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SEPTEMBER 2004

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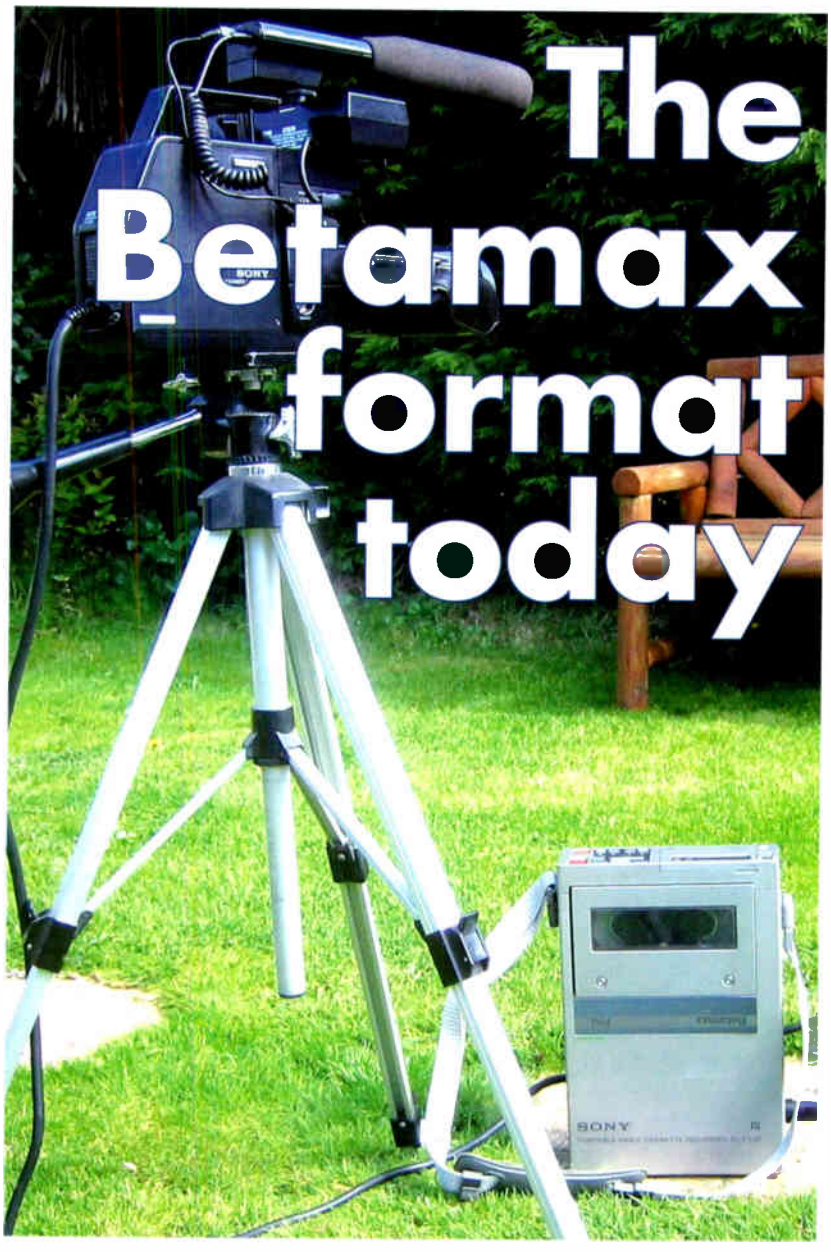

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Thomson	DTI550	IRC83080

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September 2004 Vol. 54, No. 11

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Next issue, dated October, on sale September 15

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Recording frame rate (QUAD)		Max 30 FPS	Max x 25 FPS
Recording frame rate (MUX)		Max 30 / 4 FPS	Max x 25 / 4 FPS
Storage media		Max 2 IDE Hard Disk	
Image format		M-JPEG	
Compress rate		Low: 8k bytes/field High 15k bytes/field	Medium. 10k bytes/field best. 20k bytes/field
Recording Mode		Manual / Alarm / Schedule	
Playback speed		Fat forward x2 x4 x6 Fast reverse x6 Frame by frame forward playback	
On screen display & setup		Time/date/setup menu	
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Relay output		NO or NC programmable contact x1	
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HIGHBURY BUSINESS

Dumb channels

History has a habit of standing things on their heads: what might be true at one point in time becomes decidedly not so at some stage later. In short, things change. Take television. At the beginning of the TV era we had just one channel. That was all there was room for. It's probably forgotten today how low-band VHF was at the very cutting edge of technology in the Thirties. Along with EMI, the other major contributor to the initial development of TV in the UK was the Marconi Company, which set up a television research group in 1930. By 1932 it had developed a transmitter that operated at 44·7MHz and could carry 250kHz modulation. The company was well on the way to its future success in the TV transmission field.

