UA and VK count as separate countries. Final score is total number of QSO points multiplied by number of prefixes worked. (Same as WPX) Single or multi operator entries to reach Peter Lumb, G3IRM, 14 Linton Gardens, Bury, Saint Edmonds, Suffolk, IP33 2DZ, England by 31st Jan. 1976.

ROSS HULL VHF UHF MEMORIAL CONTEST

1401 GMT 12th Dec. 1975 to 1400 GMT 18th Jan. 1976.

The rules for this contest remain unchanged from those published on page 32 of Amateur Radio for October 1974. Due to very limited participation last year and subsequent correspondence from some entrants a new set of rules is being developed. At this time the reprinting of the old rules and the complete metric distance chart (3 full pages in all) appears to be not justified. However a copy of the metric distance chart has been sent to the Secretary of each Division.

Entries should reach the Federal Contest Manager, Box 67, East Melbourne, 3002 by Wednesday, 18th February, 1976.

REMEMBRANCE DAY CONTEST 1975

A few late entries which arrived too late for inclusion in the results published last month.

Phone		
VK3AVJ	278	167
VK4NV	248	96
VK5ZIM	101	101
VK5LZ	31	31
VK5OG	12	12
CW		
VK2GT	240	43
RECEIVING		
J. Vaarnela (VK2)	1149	386

I hope that the certificates for the RD will be prepared and forwarded to reach you prior to the arrival of this edition of AR.

CONTEST CHAMPION TROPHY

This trophy has been donated, primarily, to acknowledge the important part played by high scoring entrants in Amateur Radio Contests, and also to provide added incentive to entrants.

Rule 1

The Radio Amateur, who is a member of the Wireless Institute of Australia, and holds a VK prefix, and who, under the scoring arrangement of Rule 2 obtains the highest aggregate of points in the contests nominated by the Federal Contest Manager, shall be declared Contest Champion for a nominated period of 12 months.

Rule 2

The Amateur obtaining the highest score in a nominated contest shall receive 10 points towards the trophy, the next highest scorer 9 points, and so on with the person in tenth place receiving one point.

Rule 3

The Contest Champion for the nominated period shall hold the Contest Trophy for 12 months.

Rule 4

The Federal Contest Manager shall each year, at the time of announcement of the name of the new Contest Champion, nominate the succeeding period and contests applicable to the trophy, and, together with such of these rules as he considers necessary, publish this information in Amateur Radio.

Rule 5

The Federal Contest Manager shall once in each year publish in Amateur Radio the names of all Contest Champion trophy winners with the related year/years of the contest. ■

MAGAZINE INDEX

with Syd Clark, VK3ASC

CQ MAGAZINE July 1975

The Microprocessor in the Hamshack; The True Essence of Homebrewing; Modification of the Heath HW-202; The Function Generator; The Multi-Band Dipole; Measurement of Capacitance Using A VTVM; An Electronic Hidden Word Puzzle; Accuracy & Calibration of SWR Meters; Cheap Selectivity for the Hammarlund HQ-215 and other 455 KHz IF Receivers; QRP Transmitter; Measuring the Transmitting Frequency of the Heath HW-16.

HAM RADIO June 1975

A Phasing Type SSB Transmitter; Slim-Line Touch-Tone Conversion; Hi-Fi Interference — Causes and Cures; 500 MHz Pre-scaler; Stable Crystal Oscillators; Speech Processor for the Heath SB-102; Noise Figure Measurements; Collins S-Line Drift Reduction; Cosmos Integrated Circuits.

QST August and September 1975

The Accu-Memory; A Simple Field Strength Meter and How to Calibrate It; Pip Squeak Modifications; Radio Direction Finding Techniques; Improved Wide Band IF Responses from the Double-Balanced Mixer; The DXer's Crystal Ball, Part 2.

Harmonic TVI — A New Look at an Old Problem; An Alternative Method for Phasing Crossed Yagis; The DXer's Crystal Ball, Part 3; Coherent CW — Amateur Radio's New State-of-the-Art; The Micro — To MK2 Keyer; Construction Hints for VHF Converters; A High Performance 50 MHz Amplifier Part 1.

RADIO COMMUNICATION August 1975

A Small Transistorised Power Amplifier for 2M; An Aerial Splitter Unit; A Compact Medium Powered Linear Amplifier; A Crystal Controlled Solid-State Source for 10 GHz.

SHORT WAVE MAGAZINE August 1975

Going QRP On Eighty; DX from Eday Is. Orkney; Noise Bridge for Antenna Measurements; Ten Metre Aerial Amplifier; Cheap RF Output Meter. ■

MORE FROM THE CW NET

A meeting of CW Net regulars was held in Sydney on September 27th. Those present were VK4II, VK2AV, VK2AFG, VK2BWC, VK2RY, VK2SM and VK2YK.

The meeting made the following proposals: Firstly, matters concerning operation of the CW Net.

