

THE LEADING UK CONSUMER ELECTRONICS TECHNOLOGY MAGAZINE

TELEVISION

SERVICING·VIDEO·SATELLITE·DEVELOPMENTS

DECEMBER 1997 £2.50

A REED BUSINESS PUBLICATION

**Problems with
surface-mounted electrolytics**

Digital TV Modulation Techniques

**Servicing the Tatung Y2
series monitor chassis**

**Repairing remote
control handsets**

Test Reports

Satwalker

**JBC Desoldering
station**



Fault Reports *TVs, VCRs, Camcorders and Satellite*

Win with Philex

Win £1,000 worth of Holiday Vouchers by entering this simple competition.

Fancy a European break or somewhere further afield? For your chance to go somewhere special with Philex, please read on.

All you have to do is enter below the 5 most popular original remotes you provide to your customers every day.

Then complete the tie-break sentence in no more than 12 words. If your 5 most popular remotes and tie-break answer match our panel's decision, you could be a winner. Final date for entries is 31 December 1997. Post, fax, or e-mail your answer to: Philex Remote Competition, at the address shown below. Good luck!

Make Model No. No.sold weekly

- 1.
- 2.
- 3.
- 4.
- 5.

Please complete the following sentence in no more than 12 words.

I use Philex replacement remote controls because.....

.....

.....

.....

- Are you? 1. A Service Engineer
2. A Distributor 3. An End User

Name.....

Position.....

Company.....

Address.....

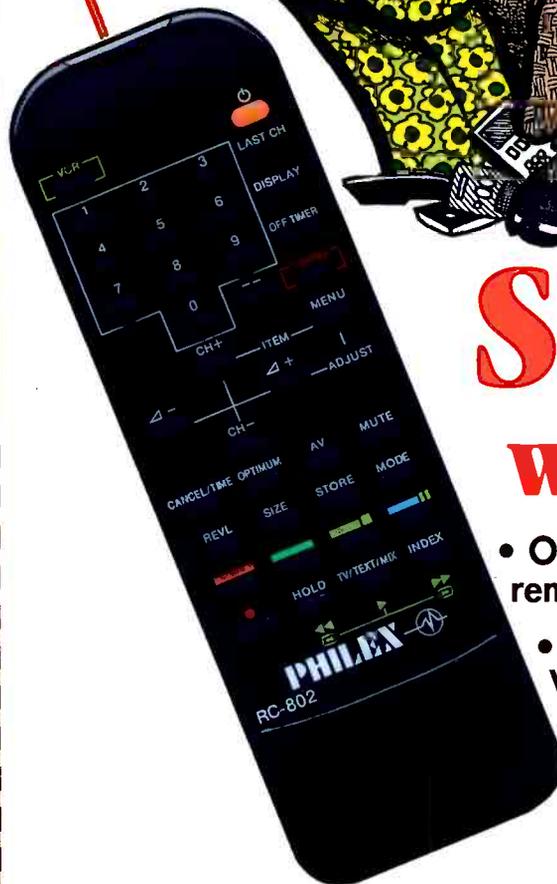
.....

Post Code.....

Daytime Tel:.....

Rules: 1. Only one prize will be awarded to value in Vouchers of £1,000. 2. The judges decision will be final. 3. No correspondence will be entered into. 4. A full list of the rules is available on request to Philex. 5. Winners name will be published upon request. 6. Winner may be required to help with future promotional material. 7. The winner will be notified by post by 30 April 1998. 8. Only one entry per person. 9. The 5 remotes must not be part of the present replacement Philex range.

Problem



Solving with Philex

- Over 200 superb replacement remotes available
- Over 7000 original TV & VCR models covered
- Stylish ergonomic design
- Robust and user friendly
- Made to our strict levels of quality control

For over 14 years Philex has been at the forefront of providing high quality replacement remote controls for TV, VCR, and satellites. Our complete range offers solutions for nearly all your remote problems. Our latest catalogue has a comprehensive model cross reference and clear, detailed line drawings of all the remotes in our range. For further information, why not call the number below?



Philex. Committed to your success.

0181 202 1919

PHILEX PLC, 110-124 THE BROADWAY,
WEST HENDON, LONDON NW9 7PP
FAX: +44 (0) 181 202 0015
web site <http://www.philex.com>
email: sales@philex.com

CONTENTS

December 1997

Vol. 48, No. 2

If it takes three men . . . 79

Teletopics 82

The analogue TV switch off, latest on flat-screen displays and DVD technology and other news.

Camcorner 84

Camcorder servicing hints and fault reports.

Satellite Workshop 88

Jack Armstrong's column on satellite receiver servicing.

Test Case 420 89

Amstrad Tuning Modification 90

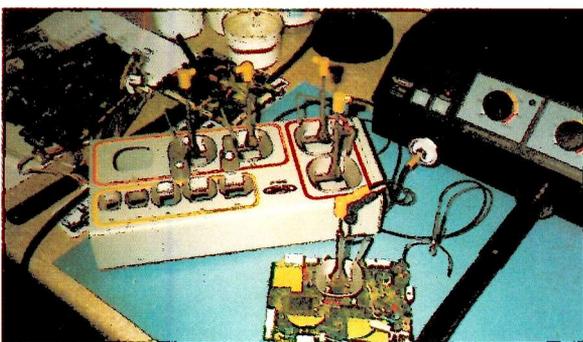
Martin Pickering, B.Eng., describes a simple way of increasing the tuning range with satellite receiver Models SRD510/520.

Satellite Notebook 92

Problems with satellite equipment and installations.

**Test Report:
The JBC Desoldering Station** 94

Steve Beeching, I.Eng., on the problem of desoldering surface-mounted ICs and the solution provided by this station.

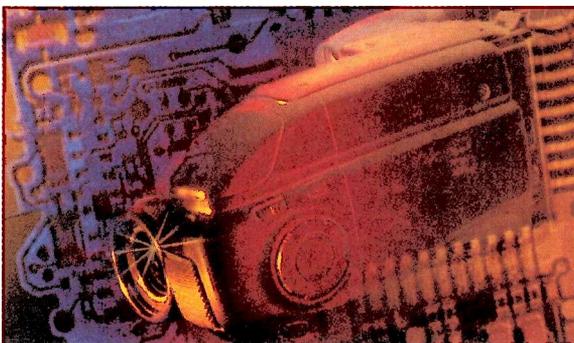


Repairing RC Handsets 96

Chris Watton on economic remote-control unit repairs.

**Test Report: The Satwalker
180° H-H Mount** 99

Mike Hancox finds that the Satwalker 180° horizon-to-horizon dish mount offers several advantages including silent operation and simple fitting.



Photography Mark Swallow

Surface-mounted Aluminium Electrolytics 100

Nick Beer on the problems that these troublesome components cause, repair procedures and sources. With notes on some models that are particularly prone to leaky electrolytic faults.

What a Life! 104

A fuse-blowing VCR and mystery phone calls plague Donald Bullock.

TV Fault Finding 106

Letters 110

Help Wanted 123

VCR Clinic 124

**Monitor Servicing: The Tatung
Y2/Y2V Chassis** 126

Russ Phillips on the circuitry used in these popular monitor chassis and the faults you might encounter. Circuit descriptions include the power management system.

Introduction to Digital TV 130

J. LeJeune describes the modulation techniques used for digital satellite, terrestrial off-air and cable TV, and explains why different systems are used.

Long-distance Television 134

Terrestrial DX and satellite TV reception, news from abroad, and the saga of obtaining planning permission for a second dish. Roger Bunney reports.

Next Month in Television 138

Editor

John A. Reddihough

Production Editor

Tessa Winford

Consultant Editor

Martin Eccles

Publishing Director

Susan Downey

Advertisement

Manager

Kate Hale

0181-652 3076

Advertisement

Sales Executive

Pat Bunce

0181-652 8339

Fax 0181-652 8931

Editorial Office

0181-652 8120

Fax 0181-652 8956

Note that we are unable to answer technical queries over the telephone and cannot provide information on spares other than that given in our Spares Guide.

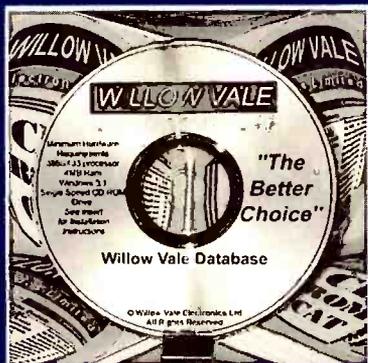
A WORLD OF SPARES

CD-Rom Revolution

The updated CD-Rom catalogue now contains even more information

587,000 Descriptions
351,000 Part Numbers
300,000 Products
3,000 Pictures

Now with interactive COPLINK giving up to the minute information and availability.



TECHLINE is always available. Should you require any technical help or advice on 0891 615915. (*all calls charged at premium rate).

DE-ZINE-LINE, Willow Vale's FREE planning service designing your professional sound and communication system. Phone or Fax Gerry Bevan on 01635 254218.

C.O.P.S. computer ordering parts system via our 'viewdata' based order/enquiry system.

Call Willow Vale
0118 987 6444

Fax Willow Vale
0118 986 7188

Authorised Spares and Accessories Distributors for:

- Sharp
- Philips
- JVC
- Grundig
- Tatung
- Pace
- Nokia
- Matsui
- Ferguson
- Saisho

Genuine manufacturers' parts available for many other premium brands.

Sound and Security Division Distributors for:

- Aadastra
- Altai
- Aiphone
- Audio Technica
- Audix
- Baldwin-Boxall
- Bose
- Computar
- Domineye
- Eagle
- ERL
- Goodmans
- Inkel
- Jamo
- Millbank
- Next Two
- Philips
- Secure Care
- Shure
- TOA
- Trantec
- Univox

WILLOW VALE
ELECTRONICS LIMITED

'The Better Choice'

READING HEAD OFFICE
Tel: 0118 986 0158
Fax: 0118 986 7188

MANCHESTER BRANCH
Tel: 0161 682 1415
Fax: 0161 682 9031

If it takes three men four days . . .

Maths has never been my strong point, to put it mildly. It all started at school, when I was presented with this book which had rows of apples, green ones. You had to count them and enter the total at the right-hand side. This was soon mastered. Then subtraction came. How can you take one apple from another? Are there negative apples, sort of anti-apples, and what do they do to your everyday ones? One had to think of them as being in a basket, with some being removed and set aside. This approach is of limited usefulness however. Multiplication and division followed, which meant further problems.

Then, one day, a maths master presented us with a problem we were supposed to be able to answer. If it took three men four days to dig a trench 200 yards long, how long would it take seven men to dig a trench 350 yards long? Or something like that. A dirty, underhand question to ask I'd say. Anyway I sat there, puzzled. I had this picture of the three men, in their cloth caps etc. One was resting on his shovel, lighting a fag. Another was rummaging around looking for something he'd dropped. The third, if I recall correctly, was opening his sandwiches and pouring a mug of tea (not at the same time, you understand). How was I supposed to know how long it would take them or the other lot to do anything at all?

After a while there were stirrings in the class. Someone had an answer! Then others. Some were actually correct. Meanwhile I sat there flummoxed. A vital piece of information was missing. Did the diggers all put in the same amount of work? We'd not been told that. Some must have inferred that they did, which is illogical, since it was not implicit in the question as

asked. So what we should have been asked is "given that a digger removes a set amount of earth a day . . ." But that was not the end of the matter. Oh no.

While excavating a trench, you might well come across an obstacle which would involve digging beneath or around it. That would take extra time. And you couldn't assume that the length of the trench to be dug would consist of the same type of material throughout. Some sections would probably be harder to dig than others. So the question should have been "given that a digger removes a set amount of earth a day, and that the earth is of given consistency and there are no unforeseen obstacles . . ."

What about the weather? Trenches are generally dug outdoors. Suppose there was a downpour? You'd have to stop digging, then maybe take steps to remove the water from the trench. Get buckets and so on. After all you are digging a trench, not a canal or a river. I had assumed that pipe-laying was the object of the exercise, or maybe digging foundations. You don't dig a trench for the sake of it, unless, perhaps, you are a maths master.

Suppose one of our diggers broke his spade? It happens. He might have had to wait a day for a replacement. Done a bit of tidying up perhaps. This would have affected the outcome.

There are possibly other factors that might have affected how things went, making a comparison between our first gang of three diggers and the second of seven difficult to assess. But of course you weren't supposed to be looking at things in this sort of way in a maths class.

There is a little moral in this: that there are different ways of doing things and

different types of learning. In electronics for example you could concentrate on network calculations and other such delights, or perhaps on component failure mechanisms say. Quite different matters. To be competent in the electronics field you need to know a bit about both of course. But there is learning to pass exams, which is based on the theory that someone at some time thought relevant to the curriculum concerned. And there's learning how to cope with everyday problems, which is what our NVQs are supposed to be all about. In both cases it's difficult for education authorities to get the right balance of what to include.

It is also difficult to know what to keep in a syllabus. We don't need to know much about valves now, except for the CRT. What about tuned circuits, which could once occupy a lot of time? Since little bits of resonant ceramic or a surface-wave acoustic filter will do most of what we might want, it is hardly necessary to have a detailed knowledge of resonant circuit theory. But at least, in electronics, we don't have to worry about men digging trenches!

If you want to know in which way your mind tends to work, try the famous butter test. The question is: how many sides are there to a pack of butter? Some of us will concentrate on the butter, thinking of a yellow pack, then counting the sides. Or maybe we'd see a silver or gold pack, with Wheelbarrow or something written on it. Others realise straight away that the butter is irrelevant. The pack is a cube, and a cube has six sides. Forget the butter! For those of us who can't, life can be perplexing. I wonder who makes the better diagnostician?

COPYRIGHT

© Reed Business Information Ltd., 1997. All rights reserved. No part of this publication may be reproduced, stored or transmitted in any form or by any means without the written permission of the publishers.

All reasonable precautions are taken by *Television* to ensure that the advice and data published are reliable. We cannot however guarantee it and we cannot accept legal responsibility for it.

CORRESPONDENCE

All correspondence regarding advertisements should be addressed to the Advertisement Manager, "Television", Reed Business Information, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. Editorial correspondence should be addressed to "Television", Editorial Department, Reed Business Information, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

INDEXES AND BINDERS

Indexes for Vols. 38 to 46 are available at £3.50 each from SoftCopy Ltd., who can also supply an eight-year consolidated index on computer disc. For further details see page 138.

Binders that hold twelve issues of *Television* are available for £6.50 each from Television Binders, 78 Whalley Road, Wilpshire, Blackburn BB1 9LF. Make cheques payable to "Television Binders".

BACK NUMBERS

Some back issues are available at £3.00 each. For further details see box on page 97.

SUBSCRIPTION ENQUIRIES

Telephone: 01444 445 566
Fax: 01444 445 447
Credit card orders: 01622 778 000
Address: Television, Subscriptions Dept, PO Box 302, Haywards Heath, West Sussex RH16 3YY, UK.
Make cheques payable to: Television
Subscription rates:
UK £30.00 per year
Airmail Eire £34.00 per year
Airmail Europe £43.00 per year
Airmail Rest of World £56.00 per year

NEWSTRADE ENQUIRIES

Distributed by MarketForce
Telephone: 0171 261 7704

WEB SITE

For a full list of RBI magazines:
<http://www.reedbusiness.com>

ISSN 0032-647X



REED
BUSINESS
INFORMATION

YOU!!



NEED ECONOMIC

10000 Thousands of semiconductors I.C's etc.
of video parts, heads, belt kits etc.
of remote controls. etc. etc.

100000 over 100,000 database records to help find the difficult
video parts quickly. Stock availability & price in seconds

We compete on **QUALITY** - We compete on **SERVICE**
We will not compromise and yet our prices are often less.

.....and look at the special offers..... (strictly while stocks last)

REGBABY10 each £13.00	TEA2018A X 5 \$5.75	STK5481 X 2 \$10.00
BU208A X 5 £3.75	BUT1AF X 5 \$2.75	STR50103 X 2 \$5.90
BU508A X 5 \$4.15	BUT11A X 5 \$1.75	\$2000AF X 5 \$5.25
BU508AF X 5 £3.50	CNX62A X 5 \$3.00	TDA3653B X 2 \$1.80
BU508D X 5 \$4.45	UC3842 X 5 \$2.95	TDA3654 X 2 \$1.80
Philips type 1.2 volt Back up battery X 5 \$4.50		
Philips type 2.4 volt Back up battery X 5 \$8.75		
Scart - Scart lead 1.5m Fully wired X 2 \$2.90		
Standard video sensor lamp X10 \$2.50		
Std video sensor lamp + plug X10 \$4.00		
3V29 etc. Belt kit X 5 \$4.50		
3V35/36 etc. Belt kit X 5 \$4.25		
VT11E etc. Belt kit X 5 \$5.50		
Positor PT37, TH98009 (White) X 5 \$4.75		
Thom TX100 Green spot LOPTX each \$12.95		

(please add £1.00 handling all + VAT)

.....and now ask
for a full price list.

Satellite division Satellite division Satellite

PSU repair - refurb kits

Over **120,000** kits sold

KIT1 \$6.95 Pace - PRD800, PRD900, PSR800, PSR900, Ferguson SRD5, SRD16, Grundig STR1, Maspro SRE250S/1, 350S/1, Philips STU802/05M, Manhattan 850, 950 Goodmans ST700, Toshiba TU-SD200, SAT99	KIT4 \$6.95 Amstrad SRD 500
KIT2 \$8.95 Pace - SS900, 9200, 9210, MRD920, Ferguson SRV1, Grundig GIRD2000, 3000, Philips STU801, Network 900, 9200, Bush IRD150, Nokia SAT1500, Maspro SRE250S, 350S, 450S, Alba SAT6600, Finlux SR5700, Thompson SR54	KIT6 \$6.95 Pace D100, 120
KIT3 \$6.95 Amstrad - SR510, 520, 540, SRDR45, SRD550	KIT8 \$5.95 Pace MSS100
KIT5 \$6.95 Amstrad SRX320, 340 etc (export models)	KIT10 \$19.11 Pace MSS500, 1000
KIT7 \$6.95 Churchill D2MAC decoder	
KIT9 \$9.45 Pace MSS200, 300, Apollo	
KIT11 \$5.95 Ferguson SRD4	KIT12 \$14.45 EchoStar SR5500 (early PSU with adjuster)
KIT13 \$29.71 EchoStar SR6500, 7700, 8700	KIT14 \$23.95 Amstrad SRD600
KIT15 \$7.36 Mhztec (Sorenson PSU type only)	
KIT16 \$5.95 Amstrad SRD700, SR950, SRX100, 301, 501, 1002, 2001, SRD2000, SAT250	

Please add £1 handling all + VAT

Satellite division Satellite division

"The Satellite Repair Manual"

You could say that what Martin Pickering doesn't know about satellite receivers isn't worth knowing. What he does know has become legendary. Having been at it since the start of consumer satellite TV, he has built up a massive data base on satellite receivers. Not only on their faults, common and less common but also on modifications and upgrades. Martin brings in-depth expertise to the subject, having previously been involved with equipment reliability testing and component specification. This book has become established as a bible for satellite TV repair. But

the subject doesn't stand still. New models, new faults - there is always something to add. So here we have the fourth edition, which has been completely updated and now has 240 pages - the previous edition had 135. In addition to receiver fault notes and general information you'll find many useful button sequences for resetting parental lock codes, resetting installation choices to factory defaults and other less well known operations, practical information on LNBs with typical current drains, a list of manufacturers and suppliers addresses and other useful material, all presented in a nice Wire-O binding so that the book lies flat on the bench.

Recover the cost with your first repair! **£16.95**



Economic Devices

32 Temple Street, Wolverhampton, WV2 4AN, UK Tele ++ 44 (0)1902 773122 Fax ++ 44 (0)1902 29052

http://www.telepart.co.uk

Possibly a **FIRST AGAIN**, you can search our www site for video spares, semiconductors, remote controls, satellite gear, line output transformers and CCTV components. Its simple and will only cost the price of a local call. You can order parts, enquire about parts, or simply send a message. All at the cost of a local call. If you don't have the gear to access the internet get straight in touch with your local computer supplier or ask us for a fact sheet.

have you got **HASSLE!!** **USE your ACCESS of VISA**

Economic supply TV & Video parts *sent sent* **Fast**

Our experienced staff **WANT WANT WANT** to help you
 We can give you an instant answer from our database which contains over **100,000** references and we can give that answer **IN SECONDS**
 If we can't find it immediately, we will **HASSLE & HASSLE** our supplier, **HASSLE** the manufacturer. We will make phone call after phone call, and Fax after Fax on your behalf. **WE WILL DO ALL THIS FOR YOU.**
 We do it willingly and for **FREE**. **YOU NEED ECONOMIC!!**

1N4001	0.03	2SC2274	0.35	AA119	0.36	BC557	0.09	BT151500R	1.12	BZX6122	0.19	MAX232CPE	4.70	TA7281P	3.20	TDA36540	2.82
1N4002	0.04	2SC2335	1.12	AC127	0.71	BC557B	0.18	BT151800R	1.15	BZX612V4	0.07	MC13002P	7.69	TA7698AP	5.97	TDA4500	4.66
1N4003	0.03	2SC2458	0.84	AD162	0.96	BC5588	0.18	BU208A	1.46	BZK6133	0.19	MC7812CT	0.77	TA7778P	5.11	TDA4501H	9.57
1N4004	0.11	2SC2482	0.35	AF127	2.48	BC558C	0.09	BU208D	1.61	BZK6136	0.19	MJ15003	2.23	TA8205AH	4.50	TDA4503	4.00
1N4005	0.06	2SC2570A	0.38	AN5265	1.76	BC559B	0.14	BU2508AF	1.58	BZK613V9	0.14	MJ2955	0.77	TA8210AH	4.00	TDA4505E	7.35
1N4006	0.06	2SC2655	0.31	AN5512	1.76	BC560C	0.11	BU2508DF	1.58	BZK615V6	0.11	MJ802	2.91	TA8210H	4.79	TDA4505M	11.97
1N4007	0.04	2SC2705	0.35	AN5515	2.79	BC635	0.23	BU326A	1.36	BZK6168	0.11	MJE13005	0.86	TA8215H	4.96	TDA4510	2.74
1N4148	0.06	2SC2785	0.36	AN5521	1.66	BC636	0.14	BU406	0.69	BZK616V2	0.11	MJE18004	2.05	TA8216H	8.01	TDA4580	10.05
1N5062	0.14	2SC3225	0.60	AN5601K	9.74	BC637	0.11	BU426A	0.86	BZK616V8	0.19	MJE3055T	0.45	TA8221H	0.00	TDA4600	2.14
1N5401	0.14	2SC3330	0.52	AN7171K	5.56	BC639	0.21	BU500	1.41	BZK617V5	0.09	MJE340	0.45	TA8403K	2.31	TDA4600/2/3	2.82
1N5402	0.14	2SC3400	0.17	AN7190K	11.11	BC640	0.11	BU500S	2.05	BZK618V2	0.19	MJF18004	2.05	TA8427K	3.76	TDA4601	1.46
1N5404	0.13	2SC3423	0.60	BA157	0.09	BC846B	0.52	BU508A	1.29	BZK619V1	0.09	MJF18204	6.07	TA8718N	7.69	TDA4601D	1.46
1N5408	0.09	2SC369	0.06	BA158	0.07	BC848B	0.35	BU508AF	1.32	BZK61C22V	0.11	MN650	1.71	TA8739P	6.01	TDA4605	4.10
1N6263	0.20	2SC3807	0.91	BA159	0.11	BC848C	0.41	BU508APH	1.99	BZK7910	0.30	MPSA06	0.35	TA8750B	0.31	TDA46052	1.97
1N914	0.02	2SC3953	0.72	BA3910B	6.99	BC856B	0.21	BU508D	1.56	BZK7912	0.11	MPSA13	0.18	TBA120S	0.89	TDA4950	1.76
1S44	0.11	2SC4517A	3.14	BA5406	2.14	BC858C	0.19	BU508DF	1.88	BZK7936	0.10	MPSA63	0.18	TBA120U	0.47	TDA7240A	2.57
2N2222A	0.23	2SC458	0.18	BA5412	2.48	BC875	0.33	BU508V	2.40	BZK793V9	0.09	MPSA93	0.11	TBA280M	0.35	TDA8138	3.59
2N3055	0.50	2SC4742	5.11	BAG209	1.18	BD131	0.26	BU536	1.65	BZK795V6	0.09	MR856	0.11	TDA1013A	1.56	TDA8140	4.62
2N3055H	1.29	2SC4769	4.02	BAG209N	1.27	BD132	0.26	BU806	1.03	BZK796V2	0.08	NE555	1.03	TDA1015	1.37	TDA8145	1.97
2N3773	1.52	2SC536	0.30	BAG219B	1.76	BD137	0.46	BUC908	1.68	BZK79X33	0.11	NE555N	0.43	TDA1035T	4.27	TDA8170	4.70
2N3904	0.32	2SC945	0.11	BAG222	1.70	BD139	0.31	BUH515D	2.14	BZK79C5V1	0.11	PG60A	0.33	TDA1044	1.43	TDA8172	2.65
2N4401	0.11	2SD1207	0.57	BAG247	1.95	BD140	0.24	BUK444500B	2.40	BZK853V9	0.11	PGKE130A	2.55	TDA1060	1.08	TDA8175	6.41
2N555	0.12	2SD1246	0.30	BAT43	0.52	BD233	0.23	BUL54AR	1.27	BZV8812	0.09	PGKE180A	4.65	TDA1085C	2.74	TDA8178FS	5.95
2SA1013	0.35	2SD1275	1.41	BAT85	0.96	BD234	0.36	BUT11	0.65	BZV882V7	0.23	PIC16C8404S04	5.00	TDA1170	1.82	TDA8180	4.87
2SA1015	0.11	2SD1276	1.39	BAV21	0.21	BD237	0.31	BUT11A	0.95	BZV883V0	0.11	RZKL	0.77	TDA1170N	2.57	TDA8190	3.59
2SA1020	0.44	2SD1292	0.64	BAX14	0.17	BD238	0.24	BUT11AF	1.18	BZV884V7	0.09	R2M	0.84	TDA1170S	2.05	TDA8350Q	5.56
2SA1029	0.26	2SD1330	0.31	BC107B	0.20	BD243	0.45	BUT12A	1.17	BZV885V1	0.13	R4050	3.04	TDA1180P	2.48	TDA8380	2.53
2SA1048	0.19	2SD1397	2.31	BC108	0.24	BD243A	0.60	BUT12AF	1.87	BZV88C12V	0.09	REGBABY10	13.00	TDA1516Q	3.59	TDA9503	2.13
2SA1145	0.36	2SD1398	2.14	BC109A	0.00	BD243C	0.44	BUT18AF	1.37	CD4001	0.24	RG2	0.64	TDA1518Q	4.27	TEA1039	2.11
2SA1286	0.60	2SD1426	3.51	BC141	0.36	BD244A	0.34	BU556A	1.19	CD4017	0.47	RGPI10G	0.26	TDA1519A	2.74	TEA2018A	2.29
2SA1370	0.43	2SD1427	2.91	BC147A	0.24	BD244C	0.43	BUV48A	1.97	CD4049	0.35	RGPI56G	0.33	TDA1520B	4.50	TEA2029C	7.04
2SA1706	0.50	2SD1432	5.04	BC148A	0.35	BD245C	0.94	BUW11A	1.32	CD4052	0.29	RGPI15J	0.17	TDA1524A	7.52	TEA2031A	4.26
2SA733	0.18	2SD1439	5.86	BC148B	0.11	BD433	0.29	BUW41B	1.39	CD4053	0.61	RGPI15M	0.44	TDA1553Q	4.79	TEA2164	3.40
2SA872A	6.10	2SD1441	5.98	BC158B	0.12	BD434	0.31	BUW64A	1.03	CN862A	1.29	RGPI30M	0.30	TDA1554Q	8.12	TEA2260	2.48
2SA933	0.36	2SD1453	3.85	BC168	0.04	BD436	0.52	BUX84	1.03	CN8X2A	2.10	S2000A	2.57	TDA1557Q	4.23	TEA2261	3.68
2SA940	0.82	2SD1497	4.74	BC182	0.14	BD437	0.52	BUZ71A	1.03	CN83BA	2.55	S2000A3	3.59	TDA1558Q	7.69	TEA5101A	6.48
2SA950	0.18	2SD1541	4.96	BC182L	0.14	BD438	0.38	BUZ80	3.52	CNY758	0.52	S2000AF	1.46	TDA1670A	2.98	TIC1062	0.82
2SA966	0.41	2SD1548	5.95	BC184A	0.12	BD681	0.47	BUZ80A	4.15	D7A114ES	0.31	S2055AF	3.74	TDA1675A	3.85	TIC2460	1.54
2SA992	0.31	2SD1554	3.25	BC184L	0.06	BD826	0.43	BUD90A	3.40	DTA124F5	0.77	SAA129302	10.37	TDA1904	1.63	TICP106D	0.60
2SB1010	0.35	2SD1555	2.65	BC187	0.47	BD839	0.57	BUD90AF	3.30	DTC144F5	0.19	SAB3035	1.71	TDA1908A	5.61	TIP110	0.35
2SB1066	0.82	2SD1556	5.11	BC212	0.09	BD901	0.52	BY127	0.18	FG605	1.90	SG264A	12.88	TDA2002	1.12	TIP12H	0.77
2SB1143	0.77	2SD1651	2.38	BC212B	0.19	BD902	0.60	BY133	0.08	FXT749	0.43	SGSF344	10.70	TDA2005	1.83	TIP120	0.40
2SB1243	0.60	2SD1858	0.43	BC212L	0.18	BD911	0.52	BY206	0.20	HA13001	3.85	SL1430	1.92	TDA2006	1.06	TIP122	0.40
2SB560	0.43	2SD1877	2.14	BC237	0.12	BDT64C	1.18	BY227	0.13	HA13119	2.05	SL1431	2.82	TDA2030H	0.91	TIP2955	0.89
2SB643	0.29	2SD1878	2.63	BC237B	0.19	BDT65C	1.68	BY228	0.26	HA13151	13.20	SN74141N	0.17	TDA2030V	1.46	TIP295E	0.77
2SB647	0.57	2SD1879	3.16	BC238	0.11	BF194	0.22	BY2291000	1.31	HA51338SP3	7.69	STK4132H	10.00	TDA2050	4.56	TIP3055	1.08
2SB649A	0.77	2SD1884	3.35	BC238B	0.16	BF195	0.07	BY255	0.14	HM6251	14.32	STK4141H	10.23	TDA2270	12.08	TIP31A	0.36
2SB688	1.61	2SD1887	3.56	BC307	0.16	BF197	0.18	BY299	0.18	ICH281	0.26	STK4142H	9.40	TDA2540	1.29	TIP32C	0.40
2SB698	0.35	2SD288	0.85	BC307B	0.15	BF199	0.18	BY397	0.20	IRF594	15.79	STK4152H	10.95	TDA2541	1.12	TIP35C	1.82
2SB716	0.43	2SD350A	1.97	BC308	0.09	BF258	0.04	BY398	0.16	IRFBC40	5.98	STK4192H	14.64	TDA2578A	3.45	TIP42C	0.65
2SB772	0.50	2SD381	1.66	BC308A	0.09	BF420	0.21	BY399	0.12	KA6210AH	6.15	STK5332	2.82	TDA2579A	4.91	TIP42C	0.65
2SB774	1.61	2SD400	0.34	BC308C	0.26	BF421	0.24	BY448	0.30	LA4270	2.73	STK5342	4.07	TDA2578A	2.57	TIP42C	0.65
2SB891	0.60	2SD401A	0.77	BC309B	0.10	BF422	0.19	BYD14J	0.35	LA4280	3.12	STK5372H	6.84	TDA2582	3.85	TIP42C	0.65
2SB892	0.35	2SD468	0.28	BC327	0.10	BF423	0.14	BYD33D	0.12	LA4282	5.11	STK5421	9.52	TDA2593	1.12	TIP42C	0.65
2SC1008	0.24	2SD667	0.38	BC328	0.14	BF459	0.43	BYD33J	0.16	LA4445	3.45	STK5481	8.12	TDA2600	7.69	TIP42C	0.65
2SC124	0.48	2SD669A	0.64	BC337	0.14	BF471	0.37	BYD33M	0.26	LA4460	2.50	STK7253	7.69	TDA2611A	0.64	TIP42C	0.65
2SC1318	0.19	2SD718	1.90	BC338	0.06	BF487	0.57	BYD1040	2.55	LA4700	4.27	STK7308	6.41	TDA2611AQ	1.32	TIP42C	0.65
2SC1473	0.21	2SD756	0.47	BC368	0.18	BF491	0.41	BYV95B	0.21	LA6324	2.05	STK7348	5.74	TDA2653A	4.70	TIP42C	0.65
2SC1573	0.52	2SD837B	1.12	BC369	0.18	BF494	0.12	BYV95C	0.28	LA6510	2.94	STR11006	7.37	TDA3190	2.05	TIP42C	0.65
2SC1675	0.14	2SD856	0.79	BC372	0.53	BF759	0.38	BYV96D	0.27	LA7830	1.88	STR4211	9.40	TDA3330	14.21	TIP42C	0.65
2SC1685	0.21	2SD882	0.43	BC546A	0.11	BF869	0.38	BYV96E	0.53	LA7832	2.40	STR50020	9.38	TDA3505	2.40	TIP42C	0.65
2SC1740	0.16	2SD898B	6.41	BC546B	0.12	BF871	0.41	BYV96F	0.31	LA7835	2.99	STR50103	4.48	TDA3560	6.13	TIP42C	0.65
2SC1815Y	0.11	2SD965	0.67	BC547	0.11	BF959	0.18	BYV96G	0.21	LA7837	4.19	STR50103A	5.56	TDA3561A	3.85	TIP42C	0.65
2SC2001	0.23	2SD965R	1.05	BC547A	0.04	BF960	0.30	BYV96E	0.50	LC7132	4.70	STR54041	5.15	TDA3562A	4.62	TIP42C	0.65
2SC2023	3.18	2SK1117	3.40	BC547B	0.11	BF970	0.43	BYX5600	0.23	LED3G	0.10	STR5412	4.02	TDA3565	2.74	TIP42C	0.65
2SC2073	1.03	2SK1118	3.40	BC548	0.11	BF90A	0.68	BYX5600	0.10	LED3R	0.10	STR58041	3.42	TDA3566	6.41	TIP42C	0.65
2SC2078	1.00	2SK30A	0.35	BC548A	0.11	BFY51	0.39	BZV85C5V1	0.1								

TELETOPICS

The Analogue TV Switch Off

Details of a report being prepared for the Department of Culture, Media and Sport by research consultancy Nera on the costs involved in an analogue TV signal switch off in either five, ten or fifteen years are expected to be published shortly. A consultation paper will be published at the same time, to enable consumer groups and industry bodies to contribute to the discussion on when to switch the signals off.

Television companies involved in the launch of digital terrestrial TV (DTT) next year would like the government to announce a firm date for the end of analogue TV as soon as possible. When the switch off occurs, viewers will have to buy a digital TV set or a

digital set-top adaptor – the government does not want to get involved in any sort of digital TV equipment subsidy. It is hoped that the announcement of a firm date will encourage viewers to buy more expensive digital TV sets when their present analogue ones need replacement. Public uncertainty could have an adverse effect on trade by postponing buying decisions.

The start of DTT next year has already been delayed as a result of the ITV deferring the award of licences. Instead of a July launch, in time for the 1998 World Cup, October is now the most likely date for the start of DTT. British Digital Broadcasting is still drawing up digital receiver/set-top

box specifications for manufacturers. Meanwhile European broadcasters, technology groups and regulators have agreed to work on a single set-top box standard that will cover the TV signal, interactive multimedia services and the internet. The aim is to produce a reference design with a common application programming interface (API), electronic programme guide (EPG) and a common interface for conditional access (CA).

The US government announced earlier this year that analogue TV transmissions would end in nine years' time. Since then however Congress has attached a number of conditions that could delay the switch off.

Flat-screen Displays

There have been a number of flat-screen display developments recently. Sony, Philips and Sharp have jointly developed a 42in., wide-viewing angle, flat-panel display that uses Plasma Addressed Liquid Crystal (PALC) technology. It has an active-matrix LCD with Axially Symmetric-aligned Microcell mode (ASM) technology. The latter increases the viewing angle without affecting the contrast – by aligning the liquid-crystal material to each pixel in an axially-symmetrical

manner. The display has 16-bit colour resolution (16.77 million colours), a 16:9 aspect ratio, a contrast ratio of 100:1 and a viewing angle of 140°. There is no information yet on when a commercial version of the display will become available.

NEC has brought into production a 50in. plasma display (see picture) that's intended for the high-definition TV market. The Hi-Vision PlasmaX panel, which has a one-million pixel capability, will go on

sale in Japan next February to coincide with the HDTV coverage of the Nagano Winter Olympic Games. Sets that use the display are likely to cost around 2.7m yen (some £13,000).

Hitachi has developed a 41in. colour plasma display that's aimed at the business market. It has a contrast ratio of 300:1 and a viewing angle of 160°. Weight is 37kg, with a built in power supply but not including the stand. There are no price details.

Toshiba has announced the world's first 12.1in. thin-film transistor (TFT) LCD panel that uses low-temperature polysilicon technology. This enables the drivers to be formed directly on the LCD substrate, reducing the component count by up to 40 per cent in comparison with a typical amorphous silicon TFT LCD. Production of the new display is likely to start towards the end of 1998.

Samsung has produced the world's first 30in. single-glass UXGA TFT LCD panel. Its UXGA resolution is 1,600 x 1,200 (red, green, blue). Weight is 4.5kg, thickness 4.5cm, power consumption 45W. Samsung sees it as a competitor to large plasma displays and says that the technology could stretch to 40in.



Designed by renowned Japanese interior designer Motomi Kawakami, the first "Hi-Vision" high-definition PlasmaX television is also the world's slimmest. Pixel pitch has been reduced from 1.08 to 0.81mm: over a million pixels are displayed. Compared to the previous PlasmaX, which was announced last February, this latest model is 10mm slimmer at 89mm.

DVD Technology

The DVD Forum, led by Toshiba, Matsushita and Hitachi, has demonstrated DVD-R (write once) and DVD-RAM (rewritable) discs and drives and published fresh specifications. The DVD-R disc, which is intended mainly for data archiving, has a capacity of 3.9Gbytes – a 4.7Gbyte version is under development however. While the DVD-RAM version 1.0 has a capacity of 2.6Gbytes per side, a prototype 4.7Gbyte version was demonstrated at the DVD conference in Berlin last October.

Phase-change technology is used to write and erase data with a DVD-RAM. The read/write laser light has a wavelength of 650nm, a lens with a numerical aperture of 0.6 being used. The data bit length is 0.41-0.43 microns, the track pitch being 0.74 microns. Draft approval of the DVD-RAM specification by the European Computer Manufacturers Association is expected next summer.

Toshiba points out that the longer-recording DVD-RAM disc will be able to store two hours of MPEG-2 video per side. With the development of low-cost, one-chip

encoders, expected to be available by 1999, this would lead the way to DVD home video recorders.

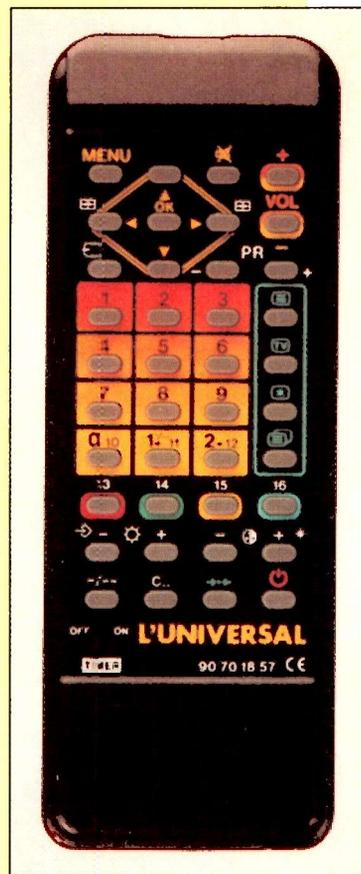
Cirrus Logic has launched what it claims is the first multi-standard, multi-channel audio decoder for consumer DVD players. Known as the CS4925, the decoder provides both Dolby Digital (AC-3) and MPEG-2 5.1-channel sound. It will sell to manufacturers at approximately \$15 in lots of 100,000.

Matsushita has revised downwards its forecast for first-year total worldwide DVD player sales. Initially sales were expected to be around two million units. The revised forecast is below one million units.

Six of the ten companies that hold patents on the initial DVD technology are to start a joint licensing operation, providing new entrants to the field with a one-stop shop for DVD technology. It's being run by Toshiba. The royalties are expected to amount to some four per cent of the cost of a DVD player and seven and a half per cent of the cost of a disc.

Willow Vale Electronics has been appointed national distributor of Wallis Universal CTV remote control units to the independent retail trade. These new handsets incorporate a microchip that gives operation with most well-known brand TV sets with no need for coding or programming – they are brand matched rather than being matched to particular model numbers. Thus one unit covers one brand, with no need to search for codes.

The Wallis range being handled by Willow Vale provides low-cost replacements for Blaupunkt, Hitachi, Panasonic, Philips, Sony, Grundig, Nokia, Mitsubishi, Samsung, Sanyo, Toshiba and many other premium brands.



Parts Ordering Technology

A survey of more than 2,000 independent electrical retailers across the country has shown that while most of them are aware of the benefits that can be obtained from the use of a professionally produced CD-ROM catalogue only a tiny majority have ever used the internet or bothered with e-mail facilities.

The survey was undertaken independently by Marvyn Hamlyn Research of Peacehaven, Sussex (phone 01825 768 876) and came up with many interesting facts,

including the following. While more than 60 per cent of dealers use a PC, more than half of them don't have a call-based management system. 75 per cent of dealers prefer traditional accounts with distributors or manufacturers. More than 50 per cent prefer to use the phone for ordering: 24 per cent use viewdata, 23 per cent use faxes and two per cent use e-mail. Only one per cent had ever used the internet.

There was a 50:50 split on the acceptability of pattern parts: more than one in four said they would buy

pattern parts if the original ones were not available, while half said they could never buy pattern parts under any circumstances. On service back up, more than 40 per cent said telephone advice was vital and 30 per cent said that a catalogue was indispensable.

And their preferred trade magazine? Well *Television* of course! Over 50 per cent said that they read *Television*, higher than any other title. Good going, especially as the survey covered white goods, brown goods and mixed dealerships.

Community TV

A number of local TV companies have shown keen interest in setting up broadcasting services within cities, using a sixth terrestrial channel. The ITC has received 31 applications for two-year franchises to run such local community services. Those awarded a franchise will pay £4,200 for the use of a frequency not assigned to one of the main broadcasters in the area, plus the full transmission costs.

ITC's chief executive Peter Rodgers says that the commission

is "greatly encouraged by the number of applicants for this new and as yet untried form of television".

Correction

According to VideoPlus maker Gemstar, 80 per cent of all VCRs sold now include VideoPlus as a built-in feature. By the end of the year, two million more households in the UK will have VideoPlus technology available – the total number of UK households with VideoPlus will then be nearly ten million. Figures for VideoPlus De

Luxe, which is a new feature, are not yet available.

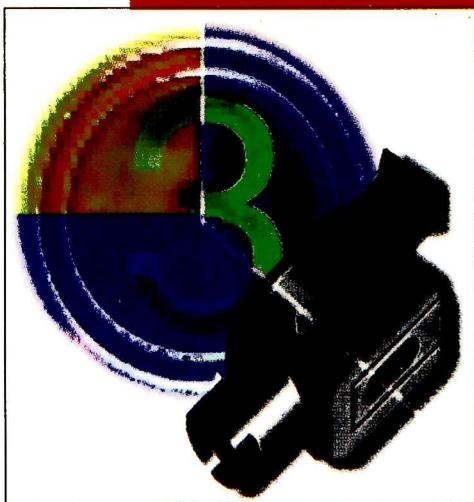
There was some confusion between VideoPlus and VideoPlus De Luxe in our video news item in Teletopics, October.

Teletest PC Competition

We are pleased to announce that Reza Hughghat Kish of Richmond, Surrey won the Ozan Teletest PC competition featured in our September issue (page 825). The competition produced a record number of entries.

Obituary

We regret to report that after a long illness Gordon Williamson recently lost his battle with cancer. He was well known to and respected by dealers in the Midlands area from his days with Philips. Subsequently he ran his own business in Birmingham. He will be remembered for his sense of humour and his everlasting store of jokes, and will be sadly missed by his friends and colleagues. Our best wishes go to his widow Betty, daughter Dawn and son Derek. **P.B.**



Reports from
**Brian Storm and
 David C. Woodnott**

Panasonic NVR50

This C-cassette model incorporates a colour viewfinder. The problem was erratic colours, sometimes all red and sometimes covered with lines. On test we found that the fault could be cured by moving the viewfinder. The cause of the trouble was eventually traced to a hair-line crack across the ribbon cable between the viewfinder and the main PCB. Its part no. is VWJ0739. **B.S.**

Sony CCDF555E

The complaint with one of these camcorders was "striations on the viewfinder picture". Replacement of C909 (1µF) on the electronic viewfinder PCB cured the fault. A general service completed the repair. **D.C.W.**

Canon UC40HiE

No eject was the complaint with this recent slimline model. There was a tape in the mechanism. When the eject button was pressed the mechanism shuffled then returned to its initial state. With units that use this mechanism it's fairly common for the supply reel spindle to become bent. This leads to various mechanical faults such as no tape eject, stopping in any mode with "eject" flashing in the viewfinder, and excessive back tension (because the underside of the reel is in continuous contact with the chassis). In this case however the reel spindle was OK.

The cause of the trouble was a faulty capstan motor FG sensor.

Camcorner

The point worth noting is the apparent reason for its failure. When we removed the motor and inspected it under a microscope we could see that the surface of the sensor was scored across in the direction of motor rotation. Grains of sand were evident: they were stuck to the sensor – and everywhere else! A new motor cured the problem.

Since that first one we have had two similar models in with failed capstan FG sensors, both with score marks across the surface and evidence that sand/grit was the cause. One of them had come in because of a detached grip strap and worked all right until it failed during a soak test! Life isn't fair, is it?! We had to replace this one FOC, but have now learnt to inspect and clean the sensor unit whenever we get one of these units in for repair. This avoids similar, expensive problems. **D.C.W.**

Sony CCDTR305E

The customer thought that his handycam's on/off switch was faulty and was pleased when we agreed with his diagnosis. He wasn't quite so pleased at the cost! The complete operation assembly (switch block control), which includes the aforementioned switch, was required. The fault symptoms were as follows: no camera power up; power up in the VTR mode OK but no functions available. **D.C.W.**

Canon E600E

This fairly recent model (July 1992) displayed the all too familiar capacitor leakage symptoms we have experienced with earlier Canon models (E60E etc.), i.e. intermittent playback colour and so on. Internal inspection revealed that we would have to replace a total of 48 capacitors to avoid subsequent failure – they were all showing signs of imminent leakage. The estimate was accepted, and we completed the work successfully. It's worrying when such relatively new units suffer from this type of problem.

We have since had others in the

range (E200 etc.) with significant capacitor failures. **D.C.W.**

Sony CCDV900E

This early Hi8 machine came in because it was "dead", which it certainly was! As I had not seen many of these camcorders I thought I'd try to save a bit of time by looking through my collection of fault reports from previous issues. I was not let down. A previous report (no on command to the DC-DC converter etc.) mentioned IC101 on board FP10P. A replacement chip cured the fault. Thank you whoever contributed that report!

I have since come across the same fault in other Sony camcorders (**Model V600E**) which use this chip in the same way, so it's worth noting.

Another V900E came in recently because of intermittent iris operation, no autofocus and intermittent E-E pictures (vertical lines only, of the type you get when there is CCD or SSG drive failure). As anyone who has worked on the camera section of an early Sony camcorder will know, it can take a considerable time to get at the innards – because various screening cans have to be unsoldered etc. When I was finally able to inspect the relevant PCBs I found that there was severe capacitor leakage.

A quick look at the mass of similar capacitors on the deck PCBs revealed the same state of affairs. We advised the customer that in our opinion repair was not worthwhile, because of the high risk of subsequent failure in almost any circuit area. Thankfully our advice was taken.