That early restriction to a single channel was the origin of the 'public service' concept in TV broadcasting. When spectrum space was limited, it was considered desirable that optimum use of it for the public's general benefit should be a requirement before issuing a licence to broadcast. Hence the insistence on carrying a percentage of news, religious programming, educational programming and so on. It still seems right that our leading broadcasters should be required to observe a duty towards the community. But in today's conditions the problem is too many channels, not too few.

What to do with all those channels? It seems to be felt that they must be filled with something or other. Digital technology has exacerbated the problem, providing a multiplex of channels in the spectrum space previously occupied by just one. Nowadays the smaller-audience channels seem to come and go at random, as those who follow our Satellite Notebook feature will be aware. There are some channels that seem hard to justify, apart from the assumed need to fill them with something. There are, in fact, better ways (the internet) of catering for the more arcane channel uses. Some channels could be described as being pretty dumb. Have we just come to the dumbest?

I refer to a channel devoted to advertising alone! Remember the great battle in the Fifties to try to prevent any advertising at all on TV? Yet here we have Sky TV introducing a channel devoted to repeats of 'classic' advertisements. The Advert Channel will feature programmes about commercials for 24 hours a day, with only nine minutes an hour devoted to current advertisements. It seems that there are people who prefer ads, well the better of them anyway, to the programmes themselves. According to one of those who have been planning the new channel, "we will be showing ads as a form of entertainment and also from the artistic, creative and cultural viewpoint". A column on the subject in the *Financial Times* analyses the sociological significance of TV advertising, and concludes that if the Sky channel doesn't do it well enough "a rival channel must start up"!

There is no doubt that many advertisements have been very popular – and successful, since an advertisement doesn't succeed if it fails to capture attention. But a whole channel just for adverts? Well, we shall have to see whether it succeeds or is just another of those that soon falls by the wayside.

One point this does raise is how much time people have to devote to the media, since for us all time is limited. Some interesting research on the use of the media by the public has just been released in the US (*Communications Industry Forecast & Report*, published by Veronis Suhler Stevenson, a New York-based media merchant bank). It found that US consumers devoted more than ten hours a day to the media in 2003, an increase of almost an hour a day in comparison with five years previously. How can so much time be devoted to media consumption? The answer seems to be that people are increasingly using more than one form of media at the same time, for example using the internet while listening to the radio or reading while listening to music. Tom Freston, co-chief operating officer of Viacom, says that about thirty per cent of viewers of the company's MTV channel are online at the same time. Furthermore new technology, such as portable music and video players, is enabling us to consume media material under conditions where it would have been difficult before. The Walkman has been around for many years of course, and the portable phone is becoming a multimedia device.

Is there no way of getting away from it all? Public places are full of the media in one form or another, but perhaps if you stare at the floor and don't avert your eyes? Might that work (though there would be the danger of bumping into things!)? Not if The Egg Factory, a US-based group that specialises in bringing innovative technology to the market, has success with IntelliMat. This is a multimedia digital display on which you can walk. IntelliMat is a wear-resistant portable LCD screen that hooks up to a standard PC, measures three by four feet, and is half an inch thick. It's being tested in Sony's flagship New York store. Now that could, I suppose, be a use for dumb channels!

Analogue switch-off delayed

The government has decided to delay for a couple of years, to 2012, the planned final analogue TV switch off in the UK. This follows warnings from the broadcasters, including the BBC, that they didn't think the previously planned 2010 switch-off was realistic. It also follows an apparent warning from the Treasury that funding for the planned public information campaign, some £300m, might not be forthcoming. A massive publicity campaign to make sure that the public is fully aware of what is involved had been seen as a key to achieving a rapid digital TV take-up. The start of the switchover period has also been delayed, from 2006 to 2007.