(a) Conversation with the NCS should be minimal — such items as newsy bits and technical details would be better sent later.

(b) We should limit contacts to about 20 minutes to permit members to get in at least four QSOs.

(c) When a station (say VK5XYZ) is readable to another (say VK2ABC) but not to the NCS, we suggest this procedure be tried:—

VK2ABC makes "VK2NCS de VK4ABC QSO VK5XYZ AR".

VK2NCS makes "VK4ABC and VK5XYZ QSY to 70xx K".

VK2ABC makes "VK2NCS de VK4ABC R VK5XYZ QSX 70xx QSY AR".

The contact can then proceed normally with the NCS having it entered in his log and VK5XYZ calling VK4ABC on 70xx kHz.

The next suggestion should interest most amateurs and there will be many who know it proposes really nothing new. Although this is only a suggestion some of us have been trying it out long before this note appears in print. In effect we are suggesting that we put a window in the 7 MHz band using 7025 kHz for calling only. The benefit to low power stations and to others who may find it difficult to break in on established QSOs and for emergency calls etc. is obvious. It does not of course mean that we should not answer calls made on other frequencies.

We intend to try it during non-DX hours and we hope it will receive a fair trial. Calls on 7025 should be brief and use normal operating procedures. Check that your listening spot is clear.

Example

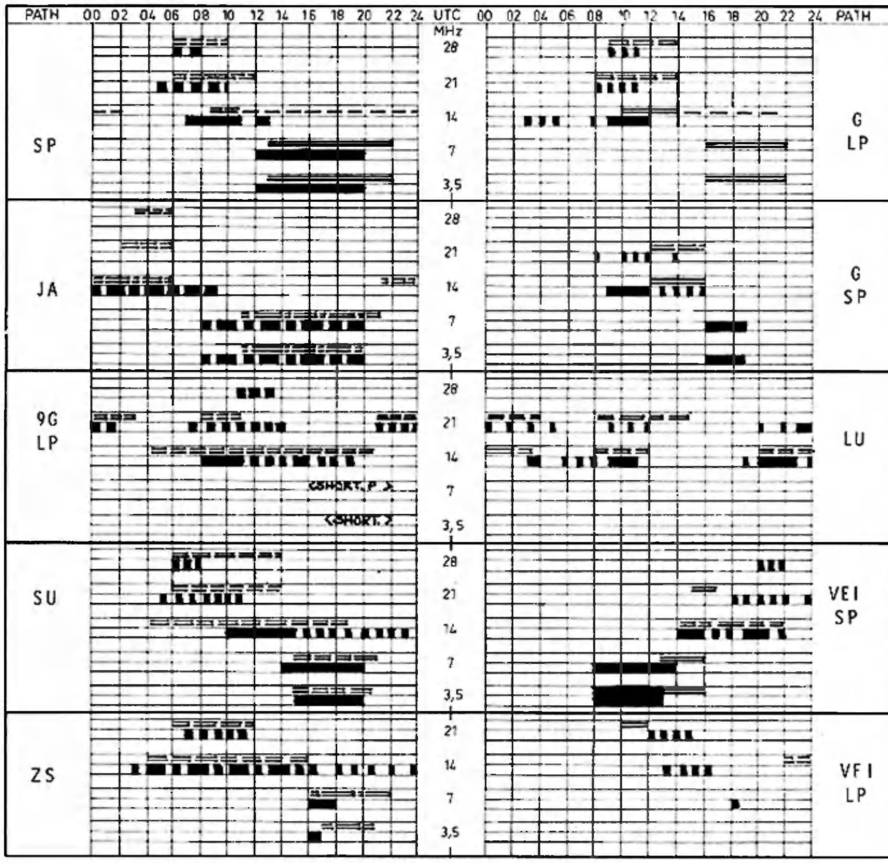
"CQ CQ de VK2XYZ, Cq Cq de VK2XYZ etc. QSX 70xx QSY AR" VK2XYZ listens on 70xx kHz. Other stations call him there. 7025 is thus left open for others to use in the same way.

This should not put crystal-control stations at a disadvantage. All they need is one crystal on or close to 7025, and another not so close, for listening.

VK-2AV
for CW Net. ■

IONOSPHERIC PREDICTIONS

WITH LEN POYNTER VK3ZGP



A new way of predicting solar activity discovered by G. M. Brown of University College of Wales, Aberystwyth, is reported in Wireless World, September, 1975.

It stems from his observation that there is a strong correlation between the sun's effect on the earth's magnetic field and the number of sunspots SIX YEARS LATER. The reason for this is not known, but it holds good over a time span which goes back to 1885 and the correlation appears to be very close.

If it proves to be a genuine effect and not a freak of statistics then it could give radio propagation experts a valuable method of improving their short wave propagation predictions.