More and more models of all makes of this vintage are falling victim to the leakage problems so often reported in these pages. Because of the high cost of replacing maybe 80 or more components, and the risk of finding severely corroded print etc., we are reluctantly advising customers that to repair their 'old friends' is in no one's interest. Comments on this would be welcome. **D.C.W.**



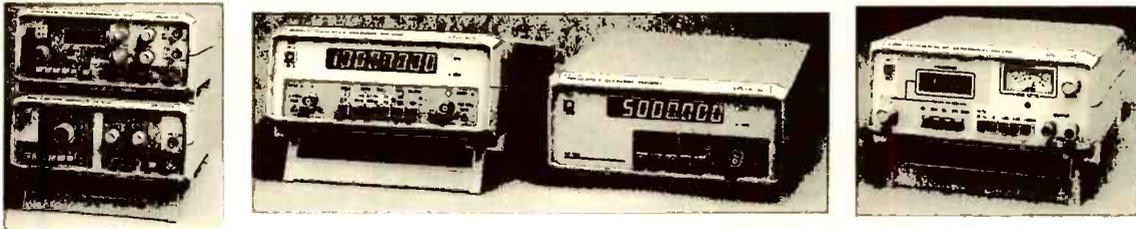
PROMAX

TEST EQUIPMENT

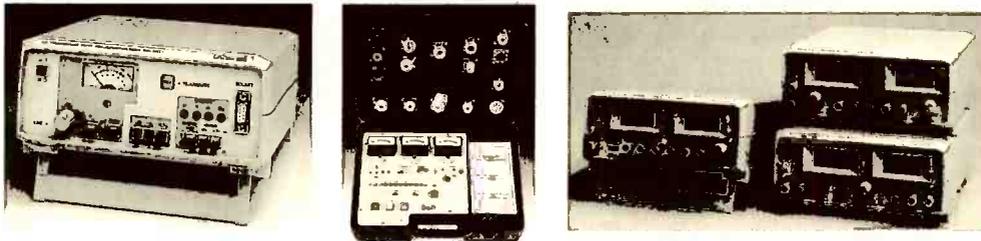
WIDEST CHOICE ~ QUALITY AT NO EXTRA COST

CHANNEL 5 LEVEL METERS & EQUALISERS IN STOCK

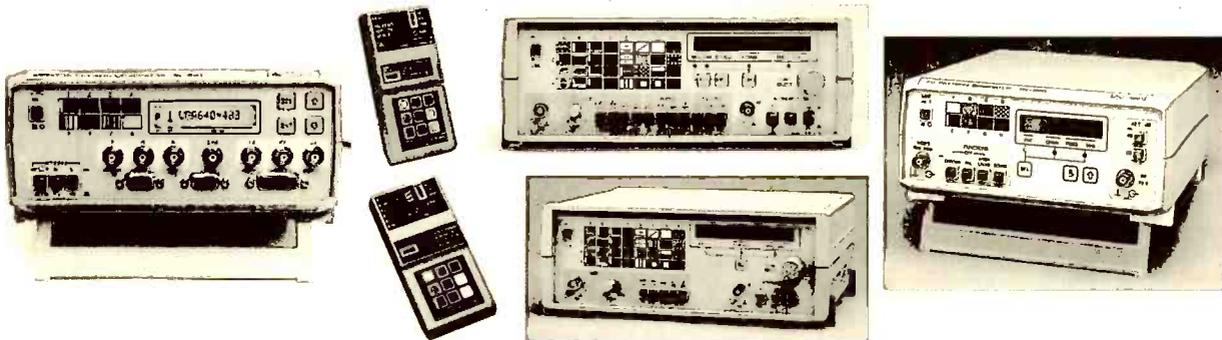
FUNCTION GENERATORS, AUDIO OSCILLATORS, FREQUENCY COUNTERS



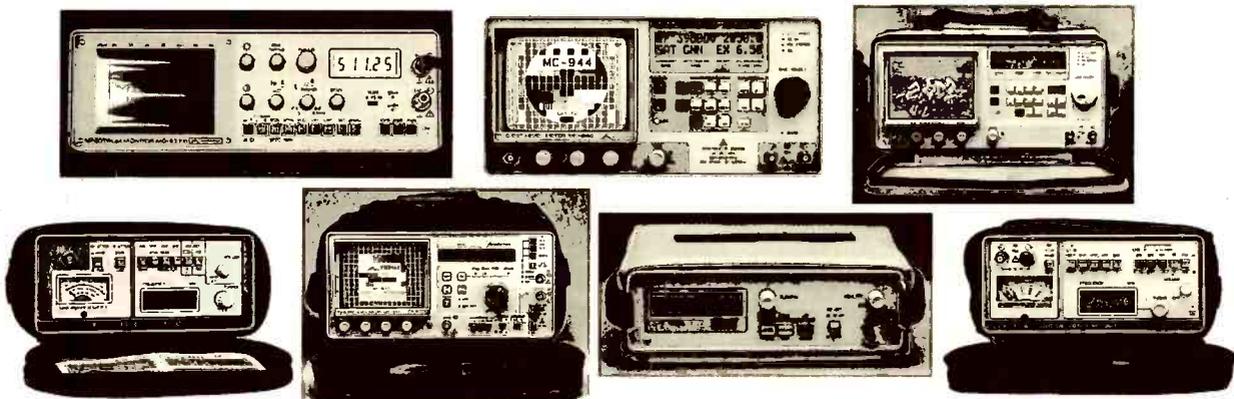
CRT REJUVENATORS, SWITCH MODE POWER SUPPLIES



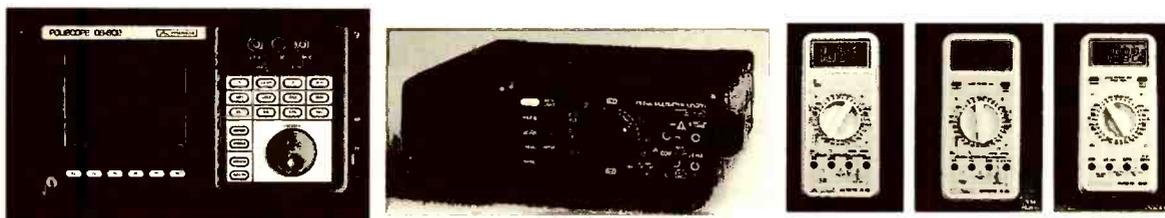
TV & COMPUTER MONITOR TEST PATTERN GENERATORS



DIGITAL READY LEVEL METERS & SPECTRUM ANALYSERS FOR FM, TV AERIAL AND SATELLITE TV SYSTEM INSTALLATION



DIGITAL MULTIMETERS, CAPACITANCE AND INDUCTANCE METERS



Alban

ALBAN ELECTRONICS LIMITED
6 CAXTON CENTRE, PORTERS WOOD,
ST. ALBANS, HERTFORDSHIRE, AL3 6XT.
TEL : 01727 832266 FAX : 01727 810546

**CALIBRATION
SERVICE
SALES**

**SPECIAL EDUCATIONAL &
RETRA INCENTIVES &
DIRECT FROM
ALBAN**

MANOR SUPPLIES

QUALITY TV & VIDEO SPARES SUPPLIED FOR ENGINEERS BY ENGINEERS

LINE OUTPUT TRANSFORMERS p.p. £2.50

AKAI	51H8	£14.00	HITACHI	4515-05	E.P.O.A.	CT141, 3214009	£16.50
5861, 6945	517, 518	£17.20	CT1-P118	DD - /	E.P.O.A.	CT142RX	£16.50
CT2571	51K2, 51K3	£17.20	C21-P720			CT142RX, 3214009	£16.50
CT2590	51K4, 51K5, 51K7	£19.50	C25-P750	£49.90		CT149TX/TXA	£16.50
CT2890	51L3	£16.00	C25-P759	£55.00		CT149TX/TXA 3214009	£16.50
AKURA	51L5, 51L7	£15.00	C25Z47	£17.20		J714002	£15.00
AX10	51P7	£15.80	Contur P28-P759	£55.00		3214009	£16.50
CX11	59B2, 59B3, 59B5, 59B8	£16.65	CL2542	£23.00		SAMSUNG	
CX18	59D2, 59D3	£16.65	CL2842	£23.00		CB338	£24.00
CX30	59D2, 59H3, 59H5	£16.65	CMT2080	£23.00		CB340	£24.00
CX4	59J7	£16.65	CPT1444	£15.00		CB349	£24.00
ALBA	59K4	£19.50	CPT1446	£15.00		CB389	£24.00
CTV10	59K5, 59K7	£15.00	CPT1454	£15.00		CB504	£15.00
CTV14RS	59L5BQ, 59L7	£15.00	CPT1455, CPT1456	£15.00		CB505	£15.00
CTV5	59M2	£19.50	CPT1463	£15.00		CIS32	£24.00
CTV55	59M5	£18.90	CPT1471-CPT1473	£16.20		CB514	£15.00
CTV704T	59P7A	£19.50	CPT1474	£14.00		CF3312	£24.00
CTV711	66B2, 66B3, 66B5, 66B8	£16.65	CPT1476	£14.00		CIS952	£15.00
CTV712	66D3	£16.65	CPT1485, CPT1486	£15.00		C1410	£24.00
CTV741	66H2, 66H5	£16.65	CPT1623/4, CPT1626	£15.00		CF3312	£24.00
CTV742	66H3	£19.50	CPT1646	£15.00		CIS052	£15.00
CTV743, DCF2077A	66M3	£18.90	CPT2024, CPT2026, CPT2028	£15.00		CIS14	£15.00
CTV743, KFS60226B	66K4	£15.00	CPT2036, CPT2038, CPT2046, CPT2048	£15.00		CIS14	£15.00
CTV744	68M5	£18.90	CPT2076, CPT2078	£15.00		C1410	£24.00
CTV747	AS1F	£17.20	CPT2158	£17.00		CF3312	£24.00
CTV752	B78NT	£18.90	CPT2174, 2176, 2178	£15.00		CIS052	£15.00
PTV10	51P8	£15.80	CPT2174, 2176, 2178	£15.00		CIS14	£15.00
PTV22	59P8A	£19.50	CPT2274, 2276, 2278	£15.00		CX514	£24.00
	TX89	£16.50	CPT2476, CPT2478	£16.50		FCC2045BL	£24.00
	TX98	£15.80	CPT2660	£42.00		FCN1145AL	£24.00
3101-3105	TX90, 14", T9031, Red Spot	£15.80	CPT2660	£42.00		FCN2015AL	£15.00
3116-3120	TX90, 20", T9044, White Spot	£15.80	C25243	£27.00		SANYO	
3201, 3203, 3204, 3206, 3207	TX100/110° T6033L, Green Spot	£13.50	C25252	£55.00		CBP2144	£20.50
3212-3218	TX100/110° FST, T6045L	£16.65	C25272	£61.80		CBP2145	£20.50
3421, 3422, 3423, 3425	TX100/90° 243892, Yellow Spot	£14.00	C25280	£61.80		CTP6144	£20.50
AT2077R1	TX100/90° T6031, Blue Spot	£14.50	FM503B	£52.50		CTP6144	£20.50
LX2500, LX2800	47319700	£19.50	FM504	£49.90		CTP6144	£20.50
M20	47328700	£16.00	FM513	£55.00		CTP6144	£20.50
M2000			FM530	£55.00		CTP6144	£20.50
BEKO			FM533	£61.80		CTP6144	£20.50
16228NX	FIDELITY		2432981	£15.00		CTP6144	£20.50
CTV58Y	AVS1600, AVS2000	£15.00	2433751	£15.00		CTP6144	£20.50
TV77R	C14406, C14R06	£15.00	2433752	£15.00		CTP6144	£20.50
TV79R	CTM1400	£15.00	2434002	£16.50		CTP6144	£20.50
BUSH	CTM2000	£15.00	2434141	£14.00		CTP6144	£20.50
154-125A	CTV140	£15.00	2434274	£15.00		CTP6144	£20.50
1500	CTV1404	£15.00	2434494	£17.00		CTP6144	£20.50
2020, 2401204028	ZX2000	£16.00	ITTNOKIA			CTP6144	£20.50
2114T	ZX3000	£15.00	Compact 80DST	£14.00		CTP6144	£20.50
2152T	ZX4000	£15.00	Compact 80R110°	£14.00		CTP6144	£20.50
2157TX	ZX4000	£15.00	Compact 80/90°	£17.20		CTP6144	£20.50
2321T	FCC2015BE	£16.00	Compact 1110°	£15.00		CTP6144	£20.50
2317T	FCC2015AE	£16.00	Compact B2	£15.90		CTP6144	£20.50
2514T	GOLDSTAR		Compact B2 FST	£17.20		CTP6144	£20.50
2515T	CBT2172	£15.00	Compact BNN	£15.00		CTP6144	£20.50
2520T	CBT2175	£15.00	Compact D2	£15.90		CTP6144	£20.50
2521T	CBT2180	£20.00	Compact D2 FST	£17.20		CTP6144	£20.50
2714	CBT2190, CBT2191	£20.00	Compact De 110°	£17.50		CTP6144	£20.50
2914	CBT9502	£16.50	Core 2	£16.00		CTP6144	£20.50
3114T	CBT9505, CBT9508	£16.50	Core 2 SQ	£16.00		CTP6144	£20.50
AT2079/10	CBT9512, CBT9745	£17.70	CP3104	£15.00		CTP6144	£20.50
CRONY	CBT9902	£17.70	CT2500/2	£17.80		CTP6144	£20.50
CTV1487R	CBZ2172, CBZ2175	£15.00	CT2512	£15.00		CTP6144	£20.50
CTV-2037V	CT2190, CIT2191	£20.00	CT2600	£14.00		CTP6144	£20.50
CTV-B5063	CIT1985	£16.50	CT2600	£14.00		CTP6144	£20.50
CTV-B5070	CIT9322	£16.50	CT3326, 3327	£15.00		CTP6144	£20.50
CTV-B7270	CIT9325	£16.50	CT3335	£15.00		CTP6144	£20.50
CTV-H3790DK	CIT9505, CIT9508	£16.50	CT3337	£15.90		CTP6144	£20.50
DTV-9254	154-132A/B	£16.50	CT3357	£15.90		CTP6144	£20.50
DAEWOO	154-125A/B	£20.00	CT6320	£17.50		CTP6144	£20.50
DCS-1634	154-194B	£17.80	CVC1100	£15.00		CTP6144	£20.50
DECCA/TATUNG	154-125C	£15.00	CVC1150	£17.80		CTP6144	£20.50
Chassis-145, 146, 147	154-125C	£15.00	CVC1175	£17.80		CTP6144	£20.50
Chassis-160, 161, 165, 166	154-177B/J	£17.70	CVC1200	£15.00		CTP6144	£20.50
85-3878-5	GOODMANS		CVC1204	£15.00		CTP6144	£20.50
85-9835-5	1401R	£15.80	CVC1210	£14.80		CTP6144	£20.50
FIRGUSON	2043TT	£17.70	CVC1212, 1215	£14.80		CTP6144	£20.50
16A1, 16A2	2175	£17.20	CVC1222	£14.00		CTP6144	£20.50
20A1, 20A2	2875	£20.60	CVC801, 803	£15.00		CTP6144	£20.50
20A3, 20A4	CTV14RC	£15.80	DIGI 3	£16.00		CTP6144	£20.50
20C1, 20C4	CTV2R/T	£17.20	DIGI 3 FST	£21.60		CTP6144	£20.50
20E1, 20E2	CTV2180	£17.20	FX3448	£17.20		CTP6144	£20.50
20G1, 20G2, 20G3	TV20RC	£15.00	FX3548	£17.20		CTP6144	£20.50
20H1, 20H2, 20H3	GRUNDIG		FX6320	£17.50		CTP6144	£20.50
22B1-22B4	CUC2201	£18.90	FX6330	£17.50		CTP6144	£20.50
22D1-22D4	CUC2210	£17.20	Mini 2 ST2	£18.80		CTP6144	£20.50
22G1-22G3	CUC2401	£19.00	Monoprint A	£15.00		CTP6144	£20.50
22H1, 22H3	CUC2600	£15.00	Monoprint B	£15.00		CTP6144	£20.50
2322, 2343, 2353, 2373	CUC2800	£15.00	Pico 1	£15.00		CTP6144	£20.50
2423	CUC3300	£18.90	Pico 1 ST2	£17.80		CTP6144	£20.50
2445, 2452	CUC3400	£18.90	Pico 2	£15.00		CTP6144	£20.50
2453	CUC3600	£15.00	SPN3578	£17.20		CTP6144	£20.50
2463	CUC4400	£22.50	SPN3878	£15.90		CTP6144	£20.50
26D1, T6033L	CUC4401	£22.50	SPN5550	£15.90		CTP6144	£20.50
26D1, T6045L	CUC4500	£22.50	SPN5581	£16.00		CTP6144	£20.50
26D2, 26D3, T6033L	CUC700	£17.20	SPN5850	£17.20		CTP6144	£20.50
26D2, 26D3, T6045L	HINARI		SPN5850	£17.20		CTP6144	£20.50
26G2, 26G3	CT14	£19.80	SPN5850	£17.20		CTP6144	£20.50
26H2, 26H3	CT17	£17.00	SPN5850	£17.20		CTP6144	£20.50
36K3	CT18	£17.00	SPN5850	£17.20		CTP6144	£20.50
36140, 36141	CT20RC	£25.50	SPN5850	£17.20		CTP6144	£20.50
37140, 37141	CT4	£15.00	SPN5850	£17.20		CTP6144	£20.50
41H2	CT5	£17.20	SPN5850	£17.20		CTP6144	£20.50
51A0-51A5	HIT10R	£16.00	SPN5850	£17.20		CTP6144	£20.50
51A8	TVA1	£15.00	SPN5850	£17.20		CTP6144	£20.50
51G2, 51G3	51-14184-1	£17.00	SPN5850	£17.20		CTP6144	£20.50
51H2-51H5	51-13914-1	£15.00	SPN5850	£17.20		CTP6144	£20.50

TRIPLERS EHT MULTIPLIERS p.p. £2.50

Continental Universal with focus	£13.80	GRUNDIG	BG 2077-642-1003/1004	£14.80
UK Universal	£7.80		BG 2087-642-1001/1002/1006	£14.80
Decca/Tatung-BF200/44	£9.80		BG 2000-641	£13.80

MANY OTHERS STOCKED, PLEASE QUOTE BG, OR TVK NUMBER

CRT TESTER & REACTIVATOR KIT - Checks emission & leakage, boosts tubes, analogue meter indication of tube condition, can be used with any type of tube. Price £68.00 p.p. £5.00

LINE OUTPUT TRANSFORMER TESTER - Price £25.00 p.p. £2.50

VIDEO (PAL) TO RGB CONVERTER - Video in, Phono - RGB+Sync out, scart. 12volts supply. Price £99.00 p.p. £5.00

HOW TO ORDER: ADD p&p TO ORDER + VAT 17.5% TO THE TOTAL
PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

Telephone 0171-794 8751/794 7346 Fax 0171-431 5778

172 WEST END LANE, LONDON NW6 1SD

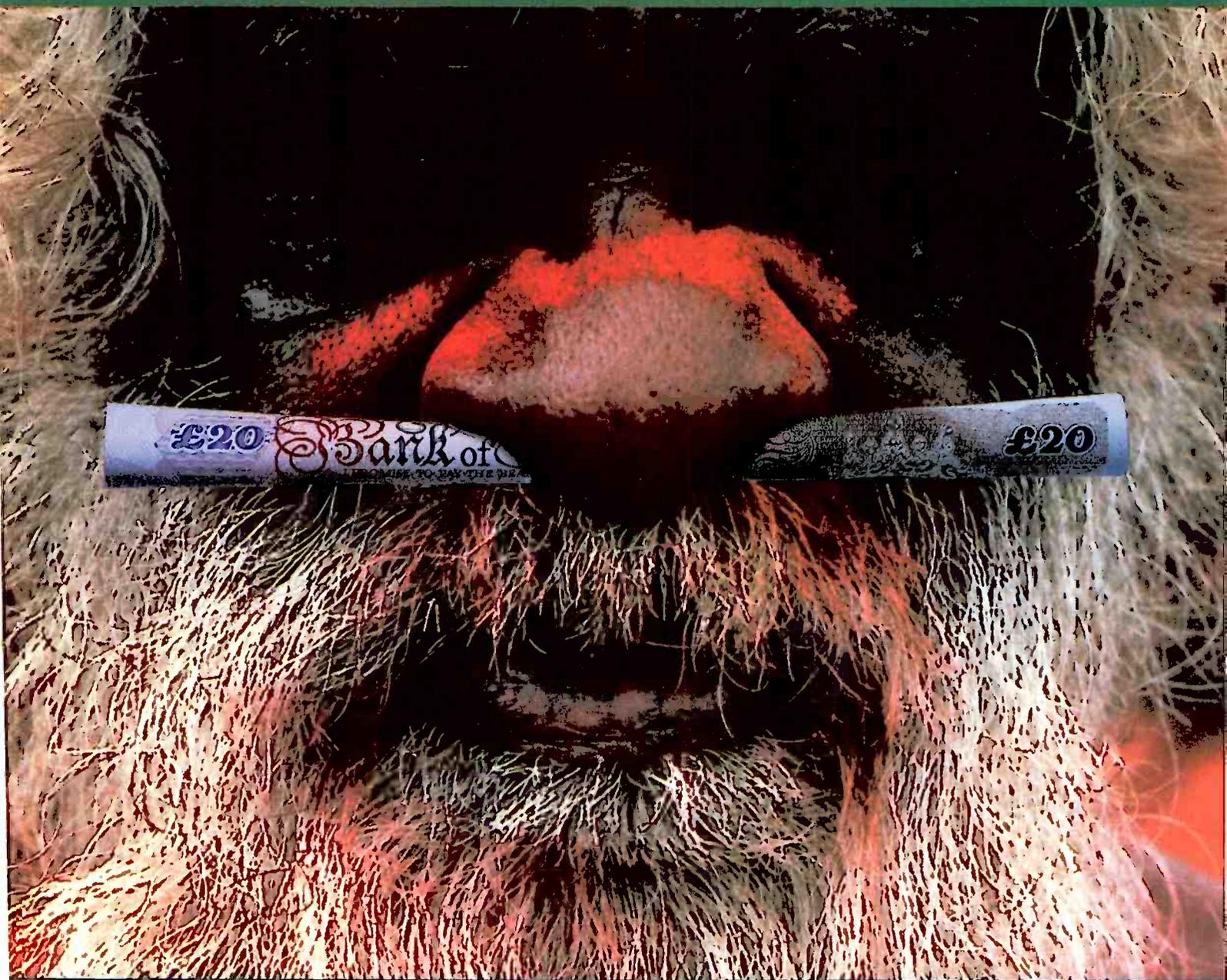
CALLERS WELCOME AT SHOP

Mon-Fri 9.30-6pm - Thurs 9.30-1pm - Sat 9.30-5pm

VISA

Access

Whatever you do with your nose



...don't pay through it!

With CPC you're guaranteed top quality brands and savings of up to 25%

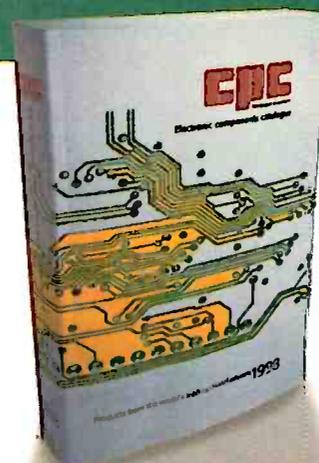
Simply by working more efficiently than our competitors, CPC offers you remote control handsets, video spares, computer products, tools and instruments, at prices which are up to 25% lower than other leading distributors. In fact, there's a choice of more than 62,000 products from over 300 of the world's leading brands.

That's why 10,124 companies have opened an account with us in the last 12 months.

Just call for your FREE copy of the new CPC catalogue

Tel **01772 654455**

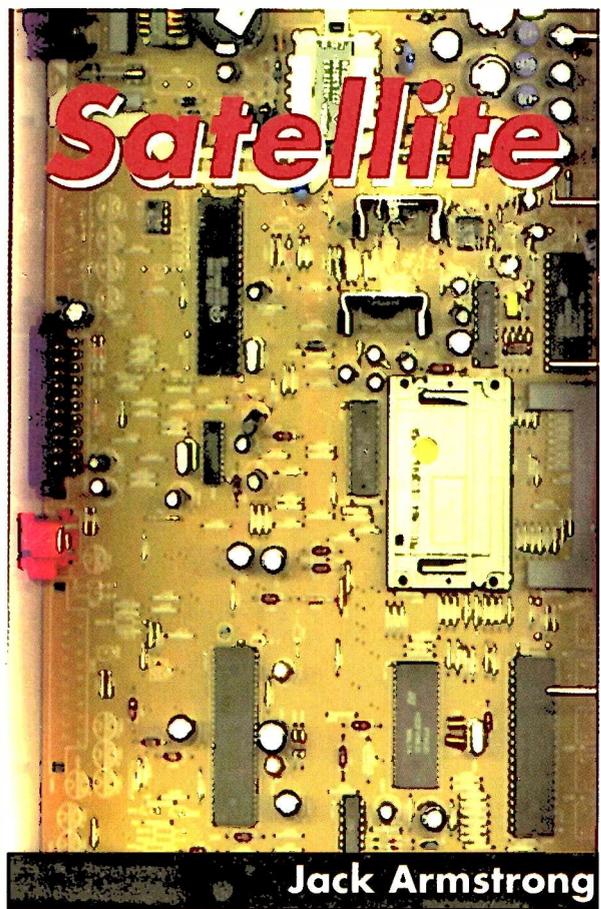
Fax **01772 654466**



The latest CPC catalogue - crammed with over 10,000 new components.



Faraday Drive, Fulwood, Preston, Lancashire



WORKSHOP

Ferguson SRD6

Most mornings I nip out and have a cup of tea with Jerry at the local TV repair shop. As most of my business is with the trade, I can go for days without seeing a 'real' customer. Today, Jerry had a present for me. "An SRD6 from Tom" he beamed, "he'd like you to have a look as it." Tom repairs TVs and VCRs but works in the next town, so he and Jerry get along just fine. They both give me their satellite receivers to fix, unless it's a simple power supply repair.

I took the SRD6 back to my workshop and connected it up. The picture rolled and jumped. There were no decoder messages, and the unencrypted channel pictures looked dull – as if the contrast control had been turned down.

I had to turn the video level adjuster PV01, which is close to the tuner module, quite a long way anticlockwise before the picture stopped jumping. As decoder messages then reappeared, I inserted my card. The picture obtained was stable but very grainy, with some sparklies and a herringbone pattern for good measure. Although the picture was watchable – many undiscerning customers would have been happy with it – I knew that it was not as Ferguson had intended.

Besides, no one had been inside with a screwdriver, and the adjuster couldn't have slipped half a turn by itself.

I turned the adjuster back until the picture was again scrambled, then used the hairdryer to heat the area around the tuner. This restored decoder operation temporarily. A few electrolytics in this area were replaced, but there was no improvement. A more marked effect was obtained when the underside of the PCB was heated, so I came to the conclusion that the faulty component was probably a surface-mounted device. Use of freezer spray and the hairdryer confirmed my suspicions, but I was unable to pinpoint the item at fault. Then I had a brainwave.

My desoldering station is made by a US company called Pace (no connection!). It's very robust and effective. One feature I'd never used before was the ability to blow instead of suck. I cleaned out the glass reservoir, then switched the iron to blow hot air. This airstream could be directed very accurately, and soon revealed the culprit – the BC858 transistor TV04, which is connected to PV01. I used a BC856B as a replacement, the nearest pnp-type transistor I had in the workshop. It restored the normal high-quality pictures.

Tom will be pleased, or maybe not – it's going to cost him half an hour's labour.

Pace PRD900

One of these receivers, which had come all the way from Manchester, had similar symptoms to the Ferguson SRD6. The owner thought that they were caused by the rain. When the rain finally stopped and the symptoms remained, he sent the receiver to me.

I put it on test and watched the rolling pictures, bemused. Despite the help of the excellent manual and the use of my oscilloscope, I was unable to trace the cause of the fault. So out came the hairdryer. By directing the warm air at the capacitors around the tuner, I was able to stop the picture rolling. Easy I thought, it's one of those electrolyt-

ics. Be fixed in a jiffy.

It wasn't! An hour later I was directing the hot air at the same spot, with the same result. But by now I'd replaced all the electrolytics in this area. Well, we all make mistakes. Then I realised that there was a significant time delay between directing the heat at the board and seeing the effect. The faulty part was underneath the board!

The only item in this area is the surface-mounted emitter-follower transistor Q100. A new FMMT2369A restored normal operation.

Amstrad SRD700

These receivers occasionally turn up dead. All that's needed is a new fuse and a new TOP202 chopper device. The one brought in by Charlie the butcher was not so easy to fix.

After scraping off a layer of dripping, I discovered that the 200V avalanche diode had also failed. Unhelpfully, the circuit diagram shows this as being a 5W, 300V diode. SatCure (01270 753 311) stocks the correct device however – it comes in the relevant repair kit – so all was not lost.

Once the receiver was up and running it exhibited more faults. The screen would sometimes blank out, or the picture would disappear in a mass of sparklies, or the receiver would refuse to come out of standby. The cause of all this was flux in the microcontroller chip's socket. I've come across the trouble in the SRD540 and similar models. A quick scrub with Isopropanol, using a toothbrush, restored normal working.

The Pace Prima

Four of these receivers arrived by Land-Rover from a retailer some miles away. He'd done a deal, swapping a 21in. Hitachi TV set for these "perfect working order" receivers. They looked perfect, but they didn't work.

The first problem was that none of them would respond to my remote control unit. Then I realised that I was holding an MSS type remote instead of a Prima RC10

type, which has identical looks.

The first receiver displayed the "no signal" message on a blue background. Audio was present when the channel tuning menu was selected (the audio mutes with a blue background). Close inspection showed that there was a dry-joint at L305.

The second receiver had similar symptoms, but there was no sound apart from a hiss. Channel changing produced pictures and sound with some of them. I found that the installation menu had been set for a "single" LNB, which seems to lock the LNB supply at 18V. Selecting "universal" restored correct operation.

The third receiver had no E-to-E, that is it didn't pass signals from the terrestrial aerial. I've had this problem with lots of MSS100 receivers. The cause is a static charge built up on the UHF aerial being discharged via the TDA8275 chip. In this case the electrical storm must have been a large one, because the 39Ω resistor in series with the chip's input was also open-circuit.

The fourth Prima was simply dead. It didn't light up, and there

were no outputs from the power supply. A new TOP202 chopper chip and 1A fuse brought it back to life. I think the cause had been a mains surge.

Don't Call Me

Several people have phoned me at home recently, having been given my number by Erm. If I catch him I'll wring his neck.

I was just sitting down to my dinner when the telephone rang. It was a Plymouth number, according to the display. Thinking that it might be my sister, I picked up the handset and mumbled hello.

"Hi! I was given your number by erm . . . Anyway, I've got this bush."

"Sorry, I deal with satellite repairs. You want the Garden Centre."

"No, yes, that is Jack, isn't it?"

"Ye-es" I replied, wearily.

"Ah good. I've got this Bush. A thirty five hundred I think. Same as a Pace six hundred."

"Six thousand?"

"Bless you. I had a cold last week. Yes, it's an ess ess six hundred. Anyway, it's dead. You can get the kits, can't you?"

Jack Armstrong is willing to try to sort out readers' satellite TV receiver problems via e-mail. You can reach him via the Internet at:

jack@netcentral.co.uk

One model per message – state make/model and fault symptoms. If you have no e-mail facilities you can write to him c/o Television, Room L302, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. Please enclose two first class stamps.

"It uses a transformer. It's not a chopper power supply."

"Right, a transformer. How much?"

"Well, I've got one in the workshop. You can have it for ten pounds. It's heavy, you see."

"Ten pounds?!"

"Includes carriage. Heavy you see. Long way to Plymouth."

"But I can get a second-hand receiver up the road for fifteen!"

I put the receiver down abruptly, and returned to my dinner. He probably thought that very rude of me. What I was about to suggest would have been more rude.

Test Case 420

Though they no longer have to do much in-depth diagnosis or repairwork in customers' homes, field technicians nevertheless have to be knowledgeable about many makes and types of equipment, and to know how to tune, set up and program anything from an audio stacker to a satellite receiver. Our first-line man is Doc Colin, whose initial meeting with Mr Greig and his Pace MSS500 satellite receiver turned out to be the first of several, as we shall see.

The start of the saga was a cry for help because of interference with UHF reception. When he called, Colin found that the UHF signals were fed to the TV set via the satellite receiver. There was patterning on the pictures. Satellite reception was OK, with no patterning – a scart lead was used for connection to the TV set with satellite reception. The trouble seemed to have started after an aerial rigger had called to improve Channel 5 reception – he'd been successful with this. Colin, who is experienced in this sort of thing, noticed that the severity and nature of the patterning changed when the satellite receiver was switched to standby; also, to a lesser extent, when certain satellite channels were selected.

It was not clear why the terrestrial UHF signal had been looped through the

satellite receiver when a scart link was in use for satellite reception. The level of interference was reduced when the UHF signal was fed directly to the TV set. It disappeared completely only when the satellite receiver's mains plug was withdrawn from the socket. Colin returned to his van and sat on its tailboard while he prepared an alternative lead. What sort? That's part of the question! This cured the interference problem. Mr Greig paid Colin's modest fee, and our man went on his way.

Two weeks later Colin was once more summoned to the Greig residence, this time because some of the satellite channels had gone missing – quite different programmes had replaced two of them, and these were covered with sparklies. In fact the satellite receiver had lost some of its memory. The Doc had to go into the installation menu to retune and store the lost channels and frequencies. There was little possibility of extracting a fee for this second call, which was done for free – as is so often the case.

A few days later Colin was exasperated to hear that "Mr Greig has been on the phone again". This time the Pace receiver had refused to come out of standby. The solution was simple: a mains reset was carried out by withdrawing the mains

plug for a few minutes then reinserting it. The box now powered up in response to the remote control command, and all the programmes were still stored. No charge again then, and Colin was soon off down the road to deal with "real" faults.

Three days later – you guessed it! – the sat-box was in trouble again. This time the surround-sound menus had disappeared. There were apparently no other symptoms. This fault was cleared by carrying out a 'factory reset', but Colin had decided to take the troublesome receiver back to the workshop. He'd gone armed with an identical receiver for loan to Mr Greig.

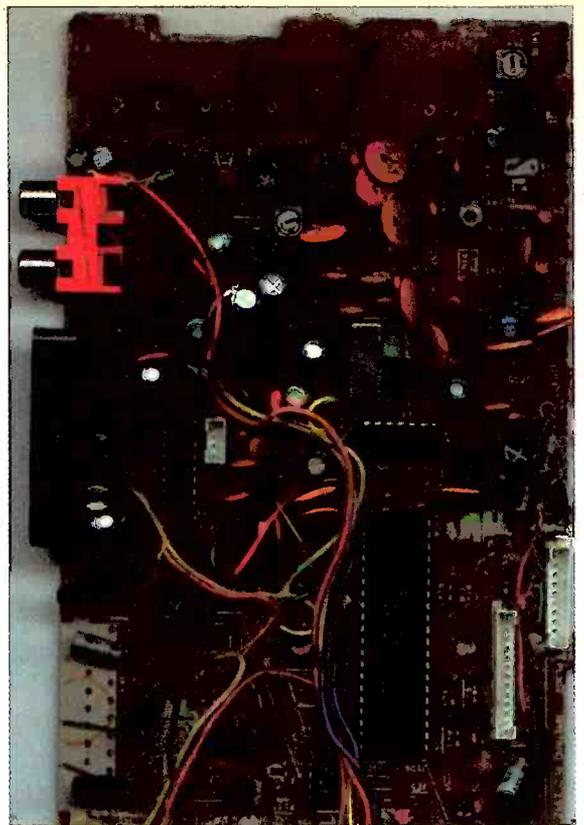
When it was back at the workshop we connected the MSS500 receiver to a dish and a TV monitor and left it to run on test, tuned to Sky News. Each day after that it was thrashed through all its channels and the menus were inspected. It responded correctly. After two weeks of this we removed its top and then tapped and flexed its PCBs, all to no effect. The receiver continued to perform impeccably for a further five weeks. It was time to return it to the customer – where Colin was in for a surprise. What was the root of the trouble, and what exactly did the Doc do on his first visit? For the solutions, turn to page 138.

Amstrad

SRD510/520

Tuning Range Mod

Martin Pickering, B.Eng. describes a simple way of increasing the tuning range of these satellite receivers



The Amstrad Model SRD510 has 99-channel capability with a full audio tuning range, but the actual channel frequency range is limited to 950-1,700MHz. By changing the microcontroller and EEPROM chips to those used in Model SRD540, 199 channels can be stored and an increased tuning range obtained in the on-screen menu. Unfortunately however the tuner module itself will go no higher than 1,900MHz, so with an enhanced (9.75GHz) LNB you still can't get Sky Sports 3.

The solution to this problem came to me via e-mail from a clever young engineer in Poland. Tomasz Urbaniec runs his own repair business in Warsaw. He discovered that by simply removing and then resoldering one surface-mounted capacitor inside the tuner in a slightly different position you can shift the tuning range upwards. You might lose the German ARD channel at the bottom end of the range, but you will gain Sky Sports 3.

Procedure

This is not a job for the faint of heart – and it helps if you are short-sighted!

The modification is shown in the accompanying photographs (see Fig. 1), which identify the capacitor concerned before at A and after at B. Dismantle the receiver and carefully desolder the tuner module from the PCB. Lift off its side cover and look inside. Locate the varactor diode marked T3. Next to it there's a capacitor which sits between two ICs. Its value is 1nF. Touch both ends of this capacitor very carefully with a fine, hot soldering iron. Flick the capacitor off its solder pads and put it somewhere safe.

Use a sharp blade to scrape away the square solder pad

that's connected to T3. Solder the capacitor back in circuit, at an angle of 45°, by soldering one end of it to T3. The idea is to reduce the effective circuit reactance by a fraction. Use the bare minimum of solder, removing any excess with solder wick. If you lose or damage the capacitor, the replacement must be of identical size. A larger device simply won't work.

Replace the tuner and reassemble the receiver. Test it to ensure that it still works as before. Dismantle the receiver again and replace the microcontroller chip (the largest one) using type AM242306. A 40-pin socket would be a good idea. Remove the EEPROM chip, which is type 24C08 or 2856, and fit a 24C16 in its place. Reassemble the receiver and switch on.

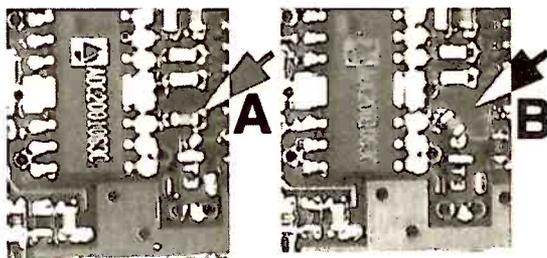
The red and green LEDs will come on for a few seconds while the microcontroller reprograms the EEPROM. I have occasionally had to perform a factory reset, which is done by pressing the appropriate handset button sequence – press OK, setup and status while in standby, holding the status button until both LEDs flash or 88 appears in the display. The receiver should now have 199 channels and should work perfectly with an enhanced LNB.

The new microcontroller chip does not provide a dish A/dish B option, so you can no longer control an ADX unit automatically (see article in the July 1997 issue). With an enhanced LNB you won't need an ADX unit anyway, but if you use a universal LNB you will need an external 22kHz tone inserter. In this case you should use an AM242284 microcontroller chip. This has an 'external audio' option which, in the SRD510/520, controls the voltage at pin 14 of the decoder scart socket. You can use this to control an external unit on a per-channel basis.

Reliability and Component Source

Before you carry out this major modification to a relatively old receiver, it would be wise to replace the components that tend to cause problems. An SRD510 reliability kit, which contains capacitors and resistors with instructions, is available for £5.45 inclusive from SatCure, PO Box 12, Sandbach, Cheshire CW11 1XA (01270 753 311). Add £4.11 for a 24C16 EEPROM and £8.66 for an AM242306 microcontroller chip (subject to availability).

Fig. 1: The capacitor whose position has to be altered, A before and B after repositioning.



KONIG

Your Reliable Partner

Konig line output transformers and full video repair kits are reduced in prices. Please ring for Prices - Quality comes from Konig Parts



Please phone us for the types not listed. Please add 60p post & packing and then add 17.5% to the total.

Trade Counter now open - Mon-Fri 9.00AM-5.00PM Sat 9.00AM-3.00PM

J.J. COMPONENTS

r/o 243-247 Edgware Road, The Hyde, Colindale NW9
Tel: Sales Hotline 0181 205 9055
Fax: Admin 0181 205 2053
Free fax orderline only : 0800 318 498

BA157=0.10	LA7835=2.35	STK5335=3.25	TCA955=4.10	2N6539=0.35	2SD761=0.55
BYD33D=0.15	LA7850=2.25	STK5337=4.85	TD1013A=2.99	2SA747=4.95	2SD810=0.55
BYD33M=25	LB1645=2.00	STK5488=4.75	TD1060=3.25	2SA794=0.60	2SD836=0.75
BYW95C=28	LM384=1.25	STK6962=2.50	TD1082=2.75	2SA861=0.70	2SD838K=POA
BYX10=15	M293B1=15.00	STK7217=5.25	TD1175=2.10	2SA893=0.50	2SD1047=2.25
BYX98=3.25	M710B1=6.10	STK7308=3.50	TD1235=3.40	2SA949=0.80	2SD1271=0.75
OA91=0.12	M51365=3.99	STK7404=6.40	TD1517=2.50	2SA1006=1.18	2SD1308=0.90
RGP15K=30	M54519=4.99	STK8250=5.00	TD1557Q=4.50	2SA1062=1.00	2SD1403=2.85
AN3320K=7.50	M58658P=6.99	STK73410=2.85	TD1558Q=3.65	2SA1124=0.78	2SD1453=4.40
AN5071=2.29	MC1377P=4.25	SKT73410/2=3.50	TD1670=2.50	2SA1180=2.25	2SD1497=2.50
AN5138=4.30	MDA2060=3.50	STR450=16.50	TD1904=0.80	2SA1302=3.00	2SD1651=1.80
AN5265=0.95	MDA2061=7.99	STR451=19.50	TD2004=1.90	2SB524=0.65	2SD1889=3.15
AN5512=1.35	NE544N=4.50	STR1195=7.99	TD2148=3.25	2SB618=3.05	2SD2125=4.15
AN5521=1.35	PA3029N=24.99	STR4090=11.15	TD2541Q=3.10	2SB648=0.50	2SK193=0.30
AN5620=2.50	SA11251=6.99	STR11006=3.50	TD2577=P.O.A.	2SB817=2.25	2SK176=8.00
AN5790=2.40	SA11293=3.5	STR16006=3.99	TD2578A=2.25	2SB883=1.40	AF200=0.80
AN6250=2.99	SA33004P=3.15	STR30115=2.75	TD2653A=2.40	2SB1156=0.79	BC303=0.20
AN6652=1.00	SA33027P=5.05	STR30125=5.99	TD3030B=5.50	2SC372=0.30	BC877=0.50
AN6878=2.50	SA55000=4.15	STR44115=5.99	TD4503=3.00	2SC461=0.10	BC880=0.40
AN7110=1.00	SA55230=12.50	STR50092=5.50	TD46200=10.50	2SC536=0.20	BD142=1.50
AN7169=2.00	SAA7000=8.99	STR50103A=3.85	TD48214B=3.45	2SC741=3.00	BD226=0.30
APU2400T=9.45	SAB3021=3.99	STR50115=4.50	TD48372=7.25	2SC840=3.15	BD677=0.50
BA340=1.40	SAB3035P=5.45	STR50213=4.50	TD48380=2.50	2SC901A=3.50	BD791=0.60
BA536=1.50	SAB3210=3.99	STR53041=4.50	TD48405=8.00	2SC1123=0.45	BDT64C=2.10
BA3920L=2.50	SAJ210=3.15	STR54041=3.50	TD48732=5.95	2SC1185=2.25	BDT65C=2.10
BA5102A=1.10	SDA2516=3.00	STR56041=4.50	TEA2018A=1.50	2SC1317=0.15	BDX670=1.67
BA5406=1.80	SDA3002=11.15	STR58041=3.00	TEA1039=1.75	2SC1675=1.85	BF337=0.30
BA6209=1.00	SDA5243=10.15	STR80145=5.50	TEA2031A=1.80	2SC1756=0.35	BF479=0.30
BA6247=2.00	SL1454=18.95	STRD1816=3.99	TEA2164=3.25	2SC1819=0.78	BF760=0.40
BA7766=2.80	STA451C=3.95	STRD6001=5.15	TEA2260=2.99	2SC1904=3.50	BF872=0.25
CNX36=90	STK032=8.75	STRD6108=7.00	TEA5170=1.40	2SC2200=2.50	BFR96=1.00
CNX62A=0.75	STK0049=4.00	TA7119=1.30	TEA8172=1.99	2SC2271=0.55	BFX89=2.50
CNX82A=0.80	STK0060=7.99	TA7210=8.95	TMS3741=5.50	2SC2440=3.00	BU502=1.25
HA1350=2.00	STK439=3.99	TA7230=1.00	TPU2732=19.99	2SC2580=2.35	BU508A=0.80
HA1457=8.99	STK1040=6.35	TA7245=2.00	U2829B=1.70	2SC2671=1.20	BU5255=4.10
HA11223=1.35	STK2029=4.75	TA7256=3.99	UAA1008=300	2SC2706=3.50	BUT13=2.25
HA11244=2.99	STK2240=6.50	TA7280=1.90	UAA4009=7.00	2SC2753=0.40	BUW41B=0.80
HA11713=1.00	STK3042=2.475	TA7281=2.00	UC3844=1.50	2SC2898=2.50	BUX80=1.80
HA11715=2.10	STK3082=5.25	TA7302=2.25	VCU2133=13.00	2SC3156=4.00	BUX98A=4.50
HA12411=5.75	STK4017=3.85	TA7318=4.90	VPJ2203=12.50	2SC3178=2.25	MJ15024=6.50
HA17741=4.99	STK4042=7.99	TA7328=1.50	XR2207=4.85	2SC3212=3.50	MJ13009=2.00
IRF840=2.50	STK4112=9.25	TA7604=3.50	UPC1018=1.10	2SC3279=1.15	S2055AF=1.85
KIA6283=2.50	STK4131=2=6.50	TA7680=2.00	UPC1163=1.15	2SC3306=2.50	T1P41C=0.35
L4964=4.99	STK4141=2=5.50	TA7698=4.75	UPC1185=6.00	2SC3358=0.60	TIP42C=0.40
LA3300=1.30	STK4151=2=6.80	TA8200=3.50	UPC1212=1.70	2SC3459=2.10	TIP40=0.85
LA3350=1.99	STK4191=2=6.85	TA8221=5.00	UPC1278M=2.20	2SC3679=3.50	TIP147=0.98
LA4182=1.65	STK4272=5.99	TA8618=1.80	UPC1536=5.25	2SC3795=2.00	TIP2955=1.10
LA4422=1.25	STK4352=4.85	TA8694=4.99	15R80H=2.50	2SC3973B=2.75	TIP3055=0.95
LA4446=2.90	STK4773=8.20	TBA520=0.95	15R85H=2.50	2SD200=1.80	TIPL761=1.89
LA4500=2.00	STK5315=4.75	TCA2705=2.99	BTA25=3.99	2SD350=4.10	TIPL=7.63
LA4700=4.40	STK5326=4.99		24004=1.20	2SD371=2.99	7808=0.38
LA7279=1.50			2N3055H=0.55	2SD551=6.99	7809=0.38
LA7830=1.99			2N6130=0.40	2SD621L=4.00	7818=0.38

ELC EAST LONDON COMPONENTS AUDIO TELEVISION VIDEO COMPONENTS AT VERY KEEN PRICES TEL: 0181-472 4871 FAX: 0181-503 5926

4 WAY UNIVERSAL REMOTE

Unique illuminated key (TV, VCR, SAT, CD/Hi-Fi) indicators

Macro function key

24 bit processor

Ergonomically designed keypad

Replaces up to 4 remote controls

Child security feature

Fastext/teletext

£12.99

REPLACEMENT REMOTE CONTROLS FROM £5.99

ELC EAST LONDON COMPONENTS 63 PLAGHAT GROVE, EAST HAM, LONDON E6 1AD. TEL: 0181-472 4871 two minutes walk from Upton Park Tube Station

VISIT OUR SHOP

OPEN MON-SAT 9AM-7PM

100% OF TOOLS, COMPONENTS INSTRUMENTS, REPAIR KITS, BOOKS & CABLES TO CHOOSE FROM

ADD £1.50 P/P + 17.5% VAT

ALL GOODS DESPATCHED SAME DAY

PRICES SUBJECT TO CHANGE WITHOUT NOTICE VISA ACCESS ACCEPTED. MIN ORDER £5.00

LINE OUTPUT TRANSFORMERS OVER 100 MODELS AT LOW PRICES

AKAI	16.99	NEI	16.99
CT2569E	16.99	1451R	16.99
CT2892E	16.99	NIKKAI	
AKURA		BABY 10	16.99
CX10	16.99	NT14	16.99
BEKO		NT20	16.99
16328NX	19.99	PANASONIC	
16228NX	19.99	TLF14561	20.00
BUSH		TLF14568	20.00
2114T	16.99	TLF14585	20.00
3114T	16.99	TLF14592	22.00
DECCA		TLF15505	22.00
DN8652	16.99	TLF15506	22.00
DT9476	16.99	TLF15534	28.00
DV9499	16.99	PHILIPS	
TN8422	16.99	2A/3A	16.99
FERGUSON		CTX/E/S	16.99
TX85/86	16.99	GRIAX	16.99
TX90	16.99	GR2,2AA	22.00
TX100	16.99	CP20	16.99
51P7	16.99	CP110	22.00
59K7	16.99	SAISHO	
68M3	16.99	CT14R	16.99
AS1F	16.99	CT142RX	16.99
FINLUX		CT142RXA	16.99
2482	19.99	CT1497XA	16.99
GOLDSTAR		SAMSUNG	
CBT1262E	19.99	CS14F	16.99
59K7	16.99	CT541ZG	16.99
CIT506	16.99	SANYO	
GOODMANS		CBP2146	22.00
CTV14R	16.99	CP2625	22.00
CTV2180	16.99	SHARP	
TV20RC	16.99	C1411S	31.00
GRUNDIG		DVS401S	16.99
CUC2401	21.50	SV2887S	20.00
CUC3400	21.50	SONY	
HINARI		KV2052UB	16.99
CT14	19.99	KV2096UB	16.99
CT20R	16.99	KV21XRTU	16.99
TYA1	16.99	KV21XMTU	16.99
HITACHI		KV2252UB	16.99
C2114T	24.99	KV25XSTA	16.99
C2118T	24.99	KV27XRTU	16.99
C21P226	24.99	KV2768UB	16.99
C2558T	24.99	KVA2121D	16.99
CPT2036	16.99	KVDX21TU	16.99
CPT2158	16.99	KVX121TU	16.99
CPT2178	16.99	KVX2121U	16.99
CPT2478	16.99	KVX2542U	16.99
ITT		KVX2932U	16.99
COMP 80R	16.99	KVX2941U	16.99
TK3425	16.99	TOSHIBA	
DIGI 3 110	16.99	140R4W	25.00
SP3876	16.99	140T8T	16.99
TK3537	16.99	1433E4WR	25.00
JVC		145R7BZ	25.00
C21E1E	16.99	15T98W	16.99
LOEWE		17578RT	16.99
ART 1	16.99	210T85	20.00
CLASSIC M	16.99	215T89	16.99
PRCPI S 28	16.99	221T48	36.00
MATSUI		2812DB	30.00
1440A	16.99	AT2078/25	30.00
209R/T	25.00	AT2079/15	30.00
MITSUBISHI		AT2079/23	16.99
CT1245EP	16.99	AT2079/40	16.99
CT1246LM	16.99		

VIDEO HEADS FROM £6.99 OVER 200 MODELS

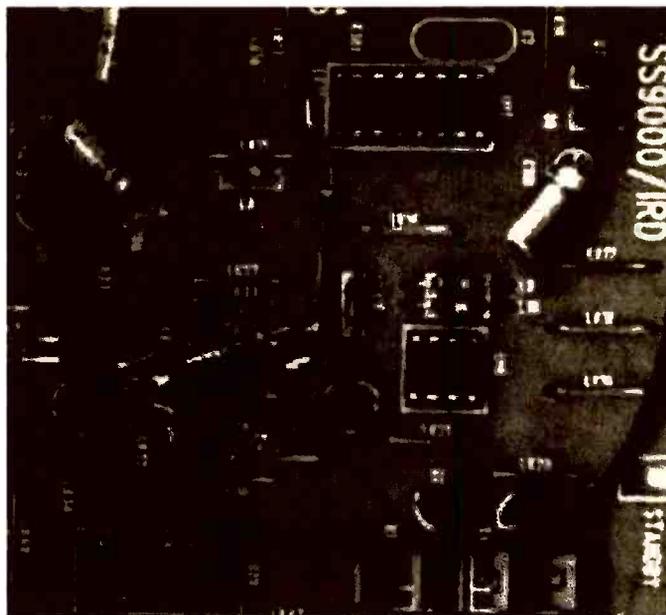
AN5512	1.99	TDA15530	6.99
AN5521	1.99	TA7271	2.50
BA3910	12.99	TDA1557Q	3.99
BA3918	12.99	TDA1558Q	3.99
BA3920	4.99	TDA2005	1.70
BA4508	4.99	TDA2030	1.30
BA5410	3.50	TDA2040	1.70
BA5412	3.50	TDA2052	3.50
BA6109	1.80	TDA2578A	2.99
BA6122	3.99	TDA2579A	2.99
BA6209	2.50	TDA2653A	3.25
BA6219	1.99	M54545L	3.40
BA6222	1.99	M54549L	4.50
BA6229	2.99	M54648L	3.99
BA6233	2.50	MC13306T3	3.99
BA6247	3.50	MC13309T3	3.99
CNX62A	1.99	PAL003A	20.00
CNX83	1.99	PAL3029B	14.99
CNY75	1.99	STK463	11.00
CNY65	4.99	STK465	10.00
HA11423	2.25	STK3082 II	8.50
HA11308	3.50	STK4121 II	8.50
HA11317	2.99	STK4131 II	6.50
HA11318	2.99	STK4132 II	7.00
HA11319	2.99	STK4141 II	6.50
HA11328	4.99	STK4142 II	8.50
HA13130	16.99	STK4151 II	6.00
HA13130	16.99	STK4152 II	9.00
HA13150	14.99	STK4162 II	8.00
HA13151A	14.99	STK4172 II	9.00
LA4270	2.99	STK4182 II	10.00
LA4280	3.99	STK4192 II	10.00
LA4282	5.99	STK5434	7.00
LA4440	2.25	STK5481	6.00
LA4445	2.60	STK5490	5.50
LA4446	2.99	STK7225	8.00
LA4489	1.60	STK730	4.80
LA4465	2.99	STK7348	4.80
LA4466	2.99	STK73605	12.99
LA4475	2.99	STK73410	6.99
LA4476	2.99	STR4211	5.99
LA4485	2.99	STR5412	4.50
LA4485	3.99	STR6020	4.50
LA4496	2.99	STR10006	6.00
LA4508	2.60	STR41090	6.00
LA4597	2.99	STR50020	6.99
LA4700	3.99	STR50105	4.99
LA4705	10.00	STR50401	5.50
LA7800	1.80	STR50411	6.50
LA7801	3.95	STR58041	5.50
LA7830	1.99	STR59041	6.00
LA7832	3.99	STRM5545	10.00
LA7833	3.99	STRD1706	7.99
LA7835	1.99	STRD1806	6.99
LA7836	2.99	STRD1816	5.99
LA7837	2.99	STRD4420	6.00
LA7838	6.99	STRD5041	5.50
MS4544L	2.99	STRD5541	7.99
TAB691N	8.50	STRD6008X	6.00
TAB701AN	2.99	STRD6108	7.99
TAB718	5.99	STRD6202	7.99
TDA1515	2.50	TAB205	3.80
TDA1552Q	6.99	TAB211	2.80

NIKKAI BABY 10 REGULATORS £11.00

TA7270	2.50
TA7271	3.99
TA7279	3.99
TA7281	2.75
TA7283	3.00
TA7288	4.29
TA7299	3.99
TA8214	3.50
TA8215	3.80
TA8216	4.25
TA8217	2.99
TA8218	7.50

Satellite Notebook

Reports from
Pete Gurney, LCGI
Hugh Cocks and
John C. Priest



Amstrad SRD500-545

No decoding of scrambled channels, sometimes with field bounce on all channels depending on model, and no card messages is a problem we quite often get with these receivers.

They all have a TEA2029 chip (IC6) on a daughter board. It's used as a sync separator to produce line and field sync pulses for the VideoCrypt decoder. The usual cause of the problem is loss of one of the sync pulse outputs – in my experience it's usually the field sync output. As you look at the daughter board, with IC6 to the left of the panel, you should have the following from left to right at the six-pin connector: 0V, 12V, 5V, line sync pulses, composite video and field sync pulses. There should be a line sync output at pin 11 of IC6, a field sync output at pin 3 and a composite video input at pin 27. A 503kHz ceramic resonator is connected between pins 18 and 19. Check the power supplies and the 503kHz signal, and suspect IC6 if there is an input but no output.

This IC is also used in the decoder in the SRD400 and the Pace SS9000 and its clones. **P.G.**

Pace SS9000

The customer complained that since he had extended the lead to the dish he could get only "one station of every channel". On site I found that according to the on-screen graphics the channels were changing, but the channel number displayed was always the same – on Astra 1D, which the customer couldn't get.

Things became clearer when I had the receiver on the bench. Because of bad joints on the secondary side of the chopper transformer the 24V tuning supply had almost disappeared. In fact the joints were so bad it was amazing that the receiver worked at all. The solder must have finally given up when the unit was moved.

C9, C11 (both 1 μ F) and C15 (2.2 μ F) were all replaced as they were the original ones. For improved reliability, 105°C types were fitted. The mains rectifier's reservoir capacitor C7 (47 μ F) was checked for loss of capacitance. Pace suggests that, depending on the mains supply voltage, there should be about 330V DC across this capacitor. Replace it if the voltage is anything much less.

When I finally had the receiver running I found that there was no H/V switching because Q3 (FXT749) was short-circuit. For good measure the customer had managed to short across his new lead when fitting it. **P.G.**

LNB Local Oscillator Trouble

The owner of a five-year old Pace SS9200 receiver phoned to say that his pictures disappeared at nine every morning, like clockwork, and reappeared as if by magic at three o'clock each day. When I called round, during the 'off' period, I found that the Pace receiver and the TV set were working normally – channel identifications could be seen when the Pace remote control unit was used to change channels. A replacement MTI LNB cured the problem.

Being curious by nature, and never having had this problem before, I decided to take a look at the LNB's local oscillator circuit (for more on this, see *Television* January 1996). Normally the oscillator just stops, removing the picture. It doesn't restart and is not temperature dependent. The signals had been returning because the dish was mounted on an easterly wall, and by three was no longer affected by the sun.

I replaced the local oscillator transistor, but when the LNB was mounted on our test dish its performance was still variable, depending on the temperature. My next step was to remove the dielectric resonator from the PCB. The glue that fixed it to the PCB had a discoloured look, so this was scraped off. The resonator was then stuck back on the board using a minimal amount of Araldite. Once this had set the unit was tested. Its performance was well up to par, with no appreciable frequency drift or loss of sensitivity even when it was cooking in the sun. The LNB has now gone into our MTI exchange stock. We keep a stock so that customers can buy a replacement when the local oscillator fails: the bracket that supports this device is much larger than that for a Marconi LNB. **H.C.**

Pacelink Update

The latest version (V1.25) of the Pacelink computerised channel download system can now handle 99-channel PRD700 series receivers and the new MSS466 MAC receiver, which is intended primarily for the Scandinavian mar-

ket. The PRD700 was sold as the Thorn Sat 99 and under a number of brand names including Mitsubishi.

Software upgrades are available for earlier versions of Pacelink. For more details check with Pacelink on 01365 631 449 or, if you have access to the internet, follow the service links from the Pace web site:

<http://www.pace.co.uk>

H.C.

Digital Woes

A French customer recently brought us a TPS digital receiver to install. Some prefer this package because it includes the French national terrestrial services, which others don't transmit – I like the frequently updated meteosat weather pictures that can be called up for different parts of the world.

The receiver ran very warm, and after half an hour or so the trouble began. Above channel 60, the picture would split itself horizontally, with a frozen part and a moving part – not unlike a video effects generator. Channels below 60 seemed to be OK, though after a long period of use the 'video effect' started to appear in channels in the fifties and forties.

A partial cure was obtained by taking off the top and positioning a fan to blow over the receiver – till the owner could exchange the unit in France. I wasn't going to get involved! It was daunting enough to look at the innards, and touching most items would result in scorched fingers.

A Dutch customer had similar heat problems with a Pace DVR500 receiver. After a few minutes' use, the receiver displayed the message "E05 Unknown Smart Card". Fortunately I was able to check the card with a friend's receiver, which produced the same message. A replacement card was requested, and the receiver is now kept in a cooler place. H.C.

Pace PRD800+

This receiver produced a 'lace-curtain' effect with encrypted channels and a dull picture with clear ones. When we took it back to the workshop and tested it the symptoms had progressed to no decoding, no decoder messages, and field bounce and a dull picture on the clear channels.

A scope check showed that the baseband video waveform suffered from sync crushing prior to the

Echostar SR5500

There aren't many of these receivers in our neck of the woods. The owner of this one was concerned because Sky Sports 3 couldn't be tuned in. I checked that the other horizontally-polarised channels could be received, and that the signals were strong. The entire equipment – 1.8m dish, receiver and 2,000ft of cable – had been shipped over from the States about five years ago, by the US owner. I then arranged to return on the following day in time for an upcoming golf competition due to be shown on Sports 3.

Reception of CNN and the two coded Spanish channels at a similar IF was fine, also NTV which is horizontally polarised and 30MHz below Sports 3. The moment Sports 3 was approached, the tuner produced a fluttery effect/oscillation with weak Sports 3 sound beneath the flutter. I decided to absolve the cable of any blame first – it was a long run. Fortunately there was plenty of cable to hand on large wooden drums. So a length was unrolled, cut and connected up. There was absolutely no difference to the fluttering effect.