The government has also announced that from September retailers will be required to include a label with all TV sets for sale explaining the switchover plans. In effect this will amount to an expiry date for analogue TV sets, unless used with an adapter.

A threat to analogue radio has now been added, with the suggestion that analogue radio signals could similarly be switched off. It's a more insidious threat. Radio continues to be as popular as ever, and as popular as TV. Digital will not improve on the quality provided by FM, though more channels can be packed into the bandwidth available. But radio has traditionally had an international as well as a local flavour (remember Lord Reith's "Nation shall speak unto Nation"). With analogue transmissions you can tune into foreign stations with no questions asked. It would be a pity for that to be no longer possible unless an expensive, special receiver is bought. Broadcasting and industry executives might favour such a move, but the overall benefits for listeners seem dubious.

High-definition TV

The HD Forum, an association that aims to promote high-definition TV, has been launched.

Initial members include Darty, Envivio, Eutelsat, Fnac, HBS, M6, Noos, Panasonic, STMicroelectronics, Sharp, Sagem, Samsung, Sony, TDF, Thomson, TF1 and TPS all manufacturers, publishers, broadcasters, producers or distributors in the audiovisual sector.

The main aims of the HD Forum will be to keep people informed about the status and development of HDTV throughout the world; to encourage the setting up of complete production and distribution chains through all types of media, including ADSL; and to raise technical questions on the choice of standards. The Forum says that fifty per cent of flat-screen TV sets today already have resolution that's compatible with HDTV broadcasting, and that the figure will rise to 100 per cent in the near future.

On July 27 Metro Broadcast, Bow Tie TV and NTL worked together on the first UK live, commercial HDTV transmission. Destination was Japan, via satellite, using MPEG-4:2:2 encoding.

HD DVD news

During July Toshiba, NEC and Memory-Tech held a three-day "HD DVD Showcase" in Tokyo to promote the new, next-generation, high-definition DVD format, which uses a blue laser and advanced video-compression technology to enable more than eight hours of high-resolution video to be recorded on a single 30GB, double-layer ROM disc. Current DVD-ROM discs can store up to 8·5GB of data on a single-sided, double-layer disc. Hardware prototypes such as HD DVD players and PC ROM drives were demonstrated at the Showcase, with film clips from major studios authored and recorded on HD DVD for technical evaluation. The aim is to launch HD DVD hardware and discs next year.

Last November the DVD Forum approved version 0.9 of the physical specification for the HD DVD ROM format. This was followed by release of the specifications Book version 1.0 in June. Last February the Forum approved version 0.9 of HD DVD rewritable, with final approval expected this autumn. Technical studies have also been completed for HD DVD-R, a write-once recordable version of the format: disc evaluation tests are being conducted by the DVD Forum in preparation for possible adoption of version 0.9 in September.

In June the DVD Forum selected MPEG-4 AVC (H.264) and VC-9 (Microsoft Windows Media 9 technology) as mandatory video-compression systems for HD DVD. Both provide three times the compression efficiency of MPEG-2, which is used for current DVDs. The Advanced Access Content System Licence Administrator has been formed to develop an advanced copy protection system for next-generation optical discs. It consists of eight major US and Japanese firms in the entertainment, IT and CE industries.

Supporters of the format claim that HD DVD has compatibility with DVD because it uses the same 0·6mm disc structure, bonded back-to-back. As a result, disc producers will be able to use their current manufacturing lines with only minimum upgrades. A dual manufacturing (DVD and HD DVD) line achieves a cycle time of 3·5 seconds for 30GB dual-layer HD DVD discs and three seconds for current DVD discs, with a high yield of more than 90 per cent. The switch from DVD to HD DVD discs takes only five minutes. The monthly production capacity of Memory-Tech's four dual manufacturing lines is 3·3m DVD discs and 2·8m HD DVD discs.

New DAB radios

The big companies are now starting to release DAB radio equipment. Sony has announced a stylish receiver with remote control, Model XDR-S1. Crown has announced two receivers, Models CDR140 and CDR240. The CDR140 is for mains operation. It has a two-line LCD display, DAB auto-tune, an additional FM tuner and a telescopic aerial. Suggested price is about £70. The CDR240 at about £90 is for mains/battery operation and includes a headphone socket. Panasonic has released a portable, Model RF-D1, at about £130 and a micro hi-fi with DAB, Model SC-EN9, at about £200.