The magnetic effect in question operates on the horizontal components of the earth's field. This normally goes through a minimum about 11.00 hours local time, but on "Abnormal Quiet Days" (AQDs) the minimum is some other time. It is the AQDs which predict the sunspot numbers. Since the AQDs are most frequent at the sunspot minima, it could be that they mark the beginning of the new cycle of solar activity rather than the end of the old one. "If this relationship proves valid it implies that the sun "breathes" with an 11 year period, such that the size of the solar activity maximum is determined at the very beginning of the cycle, or perhaps the very end of the preceding cycle, from the 'depth' of the solar minimum".

Well, we have another possible prediction service. I did check with our local observatory and this magnetic effect is part of the K measurement mentioned so much of late. From my recordings, and my interpretation of AQDs, there certainly is a general quietening down of activity. The number of disturbed days have dropped considerably which I understand is fairly normal for the time of the year. However, it will be interesting to follow up on these theories and compare it along with the multitude of others. Someone will be right.

On the subject of predictions, an index which has caught my attention is the 0F2 or Solar Flux F2 Index. This has largely been the work of Dr. M. Joachim CCIR and is featured in the Telecommunication Journal of the International Telecommuncation Union. Back in 1967 the Dr. published papers discussing the three basic indices of ionospheric propagation R12 (12 monthly smoothed sunspot number) IF2 (based on the Vertical — incidence critical frequency of the F2 layer at noon from 9 stations, now 13 stations) and 0 or Solar Flux expressed in Jansky Units (1 Jansky = 10-22 W/m-2/Hz-1), measured at 2400 MHz the effect of ionospheric "hysteresis" to be seen in the behaviour of IF2, and a new method of prediction 0 on the ITU computer. The results obtained suggest that it should now be possible to work out a new propagation index more closely related with ionospheric data and more accurately predictable than the indices in use at the present time.

In more recent times more contributions have been added and in March 1975 published under "Long Term periodicity in ionospheric activity" was the following summary. Recent work, including Cohen and Lintz CQ March 1974, indicate that in addition to the well known cycle of 11 years, the sun-spot and ionospheric activities have a long term periodicity, as do other activities connected with the movement of the planets around the sun. Some have applied mathematic analysis to periods up to 178 years using the values of Solar index R12 as observation data, these values have been recorded since 1749.

To enable similar analysis methods to be applied for predicting the ionospheric index 0F2, which is claimed to be more closely related with ionospheric data, the CCIR (International Radio Consultive Committee) Secretariat has extrapolated the series of 0F2 values for the period 1749 to 1946. The correlation employed the values of 0F2 and R12. During this analysis it showed the existence of cycles of about 11 years and 89 years.

A further comparison between the computer generated indices and measured values of 0F2 for the period 1947 to 1974 yielded a standard deviation of 6.6%.

For some years the ITU Journal has published basic indices for ionospheric propagation, which attracted my attention during 1974. In that year I was closely associated with VK3WU in an attempt to produce a DXCC on 20m within 12 months. Being new chums we probably learnt the hard way. All the gloom about poor conditions did not deter us and mid March 1974 saw the project launched. It is now history that we succeeded and the tally now stands at 235 countries worked. Confirmations stand at around 161.

Our attention was directed to talk of Solar Flux and A index but it was early 1975 before it started to dawn on us what it was all about. Not having any real evidence as to why conditions were reported to be poor, when we found it obviously to our advantage. The 0F2 index gained my attention.

For comparison purposes the index for 1974/75 measured and 75/76 predicted are displayed below.

Month	1	2	3	4	5	6	7	8	9	10	11	12
1974	82	82	82	82	86	84	86	85	84	86	88	85
1975	81	75	70	74	74	76	**77**	**77**	**77**	**77**	**78**	**79**
1976	**78**	**77**	**78**	**78**	**77**	**79**	**80**					

Those in bold type are predictions as at July, 1975. My main interest was that so long as the monthly mean remained above 80 conditions were in the main from good to excellent. We were able to trace the bad periods to incidences of high geomagnetic disturbances i.e. high K figures leading to high A figures — in keeping with Jacobs Linz and Cohen CQ articles on propagation.

Once it dropped below 80 then the change came. Early 75 saw considerable deterioration in general conditions, however in this latter part of 75 somewhat of an increase no doubt due to seasonal conditions. The interesting part is that the predictions show a rising index mid 1976 around the time many predict that the minima will be over and the new cycle expected to start.

As a direct comparison between R12 IF2 and 0F2 here are the figures for 1974.

Month	1	2	3	4	5	6	7	8	9	10	11	12
R12	33	34	34	34	35	35	34	33	32	30	28	25
IF2	7	17	13	19	21	22	29	20	20	22	22	2
0FT	82	82	82	82	86	84	86	85	84	86	88	85

I propose during the coming year to mention not only the sunspot data available, but also the measured and predicted index for 0F2 for those who like to look at indices. I hope to have further information of G. M. Brown's method of prediction to add further fuel to the fire.