I then went over to Eutelsat at 13°E, but could see no problems with signals at around this frequency – apart from some disturbance to the noise at the Sky Sports 3 frequency. So it seemed that the tuner was faulty, and I didn't relish the thought of doing battle with an Echostar tuner. As the effect occurred over a very narrow frequency band, the easiest course was to move the LNB's local oscillator frequency

slightly. This proved to be fairly easy to do, by unscrewing the local oscillator screw on the LNB a little – it was a Gardiner prime-focus LNB, which has an external local oscillator screw under a plastic cap.

Unscrewing it slightly moved Sky Sports 3 to 11.7GHz. The channel that now couldn't be received was NTV, a German news channel that was of no interest. I told the owner that at some stage the problem might worsen to cover a wider frequency range, but he felt that this was preferable to the possible replacement cost of a new tuner. Unfortunately it did mean that all the other channels had to be retuned slightly, though the LNB offset menu helped and the owner enjoyed retuning – how about an Echostar link to go along with the Pacelink tuning system?

In the course of retuning the LNB I discovered that a 4GHz C-band LNB was also fitted, along with a second long IF cable. The owner wasn't aware of this and, being American, was keen on the US-based C-Span station via Intelsat 601 at 27.5°W. This was soon tuned in, along with Russian TV and some Arabic and French channels.

Now that the dish was beginning to scan the heavens after spending five years quietly moving between 19.2 and 13°E, the dish mount took an intense dislike to the exercise and, a few days later, fractured. This was soon cured with the welder – wonderful activity at the dish on a hot summer's afternoon! H.C.

energy-dispersal clamp. Blanket replacement of the electrolytics around the Nicky chip U9 cleared the fault. The capacitors replaced were C98, C99, C107, C544 (all 10µF, 35V) and C110 (470µF, 16V). J.C.P.

Pace Prima

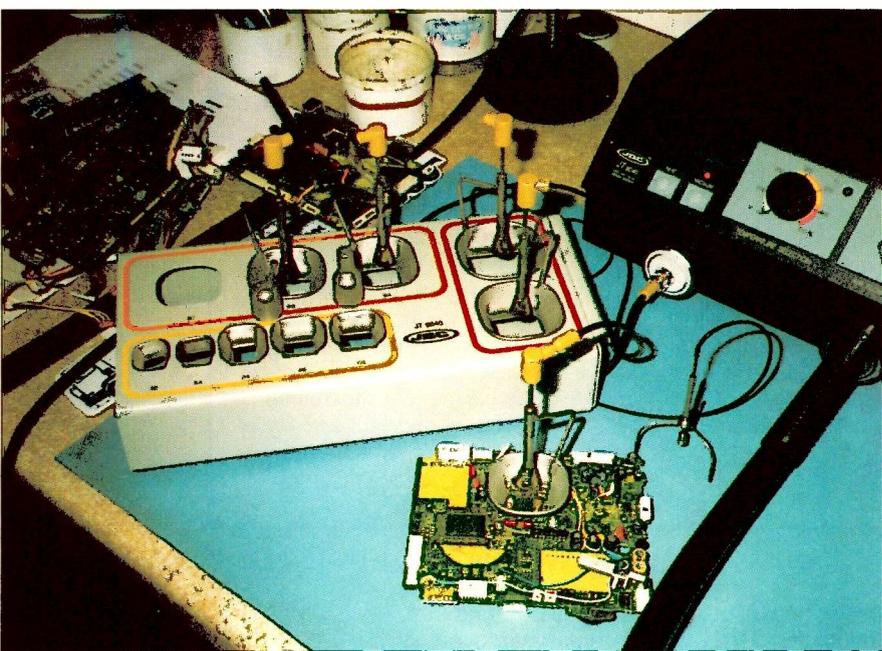
Note that the Prima has a different remote control command set from all previous Pace models. At first glance the remote control unit appears to be identical to the ones used with Models MSS100-1, MSS200-1 etc., but on closer inspection you will see that "RC-10" is printed in the bottom right-hand corner of the button plate. The RC10 type handset won't operate any earlier models, and their handsets won't operate the Prima receiver. This fact isn't mentioned in the service manual for the Prima, and I became aware of it only by accident. One of my satellite installer colleagues brought me a Prima

receiver that had suffered from ingress of water via the UHF aerial socket. He didn't bring in the remote control unit or any of the leads.

After cleaning the underside of the PCB around the RF modulator, and checking the outputs from the power supply, I found that the receiver worked normally using the front control buttons but could not be operated using any of my Pace remote control units. I spent some time checking the output from the remote control sensor through to pin 12 of U700, but everything seemed to be in order. As it was Saturday morning I couldn't check with Pace Technical, and it took me some time to get hold of my rigger friend. When I did, I asked him to bring along the receiver's handset. As I suspected, remote control operation was now OK. But I'd wasted twice as long as the job should have taken. J.C.P.

Test Report

The JBC Desoldering Station



Steve Beeching, I.Eng. examines various flatpack IC desoldering methods and the way in which the JBC JT6040 solves the problems

nique not all the legs may reflow: significant print damage can occur even if only one leg is left soldered. With the latter technique, rather too much heat may build up around the IC: although full reflow is achieved, the print can overheat and lift.

When the desoldering tool incorporates a vacuum pump, the IC will be released even if it is still attached to the print by either its leg(s) or the PCB bonding compound. In the latter case the tendency is for the operator to twist the IC with the tool in order to break the glue bonding. This can also damage the print.

An alternative approach is to use hot air to reflow the IC. Many shaped tips are also available for this, including rectangular ones with four jets, and ones for J-leg ICs. These have tilted vents to drive the hot air beneath the IC. Gentle lifting pressure ensures that all legs are reflowed before IC removal. A vacuum pen can be used for lifting.

Hot air is a disadvantage with a high-density board, where peripheral components the size of an ant's reproductive organs are mounted around the IC and adjacent to its legs. Unless they are protected, these components can go walkabouts. And as you can't see them, you can't find them. More stress! One way of getting round this is to use tape to mask off the area around the IC. But again problems arise, one of them being fire! Another is cleaning off the glue layer left by the masking tape.

The problem with flatpack IC removal is avoiding damage to the PCB and adjacent components. The more advanced the technology involved, the greater the number of legs a chip is likely to have and the smaller the components that surround it.

Most such ICs are stuck down with a red compound that softens when heat is applied to the body of the IC. Some are not stuck to the PCB at all, while others – in particular microcontrollers in VCRs – seem to be bonded with a superglue which has almost to be chiselled off. But that's another story.

Desoldering Techniques

ICs can be removed using a heated and shaped desoldering tip or a shaped tip with a vacuum plunger in the centre. Ensure that the IC's legs have all reflowed before removing it from the PCB, otherwise the print may peel away when it is lifted. There are two ways of going about this. One is to apply flux to all the IC legs to aid reflow. The other is to apply solder and flood all the legs to form a single solder blob.

Here are the disadvantages. With the former tech-

Enter the JT6040

The soldering iron market was once dominated by two or three major firms. There are now more players in the desoldering game. Last year we had the Pace system, which is expensive but good, and the Welwyn system which is not so expensive but has limited capacity for resoldering. This year the Spanish have arrived in the guise of JBC (not to be confused with JCB, which

makes very large 'solder' removers, or JVC who don't!).

The JBC JT6040 desoldering station makes real headway. Basically it consists of a hot-air blower with variable temperature and flow, and a vacuum sucker to lift the IC. The surprise is in the end pieces, which are called extractors and protectors – see Figs. 1 and 2. The extractors come in a number of large sizes: they consist of a rectangular-shaped bowl with a vacuum cup mounted above the centre.

Operation

You place the bowl around the IC to be removed and lower the vacuum cup on to it. The cup sticks to the IC when the vacuum pump is activated. Because the cup is lightly spring-loaded, the IC will be lifted gently when its legs have been reflowed with hot air. See Fig. 3.

What about the problem of peripheral components? Well, there doesn't seem to be one. Components that are outside the bowl are protected from the hot air. Those that are inside are subjected to eddy currents rather than a sideways blast, and won't blow away easily. They might however if you go mad with the air flow.

It's a magical sight seeing an IC lift off the PCB quietly and gently – makes you want to take more off just to watch it happen again!

There's a neat accessory called the 'tripod', which consists of a vacuum extractor with three legs. You place it over a small IC that's to be removed. It can be used on its own if there are no adjacent peripheral components, or with one of the smaller protector bowls if there are.

This is the easiest IC removal unit I've come across, and is an ingenious design.

Temperature can be controlled over the range 150-450°C, while the air flow is calibrated from 6-34 Lt/min on a scale of 1:10. As a starting point, the handbook recommends a temperature of 350°C and a flow rate of 6. With experience, you will soon learn the best settings for a given IC size.

Two touch buttons are used to start the vacuum pump and the hot-air flow. A foot pedal controls the latter. When you take your foot off the pedal, the air flow continues for a short period to cool down the hand-piece.

Protection is built into the controller, with error codes to indicate a problem such as a blocked filter or overheating. The controller cuts out if the pedal is activated for more than fifteen minutes.

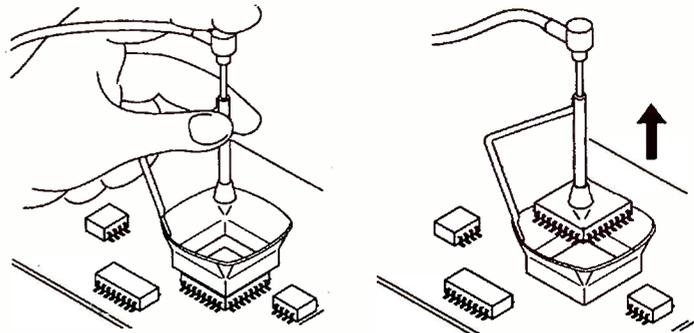


Fig. 1: Use of an IC extractor.

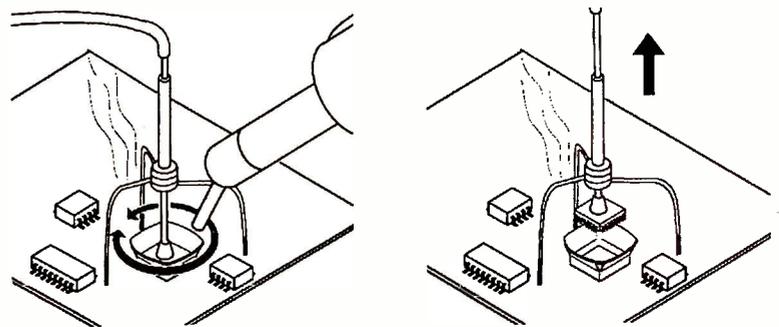


Fig. 2: Use of the tripod and protector to remove a small IC.

What You Get

Basically you get a control unit with an 800W hot-air blower and three types of nozzle, controlled by a foot pedal. There's a stand for the extractors and protectors. Five large extractors from 20 x 20mm to 33 x 33mm, five protector bowls from 10 x 10mm to 17 x 17mm, and a tripod are provided. Spare filters for the vacuum inlet, spare rubber cups for the extractors and tripod and a length of rubber tubing are supplied with the kit.

The basic kit is available at £1,280 plus VAT (trade discounts will apply) from Willow Vale Electronics, 11 Arkwright Road, Reading, Berks RG2 0LU (01189 876 444, fax 01189 867 188).

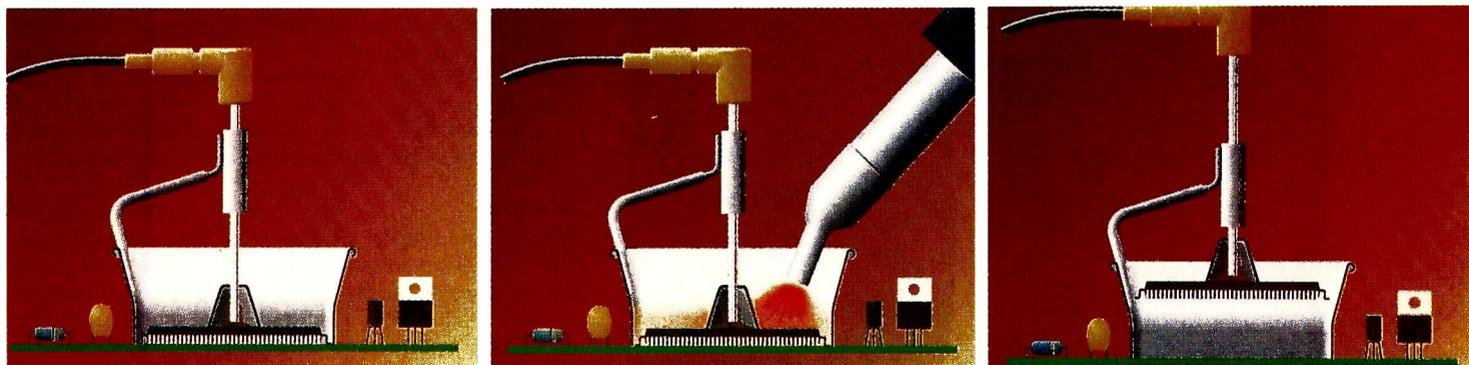
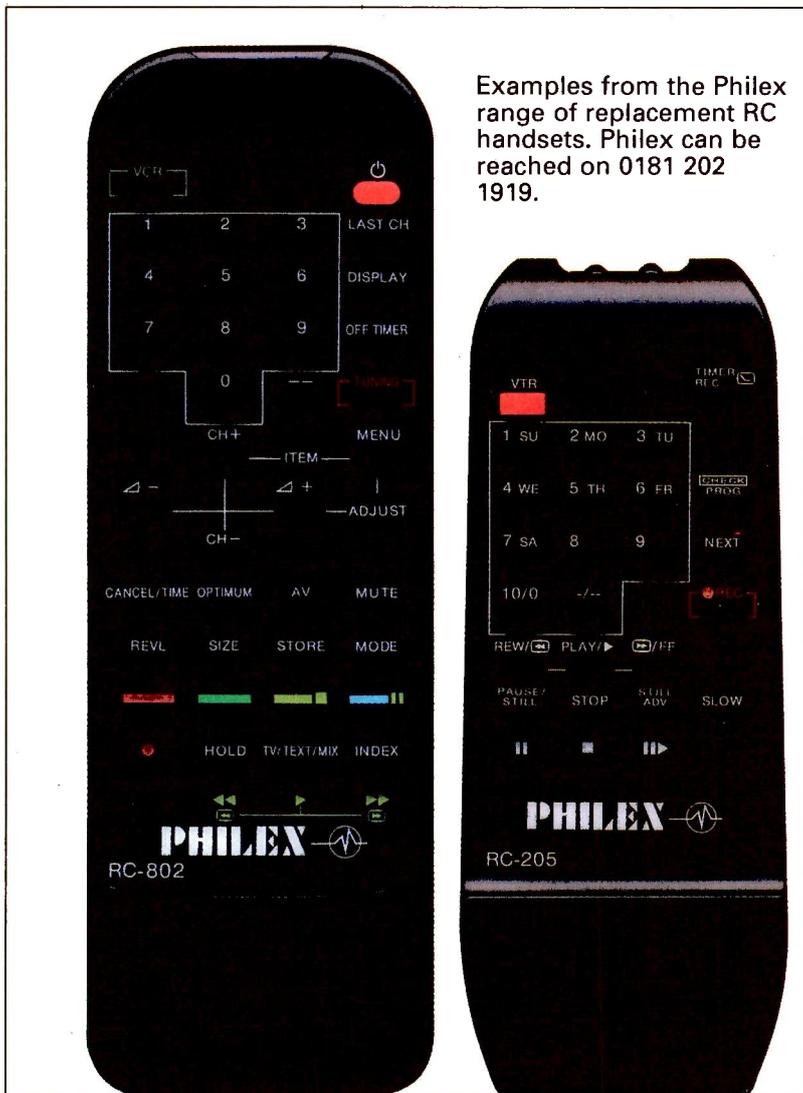


Fig. 3: How to desolder an IC using an extractor. First position the extractor (left), apply heat until the solder melts (centre) and finally remove the desoldered IC (right).

Repairing RC Handsets

While cheap RC handsets are not worth repairing, expensive ones can repay attention. **Chris Watton** explains what can be done by way of economic repair



Examples from the Philex range of replacement RC handsets. Philex can be reached on 0181 202 1919.

Nearly everything nowadays seems to be operated by a remote control handset. These devices can cause a number of problems that result in customer complaints. You may have sold a second-hand TV set to a customer who finds that the remote control unit is not 100 per cent reliable. In some cases this can lead to the customer being given a refund. Oooh the pain! Or, if a cheap replacement is not available, you may have to obtain the original type.

Many handsets are available for only £5-£10. Repairs are therefore not worth the time. But some of them are very expensive, for example VCR types that have a built-in clock display. One such unit we required recently was priced at around £80. This could have meant scrapping a top-of-the-range VCR. It prompted us to try to repair the unit.

We've all tried to bodge handsets at one time or another. The unit may then work all right for say a week or two. Typical bodes are to put pencil lead on the pads or scrape the contact area on the PCB. The latter course actually makes matters worse, as the abrasive used will reduce the contact area. So we mustn't do it!

The problem with the expensive unit we had was that some of the most used buttons either didn't work or needed Charles Atlas to press them in.

The first thing we did was to take the unit apart. With most units this can be done without sticking a screwdriver in the edge. It's worth taking a little time to get the unit apart, as a ruined case will make it a write-off – even if you can get the electronics to work properly.

Testing

Once we had it apart we could test the innards. This is done by putting a remote receiver/tester in front of the unit or, preferably, the machine with which it is supposed to work. Then, with the keypad removed, supply the voltage required and connect a 220Ω resistor cross each set of contacts in turn to check the various functions. We now use a stick with a remote pad glued to the end however. This is better, as it's easier to put the pad on the contacts than wire an 0.5W resistor across them.

If the PCB is working correctly the pad is at fault, which is usually the case. You can often see that a pad is worn, but others don't look so obviously defective. In this case an ohmmeter can be used to test them. A reading of anything up to a few kΩ is acceptable. Readings can be compared with those obtained from the pads that work.

Pad Repair

A product is now available for pad repair. It recoats the pad's contact area, is flexible and has a surface resistance which is much lower than the original material. This results in a handset with a very quick response. The product is called a remote keypad repair kit and is made by Chemtronics. It consists of a two-part polymer coating: one is a silver and carbon resin, the other a hardener. Once mixed, curing takes about seventy two hours.

You simply brush the mixture on to the keypad contact area and leave it to dry. Don't be unduly surprised by the smallness of the contents. There is enough to restore about twenty handsets completely. And a pack contains two kits. The instructions in the pack must be followed to the letter, otherwise the mixture might not stick. Once the pad is dry it should cause no more trouble.

Other Problems

Remote control unit faults that are not caused by the pad are not so easy to sort out. But it's worth carrying out a few checks before consigning the unit to the bin.

The battery running out quickly is a frequent complaint. This can be caused by the electrolytic capacitor that's connected across the supply. It usually has a value of 470-1,000µF with a voltage rating of 10V. The capacitor can develop leakage or fall in value. In either

case the result will be premature battery failure.

Liquid in the unit will have the same effect of course. This is easily cleaned out, but remember not to damage the contacts.

The crystal or ceramic resonator often breaks away or loses a leg. Once it is refitted, a spot of glue will stop this happening again.

Poor joints often develop at the infra-red LEDs. Remember that they draw a fair amount of current, possibly over 1A (in short bursts), so the connections are critical. This emphasises the need for the high-value reservoir capacitor to be in good condition.

It can be difficult to check the IC used in a handset when you don't have the circuit diagram. A few tests can be carried out however. Check the supply voltage, whether the clock is working, and the output that drives the LEDs. There is usually a transistor or perhaps two transistors between the IC and the LEDs. So check back from the base of the driver transistor to the IC when a button is pushed. You may in this way find that there's a faulty transistor.

To scan the operation of the buttons the IC used in a handset has a key scan and key encoder, as with the control chip in a VCR or a TV set.

In Conclusion

The keypad repair kit mentioned above is available from CPC of Preston (01772 654 455) under part no. SA00478. It costs about £15.

Those who require more detailed information on remote control operation should refer to page 488 in the May 1994 issue of *Television*, where Eugene Trundle explains it all. It's a good read.

BACK ISSUES

We have available a limited stock of the following back issues of *Television*:

- 1994** January, February, March, May, June, July, August, September, October, November and December
- 1995** January, April, May, June, July, August, September and December
- 1996** January to September inclusive, November and December
- 1997** January, February, March, April, May, June, July, August, September, October and November

Copies are available at £3.00 each including postage. Send orders to:

Reed Business Information,
Television Back Issues,
Room L302,
Quadrant House,
The Quadrant,
Sutton,
Surrey SM2 5AS.

Make cheques/postal orders payable to Reed Business Information Ltd.

TELETEST



COMPUTER MONITOR TEST PATTERN GENERATOR

TELETEST PC

Earn extra money repairing PC Monitors

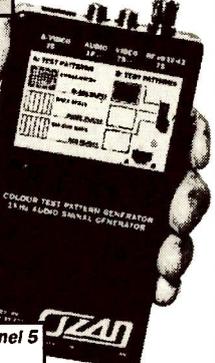
Test Pattern Generators for TVs & PC Monitors



TELETEST 60 day no quibble money back guarantee!

Above: The TELETEST PC for computer monitors.

Right: The TELETEST-2 for TVs and VCRs.



COLOUR TEST PATTERN GENERATOR 25 MHz AUDIO SYNC GENERATOR

TELETEST-2 & TELETEST PC: £149.95 each
Carry Case & PSU: £9.95 each.
UK P&P £5.95, Overseas £15.95 Prices ex VAT




OZAN: 37 Haviland Rd, Ferndown Ind Est, Wimborne, BH21 7SA. UK
 Fax: 01202 877271 (Overseas Tel: +44 1202 877270 Fax: +44 1202 877271)

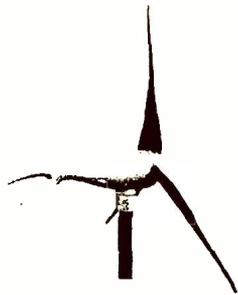
Web site: <http://www.ozan.co.uk>

Still essential for Channel 5 retuning problems

OZAN, FREEPOST, Wimborne, BH21 7BR

Freecall: 0500 009070 7am-10pm everyday

FREE info packs. Credit card sales. Technical help.



WIND GENERATORS 380 WATT

1.14 metre dia blades, carbon matrix blades, 3 year warranty, 12vdc output, 24v version available, control electronics included, brushless neodymium cubic curve alternator, only two moving parts, maintenance free, simple roof top installation, start up speed 7mph, max output (30mph) 380w. £499 ref AIR1

PLANS

PORTABLE X RAY MACHINE PLANS Easy to construct plans on a simple and cheap way to build a home X-ray machine! Effective device, X-ray sealed assemblies, can be used for experimental purposes. Not a toy or for minors! £6/set. Ref F/XP1.

TELEKINETIC ENHANCER PLANS Mystify and amaze your friends by creating motion with no known apparent means or cause. Uses no electrical or mechanical connections, no special gimmicks yet produces positive motion and effect. Excellent for science projects, magic shows, party demonstrations or serious research & development of this strange and amazing psychic phenomenon. £4/set Ref F/TKE1.

ELECTRONIC HYPNOSIS PLANS & DATA This data shows several ways to put subjects under your control. Included is a full volume reference text and several construction plans that when assembled can produce highly effective stimuli. This material must be used cautiously. It is for use as entertainment at parties etc only, by those experienced in its use. £15/set. Ref F/EH2.

GRAVITY GENERATOR PLANS This unique plan demonstrates a simple electrical phenomena that produces an anti-gravity effect. You can actually build a small mock spaceship out of simple materials and without any visible means- cause it to levitate. £10/set Ref F/GRA1.

WORLDS SMALLEST TESLA COIL/LIGHTNING DISPLAY GLOBE PLANS Produces up to 750,000 volts of discharge, experiment with extraordinary HV effects, "Plasma in a jar", St Elmo's fire, Corona, excellent science project or conversation piece. £5/set Ref F/BTC1A/G5.

COPPER VAPOUR LASER PLANS Produces 100mw of visible green light. High coherency and spectral quality similar to Argon laser but easier and less costly to build yet far more efficient. This particular design was developed at the Atomic Energy Commission of NEGEV in Israel. £10/set Ref F/CVL1.

VOICE SCRAMBLER PLANS Miniature solid state system turns speech sound into indecipherable noise that cannot be understood without a second matching unit. Use on telephone to prevent third party listening and bugging. £8/set Ref F/VS9.

PULSED TV JOKER PLANS Little hand held device utilises pulse techniques that will completely disrupt TV picture and sound! Works on FM too! DISCRETION ADVISED. £8/set Ref F/TJ5.

BODYHEAT TELESCOPE PLANS Highly directional long range device uses recent technology to detect the presence of living bodies, warm and hot spots, heat leaks etc. Intended for security, law enforcement, research and development, etc. Excellent security device or very interesting science project. £8/set Ref F/BHT1.

BURNING, CUTTING CO2 LASER PLANS Projects an invisible beam of heat capable of burning and melting materials over a considerable distance. This laser is one of the most efficient, converting 10% input power into useful output. Not only is this device a workhorse in welding, cutting and heat processing materials but it is also a likely candidate as an effective directed energy beam weapon against missiles, aircraft, ground-to-ground, etc. Particle beams may very well utilize a laser of this type to blast a channel in the atmosphere for a high energy stream of neutrons or other particles. The device is easily applicable to burning and etching wood, cutting, plastics, textiles etc £12/set Ref F/LC7.

DYNAMO FLASHLIGHT Interesting concept, no batteries needed just squeeze the trigger for instant light apparently even works under water in an emergency although we haven't tried it yet! £6.99 ref SC152

ULTRASONIC BLASTER PLANS Laboratory source of sonic shock waves. Blow holes in metal, produce 'cold' steam, atomize liquids. Many cleaning uses for PC boards, jewelry, coins, small parts etc. £6/set Ref F/ULB1.

ANTI DOG FORCE FIELD PLANS Highly effective circuit produces time variable pulses of acoustical energy that dogs cannot tolerate £6/set Ref F/DOG2

LASER BOUNCE LISTENER SYSTEM PLANS Allows you to hear sounds from a premises without gaining access. £12/set Ref F/LLIST1

PHASOR BLAST WAVE PISTOL SERIES PLANS Handheld, has large transducer and battery capacity with external controls. £6/set Ref F/PSP4

INFINITY TRANSMITTER PLANS Telephone line grabber/room monitor. The ultimate in home/office security and safety! simple to use! Call your home or office phone, push a secret tone on your telephone to access either: A) On premises sound and voices or B) Existing conversation with break-in capability for emergency messages. £7 Ref F/TELEGRAB.

BUG DETECTOR PLANS Is that someone getting the goods on you? Easy to construct device locates any hidden source of radio energy! Sniffs out and finds bugs and other sources of bothersome interference. Detects low, high and UHF frequencies. £5/set Ref F/BD1.

ELECTROMAGNETIC GUN PLANS Projects a metal object a considerable distance- requires adult supervision £5 ref F/EML2.

ELECTRIC MAN PLANS, SHOCK PEOPLE WITH THE TOUCH OF YOUR HAND! £5/set Ref F/EMA1.

PARABOLIC DISH MICROPHONE PLANS Listen to distant sounds and voices, open windows, sound sources in 'hard to get' or hostile premises. Uses satellite technology to gather distant sounds and focus them to our ultra sensitive electronics. Plans also show an optional wireless link system. £8/set ref F/PM5

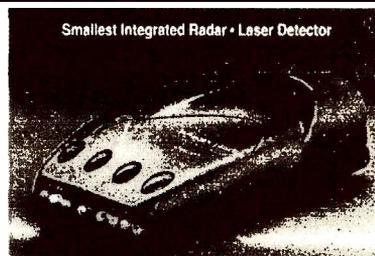
2 FOR 1 MULTIFUNCTIONAL HIGH FREQUENCY AND HIGH DC VOLTAGE, SOLID STATE TESLA COIL AND VARIABLE 100,000 VDC OUTPUT GENERATOR PLANS Operates on 9-12vdc, many possible experiments. £10 Ref F/ANM7.



COLOUR CCTV VIDEO CAMERAS,

BRAND NEW AND. CASED. FROM £99.
Works with most modern video's, TV's, Composite monitors, video grabber cards etc

Pal, 1v P-P, composite, 75ohm, 1/3" CCD, 4mm F2.8, 500x582, 12vdc, mounting bracket, auto shutter, 100x50x180mm, 3 months warranty, 1 off price £119 ref XEF150, 10 or more £99 ea 100+ £89



Smallest Integrated Radar + Laser Detector

SUPERWIDEBAND RADAR DETECTOR 360 deg COVERAGE

Detects both radar and laser, X, K, superwide KA bands. LED signal strength display Audio and visual alerts, Alert priority, Rear and front facing optical waveguides, Triplecheck verification, city mode, tutorial mode, dark mode, aux jack, volume control. These may be illegal to use in certain countries.

1.1"x2.7"x4.6"
Superband £149 ref RD2

PLACE YOUR ORDER VIA OUR WEBSITE AT BULL-ELECTRICAL.COM

BULL ELECTRICAL

250 PORTLAND ROAD, HOVE, SUSSEX.
BN3 5QT. (ESTABLISHED 50 YEARS).

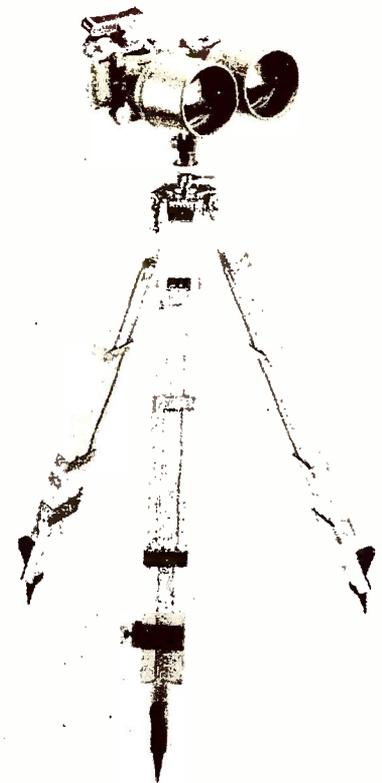
MAIL ORDER TERMS: CASH, PO OR CHEQUE
WITH ORDER PLUS £3.50 P&P PLUS VAT.

24 HOUR SERVICE £5.00 PLUS VAT.

OVERSEAS ORDERS AT COST PLUS £3.50
(ACCESS, VISA, SWITCH, AMERICAN EXPRESS)
phone orders : 01273 203500

FAX 01273 323077

E-mail bull@pavilion.co.uk



HELIOS PNB-2 RUSSIAN BORDER GUARD OBSERVATION BINOCULARS £1799

Intended for the medium to long range observation of air and ground targets and the determination of their angular co-ordinates. These giant binoculars are a tribute Russian optical ingenuity, with a performance that simply has to be seen to be believed. A large exit pupil diameter of 7.33mm provides exceptional light passing power, which when combined with its high

magnification of x15 allows the user to view over vast distances with delightfully bright, crisp, high resolution images. Robust and able in construction incorporating an uncomplicated yet thoughtfully designed mechanical layout ensuring ease of operation and quick precise targeting. These binoculars have a wide variety of applications and are suitable for use by coastguards, law enforcement organizations, customs, farmers etc.

Specifications
x15 magnification, 110mm objective, 6 deg angle of view, Field at 100m=105m, focusing 10m-inf, fully coated precision ground optics, orange and neutral filters, rubber lens caps, rapid targeting hand grips, padded headrest, screw in silica gel cartridges, wooden tripod, operating temperatures -40 c to +50 c, weight 25kg, (15kg without tripod), supplied in wooden carrying case.
Border guard binoculars £1799 ref PNB2



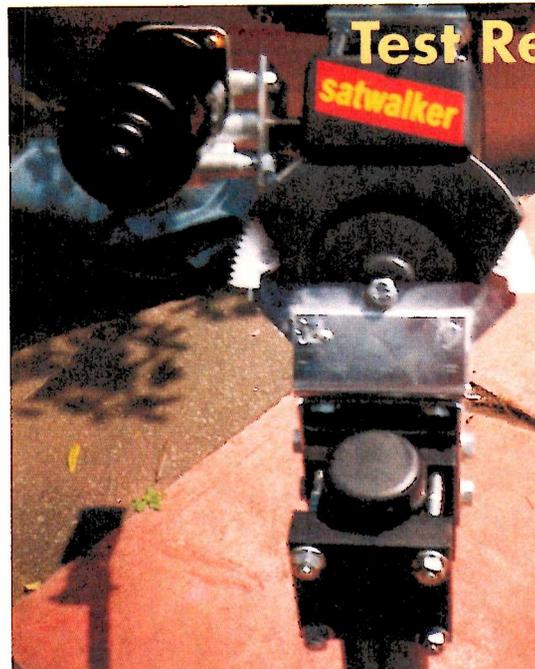
TZS4 INFRARED NIGHT SIGHT

One of our top most selling night sights is this Russian TZS4. This sight enable you to see in very low light levels, or with the aid of the built in infra red illuminator- in total darkness. In 1/4 moonlight you would spot a man at 150m, in total darkness at 75m. Magnification 2.3x, 240x66x190mm, 0.9kg, focusing range 1.5m-infinity, M42 camera mount included, runs on 2xAA batteries, 100mm focal length, 8 deg illuminator divergence, 50hrs continuous (no illuminator) 10hrs with carrying case and strap.

TZS4 Nightsight £199 ref BAR61

The Satwalker 180° H-H Mount

Mike Hancox, technical director of Satellite Scene, finds this unit simple to install, inexpensive, reliable and silent in operation



Test Report

The new Satwalker 180° horizon-to-horizon mount is one of the best and most underrated pieces of equipment I have ever reviewed. How can I make such a claim for a relatively new item?

The Original Satwalker

I was one of the first to purchase from the importers a quantity of the original Satwalker units when this unique horizon-to-horizon mount initially appeared in the UK. Others in the satellite business were less than enthusiastic. They felt that the mounts were difficult to obtain, too cheap, unreliable (though they had not tried them) and poorly made. The unfavourable view of the Satwalker seems to have been based on two main factors: first that the units did not span a full 180°, and secondly because they are not made by Jaeger, which seems to be the only name that counts when it comes to H-H mounts.

We didn't adopt this negative attitude. Instead we decided to give the units a fair try, and have been well rewarded. In fact we had struck lucky in finding a mount that runs truly silent and is, for fitting, extremely versatile. Over a period of time, my decision to use these units has been completely vindicated.

Initially we supplied a number of the mounts to customers, including hotels and language colleges, that make much use of their steerable dishes. Four years later they are all still working and we have not had a single fault that could be attributed to the mount. That's better than our record with other products.

The 180° Version

The latest version of the Satwalker has the one thing that the initial version lacked, a full 180° swing. I was concerned about one thing when I first examined the 180° Satwalker – the nylon instead of metal teeth that provide the 180° arc drive. Would there be excessive wear and tear, resulting in dish 'slap' and override? As I was concerned about this I decided to delay my review for four months in order to give the unit a thorough site test.

A mount was installed at the home of a customer whom we knew would make a great deal of use of it. He is of nordic extraction, and his wife is a Greek Cypriot. The unit would continually be whizzing from the Cypriot transmissions at 7°E through 1°W and back to Astra for the kids. For four months it did just that, changing from one satellite to another at least ten times a day. This had no detrimental effect on the unit what-

soever. My initial concern about the nylon teeth was unfounded: there have been no wear and tear problems, and no slap and backlash. The unit is as tight and reliable as when it was first installed.

The nylon teeth are certainly a help when it comes to silent operation. There is nothing more annoying at two o'clock in the morning than the sound of a neighbour's dish churning around in search of those elusive porn channels. This super-quiet unit emits hardly a sound, even in the dead of night. I have in fact not come across a quieter-running unit than the new Satwalker, which should sell it to a lot of people.

Versatile Fitting

The final plus point with this unit is the extremely versatile fitting arrangements. While other H-H mounts have to be fitted to the top of a vertical pole, the Satwalker can be fitted in several ways – at the top of a pole, at the side of a pole, on a horizontal pole such as a J pole, or to an old right-angled dish bracket for example. We have even fitted a Satwalker half way up a TV mast and on a balcony handrail.

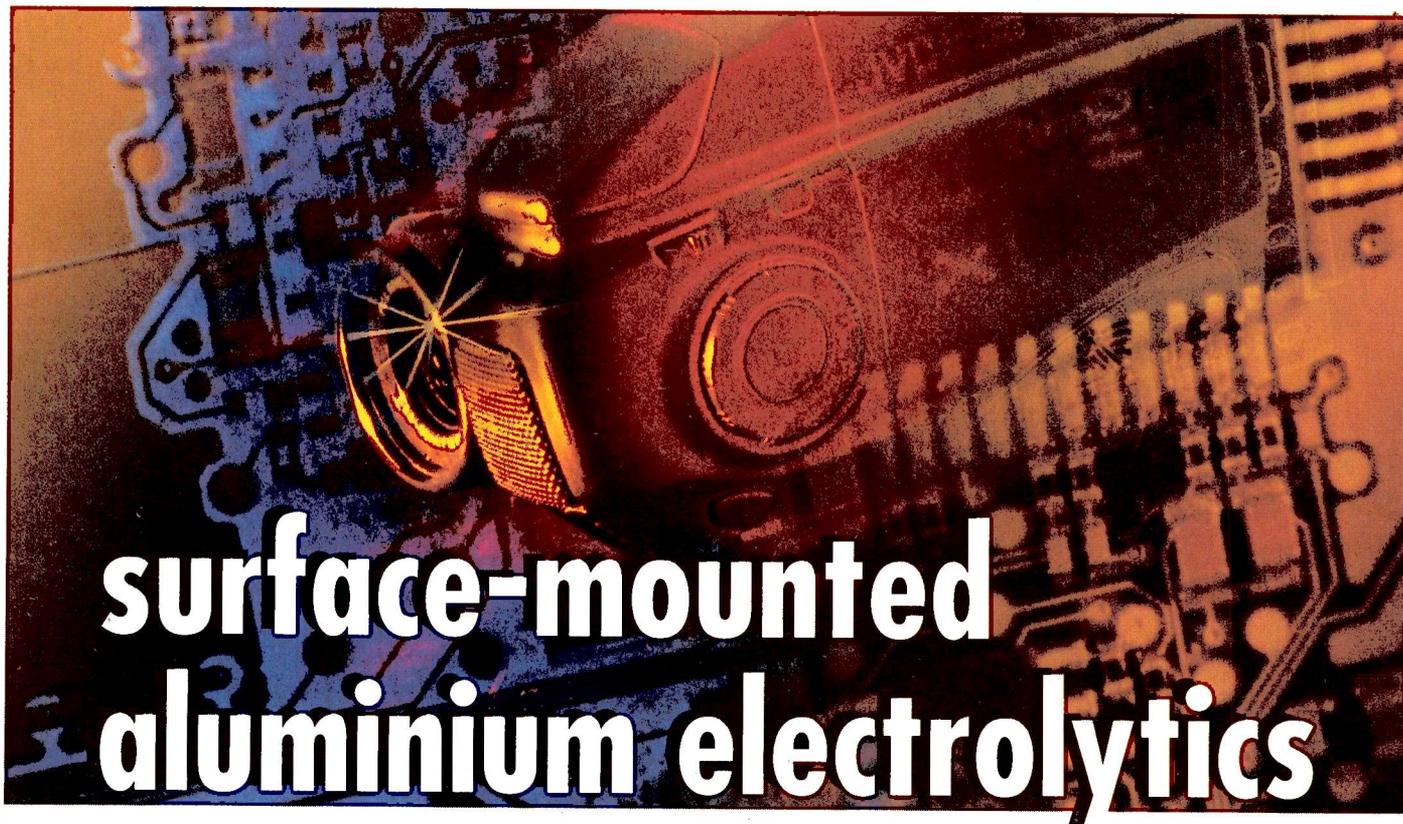
This versatility makes life much easier for the installer. It can save a lot of time, especially as the connections are via the good old-fashioned single coaxial cable and a four-core cable for the motor and pulse reed-switch feeds. A ribbon cable is not required, and there is no need to resort to the silly new system – a unit that is powered by the LNB supply via the coaxial cable, with consequent loss of signal and the inability to look for what is out there between the preset satellites.

In General

The slap and backlash one gets when using an H-H mount with a dish in excess of 1m (or 80cm or less in some cases) is almost non-existent with Satwalker units even after four years of use.

I am left with one question. Why is the availability of the Satwalker so poor? Could it be that suppliers think only familiar-name products will sell? Some of the better-known and more expensive mounts are dreadful in comparison. Take my advice: shop around and find yourself a Satwalker 180° horizon-to-horizon mount. It will give you a really easy, maintenance-free installation – and silent nights!

Satwalker units can be purchased direct from Satellite Distribution Centre, 10 Addington Road, West Wickham BR4 9BS (0181 462 4849). A 180° Satwalker mount plus positioner retails at £159 including VAT. Discounts are available to trade customers.



surface-mounted aluminium electrolytics

The tiny surface-mounted electrolytics used in camcorders and some other equipment give rise to a lot of problems. **Nick Beer** explains the failure mechanisms and repair methods and provides guidance on fault-finding

The surface-mounted aluminium electrolytic capacitor is the cause of a lot of failures in certain types of equipment, in particular camcorders and also some VCRs. The capacitors fail when the equipment is a few years old, regardless of use during that period. Because these electrolytics will be used extensively throughout a particular piece of equipment, a multitude of symptoms may be present.

In this article we will look at brands, models and faults, also how to replace these troublesome devices and where to obtain them. Fig. 1 shows a typical board assembly using surface-mounted aluminium electrolytic capacitors.

Failure Patterns

Electrolytic capacitors are chemical devices that dry out, giving us much work and keeping us in our jobs! While a surface-mounted aluminium capacitor can dry out, what almost always happens is that the device leaks its electrolyte. There is thus loss of capacitance, and the device can well go open-circuit. As with most electrolytic capacitor failures, a surface-mounted type will often reform when heated, which can provide a useful clue when fault-finding.

Unfortunately the leakage can result in some nasty PCB damage. In camcorders, where minimal size and high component density are important, multilayer PCBs have for many years been used. Through-the-board links are used to provide connections between the layers, and are the first to suffer from this leakage. It's interesting that different camcorder models suffer differently in this respect, as we shall see later.

The usual situation is that a single symptom occurs

then others soon develop. You may well find that by the time the unit reaches you for repair there are symptoms in addition to the one originally complained about. Alternatively the camcorder may have worked perfectly when it was put away the previous summer, but when it was taken out on the day the owner was due to go on holiday a couple of faults were present. Guess who's got a couple of hours in which to carry out the repair?!

These devices can fail whatever their value, and in my opinion it's best to replace the lot when you come across one that has failed. But there are certain values that are guaranteed to fail before the others. Look for 10 μ F, 16V and 22 μ F, 6-3V capacitors: these always go first. Note that renewing all the surface-mounted aluminium electrolytics in a camcorder could mean that seventy or so have to be replaced. Even the most experienced practitioner is going to take a couple of hours to do that, so don't get caught out when you provide your estimate.

Clues

There is usually more than one symptom. They can vary with time, and may well clear. If you find that a unit which is more than a couple of years old uses surface-mounted electrolytics, they are probably faulty. Perhaps the most useful clue however is the smell.

Remove the covers and sniff around a board that uses the devices and is in the area where the fault has probably occurred. If there is no obviously obnoxious smell, look for a 10 μ F or 22 μ F capacitor and heat one leg. The likelihood is that the resultant smell, best described as ammonia like, will knock you back. There will also be a gentle hissing/crackling sound as the leakage boils.

All this is welcome to the engineer on the trail of a fault.

Repair

Let's make no pretence about it, the job is a smelly one. One of my colleagues reacts very badly to the smell, which makes him ill. With most people however the smell has a fairly neutral effect, but it is best to work in a well-ventilated area – the stuff can't be doing you any good!

Because of component density, capacitor replacement can be tricky. It is often necessary to remove several other components around a capacitor to enable the latter to be replaced. It's far better to do this than to risk damage to the PCB or other devices.

To remove a surface-mounted aluminium electrolytic capacitor, first use solder braid to mop up as much solder as possible from each of its legs. Then, to free one leg, heat it while tilting the capacitor away from the iron. Do the same to the other leg. Finally, mop the lands clean. Use miniature pliers or tweezers to manoeuvre the capacitors – if you try to use your fingers they will get burnt. A device designed for handling these capacitors was shown at the Sony Service Expo last year – it was a sort of pick-up pencil – but I am not sure about its availability. I think it was of Spanish origin. One of those small, four-pronged grab tools is also helpful.

Once the leaking capacitor has been removed, the board beneath should be cleaned thoroughly with a suitable solvent. Attend to any obvious corrosion, paying particular attention to any through-the-board links under or near the capacitor. If you are in any doubt as to whether a link may have been affected, link it out to be on the safe side. For those who are not familiar with through-the-board links, they appear as small dots or holes in the PCB, always in a print land of course. You can use an ohmmeter to check a link, by measuring the resistance between the relevant pads on each side of the board. Scrape the lacquer from the top and bottom pads if necessary.

Who Suffers?

Apart from the engineer, that is! My first encounter with the problem came with a now pretty ancient machine, the Sanyo VMD3P, which is riddled with these capacitors. Readers of the camcorder fault column will have seen references to this on several occasions. Anyway, here's a run down on the models with which we've had the problem. Individual capacitors for particular symptoms are not specified, because I feel that replacing capacitors one at a time is a mistake, inevitably leading to recalls.

Sanyo VMD3P: Symptoms include no picture in the cue/review/pause mode(s); no EVF picture; excessive dropouts (because the DOC video path has been interrupted); and others. A slightly perplexing fault is no mode motor movement because the supply ICP has failed – it does this when the supply's reservoir capacitor leaks. Thus a wide variety of symptoms may be present. This model suffers from corroded print and through-the-board links.

Sony CCD-F330/340/350/500: These camcorders are by no means identical but suffer equally from electrolytic capacitor problems. Typical symptoms include severely distorted playback luminance; very poor record chroma with bars of alternating phases; etc. The camera head suffers, with bars visible on E-E pictures –

apparently because of the CCD timing pulses. These models seem to escape serious corrosion problems.

Ferguson FC27 (amongst others): These horrible-looking units suffer from various symptoms, especially because of faults in the system control and camera head areas. Examples are no auto-focusing or power zoom. They are also particularly prone to corrosion problems.

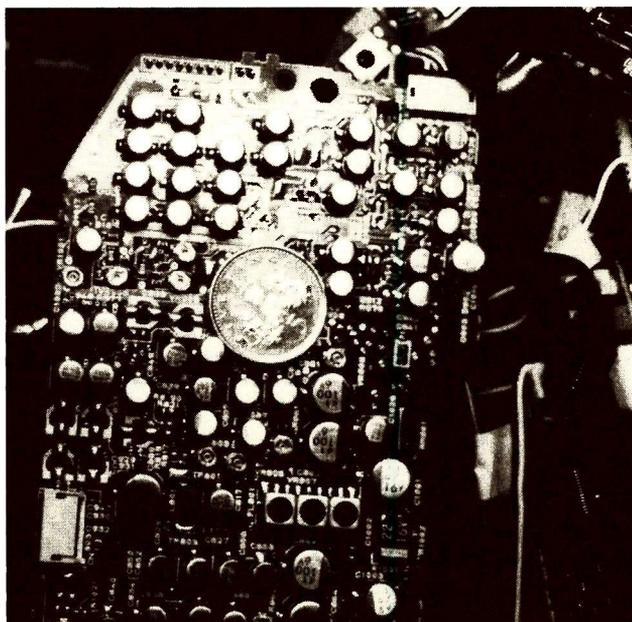
Canon A1/A2HiE: This range of camcorders was very popular with more serious users some years ago, having been given much praise in relevant magazines. Their rather unusual design makes them look more like stills than video cameras. The problem with servicing Canon products is that the company is not particularly helpful: Canon prefers to have its products returned for repair in its own workshops. Manuals cease to be available after a very short period of time, and are very expensive. As a result you often find that a customer has had difficulty getting his camcorder repaired – this could provide you with a business opportunity!

Once you get used to it, dismantling these units is fairly straightforward. The servo/motor drive PCB at the back of the mechanism gives rise to a lot of trouble, with drum and capstan rotation problems. There's a massive number of surface-mounted electrolytics on the audio board. Note that the mechanism has a Sony look about it and suffers from the same coaster and guide problems – and the Sony kits fit!

Canon UC10E: This odd little unit has a 10 μ F electrolytic on the thick-film PCB into which the imager plugs. This electrolytic leaks, and can be quite difficult to replace – because it is on a thick-film board and the solder doesn't melt easily. While you have the machine in for repair, check the tape path for loose guides – for alignment purposes the FM envelope waveform is available at the apparently unused connector on the main PCB. The head switching waveform is also available here.

Panasonic NVFS90B: This is not a camcorder – it's an S-VHS VCR. It is quite common for the S-mode luminance to be lost with the machine's own recordings. The cause of the fault is the thick-film hybrid module IC303. It is best to replace this module, but you will notice that

Fig. 1: Typical camcorder PCB with surface-mounted aluminium electrolytic capacitors.



it contains a couple of our beloved surface-mounted electrolytics – and I bet they are leaking!

It is interesting that Panasonic camcorders do not seem to suffer from the sorts of problems we've been discussing, though surface-mounted aluminium electrolytics are used in various models. Unless, that is, someone knows better!

Sources

It's sensible to obtain your capacitors from a wholesaler rather than a manufacturer. The reason for this is that you will be buying in bulk, especially if you repair more than one unit a month! RS Components and Farnell both have very good ranges available, at both 85°C and 105°C rating. The devices typically cost pence when obtained in packs of ten. You could pay around £1 a capacitor when you obtain them from a manufacturer.

Make sure that the physical size is the same when a capacitor is obtained from a wholesaler. It is tempting to go for 105°C types in place of 85°C ones (they may not leak!), but make sure they will fit. Similarly some originals will be rated at 6V, so you will need to order 6.3V types.

Some of the capacitors used by Sony and Canon have

odd values that cannot be obtained from a wholesaler. So you must obtain these from the manufacturer. Furthermore there are some slim-gauge capacitors in use, i.e. with standard values and voltages but with a much smaller diameter. The pads and component placing mean that standard-sized equivalents can't be fitted.

Try to obtain these slim-gauge capacitors from the manufacturer. Unfortunately this is not always possible. If you try to obtain them from Canon for the A2HiE for example you will be told that they are not available though a complete board can be supplied. To be fair, the PCB price is quite good – for a PCB, but not for six or so capacitors! You can get these devices from Sony however. The information in Table 1 may be helpful in this respect.

Table 1: Small-diameter (3mm) electrolytics

Value/rating	Sony part no.
10µF, 16V	112800411
22µF, 4V	112800311
3.3µF, 35V	112800811
0.47µF, 50V	116400591

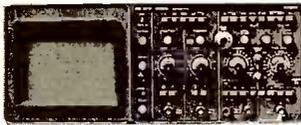
Table 2: RS surface-mounted aluminium electrolytics

85°C range				105°C range		
Voltage	Value (µF)	Stock no.	Case	Voltage	Value (µF)	Stock no.
6.3V	22	108-148	B	6.3V	22	108-390
	47	108-154	C		33	108-407
	100	108-160	C		47	108-413
10V	33	108-176	C	25V	22	108-457
	47	108-182	D		47	108-463
16V	10	108-198	B		4.7	108-479
	22	108-205	C		6.8	108-485
	47	108-211	D		10	108-491
25V	4.7	108-227	B	50V	22	108-508
	10	108-233	C		0.1	108-558
	22	108-249	D		0.22	108-564
	33	108-255	D		0.47	108-570
36V	3.3	108-261	B		0.68	108-586
	4.7	108-277	B		1	108-592
	10	108-283	C		2.2	108-609
	22	108-299	D		4.7	108-615
50V	0.1	108-306	B		10	108-621
	0.22	108-312	B			
	0.33	108-328	B			
	0.47	108-334	B			
	1	108-340	B			
	2.2	108-356	B			
	3.3	108-362	B			
	4.7	108-378	C			
10	108-384	D				

Case dimensions (mm)

Case	∅D	L	A	B	I	P	W	
	±0.5	+0.1 -0.2	±0.2	±0.2	±0.2	±0.2		∅D is case diameter, L height including legs, A width of base, B depth of base, I length of legs, P distance between legs, W width of legs.
B	4	5.4	4.3	4.3	1.8	1	0.5-0.8	
C	5	5.4	5.3	5.3	2.2	1.5	0.5-0.8	
D	6.3	5.4	6.6	6.6	2.4	2.2	0.5-0.8	

HOW DOES YOUR EQUIPMENT MEASURE UP? AT STEWART OF READING THERE'S ALWAYS SCOPE FOR IMPROVEMENT!



PHILIPS PM3217 (This is a proper scope)
Dual Trace 50MHz Delay Sweep Incl 2 Probes
£400



HC3502
Dual Trace 20MHz 5mV-20V/Div; 0.2 μ Secs - 0.5
Sec/Div. X-Y; X5 magnifier; TV Sync etc
Hardly Used £150 Un-used £200

THE CLASSIC TEKTRONIX 400 SERIES



46B Digital Storage Dual Trace 100MHz Delay £650
46B Analogue Storage Dual Trace 100MHz Delay £385
475 Dual Trace 200MHz Delay Sweep £500
46S Dual Trace 100MHz Delay Sweep £400

FLUKE PM3082 2+2Ch 100MHz Delay TB Cursors £1200
PHILIPS PM3295A Dual Trace 400MHz Dual TB Delay Cursors IEEE £1750
TEKTRONIX 2456A 4 Trace 350MHz Delay Cursors etc £2500
TEKTRONIX T4565 Dual Trace 100MHz Delay Cursors £800
TEKTRONIX 2215 Dual Trace 60MHz Delay Sweep £400
PHILIPS 3055 2+1 Ch 50MHz Dual TB/Delay £475
PHILIPS PM399 Dual Trace 50MHz SCOPEMETER Dig Storage £600
GUILD DS1100 Dual Trace 20MHz £200 HiH Delay £240
GUILD DS300 Dual Trace 20MHz £200

AND REMEMBER ALL OUR EQUIPMENT IS TESTED PROPERLY!