DVD update

Matsushita (Panasonic) has launched, in Japan, the world's first DVD recorder that can record on single-sided, dual-layer Blu-ray discs. These have a capacity of up to 50GB. Model DMR-E700BD can record digital high-definition and analogue programming.

Up to 4·5 hours of digital HD programming or up to 63 hours of analogue programming can be recorded on a BD disc.

The recorder has built-in tuners for DTT, digital satellite and analogue terrestrial transmissions. It also uses DVD-RAM and DVD-R discs, and has an EPG. No UK launch data has been announced.

A new Panasonic portable DVD player, Model DVD-LS50, has been launched in the UK. It includes HighMAT technology, which makes it easier to play back material that has been downloaded or transferred from a PC.

HighMAT (High-performance Media Access Technology) has been developed by Panasonic and Microsoft: it provides faster start-up times and intuitive play lists for music tracks or images viewed through on-screen navigation. Other features include a 7in. widescreen LCD panel with VGA resolution, built-in stereo speakers and Advanced Virtual Surround Sound. It sells for about £400 and is compatible with DVD-RAM, DVD-R, DVD-Video, DVD-Audio, CD, CD-R/RW, VCD and SVCD discs and MP3 and WMA files.

Sanyo's new slimline DVD player, Model SL40, has a three-disc memory, a multi-language facility and parental lock. It's compatible with DVD, DVD-R, DVD+R, VCD, SVCD, CD, CD-R/RW and JPEG (Kodak picture CD) discs.

Portable video player from Goodmans

Goodmans has announced a portable (pocket-sized) video player, Model GPDR1, that can record two hours of video material on a 256MB memory card using MPEG-4 compression. It can alternatively record ten hours of MP3 music or 3,000 JPEG pictures. As the recordings are only temporary, in a solid-state memory, and can be shown only on its own 64mm screen, Goodmans maintains that the player does not need to incorporate the copy-protection circuitry used in video disc or tape recorders to prevent them recording movies. The GPDR1 is expected to sell for about £220.

Narrow-field LCD

While most LCD panel manufacturers strive to develop screens with as wide a viewing angle as possible, Toshiba has developed a screen with a narrow field of view. The technology is designed to enhance privacy when viewing information or entering data with touch-screen displays in public places – such as a bank ATM or cash machine. It could also be used for personal devices such as mobile phones or personal digital assistants, providing a display that can be widened to accommodate more people or narrowed to reduce the number of viewers.

The system uses a special filter that's placed over the display area and a small circuit that's built into the display controller for pixel alignment. When this circuit is activated, anyone viewing the screen from the side sees a reticulate pattern instead of the bright, clear image seen by the user. In addition the user can control the viewing angle, widening or narrowing it by means of a single control. Depending on the pixel arrangement, an LCD is either darker or brighter when viewed from an angle.

Toshiba expects the new displays to be available during the second half of this year.

LCD glass

Ever thought about the glass used in LCD displays? It's very special, having characteristics shared with the ultra-pure silicon required for semiconductor chips. Complex physical and chemical processes are used in its manufacture, and only a handful of companies worldwide have the technology. The glass has to be extremely smooth, so that electronic components can be laid down on it. Corning claims to have about half the market, the next largest producer being Asahi of Japan with an estimated twenty per cent.

About 43,000 tonnes of high-purity glass for LCD screens were produced in 2003, in sheets about 0·7mm thick. World output this year is expected to be about a third higher. The largest sheets made at present are about 1·5 x 1·8m. Corning, which has been working on the technology since the Sixties, plans to start producing 1·9 x 2·2m sheets by the end of the year. The company thinks that sheets as large as 3 x 3·5m could be produced within a few years, but any larger size would run into road transport problems. According to Pete Bocko, director of technology strategy at Corning's display division, this could for practical reasons be the limit. The alternative would be for glass manufacturers to build plants within the factories of LCD screen companies.

DAB recording module

RadioScape has announced a digital radio module, type RS300L, which provides recording, pause and rewind of live broadcasts, and listening to one station while recording another and decoding a third data channel for say travel information and news. It's able to do the latter because it can decode three DAB radio channels in one multiplex simultaneously. It can also provide an EPG of stations and their programme schedules. Dab radio sets fitted with the module could be available by Christmas.