ADDENDA

Sunspot data for Sept., 1975.

Provisional mean = 14.1 (Aug. 39.3, Jul. 28.3 June 11.4). Smoothed mean R6 March 75 = 21. (Feb. 22.2, Jan. 23).

Predictions of smoothed monthly numbers — Oct. 11, Nov. 10, Dec. 9, Jan. 8, Feb. 7, Mar. 6.

Unfortunately there will be no predictions in the January issue. However, should anyone require any specific data I would be only too pleased to help you. A SAE will help. Best of DX for 1976, trusting you all have the best during the coming festive season.

PREDICTIONS COURTESY: IPS SYDNEY
0F2 DATA: TELECOMMUNICATION JOURNAL
LEGEND FOR PREDICTION CHART
ALL TIMES UNIVERSAL.
TOP PORTION OF BAND CHART FROM PERTH
BOTTOM PORTION OF BAND CHART FROM EASTERN AUSTRALIA
FULL LINES. BETTER THAN 50% OF THE MONTH BUT NOT EVERY DAY.
BROKEN LINES. LESS THAN 50% OF THE MONTH
BROKEN LINES — INDICATE 2nd F LAYER PROPAGATION
STATEMENTS APPLY TO BOTH LINES AND BLOCKS

VHF UHF
an expanding world

with Eric Jamieson VK5LP
Forreston, S.A., 5233
Times: GMT

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTT, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RTX, Devonport	144.900
3D	3D3AA, Suva, Fiji	52.500
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2VHP, Mt. Stewart	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHP, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400
VE	VE1ATN, Canada	50.058
KG6	KG6JDX, Guam	50.105
	KG6APP, Guam	50.150
	K2IRT/KG6, Guam	50.098
JA	JD1YAA, Japan	50.110

As December is likely to be the peak month for Es type of operating, an increased beacon list is submitted this month. Whilst conditions at the moment are not ideal for long distance DX, one never knows what is available unless listening is done. Hence, why not look around the lower end of the 50 MHz band as often as you can, particularly in the mornings to mid-day, and perhaps late afternoon. Of course the next problem you have is that if you hear a station, say in Guam, how do you let him know you are receiving him — we are operating 2 MHz further up the band! You could phone him, or get on 20 metres and hope you can contact someone else there to pass the message along. Of course in the meantime he will probably fade out! Or you send a telex! I also know another way! So there are various ways around the problem, the old hand at the game will organise something.

For the newcomer, plenty of patience will be needed, and this can apply even to New Zealand stations. As these invariably come in on second hop transmissions, they generally are not as strong as the VK stations on single hop (about 1600 Km). It is no use nowadays looking down on 51 MHz for ZLs. Those wishing to work you will be found on the lower end of 52 MHz mixed in with all the strong VKs. Other than for exceptional conditions you will need a really good antenna and quite a bit of power output to make it across the Tasman Sea, from VK5 anyway.

The VK6s will need everything they can muster. A good receiving converter is a prime requirement, and be on good terms with electricity authorities to ensure you have no leaky insulators on the power lines nearby. Talking about power lines, have any of you considered what your line voltage might be at any one time, particularly if you live in an industrial area, or the country where there may be many electric motors driving substantial water pumps for irrigation purposes. At my QTH, which is a rural area with much irrigation, I have noted voltages hovering around 225 volts at times, and for long periods about 230 volts. This plays havoc with the output of your transceivers and linears. You can be losing up to 25% of your output due to reduced HT and heater voltages. I monitor the mains voltage all the time, and use a Variac to counteract this drop. Input and output AC meters are necessary for best results, although you could get away with one by monitoring the voltage you feed out of the Variac to your equipment.

In addition to the substantial beacon list above, the newcomer should realise that you can use the sound transmissions of the three main Channel O television transmitters in Australia. They are off-set 10 KHz from each other and can be found as follows: Wagga 51.740; Brisbane 51.750; and Melbourne 51.760 MHz. As they radiate 100 kW ERP they need to be heard quite strongly before you are likely to work many amateurs from the same area. This particularly applies to the New Zealand TV stations, which are to be found around 50.750 MHz.

Don't lose sight of likely openings on 144 MHz when strong conditions prevail on 52 MHz. Use the various FM repeater channels in other States as a guide, also Channel B on 146.000 MHz. The most likely times for 2 metre contacts will be on Saturdays and Sundays when more operators are available, and from about mid-morning to mid-day. This could apply to almost any weekend during December, and possibly early January, with the most likely a week or so before Christmas.

So go to it chaps. The more you operate the more likely you are to work something different and/or unusual. But don't sit silently in the shack all the time just listening. If everyone did that nobody would be worked. Whilst it is a good thing to do plenty of listening, it also pays to stop listening every now and again and start calling. Remember the recognised calling frequencies are 52.050 and 144.100. Once you have established contact however, get off those frequencies and work a few kHz higher or lower and leave the calling frequency for others, possibly in a totally different area from that in which you are working. See you on 6!