MARCONI 2019A Syn AM/FM Signal Gen 80KHz-1040MHz £1800
MARCONI 2019 Syn AM/FM Signal Gen 80KHz-1040MHz £900
MARCONI 2018 Syn AM/FM Signal Gen 80KHz-520MHz £800
MARCONI 2017 AM/FM Signal Gen 10KHz-1024MHz £1750



FARNELL SSC320 Syn AM/FM Signal Gen 100Hz-520MHz £325
FARNELL PSC320 Syn AM/FM Signal Gen 100Hz-520MHz Portable £450
MARCONI 6311 Programmable Sweep 10MHz-20GHz £4500
MARCONI 20226 AM/FM Signal Gen 100Hz-1GHz £2000
R.P. 8556A Syn Signal Gen 0.1-999MHz £1500
R.P. 8540B Phasemod Syn Sig Gen 500Hz-512MHz £1750
R.P. 8640A AM/FM Signal Gen 500Hz-1024MHz £850
PHILIPS PM5193 Programmable Syn Func Gen 0.1MHz-50MHz £1500
PHILIPS PM5192 Programmable Syn Func Gen 0.1MHz-20MHz £1800
R.P. 3325A Syn Function Gen 21MHz £1750
PHILIPS PM5134 Sweep Func Gen 0.001Hz-20MHz Sine/Sq/Tri etc £400
PHILIPS PM5132 Sweep Func Gen 0.1Hz-2MHz Sine/Sq/Tri etc £250



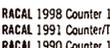
CLASSIC AV08 Mk5 in Case
with Batteries & Leads £50



FLUKE 770MM 3 1/2 digit w/
Carrying Case & Leads £60



RACAL COUNTERS
9918 10Hz-560MHz £125
9916 10Hz-520MHz £150
9904 DC-50MHz £60

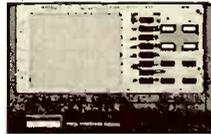


RACAL 1998 Counter 1.3GHz £650
RACAL 1991 Counter/Timer 160MHz £450
RACAL 1990 Counter 120MHz £300



SOLARTRON 7151 DMM 6 1/2 digit IEEE £450
SOLARTRON 7150 DMM 6 1/2 digit IEEE £300
True RMS

LOOK!
BRAND NEW OSCILLOSCOPES!
NEVER USED!! LIMITED STOCK!!



DMS 3850A Digital Storage/DMM
Handheld LCD display 2 Channel 50MS/S. Auto Range.
4 digit DMM/Capacitance/Frequency Counter. Battery
Operation or external 7.5-9VDC i.e. AC Adaptor (Not supplied).
RS232 Comes in Black Carrying Pouch complete
with 2 scope probes; DMM leads; manual.
New Boxed For Only £400



DTS 40 Digital Storage
Dual Trace 40MHz. 20MS/S Storage. Cursors + On Screen
Readout. Sweep Delay; Interface etc. etc. Supplied Unused
in original box complete with 2 Probes & Manual.
Amazing Value at £400



DTA 20/40/60 Dual Trace
with All Magnification; TV Trig etc. etc. Lots of Specification.
DTA20 Dual Trace 20MHz: £225
DTA40 Dual Trace 40MHz - 12KV EHT: £300
DTA60 Dual Trace 60MHz - 12KV EHT: £375
All unused & boxed supplied with 2 probes & Manual



DTV 100 3 Channel 100MHz Sweep Delay etc: £425
DTV 60 3 Channel 60MHz Sweep Delay etc: £375
DTV 20 Dual Trace 20 MHz: £200
All unused, boxed with 2 probes & manual

NEW AND HARDLY USED



PANASONIC VP8177A FM/AM SIGNAL GENERATOR
100KHz-100MHz; FM 0-100KHz; Output -19dB-99dB AM
0-60%; 32 Preset Memory; Digital Display Frequency &
Output.

Used £450 Un-used £750

PANASONIC VP7637A STEREO SIGNAL GENERATOR
Generates Broadcast FM-RDS/ARI. Preset memory; GPIB
Used £400 Un-used £700



KENWOOD FL180A WOW/FLUTTER METER 0.003%-10%; Freq
3KHz-3.15KHz RMS/AVERAGE/
PEAK; Weighted Filters; Digital
Display of rpm; 4 digit Freq
Counter (0.01KHz-9.999KHz/
0.01KHz-55KHz)
Used £400 Un-used £500



POWER SUPPLY Model HSP3010
0-30Volts; 0-10 Amps Current
Limiting; 2 Meters.
Used £160 Un-used £200



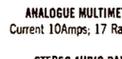
GOODWILL GV1427 DUAL CHANNEL AC MILLIVOLTMETER
10 μ V 300V in 12 Ranges
Frequency 10Hz-1MHz
Used £100 Un-used £125



GOODWILL GAG-808G AUDIO GENERATOR Sine/Square
10Hz-1MHz in 5 Ranges 0.1%
Low Distortion 5 Steps Output
Attenuator Un-used £80



GOODWILL GFC 8010G FREQUENCY COUNTER Range 1Hz-120MHz 8
Digit Display 15mV RMS Sensitivity
Un-used £75



ANALOGUE MULTIMETER Model HC260TR AC/DC Volts; DC
Current 10Amps; 17 Ranges; Continuity Buzzer; Transistor Tester
Un-used £15

STEREO AUDIO BALANCE TO UNBALANCED CONVERTOR
ie For Car Radio Servicing Un-used £20

Used Equipment - GUARANTEED. Manuals supplied.

This is a VERY SMALL SAMPLE OF STOCK. SAE or Telephone for lists. Please check availability before ordering.
CARRIAGE all units £16. VAT to be added to Total of Goods and Carriage.



STEWART of READING
110 WYKEHAM ROAD, READING, BERKS. RG6 1PL
Telephone: (0118) 9268041. Fax: (0118) 9351696
Callers Welcome 9am-5.30pm Monday to Friday (other times by arrangement)



DO YOU OFFER A RADIO DECODING SERVICE TO YOUR CUSTOMERS?

If not, you could be losing out on a very lucrative additional source of income - especially if you already service car audio equipment.

The Joule A-400 radio decoding system has now proven itself as the most cost effective solution to all your decoding requirements. This CE approved, easy to use computer based system is now being sold overseas to Service Departments and Police Forces. It can now be supplied with the software to decode most of the latest RDS radios that contain their security codes within the main processor chip, as well as the more familiar eeprom based models.

Purchase the Starter Kit which includes bundled software to decode over 100 models for £375.00 + vat (additional software is available separately). Or, the Index Reader version which includes ALL available software for £275.00 + vat and covering literally hundreds of models (codes are supplied by phone or fax and cost £5.00 each or £10.00 for the Blaupunkt RDS models). You may also opt for a combination of the two systems tailored to suit exactly your requirements which can lead to even more profitability.

Contact us now for a free brochure and demonstration disk (please state 3.5" or 5.25"), or visit our Internet Web Site at <http://www.elecsys.com>. You can download info, price lists and demo software from this site.

Electronic Sound Systems

Hilton Road, Aycliffe Industrial Estate
Newton Aycliffe, Co. Durham DL5 6EN
United Kingdom

Tel: 44(0)1325 307442 Fax: +44(0)1325 300189

Email: elecsys@elecsys.demon.co.uk

What a Life!

A fuse-blowing video recorder and mysterious phone calls are amongst the things that plagued Donald Bullock this month

This autumn Steven and Paul spent about ten days enlarging the workshop. Steven's girlfriend Jeanne felt sufficiently encouraged to tidy up some of their long-standing mud-dles. I returned from Spain to witness the result, which was so heart-warming that I offered to open up next day while they went tench fishing in the lovely Walham water.

On the following day I awoke to a soft and sunny morning and later found myself humming happily as I unlocked the shop door and breathed the scent of newly-worked wood and Mansion polish. Then the phone rang.

I picked it up. No one there. So I pulled the first job on to the bench.

Videos

It was an Hinari VXL8 video recorder which was dead. I opened it up and soon found that the 1-25A fuse Z601 had blown. A replacement brought the machine back to life, and I put it on soak test to see whether the fuse would blow again.

Then the phone rang. I picked it up but there was nobody there.

The next job was a JVC camcorder, Model GRA2E. On the job card it said "mine" and "dead" in Steven's scrawly writing. When it was switched on the 'on' light lit for half a second then died. So I opened it up and made for the crop of half a dozen so-called circuit protectors that are to be found close to the DC input socket. CP6 was open-circuit, for no apparent reason, and a new one seemed to cure the trouble. The circuit boards in this model are very thin, so I took care when removing the PCB plugs and sockets.

As I was reassembling the unit I managed to flick a screw along the bench. It rolled past the telephone and on to the floor. When I bent down to retrieve it the phone suddenly rang in my ear, which was about an inch above it. I snatched the handset and put it to my other ear, which wasn't throbbing – yet. Nobody there.

Vivian

Next thing Vivian Dunby mooched in, looking as though she'd just been poleaxed.

"What's up, Vi?" I asked.

"Well me 'usband's run off again and me daughter's gone off to Jamaica with a chap old enough to be me father. And me canary's died an' the cat's got the mumps. And now this sod's playin' up." She held up an Amstrad VCR6000 video

recorder. "He won't give me me tape back" she moaned.

Then the phone rang. I picked it up. Nobody there.

"Give me an hour" I said to Vi as I waved her out.

I tried to eject the tape, but the flap wouldn't open. When I dismantled the machine I found that the little lug at the flap's left side had broken off. As a result, the sweeping pin couldn't locate and raise it. I tried all ways to glue it back on, without success. So I got a bit of Perspex and succeeded in welding it in place.

This cured the flap problem but the picture was awful. All was well once the heads had been cleaned.

When Vi returned I handed her the recorder. "It's not all gloom" I said.

"Me 'usband's come back" she replied.

"Oh . . . er . . . never mind" I said.

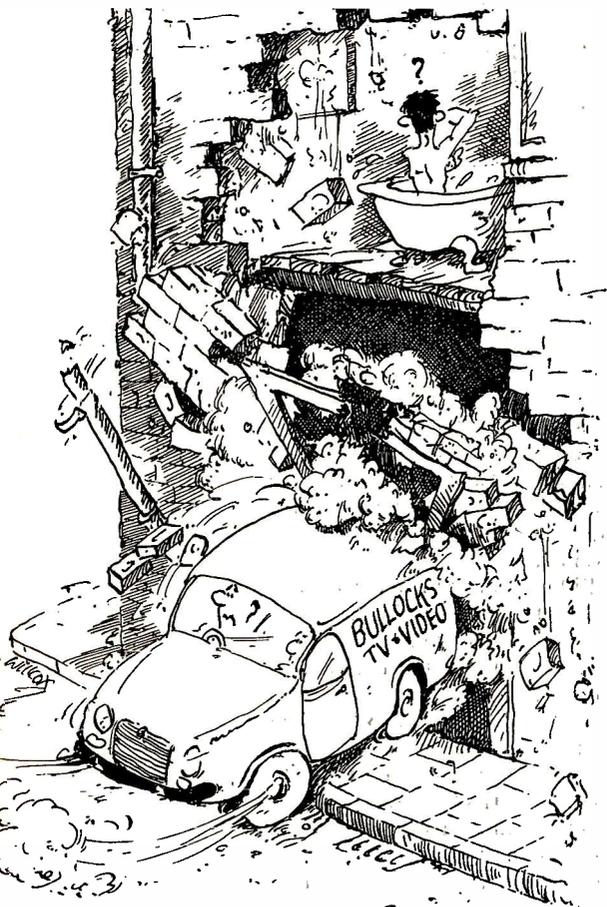
Then the telephone rang. I picked it up. Nobody there.

Ping

As I stood there, puzzled, I heard a ping from the soak-testing Hinari VCR. It was now dead. So I opened it up again. A lengthy examination failed to reveal anything obviously amiss, and none of the components seemed to be unduly warm. I pressed the plugs and sockets home and fancied that one was a little loose. Could that have been the cause of the trouble? I reassembled the machine and put it back on soak test.

Spry Sydney

At this point Spry Sydney strutted in looking, as always, as if his jacket was still wearing its coathanger. A while ago he bought a hotel and installed an Huanya 14in. colour set in every room – twenty four of them in all. Those that didn't sim-



Steven and Paul enlarging the workshop.

ply walk gradually developed a loud 150Hz note to accompany the sound.

Our remedy has been to replace the STR4211 chopper chip IC901 and the 27V zener diode ZD907. This one was the same, and I gave it identical treatment.

"How many of these do you still have, Syd?" I asked.

"Only five" he replied. Then a thought struck him. "Eh, could you take the handles off them?"

"Sure can Syd" I said. "You should have asked at the outset and got a quantity discount."

The phone rang and I picked it up. Nobody there.

The Shop Steward

Who should come in next but Len Grunt. He's a local shop steward and had with him an old Matsui 1455 portable. After thumping it on the bench he stood facing me with his right index finger poised over his left hand – as though he was about to write down a speech.

"Missus put 'im on. OK. Next day I puts 'im on. OK. Yesurday wife's brother calls in. Puts 'im on. Dead!"

He put his hands aside and addressed Steven. "Always was the trouble, wife's brother. Won't join no union. Never would!"

Steven opened the set and switched it on. The chopper circuit was dormant. We didn't have the circuit diagram, but he drew my attention to the 2SD820 chopper transistor Q604. The transistor and its heatsink were quite warm.

"Can you take over?" he asked. "I'm off to see the vicar about getting married."

"Struth!" I said.

When he'd gone I decided to look for shorts on the secondary side of the power supply. The HT rectifier D607 read short-circuit both ways, so I replaced it. This made no difference. When I checked the new diode I once more obtained a short-circuit reading. At this I retested the original diode, which was all right. Further checks revealed that one of the protection capacitors in parallel with D607 was the culprit. The offending item was C613 (4.7nF, 1kV). I should have checked D607 out of circuit if course. A thorough approach is essential when fault finding.

A Reply at Last

As I was reassembling the Matsui set the phone rang again. I picked it up.

"Bullocks" I screamed.

"Ooh. I owp yoo can 'elp me"

said a voice, "or are you just the old man?"

"Never you mind that" I said, "this is the boss."

"Oh well" croaked the voice, "you'll 'ave to do. Right now I'm needing a camcorder, so I'm asking you which is the best?"

"Well, if it's any recommendation Steven's got a JVC" I said.

"Does Argos sell JVCs?" asked the cracked voice. "Do you happen to have their latest catalogue there?"

"Of course I have" I replied, oozing kindness. "I keep it specially for enquiries like yours. If I could trouble you to hang on for a second I'll look into the camcorder section. If they've got what you want I'll shut the shop and nip along and buy it for you. I think I can afford it, and they are only three miles down the road. May I ring you back?"

As I put the phone down I noticed that the Hinari VCR had failed again. Fuse Z601 was once more open-circuit, and I spent an hour trying to find out why. Eventually I resorted to resoldering every joint in the power supply. Then I boxed it up again and put it back on soak test.

The phone rang. I picked it up. No one there. I slammed it down and picked up the next job.

Hikona Portable

It was an Hikona RM2000, which is a 14in. colour portable made in Turkey. The set was dead and groaning, and it had my sympathy. I noticed a 10µF, 250V electrolytic – C320 – and hooked it out for testing. You know my suspicion and prejudice about electrolytics. I was right – it was open-circuit. When I'd fitted a replacement a picture of a harem scene came up. As the sheikh galloped in, the set died again.

After a further bout of diagnostic effort I discovered that one end of the 47Ω, 5W wirewound resistor R505 was dry-jointed. I cleaned it off and resoldered it. When I switched the set on again I was just in time to see the sheikh galloping off into the sunset.

The Hinari's Secret

As I boxed up the Hikona set I heard a ping from the fuse in the soak testing Hinari VXL8. This time I plugged in the bench light magnifier then studied and carefully tapped every inch of the chassis and the panels in the machine. I eventually came to the capstan drive chip IC206. When I moved it the fuse blew.

Homing in on its pins I found that one of them, while looking as if it was perfectly soldered to the blob, was ringed by a very fine crack. I resoldered it and once again put the machine on an extended soak test. This time it was all right.

Ribby Ellis

Then Ribby Ellis, the telephone engineer, came in – grinning as usual.

"Who's that looking over your shoulder, Don?" he enquired.

I turned round and there was nobody there of course.

"Oh it's all right. It's your ears" he bawled, shaking with mirth.

"What's your trouble?" I asked, "apart from the fact that you're a prat."

"This 'un" he said, holding up a 14in. Philips portable, Model 14CT2006 (CTX chassis). "Picture gradually goes dark – sound's OK though."

I opened it up and studied the panel area beneath the line output transformer. The transformer's pins were dry-jointed. So I resoldered them, boxed the set up and gave it back to him.

"Ribby" I said, you've not inflicted any of your silly practical jokes on me of late. So I'm going to show my appreciation. Have this one on me."

"Gosh Don, that's good of you" he said. "Makes me feel guilty about playing you up all day."

I looked at him and he pointed to the phone.

"You?" I exclaimed.

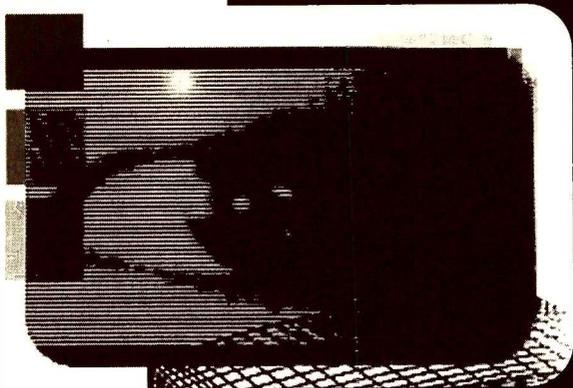
He nodded. "I'm working over the road" he said.

"Clear off" I hissed, "you ought to be birched!"

Getting Around

Television certainly gets around. It's always a pleasure to hear from fellow sufferers in this trade. Recently I received a letter from Bill Challoner, a lad of 84, formerly of Southport but now living at 5 Erica Street, Geraldton, Western Australia.

Bill was originally a cinema projectionist. He studied TV servicing when Australian outdoor cinemas became extinct, and managed to make a living from it. Now ill, he's just undergone surgery. Bill reckons that reading in *Television* about the slings and arrows we suffer brightens his day. His letter certainly brightened mine. I know that he would be interested to hear directly from other readers who have tales to tell.



Reports from
Philip Blundell, AMIEEIE
Stephen Leatherbarrow
Robert Marshall
Chris Watton
Brian Storm
Michael Dranfield
Mike Orr, Owen Green
Maurice Kerry
John C. Priest and
Nick Beer

Philips 25ML8300/05B (FL1.7AA Chassis)

There was no sync – the field and line scans could be seen slipping slowly through. A scope check at pin 5 of IC7400 showed that the sync signal from the high-end box (where 100Hz scanning conversion takes place) was missing, though it was present at pin 6 of ribbon cable H/S20. There was a crack in the print where the track runs along the edge of the board. When this had been bridged however the fault had hardly changed. R3228 in the high-end box was misadjusted.

Incidentally your eyes are not deceiving you when you look at the circuit diagram: yes, there are two TDA2579B chips in this set! **P.B.**

Grundig GT2101 (G1000 Chassis)

Loss of one colour has become a common problem with these sets lately. So far we have had two causes: either the 330Ω emitter bias resistors (R903, R908 or R913) for the RGB output transistors on the CRT base panel, or the BC847 RGB emitter-follower transistors (TR801/2/3) on the main panel. The resistors go open-circuit while the transistors develop base-emitter leakage.

There's a trap for the unwary. Because of its auto grey-scale action, the video processor chip IC800 will probably be producing a greater output in the channel affect-

TV Fault Finding

ed than in the other two. So in the case of an open-circuit 330Ω resistor the faulty channel is the one with the largest signal on the main board! **P.B.**

Sharp DV5935H (BCTV-A Chassis)

The 2SD1546 line output transistor Q600 was short-circuit in one of these sets. As I was removing it I noticed that R619 (39Ω, 0.5W) and R632 (39Ω, 0.5W fusible) in the line scan circuit were both burnt. The 0.56μF line scan coupling capacitor C607 was open-circuit. Normal operation was restored when these four items had been replaced, using components obtained from Sharp. **P.B.**

Philips CP90 and CP110 Chassis

Problems in the IF department are becoming more common as these sets age. The IF/sync module is meant to be replaced rather than repaired, but the price of the module is prohibitive. Probably the most common symptoms are ringing on the picture, with herringbone patterning and loss of teletext. In this case coil L5082 is usually the culprit. I have not so far been able to find a source of replacement coils, and instead rob them from old modules. **P.B.**

Hitachi C2114R

If one of these sets keeps reverting to standby, check that the 112V HT supply is correct – measure it at the cathode of D951. If the voltage is high, suspect that R951 (39kΩ, 0.5W 5%) has risen in value. In one set I had in recently the high voltages had killed the TA8427K field output chip IC601. **P.B.**

Child Lock

A **Tatung Model TU2C52** was stuck on ch. 1 and there was no

control of the analogue functions, either via the on-board controls or by remote control. Before you suspect the microcontroller chip or an EEPROM problem, don't forget the child lock. The set proved to be in this lock-out mode. To return to normal operation, hold in the programme + button whilst switching the set on.

While on this subject, with **Ferguson ICC5** series sets you use the Fasttext keys to remove the child lock: press red, green and blue and hold yellow until successful (usually after a few seconds). **S.L.**

Philips K40 Chassis

This set was dead with the line output stage screaming to be put out of its misery. When the supply to the line output stage was disconnected, the HT voltage returned to normal. The BU508A line output transistor T7162 turned out to be leaky. A replacement didn't alter the symptoms however.

When I disconnected the scan coils there was EHT, sound and the tube's heaters lit up. With some relief, I fitted a replacement scan yoke. Sadly, this didn't cure the basic fault.

I eventually found that someone had fitted two 47kΩ, 1W resistors in parallel in the feed to the line driver transistor. As there should be a 680Ω resistor in this position, the supply was insufficient. For those who are not aware of it, the line driver stage is actually on the power supply board which is mounted centrally beneath the neck of the CRT. **S.L.**

Sony KVM1421 (BE2A Chassis)

This set, the teletext version of the KVM1420, was stuck in standby. Only the standby light could be seen, though the power supply was

working. A tap on the teletext board would sometimes get the set to start up, but resoldering the power transistors Q01-03 on this board didn't provide a lasting repair.

In desperation I removed the chip transistor Q02 and reconnected it using wires. This enabled the set to work. So did refitting Q02 slightly off the board. The transistor's mounting seemed to have been the cause of the trouble. **R.M.**

Boots CTV1417R

This 14in. portable had a burnt out resistor (R306 – 10 Ω , 0.5W safety) in the supply to the field output stage. But a replacement resistor wasn't all that was required. R234 was unrecognisable (should be 39 Ω , 1W) because its neighbour D212 (12V zener diode) was short-circuit. When I looked for a common cause of all this I found that C609 (47 μ F) in the power supply was low in value and leaky. It lay between two power resistors. I fitted a 105 $^{\circ}$ C type as a replacement, with sleeving on the full length of its leads to keep it away from the heat. **R.M.**

Philips G90AE Chassis

This set produced a strange picture – only part of it could be seen. The sound was OK. There was a pulsing white line at the top of the display, which was rolling and pulled into a contorted triangle with jagged parts at the bottom. Thankfully replacing the TDA2579 timebase generator chip IC7470 restored normal pictures. **R.M.**

Sony KVM1421 (BE2A Chassis)

This set was stuck in standby – the only thing you could watch was the standby light! The power supply was working, and as no obvious fault could be found I ordered a new ST24C02CP memory chip (IC001) from Sony. When this had been fitted all I had to do was to tune in the channels. **R.M.**

Philips 25PT4101 (AA5 AB Chassis)

The LEDs were pulsing: the timing of their flashes gives an indication of the cause of the fault. On this occasion they were flashing on and off for three seconds, which means that there is an EEPROM error. But a new ST24C02A chip made no difference. I then found that the LM317T regulator had no output and replaced it. The set still didn't work, because there was a hairline

crack at pin 1 of the line output transformer.

Service manual 727 20783 for the AA5 AB chassis should have attached to it 727 20875 for the AA5 95.01 colour TV. This supplement is essential. **R.M.**

Loewe Concept 55/63/70

This set, which had been brought into the UK from the Netherlands, was dead. I found that the BD139 line driver transistor T525 was leaky. As a result, the 3.3 Ω safety resistor in the 27V supply was open-circuit. This supply is also protected by R666, an 0.22 Ω safety resistor. **R.M.**

JVC AV25F1

A line across the screen with no sound is what you get when regulators IC521 and IC522 become dry-jointed at the same time. **R.M.**

Samsung CI213R

These 10in. portables seem to be more reliable than the similar Akura type. But this one was intermittently dead. The cause was eventually traced to the mains bridge rectifier going open-circuit. **C.W.**

Hitachi G6P Chassis

I've had quite a few of these sets that would sometimes fail to start because the values of the 82k Ω start-up resistors R902 and R903 had changed. So I now replace them without bothering to check their values. With one set recently however this failed to cure the fault. C905 (4.7 μ F, 160V) was open-circuit. A replacement restored good starting every time. **C.W.**

Nokia 6354

The symptoms with this Nicam set were an intermittent crackle and intermittent loss of sound, both affecting the right-hand channel. Good signals were present at pins 28 and 29 of the DACM chip NA10, but not so good at pin 9 of the TDA2615 audio output chip NA90. I found that the surface-mounted BC858B transistor VA80 was noisy. A replacement cured both faults. **C.W.**

Hitachi CPT2178 (G6P Chassis)

This set didn't start up every time. Sometimes it would come on with a blank raster, and at other times it would come on with a two inch band of dots across the centre of the screen and no picture.

Occasionally it would come on all right. It took me some time to trace the cause of these symptoms. The culprit turned out to be the 2.2 μ F, 50V non-polarised electrolytic capacitor C911 in the power supply. **C.W.**

Nokia 5864 (Monoplug Chassis)

With the HT voltage set correctly, at 109V, the raster just met the edges of the screen. Consequently the customer complained that with some pictures there was lack of width. The cause of the fault was coil LK11, which is in series with the line scan coils. It was quite hot when the set was in operation, and I presume that it had shorted turns.

To set the HT voltage with these receivers you short-circuit test point XF01 to chassis, enter the service mode by pressing Mute, M and TV on the remote control unit, move up and down the service options then use the volume control for adjustment. Measure the HT voltage at point X003. **C.W.**

Grundig CUC4635 Chassis

After replacing the tripler I found that there was no picture. Checks on the I2C bus lines showed that while the clock line pulse level was correct the data line pulse level was low. After some time I found that the cause of the problem was in the Nicam module, where a short was present in the MC144130 chip IC2250. A replacement restored all functions, but the customer was a bit shocked at the cost of the tripler and IC. **C.W.**

Toshiba 2539DB

The customer said that this set was dead. In fact it was tripping very quickly and the standby LED was flashing. Transistor Q841 (2SA1015) in the power supply was faulty. **C.W.**

Ferguson TX100 Chassis

This set took about five minutes to come on – the HT would rise slowly to about 100V. The cause turned out to be the chopper drive coupling capacitor C117 (100 μ F). **C.W.**

Bush 2121

The picture was shifted to the left, with a black margin on the right, slight foldover on the left and a blanked stripe about 1cm from the right-hand edge of the raster. This stripe wriggled like a snake, in sympathy with the video content of the picture. The cause of the trou-

ble was failure of the line pulses from the output stage to reach the line oscillator chip. R419 (470k Ω) was open-circuit. C.W.

Panasonic Euro 1 Chassis

This digital chassis can be quite daunting when dead. But not this time: R628 (470k Ω) which feeds pin 5 of the TDA4601 chopper control chip IC611 was open-circuit. B.S.

Panasonic TX25AD1DP (Euro 2 Chassis)

This Dolby Pro-Logic receiver had a phosphor burn on its CRT. The cause was not immediately obvious. When it had been for some days on the soak test bench I happened to switch it to standby, using the remote control unit instead of the on/off switch. This provoked a display of lights of which Black-pool would have been proud, so I hastily unplugged the set.

It soon became apparent that when standby was selected the main power supplies remained active as the line and field scans decayed. Relay RL6101 on the front panel was sticking. A replacement (part number TSE10818) and a new CRT put matters right. Panasonic recommends replacing R668 on panel E as well as RL6101. B.S.

Panasonic TX29AD2DP (Euro 2 Chassis)

This Dolby Pro-Logic receiver produced a display with ragged verticals and picture break up. I suspected the digital video processor chip IC601. Fortunately a replacement, part number VDP3108APPA1, restored normal operation. B.S.

Hitachi NP6C Chassis

This set produced slightly distorted sound, as if the speaker was faulty. But a new speaker made no difference. The cause of the fault was eventually traced to a dry-joint at pin 10 of the HA11485NT video/sound chip. Pin 10 is part of the feedback circuit. M.Dr.

JVC CS2181EKT (BYX Chassis)

This set would come on in the AV mode. When TV was selected all the channels were tuned to the same programme. This situation occurs when the -30V supply to the memory chip on the tuning module falls below -26V. Try replacing the 2SA1015 transistor Q956 in the active ripple filter circuit, also this transistor's base decoupling capaci-

tor C959 (3.3 μ F, 50V) and the -30V reservoir capacitor C958 (33 μ F, 35V). In addition, replace the electrolytic capacitors C016 (10 μ F, 16V) and C017 (10 μ F, 50V) on the station selector module. These surface-mounted electrolytics can be obtained from Farnell Electronic Components, Leeds (01132 633 411). M.Dr.

Tatung 190 Chassis

These sets usually come in because they are dead, the cause being failure of one or both of the 15k Ω start-up resistors R802 and R803. If you fit ordinary carbon resistors, the set will be back before long. Obtain resistor pack part number 337-316 from Farnell Electronic Components (01132 633 411). It contains ten 0.75W metal-film resistors rated at 350V. Fit a couple of these resistors and you'll never see the set again.

If the chopper transistor is short-circuit, replace R811 (470k Ω) as well. Use Farnell part number 337-493. These resistors cost about 6p each. M.Dr.

Panasonic TX25MD1 (Euro 2 Chassis)

This set had no teletext. When it was put in the text mode it displayed only P100 and the word TEXT**** appeared in the station identification box. The cause of the fault was traced to an open-circuit capacitor, C3508, which is a surface-mounted 0.047 μ F component that feeds composite video to the teletext processor chip IC3502. M.O.

Mitsubishi CT29A4STX (Euro 12 Chassis)

This set produced a good picture – for just a few minutes. Then rows of vertical dots, about three inches apart, would appear. After that the picture would intermittently black out. I first checked the supply lines, which were all OK. I then checked the voltage at pin 21 of the colour decoder/timebase generator chip IC201. This is the blanking feed from the text board. In the picture mode the voltage here should be 0.2V. I found that it was changing from 0.5V to 0.8V. Q7705 (JC501Q, R) on the text panel was at fault. M.O.

BPL 9009KDR

This small portable is the same as the Sanyo CBP3001. There were lines superimposed on its picture: in addition and as a result the verticals were kinked and variable. The

lines were also visible when the set was displaying a blank raster in the AV mode. It seemed to be a decoupling fault. I traced the cause to C421 (1,000 μ F), which decouples IC201's supply pin 6. M.O.

ITT CT3537

Intermittently dead was the complaint with this set. When it was first switched on it would run for about half an hour. If you then switched off and on again the set was OK for a further period. These periods between switch off/ons gradually decreased to about one minute. The cause of the problem was a 5V regulator on the control panel, IC405. M.O.

Finlandia C59GZ7 (Salora M Chassis)

When this set was switched on from standby the status display was left blank, with no raster or sound. The 150V HT supply was low at about 20V. I replaced the S2000AF line output transistor TB525, as failure of this item is a common fault with these sets, but the fault was still present. Replacing DB525 (BYV95C) cured the fault – it's connected in series with TB525. O.G.

Dynatron CTV114 (Philips CP110 Chassis)

The cause of an irritating "on-off" flashing picture, with misleading symptoms as though there was a dry-joint, was traced to the 22 μ F, 250V HT reservoir capacitor C2670. I also replaced the HT smoothing capacitor C2621 (same value etc.) as its plastic insulating sleeve had shrunk. O.G.

Panasonic Z5 Chassis

At switch on the EHT came up then tripped off and the standby light kept flashing. Tests showed that the protection switch Q502/3 was being activated, cutting off the line drive. By shorting across C507 to disable the protection circuit the set was made to operate, with normal picture and sound. The voltage at the base of Q505 should be 7V: it was 5.2V, which is low enough to activate the protection switch. The cause of the trouble was R525 (300k Ω , 0.5W) which was open-circuit. When it had been replaced the set worked perfectly. M.K.

Hitachi C28P759 (Salora M Chassis)

This set would come on when the mains switch was operated and could then be put into the standby

mode using the remote control unit. The trouble was that the remote control unit wouldn't bring the set out of standby. A check on the voltage (SB5V) at pin 27 of the microcontroller chip IC01 showed that in the standby mode it was low at 2.7V. When not in standby it was correct at 5V. The SB5V supply is derived from the 10V supply, which in the standby mode was low at 4.6V. The relevant reservoir capacitor is CB622 (470 μ F, 16V) which had gone low in value. **M.K.**

Panasonic TX29AD1DPB (Euro 2 Chassis)

This set was tripping slowly with picture collapse. When plug W7002 was disconnected from the audio board the set came on with a picture but no sound. Checks in the power supply on the audio panel showed that it was dead, with the start-up resistors R7000 (150k Ω) and R7005 (180k Ω) open-circuit. The I2C bus was being loaded by the inactive chips on the sound panel – disconnecting W7002 removed this load, allowing the I2C bus in the rest of the set to work. Replacing R7000 and R7005 restored normal operation. **M.K.**

Aiko/Perdio 512

Excessive brightness with flyback lines is a common fault with these sets. The usual culprit is the reservoir capacitor for the first anode supply, C120 (2 μ F, 250V). It's as well to replace the associated rectifier as a precaution, though it rarely fails. **J.C.P.**

GoldStar C1990LT

This set refused to come out of standby. The relay would click, but there was no sound or picture and the CRT's heaters remained unlit. After a few minutes a slight, warm smell would be noticed. The chopper and line output transistors both measured OK, but the HT voltage was low at 60V instead of 115V. C8075 (33 μ F, 160V) was found to be hot. Fitting a replacement cured the fault. **J.C.P.**

Hitachi CPT2198 (G8Q Chassis)

When this set was switched to the text mode it displayed a blank grey raster with just P100 in the top left-hand corner. There was no further response to handset commands until the set was returned to the picture mode. As we had another similar set in the workshop, we were able to check the text PCB by swapping it over. It was OK.

PCB connector CN2101 was removed, cleaned and refitted to the main PCB. Its partner on the text PCB was resoldered. The print on the underside of the main PCB in the general area of CN2101 was examined with a magnifier and any suspect points were cleaned off and resoldered. When the set was reassembled it worked perfectly – after adjusting C2044 to remove character dropouts. **J.C.P.**

Salora M Chassis

There was lack of height but good linearity. A check showed that the software height adjustment was at maximum. I found that the 1 Ω current sensing resistor RB575 in the field output stage had gone high in value. It's in series with the field scan coils and forms part of the feedback circuit. This was a 110° set – the resistor's value is 1.54 Ω in 90° sets. **J.C.P.**

Sanyo CBP2560

The mains switch is a weak point with these sets. It's rarely a contact problem, usually a faulty latch/return spring. This means that the set will either not stay on after being switched on or won't switch off.

As a temporary measure if you don't have a replacement switch with you, withdraw the chassis, apply a small squirt of switch lubricant to the switch spring/shaft and flick the shaft in and out a couple of times. This should provide a cure – but get back as soon as possible with the correct replacement. **J.C.P.**

Goodmans C1401R

For intermittent loss of the picture, remove the screening cans from the IF module and look for dry-joints, especially at the miniature ceramic capacitors between transformer windings.

Faults caused by dry-jointed line output transformer pins are also common with these sets. You can get picture fade out because of loss of the CRT heater supply for example. **J.C.P.**

Goodmans 3375

This monstrous set was dead. The cause was an arcing joint at the chopper transformer pin that's connected to the chopper transistor. As has been my experience with these sets, there were plenty of other dry-joints that required attention. **N.B.**

Toshiba 217D9B

There was severe field distortion for the first hour or so. So there was obviously a faulty electrolytic

somewhere. It turned out to be C317 (2.2 μ F, 50V), which is in the linearity feedback loop. Violent field linearity variations occurred when I cooled and heated it. **N.B.**

Salora 22J20

There was very intermittent but severe width contraction with attendant EW correction problems. The cause was eventually traced to a dry-joint at L508. **N.B.**

Finlux 5810

This 10in. portable was dead. It would come out of standby then go straight back again, with the 11V supply doing the same. The cause of the trouble was failure of the 11V supply to reach the line output stage because of a microscopic break around the leg of L652 in the feed. **N.B.**

B and O LX2500/2800

For various intermittent faults related to going off then coming back on again, check for dry-joints around transistors 1TR1/2/3 on the microcontroller/tuner board at the bottom of the cabinet. **N.B.**



SPARES PROBLEMS?

WE HAVE THE ANSWERS!

Fast friendly and efficient service backed up by a huge range of spares for:

TV, Video, Monitor, Satellite, Audio, Microwave and CRTs plus tools, Test Equipment, Service Aids etc, etc.

Start solving your own problems now by asking for our free trade catalogue.

WIZARD DISTRIBUTORS



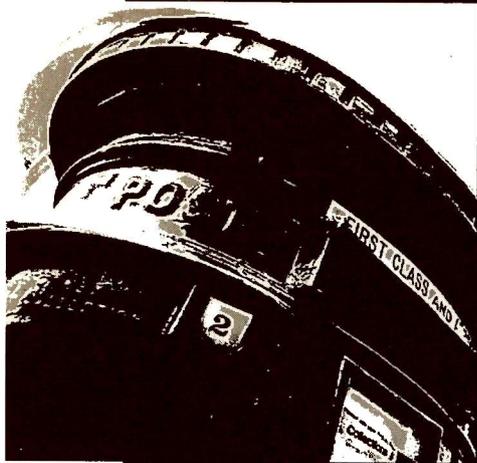


LOEWE.

**EMPRESS MILL, EMPRESS STREET,
MANCHESTER M16 9EN**
Tel: 0161 872 5438 and 0161 848 0060
Fax: 0161 873 7365

Main Distributor for





We welcome letters from our readers and try to publish as many as we can. You can send them typed, handwritten, or on disc. Address them to the Letters Editor, Room 1302, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

Camcorder Tapes

As I was experiencing occasional sound drop-out with my Sony CCD-F500E camcorder I decided that it was time I bought new tapes. So I purchased some from CPC, type 2PS-90MP. The results were now even worse, with tape judder – a scraping noise from the tape transport system – and of course severe picture break up and noise bars. Thinking that there might be a fault with the camcorder, I had it serviced by an advertiser in your columns. But after a lot of toing and froing, phone calls and a bill for £200 I was told that the tapes were faulty.

CPC was very helpful and agreed to replace them. When I used the new ones however the results were exactly the same – judder, noise etc. It seemed unlikely that this was a batch problem, as four months had elapsed between the supply of the original and the replacement 2PS-90MP tapes. I decided that it was time to phone Sony Customer Services, and was told that 2PS-90MP tapes are not suitable for use in the CCD-F500E camcorder. The correct type is 2PS-60SRB. The tapes I had originally used, for five years, were type P590HG.

Has anyone else had this problem? Why is type 2PS-90MP not suitable for use in the CCD-F500E? I can't get an explanation from Sony.

*L.E. Swain,
Buckden, Huntingdon.*

Letters

Two Wires or Three?

The letter from C.N. Cory last month under this heading raises an important issue. For some forty years TV receivers have been of safety Class II construction (IEC 65/BS 415/EN60065). The number of electric shock incidents from aerial terminals has been very low, even with older receivers that have a live chassis. These were fitted with 'aerial isolator units' which had to meet very stringent construction and quality requirements. Modern receivers have either a double-wound mains transformer (in small sets) or a switch-mode power supply with high-frequency transformer isolation of the mains supply from any accessible parts and connectors. There is no likelihood of a return to Class I construction (protection by earthing) partly because in other countries, such as Germany, there have been reported problems of aerial leads (for example) melting because of circulating currents when a system has more than one earth connection. Aerial systems have by law to be earthed in Germany and, although German TV sets are also of Class II construction, there may be a signal connection to earthed audio equipment or something else.

C.N. Cory's experiences are astonishing. While faults such as those he mentions are not entirely unknown, to come across two cases in two days must be an event of very small probability indeed. The second case indicates why the IEE Regulations (now BS 7671) disallow Class II for extended systems outside the home – though, as is common, the wording is very confusing.

These days most consumer electronic products have very little accessible metalwork. I suspect that the "child user's whole contact area" is a slight exaggeration. But this is not to minimise the seriousness of the incident. In fact both incidents should be fully investigated to determine in detail why such unusual failures occurred. Did the aerial isolator fail in the first case? Had the insulation of the degaussing coil been interfered with, or perhaps damaged by unskillful rein-

sertion of the chassis in the cabinet, in the second case? These isolation barriers are tested in production (each single product) with 3kV RMS or 4.25kV DC, and the materials have to be both durable and non-hygroscopic.

An allied matter was discussed recently by the BSI committee that's responsible for BS 415/EN60065. It is this committee's duty, not that of the BEAB or the IEE, to determine such matters. In this case it was decided to retain BS 5373:1997(1988) *Specification for electrical safety requirements for room aerials* and to reconfirm it in due course, on the grounds that, while it is considered unnecessary for aerials used with current receivers to include a second stage of isolation, room aerials are often used with older receivers. The BS has no European equivalent however, and its requirements cannot be used to remove non-compliant products from the market.

Although I am a member of the relevant BSI committee, the opinions expressed above are all mine alone.

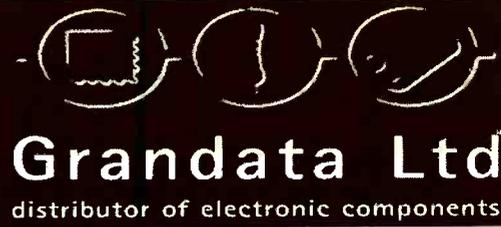
*John Woodgate, B.Sc(Eng.), C.Eng.,
M.I.E.E., M.A.E.S., F.Inst.S.C.E.,
Rayleigh, Essex.*

ITT Monoprint BNN Chassis

After reading Barry Gibbons' letter in the October issue following my suggested modification to this chassis in a fault report note (September) I couldn't rest, thinking that I had made an unnecessary design change. The fault had not returned, even after several months, but I've now checked C722 as Barry suggested. Its value was 320µF instead of 470µF, and its ESR was 2.5Ω. A new one produced an ESR reading of 0.5Ω and fitting it cured the fault, with R1427 restored to its original value. I also found that the supply ripple had been reduced by a factor of almost ten.

Thanks for the tip, Barry. The moral is to use a scope when DC readings don't make complete sense.

*Ray Porter, M.Sc., C.Eng., M.I.E.E.
Stourbridge, W. Midlands.*



TRANSISTORS/LINEAR ICs

Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price		
BC107	8p	BD434	30p	BU126	65p	BUV48AF	325p	MJ4502	300p	4N35	50p	LINEAR ICs	AN6340	600p	BA335	55p	BA7004	200p	
BC108	8p	BD435	31p	BU128	125p	BUV48C	250p	MJ10012	300p	RECTIFIER DIODES	AN203	210p	AN6341	200p	BA338	80p	BA7007	200p	
BC109	8p	BD436	30p	BU133	125p	BUV50	425p	MJ11015	250p	BY127	8p	AN210	165p	AN6344	440p	BA343	60p	BA7022	350p
BC109C	10p	BD437	28p	BU137	100p	BUV61	1000p	MJ11016	300p	BY133	8p	AN211	150p	AN6345	400p	BA336	175p	BA7025L	100p
BC140	20p	BD438	36p	BU180	100p	BUV70	200p	MJ11032	800p	BY179	35p	AN214Q	170p	AN6346	350p	BA401	60p	BA7107	475p
BC142	10p	BD439	40p	BU184	100p	BUV90	100p	MJ11033	800p	BY199	15p	AN217F	95p	AN6349	400p	BA402	50p	BA7212S	200p
BC143	20p	BD440	40p	BU204	65p	BUV93	175p	MJ11034	800p	BY228	280p	AN228	280p	AN6350	610p	BA405	80p	BA7225S	150p
BC147	8p	BD441	40p	BU205	70p	BUW11A	200p	MJ15004	300p	BY298	15p	AN252	150p	AN6352	450p	BA511	145p	BA7604N	100p
BC149	8p	BD533	50p	BU206	100p	BUW11AF	225p	MJ15005	250p	BY299	15p	AN259	250p	AN6356	600p	BA516	180p	BA7751LS	150p
BC150	30p	BD534	38p	BU207	150p	BUW12	125p	MJ15011	350p	BY348	32p	AN262	230p	AN6359	500p	BA521	150p	BA7755	250p
BC171	10p	BD536	38p	BU208A	75p	BUW12A	150p	MJ15022	250p	BY366	11p	AN271	140p	AN6360	320p	BA526	160p	BA7755S	150p
BC172	10p	BD537	40p	BU208AT	200p	BUW13A	200p	MJ15023	400p	BY377	19p	AN277B	400p	AN6362	400p	BA527	100p	BA7755S	150p
BC178	14p	BD538	40p	BU208B	200p	BUW13A2	500p	MJ15025	700p	BY411	25p	AN278	60p	AN6363	375p	BA528	240p	BA7755S	150p
BC179	14p	BD543	50p	BU209	150p	BUW48	55p	MJ15026	700p	BY418	25p	AN301	330p	AN6365	400p	BA529	160p	BA7755S	150p
BC182	7p	BD645	50p	BU209S	90p	BUW49	55p	MJ15027	400p	BY441	25p	AN302	600p	AN6367	480p	BA530	160p	BA7755S	150p
BC182L	7p	BD649	50p	BU225	120p	BUW50	400p	MJ15028	400p	BY448	25p	AN303	330p	AN6371	350p	BA532	100p	CA139A	750p
BC183	7p	BD675	50p	BU226	120p	BUW81A	150p	MJ15029	400p	BY448	25p	AN304	360p	AN6372	300p	BA534	220p	CX140E	38p
BC183L	7p	BD676	50p	BU312	90p	BUW84	75p	MJ15030	400p	BY448	25p	AN305	600p	AN6373	480p	BA534	220p	CX140E	38p
BC183L	7p	BD677	50p	BU325	55p	BUW85	80p	MJ15031	400p	BY448	25p	AN306	600p	AN6374	480p	BA534	220p	CX140E	38p
BC184	7p	BD678	50p	BU326	55p	BUX10	150p	MJ15032	400p	BY448	25p	AN307	600p	AN6375	480p	BA534	220p	CX140E	38p
BC184L	7p	BD679	50p	BU327	55p	BUX11	200p	MJ15033	400p	BY448	25p	AN308	600p	AN6376	480p	BA534	220p	CX140E	38p
BC212	7p	BD679	50p	BU328	55p	BUX12	150p	MJ15034	400p	BY448	25p	AN309	600p	AN6377	480p	BA534	220p	CX140E	38p
BC212L	7p	BD680	40p	BU329	55p	BUX13	220p	MJ15035	400p	BY448	25p	AN310	600p	AN6378	480p	BA534	220p	CX140E	38p
BC213	7p	BD681	45p	BU330	55p	BUX14	220p	MJ15036	400p	BY448	25p	AN311	600p	AN6379	480p	BA534	220p	CX140E	38p
BC213L	7p	BD682	45p	BU331	55p	BUX15	220p	MJ15037	400p	BY448	25p	AN312	600p	AN6380	480p	BA534	220p	CX140E	38p
BC214	7p	BD705	50p	BU332	55p	BUX16	220p	MJ15038	400p	BY448	25p	AN313	600p	AN6381	480p	BA534	220p	CX140E	38p
BC214L	7p	BD707	50p	BU333	55p	BUX17	220p	MJ15039	400p	BY448	25p	AN314	600p	AN6382	480p	BA534	220p	CX140E	38p
BC237	7p	BD709	50p	BU334	55p	BUX18	220p	MJ15040	400p	BY448	25p	AN315	600p	AN6383	480p	BA534	220p	CX140E	38p
BC238	7p	BD711	50p	BU335	55p	BUX19	220p	MJ15041	400p	BY448	25p	AN316	600p	AN6384	480p	BA534	220p	CX140E	38p
BC239	7p	BD712	50p	BU336	55p	BUX20	220p	MJ15042	400p	BY448	25p	AN317	600p	AN6385	480p	BA534	220p	CX140E	38p
BC300	20p	BD826	50p	BU337	55p	BUX21	220p	MJ15043	400p	BY448	25p	AN318	600p	AN6386	480p	BA534	220p	CX140E	38p
BC301	20p	BD828	50p	BU338	55p	BUX22	220p	MJ15044	400p	BY448	25p	AN319	600p	AN6387	480p	BA534	220p	CX140E	38p
BC302	20p	BD839	55p	BU339	55p	BUX23	220p	MJ15045	400p	BY448	25p	AN320	600p	AN6388	480p	BA534	220p	CX140E	38p
BC303	20p	BD839	55p	BU340	55p	BUX24	220p	MJ15046	400p	BY448	25p	AN321	600p	AN6389	480p	BA534	220p	CX140E	38p
BC304	25p	BD839	55p	BU341	55p	BUX25	220p	MJ15047	400p	BY448	25p	AN322	600p	AN6390	480p	BA534	220p	CX140E	38p
BC327	7p	BD837	50p	BU342	55p	BUX26	220p	MJ15048	400p	BY448	25p	AN323	600p	AN6391	480p	BA534	220p	CX140E	38p
BC328	7p	BDX33	60p	BU343	55p	BUX27	220p	MJ15049	400p	BY448	25p	AN324	600p	AN6392	480p	BA534	220p	CX140E	38p
BC330	7p	BDX37	100p	BU344	55p	BUX28	220p	MJ15050	400p	BY448	25p	AN325	600p	AN6393	480p	BA534	220p	CX140E	38p
BC338	7p	BDX44	100p	BU345	55p	BUX29	220p	MJ15051	400p	BY448	25p	AN326	600p	AN6394	480p	BA534	220p	CX140E	38p
BC441	28p	BDX47	60p	BU346	55p	BUX30	220p	MJ15052	400p	BY448	25p	AN327	600p	AN6395	480p	BA534	220p	CX140E	38p
BC446	8p	BDX54C	75p	BU347	55p	BUX31	220p	MJ15053	400p	BY448	25p	AN328	600p	AN6396	480p	BA534	220p	CX140E	38p
BC477	18p	BDX62C	150p	BU348	55p	BUX32	220p	MJ15054	400p	BY448	25p	AN329	600p	AN6397	480p	BA534	220p	CX140E	38p
BC516	22p	BDX63C	175p	BU349	55p	BUX33	220p	MJ15055	400p	BY448	25p	AN330	600p	AN6398	480p	BA534	220p	CX140E	38p
BC537	25p	BDX64C	175p	BU350	55p	BUX34	220p	MJ15056	400p	BY448	25p	AN331	600p	AN6399	480p	BA534	220p	CX140E	38p
BC546	8p	BDX65C	175p	BU351	55p	BUX35	220p	MJ15057	400p	BY448	25p	AN332	600p	AN6400	480p	BA534	220p	CX140E	38p
BC547	8p	BDX66C	175p	BU352	55p	BUX36	220p	MJ15058	400p	BY448	25p	AN333	600p	AN6401	480p	BA534	220p	CX140E	38p
BC548	8p	BDX67C	175p	BU353	55p	BUX37	220p	MJ15059	400p	BY448	25p	AN334	600p	AN6402	480p	BA534	220p	CX140E	38p
BC549	8p	BDX71	175p	BU354	55p	BUX38	220p	MJ15060	400p	BY448	25p	AN335	600p	AN6403	480p	BA534	220p	CX140E	38p
BC550	8p	BDX77	175p	BU355	55p	BUX39	220p	MJ15061	400p	BY448	25p	AN336	600p	AN6404	480p	BA534	220p	CX140E	38p
BC551	8p	BDX87C	175p	BU356	55p	BUX40	220p	MJ15062	400p	BY448	25p	AN337	600p	AN6405	480p	BA534	220p	CX140E	38p
BC552	8p	BDX88C	175p	BU357	55p	BUX41	220p	MJ15063	400p	BY448	25p	AN338	600p	AN6406	480p	BA534	220p	CX140E	38p
BC553	8p	BDW24	55p	BU358	55p	BUX42	220p	MJ15064	400p	BY448	25p	AN339	600p	AN6407	480p	BA534	220p	CX140E	38p
BC554	8p	BDW93	50p	BU359	55p	BUX43	220p	MJ15065	400p	BY448	25p	AN340	600p	AN6408	480p	BA534	220p	CX140E	38p
BC555	8p	BDW94	50p	BU360	55p	BUX44	220p	MJ15066	400p	BY448	25p	AN341	600p	AN6409	480p	BA534	220p	CX140E	38p
BC630	20p	BDY29	50p	BU361	55p	BUX45	220p	MJ15067	400p	BY448	25p	AN342	600p	AN6410	480p	BA534	220p	CX140E	38p
BC631	20p	BDY56	225p	BU362	55p	BUX46	220p	MJ15068	400p	BY448	25p	AN343	600p	AN6411	480p	BA534	220p	CX140E	38p
BC640	20p	BDY58	500p	BU363	55p	BUX47	220p	MJ15069	400p	BY448	25p	AN344	600p	AN6412	480p	BA534	220p	CX140E	38p
BCY33	200p	BDY90	125p	BU364	55p	BUX48	220p	MJ15070	400p	BY448	25p	AN345	600p	AN6413	480p	BA534	220p	CX140E	38p
BCY34	200p	BDY92	100p	BU365	55p	BUX49	220p	MJ15071	400p	BY448	25p	AN346	600p	AN6414	480p	BA534	220p	CX140E	38p
BCY70	16p	BF137	35p	BU366	55p	BUX50	220p	MJ15072	400p	BY448	25p	AN347	600p	AN6415	480p	BA534	220p	CX140E	38p
BCY71	16p	BF167	35p	BU367	55p	BUX51	220p	MJ15073	400p	BY448	25p	AN348	600p	AN6416	480p	BA534	220p	CX140E	38p
BCY72	16p	BF171	35p	BU368	55p	BUX52	220p	MJ15074	400p	BY448	25p	AN349	600p	AN6417	480p	BA534	220p	CX140E	38p
BD115	30p	BF183	20p	BU369	55p	BUX53	220p	MJ15075	400p	BY448	25p	AN350	600p	AN6418	480p	BA534	220p	CX140E	38p
BD124P	50p	BF195	7p	BU370	55p	BUX54	220p	MJ15076	400p	BY448	25p	AN351	600p	AN6419	480p	BA534	220p	CX140E	38p
BD131	25p	BF199	8p	BU371	55p	BUX55	220p	MJ15077	400p	BY448	25p	AN352	600p						