In addition the module provides service linking, i.e. the radio will switch automatically to an associated station when the one being received goes out of range or off air. The link can be from one DAB station to an associated FM station.

RadioScape has also announced a module, type RS350A, for the DAB car radio market. It has many of the same features as the 300L and can even be programmed to provide one channel for those in the front of a car and another channel for those at the rear.

Both modules are based on the Texas Instruments' TMS320 -DRE310 digital signal processor chip.

There is still business to be done with Beta recorders, which are nowadays often worth far more than VHS ones. Enthusiasts value them, and a lot of transfer of recordings to DVD is being carried out

Photo 1: Mechanical monsters may be repairable, but often don't give the best results and are not valuable.

The Beta format today

It is very difficult today to make a profit from servicing VHS recorders. Even HiFi stereo VHS machines can be bought new for less than a modest repair charge. So, for the most part, we've given up repairing all but the most expensive machines. Strangely however a small opening for profitable VCR repairs exists with Beta (often known as Betamax) machines, which can be surprisingly valuable. They are sought by video collectors and enthusiasts, and are also needed by those who wish to transfer Beta videotape memories to DVD. The tables have turned: a good used Beta video recorder is now likely to be worth ten times as much as a similar VHS machine.

You might like to consider renting out a good Beta VCR from your workshop, perhaps along with a DVD recorder. A similar situation could occur with V2000 machines, but these are much harder to obtain and are less likely to be needed today. Beta was the preferred choice over VHS in the early days of home video cameras, so there are many collections of treasured memories on Beta tape waiting for the chance to be transferred to DVD.

Background

In the early Nineties Beta VCRs were being dumped, befalling 'accidents' for insurance claims and were generally discarded. Fortunately some people were wise enough to store away unwanted machines rather than destroy them, and now there's money to be made. Beta machines are starting to appear at eBay and other auction sites, and are getting to see the light of day again.

Some machines have stood the test of time better than others. This article may awaken your interest in Beta video recorders as money earners, not just as a trip down memory lane. It's probably also a good time to check whether you have a few useful machines stashed away yourself.

Most of us who have been in the video servicing game for a number of years will remember the various models and some of the faults to which they were prone. You may not have seen some models for a long time however, while the availability of parts and reliability issues can nowadays be more important than ever.

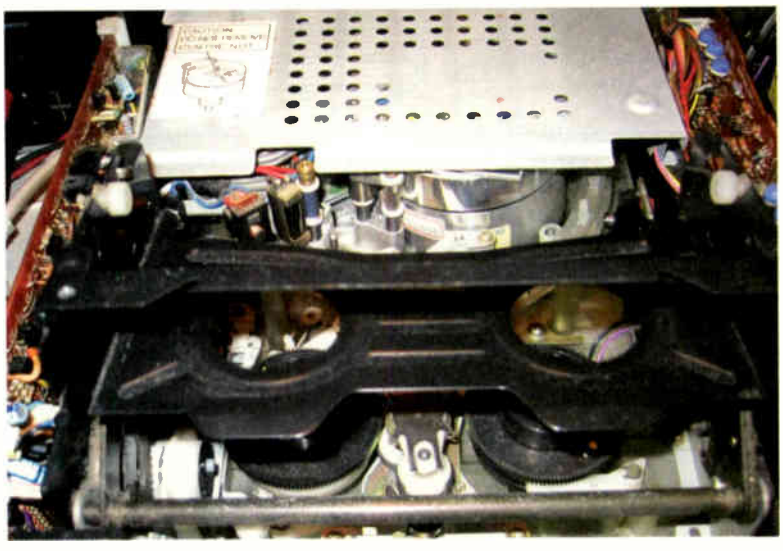

Photo 2: Most Sanyo reel idlers are easy to replace.

Which machines to consider?

The main Beta format brands were Sony, Sanyo and Toshiba. Other manufacturers, such as NEC and Aiwa, sold small numbers of Beta VCRs in the UK, and there are some that were simply clones of other brands. You are most likely to come across Sony and Sanyo machines today, so these are the

ones I'll discuss with respect to their being worth servicing for customers, or for selling or renting, or better avoided.