EME OPERATIONS

Lyle VK2ALU, of the Dapto EME project, sends his usual notes via "The Propogator". On 7/9/75 M grade reports were exchanged with PA0SSB. F9FT was then worked with good signals each way. He later tried SSB which could be heard in the noise but could not be resolved clearly.

Repairs and adjustments are continually being made to the 432 MHz equipment at Dapto to improve prospects for contacts, but the group are sorely in need of further helpers to keep everything going. Same old story it seems. However, the transmitter frequency checking system, using HF signals from standard frequency stations, has been installed.

Chris VK5MC at Hatherleigh near Millicent sends a brief report of his 144 MHz EME operations. 1/9/75 1814Z, JA6DR, report sent 539, received 539. This was a new country for Chris. 25/9 1326Z, W7CNK, sent 549, received 339; W6PO, sent 549, received 439. 29/9, 1856Z, K2RTH, "O" and Roger sent and received. Chris now has a post-amp and a pre-amp up in the box at the stacked rhombics antenna, and this does appear to be giving a better overall system noise figure. Thanks Chris for your information.

GENERAL

I note from "Blurb" of the South East Radio Group in Mt. Gambier that the Club projects for the 1975/76 season are going to keep members busy. Such things as: Establishment of a 2 metre beacon, AND a 2 metre repeater; re-drafting of the Constitution, fund raising, new Club Rooms and participation in the Back to Mt. Gambier celebrations. That's quite a task. We wish them well as the Mt. Gambier boys represent the most active group of really out-of-town VHF amateurs within reach of both Adelaide and Melbourne. I also note much work has been going on upgrading and rebuilding 2 metre converters, so this augurs well for this summer period of operating. It is great that these boys think in terms of VHF when so many of them have full callsigns.

The Gold Coast Radio Club Newsletter has arrived again, and I note they have now received their UHF repeater from John Willis, VK4WN. It operates narrow band FM, receives on 433.100 and transmits on 434.300 MHz. It is presently not proposed to instal it on Mt. Tamborine, the site of the present Channel 1 repeater, until the completion of the new VHF antennae.

Winston VK7EM writes to advise he will be active again during the summer months on ATV. He is still running 30 watts input to a QQE03/20, and a phased array 6 metres high. Transmit frequency is 426 MHz. Winston hopes for many more contacts to VK3 this year, and other areas too if possible.

In north-western VK7 there are many stations preparing for ATV so it could be an interesting year for the cameras. Skeds can be arranged with Winston via Channel 4 repeater, Channel B, 144 MHz AM or on HF. He monitors the commercial TV stations across the water and when signals are reasonable listens on all 2 metre channels including the VK3 ATV group channel V.

Representing the Mackay Amateur Radio Club, a letter has arrived from Publicity Officer Eddie VK4RR, probably better known to some as VK4ZRE. He reports 2 metre activity is on the increase in North Qld., with many large antennae being constructed. John VK4TL in Cairns started the ball rolling with four 6 elements yagis, vertical on Channel 50, and ran regular skeds with Ron VK4ZLC in Townsville, and found contact could be made almost every night. Richie's QTH is 33 Km north of Mackay and about 600 Km from Cairns, and he finally worked John in Cairns on 14/7/75 after hearing him for several months, using two 12 el. yagis at 17m high, with 4 watts output from the transmitter. (Not a bad effort 5LP). Now that he is running 60 watt it has meant quite a few 5 x 9 contacts to Cairns.

Richie has found in the north the same things that happen down here. When the activity increases, you suddenly find the band is open on many more occasions than thought possible. He reported an outstanding opening on 12/10 and worked John VK4TL and Ted VK4YG in Cairns, Mario VK4ZMS in Ingham, Joe VK4JH in Townsville, and Ross VK4RO in Ayr.

Longest distance contact was between Ron VK4EN in Mackay to John VK4TL in Cairns, and best contact was between Peter VK4APS operating mobile in Mackay with 2 watts to a 5/8 whip to John VK4TL in Cairns. On the same night in Mackay Ron VK4EN and Peter VK4APS worked Claude VK4UX and Charlie VK4MP in Rockhampton on Channel 40.

Richie further reports there is quite a deal of interest in 2 metre SSB in the north, but the problems of lack of finance to buy commercial equipment, and the lack of time to build it yourself, seems to be delaying the commencement to any extent. One can get on FM for as little as $30 for used equipment, but many times that for SSB equipment.

Thanks for writing Richie. The above information has been included in these notes to let the rest of VK land know that 2 metres in one form or another has not been overlooked in the north, and when the conditions are right as Christmas approaches, contacts to the south could be the order of the day, and with some of the very substantial antennae erected in the north such contacts are certainly feasible.