PLEASE PHONE US FOR TYPES NOT LISTED AS WE
 HAVE OVER 50,000 ITEMS IN STOCK.
 QUOTATIONS GIVEN FOR LARGE QUANTITIES

LINEAR ICs

Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price
HA13001	110p	LA2800	350p	LA7096	200p	LF353	48p	MC3302	50p	SAB3029	525p	STK3102 II	530p	STK6478	380p	STR16006	500p	TA7281	200p
HA13002	200p	LA3120	200p	LA7113	200p	LF355	60p	MC3401	45p	SAB3035	275p	STK3105	2500p	STK6479	300p	STR17008	500p	TA7282	160p
HA13006	400p	LA3150	200p	LA7116	125p	LF357	70p	MC3423P	100p	SAB3036	725p	STK3122 III	725p	STK6481	470p	STR20005	450p	TA7283	200p
HA13007	200p	LA3160	120p	LA7123	1300p	LF398	300p	MC3488AP	250p	SAB3037	700p	STK3152 II	900p	STK6482	285p	STR20012	450p	TA7284	200p
HA13108	280p	LA3161	40p	LA7210	60p	LH2426S	600p	MC34063AP	300p	SAB3042	825p	STK3156	500p	STK6483	440p	STR20015	450p	TA7285A	400p
HA13117	175p	LA3210	65p	LA7212	150p	LM301	26p	MN1220T	600p	SAB3064	130p	STK4017	400p	STK6486	450p	STR30110	330p	TA7288	220p
HA13118	140p	LA3226	60p	LA7214	150p	LM311	35p	MN1226	450p	SAB3209	225p	STK4019	480p	STK6487	525p	STR30115	275p	TA7291P	200p
HA13119	140p	LA3246	60p	LA7220	125p	LM319	165p	MN1228	80p	SAB3210	225p	STK4021	380p	STK6488	480p	STR30120	400p	TA7292P	325p
HA13127	350p	LA3300	140p	LA7222	110p	LM324	30p	MN1234	132p	SAB3211	112p	STK4022	450p	STK6489	450p	STR30123	450p	TA7294P	450p
HA13128	400p	LA3301	75p	LA7224	150p	LM3352	120p	MN1280	70p	SAB8048	250p	STK4025	530p	STK6532	450p	STR30125	500p	TA7299	450p
HA13130	450p	LA3361	100p	LA7225	250p	LM339	35p	MN3004	600p	SAB8049	700p	STK4026	480p	STK5720	400p	STR30130	250p	TA7299	200p
HA13135	500p	LA3365	70p	LA7292	275p	LM348	50p	MN3005	2000p	SDA2005	450p	STK4028	550p	STK5725	450p	STR40090	350p	TA7302P	75p
HA13139	600p	LA3370	70p	LA7294	200p	LM358	45p	MN3011	4000p	SDA2006	325p	STK4032 II	510p	STK5730	450p	STR40115	600p	TA7303	70p
HA13150A	1150p	LA3373	70p	LA7295	160p	LM380	80p	MN3101	110p	SDA2007	700p	STK4034 X	925p	STK6316	350p	STR41090	330p	TA7307	100p
HA13151	875p	LA3375	300p	LA7297	120p	LM381	150p	MN3102	375p	SDA2008	400p	STK4035	470p	STK6324B	500p	STR4111	950p	TA7310	100p
HA13403	400p	LA3376	80p	LA7305A	350p	LM382	130p	MN3207	310p	SDA2009	400p	STK4040 II	680p	STK6328A	800p	STR4111	950p	TA7312	120p
HA13406W	400p	LA3380	300p	LA7308	70p	LM386	60p	MN3208	950p	SDA2112	450p	STK4040 II	650p	STK6328A	800p	STR50020	350p	TA7313	70p
HA13408	350p	LA3390	250p	LA7311	200p	LM387	100p	MN6030B	350p	SDA2120	225p	STK4042 II	800p	STK6431	850p	STR50020	350p	TA7313	175p
HA13412	600p	LA3400	250p	LA7320	120p	LM389N	105p	MN6163A	700p	SDA2131	225p	STK4044	800p	STK6607	725p	STR50092	550p	TA7315	175p
HA13426	500p	LA3401	90p	LA7323	325p	LM393	45p	MTA001M	60p	SDA2208	450p	STK4046	950p	STK6722	725p	STR50103A	260p	TA7317	120p
HA13432	400p	LA3410	150p	LA7330	350p	LM431	50p	NE555	200p	SDA4212	775p	STK4048	1280p	STK6722	1000p	STR50113A	500p	TA7320P	200p
HA13441	450p	LA3430	130p	LA7331	140p	LM381	150p	NE555	40p	SDA4212	775p	STK4052 II	1600p	STK6822	900p	STR50115	500p	TA7321P	200p
HA17524	250p	LA3600	60p	LA7332	225p	LM710	10p	NE555	110p	SDA4212	775p	STK4056 II	1200p	STK6822	900p	STR50151	500p	TA7322	130p
KA2102	100p	LA3605	100p	LA7340	300p	LM741DIL	18p	NE555	80p	SDA5243-2	450p	STK4060	510p	STK6922	500p	STR51043	500p	TA7323	80p
KA2103	100p	LA3607	125p	LA7376	150p	LM741MET	45p	NE567	115p	SDA5640	200p	STK4101	500p	STK6962	275p	STR53041	400p	TA7324	75p
KA2131	110p	LA4030	180p	LA7391	550p	LM747	55p	NE571	290p	SDA5642	200p	STK4111	500p	STK6972	400p	STR54041	320p	TA7325	90p
KA2208	150p	LA4031	140p	LA7520	200p	LM1017	200p	NE592	85p	SGS444	500p	STK4112	500p	STK6981B	600p	STR55041	450p	TA7326	200p
KA2209	125p	LA4032	140p	LA7530	200p	LM1039	350p	NE592P	85p	SGS445	500p	STK4121	480p	STK6982	600p	STR55041	450p	TA7328	110p
KA2210	230p	LA4051	160p	LA7535	75p	LM1040N	650p	NE592P	85p	SGS445	500p	STK4122	480p	STK6982H	600p	STR55041	450p	TA7328	110p
KA2212	65p	LA4100	85p	LA7545	160p	LM1203	225p	NE592P	85p	SGS445	500p	STK4131	480p	STK7216	420p	STR59041	300p	TA7330P	80p
KA2213	130p	LA4101	80p	LA7550	275p	LM1203AN	225p	NE592P	85p	SGS445	500p	STK4132 II	600p	STK7217	420p	STR60001	525p	TA7331P	80p
KA2214	100p	LA4102	100p	LA7555	150p	LM1875T	330p	NE592P	85p	SGS445	500p	STK4133 II	750p	STK7225	500p	STR80145	475p	TA7333	100p
KA2224	50p	LA4110	120p	LA7620	500p	LM1881N	375p	NE592P	85p	SGS445	500p	STK4141 II	420p	STK7226	600p	STR81145	475p	TA7335	85p
KA2244	75p	LA4120	270p	LA7680	675p	LM1888	250p	NE592P	85p	SGS445	500p	STK4142	530p	STK7251	500p	STR90120	425p	TA7336	120p
KA2261	100p	LA4178	150p	LA7681	675p	LM1889	300p	NE592P	85p	SGS445	500p	STK4142 II	1450p	STK7253	450p	STRD1206	500p	TA7337P	175p
KA2263	100p	LA4140	60p	LA7710	250p	LM1894N	200p	NE592P	85p	SGS445	500p	STK4151	680p	STK7308	350p	STRD1406	600p	TA7339P	175p
KA2264	100p	LA4142	65p	LA7800	90p	LM1895N	275p	NE592P	85p	SGS445	500p	STK4152	650p	STK7309	400p	STRD1706	360p	TA7341	250p
KA2284	75p	LA4145	65p	LA7801	100p	LM2901N	350p	NE592P	85p	SGS445	500p	STK4161	650p	STK7310	470p	STRD1806	360p	TA7342P	70p
KA2309	175p	LA4160	100p	LA7802	300p	LM2902N	40p	NE592P	85p	SGS445	500p	STK4162	550p	STK7338	400p	STRD1816	350p	TA7343	120p
KA2401	150p	LA4162	110p	LA7806	260p	LM2903N	40p	NE592P	85p	SGS445	500p	STK4164 II	1175p	STK7366	425p	STRD1906	550p	TA7347P	120p
KA2412	125p	LA4178	150p	LA7809	250p	LM3900	350p	NE592P	85p	SGS445	500p	STK4171 II	900p	STK7368	440p	STRD3035	300p	TA7348P	125p
KA2912	125p	LA4180	150p	LA7820	200p	LM3909	100p	NE592P	85p	SGS445	500p	STK4172 II	650p	STK7369	440p	STRD4412	200p	TA7349P	175p
KA2913A	175p	LA4182	180p	LA7823	200p	LM3911N	200p	NE592P	85p	SGS445	500p	STK4181	680p	STK7404	400p	STRD4420	550p	TA7354P	65p
KA2914A	200p	LA4190	300p	LA7824	130p	LM3914	160p	NE592P	85p	SGS445	500p	STK4182 II	750p	STK7406	65p	STRD5412	400p	TA7357	340p
KA22427	100p	LA4192	140p	LA7830	90p	LM3915	160p	NE592P	85p	SGS445	500p	STK4191	700p	STK7408	675p	STRD5441	475p	TA7358	85p
KA22428	100p	LA4194	140p	LA7831	85p	LM3916	170p	NE592P	85p	SGS445	500p	STK4192	700p	STK7410	1500p	STRD5441	475p	TA7358	85p
KA22429	100p	LA4196	140p	LA7832	130p	LM3917	170p	NE592P	85p	SGS445	500p	STK4211 II	1000p	STK7458	125p	STRD6008	575p	TA7359P	90p
KA22430	100p	LA4198	140p	LA7833	130p	LM3918	170p	NE592P	85p	SGS445	500p	STK4212 II	1000p	STK7459	125p	STRD6008	575p	TA7359P	90p
KA22431	100p	LA4201	130p	LA7834	130p	LM3919	170p	NE592P	85p	SGS445	500p	STK4221 II	1200p	STK7561	650p	STRD6018	450p	TA7362	150p
KA22432	100p	LA4202	130p	LA7835	130p	LM3920	170p	NE592P	85p	SGS445	500p	STK4222 II	1200p	STK7562	650p	STRD6020	450p	TA7364P	175p
KA22433	100p	LA4203	130p	LA7836	130p	LM3921	170p	NE592P	85p	SGS445	500p	STK4223 II	700p	STK7563	800p	STRD6021	450p	TA7366P	65p
KA22434	100p	LA4204	130p	LA7837	150p	LM3922	170p	NE592P	85p	SGS445	500p	STK4224 II	1050p	STK7563	800p	STRD6022	450p	TA7368P	35p
KA22435	100p	LA4205	130p	LA7838	200p	LM3923	170p	NE592P	85p	SGS445	500p	STK4225 II	1200p	STK7564	800p	STRD6023	450p	TA7373F	150p
KA22436	100p	LA4206	130p	LA7839	200p	LM3924	170p	NE592P	85p	SGS445	500p	STK4226 II	1200p	STK7565	800p	STRD6024	450p	TA7374	175p
KA22437	100p	LA4207	130p	LA7840	200p	LM3925	170p	NE592P	85p	SGS445	500p	STK4227 II	1200p	STK7566	800p	STRD6025	450p	TA7376P	100p
KA22438	100p	LA4208	130p	LA7841	200p	LM3926	170p	NE592P	85p	SGS445	500p	STK4228 II	1200p	STK7567	800p	STRD6026	450p	TA7378P	60p
KA22439	100p	LA4209	130p	LA7842	200p	LM3927	170p	NE592P	85p	SGS445	500p	STK4229 II	1200p	STK7568	800p	STRD6027	450p	TA7401	250p
KA22440	100p	LA4210	130p	LA7843	200p	LM3928	170p	NE592P	85p	SGS445	500p	STK4230 II	1200p	STK7569	800p	STRD6028	450p	TA7402P	200p
KA22441	100p	LA4211	130p	LA7844	200p	LM3929	170p	NE592P	85p	SGS445	500p	STK4231 II	1200p	STK7570	800p	STRD6029	450p	TA7403	325p
KA22442	100p	LA4212	130p	LA7845	200p	LM3930	170p	NE592P	85p	SGS445	500p	STK4232 II	1200p	STK7571	800p	STRD6030	450p	TA7404	150p
KA22443	100p	LA4213	130p	LA7846	200p	LM3931	170p	NE592P	85p	SGS445	500p	STK4233 II	1200p	STK7572	800p	STRD6031	450p		

JAPANESE TRANSISTORS

Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price		
2SC1675	90p	2SC2261	700p	2SC2719	25p	2SC3263	280p	2SC3798	220p	2SD257	195p	2SD880	40p	2SD1327	150p	2SD1763A	60p	2SK312	750p
2SC1678	80p	2SC2267	90p	2SC2721	120p	2SC3264	390p	2SC3807	120p	2SD287	250p	2SD882	25p	2SD1328	60p	2SD1764	60p	2SK315	70p
2SC1683	100p	2SC2270	60p	2SC2724	15p	2SC3269	50p	2SC3808	70p	2SD291	250p	2SD889	35p	2SD1330	50p	2SD1765	70p	2SK320	120p
2SC1684	30p	2SC2271	25p	2SC2738	200p	2SC3270	50p	2SC3811	80p	2SD312	25p	2SD892A	75p	2SD1347	70p	2SD1769	110p	2SK323	130p
2SC1685	30p	2SC2274	15p	2SC2749	350p	2SC3271	75p	2SC3831	250p	2SD315	75p	2SD894	35p	2SD1348	65p	2SD1773	70p	2SK332	175p
2SC1729	900p	2SC2275	50p	2SC2750	300p	2SC3277	280p	2SC3832	135p	2SD325	35p	2SD895	100p	2SD1350	150p	2SD1776	100p	2SK359	40p
2SC1730	10p	2SC2278	70p	2SC2751	75p	2SC3279	30p	2SC3833	250p	2SD330	65p	2SD896	200p	2SD1376	60p	2SD1783	70p	2SK359	40p
2SC1735	70p	2SC2283	280p	2SC2752	270p	2SC3280	200p	2SC3851	100p	2SD348	300p	2SD898B	225p	2SD1378	60p	2SD1785	160p	2SK363	50p
2SC1740	10p	2SC2290	1800p	2SC2767	300p	2SC3281	200p	2SC3852	80p	2SD350	320p	2SD900	400p	2SD1379	100p	2SD1789	210p	2SK364	40p
2SC1741	35p	2SC2291	40p	2SC2769	400p	2SC3284	600p	2SC3853	220p	2SD357	40p	2SD905	450p	2SD1380	100p	2SD1792	120p	2SK367	40p
2SC1755	90p	2SC2298	35p	2SC2773	700p	2SC3293	85p	2SC3855	220p	2SD358	50p	2SD916	130p	2SD1382	60p	2SD1802	75p	2SK369	30p
2SC1756	35p	2SC2307	300p	2SC2774	500p	2SC3298	50p	2SC3857	500p	2SD359	50p	2SD917	300p	2SD1384	50p	2SD1806	75p	2SK373	40p
2SC1758	30p	2SC2308	10p	2SC2785	40p	2SC3299	120p	2SC3858	550p	2SD361	100p	2SD921	320p	2SD1390	350p	2SD1812	50p	2SK374	45p
2SC1760	70p	2SC2312	300p	2SC2786	20p	2SC3300	400p	2SC3866	275p	2SD362	100p	2SD923	360p	2SD1391	250p	2SD1815	45p	2SK386	600p
2SC1775	10p	2SC2314	70p	2SC2787	10p	2SC3303	10p	2SC3868	100p	2SD371	240p	2SD946	120p	2SD1392	85p	2SD1825	60p	2SK389	115p
2SC1781	20p	2SC2316	150p	2SC2791	500p	2SC3306	100p	2SC3870	200p	2SD380	650p	2SD947	100p	2SD1395	80p	2SD1827	120p	2SK400	700p
2SC1789	100p	2SC2320	10p	2SC2792	720p	2SC3307	600p	2SC388A	25p	2SD381	50p	2SD950	300p	2SD1396	120p	2SD1843	70p	2SK405	450p
2SC1809	40p	2SC2324	120p	2SC2793	200p	2SC3309	150p	2SC3883	210p	2SD382	75p	2SD951	200p	2SD1397	100p	2SD1846	350p	2SK414	550p
2SC1810	250p	2SC2328A	50p	2SC2808	40p	2SC3310	120p	2SC3884A	200p	2SD386	70p	2SD957A	520p	2SD1398	120p	2SD1847	275p	2SK415	550p
2SC1815	10p	2SC2310	25p	2SC2810	360p	2SC3316	280p	2SC3885	250p	2SD388	150p	2SD958	80p	2SD1399	300p	2SD1849	280p	2SK420	320p
2SC1819	70p	2SC2315	175p	2SC2812	40p	2SC3317	350p	2SC3885A	290p	2SD389	60p	2SD965	35p	2SD1400	280p	2SD1850	325p	2SK423	75p
2SC1826	60p	2SC2329	480p	2SC2814	40p	2SC3326	50p	2SC3886A	275p	2SD400	14p	2SD970	170p	2SD1402	120p	2SD1853	40p	2SK427	50p
2SC1827	60p	2SC2330	300p	2SC2824	75p	2SC3327	60p	2SC3890	150p	2SD401	50p	2SD972	40p	2SD1403	225p	2SD1856	40p	2SK430	200p
2SC1829	500p	2SC2331	50p	2SC2825	900p	2SC3328	50p	2SC3892A	250p	2SD402	120p	2SD973	60p	2SD1405	80p	2SD1857	75p	2SK511	450p
2SC1833	27p	2SC2333	200p	2SC2826	200p	2SC3330	20p	2SC3893	225p	2SD414	45p	2SD973A	70p	2SD1406	60p	2SD1858	40p	2SK513	325p
2SC1834	50p	2SC2334	80p	2SC2827	130p	2SC3331	25p	2SC3895	325p	2SD415	55p	2SD982	90p	2SD1407	60p	2SD1859	35p	2SK526	160p
2SC1841	12p	2SC2335	55p	2SC2832	300p	2SC3333	120p	2SC3896	400p	2SD424	150p	2SD985	120p	2SD1408	125p	2SD1864	85p	2SK531	350p
2SC1844	50p	2SC2336A	125p	2SC2834	280p	2SC3345	100p	2SC3897	400p	2SD426	350p	2SD986	120p	2SD1409	170p	2SD1877	175p	2SK534	700p
2SC1845	15p	2SC2344	150p	2SC2837	250p	2SC3346	130p	2SC3907	250p	2SD427	350p	2SD988	70p	2SD1411	85p	2SD1878	275p	2SK537	900p
2SC1846	35p	2SC2347	35p	2SC2839	40p	2SC3352	200p	2SC3927	250p	2SD438	35p	2SD990	70p	2SD1412	75p	2SD1879	275p	2SK538	350p
2SC1847	45p	2SC2353	120p	2SC2853	70p	2SC3353	280p	2SC3940	40p	2SD467	15p	2SD1012	40p	2SD1413	60p	2SD1880	360p	2SK539	1100p
2SC1855	85p	2SC2360	120p	2SC2873	60p	2SC3355	50p	2SC3943	75p	2SD468	15p	2SD1020	40p	2SD1415	190p	2SD1881	350p	2SK544	30p
2SC1856	25p	2SC2361	150p	2SC2877	120p	2SC3356	120p	2SC3944	80p	2SD471	80p	2SD1021	120p	2SD1417	75p	2SD1884	300p	2SK552	250p
2SC1865	700p	2SC2362	50p	2SC2878	20p	2SC3358	50p	2SC3950	120p	2SD476	100p	2SD1022	250p	2SD1425	260p	2SD1886	300p	2SK553	225p
2SC1870	700p	2SC2365	280p	2SC2879	3200p	2SC3376	300p	2SC3953	50p	2SD525	50p	2SD1024	850p	2SD1426	135p	2SD1887	225p	2SK555	320p
2SC1871	425p	2SC2369	100p	2SC2882	60p	2SC3377	50p	2SC3955	60p	2SD526	70p	2SD1027	850p	2SD1427	160p	2SD1894	300p	2SK556	500p
2SC1875	220p	2SC2371	25p	2SC2883	60p	2SC3378	120p	2SC3964	100p	2SD545	18p	2SD1030	75p	2SD1428	180p	2SD1895	225p	2SK557	400p
2SC1881	70p	2SC2373	210p	2SC2888	200p	2SC3379	1200p	2SC3972	250p	2SD549	120p	2SD1031	70p	2SD1430	280p	2SD1910	175p	2SK558	500p
2SC1890	15p	2SC2383	50p	2SC2899	50p	2SC3381	130p	2SC3973	210p	2SD551	300p	2SD1036	600p	2SD1431	200p	2SD1911	300p	2SK559	400p
2SC1895	500p	2SC2389	45p	2SC2909	60p	2SC3383	80p	2SC3975	210p	2SD554	225p	2SD1046	200p	2SD1432	400p	2SD1913	50p	2SK560	600p
2SC1904	125p	2SC2407	110p	2SC2910	25p	2SC3393	80p	2SC3987	160p	2SD555	500p	2SD1047	180p	2SD1433	300p	2SD1929	50p	2SK566	580p
2SC1906	15p	2SC2408	120p	2SC2911	80p	2SC3397	20p	2SC3996	600p	2SD556	225p	2SD1051	130p	2SD1438	60p	2SD1930	50p	2SK566	475p
2SC1907	20p	2SC2412K	60p	2SC2912	120p	2SC3399	50p	2SC3997	1250p	2SD558	500p	2SD1055	60p	2SD1439	165p	2SD1933	45p	2SK606	70p
2SC1909	250p	2SC2440	200p	2SC2921	650p	2SC3400	35p	2SC3998	800p	2SD560	50p	2SD1060	130p	2SD1441	220p	2SD1939	60p	2SK612	80p
2SC1913	90p	2SC2458	10p	2SC2922	480p	2SC3401	50p	2SC4006	100p	2SD571	20p	2SD1062	150p	2SD1442	80p	2SD1941	350p	2SK684	950p
2SC1914	30p	2SC2459	50p	2SC2923	75p	2SC3402	40p	2SC4020	150p	2SD575	530p	2SD1063	200p	2SD1445	200p	2SD1944	50p	2SK685	1150p
2SC1921	15p	2SC2466	55p	2SC2928	550p	2SC3405	130p	2SC4023	325p	2SD582	25p	2SD1064	250p	2SD1446	300p	2SD1958	80p	2SK699	100p
2SC1922	175p	2SC2482	275p	2SC2929	280p	2SC3409	400p	2SC4029	350p	2SD586	25p	2SD1065	160p	2SD1450	60p	2SD1959	210p	2SK719	300p
2SC1923	10p	2SC2496	50p	2SC2934	75p	2SC3416	30p	2SC4043	45p	2SD600	30p	2SD1069	150p	2SD1451	200p	2SD1978	50p	2SK725	500p
2SC1929	180p	2SC2470	65p	2SC2937	250p	2SC3417	90p	2SC4046	40p	2SD601	40p	2SD1073	350p	2SD1452	275p	2SD1984	60p	2SK726	425p
2SC1940	110p	2SC2481	120p	2SC2939	400p	2SC3419	120p	2SC4056	200p	2SD602	60p	2SD1088	150p	2SD1453	140p	2SD1991	50p	2SK727	475p
2SC1941	27p	2SC2482	120p	2SC2944	300p	2SC3420	80p	2SC4059	40p	2SD612	50p	2SD1094	375p	2SD1455	250p	2SD1994	200p	2SK728	425p
2SC1942	350p	2SC2483	20p	2SC2958	50p	2SC3421	45p	2SC4064	140p	2SD613	70p	2SD1110	225p	2SD1457	165p	2SD1996	45p	2SK739	400p
2SC1944	350p	2SC2484	185p	2SC2962	800p	2SC3422	75p	2SC4106	150p	2SD617	30p	2SD1111	20p	2SD1458	50p	2SD2006	75p	2SK759	300p
2SC1945	350p	2SC2485	400p	2SC2979	160p	2SC3423	60p	2SC4107	175p	2SD633	70p	2SD1113	225p	2SD1459	60p	2SD2010	250p	2SK767	200p
2SC1946	1500p	2SC2491	200p	2SC2987	250p	2SC3425	65p	2SC4123	230p	2SD636	15p	2SD1128	200p	2SD1468	40p	2SD2011	60p	2SK778	800p
2SC1947	450p	2SC2498	50p	2SC2988	150p	2SC3446	150p	2SC4124	200p	2SD637	15p	2SD1133	65p	2SD1487	225p	2SD2012	60p	2SK787	200p
2SC1953	45p	2SC2500	14p	2SC2995	60p	2SC3447	130p	2SC4125	275p	2SD638	15p	2SD1135	75p	2SD1494	150p	2SD2018	65p	2SK791	225p
2SC1957	70p	2SC2502	250p	2SC2999	50p	2SC3456	200p	2SC4137	40p	2SD639	20p	2SD1138	40p	2SD1496	300p	2SD2033	80p	2SK797	300p
2SC1959	10p	2SC2503	600p	2SC3001	1400p	2SC3457	125p	2SC4138	200p	2SD640	300p	2SD1140	40p	2SD1497	230p	2SD2061	100p	2SK799	225p
2SC1962	175p	2SC2512	20p	2SC3019	320p	2SC3459	180p	2SC4157	400p	2SD645	15p	2SD1142	350p	2SD1497-02	350p	2SD2066	250p	2SK799	300p
2SC1967	1300p	2SC2517	120p	2SC3020	1450p														

REPLACEMENT VIDEO HEADS

Model	Price	Model	Price	Model	Price	Model	Price	Model	Price
AKAI		VHSAN3	800p	HRD750, HRD830, HRD860	3300p	NVFS 100	5000p	TL51100	3100p
VS105, 112, 115, 116, 120, 125, 126, 201, 202, 205, 220, 240, 244, 245, 247, 248, 250, 301, 303, 304, VSFB, VSFB2	1000p	VHSAY3	1200p	HRD2510, HRD2515	2200p	NE.C.	4850p	VHR120, 130, 14, 141, 143G, 145P, 151, 15, 16, 17, 220, 23, 244, 274, VHR310, 330, 4100, 4105, 4200, 4300, 4300, 4400, 4500, 5080, 5100, VHR5200, 5600, 6800, 7100, 7200, 7250, 7300, 8070, 8100, 8101, 8200, VHR7800, 7810, 8005P, 88015P, VHRD400, 4410, 4500, 4600, VHRD4610, 6700, 4800	3100p
VP7100, VS9300, VS9500	650p	VHSB14, VHSCH1	1600p	HRD180, 190, 230, 61, 3V59, FV12L, FV20B, 26, 30, 32, 33, VC141L	2050p	N9011, 9012, 9013E, 9014E, 9014G, 9015, 9016, 901A, 902A, 9033, N9034, 9040, 9053, 9054, 9055, 9056, 9063, 9065, 9066, 906, 9077, N9096, DX1000, 1600, PX1200	1150p	VHR16, 235, 335E, 4150, 4160, 4350, 7250, 7260, 8250	1950p
VS1	1250p	VHSB3	2600p	HRD370, HRD430, HRD470, 3V58, FV13H	2300p	N911A, 914C, 915A, 916A, 917, 9110, 9120	2400p	VHR3500, VHR6500, VHR7400	4500p
VS2	1200p	VHSD2	1600p	HRD530, HRD700, HRD840, HRD870, HRD910, HRD914, FV57H	300p	PVC600, 740, 744, 754, 763E, 764, PV2300, 2400, 760, 794, 770, 774	1650p	VHR16, 235, 335E, 4150, 4160, 4350, 7250, 7260, 8250	1400p
VS3	1350p	VHSEH2, VHSDH2	1600p	HRD950, HRD960, HRD980, FV46	5000p	N830, N831, N830, N831, N832, N833, N834, N835, N836	700p	SHARP	
VS10	1800p	VHSEY1, VHSF2	1400p	HRD5500, HRS5500, 5800, 9000, FV395, BRS600, SRS398E	5550p	82611AH1 (FOR MODEL DX3000), DX4000, N9610, N57000	3150p	VC390, VC393, VC496	2750p
VS11	2100p	VHSEY1, VHSF2	1300p	FV22L	1400p	N9052, N9530, DX2000	3400p	VC488	4200p
VS33, 35, 37, 38, 38EOG MKII, 53, 55, 66, 765, 766, 767, 768, 865, 867, VSF30, 33, 4, 400, 410, 420, 430, 440, 441, 450, 455, 480, 490, 497, VSG1, 54, 55, VXS450, VXS470	2250p	VHSTJ1, VHSJTJ2, VHSJTJ3, VHSWJ3, VHSYJ2	1300p	FV42	1900p	PVC1	1700p	VC779	1800p
VS42, 465, 467, 467EOG2, VSF12, 15EK, 15EOH, 300, 301, 310, VSF230, 330, 340, 350, VSG30, 33, 34, 35	2300p	VHSTJ1, VHSJTJ2, VHSJTJ3, VHSWJ3, VHSYJ2	700p	FV67HV, FV68TX, FV77	4500p	PVC2300, 2400, 740, 744, 760, 764	1400p	VC789, VC790	2900p
VS512, VSS15, VSS16	2250p	VHSTJ1, VHSJTJ2, VHSJTJ3, VHSWJ3, VHSYJ2	700p	R2000 SERIES	4500p	784	1400p	VC800, 220, 300, 381, 383, 384, 385, 388, 387, 388, 471, 477, 481, 482, VC483, 486, 3300, 8391, 9100, 9300, 9400, 9500, 9600, 9700	1150p
VS62, 465, 467, 467EOG2, VSF12, 15EK, 15EOH, 300, 301, 310, VSF230, 330, 340, 350, VSG30, 33, 34, 35	2300p	VHSTJ1, VHSJTJ2, VHSJTJ3, VHSWJ3, VHSYJ2	700p	FV61LV, FV62LV, FV67HV	101.00p	FV42L	1950p	VC108, 208, 382, 402, 405, 408, 500, 550, 571, 573, 581, 582, 583, VCSW20E, 600, 651, 674, 681, 684, 6V3, 750, 780, 781, 683, 684, 402, VCS500, 571, 573, 580, 584, 600, 682, 693, 700, 772, 7810, 782, 7822, VC783, 8481, 8581, VCA100, 100, 102, 103, 1031, 103, 104, 105, 106, VCA111, 113, 116, 131, 140, 202, 203, 211, 234, 244, 254, 255, 30, 35, VCA40, VCB311N, 320, VCD801, 802, VCM73, VCT12, 310, 410, VCT510, 72, VCT1314, VCT313	1100p
VS660, 64, 65, VSG70, 73, 74, 75, VXS60, 580	3600p	VHSTJ1, VHSJTJ2, VHSJTJ3, VHSWJ3, VHSYJ2	700p	VP160L, VR172L	1950p	VH900	1100p	VCA111, 113, 116, 131, 140, 202, 203, 211, 234, 244, 254, 255, 30, 35, VCA40, VCB311N, 320, VCD801, 802, VCM73, VCT12, 310, 410, VCT510, 72, VCT1314, VCT313	1100p
VS155, VS165	2300p	VHSTJ1, VHSJTJ2, VHSJTJ3, VHSWJ3, VHSYJ2	700p	HRJ200, HRJ205	3300p	VH1000 (ALL MODELS)	1100p	VCA111, 113, 116, 131, 140, 202, 203, 211, 234, 244, 254, 255, 30, 35, VCA40, VCB311N, 320, VCD801, 802, VCM73, VCT12, 310, 410, VCT510, 72, VCT1314, VCT313	1100p
VS20, 22, 23, 24, 25, 26, 27, 422, 425, 426, 427, 435, VSF10, 11, 180, 190	2400p	VHSTJ1, VHSJTJ2, VHSJTJ3, VHSWJ3, VHSYJ2	700p	HRJ300E, HRJ600EK, HRJ605EG, HRJ605UK, HRJ610EK	7100p	D1000X, D1100	1600p	VCA111, 113, 116, 131, 140, 202, 203, 211, 234, 244, 254, 255, 30, 35, VCA40, VCB311N, 320, VCD801, 802, VCM73, VCT12, 310, 410, VCT510, 72, VCT1314, VCT313	1100p
VS200, 210, 220, 221, 222, 230, 240, 260, 261, 262, 265, 270, 275, 280, VSF290, 510, 550, VSG20, 204, 205, 206, VSG21, 211, 212, 215, VSG217EOG, 23, 24, 25, 405, 411, 415, 417, VSP 100, 100EM, 110, VSPFB, 88KC, 8111, VSP9, VSR100, 100EDG, 100EM, 110, VXS400	1250p	VHSTJ1, VHSJTJ2, VHSJTJ3, VHSWJ3, VHSYJ2	700p	HRJ300, HRJ305, HRJ315, HRJ315E, HRJ315E, HRJ315E, HRJ400, HRJ405, HRJ407MS, HRJ41, OEQ, HRJ415, HRJ416	8580p	D1200X, D2000X, D5000	1600p	VCA111, 113, 116, 131, 140, 202, 203, 211, 234, 244, 254, 255, 30, 35, VCA40, VCB311N, 320, VCD801, 802, VCM73, VCT12, 310, 410, VCT510, 72, VCT1314, VCT313	1100p
VS109, VS603, VS606, VS607	2500p	VHSTJ1, VHSJTJ2, VHSJTJ3, VHSWJ3, VHSYJ2	700p	MATSUI		VR6420	1800p	VCA111, 113, 116, 131, 140, 202, 203, 211, 234, 244, 254, 255, 30, 35, VCA40, VCB311N, 320, VCD801, 802, VCM73, VCT12, 310, 410, VCT510, 72, VCT1314, VCT313	1100p
VS75	2500p	VHSTJ1, VHSJTJ2, VHSJTJ3, VHSWJ3, VHSYJ2	700p	VX500E, 800A, 810A, 820, 80A, 770B, 773B	1200p	VR6411 4 HEAD	2500p	VCA111, 113, 116, 131, 140, 202, 203, 211, 234, 244, 254, 255, 30, 35, VCA40, VCB311N, 320, VCD801, 802, VCM73, VCT12, 310, 410, VCT510, 72, VCT1314, VCT313	1100p
VS965, VC967	3450p	VHSTJ1, VHSJTJ2, VHSJTJ3, VHSWJ3, VHSYJ2	700p	VX600	1100p	VR6420	1800p	VCA111, 113, 116, 131, 140, 202, 203, 211, 234, 244, 254, 255, 30, 35, VCA40, VCB311N, 320, VCD801, 802, VCM73, VCT12, 310, 410, VCT510, 72, VCT1314, VCT313	1100p
VSF1000, VSF1010, VSF1030	5800p	VHSTJ1, VHSJTJ2, VHSJTJ3, VHSWJ3, VHSYJ2	700p	VX900	2650p	VR6441	1300p	VCA111, 113, 116, 131, 140, 202, 203, 211, 234, 244, 254, 255, 30, 35, VCA40, VCB311N, 320, VCD801, 802, VCM73, VCT12, 310, 410, VCT510, 72, VCT1314, VCT313	1100p
ALBA		HINARI		MITSUBISHI		SAISHO		SALORA	
VDR3000, VCR4000, VCR5000, VCR6000	1650p	VXL2, 3, 4, 20, 25, 35	1000p	HS303, HS304, HS320, HS700	1400p	VR100, 605, 705, 805, 905, 1000, 1100	1200p	DSL-19R FOR SLT-9ME	3100p
VTV10	1000p	VXL5, V20H	1050p	HS306, HS318, HS710	1400p	VR120, 1600	1400p	DSL-21 R FOR SLC-8-C9	2600p
VCR7000, 7800, 8000, 8800	1100p	VXL7	1200p	HS307	2300p	VR3300X, VR3600X, VR3650X, VR3800	1400p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
AMSTRAD		HINARI		MITSUBISHI		SAISHO		SALORA	
VCR4500, VCR5200, VCR9000, TVR1	900p	VXL8, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS309, HS321, HS310, HS310, HS200	1350p	VR3260, 6349, 6442, 663, 6448, 6449, 6542, 6643	1250p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
VCR1000, 2000, 6000, 61000, 62000, 8600, 8602, 8700, 9005, DD8900, DD8904, TVR4	1100p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS312, HS312, HSE27, 31, 32, HSE27, 31, 32, HSM33, 34, 35, 37G	2150p	VR601	1800p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
VCR1400, VCR1800, VCR4600, VCR4600 MKII, VCR400	1100p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS411	1900p	VR6443	2750p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
VCR8800, VCR8804, VCR9340	2100p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS412, HS412G	2100p	VR6444	1300p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
VCR8603, VCR8604, VCR8704, VCR8714	1350p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS413, HS413G	2100p	VR6445	1300p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
VCR9140, VCR9142	2550p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS414	3000p	VR6446	1300p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
VCR9340	3650p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS415, HS415G	3000p	VR6447	1300p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
VCR9244	3450p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS416, HS416G	3000p	VR6448	1300p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
UF020, 22, VCR3000, 3002, 9500	1750p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS417, HS417G	3000p	VR6449	1300p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
FISHER		HINARI		MITSUBISHI		SAISHO		SALORA	
FVHP420, 510, 520, 530, 615, 618, 620, 622, 710, 711, 715, 716, 720	1800p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS418, HS418G	3000p	VR6450	1300p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
FVHP721, 722, 730, 830, 905, 906, 907, 908, 910, 911, 915, 916, 918, FVHP5000, 5001, 5005, 5050, 5075	1100p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS419, HS419G	3000p	VR6451	1300p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
VBS3500, 7100, 7500, 7600, 9900, VBR330	1800p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS420, HS420G	3000p	VR6452	1300p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
VBS7000, VBS7100, VBS9000	2000p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS421, HS421G	3000p	VR6453	1300p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
FVHP5000, 711, 715, 721, 730, 830, 910, 5100, FVHD720	1100p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS422, HS422G	3000p	VR6454	1300p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
FVHP725, FVHP830, FVHP980	2500p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS423, HS423G	3000p	VR6455	1300p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
FVHP990	2700p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS424, HS424G	3000p	VR6456	1300p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
FVHP975	2400p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS425, HS425G	3000p	VR6457	1300p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
FVHD407, FVHD140, FVHP1, FVHP10	1150p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS426, HS426G	3000p	VR6458	1300p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
FVHD230, FVHP1100, 1200, 130, 1340, 1410, 2000, 200, 210, 300, VCR9140, 410, 420	1800p	VXL9, 9, 10, 11, 19, 90, VCR34H, VTV 100, 200	1100p	HS427, HS427G	3000p	VR6459	1300p	DSL-35R FORC20, C30, C40, SLF11U, SLF12E PIN, SLC24P5, 33E, 34, 44P5, SLF11, 30PF, 35, 60PS, SLC85, SLT20ME, 30ME, SL100	1500p
FVHD250, 270, 370, FVHP1500, FVHP250	270								

PINCH ROLLERS

Model	Price	Model	Price	Model	Price	Model	Price	Model	Price								
AKAI VS10, VS9300, VS9500, VS9700, VS9800, VPT100, VPT71 140p VS1, VS2, VS3, VS4, VS5, VS6, VS8, VS9 VS12, VS15 140p VS105, 112, 115, 116, 120, 125, 126, 155, 165, 205, 220, 240, 244, 245, VS247, 248, 250, 512, VS515, 516, VSX9 140p VS201, 301, 303, 304, 603, 606, 607, VSP8, VSP82, VPS8, VPS82 VS125, VS165, VS165, VS220, VS240, VS250, VS512 140p VS22, 23, 25, 35, 37, 38, 53, 66, 75, 422, 425, 426, 427, 462, 465, 467, VS485, 765, 766, 767, 768, 865, 867, 965, 967, VS477, VSA650 VSF10, 11, 12, 15, 180, 190, 200, 210, 220, 221, 222, 230, 240, 30, 33 VSF30, 4, 500, 550, VSP88, VSR100, VSX400, 450, 470 140p VSF269, 261, 262, 265, 270, 274, 275, 280, 290, 340, 350, 410, 420, 430 VSF441, 440, 450, 455, 480, 490, 497, 510, 560, 580, 590, 599, 600, VS620, 21, 23, 24, 25, 30, 33, 34, 35, 51, 54, 55, 60, 64, 65, 70, 73, 74, 75 VSP110, VSX560, VSX580 140p VS17, 20, 22, 23, 24, 25, 26, 27, 35, 37, 38, 53, VS5, VSA77 775p PINCH ROLLER ASSEMBLY VS422, 425, 426, 427, 462, 465, 467, 485, 488, 765, 766, 767, 768, 865, 867, 965, 967, VSA650, VSF10, 11, 12, 14, 15, 180, 190, 200, 210, 220, 221, 222, 230, 240, 30, 300, 301, 310, 320, 33, 330, 4, 500, 510, 600, VSX20, V1, VSX100, 400, 450, 470 PINCH ROLLER ASSEMBLY VS599 140p	ALBA VCR3000X, VCR4000 140p VCR5000, VCR6000 140p VCR161, VCR222 140p VCR7000, VCR7800, VCR8000, VCR8900 140p VCR9000 140p VTV10 140p	AMSTRAD VCR1000, 2000, 4500, 4600, 4700, 5200, 6000, 6100, 6200, 8600 VCR8602, 8603, 8604, 8700, 8704, 8714, 8800, 8804, 9000, 9005, VCR9244, 9340, DD8900, 8904, TVR1, 2, 3, 4 140p VCR7000 140p DD8900, DD8904, VCR6000, 6100, 6200, 8600, 8602, 8603, 8604, VCR8700, 8800, 9000-9, 9140, 9244, 9340 700p PINCH ROLLER ASSEMBLY PART NO: 153148 VX3650, UF20, VCR3000, VCR3002, VCR4000, VCR9500 300p PINCH ROLLER ASSEMBLY PART NO: 2554966 DD8900, 9904, VX3650, UF20, 22, 24, VCR3000, 3002, 9500 140p VS1004 VS1104 140p	FERGUSON 3V00, 3V01, 3V16, 3V22, 3V23, 3V24, 3Z92, 8900, 8901, 8902, 8903, 8904, 8906, 8909, 8912, 8922, 8923, 8924, 8925, 8929 140p 3V29, 3V30, 3V31, 3V32, 3V52, 8930, 8931, 8933, 8940, 8941, 8942 140p 3V35, 3V36, 3V38, 3V39, 3V42, 3V43, 3V44, 3V45, 3V48, 3V49, 3V53, 3V54, 3V55, 3V56, 3V57, 3V58, 3V59, 3V65, FV10, FV11, FV12, FV14, 8943, 8944, 8945, 8947, 8948 140p 3V52 140p 8920, 8951, FV10B, 11R, 13H, 14L, 20B, 21R, 22L, 26D, 31R, 32L, FV33H, 39S, 41R, 42L, 50B, 51R, 52L, VC414L FV37H, FV41H, FV46T, FV43H, FV57H 140p 3V35, 3V36, 3V38, 3V39, 3V49, 8943, 8944 1100p PINCH ROLLER ASSEMBLY 3V42, 3V43, 3V44, 3V45, 3V48, 3V53, 3V54, 3V55, 3V56, 3V57, 8945, 8947, 8948 135p PINCH ROLLER ASSEMBLY FV37, FV57, FV58 350p PINCH ROLLER ASSEMBLY FV31R 140p FV41L, FV42L 140p PINCH ROLLER ASSEMBLY 3V58, 3V59, 3V64, 3V65, FV10, 11, 12, 13, 14, 20, 21, 22, 26, 30, 32, 33 FV39, VC141L 875p PINCH ROLLER ASSEMBLY FV43H, FV44L, FV45X, FV46T 700p PINCH ROLLER ASSEMBLY FV61, FV62, FV67, FV68, FV70, FV71, FV72, FV74, FV77 775p PINCH ROLLER ASSEMBLY	FISHER FVHP420, 520, 530 140p	BRS600 , 605, 747, 777, 920, 925 140p HRS10 140p BP5000, HRD110, 111, 120, 220, 225, 455 1100p PINCH ROLLER ASSEMBLY HRD140, 141, 142, 143, 150, 152, 157, 158, 160, 565, 566, 725, 755, HRP50 1350p PINCH ROLLER ASSEMBLY HRD1520, 510, 520, 521, 522, 525, 527, 560, 600, 610, 620, 637, 641, HRD650, 720, 830, 840, 910, HRJ205, HRS8500 350p PINCH ROLLER ASSEMBLY BR7030, BR5600, HRD160, 170, 171, 180, 190, 210, 211, 217, 227, HRD230, 271, 300, 310, 320, 321, 330, 337, 350, 400, 430, 440, 441, HRD470, 500, 530, 700, 750, 950, HRS5000, 5500, 9000 875p PINCH ROLLER ASSEMBLY HRD540, HRD550, HRD580, HRD660, HRD860, HRD890 700p PINCH ROLLER ASSEMBLY HRJ600, HRJ605, HRJ815, HRS9200 875p	MATSUI VX6000, 730, 735, 750, 755, 765, 800, 850, VS888 140p VX1000, VX2000, VX2500, VX3000, VX6000A 140p	MITSUBISHI HS12, 5300, 5424, 5600, HSB11, 12, 16, 21, 27, 31, 32, 41, 51, 52, 82, HSE12, 16, 17, 21, 22, 27, 31, 32, 41, 51, 52, 82, HSM1000, 110, 120, 15, 0, 16, 170, 180, 210, 23, 25, 250, 27, 33, 34, 35, 36, 37, 370, 380, 45, 450, 5, 4, 55, 555, 57, 58, 59, HSM52, 9, HSS11, 14, 15, 17, 19, 21, 25, 5600, HV F125, 150, 303, 85, SV8900, 8930 750p PINCH ROLLER ASSEMBLY PART NO: 948D020010 HSE11, 12, 16, 17, 21, 22, 27, 31, 32, 41, 51, 52, 5300, 5424, 5600, HSB11, 12, 16, 21, 27, 31, 32, 41, 51, 52, 82, HSM1000, 110, 120, 150, HSM16, 170, 18, 190, 210, 23, 25, 250, 27, 30, 33, 34, 35, 36, 37, 370, 38, HSM300, 40, 45, 450, 50, 54, 55, 555, 57, 58, 59, 60, 68, HSM52, 9, HSMX1, 18, 19, 2, HSS11, 12, 14, 15, 17, 19, 21, 25, 5600, HVF125, HVF150, 303, 85, SV8900, 8930 140p HS200, HS300, HS301, HS302, HS303, HS304, HS310, HS320, HS330, HS360, HS700 140p HS306, HS307, HS318, HS319, HS337, HS338, HS347, HS349, HS400, HS410, HS411, HS412, HS421, HS480, HS710, HSB 10, HSB20, 30, HSE 10, 20, 30, 70 140p	NATIONAL PANASONIC NV100, 180, 300, 330PX, 332, 333, 340, 360, 600, 688, 777, 788, 3321, AG6010, 6015, 6100, 6200, 6400, 6800, 7450 140p NV230, 250, 260, 280, 370, 380, 430, 431, 433, 450, 460, 465, 470, 480, NV630, 650, 730, 770, 810, 830, 850, 870, 890, 2000, 2010, 3000, NV7000, 7200, 7800, 8050, 8150, 8170, 8200, 8300, 8400, 8500, 8600, NV8610, 8620, NVG11, 14, 16, NVG7, 10, 12, 15, 18, 30, 130, 400, AG 1000, 1050, 1200, 1500, 2100, 2200, 6500, 6810, 7500, 7510, NVH70 140p NVG8, NVG120 140p AG6840, 6720, 7150, 7330, 7350, 7355, 7650, NVH65, 75, NVJ30, NVL20, 23, 25, 28, NVG300, NVH65, NVF70, NVF51 NVF5 100, NVG 19, 20, 25, 33, 40, 50, NVV8000 140p NVD48, NVD80, NVG21 NVG45 140p NVJ700PX 140p NVHD100, NVHD101, NCHD90, NVSD30, NVSD40 1125p PINCH ROLLER ASSEMBLY AG5150, 5250, 5700, 6024, NVD38, 48, 80, NVF55, 65, 70, 75, 77, NVF51, 100, 200, 80, 90, NVG 19, 20, 21, 22, 25, 28, 300, 325, 40, 45, 46, NVG50, NVH65, 75, NVJ30, 33, 35, 37, 40, 42, 45, 47, NVL20, 23, 25, 28, NVW 1 PINCH ROLLER ASSEMBLY 300p	N.E.C. N830, 831, 832, 833, 895 140p PCV2300, 2400, 740, 744, 746, 760, 764, 766 140p DX1000, 1600, 1800, 2000, 3000, N9012, 9013, 9014, 9016, 9033 N9034, 9053, 9054, 9055, 9056, 9066, 9096, 9110, 9120, 9510, 9520, N9530, 9610, PX 1200 140p DS6000G, DX4000, N9077	MS7000 140p ORION VH1, VH2 V150, 160, VH3, 33, 200, 201, 205, 212, 250, 254, 280, 300, 303, 312, VH404, 555, 700, 704, 712, 770, 780, 844, 900, 1000, 2948, 3030, 3312 VHF2A, VP2948 140p COMB 15000, 16000, HV03, LVH50, NEVH, NEVHM, NEVHML, TVP230RC, VCP, VH04, 30, 103, 300, 358, 360, 362, 400, 416, 512, VH530, 532, 535, 536, 600, 630, 635, 640, 666, 730, 735, 744, 774, 790 VH800, 820, 850, 888, 893, 900, 930, 940, 942, 974, 1012, 1040, 1050, VH1060, 1070, VH1100, 1120, 1204, 1440, 1500, 1660, 1800, 2004, VH2151, 2308, 22042400, 2500, 2600, 2700, VH2960, 2970, 3050, VH3060, 4000, 4008, 4010, 4012, 4015, 4015, 4020, 4300, 5020, VP 10, 200, 220, 225, 245, VR221, 925, 1032, 2949, 2959, 2957, 2966, 2979, 2980, VTV300, VXL20, 25, 30 140p	PHILIPS VR6460 VR6920 140p VR2020, VR2021, VR2022, VR2023, VR2024 140p VR6540 140p VR6560 140p VR6566, 586, VR702, 703, 6485, 6585, 6589, 6745, 6880, 6948 140p VR485, VR642, VR6542, VR6643, VR6843, VR6943, 44S89 140p DV464, 662, VR2220, 2300, 2324, 2330, 2334, 2340, 2350, 2414, VR2480, 2485, 2486, 2489, 2490, 2498, 2840, 6462, 6463, 6464, 6560, VR6660, 6860, 6861, 6862, 6863 140p N-1700, VR2870 140p VR2025, VR6580, VR6581 140p 49S86, VR3260, 6349, 6448, 6449, 6548, 6648 PRESSURE ROLLER ASSEMBLY PS403-40205 VD186, 190, VR211, 2115, 212, 213, 223, 286, 291, 292, 311, 312, 313, VR3210, 3219, 322, 3229, 323, 535B0, 486, 471, 562, 582, 571, 761, VR201, 202, VR203, 302, 303, 305, 6180, 6182, 6185, 6285, 6290, VR6291, 6293, 6362, 6367, 6390, 6391, 6393, 6467, 6468, 6470, 6561 VR6570, 6581VR6600, 6676, 6710, 6760, 6761, 6762, 6870, 6970, VR6975, 86B1, 63S87, 68S84, 71S84, 71S85, 72S88, 72S89, 92S831, 20DV1, 20DV2, 20RW7, 21DV1, 21DV2, 25S81, 25S82, 25B11, 25B12, 30DV2, 31DV1, 31DV2, 31DV3, 35S802, 35S803, 35B05, 35B11, 35B12, 35B13 VR231, 232, 332, 422, 4229, 512, 5229, 720, 7229, 723 140p VR501 PR38 140p	SANYO VHR1100, 1110, 1150, 1200, 1300, 1500, 2100, 2300, 2370, 2500, VHR2700, 3300, MVR220 140p VTC5000, 5150, 5300, 5350, 5400, 5500, 6000, 6100, 6500, 9100, VTC3300, VTCM10, 20, 11, 21, 30, 31, 40, 50, VPS8800 140p VHR3100, 3300, 3310, 3400, 3500, 3700, 3800, VHRD500, 700 140p VTC3000 140p VHR120, 130, 14, 141, 143, 14, 150, 151, 153, 154, 15, 16, 171, 194, 22 0VHR23, 235, 240, 244, 250, 251, 274, 27, 297, VH130, 335, 350, 390, VHR4100, 4105, 4150, 4200, 430, 4300, 4350, 4400, 474, 470, 5800, VHR5100, 5200, 5300, 5350, 5600, 5700, 6050, 7100, 7200, 7250, VHR7260, 7300, 7400, 7440, 7500, 7520, 7530, 7540, 7700, 774, 780, 0VHR7810, 8000, 8070, 8100, 8200, 8250, 8500, 8800, VHRD4400, 4410, 4500, 4600, 4610, 4710, 4890, 6700, VHR8700 140p VCR100 140p VHR120, 135, 150, 190, 4150, 4160, 4350, 5200, 5240, 5350, 7200, 7250, 7260, 7700, VHRD410, 4610, 4710, 4890, 5450, VHR5700 975p PINCH ROLLER ASSEMBLY VHR3100, 3200, 3300, 3310, 3400, 3700, 3800, VHRD500, 700 1350p PINCH ROLLER ASSEMBLY	SHARP VC200, 381, 383, 384, 385, 386, 388, 390, 393, 800, 2300, 3300, 6000, VC6200, 6300, 7300, 7700, 7750, 7800, 8300, 8380, 9100, 9300, 9400 VC9500, 9600, 9700, 9800 140p VC300, 387, 402, 471, 473, 477, 481, 482, 483, 486, 488, 496, 500, 571, 573, 581, 582, 583, 584, 585, 8481, VC5F3, VC5W2E, VCA1031 140p VCL08, 208, 405, 408, 550, 600, 651, 671, 674, 675	681, 682, 684, 685, 693, VC699, 700, 772, 750, 779, 780, 781, 7810, 782, 782MKT, 7822, 783, VC785, 786, 787, 793, 800, 7810, 7822, VCT72, VCF63, VCF63, VCA 100, 102, 104, 131, 140, 170, 202, 203, 211, 234, 303, 501, 502, VCA602, 5011, VCD801, 802, 851, 852, 881, 882, VCM73, VCT73, VCT72, VCB351 140p VC220 140p VCA10, 30G, 60, 103, 105, 106, 111, 113, 131, 211, 244, 254, 33, 35, 36, VCA37, 39, 40, 42, 454, 46, 47, 48, 50, 505, 51, 52, 53, 54, 55, 57, 58, 505, VCA60, 605, 612, 63, 67, 68, 1031, 11613, VCB311, 320, VCB597, VCD805, 806, 810, 815, VCH80, 81, 865, 910, VCS 1000, VCT310, VCT410, 610, VCT 1314, 5313, VCT990 140p VCR780, 790, VCA10, 103, 1031, 105, 106, 211, 244, 254, 255, 30, 35, VCA340, 43, 47, 50, 60, 605, 615, VCD806, 815, VCH80, 81, 83, 85, VCH865, 87, 910, VCS 1000, VCT212, 310, 410, 510, 610, VCT1314, VCTS313 525p PINCH ROLLER ASSEMBLY	SAISHO VHL3, VR1000, 2000, 2500, 3200, 3300, 3500, 3600, 3650, 3800, VRS4400, VRS5000 140p VR3400 140p	SAMSUNG SV716, 617, VB510, 520, 610, 616, 617, 619, 620, 626, 627, 629, 900, V910, V1510, 520, 611, 616, 621, 626, 900, 100, VXS10, 520, 616, VX617, 619, 626, 627, 629 140p SVX301, 303, 305, 307, 319, 322, VB710, 713, 710, 770, 971, 8220, VB8225, V1710, 730, 750, 770, 790, 8220, 8225, 970, VXT710, 710, 730, VX720, 730, 750, 770, 980, 825, 8225, 970, 971, 972, 8220, PX980, 981, 982, SE9000, 9001, SX7120, 7120, 7220, 7221, 7230, SX7301, VK8220, VPX31 140p VX8980 140p PX31 R, 32R, PXR30, SV80, SX3230, 3231, 3260, 3261, VS390, VX30, 31, 32, 3560, 3561, 370, 375, 380, VVK300, 301, 306, 307, 320, VKK321, 326, 330, 331, 336, 337, 350, 351, 356 PX990, 991, 992, S11230, 1240, SVX4000, 503, 504, 600, SX1230, SX1231, 1260, 1261, 1566, V11560, VPK43, VX1230, 1260, 1261, VX1560, 1561, 1850 140p	SONY SLC5, 6, 7, SL3000, 8000, 8080, 8200, SLJ 10, SLT6ME, SLT7ME 140p SLC9, 20, 24, 30, 33, 44, SLHF10, SLF1, 11, 20, 25, 30, 35, 60, 100, SLF200, SLF60PS, SLF90E, SLFH150, SLF30E, SLK88, 95, SLT20ME, SLT30ME, SLT50ME 140p BMC 100, BMC200, BMC500 140p SLV201, 202, 301, 302, 401, 402, 801, 802 140p SLV210, 270, 273, 275, 300, 353, 373, 410, 415, 416, 656, 715 300p SLV757, 777 140p SLV255 140p SLV275, 282, 315, 325, 353, 363, 373, 410, 415, 416, 474, 625, 656, SLV715, 725, 727, 757, 777, 815, 825, SLVX30, 50, 55 140p SLV125, 213, 225, 252, 255, 262, SLVX1, 20, 3 140p SLV215, 216EE, 275, 282, 315, 325, 353, 363EE, 373, 393, 410, 415, SLV416EE, 474, 494EE, 555UC, 559, 575UC, 579, 585HF, 595HF, SLV60W, 615, 625, 656, 676UC, 686HF, 696HF, 715, 725, 727, 757, SLV767H, 777, 815, 825, SLV67, 8, 9SLVX30AS, SLVX35AF, SLVX50AS, SLVX55DH, SLVX65BR, SV0140, 160 1250p PINCH ROLLER ASSEMBLY PART NO: X37277010 SLV210, 212, 270, 273, 275, 285, 300, 310, 335, 425, 427 350p PINCH ROLLER ASSEMBLY SV6700, 8750, 9700, VHR3100, 3200, 3300, 3310, 3400, 3700, 3800, VHRD500, 700 1350p PINCH ROLLER ASSEMBLY SL100, 200, SL20, 30, 33, 34, 40, 44, 80, 88, 9, SLF1, 20, 25, 30, 35, 45, SLF60, 65, 73, 90, SLHF100, 150, 950, SLK85, 95, SLO1700, SLS550, SLT0, 30, 50 300p PINCH ROLLER ASSEMBLY

VIDEO LAMPS

Models & Description	Order Code	Price	Models & Description	Order Code	Price	Models & Description	Order Code	Price	Models & Description	Order Code	Price
UNIVERSAL VIDEO LAMP 9V 80mV (310mm WIRES)	VL01	25p	AIWA, AKAI, ALBA, AMSTRAD, BLAUPUNKT, FERGUSON, FIDELITY, FISHER, FUJITSU, FUNAI, G.E.C., GOLDSTAR, GRANADA, GRUNDIG, HINARI, HITACHI, ITT, JVC (HRD SERIES), MATSUI, MITSUBISHI, NEC, ORION, NATIONAL, PHILIPS, SAISHO, SALORA, SAMSUNG, SANYO, SHARP, SIEMEN, SONY, TELEFUNKEN, THOMSON, TOSHIBA	VL05	100p						

MODE SWITCH

NV2000, 2010, 7000, 7200, 7800 (VS50048)	
NV230, 260, 430, 810, 870, 2300, 4300 (VSS0110)	£3.50
NV830 (VSS0091)	£2.25
NV300, 333, 340, 366, 688, 777, 778 (VSS0060)	£2.10
NVG21, 25, NVH65, NVD80 (VSS0175A)	£3.75
	£2.00

AUDIO CONTROL HEADS

AMSTRAD ORIGINAL NO: 150751
 Used on: AMSTRAD TVR1, 2, 3, VCR4600, 4600MKII, 4700, FUNAI VS2, VCR4600, 4800, 5200, 5600, 6600, VIP3000, 5000
 Also fits: FIDELITY, FUNAI, HINARI, PROLINE, SCHNEIDER, TOWADA, UNIVERSUM
ORDER CODE: AH01 PRICE: 1350p

AMSTRAD ORIGINAL NO: 153134
 Used on: AMSTRAD DD8900, 8904, VCR2000, 6000, 6100, 8600, 8602, 8603, VCR8604, 8700, 8704, 8714, 8800, 9005, 8244
 Also fits: ANTECH, BONDSTEC, CASIO, CROWN, FIDELITY, GOLD-HAND, GRANADA, HINARI, MARQUANT, OMEGE, PROFEX, SCHNEIDER, SEG, SENTRA, SHINTOM, TASHIKO, TATUNG, TOWADA, UNIVERSUM
ORDER CODE: AH02 PRICE: 1450p

Replacement Audio Control Video Sound Head for National Panasonic

PART NUMBER	MODELS	PRICE
VBR 0091	NVG7 etc	875p
VBR0050	NV300, NV340 etc	875p
VBR0061	NV777 etc	875p
VBR0103A	NV250, NV450 etc	625p
VBR0125		625p

VIDEO TOOLS

VIDEO CLEANING STICKS

Price 17p each 15p each pack of 10pcs
 13p each pack of 25pcs
Order Code: SP14

VIDEO MAINTENANCE TOOLS

Set of 8 Allen keys packed in a plastic wallet
Order code: TOOL 9, Price 125p
 Specifically designed for video maintenance

UNIVERSAL HEAD EXTRACTOR

Hand tool designed for extracting hard to remove heads without damage to either the head or the mounting assembly. Adjustable so as to suit various heads.
Order code: TOOL 8, Price 600p

VCR ALIGNMENT KIT

CONTAINS: SET OF 7 HEAD & TAPE PATH ALIGNERS

- RCA TYPE AUDIO & CONTROL HEAD POSITIONING TOOL
- RCA ADJUSTMENT TOOL FOR TAPE GUIDE POSTS
- RCA TYPE BACK TENSION TOOL
- TENSION ADJUSTMENT TOOL FOR VARIOUS USES
- VCR ADJUSTMENT TOOL

SET OF 8 ALLEN KEYS

0.77mm	0.90mm
1.27mm	1.50mm
1.60mm	2.00mm
2.40mm	3.00mm

3 REVERSIBLE SCREWDRIVERS
SPRING HOOK

CIRCLIP PLIERS
MICRO SCREWDRIVER

VCR HEAD EXTRACTOR

Order code: TOOL 10, Price 2900p

TRANSPARENT REPAIR/ADJUSTMENT CASSETTE

This transparent videocassette replaces a normal videotape during measurements, adjustments and inspection. The mechanical parts come into sight and become accessible.