The Sanyo range

The models in the Sanyo range were sold at keen prices and were sometimes less elaborate than their Sony counterparts. You get the feeling that the two companies may have worked together to avoid treading on each other's toes! Picture quality, at the extreme, was probably not quite as good as the best that Sony could offer, but nevertheless clearly outshone anything that VHS could offer, with low video noise and good bandwidth. Though Sony commanded higher prices in the good Beta years, in 1983 Sanyo had the top selling model – it outsold every VHS machine as well.

Sanyo models are slightly noisy mechanically, but were astonishingly well put together. This makes them a real prospect for use today. Many parts are still readily available.

The earliest models included the huge and heavy **VTC9300**. see Photo 1. It suffered from 12V regulator failures and slipping belts, but these machines are too ancient to be worth the trouble today. Though they are quite reliable and solid, they don't attract the interest of enthusiasts and the picture quality is a little average.

Model **VTC5300** and the very similar **VTC5400** were a step forward in size and weight, but were still fairly heavy with average performance. Parts availability is not as good as with later models. They were the last of the Sanyo Beta machines to remain laced up during fast forward/rewind. Probably not the best models to attempt to revive today.

Sanyo's model numbering system jumped about. The next model was the **VTC5000**, followed by the very similar **VTC5150**. We are now on to a winner. These were very popular, lightweight top-loading machines, and you are still likely to see them around today. They and subsequent models adopted the VHS approach of unlacing for FF/REW, which reduced head wear and strain on the idlers.

The electronics are very reliable, and the mechanics are easy to service. Reel idlers (see Photo 2), pinch rollers and belts are easy to change and are readily available from Grandata and other parts suppliers. Replace them as a matter of course. Occasionally a reel motor will need to be replaced, and this may be a little harder to find. Symptoms include dead spots or white flashes that mar playback. There is a modification to rectify low reel-motor torque, see 'links' later. Video heads are as simple as VHS ones to replace – head failure is not too common.

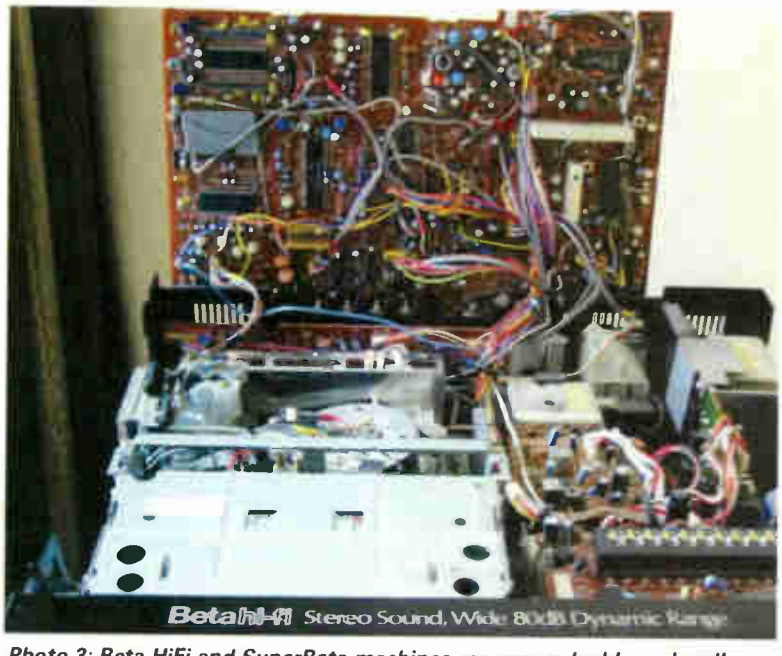

Photo 3: Beta HiFi and SuperBeta machines are very valuable and well worth servicing. This Sanyo Model VTC-M40 Beta HiFi machine is an excellent proposition.

Photo 4: There is altogether too much of everything in a Sony SL-C7.

Sanyo went on to produce an excellent range of front-loading models that shared many parts with the VTC5000, though the reel idlers are more prone to wear. The front-loading machines are not only a good bet in terms of being repairable for customers but also fetch good prices. Beta HiFi models such as the **VTC-M40** (see Photo 3) usually sell for over £300 at eBay but, if new HiFi video heads are required, you probably won't be able to obtain them.

Sanyo tended to set the drop-out compensator (DOC) rather conservatively: now that tapes and heads are perhaps a little less than perfect, slight adjustment of the DOC control can work wonders for the playback results.