My old faithful, Kerry VK5SU from Ceduna, has written to make sure we all know he will be around again this year, on 52 MHz to all States, on 144 MHz to the east, monitoring 144.050 and 144.100, repeaters and simplex channels with calls on these frequencies especially during 6 metre openings.

Kerry is also taking up the cudgels for 2 metres to the West, particularly to the Perth area. He has received advice that Phil VK6ZKO and Peter VK6ZDY are both keen to work long haul 2 metre DX. They both hope to be running high power to 13 element 24 foot yagis. Phil's QTH is right on top of the ranges (330m high) east of Perth with a clear take off to the east! (That's certainly news for us over here — the chances of working Perth in the usual way have been rather slim, but there are hopes for the future — 5LP).

Kerry also mentions the Perth beacons have been re-located and are now at the 40m level of the TVW6 TV tower at Bickley, this being 350m above sea level. Antennae have been rebuilt, with a halo on 145.000. The halo for 52.300 has given some trouble and may have to be rebuilt again. At the moment the 6 metre beacon is using a dipole pointing north and south! There are problems in pointing it east and west.

The band on 6 metres opened for Kerry on 12/10 to VK3, with stations in Melbourne, Geelong and Werribee being worked. What a lovely distance you are from everybody Kerry. But how lucky are we to have such a keen VHF-er at a place like Ceduna, keeping everyone around the Continent on their toes through your generous contacts. Thanks for writing; sorry I missed you when you were in Adelaide recently.

As of this writing there have been a few short 6 metre openings to VK5. Reasonably good one to

VK6 on 1/11/75. We should all soon be having more of these openings, with the pattern last year being for some very strong one's early in November. By the time these notes are read the Ross Hull Contest should be in full swing, so wish you all well in that.

Christmas is coming, so I take this opportunity of once again sending greetings to all my correspondents who keep me supplied with notes, to all my readers who from time to time write and say "thank you" and to those of you who recognise me on the air and also say "thank you". If I can give some pleasure or create an interest for a number of you then I am rewarded; if many of you feel these writings are generally worthwhile, then I am amply repaid.

So, a Happy Christmas to everyone, and a very prosperous New Year, and plenty of DX.

Thought for the month: "It's a strange life. You can skate on thin ice and end up in hot water."

The Voice in the Hills.

Awards Column

with BRIAN AUSTIN VK5CA
P O Box 7A, Crafers, SA 5152

Conditions for the Hong Kong Firecracker Award have been amended as follows:

1. All licensed radio amateurs and SWLs throughout the world are eligible to apply for the award.
2. Claims may be made within the following categories:
   CW only,
   CW/Phone or
   Phone only,
   and the award will be endorsed accordingly.
3. The contacts are required to be made with different VS6 stations as follows:
   (a) Zones 18, 19, 24, 25, 26, 27 and 28: 10 contacts
   (b) all other Zones 6 contacts
4. Contacts may be made on any of the authorised amateur bands.
5. Contacts made on or after 1st January 1964 ONLY will be eligible for the award.
6. Contacts made during contests will be eligible for the award.
7. In support of an application for the award, QSL cards must be held for the contacts claimed. It is not necessary to send QSL cards with the application, alternatively a log extract, certified by the National Club or Society will suffice. Details required are: date, time, band, mode, and signal reports, both given and received. Minimum report accepted will be readability 3 and for CW tone 8 on the RST system.
8. To cover administration costs, 10 IRCs are to be sent with the application. Postal orders, stamps or cash not acceptable.
9. Applications for the Hong Kong Firecracker Award are to be sent to the QSL Manager, Hong Kong Amateur Radio Transmitting Society, P.O. Box 541, Hong Kong.

WAOY

1. The award is available to licensed amateurs.
2. Contacts on and after 11th April 1965 are valid.
3. Do not send QSL cards. A list, giving full details of the contacts should be certified by another licensed amateur.
4. Mixed mode contacts — CW to SSB etc. — and cross band contacts are not valid.
5. The fee for the award is 10 IRCs or equivalent.
6. The address for application is:
   FRA,
   Awards Manager,
   Post Box 184
   Torshavn
   Faeroe Islands.

Rules: For stations outside Europe each FRA member station counts as one point on 28, 21 and 14 and two points on 7 and 3.5 MHz. OY6FRA and OY6NRA count double points on each band.

Requirements: 20 points.

DTA

1. The award is available to licensed amateurs.
2. Contacts on and after 1st April, 1946 are valid.
3. Do not send QSL cards. A list, showing full details of the contacts should be certified by the Awards Manager of a National Society.
4. The award is issued for all CW or all phone.
5. The fee for the award is 6 IRCs.
6. The address for application is:
   M. Menetrier, F5IN
   128 Avenue de la Resistance
   93340 Le Raincy,
   France.