Order code: TOOL 23, Price 500p

BACK UP BATTERIES

PHILIPS

Part Nos: 138 - 101138, 138 - 10313 1.2v 90mA
 Order Code: BB01
 Part Nos: 138 - 10229, 2.4v 100mA
 Order Code: BB02

Price: 75p

Price: 135p

FERGUSON

Part No: 00E6 - 067 - 001 1.2V 100mA
 Order Code: BB03
 Part Nos: 00E6 - 606 - 8001 2.4V 100mA
 Order Code: BB04

Price: 90p

Price: 150p

SATELLITES

MAKE & MODEL	CODE	PRICE
PACE PRD800, PRD900	SATPSU1	600p
PACE SS9000, 9200, 9010, 9210, 9220	SATPSU2	550p
AMSTRAD SRD510, SRD520	SATPSU3	600p
AMSTRAD SRD500	SATPSU4	600p
AMSTRAD SRX340, SRX345, SRX350	SATPSU5	600p
PACE D100/150	SATPSU6	650p
CHURCHILL D2MAC	SATPSU7	650p
PACE MSS100	SATPSU8	730p

MAKE & MODEL	CODE	PRICE
PACE MSS200/300 APPOLL	SATPSU9	900p
PACE MSS500/1000	SATPSU10	1230p
FERGUSON SRD4	SATPSU11	650p
ECHOSTAR SR5500	SATPSU12	1600p
ECHOSTAR 6500/7700/8700	SATPSU13	2750p
AMSTRAD SRD600	SATPSU14	2600p
MIMTEC (Surensen)	SATPSU15	700p
AMSTRAD SRD700, SR950, SRX100, 301, 501, 502, 1002, 2001, SRD2000 SAT250	SATPSU16	650p

SATELLITE TUNERS

PACE PRD800/MSS200 2Ghz (221-2077062)
 ORDER CODE: TUNER01 PRICE: 1400p + VAT

PACE PRD900/MSS1000 2Ghz (221-21770112)
 ORDER CODE: TUNER02 PRICE: 1400p + VAT

SWITCH MODE TRANSFORMERS

PACE 9000
 ORDER CODE: PACE9000 PRICE: 800p

PRD800/PRD900
 ORDER CODE: PRD800 PRICE: 550p

SATMETER

The Satmeter is a professional portable satellite strength meter designed for the installation and maintenance of satellite TV systems. The Satmeter can be used as stand alone with powering the LNB as well as in loop.

Through operation with satellite RX powering the LNB.

* Acoustical signal: On signal strength *LED indicator: Vert/Hori

* Frequency Range: 900 to 2050 Mhz *Input impedance: 70 Ohm

* Power amplifier: 18db *Detection Range: -60 to -10 DBM

* Max. input signal: -10 DBM

ORDER CODE: TOOL22

PRICE: 8500p

REPLACEMENT TV SWITCHES

GRUNDIG

PART No: 29703, 29102
 USED ON:
 C7500, C8500, C8502, C8712...ETC
 Order Code: SW1 Price: 140p

PHILIPS

USED ON:
 K30, K35, K40, KT3, KT4
 Order Code: SW13 Price: 95p

SONY

USED ON:
 KV1612, KB1612, KV1614, KV2052, V2056
 KV2062, KV2067, KV2212...ETC
 Order Code: SW5 Price: 150p

USED ON:
 KV1400, KV1440, KV2040, KV2060
 (POWER SWITCH 26mm)
 Order Code: SW12 Price: 125p

SONY

USED ON:
 KV2020
 (POWER SWITCH 21mm +Remote)
 Order Code: SW6 Price: 200p

SONY 2 PIN FUNCTION SWITCH

Order Code: SW9 Price: 35p

FUSES

CURRENT RATING	TIME LAG (20mm)		QUICK BLOW (20mm)	
	ORDER CODE	PRICE	ORDER CODE	PRICE
100mA	FUSE36	75p	FUSE37	60p
160mA	FUSE01	75p	FUSE17	60p
250mA	FUSE02	75p	FUSE18	60p
315mA	FUSE03	75p	FUSE19	60p
400mA	FUSE04	75p	FUSE20	60p
500mA	FUSE05	75p	FUSE21	60p
630mA	FUSE06	75p	FUSE22	60p
800mA	FUSE07	60p	FUSE23	60p
1A	FUSE08	60p	FUSE24	60p
1.25A	FUSE09	60p	FUSE25	60p
1.6A	FUSE10	60p	FUSE26	60p
2A	FUSE11	50p	FUSE27	60p
2.5A	FUSE12	50p	FUSE28	60p
3.15A	FUSE13	55p	FUSE29	50p
4A	FUSE14	55p	FUSE30	50p
5A	FUSE15	60p	FUSE31	50p
6.3A	FUSE16	60p	FUSE32	50p

CERAMIC PLUG TOP

CURRENT RATING	ORDER CODE	PRICE
3A	FUSE33	100p
5A	FUSE34	100p
13A	FUSE35	100p

32 mm CERAMIC SLOW BLOW

CURRENT RATING	ORDER CODE	PRICE
8A	FUSE44	185p
10A	FUSE45	185p
15A	FUSE46	185p
20A	FUSE47	210p

NB. All fuses are made in the UK and fully meet BS4265 & BS1362 safety standards and should not be compared with cheap imported types

VOLTAGE TESTER

A terminal screwdriver incorporating continuity & voltage with Euroslot

ORDER CODE: TOOL11

PRICE: 220p

20mm CERAMIC TIME LAG

CURRENT RATING	ORDER CODE	PRICE
6.3A	FUSE38	100p
8A	FUSE39	100p
10A	FUSE40	100p
3 15A	FUSE41	85p
4A	FUSE42	85p
5A	FUSE43	85p

38mm CERAMIC TIME LAG

CURRENT RATING	ORDER CODE	PRICE
10A	FUSE48	825p

** ALL THE ABOVE PRICES ARE FOR PACKS OF 10 FUSES **

SPRING HOOK

Spring Hook, to unlock springs in audio tape recorders & VCRs

ORDER CODE: TOOL20

PRICE: 265p

FAULT FINDING / COMPARISON BOOKS

Satellite Fault Finding Guide Issue 1.
Listing about 1,000 faults for over a range of 24 different brands.

Order Code: BOOK05.

Price £8.50 - No VAT.

TELEVISION Edition 6

Lists more than 8,450 faults with 460 pages covering 58 different brands

Price: 1600p only - no VAT. Order Code: BOOK02

Satellite Repair Manual Edition 4

A comprehensive guide to receiver reviewing, featuring stock faults and installation tips.

Price £15.00 Only No VAT Postage 100p
Order Code: BOOK03

SEMICONDUCTOR COMPARISONS 1997/8

Listing more than 31,600 Semiconductors with suitable alternative complete with descriptions and base information.

Price: £15.50 - No VAT. Order Code: BOOK04

SEMICONDUCTOR COMPARISONS 1997

The new 1997 Jaeger Semiconductor with 952 pages packed with information on over 80,000 semiconductors in much greater detail plus marketing data on SMD devices and a separate generic table of all type designations.

Price: £40.00 only - No VAT (+ £5 Postage).
Order Code: BOOK06

Video Recorders Edition 5 1997

Over 300 pages packed with more than 5500 faults for different brands

Price £15.00 - No VAT. Order Code: BOOK01

SERVICE AIDS

DESCRIPTION	VOLUME	CODE	PRICE
VIDEO HEAD CLEANER	75ML	SP01	125p
SWITCH CLEANER	176ML	SP02	140p
SILICONE GREASE	200ML	SP03	170p
FREEZE IT	170ML	SP04	280p
FREEZE IT	400ML	SP16	570p
FOAM CLEANER	400ML	SP05	155p
ANTI-STATIC	150ML	SP06	155p
AEROKLEANE	135ML	SP07	185p
AERO DUSTER	150ML	SP08	290p
AERO DUSTER	400ML	SP17	550p
PLASTIC SEAL	200ML	SP09	230p
GLASS CLEANER	250ML	SP10	155p
COLOKLENE	250ML	SP13	225p
EXCEL POLISH 80	250ML	SP18	145p
ADHESIVE 120	400ML	SP19	190p
LABEL REMOVER 130	200ML	SP20	240p
REFURB 140	400ML	SP21	240p
TUBE SILICON GREASE	50 GRAMMES	SP11	200p
TUBE SILICON SEALANT WHITE	75ML	SP22	250p
TUBE SILICON SEALANT CLEAR	75ML	SP23	250p
TUBE HEAT SINK COMPOUND	25 GRAMMES	SP12	140p
DRIVE CLEANER	200ML	SP24	130p
SCREEN CLEANER	200ML	SP25	145p
COMPUTER CARE KIT	-	SP26	2100p

All the above items are manufactured by Servisol
If you purchase more than one Servisol Product, postage & package will be charged as follows:

300p for 2- 5 cans 500p for more than 5 cans

SOLDERING ACCESSORIES

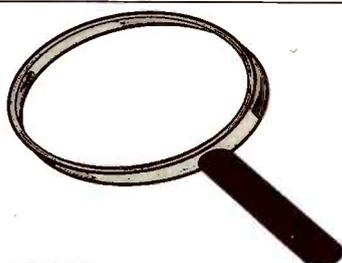
DESCRIPTION	CODE	PRICE
ANTEX SOLDERING IRONS		
25 WATT 240 VAC (XS25W 240V)	S101	900p
15 WATT 240 VAC (XS15W 240V)	S102	900p
25 WATT SPARE ELEMENT	S103	450p
15 WATT SPARE ELEMENT	S104	450p
SOLDERING STAND & SPONGES		
SOLDERING STAND (MADE BY ANTEX)	S108	350p
SPARE SPONGE	S109	55p
SOLDER		
18 SWG 500 GRAMMES	S110	500p
20 SWG 500 GRAMMES	S111	650p
22 SWG 500 GRAMMES	S112	700p
DESOLDERING AIDS		
SOLDER MDP STANDARD GAUGE 1.2MM X 1.5M	S107	80p
SOLDER MDP 1.2MM X 10M	S113	400p
DESOLDERING PUMP	S105	320p
SPARE NOZZLE	S106	60p

I.C. PROTECTORS

ICPF10, ICPF15, ICPF20,
ICPF25, ICPF38, ICPF50,
ICPF75

ICPN5, ICPN10, ICPN15,
ICPN20, ICPN25, ICPN 38,
ICPN50, ICPN75

PRICE: 30p EACH ONLY



CAN'T FIND WHAT YOU'RE
LOOKING FOR?

RING US...AS THIS IS ONLY
A SELECTION OF THE
ITEMS THAT WE STOCK

GRANDATA LTD

Tel: 0181 900 2329

Fax: 0181 903 6126

CASSETTE DC MOTORS

6V MOTOR	170p
9V MOTOR	170p
12V CW MOTOR	170p
12V CCW MOTOR	170p
13.2V MOTOR	290p

CASSETTE TAPE HEADS

MONO HEAD	90p
STEREO HEAD	110p
MINI HEAD	150p
AUTO REVERSE HEAD	200p

CD PICK UPS

Models & Description	Order Code	Price
AIWA XC007	KSS151A	1900p
DX-990A, DX-DIA CX180, CX185G, CX180, CXN130, CXN320, CXN330, CXN360, CXN490, CXN430, CXN540, CXN590, CXN990, CXN999, CXN920, CXSL70, DXZ9100M, FDN636, FDN636, FDN939, LCX60, LCX66G, LCX70M, LCX80, M7400, M75, NSX320, NSX360, NSX400, NSX430, NSX590, NSX992, NSX999, NSXD636, NSXD939, NSXV20, SFXN560, SFXN520, XC300, XC550, XC750, XC900, XC950, XCN992, XG320, XG360, XG400, XG990, ZD3000M, ZD3100M CXAP1, CXL7, CXLB8, CXLC50P, CXZ58, DXM740, DXM75, DXM76, DXM77, LCX50, LCX7, LCX8G, LCXAP1, XC002, XC004, XC005, XC777	KSS152A	1600p
XP31, XP33, XP55, XP80G XP6, XP7	KSS152A	1600p
AKAI CD73, DC93 CD25, CD26, CD27, CD32, CD36, CD37, CD52, CD55, CD57, CD650, CD670, CD69, CD750, CD79, CDM480, CDM600, CDM70, CDEM770, CDM959, MX550, MX570, MX650, MX670, MX750, MX950	KSS151A	1900p
DENON DCD1500U, DCD1520, DCD63520 DCD1400, DCD860, DCD980 DCD1420, DCD250, DCD310, DCD620, DCD660, DCD810, DCD820, DCD860, DCD910, DCD920 DCD1015, DCD1290, DCD2060, DCD2060G, DCD315, DCD480, DCD580, DCD615, DCD715, DCD825, DCD890, DCD895, DN2000F	KSS151A KS152A KSS210A	1900p 1600p 1800p
GOLDSTAR CD952A, CD952AJ, CD952J, CD952SJ, FFH101KL, FFH101WL, FFH222AL, FFH272L, FFH333L, FFH373K, FJ605, FR60L CD320AL, CD630SL, FFH212AL, FFH212E	KSS210A KSS210B	1800p 2000p
GRUNDIG CD360, CD435 CCD300, CD101MCD904, MC10, NEW ORLEANS CD KRCD100, RR1900CD, RR3100CD, RR4000CD, RR610CD, RR700CD CDP60, CDP90 CDP65 CD905	HOPM3 KSS210A KSS210B KSS220A KSS331A OPTIMA5	2150p 1800p 2000p 2500p 3400p 3000p
HITACHI DAW560 FX-10 AXC10	HOPM3 KSS210A KSS210B	2150p 1800p 2000p
J.V.C. 1990-1992, LATE 1987-1988 - XLE300BK, XLE319BK, XLE519BK, XLE900BK, XLM9E19BK, XLV101BK, XLV211BK, XLV222BK, XLV311BK, XLV333BK, XZ1010TN, XLZ111BK, XLZ444BK, XLZ555BK, XLZ611BK, CDRADIO CASSETTE, MINI SYSTEMS - MODELS 1990-1992 CA-C33, CA-MX300K, CA-MX333BK, UX-A6, UX-A6, XLM309, XLM403BK, XLM408, XLM409, XLM409, XLM409BK, XLM409TN, XLM508, XLM509, XLM509TN, XLM705TN, XLM-V131BK, XLM-V151TN, XLM-V221BK, XLM-V241BK, XLM-V242BK, XLM-V251TN, XLM-V252BK, XLM-Z1050TN, XLM-Z551TN, XLM-Z552BK 1994 ONWARDS - CAE488BK, CAMCG7, CAMXG9, CAS208K, CAS309K, VAS50, CAS608BK, MXS20, MXS30, MXS60, PCX105, PCX130, PCX95, RCX230, RCX320, RCX520, RCX620, RCX720, UXA4, UXA5, UXA65, UXC7, UXT1, UXT3, XLF115, XLF116, XLF215, XLF216, XLMC100M, XLMXG7, XLMXG9, XLV163TN, XLV184BK, XLV174, XLV263TN, XLV264BK, XLV274BK, XLZ463TN, XLZ464BK, XLZ574, XTMXG7, XTMXG9, XTS60	OPTIMA3 OPTIMA4S OPTIMA5	4000p 5000p 3000p
KENWOOD DP47, DP66SG, DP9020, DP87, L1000D DP100, DP110, DP2010, DP2030, DP3010, DP3030, DP3050, DP4030, DP491, DP5010, DP5030, DP5040, DP520, DP7030, DP7040, DP7060, DP730, DP920, DP930, DP950, DPM650, DPM6630, DPM7730, DPM850, DPM991, DX6620, M225, M25, M450, M850, PD3030, PDM991, RDX25, RDXC3, RDXC3L, UD202, UD302 DPC42, DPC72, DPC77, DPC80, DPC92 DP1050, DP2050, DP3060, DP501, DP5060, DP722, DP76, DPB5, DPB9, M77A, PD3060, UD502, UD70, UD701, UD90, XE5 DPC321, DPC531, DPC531K, DPC721, DPC731 DP1060, DP2060. PART No: RCTRHB136AFZZ	KSS152A KSS210A KSS220A KSS240A KSS331A RH8136A	1800p 1800p 2500p 1900p 3400p 4500p
PANASONIC SLP177A, SLP202A, SLP212A, SLP222A, SLP277A, SLP377A, SLP477AK, SLP477A, SLP6100A, SLP6200A, SLP6400A, SLP6500AK, SLP6500AS, SLPJ24A, SLPJ26A, SLPJ27A, SLPJ28A, SLPJ325A, SLPJ325A, SLPJ37A, SLPJ38A, SLPJ46A	691-30209	5500p

Models & Description	Order Code	Price
SAD30, SLCH9, SLP150, SLP170, SLP200, SLP202, SLP222, SLP230, SLP250, SLP333, SLP370G, SLP400C, SLP555, SLP777, SLP999, SLP1A10, SLP2C20, SLP2C5, SLPJ25, SLPJ26, SLPJ27, SLPJ37, SLPJ45, SLPK25, SLPK26, SLP550, SLP570, SLP5840, SLP5900	SOAAD70A	2350p
PHILIPS AZ8304, CD070, CD080, 690, 910, 920. PART No. 4822-691-20768 CD100, CD130, CD1380, CD1482, CD200, CD204, CD210, CD300, CD303, CD304, CD380, CD480, CD482, CD500, CD592, CD582, CD583, CD584, CD610, CD620, CD630, CD780, CD781, CD782, CD840, CD853, CD859, CD914, CD941/19, CD918 AS440, AS445, AS540, AS540, AZ8049, AZ8049, CD070, CD080, CD081, CD163, CD165, CD690, CD710, CD720, CD732, CD740, CD750, CD910, CD920, CD935, FW17, FW21, FW26, FW30, FW35, FW360, FW380, FW40, FW41, FW46, FW56, FW66, FW68 CD1210/40 AZ8006 FW11	4822-691 691-30209 CDM12.1 CDM12.4 KSS210B OPTIMA6S	3100p 5500p 1800p 2200p 2000p 3300p
PIONEER PDM400, PDM410, PDM500, PDM510, PDM600, PDM610, PDM700, PDM710, PDM730, PDT303, PDT403, PDT503, PDX940M, PDX950M, PDZ560T, PDZ72T, PDZ73T, PDZ81M, PDZ82M, PDZ83M, PDZ960M, XZ53T, XZ54T N32, N90M, PD101, PD201, PD32, PD41, PD450, PD4700, PD52PD5700, PD651, PD6500, PD6700, PD700, PD8700, PD970, PDCP420, PDCP520M, PDCP520T, PDJ400T, PDJ500T, PDJ800M, PDJ800M, PDM450, PDM450, PDM630, PDM650, PDM750, PDM801, PD710T, PD720T, PD910M, PD920M, PD9301, PD5601, PD5701, PD5701G, PD5801, PD7310, PD7510, PDZ, PDZ70T, PDZ74T, PDZ84M, PDZ970M, PKA1349, S135CDT, S135CDT, S303CDM, S303CDT, S560DM, S560DT, S707DM, S707DM, S990DM, S990DT, XCP10M, XCP410T, XZ54T, XZ55T, XZ64M, XZ64T, XRP210, XRP320 PDM400, PDM410, PDM500, PDM510, PDM600, PDM610, PDM700, PDM710, PDM730, PDT303, PDT403, PDT503, PDX940M, PDX950M, PDZ560T, PDZ72T, PDZ73T, PDZ81M, PDZ82M, PDZ83M, PDZ960M, XZ53T, XZ54T, XZ55T, XZ62, XZ62M, XZ630, XZ6282	KSS151A	1900p
SAMSUNG CD20 CD1200, CD1310, SCM-6000, SCM6900 RCD1200, RCD1300, RCD1350, RCD1600, RCD2600, RCD990, RCD995, SCM6900	HOPM3 KSS210A SOH90T4N	2150p 1800p 3600p
SANYO DCFS3, DCT55, DCX502, DCX701, DCX702, DCX802, DCX891, DCX891N, MCDZ10. PART No. 6142186855 DCFS5, MCD490K, 660K, MCDZ30L, 60F. PART No. 6142205006 DCX1000MD, DCX1003, DCX900MD, DCX903, DCX919 DCX10, DCX11U, DCX20, DCX30, DCX30AT, DCX, DCX8U, DCMS1, DCX110, DCX120, DCX210, DCX220, DCX993, DCX994, MCDMS40L, MCDMS50L, MCDMS60L, MCDZ1L, MCDZ2L, MCDZ3L. PART No. 6142391303 DCD12. PART No. 6450055966 MCDZ31L, MCDZ41L, MCDZ61L, MCDZ71L	614218 614220 KSS210A 614239 645005 KSS210B	2300p 5600p 1800p 3300p 3700p 2000p
SHARP CD-111, CD-301, CD-302, CD-304, CD-310, CD-C3, CD-L700, CD-L800, CD-U1, CD-U10, CD-X10, CD-X12, CD-X15, CD-X16, CD-X17, CD-X20, CD-X9, CKL650, CM95CD, DX-150, DX-160, DX-450, DX-460, DX-461, DX-650, DX-660, DX-999, DX-A3, DX-N45, DX-R54, DX-R7, DX-R75, DX-R750, DX-R77, DX-R770, DX-R820, DX-R840, DX-Z100, DX-Z1000, DX-Z1500, GFC055, QT-30CD, QT-33CD, QT-350CD, QT-37CD, QT-38CD, QT-CD20, QT-CD33, RS95, SC-77CD, SC-99CD, SC-RS95, SG-A1, SG-W10D, SG-W2CD, SYS302, ZCD7CD. PART No. RCTRHB122AFZZ QT-300D, QT-65CD, QT80CD. PART No. RCTRHB124AFZZ DX-R40L. PART No. RCTRHB130AFZZ CDS360E, 360M, 370, 450HIE, CMS150CDH, CMSR400CDH, CP150, CPR400, CPS360, 370. PART No. RCTRHB136AFZZ	RH8122A RH8124AF RH8130AF RH8136AF	5750p 2900p 2900p 4500p
SONY KSS240A KSS212A KSS151A KSS210A KSS210B KSS220A KSS331A KSS360A	KSS240A KSS212A KSS151A KSS210A KSS210B KSS220A KSS331A KSS360A	1800p 3500p 1900p 1800p 2000p 2500p 3400p 2600p
TECHNICS SLP200, SLP230, SLP250, SLP333, SLP555, SLP777, SLP999, SLP1A10, SLP2C20, SLPJ25, SLPJ45, SLP5700, SLP5900	SOAD70A	2350p

REMOTE CONTROLS

Description	Code	Price	Description	Code	Price	Description	Code	Price	Description	Code	Price			
AKAI RC-V10A RCV 37 B V25A	RC876 RC891 RC896	650p 650p 650p	A512120/230 A514790 A5088470 A518612 SCL002 C2096 A511940 6556Q2H	RC900 RC901 RC902 RC903 RC904 RC905 RC906 RC1920	650p 650p 650p 650p 650p 650p 650p 650p	PANASONIC EUR51200 TC2200 VSQ0357/NV730 TNQ1621	RC200 RC204 RC202 RC203	650p 650p 650p 650p	SONY RM604, RM605, RM606 32 CHANNEL RM613 RM632, RM636	RC140 RC140 RC141 RC160	650p 650p 650p 600p			
DECCA RC70	RC894	650p	ITT IFB13, 14, 15 FS4 RG305 RG306 FS9/1-10/1 VS5 RUK VS4-1 MULTICONTROL (17C20)	RC143 RC148 RC305 RC306 RC307 RC308 RC308 RC311	650p 650p 650p 650p 650p 650p 650p 650p	PHILIPS RC5002.5154 KT3 NON TEXT 69117032 69117194 RC5991-UNIV RC38 KT3 TEXT RC352 RC375 RC5 STANDARD RC5903	RC134 RC135 RC178 RC180 RC301 RC5301 RC5352 RC5375 RC300 RC5903	650p 650p 650p 650p 650p 650p 650p 650p 650p	TATUNG FXA RC70 FX70 FASTTEXT TELEFUNKEN FB632 FB639 THORN/FERGUSON 3V35-42 3V31-32 3V57-58 TX10 TEXT TX10 STEREO TEXT TC9-90-100 3V55, FV11 TX100 FASTTEXT TX100 ST, FASTTEXT PROFESSIONAL TOSHIBA CT937 CT9117	RC877 RC883 RC894 RC160 RC632ST RC639 RC342 RC344 RC628 RC732 RC738 RC740 RC783 RC789 RC790 RC950 RC951	650p 650p 650p 600p 650p 650p 600p 650p 650p 650p 650p 650p 650p 650p 650p 650p			
FISHER RC905B	RC879	650p	LOEWE DC11	RC146	650p	SALORA SERIES L 86173	RC190 RC882	650p 650p	SANYO RC218, RC222, RC228, RC238 JXGE JXDE VHR2300 RC628 SHARP G0121CESA, 123CESA, 204, 251	RC140 RC878 RC884 RC890 RC865 RC140	650p 650p 650p 650p 650p 650p	ORION RC53	RC892	650p
GRANADA UNIVERSAL TEXT MK4 TEXT, 70155G, 70115G, 70133G 95288E 94490D	RC309 RC880 RC882 RC884	650p 650p 650p 650p	MATSUI 010270601 VX770	RC889 RC892	650p 650p	NOKIA SATELLITE	RC550	650p						
HITACHI CLE800-CLE830 A617402/655602	RC140 RC1920	650p 650p												

WE STOCK REMOTE CONTROLS FOR OVER 5,000 DIFFERENT MODELS RING FOR MODELS NOT LISTED ABOVE ON 0181 900 2329

8 way Preprogrammed Universal Remote Control

A single remote control to operate Televisions, Videos and Satellite Receivers. Plus Auxiliary Options!
• Replaces up to 8 remotes with one • Simple 4 digit setup routine
• Controls 1000s of models • Teletext functions with Fastext
• Clear (large key) layout • Code Search Facility
• Stylish and easy to operate • Replace broken or lost remotes
• Original remote not required

Order Code: 8 WAY

PRICE: 14.50p + VAT

2 way Preprogrammed Universal Remote

• Replaces up to 2 remotes (TV/Satellite)
• Simple key arrangement
• Set-up by library review

Order Code: 2 WAY

PRICE: 925p

HELP WANTED

The help wanted column is intended to assist readers who require a part, circuit etc. that's not generally available. Requests are published at the discretion of the editor. Send them to the editorial department - do not write to or phone the advertisement department about this feature.

Wanted: MAB8440P-D014 microcontroller chip for the Panasonic Model TX2636, or a complete front board (M). Also require any data/circuits for the Taylor Model 94A TV waveform and alignment generator (405 lines). Have a working Decca dual-standard monochrome receiver free to a good home. Tony Blakemore, Fowlers Ltd., 7-9 Oxford Street, Ripley, Derbyshire DE5 3AG. 01773 743 124.

Wanted: Circuit diagram for the Advance OS2200 oscilloscope. Ian Robinson, 60 Moor Street, Spondon, Derby DE21 7EB. 01332 873 990.

Wanted: Nicam board for the Philips Model 25PT532A/05 (GR2.2AA chassis). Will pay all costs involved. Phone Bob on 01296 421 070.

Wanted: TACS control board (PC1223-002) for the Ferguson Model 66H3 (TX100 chassis). J. Southwell, Aquarius Electronics, 125 Honeysuckle Road, Bassett, Southampton, Hants SO16 3BT. 01703 396 567/346 942.

Wanted: Circuit diagram and any other information for the Mullard type E7600/3 valve tester. Peter Hill, 63 Harpur Avenue, Littleover, Derby DE23 7EL. 01332 606 979.

Wanted: Information on how to fit text board no. 1-610 989 21 to the Sony Model KV2752UB. Also operating instructions for the Salora 5902 or Nokia 1200 satellite receiver. H. Foyne, 7 Ennerdale, Tanhouse, Skelmersdale, Lancs WN8 6AG.

Wanted: Loan of a service manual or a photocopy of it for the Ferguson Model 3857 (1691 series chassis). In particular need to know the equivalents for the field output transistors VT23 and VT24 which are both faulty. A. Watson, 2 Masfield Avenue, Padiham, Burnley, Lancs BB12 8SK.

Wanted: Circuit diagram for a 15in. SVGA monitor that bears the name Superview 1280 at the front and Model TE1654M on the nameplate at the back. It was made in Taiwan for Highmead Fountain. Am also looking for a working Philips V2000 type machine for transfer of existing tapes to the VHS format. Ken Clarkstone, 18 Eltham Park Gardens, London SE9 1AW. 0181 850 2864.

Wanted: Service manual or circuit diagram for the Polatech monitor type Polar E.B., which was made in Switzerland. It is used on a Polar 115 guillotine. Len E. Fleming, 72 Eastway, London E9 5JH. 0181 985 8659.

Wanted: Service sheet (photocopy OK) for the Britannia Model B1014R television receiver. Len Orwell, 21 Chilcot Close, Poplar, London E14 6AN. 0171 987 1504.

Wanted: New tapes for the V2000 VCR system, preferably VCC480 or VCC360 types. Paul Hardy, 43 Sheridan Avenue, Caversham, Reading RG4 7QB. 01189 475 869.

Wanted: CD cover or complete top for the Hitachi MX-W50 Opus HiFi system. Would consider buying complete non-working system if case is tidy. Stuart Fletcher, 131 Walsh Avenue, Hengrove, Bristol BS14 9SQ. 01275 891 893.

Wanted: LOPT for the ITT Model CD752/P (CVC30 chassis). P.T. McKeever, 4 Castleview Park, Derry BT48 8DL. 01504 353 613.

Wanted: TUV-C PCB (part no. BK2001F01002A) for the Amstrad Model DD8900. Joe Thomas, JD Electronics, 35 Northgate, Canterbury, Kent CT1 1BL. 01227 458 903 (0900-1700 Tuesdays to Saturdays).

Wanted: Information on the following ICs: C1251 (NEC), T2333 and T2563 (both Toshiba) - or where can I obtain this information? The ICs are used in the pre-heat timer of a Diahatsu 4WD. Reg Fullerton, 5 Shilgrove Place, Castledawson, Co. Londonderry BT45 8AL. 01648 468 477.

For sale: Service manuals for Panasonic/Technics models covering the last eight years. All in mint condition. Includes camcorders, Hi-Fi, Walkmans, in-car equipment, microwaves, vacuum cleaners and TV sets (including the Euro, Alpha and Z chassis) but no VCRs. James Burch, 9 Groveland Road, Beckenham, Kent BR3 3PU. 0410 626 002.

Wanted: Service manual (photocopy OK) for the Sony CCDF335E camcorder. George Stephens, 69 Oldfield Estate, Tewkesbury, Glos GL20 5QT. 01684 296 216.

Wanted: VHF channel-change knob for

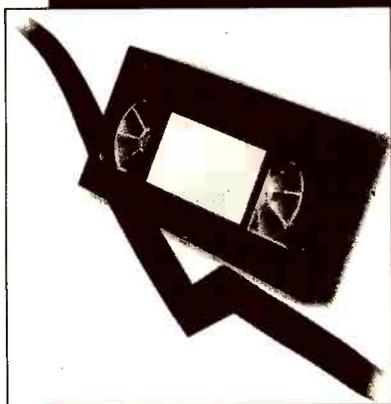
the Sony 9-306. Tube for the JVC CX610GB. Sony 9-90UB with front cover in good condition. C.D. Evans-Fleming, 3 Walton Road, Clacton-on-Sea, Essex CO15 6DV. 01255 423 551. **For disposal:** Satoki talking watch £20. Hilka soldering kit £10 - soldering gun, soldering iron, helping hands, solder pump, holder, solder and scraper, as new. Sanyo Sportster Walkman with anti-roll mechanism and new headphones £10. Shiva Fastpht 4 10BASE2 Ethernet/802.3 auto data switch with BNC/AUI and Appletalk sockets £30. Crosstalk for Windows communication software v2.0.1E rev. A £27 - includes Prestel, Minitel 2 and BTX/CEPT-1 emulations, boxed in mint condition. Julian Bohan, 30 Stanley Street, Lincoln LN5 8NG. 01522 871 926. **Wanted:** Can anyone tell me the correct 22in. tube type for the ITT Digi 3 110° chassis (Model TX3447)? Require scan panel assembly board 3 (index 82929) for the Rediffusion Mk. 4 chassis, 8 rotary tuner unit (55-332) for the ITT Model C20WK1/B, and a tube base for the Decca 130 chassis (A56-X540 tube). R. Bruce, 11 New Zealand Way, Rainham, Essex RM13 8JP.

Wanted: Circuit diagram/service manual or any parts for the Hi-Beam CRT video projector Model HB250. Will accept reverse charges on 01449 723 009 or write to R. Gifford, 4 Gipsy Lane, Needham Market IP6 8DY.

Wanted: £1 coin-operated TV meters, any quantity, preferably working though non-workers considered, electronic or manual, free-standing or fixed, with keys. G.H. Jones, Einion Electrics, Bridge Street, Llanfair Caereinion, Welshpool, Powys SY21 0RZ. 01938 810 539.

For disposal: Two Philips VR2020 VCRs, one with remote control. Complete but just stopped working. Twenty tapes, mostly four-hour. With instruction and service manuals. Buyer collects. A.W. Hankin, 32 Brae Court, Kingston Hill, Kingston-on-Thames KT2 7QQ. 0181 546 3662.

Wanted: Service manual (photocopy OK) for the Telequipment type S51B servoscope, and probes if possible. B. Marsden, 25 St. Georges Road, Newquay, Cornwall TR7 1RE.



Reports from
Philip Blundell, AMIEEIE
Robert Marshall
Ronnie Boag
Pete Gurney, LCGI
Adrian Farnborough
Brian Storm and
Maurice Kerry

Toshiba V423

The sound would mute and field sync would be lost when there was a lot of white in the picture being played back. A scope check at pin 1 of the mute chip showed that with the pictures concerned the video signal had no sync pulses. When I traced back along the circuit to find the source of this input I came to an AN3248 luminance processing chip. To cut a long story short, I eventually found that the associated 3.3 μ F electrolytic capacitor CN09 had fallen in value. **P.B.**

Philips VR727

A tape would sometimes jam in this machine, with the loading motor in operation but unable to fulfil its purpose. A replacement drive belt seemed to cure the problem, but the fault recurred. With the power off, the loading cycle could be performed without any problems, but insert a cassette and there was lock up.

The cause of the trouble was eventually traced to a wonderful Philips innovation, the 'intermediate lever'. It sits under the arm mechanism, controlling the tape in the capstan and audio/control head area. You see it as a flat bit of plastic (item 32 in the Philips diagram) that goes over part of the main timing gear. Take it out and look at its underside. There's but a

VCR Clinic

single tooth – in this machine half a tooth. Philips, which is always "Years Ahead", is ready for you with Service Kit F. It contains parts 29 to 32. **R.M.**

Sony SLV425

This machine was playing dead – it couldn't be switched on. The operate switch had no LED indication, but the drum was twitching. Suspicion fell on the power supply, where C5030 had fallen in value. It should be 47 μ F but read only 2 μ F. **R.M.**

Ferguson 3V43/JVC HRD725

Playback picture dropouts appeared on the screen in exaggerated form instead of being filled by the dropout compensator. IC8 in the dropout compensator circuit switches between the main (pin 12) and delayed (pin 6) signals. When a dropout is recognised, IC4 generates a switching command (at pin 15) which is sent to pin 14 of IC8. The delayed signal is produced by IC9 (type TL8704P), using charge-coupling techniques. There was an input at pin 11 of this chip but no output at pin 7. So IC8 had been switching to nothing instead of the delayed dropout fill-in signal. A new TL8704P chip from Willow Vale cured the problem. **R.M.**

Samsung VIK350

When this VCR was powered the supply reel would turn for a few seconds, the lift would shuffle then the machine would go to standby. The problem was cured by replacing the lift side chassis and attending to dry-joints on the LED tower. **R.B.**

JVC HRD820

Tape spilled from the spool in the reverse search mode. There was no

further trouble once we'd replaced the mode state switch. **R.B.**

Daewoo V2000

The customer complained about wow with the playback sound. A new back-tension band cured the wow. **R.B.**

Nikkai J2

The 800mA fuse in the power supply had blown and there was a hum bar in the E-E mode. Normal operation was restored by replacing the fuse and the 100 μ F, 50V electrolytic capacitor in the power supply. **R.B.**

Philips VR2547

This machine would shut down after three seconds in play. It uses a permutation of the deck mechanics originally designed for JVC 540/560 series VCRs. In this case the cause of the trouble was a faulty take-up sensor, something that's quite common with the earlier JVC machines.

Note that in this machine the tape-end stop sensors are mounted on the deck PCB, not on the cassette lift, with two plastic light guides for coupling. To prevent the sensors operating and causing additional, misleading symptoms, shield the deck from strong light while working with the lid off. **P.G.**

Mitsubishi HS621V

It was not possible to load a cassette and, under certain lighting conditions, the cassette housing (more correctly the 'bottom unit') would shuttle forwards and back – reminiscent of something useful in the cotton industry a couple of hundred years ago!

After a time spent delving amongst the many optical devices used on this deck I found that D5B5 was faulty. It's a LED-type

device, part no. SLR-932C-20-AB-T1. A.F.

Mitsubishi M16

This machine would accept a cassette but the loading arms would arrive at the V blocks with the tape left behind. In addition the pinch roller didn't engage with the capstan. Feeling fairly perplexed, I replaced the mode switch. This didn't make any difference.

Checks were then carried out around the M37420M6-490SP microcontroller chip IC5A0. It appeared to be at fault and a replacement cured the problem. A.F.

Panasonic NVHS1000

Poor slow-tracking performance was the complaint with this machine: random noise bars would appear in the pause and slow jog modes. Everything else worked perfectly. Having had trouble with the capstan motor in other K mechanism machines I tried a new capstan stator (part no. VEK5927). Fortunately this cured the fault. B.S.

Panasonic NVHD605

There was no loading motor operation. Even when the test modes were accessed the motor stubbornly refused to rotate. Checks around the loading motor drive chip IC2001 showed that there was no voltage at pin 7, where the loading motor drive torque is controlled. The cause of this was C6002 which was short-circuit. It's an 0.22 μ F surface-mounted electrolytic.

I subsequently had a similar machine with weak loading motor drive. C6002 was again the cause, but this time it had developed an unhealthy leak. B.S.

Panasonic NVSD200

One of these VCRs permanently displayed fault code F06 at the front. On investigation I found that the main right-hand side carriage loading arm had bent away from the carriage and become jammed against a metal guard. The reason for the distortion became apparent when a new loading shaft assembly (part no. VXP1339-1L) had been installed.

When a cassette is inserted, Q7 lurks beneath the nylon loading arm. In fact it almost touches the arm – and it gets very, very hot! The replacement loading shaft assembly is an improved version, but it is still made of nylon and Q7

still gets very, very hot. I judiciously tilted Q7 away from its original position and hoped for the best. B.S.

Panasonic NVHD605

There was no display and the drum was rotating at a very high speed. The 2SD1330 transistor Q1004 in the power supply had failed. B.S.

Panasonic NVFS100

In the S-VHS mode this machine recorded a blank picture, though playback was perfectly good. I hooked up an oscilloscope to trace the signal through the congested luminance and chrominance pack and found that it faltered at the ceramic module IC303, where a corroded capacitor told its own sorry tale. The module is available under part no. VCR0389. A replacement restored the S-VHS recording facility. B.S.

Panasonic NVHD660

This machine's on-screen menus and tuning signal were incorrectly coloured and rolled down the screen. I suspected IC7705, which is the PAL encoder for the OSD information. But the culprit turned out to be the surface-mounted capacitor C7703 (0.22 μ F), which is connected to pin 12 of IC7705. It was badly leaky. B.S.

Panasonic NVHD605

This machine would accept a cassette then eject it almost immediately. The cause of the rejection was a problem in the capstan motor circuit. The motor rotated at high speed but failed to tell the system control circuitry that it was working: at this point the tape was ejected. C2043 (0.47 μ F), a surface-mounted capacitor in the FG feed circuitry, was eventually found to be short-circuit. B.S.

Panasonic NVSD410

This VCR wouldn't complete the auto-tune operation, though stations could be tuned in by using the manual method. After much tearing of hair and grinding of teeth I eventually found that C7708 (0.1 μ F), which is connected to pin 7 of the teletext processor chip IC7708, was leaky. It's a surface-mounted capacitor. B.S.

Panasonic NVJ35

Standard-speed recordings were played back as though they had been recorded in the long-play mode – with no colour in the trick modes and wide noise bars in cue

and review. After much chasing around in the servo circuitry I found that the surface-mounted, 1.5k Ω resistor R2302 was open-circuit. It had developed a hairline crack at one end. B.S.

Panasonic NVHD660

The E-E picture was too light and crushed while the playback picture had no colour. The TDA9725 luminance and chrominance signal processor chip IC302 was faulty. B.S.

Daewoo V50

The customer had complained about a "poor picture". We found that the drum speed was erratic and that when it did manage to lock the picture the colour was noisy and the picture jittered from side to side. In the stop mode the drum ran but was unstable: this could be heard as a pulsating buzz on E-E sound.

A scope check on the 12V motor supply showed that bursts of HF were superimposed on it. Replacement of C853 (47 μ F, 25V) cured the fault. It's as well to check C855 in the same area. M.K.

Maxell VR2100 (Sanyo deck)

Tapes were being chewed because the supply brake was on in the playback mode. The brake pivot shaft had broken at its base. To repair it we inserted a thin screw from below through the base into the pivot shaft, thus securing it. This cured the fault. M.K.

Ferguson FV71LV (R3000 Chassis)

Two power supply faults took us a little time to track down. When the VCR first came in it had a tape stuck inside and there were no functions. Checks in the power supply showed that it was tripping. The power supply can be run outside the machine. When we tried this it was still tripping. The over-current sensing resistor RP18 (1.5 Ω , safety type) was eventually found to be the cause. It tested OK, but a replacement cured the fault.

The machine came back again later with the complaint that it was dead. This was not true. The display went out when the VCR was put into standby. When it was brought out of standby the display came on. The cause of this was CP41 (220 μ F, 10V) which supplies the display filament. It had gone low in value. M.K.

Monitor Servicing

The Tatung Y2/Y2V Chassis

Monitors incorporate various features that you won't find in a TV set. Russ Phillips takes a look at the circuitry used in this popular monitor chassis and the faults that can arise.

The Tatung Y2 VGA/SVGA monitor chassis is basically similar to the Y chassis, and many of the notes in this article apply to the earlier chassis. The Y2 chassis is used in 3401 series monitors and in some Apricot monitors, including the XJ52178.

The Y2V chassis, used in 3401V series monitors, incorporates changes to comply with the MPRII radiation standard. Foremost amongst these changes is a new CRT, part no. 18-1021-9.

The Y2 and Y2V chassis have five operating modes, with line frequencies of 31.5-38kHz and frame frequencies of 55-87Hz. Depending on the mode, the line and the frame sync pulse inputs may be either positive- or negative-going.

We'll start by looking at the power supply circuit, which is shown in Fig. 1.

The Power Supply

The chopper power supply used in this chassis is based on a UC3842AN controller chip (IC801) which drives the MTP3N60 chopper FET (Q801) directly. The duty cycle of the drive waveform is varied to regulate the outputs from the power supply. Fig. 2 shows a block diagram of the UC3842AN chip.

IC801 requires a start-up voltage of around 17V at pin 7. This is supplied via R805 and D820, which charge CE813. Once the power supply is running, thyristor D821 (TICP106D) is switched on to disable the start-up circuit. This ensures that the power supply will not attempt to restart should a fault condition have shut it down. When the power supply is running the voltage at pin 7 of IC801 is maintained at 12.5V by the rectifier circuit D810, R820, CE813.

If the monitor appears to have no start-up, disconnect D821. If the power supply keeps trying to start up with D821 disconnected there is probably a short-circuit across one of the outputs. As with most TV sets, the most likely candidates are the BU2508AF line output transistor

TR407 or the line output transformer T402.

The secondary windings on chopper transformer T801 provide outputs at pins 15, 12 and 16. Pin 15 feeds the HT rectifier D813 (BYW96D) which produces 110V across its reservoir capacitor CE819. This supply is protected by the clamp network D822, C826 and R835. Pin 12 feeds rectifier D814 (BYW96D) which produces 21V across its reservoir capacitor CE820. This supply is also fed to the 78M12 regulator IC803 which produces a regulated 12V output. Pin 16 feeds rectifier D815 (SB140) which produces a 6V supply across CE821 for the CRT heaters.

The regulation circuit monitors the HT voltage and is based on the TL431CLP variable-voltage zener diode IC804 and the TLP731-LF2 optocoupler IC802. The emitter of the phototransistor in IC802 produces an output across R825 to feed the error voltage pin 2 of IC801. The supply for its collector is obtained from pin 8 of IC801 – this 5V supply is also used to switch D821 on.

Excess current protection is provided by monitoring the voltage across Q801's source resistor R808. This point is linked to pin 3 (current sensing) of IC801 via R823, with C825 for filtering. The supply shuts down in the event of excess current being detected, for example because of a short across one of the outputs on the secondary side of the circuit.

To set the HT voltage (RV832), the monitor should be provided with a blank raster signal with negative-going sync pulses at 31.5kHz and 60Hz. Set the contrast and brightness controls at mid-point, then use RV832 to set the voltage across CE819 to 110V \pm 1V.

R806 (0.33 Ω , 0.5W flameproof) provides protection should Q801 go short-circuit. Overvoltage protection is provided by zener diode D809, which conducts when the supply provided by the rectifier circuit D812/CE803 exceeds 16V. This fires thyristor D805 which latches on, removing the supply to IC801. CE804 is included to ensure that D805 is not triggered by spurious spikes.

If the chopper transistor Q801 has failed, D806, D807,

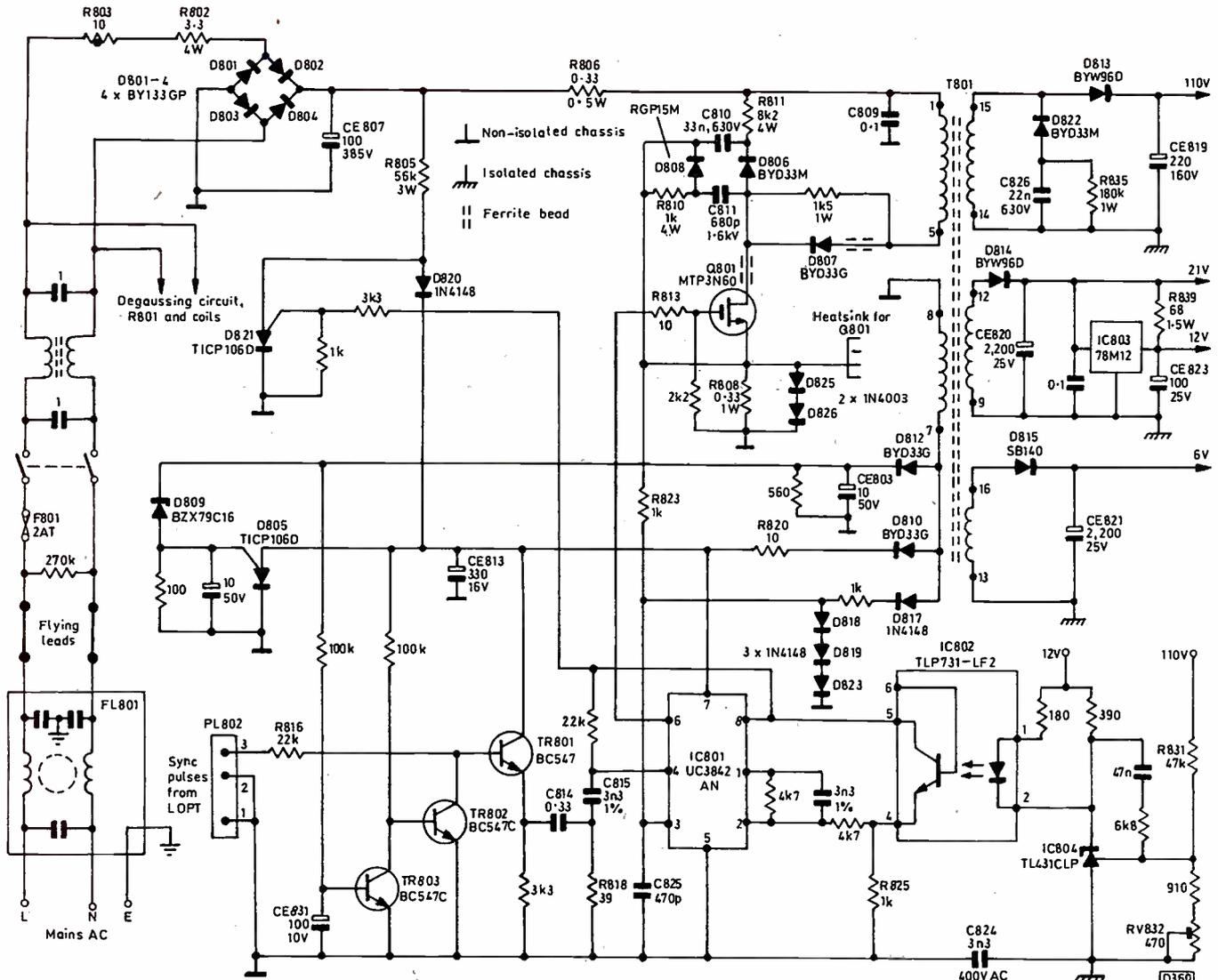


Fig. 1: The chopper power supply circuit used in the Tatung Y2/Y2V chassis.