In my opinion, all Sanyo front-loading machines represent the pick of the bunch in terms of looking presentable, being simple to service, and reliable.

The Sony range

In general Sony machines tend to be more in demand by Beta enthusiasts but are probably not the best choice for regular use today. Video enthusiasts prefer the technical prowess of the Sony models, but they are far less reliable than Sanyo machines. The mechanics are more fragile, and the electronics are

Photo 5: The Sony SL-C5 looks similar to the sophisticated SL-C7. It's basic, heavy, unreliable and unloved.

prone to random component failure. You often have to get involved in real component-level fault-finding. In addition parts can be extremely difficult to find. Even simple faults are compounded by not having a source of replacements. But there's no telling some Betaphiles that Sony machines are a pain, they just love them anyway.

If you need to replace the video heads you will have to set up the eccentricity when installing them. Actually this doesn't take long and, with practice, can be done by eye just as well as with an eccentricity gauge or dial-test indicator.

A Hall-effect sensor on the lower drum in all models from the C9 onwards can fail, though the cause may just be dirty glue on the pins. If glue removal doesn't help, it can be the end of the machine. All consumer Sony Beta machines remain laced up during FF/REW, which with many models provides the added feature of 'peep search' during tape winding. But it can increase wear on the video heads and mechanism. So, are any of them worth trying to repair?

Though ancient mechanical monsters do exist, the oldest Sony models you are likely to encounter today are the **SL-C7** and the simplified **SL-C5**, see Photos 4 and 5. Some collectors like the SL-C7 because it is so sophisticated, but you certainly wouldn't consider renting one out because you would spend the rest of your days maintaining the old lump. It's way overcomplicated, far too many capacitors fail, there are complex power supplies, the clock buttons jam, you get random electronic failures, the mechanics are poor and the thing is heavy. It's an enthusiast-only model. Since the SL-C5 is almost as unreliable and doesn't have the sophistication, these machines are unloved and have low value.

The **SL-C6** is a heavy, front-loading model. A couple of 0·22μF electrolytic capacitors (of Sanyo manufacture as it happens!), C7 and C8, were an unfortunate choice in the capstan circuit. When the capstan speed is wrong or varying, they are best replaced with non-electrolytic capacitors. Apart from that the SL-C6 is relatively reliable for a Sony Beta machine, and might just be worth considering if you can get idlers and belts, of which there are many.

The **SL-C9** is a fairly slim front-loading model that was quite sophisticated for its day. These machines are a practical proposition, just about, if you can find one that needs little work or parts. They are quite collectable, especially with the original remote-control unit. But failure of a DC-DC converter, front-loading mechanism weaknesses and common Sony electronic failures mean that your chances of finding a good one are as slim as the machine itself!

Models **SL-C20**, **SL-C30** and **SL-C40** (see Photo 6) are slightly newer than the SL-C9. The mechanics are fairly reliable apart from the reel idler, which is no longer available, and front-loading problems. Electronic stock faults include failure of the bias oscillator coil and capacitors in the power supply – at least the latter are easy to replace.

Later Sony machines are quite sought after. HiFi models such as the **SL-HF100** are worth over £300 when perfect. SuperBeta models are also valuable. The SuperBeta HiFi **SL-HF950** is worth a mint, so you will probably never see one. Faults are many and various, including defective (and unrepairable) LED VU meters, loading problems, defective bias oscillator coils, faulty reel idlers and other problems that were common throughout the Sony front-loading ranges.

Sony used its professional-equipment expertise well in pushing the Beta format for home-movie use, see Photo 7. You will find that the **SL-F1** portable machine turns up from time to time, often with video camera. These are not the ideal choice for tape-transfer tasks. The SL-F1 suffered not only from the other myriad Sony reliability problems but from cracked flexicables between PCBs as well. A system with camera and accessories may still fetch a good price amongst enthusiasts, but you probably won't get rich messing about with these.

The SL-F1 had a niche market however: it was used by music recording studios, in conjunction with a PCM adaptor, as a means of getting very high-quality audio

Photo 6: Older Sony front-loading machines may be unreliable but provide very good results.

recordings from one location to another. In common with some other Beta recorders, the SL-F1's tuner-timer unit includes a switch that disables the dropout compensator for use with a PCM adaptor. The cameras, which have a certain 'pro' look about them, are slow to respond to fast-moving events, so only collectors are interested in them today.