Requirements: Confirmed contacts are required with THREE of the French Austral countries. There is also an "Excellence" DTA for confirmed contacts with all four countries.

Countries List:

Crozet Islands	FB8W
Kerguelen Islands	FB8X
Adelie Land	FB8Y
St. Paul and New Amsterdam	FB8Z

Around the Trade

Alex (Sandy) Bruce-Smith (VK2AD) has joined Dick Smith Electronics Pty. Ltd. as Manager of the Communications Section. He will be responsible for Amateur gear sold by the company.

Sandy has been a licensed Amateur for 18 years and is active on all bands. He has been actively engaged in the sale of communications equipment for the past ten years and was at one time N.S.W. agent for Yaesu Musen. He was formerly with Racal Electronics and has considerable experience in communications used in oil exploration.

Mr. Bruce-Smith is based at the Gore Hill Electronics Centre and Amateurs may contact him there on (02) 439 5311.

Spectrum International have recently added a new filter to the 9.0 MHz line. It is the XF9-NB, a narrow band unit for CW reception (and digital data) with minimum ringing characteristics. Its specs are:

Bandwidth — 500 Hz; No. of Crystals — 8; Ripple — less than 0.5 dB; Insertion — less than 6.5 dB; Terminations — 500 ohms, 30 pF, same as other 9.0 MHz filters; Shape Factor — 6:60 dB 2.2:1, 6:80 dB 4.0:1; Ultimate Attenuation — greater than 90 dB. Price is U.S.$63.95.

Hamads

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.
- The current WIA Callbook is the 1975 edition.

FOR SALE

Trio 9R59DS Communication Rx and Manual, $120; TCA1677 60 watt carphone, 4 ch and Manual, $100; 10-15V 8A PSU, $45. VK2YCR, QTHR. Ph. (02) 982 3707 (Tony).

Three-Section 100 ft. Guyed Tower plus Ham-M Rotator and 3 el. beam atop. Part of deceased member's estate. Would appreciate offers with assistance to remove. Mrs. Athans, 76 Pascoe St., Burwood, 3125.

AR7 with circuit, $35; **CRO** using 5BP1, with circuit, $30; Multimeter, AVO Mod. 8, Mk3, $80; **Tradiper TE15**, $20; Tape recorder, Robuk, mike and circuit, $30; Microphones with table stands 1-Zephyr, 50 ohm, $15 and 1-Astatic, D104, $10. Have other meters etc. also available. John Sydenham, Ph. (03) 232 4637, any time.

Creed 7 Teleprinter with 3 governors, fibre box cover, PLL decoder, pair MJE340 AS magnet drive, power supplies, $70. Will separate. R. Graham, QTHR. Ph. (02) 642 0122.

Yaesu FT2FB with 1, 4 and 40. As new, $145. Solid state multi-band Rx, covers B/C 30/50, 88/108, 108/170 MHz AC or battery, $25. AWA MR/6A 2FM, restored to new cond., $35. VK3OM, QTHR. Phone (03) 560 9215.

Yaesu FT201, brand new in carton, fitted 12V DC accessory kit, complete with new mike, $500. Matching SP101 speaker, new. Latest Katsumi elec. keyer EK-26 12V DC, 240V AC, little use, $45. 4-Track, 4-Speed solid state Tape Recorder, Type Juli-Corder 999, 12V DC/240V AC, unmarked, as new, $75, including mikes, accessories and 5 new Sony 7" tapes. J. Moyle, VK4ZT, QTHR.

Yaesu FT200 with matching heavy duty power supply, as new condition, $350. Quad 10, 15, 20m, aluminium spider hub, fibreglass spreaders, $100. VK6AZ, 608 Morley Dr., Morley, 6062. Ph. (092) 76 4491.

FT2F FM unit, very good cond., repeater xtals 1, 2 and 4, Simplex A, 40 and 50, $135. K. Roget VK3YQ, QTHR. Ph. (03) 85 3604.

FT101B with matching SP101 speaker, all accessories, $500; VF101B matching remote VFO, $75; Mobile mount for FT101B, $15. All in mint condition, as new. VK3TG, QTHR. Ph. (058) 52 1636.

FT200 Transceiver and Power Supply, 2 years old, as new, little used; microphone and handbook, $350. VK2BZ, QTHR. Ph (047) 53 6149, after hours.

Galaxy 5 with remote VFO mike, speaker and power supply, exc. cond., $370 ONO. Geloso VFO 807 final, 3.5 through 28 MHz, $25. New Anixter Whips, 80 and 40m with bumper ball fitting, $40. VK5ZB, QTHR. Ph. (08) 276 1053.

FT101 Transceiver (no 160 mtr), excellent condition, $350; Sinclair stereo 60 audio pre-ampl., new condition, $18. VK5PV, QTHR. Ph. (08) 381 2415, 382 5851.