D808, R806 and R808 should also be checked. Pulses from the line output transformer synchronise the operation of the power supply and the line output stage. These pulses are picked up by a single turn of wire around the transformer's core and are connected to the power supply by plug PL802. They then pass via R816, TR801 and C814 to the junction of R818 and C815 which form part of the oscillator circuit in IC801 (pin 4). This oscillator and the error amplifier connected to pin 2 provide the two inputs to the pulse-width modulator within IC801. This in turn generates the drive waveform for Q801.

B+ Regulation

The B+ voltage which is applied to the line scan coils via the primary winding of the line output transformer varies between 84V and 105V depending on the line frequency: higher frequencies require higher voltages. When the line frequency is at its lowest, i.e. 31.5kHz, the B+ supply is 84V: it's derived from the 110V HT supply via R509 with transistor TR504 in parallel (along with R508 and R514) – see Fig. 3. When a higher B+ supply is required, the forward bias applied to TR504 increases so that it conducts more heavily, reducing the voltage across R509 and the parallel network R508/R514/TR504. Negative pulses at an amplitude of about -280V are taken from pin 5 of the line output transformer and recti-

fied by D501/R501 and C502, providing feedback to the B+ regulator circuit to stabilise the width and the EHT supply. To check the B+ voltage, set up the monitor as for HT voltage adjustment and measure the voltage across CE425. At the line frequency of 31.5kHz the reading

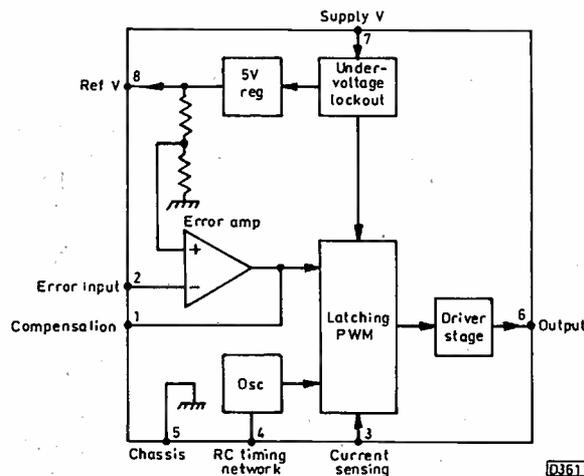


Fig. 2: Block diagram of the UC3842AN chopper control chip. 3842 series chips are widely used in monitor power supplies.

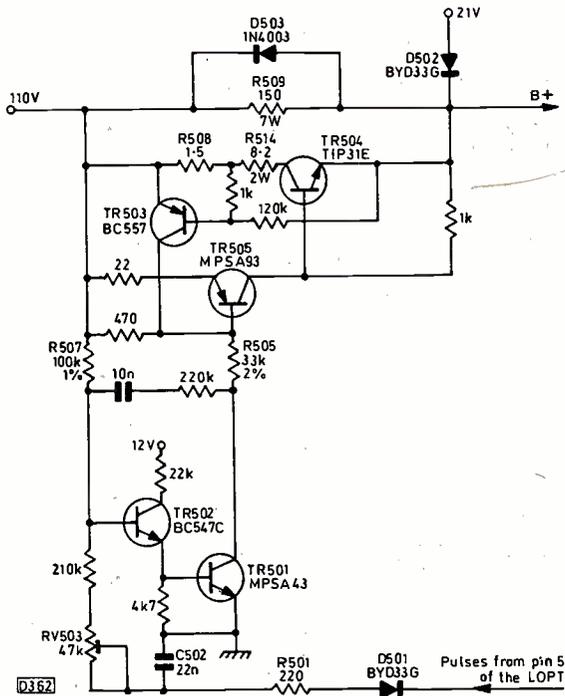


Fig. 3: The B+ regulator circuit.

Fig. 4: The excess EHT voltage protection circuit. There is also protection against excess beam current - TR420 monitors the voltage developed by the beam current flowing through R460.

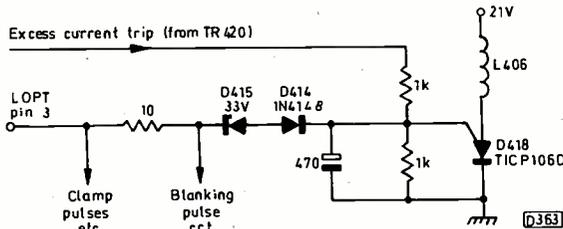
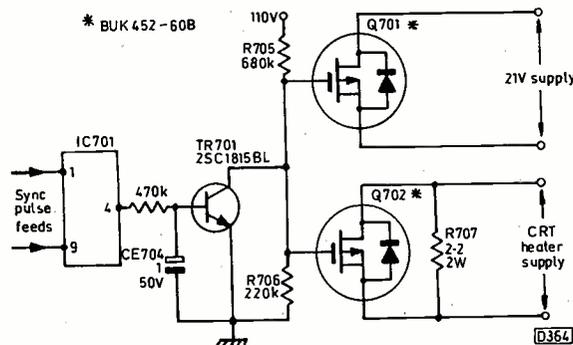


Fig. 5: This power management circuit is incorporated in some monitors that use the Y2/Y2V chassis.



should be 84V ±0.5V (85V ±0.5V with the Y2V chassis). RV503 is provided for adjustment.

D502 provides protection should a short-circuit occur across the B+ supply. In this event it will conduct heavily, shorting the 21V supply to chassis and thus forcing the power supply to shut down.

R501 (220Ω, 0.5W flameproof) is included to provide protection in the event of failure of D501 or C502.

Synchronisation

The incoming sync pulses vary in frequency and polarity. They are fed to the sync decoding logic section of the monitor where three 74 series logic chips are used, IC401 (74LS86) which is a quad two-input exclusive-or gate, IC402 (74LS123) which is a dual retriggerable monostable and IC403 (74LS156) which is a dual two-to-four line decoder with open-collector outputs.

IC401 is used to ensure that only positive-going pulses are fed to the line and frame oscillators. IC401 is also

used, with IC402, for mode detection. IC403 uses the mode detection signals from these chips to provide automatic height adjustment in the VGA modes, with RV422 providing correction. In the SVGA mode the user sets the height with RV409.

For SVGA operation pin 13 of IC402 is held high. TR417 switches on and TR405 switches off, enabling the line phase control to adjust the line frequency between 35.5kHz and 38kHz. For VGA operation pin 13 of IC402 is held low, switching TR417 off and TR405 on. This sets the line frequency at 31.5kHz.

The Frame Timebase

A TDA1675 chip (IC301) is used as the field generator and output stage. Positive-going frame sync pulses from pin 11 of IC401 are fed via R301 to pin 5 of IC301. C311, C312 and TR403 ensure that the amplitude of the field output waveform at pin 1 is correct. R307 (0.68Ω) in the field scan current path is the source of feedback which is fed to pin 12 of IC301.

TR301 controls the vertical centring. RV313 is provided as a user adjustment to centre the image.

The Line Timebase

An LM1391N chip (IC404) is used as the line generator. It incorporates a phase-locked loop. The line sync pulses are fed to pin 3. In the VGA mode TR405 is switched on and the frequency is set by RV429, R428 and C410. In the SVGA mode TR405 is switched off, adding RV433 and R493 to the circuit. This enables the oscillator to operate in the 35-38kHz region.

The line drive output from pin 1 of IC404 is fed to the base of a 2SD667AG transistor (TR406) which forms part of a conventional line driver stage, with transformer coupling (T401) to the base of the BU2508AF line output transistor TR407. There's a conventional EW modulator arrangement to tune the output stage, the diodes being D402 (BY328) and D403 (BYD73F) and the parallel capacitors C420 (4.7nF, 1.6kV) and C421 (15nF, 630V) respectively, with C422 (680pF, 1.6kV) to provide fine tuning. The voltage developed across C423 (3.3μF) in the EW modulator driver stage is used for EW and width control. There's also a DC potential for horizontal shift: this is controlled by plug and socket PL/SK403.

There's a fairly straightforward beam current limiting circuit which is connected to pin 8 of the line output transformer - this is the earthy end of the diode-split EHT winding. If the beam current exceeds 0.5mA the BC557 (pnp) transistor TR411 will switch on, reducing the voltage at the wiper of the contrast control RV211.

An excess EHT protection circuit (see Fig. 4) is connected to pin 3 of the line output transformer. If the pulses here exceed about 33V, zener diode D415 (BZX79-C33) and the 1N4148 diode D414 conduct, triggering the TICP106D thyristor D418. This will short out the 21V line and shut down the power supply.

The pulses at pin 3 are also used for line blanking and video clamping. The clamp pulses are fed via pin 6 of SK202 and plug PL202 to pin 15 of IC201 on the video panel. Mixed blanking pulses are fed to the video panel via pin 5 of this plug and socket.

Pin 9 of the line output transformer feeds the rectifier circuit D411 (BYG33G), R467 (1kΩ) and CE428 (10μF, 100V) which produces a -64V supply for the brightness control circuit. The voltage at the slider of the control (RV469) is also fed to the video panel via pin 5 of SK202/PL202.

Pin 4 of the line output transformer feeds the rectifier circuit R472 (4.7Ω, 0.5W), D410 (BYD33G) and CE429 (100μF, 25V) which produces a -15V bias supply for the

RGB output stages. This is fed to the video panel via pin 8 of SK202/PL202.

Video Circuitry

The incoming RGB analogue video signals are terminated by 75Ω resistors and fed via 100µF coupling capacitors to pins 3, 7 and 11 respectively of the M51387P chip IC201 on the video panel. This IC provides gain control, cut-off control and DC restoration.

The RGB outputs appear at pins 29, 25 and 21 respectively of IC202. They are fed to the RGB output stages which are of the cascode type. Those familiar with Decca/Tatung chassis will know that this type of output stage has been favoured for many years. Each output stage has a 2SD1610C transistor (top) and a 2SD468C transistor (bottom) to which the input is fed. The output stages receive their supply from the 110V line and use relatively low-value load resistors (two 680Ω, 3W resistors in series in each stage) with a series peaking coil. The drive to the tube's cathodes varies between 93V (black level) and 40V.

Power Management Circuit

Some monitors fitted with the Y2/Y2V chassis incorporate a power management PCB. The circuitry on this panel reduces the monitor's power consumption when either the line or the frame pulses are absent for more than about a second, enabling the monitor to take advantage of PC video boards that are compatible with the VESA display power management system (DPMS).

Fig. 5 shows the basic circuit. Line and frame sync pulses are fed to the 74LS123 dual retriggerable monostable chip IC701. Provided both sets of sync pulses are present,

the output at pin 4 remains low. This output is fed to TR701, which is thus switched off. With TR701 off, Q701 and Q702 are biased on by the potential divider R705 and R706 and the 21V supply to the line driver stage is maintained.

If one or both sets of sync pulses is missing, pin 4 of IC701 goes high and TR701 switches on. The gates of Q701 and Q702 will thus be at chassis potential and they will switch off. There will be no 21V supply to the line driver stage, and the monitor's power consumption will be reduced to less than 30W. With Q702 switched off, R707 is added in series with the tube's heater supply, which is thus reduced.

CE704 is included to prevent the circuit operating when the monitor is first switched on.

Conclusion

From my experience these chassis have proved to be reasonably reliable. Most of the faults I've encountered have been straightforward, but one is worth special mention.

The monitor had a blank screen. When the first anode voltage was turned up (at the line output transformer) a blank raster appeared. Oscilloscope checks around IC201 showed that the inputs were healthy, but there was nothing but blanking pulses at its outputs. Naturally I fitted a new (and expensive) M51387P IC. The cause of the fault however was TR411 in the beam limiter network. This BC557 transistor was short-circuit. Since the first occasion I've had the same fault with several other monitors.

A quick way to check this out is to remove plug PL204 from socket SK204 on the main panel. If the picture comes up, TR411 is probably faulty. A BC307 can be used as a replacement – it has the same pin connections.

MARAPET ELECTRONIC COMPONENTS
 Tel: (01452) 53 22 53 Fax: (01452) 549514

QUALITY SPARES for the CONSUMER ELECTRONICS SERVICING TRADE
 THIS IS JUST A VERY SMALL SAMPLE OF OUR STOCK. We can supply spares for a vast range of Makes & Models. Please contact us with your requirements, we'll be pleased to offer a 'PRICE & AVAILABILITY'. Many General Components and obsolete Home Computer Spares also available. Telephone or write for a Selected Spares Guide.

MONITOR FLYBACK TRANSFORMERS		COMPUTER LEADS	
This is just a sample of the types we can supply.		AMSTRAD PC14CDR (I) Signal Cord	£21.85
ACORN/DIGITAL/IBM etc	P.O.A.	COMMODORE AMIGA to PHILIPS CM8833	£7.95
AT2090/08 (ESCOM)	£19.95	IBM KEYBOARD EXTN. (Standard DIN)	£2.95
CALIBRA AT2090/48	P.O.A.	SPECTRUM/C64 TV-RF	£0.95
COMMODORE 1084SD1 (2 types)	P.O.A.	Many other leads available - for Printers and Modems, etc	
COMMODORE 1084P/1084SP	£20.95	TV FLYBACK TRANSFORMERS	
COMMODORE 1084ST	P.O.A.	FERGUSON TX90 90 (RED SPOT)	£16.99
ELONEX AT2090/33	P.O.A.	FERGUSON TX100 51CM FST	£16.99
GOLDSTAR/DELL 154-166A	£27.91	We can supply many other LOPTx's, for ALBA & BEKO through to TOSHIBA & ZANUSSI. Please supply model no. and full information from original part.	
OLIVETTI TF200A	£26.95	SELECTED VIDEO HEADS	
OLIVETTI 1172.0018	£26.15	AMSTRAD TVR1/VCR4500/5200	£13.99
PHILIPS CM8833 Mk 1 (popular uSlot type)	£20.95	FISHER FV HP420/615/720/721/722	£15.99
PHILIPS CM11342 (CM8833 Mk 2)	£23.95	GOLDSTAR GHV12XX series (Most)	£12.56
CONTACT US FOR TYPES NOT SHOWN. NB: Please supply all markings from the original flyback, as some monitors utilise more than one type number.		SHARP VC381 to VC388	£10.99
		These are quality heads - Phone for models not shown	

SELECTED AUDIO SPARES		SEMICONDUCTORS	
AIWA CAW51K	KNOB - Play (R/H) DECK	BC848B	£0.20
AMSTRAD CDX Midi (Funai) MX200	SPRING - Cassette Door	DTC144ES	£1.28
AMSTRAD CDX Midi (Funai) MX200	DOOR - Cassette (R/H)	PC713V	£2.89
HITACHI CX-W500EK	KNOB - Operate (On/Off)	RZG	£1.29
PIONEER PDX550	MOTOR - Loading	TAB410K	£4.59
SANYO M2114L	BELT - Capstan	14DN476G (Amstrad)	£9.99
SHARP RGF278/291/284/B13K/616	BELT - Main Drive	27C256-200	£3.50
TOSHIBA ST-U2/U2L	TRANSFORMER - Mains	SED9420CAC	£9.99
SONY CDP222/910	CD Pickup - KSS151A	TAB125S	£4.88

Our range of Video Spares is now much expanded - we can supply parts for over 150 makes. Try us also for a wide range of: Remote Controls, TV On-Off Switches, Posistors, Resistors, Capacitors, Fuses, Connectors, Cables, Tools, Domestic Electrical Accessories and much much more...

EQUIPMENT MANUALS
 Large range of Manufacturers Service & User Information available. Original manuals supplied if possible. We only show a few examples here.

AIWA NSX-800	£9.56	AMSTRAD PC4386X	£16.29	AMSTRAD PC5286	£18.31
BINATONE 01/9771	£8.25	HITACHI CPT2658	£9.42	PIONEER XCP-410M/T	£14.53
PANASONIC KXP-1123	£12.41	PANASONIC TX2	£9.52	PHILIPS CM11342	£10.83
PHILIPS CM8524	£7.42	PHILIPS CM8833 (Mk 1)	£9.49	TOSHIBA ST-U2	£7.49

When ordering, please add £1.50 P & P and then add 17.5% VAT. (N.B. VAT is due on P & P - Equipment Manuals are zero-rated). Small payments by Card accepted, however a nominal surcharge may apply - please enquire. Overseas orders welcome - minimum P & P is £3.00, but please check to avoid delays. 'Validity Dates' required for card orders, also the Issue No. for SWITCH. All stock items despatched as quickly as possible, subject to clearance of payment. All items subject to availability - Prices can change without notice.

Very sorry, we are unable to accept callers - Please order by PHONE or POST.
 We accept: VISA, ACCESS, MASTERCARD, DELTA, SWITCH, EUROCARD
 M.E.C. 1 HORNBEAM MEWS, GLOUCESTER GL2 0UE

? **PARTS UNAVAILABLE** ?

? **TOO EXPENSIVE** ?

SECOND HAND PARTS FOR VCR

(Complete boards, head motors, loading motors, capstan motors, mechanisms, panels, etc.)

CALL/FAX
 01349 884804
EASI-SPARES
 (at RADCOM UK)

10 Avern Road Alness IV17 0PT

Payment by cheque with order (no credit cards) to RADCOM; prices on application plus p&p for all orders.

See us on
<http://www.angelfire.com/az/radcom/index.html>
 Email on user@wardrop.dial.netmedia.co.uk

This time J. LeJeune describes the modulation techniques used for digital TV transmission and the reasons for employing different systems for satellite, terrestrial off-air and cable broadcasting

Introduction to Digital TV

It is often said that there is nothing new under the sun, which in many cases is true. Take the transmission of digital signals for example. The first Marconi wireless transmissions were digital in nature, using on/off signalling and the Morse Code. The transmitter was manually keyed by using the Morse key, the carrier being on to signal a dot or dash.

Forms of Modulation

This is a kind of amplitude modulation, as the carrier is made to vary between zero and 100 per cent by the code characters. The actual term given to this mode of transmission is CW (continuous wave) – which it clearly isn't because the carrier is transmitted only when the Morse dots and dashes are being sent! With the key in its up position, there is no transmission. The method is slow and requires two operators, one at each end, to encode and decode the messages ('traffic').

Message transmission was speeded up with the advent of the teleprinter, using the 7-bit Gray Code. It could also be automated. A better method of transmitting the teleprinter signals ('RTTY') was sought: it was felt that there should be a positive indication of the off (space) as well as the on (mark) state of the code. This led to the use of Frequency Shift Keying: one or other of two closely-spaced radio frequencies is transmitted, one to indicate a mark and the other a space. In essence this is a form of frequency modulation.

Either amplitude or frequency modulation can and still is used for music and speech in analogue form. FM requires a greater bandwidth, and as a result is used in the higher broadcast bands.

A third form of modulation has come into use for both analogue and digital signal transmission – phase modulation. With an analogue signal, the phase of the carrier varies in sympathy with the modulating signal, the reference point being the unmodulated carrier phase. It is often necessary to incorporate a reference oscillator in the receiver to obtain accurate demodulation. Synchronous demodulation (as in a PAL decoder) or the phase-locked loop principle can be used.

Quadrature Phase Shift Keying (QPSK)

Nicam sound, which is digital, uses a variant of simple

phase modulation called QPSK – Quadrature Phase Shift Keying. Two carriers at the same frequency but with a 90° phase difference between them are used. The carriers are referred to as I and Q (In-phase and Quadrature). By shifting one or both carriers by 180°, you get four different phasors as shown in Fig. 1. These can be used to denote the four possible states (00, 01, 10, 11) of a two-bit binary code. Each state is referred to as a 'symbol'.

The three most common methods of digital TV signal delivery, terrestrial off-air, satellite and cable, will all use MPEG-2 compression in the UK. The chief differences between them will be in the modulation method employed. This is chosen to match the characteristics of the transmission medium.

Satellite Digital TV

Satellite digital TV is to use QPSK. The arrangement shown in Fig. 1 is the basis of what is called a "phase constellation map", in which phasor end points rather than the actual phasors are shown – see Fig. 2. Satellite transmission involves the use of low transmitter powers and high-gain aerial systems at the transmitting and receiving end to provide noise-free gain. The noise floor with a satellite transmission is not very low however, which is why QPSK was chosen. With a digital transmission noise tends to move, confusing the phase constellation points. With only four phasors, there is plenty of room to move before the decoding system fails to recognise what is being transmitted.

With QPSK the I and Q carriers are always at 90° with respect to each other and their amplitude is constant. This makes it fairly easy for the demodulator to recover the original modulation, particularly in the presence of noise.

Because there is no phase reference built into the receiver, it might seem to be necessary to transmit a reference to enable the I and Q carriers to be identified. Each phase change (symbol) takes a certain time to transmit. A form of QPSK in which successive phase changes are made in relation to that of the previous symbol can be used. This system, known as 'differential coding', removes the need to transmit a reference.

The transponders used for satellite transmissions are

also able to handle analogue signals sent using FM. Thus the on-board transmitters are essentially non-linear. The transmission path is noisy but is not subject to reflections (multi-path reception) and is largely free from interference. This makes QPSK the ideal choice. Down here on Earth however the situation is different.

Cable TV - 64-QAM

It is worth considering briefly the requirements with cable TV. Traditionally CATV networks have used coaxial cable for local distribution with high-quality optical-fibre transmission for the trunk networks. The weakest link in the chain determines the overall performance of the system, and the modulation method chosen for cable has to be suited to this.

Noise is not a serious problem with a modern cable network. Low-noise amplifiers are readily available and operate linearly when within their recommended ratings. The cables pass amongst buildings of all sorts and conditions however, picking up electrical interference. This is at a low level, and need not seriously impair the service. Narrow-band amplifiers are used in places to provide automatic level control of individual channels. Because of the traffic density with a modern CATV system, the channel limits are maintained closely, both in level and bandwidth.

The digital modulation system that has been chosen for cable TV is known as 64-QAM. Quadrature Amplitude Modulation (QAM) is a variant of QPSK: it employs both amplitude and phase modulation of I and Q carriers, giving in all a total of 64 combinations of phase and amplitude. These combinations are referred to as 'symbols'. The I and Q carriers retain their quadrature relationship, but there are more phase states than the simple 180° changes with QPSK.

Fig. 3 shows the phase/amplitude constellation for 64-QAM. The provision of more points in the constellation means that more data can be packed into a symbol period. But because the points in the constellation are closer together, the tolerance of 64-QAM to a noisy environment is much less than that of simple QPSK. This is not a serious consideration for cable TV. Reflections caused by impedance mismatches within the system are a problem however, and to compensate for this and for interference heavy (and expensive) coding of the signal is used. It provides comprehensive error correction.

For digital cable TV a single carrier is used for 64-QAM.

Terrestrial Digital TV - COFDM

64-QAM also forms the basis of digital terrestrial off-air TV transmissions. But the environment is much less benign than with cable. Terrestrial reception is subject to flat fading, frequency-selective fading, reflections and interference of various kinds. Frequency-selective fading is often caused by multipath effects. If the main and the reflected signals have a phase difference of 180° they will tend to cancel out.

All these problems affect an analogue signal transmission and cause some degradation of the picture and sound quality, but the nature of the analogue system is such that a picture of some sort can be obtained. Careful aerial alignment can be used to minimise the effects. With digital transmissions data loss is a more serious problem.

Although 64-QAM is the basis of terrestrial digital TV, it is not - as with cable TV - used with a single carrier. Instead, a modulation system called Coded Orthogonal Frequency Division Multiplexing

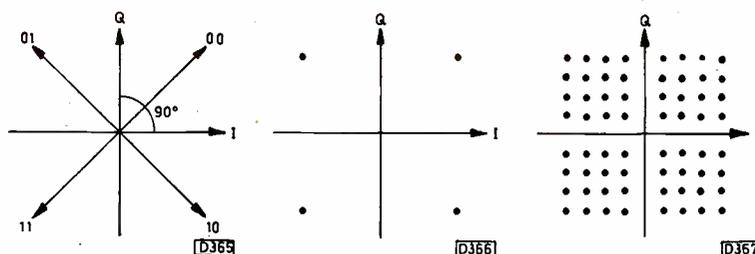


Fig. 1 (left): The QPSK modulation technique. Two carriers at the same frequency but with a 90° phase difference between them can each be shifted through 180°, giving four possible phasors each able to convey a two-digit combination (known as a symbol). **Fig. 2 (centre):** This way of depicting the conditions shown in Fig. 1 is called a constellation map. **Fig. 3 (right):** Constellation map for 64-QAM, which has 64 possible phase/amplitude states.

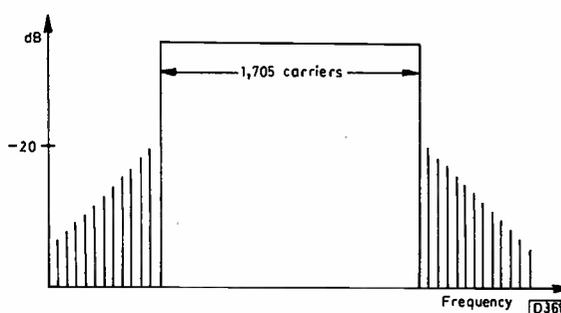


Fig. 4 (left): Spectrum of the 2K COFDM signal to be used for terrestrial off-air digital TV transmissions in the UK.

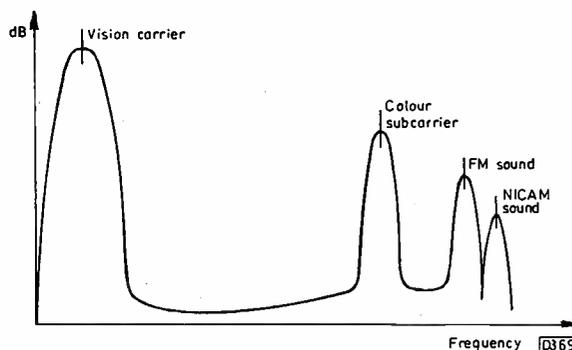


Fig. 5: For comparison, the RF energy distribution in an analogue TV channel.

(COFDM) is used. The frequency division multiplex implies a multi-carrier system; orthogonal means at right angles, so the carriers are in quadrature; coded means that some frequency interleaving and other error avoidance measures are employed to ensure a rugged transmission.

In the UK, the modulation will be split amongst 1,705 carriers. This is referred to as the 2K option: continental European broadcasters may adopt the 8K option, which uses 6,817 carriers. With the 2K option each carrier has to transport about two-thousandth the symbol rate with 64-QAM. The coding interleaves the data in time and frequency to provide enhanced error correction possibilities.

Fig. 4 shows the spectrum with 2K COFDM. The arrangement enables the 8MHz channel bandwidth to be fully used - contrast this with the analogue channel signal spectrum shown in Fig. 5. You can see that the system makes more efficient use of spectrum space.

Fig. 6: Carriers with orthogonal frequency spacing - the carriers are 90° apart and don't interfere with each other.

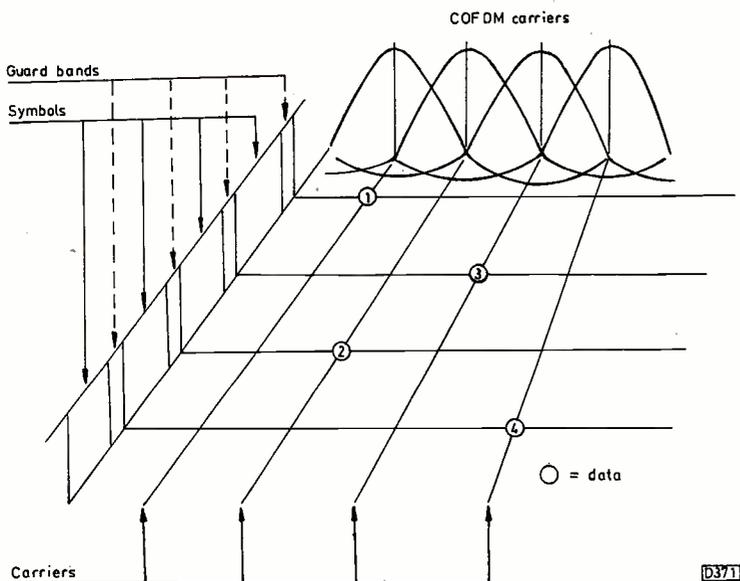
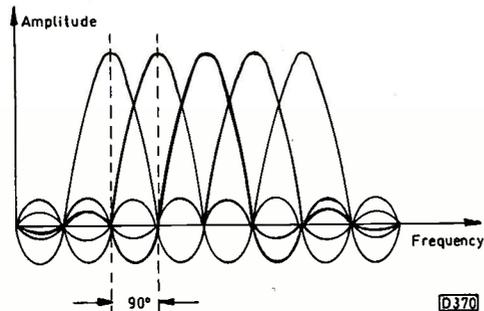


Fig. 7: Three-dimensional representation of a COFDM signal. 1-4 interleaved data.

Because of their orthogonal frequency spacing, the COFDM carriers do not interfere with each other – see Fig. 6.

Since each carrier's data rate is low, the symbol rate per carrier is much longer than with QPSK and QAM. This provides tolerance to multi-path effects. To enhance this tolerance, a guard band is added to each symbol period to lengthen it. Echoes that occur within the symbol period cause a flat signal fade. Those that occur outside it, in the guard interval, produce the effect of a phase sum and difference: the result is frequency-selective fading. The guard interval also prevents inter-symbol interference, which could present two symbols to the demodulator simultaneously – one of which would be the correct one!

Fig. 7 shows a three-dimensional representation of a COFDM signal, in time, frequency and amplitude. It also shows the interleaved data. In the event of a strong frequency-selective fade some carriers will be boosted while others are attenuated. An efficient coding system is used to identify and retrieve data lost as a result of such conditions. The coding cross-references data bits, enabling bits mutilated by fading or interference to be recovered. It is a very intricate process that's called convolutional coding – an apt description! In fact it actually makes use of echoes to improve the signal-to-noise ratio of the received signal.

Advantages of COFDM

Because of its coding and the guard interval which is added to each symbol, COFDM is very tolerant of multi-path reception. This would make it possible to use a single-frequency network (SFN) for a national broadcast service. With the same channel in use by all the transmitters that broadcast the same service, signals from distant transmitters would appear as long-delay echoes. The actual minimum separation between transmitters would be somewhere in the region of 45 miles. Because there is not a free frequency for the purpose, it is not an option in the UK at present.

The power-filled COFDM spectrum enables much lower transmitter ERPs to be used. Typically, a 5kW station in south London could cover the area from Basildon to Bracknell and Hitchin to Reigate. Much of the reception in this area would be possible using a simple set-top Yagi aerial.

Any fill-in stations required with an SFN system would again use the same frequency, making life simpler for the aerial industry and for installers. Thus the change to digital transmission could make life easier for everybody.

Analogue and digital services will have to coexist for a number of years however. It could be that the analogue services will close down as the transmitters show signs of becoming unserviceable: by that time the majority of viewers could be expected to have obtained digital receivers.

Obtaining Signals

Signal seeking and aerial alignment will call for techniques different from those used for analogue transmissions. If you recall the early days of satellite TV, colour or even VHF radio, you will appreciate that we will have to go through the same learning process with digital TV.

Some digital satellite receivers have a menu page that shows a signal-strength bar graph. This assists with dish alignment, and enables the viewer to judge whether the signal has deteriorated since the dish was installed. The system works by reading the Bit Error Rate (BER), which is checked in the receiver by the error-correction circuitry. The higher the BER, the shorter the bar-graph column.

Ideally a spectrum analyser should be used for dish or terrestrial aerial alignment, as it enables optimum signal-to-noise ratios to be determined visually and accurately. To rely on the BER for aerial alignment will not always result in the best reception conditions. COFDM is capable of producing excellent pictures using a set-top aerial, but there will still be black spots – as there are with analogue services. Despite this, the digital network should provide excellent coverage throughout the country.

Summary

The coming of digital TV will change things for ever. For the viewer it will mean vastly improved facilities, with an electronic programme guide and superior quality pictures. For the service engineer it will mean a change of thinking because of the computer-like processing of the image and sound. Things will never be the same – they could even be better!

In the concluding instalment next month we'll take a look at satellite digital receiver servicing techniques.

Is looking for . . .

ICs TRANSISTORS SEMIs an up hill struggle?

A phone call to us could get a result. We stock a very wide range . . . and with a World-wide database at our fingertips we are able to source even more. We specialise in devices with the following prefix (to name but a few):

2N 2SA 2SB 2SC 2SD 2P 2SJ 2SK 3N 3SK 4N 6N 17 40 AD ADC AN AM AL BA BC BD BE BF BV BW BX BY BZ CA CD CE CF CH CI CJ CK CL CM CN CO CP CR CS CT CU CV CW CX CY CZ DA DB DC DD DE DF DG DH DI DJ DK DL DM DN DO DP DR DS DT EA EB EC ED EE EF EG EH EI EJ EK EL EM EN EO EP ER ES ET EU EV EW EX EY EZ FA FB FC FD FE FG FH FI FJ FK FL FM FN FO FP FR FS FT FU FV FW FX FY FZ GA GB GC GD GE GF GH GI GJ GK GL GM GN GO GP GR GS GT GU GV GW GX GY GZ HA HB HC HD HE HF HG HH HI HJ HK HL HM HN HO HP HR HS HT HU HV HW HX HY HZ IA IB IC ID IE IF IG IH II IJ IK IL IM IN IO IP IR IS IT IU IV IW IX IY IZ JA JB JC JD JE JF JG JH JI JJ JK JL JM JN JO JP JR JS JT JU JV JW JX JY JZ KA KB KC KD KE KF KH KI KJ KL KM KN KO KP KR KS KT KU KV KW KX KY KZ LA LB LC LD LE LF LG LH LI LJ LK LL LM LN LO LP LR LS LT LU LV LW LX LY LZ MA MB MC MD ME MF MG MH MI MJ MK ML MN MO MP MR MS MT MU MV MW MX MY MZ NA NB NC ND NE NF NG NH NI NJ NK NL NO NP NR NS NT NU NV NW NX NY NZ OA OB OC OD OE OF OH OI OJ OK OL OM ON OO OP OR OS OT OU OV OW OX OY OZ PA PB PC PD PE PF PH PI PJ PK PL PM PN PO PP PR PS PT PU PV PW PX PY PZ QA QB QC QD QE QF QH QI QJ QK QL QM QN QO QP QR QS QT QU QV QW QX QY QZ RA RB RC RD RE RF RH RI RJ RK RL RM RN RO RP RR RS RT RU RV RW RX RY RZ SA SB SC SD SE SF SH SI SJ SK SL SM SN SO SP SR SS ST SU SV SW SX SY SZ TA TB TC TD TE TF TH TI TJ TK TL TM TN TO TP TR TS TU TV TW TX TY TZ UA UB UC UD UE UF UH UI UJ UK UL UM UN UO UP UR US UT UV UW UX UY UZ VA VB VC VD VE VF VH VI VJ VK VL VM VN VO VP VR VS VT VU VV VW VX VY VZ WA WB WC WD WE WF WH WI WJ WK WL WM WN WO WP WR WS WT WU WV WW WX WY WZ XA XB XC XD XE XF XH XI XJ XK XL XM XN XO XP XR XS XT XU XV XW XX XY XZ YA YB YC YD YE YF YH YI YJ YK YL YM YN YO YP YR YS YT YU YV YW YX YY YZ ZA ZB ZC ZD ZE ZF ZH ZI ZJ ZK ZL ZM ZN ZO ZP ZR ZS ZT ZU ZV ZW ZX ZY ZZ + others.

We can also offer equivalents (at customers' risk). We also stock a full range of other electronic components.

Mail, Phone, Fax, Credit Card orders & callers welcome



Connect



Cricklewood Electronics Ltd

40-42 CRICKLEWOOD BROADWAY LONDON NW2 3ET
TEL 0181 452 0161 & 450 0995 FAX 0181 208 1441

P.V. TUBES

104 ABBEY STREET, ACCRINGTON, LANCS. BB5 1EE
Tel: 01254 390936/236521 Fax: 01254 395361

TRADE COUNTER OPEN MON-FRI 9-5, SAT 9.30-12 NOON, CLOSED ALL DAY WED.

Please add VAT 17.5% to all prices. We accept payment by cheque, Cash, Access, Visa. Add £2 pp for orders up to 1K. Heavier parcels add £4. Next day delivery on LG. Consignments POA. Goods will be despatched on the day we receive your order. If we are out of stock we will inform you ASAP. Please allow up to 28 days delivery.

CROWN TV/VIDEOS

10" AC/DC CTV	£163.00
14" RC CTV UHF/VHF	£122.00
14" RC UHF/VHF text	£145.00
21" RC	£184.00
21" RC text	£199.00
21" RC Nicam text	£225.00
28" RC Nicam text	£375.00
33" RC Nicam text	£749.00
Twin speed VCR with video+	£150.00

SATELLITE NEWS

60cm dish, wall mtd, boxed	£21.95
80cm dish, wall mtd, boxed	£39.95
Standard LNB	£24.95
Enhanced LNB	£24.95
0.8db enhanced LNB	£29.95
Digital universal 0.7db	£35.95
Twin enhanced LNB	£45.95
Multi LNB holder	£15.95
Astra ID converter	£19.95
D2 MAC decoder	£130.00
Pace MSS 100 rec. only	£120.00
Pace MSS 300 rec. only	£170.00

CHANNEL 5

JBX HIGH GAIN AERIAL WIDE BAND OR GROUP A/B/CD £22.95 + VAT

PV Tubes has been established for 20(0) years and has supplied the TV and electronics trade with components and service aids since it began. In a continuing effort to maintain the industries requirements it is our intention to make available an increasing range of specialised service aids and skills.

The PV1 multi-purpose degaussing coil is an example of our commitment to supply quality product at competitive prices. The PV1 degaussing coil is intended for use with a 240v mains supply, although a 120v version is available upon request. This compact and cost effective unit will have major interest to TV Service Departments, TV manufacturers, TV Sales and Rental Companies, TV Broadcasting Authorities, Universities and Colleges, The Armed Forces, Aviation and Computer Companies.

Specialised degaussing systems can be designed and manufactured to suit specific applications within many engineering environments.

As part of the strategy in supplying specialised skills within the electronics industry, we are able to offer design, consultancy, and manufacture of electronic products, specific to those larger customer requirements.

SPECIAL BUYS

Qty(10)
UK MOULDED 13A computer main lead - mtr.0.99 each
13A Fig 8 mains lead - 2 mtr. 0.99 each

WE ALSO

STOCK

TVs
VIDEOS
SATELLITE SYSTEMS
LNB/DISHES
REMOTE CONTROLS
VIDEO HEADS
SEMICONDUCTORS
VALVES
SCANNERS
AERIALS
FUSES
RESISTORS
CAPACITORS
LEADS
CABLES
SECURITY SYSTEMS
VIDEO TAPE
WALL BRACKETS
MULTI METERS
PLUG/SOCKETS

IF WHAT YOU NEED ISN'T LISTED - ASK! RING SHEILA OR EMMA

CAMPION WHOLESALE LTD.

QUALITY USED TV & VIDEO COMPLETE RANGE OF TVs VIDEOS AND SATELLITES

Most makes and models available
TVs from £3.00 • Satellites from £8.00
Videos from £15.00
Prices Ex-VAT

Free Delivery Service to most areas of the UK

U.K.s Largest Export Wholesaler
Specialists in conversions to most countries systems

UNIT 75, BARRACKS ROAD,
SANDY LANE INDUSTRIAL ESTATE,
STOURPORT-ON-SEVERN,
WORCESTERSHIRE DY13 9QB
Just 10 Mins from M5 Junct. 6 Worcs North

01299-879642 (3 lines)

FAX: 01299 827984

IS YOUR RENTAL BUSINESS EXPANDING?

Broughfame Ltd.

can help to expand your television/video rental business and increase your profitability.

Our rental Finance Plan offers you financial facilities from **£1,500** upwards.

Block Discounting finance also available.

For further details ring or write to:

Broughfame Ltd.

115A St John's Hill,
Sevenoaks, Kent TN13 3PE

Tel: (01732) 743400

Fax: (01732) 743335

E-Mail: R@Broughfame.Tel Me.com

Long-distance Television

Terrestrial DX conditions and reception, satellite TV sightings and news, and the saga of planning permission for a second dish.
Roger Bunney reports

September means the start of autumn, when the nights become colder and longer. It should also mean improved tropospheric reception. September 29-30th probably produced the best opening so far this year. At the time of writing it's too early for any reports to have come in, but I can report on the situation here at Romsey, Hants and nearby.

Band III and the UHF spectrum were both full of French stations. As a result, reception from local UHF transmitters was covered with line pairing. Very strong Belgian signals swamped the UHF bands in Dorset. I have been told that at times the local UHF police repeaters became unusable, with French police capturing the inputs!

The cause of all this was a lingering high-pressure system over the UK. It extended across into central Europe. I hope to be able to provide more news of this opening next month.

The Sporadic E situation was very poor. The Italian station TVA

(ch. 1A) was received on the 2nd; a minor opening on the 25th produced signals from ARD (Germany) on ch. E2 and LTV (Lithuania) on ch. R2; and SVT-1 (Sweden) ch. E4 was received on the following day. That was it!

Taking a longer-term viewpoint, as the new century approaches we must consider the progress of the present sunspot cycle – number 23. During the summer months there was a rapid increase in sunspot numbers. This suggests that the year 2000 could coincide with the cycle's peak. When solar activity is very high, the MUF (maximum usable frequency) rises. It's then possible for low VHF signals to be propagated over many thousands of miles via F2 layer reflection. Signals have been received in the UK from Australia, New Zealand, China, the USA and the Gulf during past openings. On a more sombre note, with the advent of terrestrial digital TV cycle 23 could be the last opportunity we shall get for F2-layer DX-TV.

Satellite Sightings

James Broughton (Yateley) and Tim McClellan (Christchurch) have both been monitoring the French Telecom satellites at 3°E, 5°W and 8°W. At 5°W La Chaine Info has recently been replaced with promotional material for Canal Satellite – unusually, PAL not SECAM.

PAS-3R (43°W) has been very active with analogue signals recently: Ryder Cup golf in particular including split feeds for Sky Sports. One source I couldn't identify was "JWRC NEWS FD"

on September 24th – any ideas?

The successful land speed record attempt in the Colorado desert was rather more dramatic. It was carried live from the 22nd onwards via Intelsat 601 (27.5°E) using Starbird capacity – at 11.497GHz horizontal. It was interesting to see the uplink truck in sandy isolation with its dish focused on to a low-elevation satellite for the first hop.

As of September 15th the dispute between Astra and Eutelsat over the orbital slot at 29°E continues. Hot Bird 3 has been carrying out "evaluation tests" here (at 12.383GHz vertical), with promotional videos etc. In effect this was Eutelsat's way of confirming its claim to the slot prior to the launch of the Astra series 2 digital satellites at 28.5°E.

Paulo Raymundo (Bahia, Brazil) uses a 1.5m dish on the balcony of his eighth floor flat. The azimuth range is restricted but he does have access to Intelsat K at 21.5°W, giving him several Ku-band Reuters/ABC news feeds that use either NTSC or PAL-G. He's hoping for access to Sky digital soon – not the Isleworth offerings but signals from the recently launched PAS-6, which may carry up to 140 channels. Currently DirecTV transmits twenty pay-per-view and 33 music channels. Prices of receiver systems have dropped from \$995 to \$700. Incidentally many of the vertical Reuters feeds via K seem to have ceased.

John Rogers (Liverpool) reports receiving analogue ITN news feeds for News at Ten via Eutelsat II F3 in the 10.95-11.7GHz band on the 12th, during the Scottish Assembly

During the recent successful land speed record attempt in Colorado the camera panned over to this SNG uplink truck, which was feeding Intelsat 601 at 27.5°W.



A Planning Saga

I can now recount the full saga of my recent, successful efforts to gain planning permission for a second dish. Some lessons may be of help to others facing a similar problem.

Most people don't understand aerials, particularly the "different-looking" ones used by enthusiasts. Such aerials tend to be regarded with suspicion, and may be blamed for various problems.

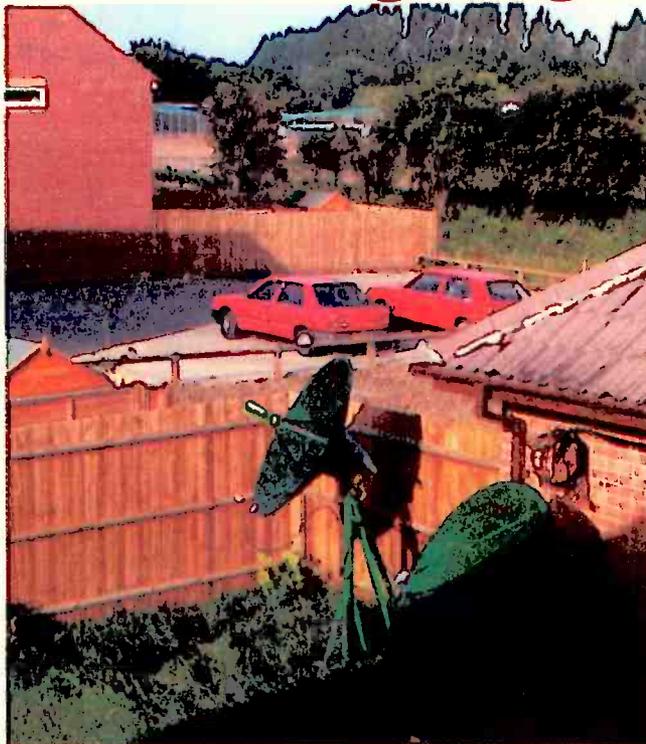
After a recent move to a new estate, I erected various aerials. One neighbour, whose house overlooked my garden, noted these activities with some displeasure. In addition to the domestic TV aerial and Astra black dish, both mounted on the rear wall, the only aerials that projected above the roof ridge were a two-element Band I array and a discone, neither of which was higher than my domestic TV aerial.

My original 1.5m dish was mounted, unused, on a short stand in the garden, backing on to a garage wall. It was held down with breeze blocks, and was below the 6ft fence level. A new, dark green 1.2m dish on a concreted in steel post projected some 15in. above the fence (see photograph alongside).

On June 19th I received a visit from the local council planning enforcement officer. He pointed out that I had two dishes in use, though only one dish per dwelling is permitted under the February 1992 DOE guidelines. I would need to apply for retrospective planning permission to retain the green dish in use.

Five copies of my planning application, with area maps, other papers and various photographs supporting my application, also a cheque for £90, were delivered to the local planning office on July 22nd. In exchange, I received a planning notice to display prominently for passers-by to read, and the council would write to those nearby to ask for any objections or comments. I had already written to my neighbours to tell them about the application and invite any queries/concerns about the dish – there weren't any.

During August the ward councillor



(planning) called to see the dish. A demonstration of satellite reception impressed him, and he departed with the comment that the application would have the town council's approval, the decision being passed to the borough council planning department.

At an officer-level meeting the planning department wouldn't make a decision (but recommended approval) because an objection had been received. The application was deferred to the area planning committee, on September 23rd, for consideration and a decision. I was told about the objection – a neighbour to the rear "comments on the number of aerials and satellite dishes at the property and queries the need for them, their effect on property values and health and the effect on the appearance of the area". Only the last point was material to consideration of the application. The council noted the number of aerials and dishes at the premises.

Warned about the objection, I prepared a brief with numerous photographs showing the 15in. dish segment that projected above the fence and the general background. The objecting neighbour, who had a 2m high panel fence and another garden between himself and the dish, couldn't

see it from his garden or ground floor rooms. I had previously outlined my activities and needs. Several copies of my application brief were distributed to the committee prior to the meeting. I had also sought and obtained applicant's right to speak to the committee (for an allowed three minutes).

My homework effort paid off. Once the application had been read and the details outlined, the committee moved to approve the application without discussion. In forty seconds permission had been granted – but it had taken three months and four days in total!

What are the lessons? It seems that aerials erected on a house and dish(es) mounted on temporary foundations in the garden, i.e. not concreted in as a permanent fixture, are exempt from planning requirements. The "array of aerials" complained about is not the concern of planning legislation. Had I lived in a conservation area however, or an area of outstanding natural beauty, I would have had to apply for permission to retain them.

It's wise to supply information in a simple, concise way. Planners are generally not familiar with RF technology, and appreciate guidance. They are also reasonable and helpful when you seek their advice.

I minimised any objections by approaching neighbours at an early stage to explain my activities and point out that the aerials would be used for reception only and would be insured etc. Clearly we need to live in harmony with our neighbours, and a degree of restraint and consideration is necessary – unless the Lottery coughs up and you can buy your own hill estate!

New DOE regulations allow a single 90cm dish at a domestic property without the need for planning permission – unless it's a conservation area/one of natural beauty.

I had to spend three months getting permission. But it worked for me. It should for you!

over sixty low-orbit satellites, has lost one of a recently-launched cluster of five. Fifty or so remain to be launched. The service is expected to start next autumn (1998). Sixteen satellites are in orbit, testing, and backpack pagers have already received signals.

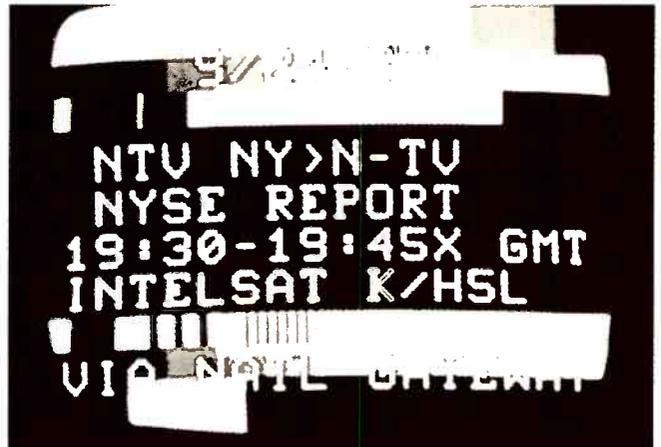
The Spanish Via Digital service has signed up BBC Prime and BBC World as part of a package via the Hispasat craft at 30°W, using MPEG digital compression. Seventy channels will eventually be available via this satellite. Both Simulcrypt and Multicrypt are to be used for Spanish services, ending a recent standards controversy.

Altair-2, which has replaced Cosmos 2054 at 16°W, may provide MIR downlink signals at times. Check at around 10.825GHz (circular) – at least a 1m dish is required.

Intelsat 802 is now at 174°E, replacing 701 which has moved to 180°E to replace the elderly and very tired 511. These moves have provided greatly improved C band signal quality across the Pacific Rim. Intelsat 803 is to take up position at 21.5°W, replacing 515:

it will provide C band signals at 42.5dBW and Ku band signals at 52.25dBW. 605 at 24.5°W lost telemetry during a recent orbital shuffle. A new series 8 satellite is to be positioned at 27.5°W, when 601 will move to 34.5°W, 603 to 24.5°W and 605 to a parking slot pending a decision on its future. 901 is to be built by Lockheed-Khrunichev Energia and will be launched via a Protom M rocket some time around April/May 2000.

At the Amsterdam IBC SNG operator SISLink uplinked pictures from its show stand camera via a succession of four PanAmSat craft, circling the globe, and received them back for display on a nearby monitor. Also at IBC, Intelsat announced that over 330 hours of transponder time have already been booked for the 1998 Winter



This NY stock exchange report was received via Intelsat K at 21.5°W

Olympics at Nagano, Japan. Much of it consists of short-term leases, using digital transmission.

Obituary

It is with deep regret that I have to report the death of a New Zealand radio DXer, Arthur Cushen. His monitoring skills during the Vietnam conflict gave hope and relief to many families who learnt that their relatives were in captivity rather than "presumed missing". Despite impaired sight, Arthur contributed to several international broadcasts over the years and gave an authoritative and respected face to the hobby of short-wave listening. He will be missed.

DJ Stephenson's

SATMASTER PRO



TRY IT FREE ON:- <http://www.swiftpub.u-net.com>

- ✓ Already used by hundreds of leading broadcasters, teleport engineers and installation companies!
- ✓ Antenna aiming module with az-el and polar mount set-up angles. Fully automatic magnetic variation calculation!
- ✓ Dual/multi feed calculations for multi-satellite operation!
- ✓ Five link budget calculators! Up-down FM, two up-down SCPC/MCPC digital (BPSK, M-PSK and M-QAM any FEC) plus FM and digital downlink all with choice of CRANE or ITU climatic models. (Note: 5.1LE has downlink calculators only!)
- ✓ Displays footprint maps in BMP, PCX, TIFF and JPEG formats. Start-up collection supplied free!
- ✓ Huge databases of worldwide towns and satellite locations. Plus a 40,000 word technical help file!
- ✓ Easily the best work of its kind in the World!

NEW VERSION 5.1LE
PRICE CRASH!

ONLY **£49** 5.1 LE
Post-UK: £1.50
Europe: £2.50
R of W: £6

Please state requirement, whether 16-bit or 32-bit.

5TH EDITION COMPLETELY REVISED & UPDATED FOR 1997/98

THE SATELLITE BOOK

A COMPLETE GUIDE TO SATELLITE TV THEORY AND PRACTICE

WORLDWIDE ACCLAIMED BY THOUSANDS!

"...a magnificent tome... Chapters cover just about every facet of the subject ... well written ... Thoroughly recommended."

Independent Electrical Retailer

"It is a first-class product; beautifully produced ... the definitive, comprehensive reference work on satellite TV technology ... much of it in words that even the less technically minded can understand"

ERT

"... An impressive book ... practical aspects are dealt with in a way that leaves no doubt ... lavish use of very clear diagrams throughout."

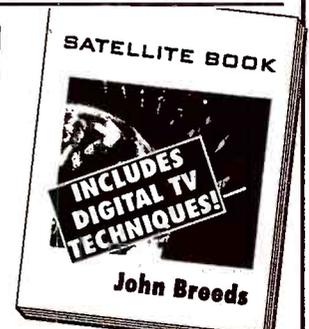
Television

"... All in all most of the information you'll ever need or want to know about satellite television is at your fingertips ... It's certainly the best work of its kind"

What Satellite

"John Breeds' most comprehensive work yet ... useful tips for people thinking of setting up their own business ... this is the one to read, even if you haven't got a technical background - the text is well written and very easy to understand"

Which Satellite



"... the most comprehensive, incisive and informative book ever published on satellite television."

Satellite Trader

"A bible for the satellite TV industry ... includes invaluable hints, tips and tricks of the trade."

Interspace

ISBN 1 872567 118
ONLY **£34**
POSTAGE:-
UK: £3.50
EUROPE: £5
R of W: £16

All available by return post! Send stamped envelope for complete list.