New Valves: two 4-125, ea. $9.00; one QY 3-125, $8.00; one QB 3/300, $8.00; one 811A, $5.00; two 5763 ea. $1.00; one QQE 03/12, $2.50; 6HF5s, ea. $4.00; two heavy duty variable cap's, silver plated, good for 4 kV, 20-200 pF and 20-180 pF, 160 x 110 x 85 mm, ea. $7.00; provide postage. VK2BMI, QTHR. Ph. (02) 771 1657.

Gonset GSB100 Tx, mint condition, CW, AM, PM, SSB, VOX, manual, drive any linear, $200. Homebrew Linear on chassis with B&W 1 kW turret, 10-80m, 3 metres, 2 811As, $100. Pair Selsen motors, $20. VTVM Cossor Heath Type, $20. Asahi Mobile Ant., 10-80m with spring, cost $105, sell $75. Tranpro VCT, $40. BC 459A, $20. VK2DA, QTHR. Ph. (02) 94 1039.

Silent Keys

It is with deep regret that we record the passing of—

R. A. DUDGEON	L30259
A. ATHANS	VK3ACB

Hallicrafters 370W Transmitter/Linear Model HT 37, AM, SSB, USB, LSB, CW on 80, 40, 20, 15, 10, with built-in 230V PS, VOX and remote control, $225 or exch. for FT75B. G. Down, 3 Broome Street, Katanning, 6317.

TS500 Transceiver, 80-10m (Trio Kenwood) with 230V PS and speaker, inst. manual included. Used for few months rec. only, $375. May accept FT75B as part payment. G. Down, 3 Broome St., Katanning, 6317.

SR700A/ST700 Star SSB Receiver and Transmitter, with internal power supplies, condition as new, complete with cables, speaker, manuals and circuits. Spare tubes can be supplied at cost if required, $400 ONO. Radio Communication (RSGB), 28 copies (unmarked), from Dec. 72 to April 75, $10 the lot. VK3WQ, QTHR. Ph. (03) 211 5189.

Collins Mechanical Filter Type F455K 31 with Xtals $20. Midland Twin-Meter SWR Bridge, new in box, $16. Communications desk mic. with desk stand $7. New pair stereo phones $10. SP400 Yaesu speaker unit $20. Full set Asahi moblie whips 10 to 80m with ball and spring $65. New, unused 6KD6's x 2 and 6GK6, $16 the set. All above either brand new or mint condition. VK3ARZ,QTHR. Ph. (03) 932 9492 A.H. only.

FT200 AC, PS and Homebrew DC PS. All 10m Xtals plus 11m. Good cond. New 6JS6Cs. No mike. You freight. $350. VK1MP, QTHR.

Tri Band Linea, 80, 40, 20 Mx, 2 x 813, plus 2 spare tubes, home built, with rugged power supply. In large cabinet (3'6" x 2'). Work OK, needs tidying up. $75.00. B. Bathols, VK3UV, QTHR (03) 90 6424.

Stereo Amp, 8 x 8 watt RMS $59. Stereo Amp 16 x 16 watt RMS $69. Labcraft 605 turntable $59 (o.n.o.). VK3ZR, QTHR. Ph. (03) 89 4645.

WANTED

Circuit Diagram and Service Info for Collins front-ends mod. nos. 55D2 and 55B2. These units appear to be ex-Navy and use 6SK7, 6SK7, 6SJ7 valves. VK3ZR, QTHR. Ph. (03) 89 4645.

Cheap Receiver wanted for school boy sitting for novice exam. 3 to 6 command, low band command, AR8 or similar. B. E. White VK2AAB. Ph. (02 487 1428.

Circuit diagram for AVO Valve Characteristic Meter Mark III. Also copy of instruction book, all expenses will be paid. VK3WQ, QTHR. Ph. (03) 211 5189.

Theosophists, or similarly-inclined: Tom House, BA — VK2BTH — would welcome hearing from you. Skeds, preferably CW, eyeball QSOs or correspondence. 34 Wolsely Rd., Lindfield, 2070. Ph. (02) 467 2773.

Crystal Filter 9 MHz for SSB Tx/Rx. Consider other freq. or homebrew. VK7TA, QTHR.

Circuit Diag. of Astor Model TV1 Oscilloscope for copying. Return and postage costs guaranteed. B. Bathols VK3UV, QTHR. Ph. (03) 90 6424.

CRO Single Channel for TV work, around $400.00. Tower, tilt-type, 35 ft. and above. Rotator for quad, e.g. (Stolle or better). Bruce R. Kendall L30578. 10 Carter Cres., Werribee. Ph. (03) 741 2382.

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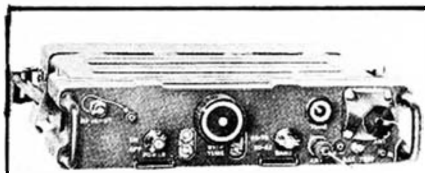

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