SWIFT TELEVISION PUBLICATIONS

17 Pittsfield, Cricklade, Wilts, SN6 6AN, England
Tel 44 (0)1793 750620 Fax 44 (0)1793 752399



TELEVISION INDEX/DIRECTORY AND FAULTS DISCS PLUS REPRINTS SERVICE

INDEX DISC

Version 5 of the computerised index to TELEVISION magazine covers Volumes 38 to 46 (1988 – 1996). It has thousands of references to TV/VCR fault reports and articles, with synopses. A TV/VCR spares guide, an advertisers list and a directory of trade and professional organisations are included. The software is easy to use and very quick. It runs on any IBM or compatible PC with 512K RAM and a hard disc. Price £30 (3.5"HD, alternatively 3.5DD" or 5.25" if required) Those with previous versions can obtain an upgraded version for £15. Please quote the serial number of the original disc.

FAULT REPORT DISCS

Each disc contains the full text for TV, VCR, camcorder, satellite TV and CD fault reports published in individual volumes of TELEVISION, giving you easy access to this vital information. Note that the discs cannot be used on their own, only in conjunction with the Index disc: you load the contents of the Fault Report disc on to your computer's hard disc then access it via the Index disc. Fault Report discs are now available for Volume 38 (November 1987 – October 1988); Volume 39 (November 1988 – October 1989); Volume 40 (November 1989 – October 1990); Volume 41 (November 1990 – October 1991); Volume 42 (November 1991 – October 1992); Volume 43 (November 1992 – October 1993); Volume 44 (November 1993 – October 1994); Volume 45 (November 1994 – October 1995); Volume 46 (November 1995 – October 1996). Price £15 each (3.5" HD, alternatively 3.5"DD or 5.25" if required).

REPRINTS

Reprints of articles from TELEVISION back to 1986 are also available: ordering information is provided with the index, or can be obtained from the address below. Hard copy indexes of TELEVISION are available for Volumes 38 to 46 at £3.50 each.

All the above prices include UK postage and VAT where applicable. Add an extra £1 postage for overseas EC orders, or £5 for non-EC overseas orders. Cheques should be made payable to SoftCopy Ltd. Allow 28 days for delivery (UK).

SoftCopy Limited, 1 Vineries Close, Cheltenham GL53 0NU, UK. Telephone 01242 241 455

Answer to Test Case 420

- see page 89 -

Two problems this month – in real life they very often come more than two at a time! The initial trouble, patterning with terrestrial TV reception whenever the satellite receiver was powered, is not that uncommon. It's caused by radiation from the satellite receiver being picked up by the UHF interconnection lead. The cure was to fit a replacement lead made from double-screened CT100 satellite cable, with metal coaxial plugs at each end. Cheap UHF interconnection leads have very poor screening. For MSS200/300/500/1000 series receivers there is also an official Pace power supply modification to reduce radiation – see page 5 of the Winter 1996 *Service Matters* bulletin from Pace.

What about the other business? The surprise that Doc Colin got when he returned with the sat-box was that Mr Greig had been having similar problems with the loan set. He had overcome them by repeating Colin's actions – he'd watched carefully – and by consulting the instruction book. If only he'd told us this! He said that he didn't want to cause any more trouble . . .

There was nothing wrong with either Pace receiver of course, apart from the vulnerability of all such receivers when the mains supply is 'rough'. Surges, glitches and 'outages' play havoc with satellite receiver operation. In this case the cure (touch wood!) was to fit a mains-cleaner plug.

NEXT MONTH IN TELEVISION

Servicing Panasonic NVL20/25/28 VCRs

Brian Storm provides a quick guide to servicing these popular but now middle-aged VCRs. They use the G deck and have super-still video heads, bar-code scanning for the clock and timer and an integrated bar-code scanner in the remote control unit.

TV Sound Systems

For many years manufacturers paid little attention to the audio side of TV. Then Nicam stereo came along, offering true hi-fi with the pictures. Since then we've had Dolby sound with various speaker arrangements and the spatial stereo system. Alan J. Roberts takes a look at the various systems available.

Digital Satellite Receiver Servicing

It's early days yet of course, but digital satellite receivers are around and it is possible to consider what servicing them will involve. The guidance presented by J. LeJeune in the concluding article in his present series relates mainly to Pace's digital satellite receivers, which have been available on the continent for some time now.

Dish Alignment by the Null Method

There are several advantages to the use of the null method instead of a meter for dish alignment. John Pitt-Francis explains the technique and provides details of a modified receiver that can be used for the purpose.

Published on the third Wednesday of each month by Reed Business Information Ltd., Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. **Filmsetting** by Marlin Imaging Ltd., 2-4 Powerscroft Road, Sidcup, Kent DA14 5DT. **Printed** in England by BPC Magazines (Carlisle) Ltd., Newtown Trading Estate, Carlisle, Cumbria CA2 7NR. **Distributed** by MarketForce (UK) Ltd., 247 Tottenham Court Road, London W1P 0AU (0171 261 7704). **Sole Agents** for Australia and New Zealand, Gordon and Gotch (Asia) Ltd.; South Africa, Central News Agency Ltd. **Television** is sold subject to the following conditions, namely that it shall not, without the written consent of the Publishers first having been given, be lent, resold, hired out or otherwise disposed by way of Trade at more than the recommended selling price shown on the cover, excluding Eire where the selling price is subject to currency exchange fluctuations and VAT, and that it shall not be lent, resold, hired or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever.

STARVISION

**SUPPLIERS OF HIGH QUALITY
EX RENTAL - EX DISPLAY
TV & VIDEO**

**ALL SETS ARE FULLY SERVICED WITH
REMOTE CONTROLS AND ARE READY
FOR RETAIL SALE**

**MOST POPULAR MAKES ALWAYS IN
STOCK AT PRICES THAT WON'T SHOCK**

**ALL PRICES INCLUDE V.A.T.
NO MINIMUM QUANTITY**

**RING TODAY FOR LATEST PRICES
TELEPHONE**

0121 502 3016 - 0121 505 1033

**STARVISION
UNIT A, BRUNSWICK PARK ROAD
WEDNESBURY, WEST MIDLANDS
WS10 9QR**



BSMART (CRAWLEY) LTD

**Largest selection
of**

**MAJOR MANUFACTURERS
NEW "B"
GRADE PRODUCTS**

**T.V. VIDEO AUDIO
MICROWAVE OVENS**

Contact Fred Bean

**BSMART (CRAWLEY) LTD.
10/11 LLOYDS COURT, MANOR ROYAL,
CRAWLEY, SUSSEX RH10 2QX**

**Tel (01293) 618000
Fax (01293) 400133**

TUBES

**1,000s of C.R.T.s
in stock**

**We stock a huge range of
Ex-EQUIPMENT TUBES
reclaimed from new or
used sets**

**We offer a wide range of
guaranteed re-gunned tubes,
also manufacturers 'B' Grade**

**Scan Coils – Hundreds
in stock – Ring with
Type Number**

**If you need advice on
tube types,
tube compatibility,
prices or availability –
RING Irene or Jane**



**Carriage and VAT
extra**



EXPRESS TV

**The Mill, Mill Lane,
RUGELEY, Staffs WS15 2JW**

Tel: 0889-577600

Fax: 0889-575600



LTD

TV & VIDEO WHOLESALERS

PENTIUM COMPUTER SYSTEMS - MORE STOCK AVAILABLE

TOP QUALITY GRADED TELEVISIONS

SONY KV25F1U KV25F2U KV29F1U KV29F2U

TOSHIBA 2557DB 2857DB

PANASONIC TX25AD2DP TX29AD2DP

ALSO WE HAVE THE FOLLOWING BRANDS IN STOCK

SHARP • SANYO • MITSUBISHI • JVC • HITACHI

• FERGUSON • TATUNG • SAMSUNG

PREMIUM BRAND VIDEO RECORDERS

AKAI • AIWA • FERGUSON • JVC • MITSUBISHI • PANASONIC

• SANYO • SONY

SAVE MONEY ON BRANDED AUDIO SYSTEMS

AIWA NX858 AKAI 500 PIONEER 240 SONY MHC 70

ALSO WE HAVE

TECHNICS • JVC • MITSUBISHI • SANYO • PHILIPS

Long Play Videos £60 Video Plus Videos £85

Nicam Stereo Videos £120

Special Offers on Branded Videos. Contact your nearest Branch.

All prices based on a quantity of 5 or more and subject to VAT.

**-HEAD OFFICE-
BIRMINGHAM**

208 BROMFORD LANE
ERDINGTON
BIRMINGHAM B24 8DL
TEL: 0121-327 3273
FAX: 0121-322 2011

CLEVEDON

UNIT 20
5C BUSINESS CENTRE
CONCORDE DRIVE
CLEVEDON
AVON BS21 6UH
TEL: 01275 341789

LONDON

UNIT 2
THE ROYAL LONDON EST.
29/35 NORTH ACTON ROAD
LONDON NW10 6PE
TEL: 0181-961 5005

PRESTON

UNIT 439
OAKSHOTT PLACE
WALTON SUMMIT IND EST
PRESTON PR5 8AU
TEL: 01772 312101

CENTRAL TV

WHOLESALE DISTRIBUTION LTD

AIWA PRODUCTS

AUDIO

NSX-VHS ...PRO-LOGIC MINI HIFI REMOTE
 NSXV70.MINI HIFI 3 CD SURROUND SOUND
 Z2300PRO-LOGIC MIDI HIFI REMOTE
 L/CX100CD MICRO SYSTEM
 NSXV750MINI HIFI CD PLAYER
 NSX640...MINI HIFI 3CD SURROUND SOUND

EX-RENTAL TVS & VIDEOS
 ALWAYS AVAILABLE
 PHONE NOW
 FOR BEST PRICES

PHILIPS, PANASONIC, SHARP,
 SANYO, FINLANDIA ETC...

AMSTRAD SRX 100 AT ONLY £2.00 A PIECE
 AMSTRAD SRX 200 AT ONLY £10.00 A PIECE
 BT 250 AT ONLY £7.00 A PIECE
 (QUANTITIES OF 10 + ONLY)
 PLUS VIDEO CRYPT DECODERS NOW AVAILABLE

WALKMANS

HSTA153	HSTA223	HSTA253
HSTA353	HSTA423	HSTX356
HSTX646	HSTX446	
HSGS242	HSGS252	HSGS352
HSPX257	HSPX347	HSPX357
HSPX447	HSPX547	HSPX747

SANYO GRADER
 28", 25", 21" F.S.T.
 SP/LP VIDEO +
 (NOW IN STOCK)

FOR ALL EXPORT
 ENQUIRIES ON TVS
 AND VIDEOS CALL OUR
 BIRMINGHAM OFFICE
 NOW

PHONE FOR BEST PRICE
 ON THESE 'A' GRADED STOCK
 PLUS MANY MORE MODELS AVAILABLE

LONDON CONTACT: JOSHI/SALEEM
 ELEY ESTATE, NOBEL ROAD,
 EDMONTON N18
 TEL: 0181 807 4090
 FAX: 0181 884 1314

BIRMINGHAM CONTACT: ASH/MICK
 369 STRATFORD ROAD, SPARKHILL,
 BIRMINGHAM B11 4JY
 TEL: 0121 772 1591
 FAX: 0121 766 6383

J. KAYS

MAJOR PARCEL OF MANUFACTURERS RETURNED GOODS
 ALL STOCK IN 'A GRADE' MANUFACTURERS ORIGINAL BOXES LIKE NEW

JAPANESE BRANDED
 ALL CURRENT MODELS

21", 25", 28" TELEVISIONS, TO INCLUDE NICAMS, FST TEXTS,
 VCRS, LONG PLAY, VIDEOPLUS, NICAMS.

HI-FI, 3 CD MIDI SYSTEMS, 3 CD MICRO SYSTEMS, ALL REMOTE AND HIGH POWER
 PORTABLE AUDIO, CD GHETTO BLASTERS, REMOTES CDS ETC

CAMCORDERS, PALMCORDERS.
 MICROWAVES

STOCK IDEAL FOR EXPORT

151-153 SOHO RD, HANDSWORTH, BIRMINGHAM B21 9SU
 TEL. 0121-551 1404, 0121 554 2637. FAX. 0121 554 1408

TV WHOLESALE



vista electronics LTD

Manufacturers of television tube and video heads

**SEND FOR
FREE**

COMPONENTS CATALOGUE

**TV/VCR COMPUTER
SPARES AND ACCESSORIES**

£10

**FREE
CARRIAGE
FOR ORDERS
ABOVE £10**

**VIDEO
HEADS**

**HIGH QUALITY
LOW PRICES
WIDE RANGE
FAST DELIVERY**

FREE 1.5M ROLL OF SOLDER
BRAID WITH ALL COMPONENT
ORDERS ABOVE **£25.00**

*We are committed to providing
the best service possible
to our customers*

TUBES

**THOUSANDS OF NEW,
B GRADE, AND REGUNS
IN STOCK**

SPECIAL OFFERS

A51-EAL	£55.00
A51-JAR	£55.00
A51-EFS	£50.00
A59-EAK	£69.50
A66-EAK	£72.00
A59-ECY	£69.50
A66-ECY	£72.00
A51-AEZ	£45.00
A68-EGD	£78.00
A66-EGW	£72.00
A34-EFU	£25.50
A33-LPE	£25.50
A34-EAC	£25.50

ALL NEW TUBES

Carriage Extra

12 MONTHS GUARANTEE

Enquire for types not listed

TELEPHONE COMPONENTS 01429 838057

FAX

TUBES

01429 837100 01429 837101

VISTA ELECTRONICS LTD, UNIT 1B, WINGATE GRANGE IND EST
WINGATE, CO DURHAM TS28 5AH



DARTEL ELECTRONICS

8 Heather Park Drive, Alperton,
Wembley, Middlesex HA0 1SL

Tel: 0181 795 1735 Fax: 0181 795 1736

**SUPPLIERS OF HIGH QUALITY AUDIO
VIDEO/TV EQUIPMENT - GRADE A
STOCK WITH WARRANTY**

Popular brand names at competitive prices, eg:
Video Recorder, LP/SP, from.....£85.00
Video Recorder, LP/SP, VideoPlus from £95.00
Twin Deck Video Recorders.....£145.00
20in TV/Video Combi£235.00
14in TV/Video Combi£180.00
Microwaves, Digitouch, from£47.00
Camcorders, from.....£165.00
Triple Disc HiFi Systems from.....£120.00

Televisions, all sizes including Prologics,
Nicam, VCRs etc

PHONE OR FAX FOR FULL LIST

WE ARE NOT EX-RENTAL DEALERS

ALL PRODUCTS SUPPLIED ARE CURRENT LINES

ALL PRICES SUBJECT TO VAT PLUS CARRIAGE AND AVAILABILITY

NOW OPEN
IN NORTH EAST - W. TREE TRADE WAREHOUSE
UNIT 9A/9B CARRMERE RD, LEACHMERE
IND ESTATE, SUNDERLAND SR2 NTE
TEL 0191 5211500
GRADED STOCK ALL BOXED TESTED + WORKING

**WANTED - BULK BUYERS OF
'B' GRADE STOCK**

TVs, Videos, Camcorders, Hi-Fi
also Microwave

EXAMPLE: 14" A/C £55

L/P Videos £60

All boxed, but untested

Mixed loads of various sizes Camcorders
also available in large quantities

**THORN FSTS - Working from £35
F/C VIDEOS - Untested
Lots of 10 - £150**

14" Colour Tubes£15
20" Colour Tubes£29
21" Colour Tubes£35

SPECIAL OFFER - 'B' GRADE
Boxed Fully Tested L/P Videos £80
With Instructions VideoPlus £90

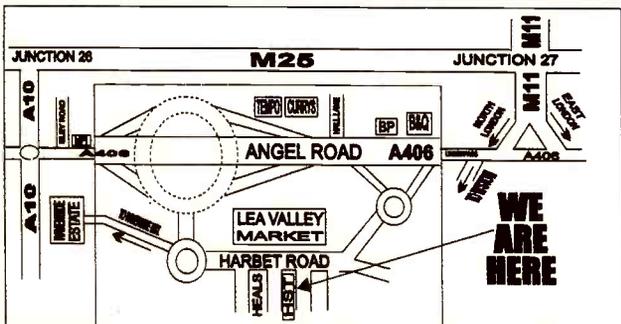
W. TREE TRADE WAREHOUSE

Unit 1, Sunshine Mills, Wortley Rd, Leeds

Tel: (0113) 2638804 Fax: 2310275

HST APPROVED TELEPRICE DISTRIBUTOR
DISTRIBUTORS LONDON
Suppliers of high quality
**EX-RENTAL & GRADED
TV's AND VIDEO'S**
Direct From Source

**PHONE FOR DELIVERY DAYS ON
0181 - 803 0505**



UNIT E2/3, HARBET ROAD, (off Angel Road), STONEHILL BUSINESS PARK,
LEA VALLEY TRADING ESTATE, LONDON. N18 3LD
DELIVERY SERVICE AVAILABLE

W.M.T.V.

THE LARGEST INDEPENDENT
WHOLESALE IN WALSALL
- SUPPLIERS OF HIGH QUALITY EX-RENTAL
TVs AND VIDEOS TO THE TRADE
AT COMPETITIVE PRICES

ALSO AVAILABLE: NEW B-GRADE PRODUCTS
- TVs, VIDEOS, AUDIO & MICROWAVES -
ALL TESTED & BOXED

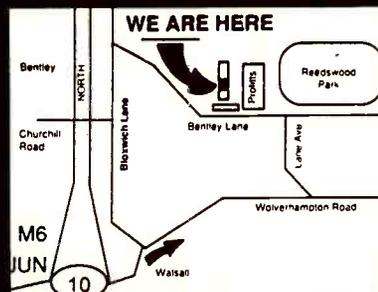
Satellite Receivers and Export Enquiries Welcome
1/2 Mile off Junction 10 M6. Easy Parking Facilities

UNIT 3, BENTLEY LANE BUSINESS PARK
BENTLEY LANE, WALSALL WS2 8TL

Tel: 01922-724542. Fax: 01922-722208

Mobile: 0831-246622 (24 hours)

OPEN:
MON-SAT,
9-6pm
SUNDAY BY
APPOINTMENT
DELIVERY
SERVICE
THROUGHOUT
THE COUNTRY



TV WHOLESALE



WILTSGROVE LTD



28-29 RIVER STREET, DIGBETH, BIRMINGHAM B5 5SA

TEL: 0121-772-2733

FAX: 0121-766-6100

SEASONAL SPECIAL OFFERS

EX-RENTAL TV'S
20 MIXED TELEVISIONS
5 TEXT + 6 A/C + 5 BASICS
+ 4 PORTABLES
ALL WORKING STOCK, WITH A/C
20 for £530

BRAND NEW & BOXED NOKIA
PALPLUS WIDESCREEN 16:9
WITH DOLBY PRO-LOGIC 77CM (32")
PLANO BLACK FINISH

OUR PRICE **£899**

- PICTURE IN PICTURE
- NICAM STEREO
- FASTTEXT
- 2 SCART SOCKETS
- FRONT AV CONNECTORS
- UHF/VHF
- A.I.P. SYSTEM

(COMPLETE WITH HANDSET & INSTRUCTION BOOK)

WE REGRET TO INFORM YOU THAT THE VISIONCARE BRANCH IN READING HAS CLOSED DOWN.
VISIONCARE CUSTOMERS CAN CONTACT WILTSGROVE LTD BIRMINGHAM THANKYOU

Delivery Service Available

GRADED STOCK

HITACHI WIDESCREEN C28300TN
ONLY **£449**

- DOLBY PRO-LOGIC
- NICAM DIGITAL STEREO
- 28" FST
- FASTTEXT
- 2 SCART SOCKETS
- COMPLETE WITH CABINET STAND

COMES COMPLETE IN BOX

GRADED STOCK

5 MIXED VCR'S
£599

- 3 x LP/SP VIDEOPLUS
- 2 x LP/SP VIDEOPLUS NICAM

SF40 PERSONAL FACSIMILE

Compact FAX With Telephone
Answering Machine Connection
10 Speed Dial Number Memory
Mercury Button
Overseas Button

GRADED STOCK FAX MACHINES
SAMSUNG SF40 - £99
SAMSUNG SF30 - £89

BOTH ITEMS COME WITH 6 MONTHS GUARANTEE

EX-RENTAL VCR'S

5 MIXED SLIM VCR'S **£225**
10 MIXED VCR'S - **£399**
ALL WORKING STOCK, WITH HAND SETS

CHECK OUT THE PRICE

BRAND NEW AKITA 14" CTV
£99.99
with 12 months guarantee

- Teletext
- OSD
- Sleep Timer
- Scart Socket
- 40 Channels
- Remote Control
- Mains Operated
- UHF/VHF

BRAND NEW JUST IN !!!!

33" FERGUSON DOLBY TV
WITH 12 MONTHS G'TEE
ONLY **£679**

EX-RENTAL

10 MIXED TX100
5 x R/CONTROL **£399**
5 x TEXT

FERGUSON TV & VIDEO PACKAGE
21" TV + VCR VIDEOPLUS + PDC, LP/SP
complete with 12 mths G'tee **£299**

EX-HOTEL STOCK TELEVISION

21" FST/R-C STEREO CTV WITH UHF/VHF TUNER **£75**

VPH-65
12X ZOOM, 8mm HI-BRAND
6 MODE PROGRAM AE

OUR PRICE **£269**
R.R.P. **£699**

QUANTITY DISCOUNT & A WIDE RANGE OF MODELS AVAILABLE (GRADED STOCK)

ALL WORKING STOCK IN ORIGINAL BOX, COMPLETE WITH ACCESSORIES

FREE DELIVERY ON REASONABLE ORDERS, TO MOST AREA'S IN THE U.K.

WILTSGROVE LTD

BRAND NEW AKAI 28" NICAM COLOUR TELEVISION
WITH 12 MTHS G'tee **£279**

YOUR FIRST CHOICE FOR QUALITY SPARES IN THE MIDLANDS

WILTSGROVE LTD wishes all its customers a Merry Christmas & Happy New Year

WIDE RANGE OF SPARES COMPONENTS AVAILABLE FOR: TV, VIDEO, SATELLITE & MICROWAVES

Check it out:

We stock Video Reference Manuals, Repair Kits, Belt assortments, Battery Chargers, Mains Accessories, Lamps, Electrical Fittings and much much more...

TRADE ONLY ALL STOCK SUBJECT TO AVAILABILITY, CARRIAGE & V.A.T

FREEFAX ORDERLINE: 0500 55 05 05

Universal

The Amstrad Service Centre

Audio Television Video Telecommunication

The 'Amstrad Service Centre' is the exclusive returns centre for all standard customer returns on behalf of Amstrad and Betacom. For the first time we are offering to supply genuine Standard Customer Returns direct at market competitive prices. All of the products we offer for sale are supplied in original manufacturer cartons, both picture print and full colour gift type. All product is 'virgin' and has not been serviced by the Amstrad Service Centre or any other outside service agent. If you would like to receive a colour product catalogue and an up to date stock and price list please fax your full company details through to the facsimile number listed below.

Currently we have over 90 lines throughout the consumer electronics range starting with walkmans, clock radios, portable stereos, portable CD stereos, personal CD players, micro systems, CD micro systems, mini hi-fi, midi hi-fi, 14" television, 20" television, 28" television, non videoplus VCR, videoplus VCR and fans and, approximately 40 different telecom products.

There are no restrictions on the sale of these products but if any are exported it is your legal responsibility to check the goods meet all electrical requirements and relevant regulations for the country of export. Export enquiries welcome.

Please mark all references from this advertisement for the attention of Mr T James, Operations Manager.

Switchboard 01630 655 797 Facsimile 01630 655 683
Amstrad Service Centre, Universal Consumer Products, Universal House, Tern Valley Business Park,
Market Drayton, Shropshire TF9 3SQ.

EX RENTAL TV STOCK

(Ex Radio Rentals)

Cheapies to Nicam.

Working or unchecked.

Good stock – Fair prices.

Collect or delivery arranged.

**Phone Bob at
T.H.V. TV
Nuneaton, Warwickshire**

**01547 530711 or
01203 387904**

Sole UK
Agents for



SADELTA



TC-402D

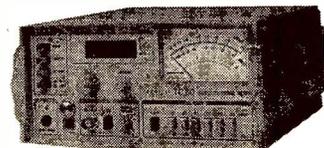
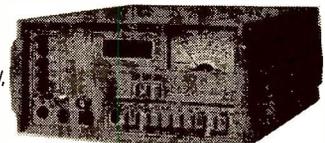
Due to its weight and size, the TC-402D is the ideal instrument for the installation of FM and Terrestrial TV antenna, as well as CATV systems.

- Peak detection
- Built-in loudspeaker for AM and FM reception
- Frequency Indication with 4 digit LCD Display
- Multi-turn potentiometer to enable tuning
- Weight including batteries: 1.9 Kg

TC-90

Portable equipment, with many applications, designed to carry out any type of Terrestrial TV, FM Radio, CATV and Satellite TV installations.

- Frequency Sweep on Satellite
- Peak Detection
- Measurement of terrestrial TV from 20u V to 3V without the need of external attenuators.
- Rechargeable 12V / 2.6 Ah Battery
- Weight including batteries: 3.5 Kg



TC-80

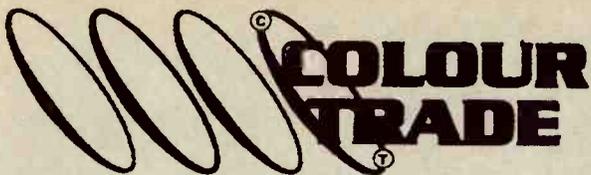
The TC-80 has been designed for the reception of TV Satellite systems, the installation and testing of domestic and SMATV systems.

- Full Band Frequency Sweep
- Switchable 14V or 18V LNC Power Supply
- Rechargeable 12V / 2.6 Ah Battery
- Weight including batteries: 3.3 Kg.

Available from most wholesale distributors across the UK or direct from

COASTAL AERIAL SUPPLIES

Unit X2, Rudford Industrial Estate, Ford, Arundel BN18 0BD
Telephone: 01903 723726 Fax: 01903 725322 Mobile: 0976 241505



**Wholesale Distributors & Export Agents
of Domestic Electronics & Appliances**

We have moved to bigger premises

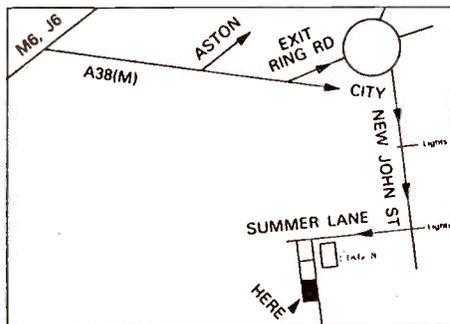
NEW 'B' GRADE

**Major Brands ONLY. TV's - Video - Audio. Microwaves,
Satellite Receivers, Decoders. Camcorders - Phones/Fax
COMPLETE BOXED - WITH STAND - HANDSET - BOOK ETC
MINT LATEST NICAM FASTEXT F.S.T.**

**EXPORT AGENTS FOR THE FOLLOWING
TV, VIDEO, HI-FI, CAMCORDERS, SATELLITE
WHITE GOODS, HEATING EQPT., VACUUM CLEANERS, KITCHEN
APPLIANCES, GARDEN EQUIPMENT, POWER TOOLS**

FERGUSON - DECCA - TATUNG - AMSTRAD

FULL RANGE - ALL CURRENT MODELS OF TV-VIDEO IN STOCK No minimum quantity



NATION-WIDE NEXT DAY DELIVERY SERVICE - VISITORS BY APPOINTMENT

Phone 0121-359 7020

FAX 0121-359 6344

**PHOENIX HOUSE, 190 BRIDGE ST. WEST,
BIRMINGHAM B19 2YT**



BESCO LTD

**YOUR PREMIER SUPPLIER FOR OVER 30 YEARS
NEW STOCKS ARRIVING DAILY**

HI FI HI FI HI FI HI FI HI FI

100s OF UNITS IN STOCK!! - STOCK UP NOW FOR CHRISTMAS

Large stocks available A and B grade:

makes include: Kenwood, Aiwa, JVC, Sanyo, Akai, Pioneer, Panasonic, Goodmans, Alba etc.

CHRISTMAS SELLERS

Alba/Bush Ghetto Blasters, CD, Radio, Tape boxed £25

Alba/Bush CD Micro Systems boxed £35 • Alba/Bush CD Midi Systems boxed £40
most goods under half price

VIDEOS/TV's: A and B Grade

Bush/Alba long play boxed £60 • Roadstar long play boxed £50

Akai, Sanyo, JVC, Toshiba, Aiwa less than half price

21" Remote Control Crown/Bush, Alba boxed £60

EX-RENTAL TV/VIDEO ALL TESTED, SEEN WORKING

Philips complete with remote £45

Salora all models with remote £65, Grundig from £65 many other makes/models in stock

Cheaper Video/front loading from £25

ALL MAKES, MODELS & SIZES OF TV IN STOCK

Brown cabinet working TVs from £12 • Videos off the pile from £10

We stock Camcorders, Car Stereo, portable radio/CD

kettles, irons, toasters etc, etc.

ALL PRICES INCL. VAT. TERMS - CASH ONLY

*** DISCOUNT ON BULK PURCHASES ***

Send S/A Envelope for price list or call 01274 308186

Walker House, 16 Bottomley Street, Manchester Road, Bradford BD5 7LJ

Tel: (01274) 308186 Fax: (01274) 722229

TV WHOLESALE

No other consumer magazine in the country can reach so effectively those readers who are wholly engaged in the television and affiliated electronics industries. They have a need to know of your products and services.

CLASSIFIED

PHONE 0181-652 8339

FAX 0181-652 8931

The prepaid rate for semi display setting is £13.50 per single column centimetre (minimum 4 cm). Classified advertisements £2.00 per word (minimum 20 words), box number £22.00 extra. All prices plus 17% VAT. All cheques, postal orders etc., to be made payable to Reed Business Information. Advertisements, together with remittance, should be sent to Television Classified, 11th Floor, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS

SERVICE MANUALS AND CIRCUIT DIAGRAMS

Thousands of different models available
For most U.K. European, Far East & USA makes

	Service Manual	Circuits
B/W TV	£ 6.00	£3.00
CTV/VCP	£10.00	£5.00
VCR	£14.00	£7.00

Audio/Satellite/Microwave also available - P.O.A.
Cheque/PO with order only please.

Add £2.00 P/P etc. to order total. Do not add any VAT

D-TEC

PO BOX 1171, FERNDOWN, DORSET BH22 9YG

Tel: 01202 870656

Fryerns

Service Information **FES** Circuit Diagrams

TV's, VCR's SATELLITE AUDIO & HI-FI

Most models/makes old & new covered

Also fault guidance service available

Prices are from £3.75 + £2.50P/P

i.e. 1 item - total £6.25 inc

2 items - total £10.00 inc

3 items - total £13.75 inc

4 items - total £17.50 inc

Payment by credit card or Postal Order for next day delivery. Cheques to clear.

Tel/Fax: 01268 470899

Answerphone outside office hours

4 Pincey Mead,

Basildon, Essex

SS13 3EW

please note new prices



SERVICE INFORMATION

CIRCUITS and SERVICE MANUALS from 1930s - 1990s:

Radios, amps, radiograms, tuners, CDs, TVs, videos, cassette radios, ICE etc.
LARGE QUANTITY USED TV and VIDEO PANELS
BACK COPIES PW and TV MAG.

DAVE WILLIAMS

16 Church Street, Owston Ferry,
Doncaster, S.Yorks DN9 1RG

Tel and Fax: 01427 728046

Mail order only. No callers

CLASSIFIED

Tel: 0181-652 8339

Fax: 0181-652 8931

Servicing Books from

U-VIEW

Technical Publishers

December Special Offers

Television Servicing Books

1989/90 ... Now £59

1991/92 ... Now £69

Satellite Servicing Books

1991/92 & 1993/94... £39 each

Video Servicing Books

1989/90 £49 (to clear)

1991/92 £195... Now £97.50

1993/94 £220... Now £175

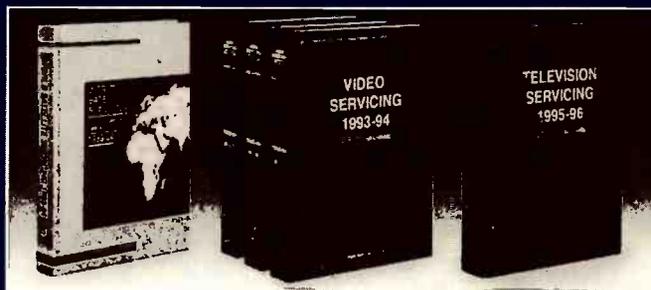
NEW EDITION

Satellite Servicing Book Four £79

Covers over 320 models

While Stocks Last

Professionally Produced with the Manufacturers Full Co-operation



To qualify for this offer please quote TAD12 when ordering. Offer is limited to one book per customer. Offer ends 30 12 97

All Books Contain:

Circuit Diagrams, Scope Readings,
Voltage Tables, Part No's,
Alignments & Adjustments,
Trouble Shooting Guides.

Send for brochure with full model list.

U-View Technical Publishers.

4 South Parade, Bawtry, Doncaster, Yorkshire. DN10 6JH.

Tel: 01302 719997 Fax: 01302 719995

All Books Available			
Satellite Servicing 1991-92	£39.00	Covers 251 Models.	ISBN: 0 9513897 8 5
Satellite Servicing 1993-94	£39.00	Covers 316 Models.	ISBN: 0 898 598 05 3
Satellite Servicing Book 4	£79.00	Covers 320 Models.	ISBN: 1 898 598 12 6
Television Servicing 1989-90	£59.00	Covers 307 Models.	ISBN: 0 9513897 1 8
Television Servicing 1991-92	£69.00	Covers 307 Models.	ISBN: 0 9513897 7 7
Television Servicing 1993-94	£95.00	Covers 629 Models.	ISBN: 1 898598 03 7
Television Servicing 1995-96	£99.00	Covers 400 Models.	ISBN: 1 898598 11 8
Video Servicing 1989-90	£49.00	Covers 247 Models.	ISBN: 0 898598 04 5
Video Servicing 1991-92	£97.50	Three Volume Set.	ISBN: 0 9513897 9 3
Video Servicing 1993-94	£175.00	Three Volume Set.	ISBN: 0 898598 07 X

All prices include UK postage, packing & insurance
Interest Free Credit Available - Phone for Details



CLASSIFIED TEL: 0181 652 8339

REPAIR DATABASES & INDEXES

**NEW FAULT GUIDES NOW AVAILABLE FOR 98
NEW !! Kwik tips on disk V1.0**

First time release: KWIK TIPS on DISK now available. Based on the forthcoming 2nd Edition Kwik Tips publications the program also includes current 1st edition repair information. Altogether a vast fault & remedy database of TV & VIDEO repair information for an extensive range of makes & models.

Kwik Tips V1.0 Excellent value at only £27.95

New Editions Fault Indexes in book format

Just released - Edition 19 of the Television Magazine Index, Covers over 14,000 Television, Video, Satellite, Camcorder & Compact Disc faults, Large easy to read A4 format. The newest addition to a highly acclaimed series. In daily use in workshops across the UK (And beyond).

ISBN 1 898394 22 9 **Edition 19: Complete set £14.75**

New version Fault indexes on disk - V1.5

Our largest ever fault index database on disk, Covering a massive 18,300 !! Television, Video, Camcorder, Satellite, CD & Monitor faults listed in 17 years of Television.

Version 1.5: Indexes on Disk (price held) \$17.50

Low cost updates are available for all fault indexes.

LATEST RELEASE - Equivalents guides - 2nd Edition.

The long awaited 2nd Edition of our equivalents guides now available, Over 6,300 entries - **Equivalents covering Video, TV, Camcorder & satellites plus TV model-chassis guide.** This single comprehensive book contains all FIVE guides.

Edition 2: Equivalents guides \$5.95

All disks require PC or compatible (Supplied on 3 1/2" HDs)

E.C.S.
Technical Publishing

316, Upton Road,
Noctorum, Wirral,
Merseyside. L43 9RW.
Tel / Fax 0151 522 0053

Please add £1.75 P & P to total (Europe £2.75, r.o.w please enquire).

Technical Information Services

76 Church St, Larkhall, Lanark ML9 1HE

N.B.: There is a £2.50 Post/Handling Charge on all orders

Send an SAE For Your **Free** Quote & Catalogue

We have the world's Largest Selection of

	SERVICE MANUALS	
CD-ROMS COLLECTIONS OUT SEPT '97		NEW CATALOGUE OUT NOW

VCR CIRCUITS £8.00 CTV CIRCUITS £6.00

CTV CIRCUIT COLLECTIONS

Ferguson from 1980's till present @ £45.00 • Bush £22
Hitachi £45 • Mitsubishi £38 • Panasonic £30...etc...

Call for full list & prices of all 27 collections

Tel: 01698 883334/884585 □ Fax: 01698 884825

TOP SELLING BOOKS

PRACT' VCR or TV REPAIRS
£16.95 each (or £30 for Both)
MICROWAVES: ENERGY & OVENS
£12.95
Data Reference Guide (Chassis/X-Ref)
£9.95
KUXO' SCRAMB' SYS' (New 5th Edn.)
£35.00
Buy, Sell & Service Used CTV/VCR/CD
£9.95 each
IC DATA BOOKS - Various Titles
£12.95 each
With 100's of Titles, send SAE for Full List

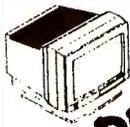
SERVICE MANUAL LIBRARY

BUY ANY MANUAL FOR **£10.00**
or Swap at **£5.00** Each (plus p&p)
Initial Joining Fee £65.00
(£20/annum, thereafter)

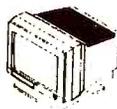
NEW RELEASES:

3.5" Disk Drives £9.50
(Installation & Circs): £5.00
Data Ref' on 3.5" Disk: £5.00

SERVICE MANUALS & TECHNICAL BOOKS



PRICE CRASH



On our CD-ROM's

Due to the success of our CD-ROM compilations we can now offer them at a new reduced price of just £24.95 each (plus VAT). Now there is even more reason for you to change to this method of data purchase. Why spend £££'s on individual manuals when you can get dozens on just 1 CD-ROM and save a fortune.

We now have 8 Monitor CD-ROM's

Coming soon - TV Manuals on CD-ROM

DON'T DELAY - ORDER TODAY

Full details on the contents of each CD-ROM shown on our web site and our free PC Disc

All orders plus post/packing £2.94

We have the largest range of Service Information and Technical Data obtainable anywhere.

For Televisions, Video Recorders, Test Equipment, Computer Monitors, Vintage Wireless, Domestic Equipment etc etc. In fact practically anything electronic. Originals or Photostats as available.

Also available. Our catalogues on PC Discs detailing Hundreds of Technical Books and Repair Guides. Return coupon for your FREE Discs. The entire index of manuals we have is available on PC disc for just £5.00 inclusive with FREE updates.



MAURITRON TECHNICAL SERVICES (TV)

8 Cherry Tree Road, Chinnor, Oxfordshire, OX9 4QY

Tel:- 01844-351694. Fax:- 01844 352554.

Email:- sales@mauritron.co.uk Our catalogue is now on the Web at <http://dialspace.dial.pipex.com/mauritron/>

Please forward your PC Discs catalogues of CD-ROM'S and Technical Books for which I enclose 4 x 1st Class Stamps.

Please supply Index of manuals on PC Disc for £5.00 inclusive.

NAME _____ *Circle items required*

ADDRESS _____

POSTCODE _____ You may pay by Cheque, PO or

Visa, Access, Delta, Electron, JCB, Mastercard, Eurocard etc

□□□□ □□□□ □□□□ □□□□

EXPIRES _____ SIGNATURE _____

TEST EQUIPMENT

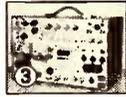


● **BMR 95** unique Regenerating-Computer and Analyser for CRTs, regenerates picture tubes even better, also if all other machines do not succeed, removes short filament-cathode-grid 1-grid 2, with FLASH-EX against remaining gas, 162 adapters available, list with 12,500 tubes-types, pays itself within 4 weeks.

● **RTT 3** Safety isolated variable Transformer input 220/230 V, output 0-270 V / 4 A, 1100 VA.

● **AT 2** audio multi-function tester, substitutes 16 devices, has all usual sockets, cuts down repair time, takes you through all necessary test-steps by button controls.

● **CBE** Screen-Demagnetiser with strongest field for screens up to 110 cm, 220/230 V, 2.7 A, 600 VA.



Ask for free catalogue
S.E.M.E. Ltd., Melton Mowbray, Leicester
Phone (0 16 64) 65392, Fax 63976
IRL: Dönberg Electronics, Ranafst, Co Donegal
Phone (0 75) 4 82 75, Fax 7 10 31
Germany: U. Müter, Fax 0049 2368 57017

REPAIRS

WANTED



Billingshurst, West
Sussex RH14 9EZ

VALVES WANTED FOR CASH

(KT88, PX4, PX25, DA100,
EL34, EL37, CV4004, ECC83)

Valves must be Mullard/GEC/West European
to achieve top prices

Ask for our free Wanted List.

WE SUPPLY VALVES, C.R.T., VIDICONS ETC

Visitors, please phone for an appointment,
we're a very busy export warehouse.

Tel: (01403) 784 961
Fax: (01403) 783 519

accént

TECHNIC

CAMCORDER REPAIRS

Collection and delivery any-
where in the UK.

All makes, fast service.
Phone free for details.

Fax: 01905 796385
(0800) 281009

PROPERTY

For sale due to ill health
**Freehold TV, Video,
Satellite, Computer
Sales and Repair Shop**

Near Blackpool
Two bed accommodation
Main Road Location
Long established
Offers + SAV
Box 2739, 12th Fl. Quadrant House,
The Quadrant, Sutton, Surrey SM2 5AS

SPARES

CALDER COMPONENTS

127a West Gate, Heck, Huddersfield,
West Yorkshire WF16 0EW
Phone: 01924 411089
Fax: 01924 411104



DECEMBER SPECIALS

Pace Remotes

SS9000/9200 Pro 800/900
MSS Series Pace Prima
All one price **£7.50 + VAT**
(cheque with order)

Pro 800 Tuners **£12**
New catalogues available

Suppliers of Electronic
Components To The TV Trade

Trade Only

Televisions from £5.00
Teletext from £20.00
Videos from £20.00
Twin Speed Stereo from £25.00

Minimum quantity - 10 units

**BOURNEMOUTH
WHOLESALE
01202 470443**

TRANSFORMERS

TV LINE OUTPUT TRANSFORMERS

PHONE: 0181-948 3702 FAX: 0181-332 0583

ALBA · AMSTRAD · BUSH · DECCA · DORIC · BLAUPUNKT ·
FERGUSON · FIDELITY · GEC · GRUNDIG · GRANADA ·
HITACHI · HINARI · INDESIT · ITT · KIMARA · NIKKAI ·
MATSUI · MURPHY · OSAKI · NORDMENDE · LOEWE-OPTA ·
PANASONIC · PYE · PHILIPS · SANYO · SAISHO · SHARP ·
SONY · SOLOVOX · SUSUMU · TANDBERG · TELEFUNKEN ·
THORN · TRIUMPH · THOMSON · GOLDSTAR · BINATONE ·

**FULL RANGE OF KONIG: VIDEO HEADS, BELT KITS,
IDLERS, PINCH ROLLERS, TENSION BANDS.
LARGE RANGE OF REMOTE CONTROLS IN STOCK**

TIDMAN MAIL ORDER LTD · 236 SANDYCOMBE ROAD ·
RICHMOND · SURREY · TW9 2EQ

Approx. 1 mile from Kew Bridge.

Mon-Fri 9 am to 12.30 pm &
1.30-4.30 pm

SPARES & COMPONENTS



H.S. WHOLESALE

Unit B3, Citadel Trading Park,
Garrison Road, Hull HU9 1TQ
Tel: 01482 222295/Fax: 222213



**AERIALS
FROM 1-99**

**CABLE FROM
8-95**

**RG6 SAT
CABLE FROM
11-95**

**SCART/SCART
21 PIN LEADS
89p**

**2M FLY LEADS
35p**

**CABLE CLIPS
'F'**

**CONNECTORS
COAX PLUGS**

**POLES
BRACKETS**

**LASHING KITS
BOLTS**

**SADELTA
TV/SATELLITE
METERS**

NOW IN STOCK

**SAT SYSTEMS
ALL PACE
RECEIVERS POA**

**LNB'S FROM
£16.95**

**STOCKISTS FOR:
ANTIFERRENCE
COASTAL**

**LABGEAR
LENSON HEATH
MERCURY**

**TELEVES
TRIAx
TOWER**

**BLAKES
PACE
WOLSEY**

**UNIFIX
PHILEX**

& MANY MORE

**CALL FOR CATALOGUE OF FULL RANGE
ALL PRICES + VAT + CARRIAGE + CREDIT CHARGE IF APPLICABLE**

RCS VARIABLE VOLTAGE D.C. BENCH POWER SUPPLY



£76 INC VAT - POST & INS £6
Up to 38 volts DC at 6 amps continuous, 10 amps peak
Fully variable from 1 to 38 volts.
Twin voltage and current meters for easy read out.
240 Volt AC input. Fully smoothed.
Size 145x117x45. 20 volt 1 amp model £44. Post £4.
RADIO COMPONENT SPECIALISTS
337 WHITEHORSE ROAD, CROYDON, SURREY, UK
Tel: 0181 654 1665
Lot of transformers, high volt caps, valves, speakers, in
stock. Phone or send your wants list for quote.

DECODER TO COMPUTER interface card
with smart card connectors and diagram:
£9. E.M.O., 62 Bridge Street, Ramsbottom,
Lancs BL0 9AG. Tel: 01706 823036.

LINAGE

AVO MULTIMETER Model 8, £45.00. 500
volt meggers £30.00. Prices plus VAT and p
& p. Send SAE for lists of Surplus Instru-
ments & Scopes etc. A. C. Electronics, 17
Apleton Grove, Leeds LS9 9EN. Tel: 0532
496048.

OCHRE MILL Technical Services, Grundig
TV spares for most models to 1985, fast,
friendly, helpful, sensible prices. Gt Lype
Farm, Charlton, Nr. Malmesbury, Wilts
SN16 9DR. Tel: 0666 823228.

PRIVATE RETAILER has excellent part
exchange colour televisions and videos to
clear. Tel: 01494 814317.

CLASSIFIED TEL: 0181 652 8339

RECRUITMENT

Channel One Television provides local news, 24 hours a day exclusively on cable television. Channel One offers a unique opportunity to work in a rapidly evolving multiskilled environment.



The following opportunities are available -

Electronic Maintenance Engineers (Job ref: EME8)

Cameras, edit suites, linear and non-linear transmission, studios and graphics to keep running. Get involved in their maintenance and development. Some experience of electronic maintenance essential. The ideal candidate will be enthusiastic, keen to learn and have an interest in computing. Shift work involved. Salary will be dependent on experience.

Applications in writing only. PLEASE DO NOT TELEPHONE. Enclose a full CV and mark the envelope with the job reference to: Paula Haywood, Human Resources Manager, Channel One TV Limited, 60 Charlotte Street, London W1P 2AX.

I.C.T.V (Southern) Ltd

REQUIRES

FIELD/BENCH ENGINEERS

To Repair
CTV/VCR/Audio/Camcorder
Products.

GOOD SALARY

For further information
contact: Graham Atkins on

Portsmouth (01705) 653654

DUE TO FURTHER EXPANSION SERVICESPEED SLOUGH

Require

FIELD/BENCH TECHNICIAN

AND TECHNICAL INSTALLERS

For the repair and installation of
CTV/VCR/Audio and Camcorder products

Top rates of pay

Tel: 01753 692408

For further details

TV SERVICE OPPORTUNITIES

You're an experienced TV repair engineer or service manager. You know most makes of TV and VCR. You're on top of the job and looking for a way to use your skills in a different direction. Taylor Nelson AGB is the answer. We're one of the world's leading research organisations, and we are seeking two engineers to join our team. One will work in the Reading/Slough area, fitting specialist electronic devices to TV's and VCR's in homes throughout the region. The other will work from our Head Office in West London, leading a small team providing logistical and field support services.

If you've the right experience - possibly including some knowledge of telecommunications - switch channels to Taylor Nelson AGB.

To apply, please send a curriculum vitae together with current salary details, to **Diane Meyler**, Personnel Executive, Taylor Nelson AGB Plc, Westgate, London W5 1UA.

**TAYLOR
NELSON AGB**
PLC
MORE THAN JUST INFORMATION

METRO

Technical Services

Field/Bench & Outsourced Engineers Central London & Anglia Attractive packages

The Metro Group, part of the WPP Group plc and Europe's largest specialist communications company, is developing and expanding its operations in London and Cambridge.

Do you have a high level of technical expertise on audio visual equipment coupled with relevant practical experience? Are you from an Engineering background with a technical qualification (HNC/HND or equivalent preferred)?

We are looking for people to fill vacancies in two areas.

- Field/Bench Engineers - based from our premises in either Central London or Cambridge, you will be servicing a range of domestic and commercial equipment, either in our own workshops, or on client's sites.
- Outsourced Engineers - based permanently on our client's premises in Central London, with the backup and support of the Technical Services team at Metro, you will be responsible for maintaining a range of equipment, and managing the use of the client's audio visual facilities. You could be involved in supervising other members of the Outsourced Team, in some positions.

We are looking for people with good customer liaison skills, confidence, a professional approach, an excellent telephone manner and the ability to cope under pressure. We are able to offer an excellent salary package, if you have the right level of skills and experience.

Interested? Then forward your CV with a covering letter and details of your current salary to: **Carolyn Rodgers** at Metro, 53 Great Suffolk Street, London, SE1 0DB.

Tel: 0171 928 2088

Fax: 0171 261 0685

CLASSIFIED TEL: 0181 652 8339

Okay, who's the bright Spark?



Workshop Service Engineers
In-Home Customer Service Engineers
Nationwide Opportunities

In-Store Service Desk Engineers

Portsmouth, Guildford, Solihull, Chelmsford, Orpington, Enfield,
Croydon, Brighton & Southampton

£Excellent + Benefits

The bright spark is the engineer that made a name with Comet. We've put more resources into quality aftersales service than any other in our sector. Which means if you think your skills deserve full recognition and reward - there's only one place to go.

A thorough approach, strong technical skills and service/repair experience - ideally gained in a similar environment - are what you'll need. Like the rest of our team, you'll need to be helpful, outgoing and able to handle a customer as carefully as you would a repair.

Ongoing training is provided to enable you to achieve your full potential! We also offer excellent rewards and benefits - including free medical insurance, pension and share save schemes - plus discounts throughout the Kingfisher Group including Woolworths, B&Q and Superdrug.

Have a spark of genius. Write, stating clearly the position and location you're interested in and enclosing a brief career history, to:

Rob Pelter, HR Advisor, Comet Group plc, Aftersales Service Dept.,
Unit 5, City Park Ind. Est., Geldard Road, Leeds LS12 6DR
Interviews will be held locally

COMET

Technically, you couldn't make a better move Trade Technical Adviser

Sony is famous around the world for its innovative products and technical excellence. We are proud of our reputation and are committed to keeping our standards amongst the highest in the industry. Every one of our people has a part to play and we are now looking for a Trade Technical Adviser to join us at the National Operations Centre at Thatcham, Berkshire.

Much of your time will be spent on the phone helping Sony dealers resolve technical problems with our range of brown goods. You'll use product manuals and will need to be capable of fault-finding to component level. You'll also work on products in our own workshops, diagnosing and solving problems, and will have regular dealings with the product information and quality control departments.

We're looking for someone with workshop experience, a good knowledge of brown goods and basic engineering skills. Friendliness and an excellent telephone manner are also important.

Our benefits package includes 25 days' holiday, private health insurance and discount on Sony products.

This is a great chance to develop your technical skills with an industry-leading company - to apply, please write, enclosing your CV and current salary details to, Sally Taylor, Sony UK Ltd, National Operations Centre, Pipers Way, Thatcham, Berkshire RG19 4LZ.

SONY

Maintenance Engineers



Creative Technology, leaders in the field of broadcast hire and video production services have two engineering vacancies.

The Engineers' duties, based in London, SW18 will include the maintenance and repair to component level of the widest range of broadcast video equipment. Reporting to the Chief Engineer, each Engineer will be able to work on his/her own initiative and will have a formal background, by qualification and/or experience, in electronic maintenance.

We offer excellent remuneration including pension and health care insurance.

Applicants are invited to send or fax their CV to Greg French:

Unit 6, 307-309 Merton Road, London SW18 5JS
Fax: 0181-877 1980

DNH CAMCORDER SERVICE CENTRE
SONY - PANASONIC - JVC - FERGUSON - AKAI
- JVC APPROVED
REQUIRES
CAMCORDER ENGINEERS
£18,000 PLUS DEPENDENT ON EXPERIENCE IN
CAMCORDER/VCR REPAIRS
(FURTHER TRAINING WILL BE PROVIDED)
FOR FURTHER INFORMATION CONTACT
DUNCAN ON
0181 295 0568

ADVERTISERS' INDEX

Aerial Techniques.....135	Manor Supplies.....86
Alban Electronics.....85	Marapet.....129
Besco.....146	Muter, Ulrich.....149
BSMART.....139	OZAN.....97
Broughframe.....133	Philex.....IFC
Bull Electrical.....98	PV Tubes.....133
Campion Wholesale TV.....133	Radcom UK.....129
Central TV Wholesale141	Satellite Solutions.....BC
Coastal Aerial Supplies.....145	Sendz Components IBC
Colour Trade.....146	Star Vision.....139
C PC.....87	Stewart of Reading.....103
Cricklewood Electronics.....133	Swift TV Publications.....137
Dartel.....143	THV TV.....145
East London Components...91	Tree W.143
Economic Devices.....80-81	U.C.P.....145
Electronic Sound Systems...103	Vista Electronics.....142
Express TV.....139	West Midlands tv.....143
Grandata Ltd.....111-122	Willow Vale Ltd.....78
HCTV.....140	Wiltsgrove Ltd.....144
HST Distributors London.....143	Wizard109
J.J. Components.....91	
Kays J.141	

MEASUREMENT

SOLUTIONS

**Meter
Repair Service**
In or out of warranty
Free Collection &
Free Delivery Available
0800-801978

**Test
Equipment
Catalogue Available**
Please call for your
**FREE COPY
TODAY**

DIGITAL SATELLITE & DIGITAL TERRESTRIAL



SATELLITE DISH ANALYSER



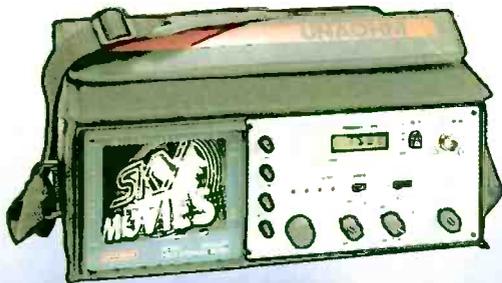
TV AERIAL ALIGNMENT METER



ANALOGUE TV/FM ANALYSER



ANALOGUE SATELLITE ANALYSER



TV & SATELLITE ANALYSER



TEL - 01604 787 888

Fax - 01604 787 999

E-mail - sales@satsol.co.uk

E-mail - support@satsol.co.uk

Internet Site - www.satsol.co.uk

**Stocking over 2,500 different
TV & Satellite items in depots located
throughout the UK. We don't just offer a Solution.
WE ARE THE SOLUTION - SATELLITE SOLUTIONS.**