Sony went on to invent the first camcorders, Beta of course, and enthusiasts may pay good money for a working example. One even uses a CCD image-sensor instead of a Trinicon tube, clearly the way of the future. If you have the equipment and expertise to service camcorders however you probably won't want to be spending time with these. They are maybe best left well alone – unless you find a near-perfect example.

Toshiba

Toshiba produced only a few Beta models, which are fairly basic. Occasionally you find a Bush-badged one. Top-loading machines (see Photo 8) are heavy and mechanically complex, whereas the front-loading models are primitive and suffer from head wear. Few Toshiba Beta machines remain in existence: if you do by chance come across one, you will have to assess it on its merits.

In general

For transfer of Beta HiFi recordings you will of course require a HiFi player, not a linear stereo model such as the SL-C9 or SL-C40. Most HiFi models have only a manual, analogue tracking control, in common with VHS recorders of the period, and you may have forgotten that tracking was sometimes a compromise between picture and HiFi audio track performance. You might need to make this clear to anyone you rent a machine to for transfer of HiFi recordings to DVD.

New blank Beta tapes are still available, but it's assumed that most users will be looking for playback solutions rather than making recordings. Indeed a video recorder with a recording or tuner faulty might be OK to sell or rent out as-is.

You need to be careful that any machine you rent out will be used with consumer Beta-format tapes (typically Betamax, Betamovie or Betacord) and not professional Betacam-format tapes. Early Betacam tapes are safe to use with consumer Beta machines, and people occasionally did so, but later Betacam tape formulations will destroy the video heads in no time.

This particular time provides a chance to make some money from servicing, selling, auctioning or renting Beta video recorders. People are now moving over to DVD, and thus want to transfer recordings to the new format. There is clearly no point in transferring recordings to VHS, as this will only create a new problem with the rapid demise of VHS. Sky Plus, other hard-disk recorders and affordable DVD recorders are rapidly taking over from analogue videotape. In addition the film rental and purchase market has almost completed the transition from VHS to DVD, further accelerating the VHS downturn. As Beta found out to its cost, this market does not like having two formats when one of them is much more popular. Even digital videotape looks dated compared to DVD, hard-disk and solid-state recording. In fact all consumer videotapes will eventually succumb to the march of progress.

Photo 7: Portable equipment is of interest to Beta collectors provided it is in good working order. These old cameras certainly look the part!

While the consumer Beta format faltered in the late Eighties and Nineties, the professional Betacam format, which was in part designed to be compatible with consumer Beta tapes, has gone on to become a major force in TV studios throughout the world. Betacam has undergone continuous development, including digital variants. At least in this sense it's interesting that Beta will have outlived VHS.

Links

There are a number of helpful websites on the subject, and also a lot of rather useless "why Beta was better" type ranting. The largest amount of Beta-format information is held at the outstanding www.palsite.com which has to be seen to be believed. I have a site myself, at www.colin99.co.uk/beta.html which provides information on Sanyo reel drives in particular.

There's a large list of fault causes at: http://users.bigpond.net.au/vidcam which covers Beta models very well. ■

Photo 8: Toshiba Beta machines are relatively uncommon today. This Model V5480 has been retained because of its multi-standard operation.

Plasma panel problems

What sort of problems could you encounter with plasma panels? Stephen Williams has had considerable experience with this type of display. He describes typical faults and provides advice on handling the panels

Over the past few years manufacturers have been discouraging the repair of high-tech products such as plasma TV sets. We've nevertheless encountered quite a few plasma panel problems, both in our workshop and in customers' homes. The following is a summary of our servicing experiences to date.

Picture size

The first problem we encountered was excessive height and width with a nice new silver plasma set. We soon discovered, at the customer's home, that there was no geometry adjustment with the model concerned. So the panel and the associated media box were taken to the workshop.

After some head scratching we decided to phone the shop where the panel had originally been purchased, and discovered that they had in their service department a similar plasma panel. Only this one had reduced height and width!

At this point the penny dropped. All the format conversion required to drive the panel is carried out in the media box. Here, incoming TV and PC signals are converted to digital formats and then reformatted to match the resolution of the particular plasma screen. The two screens differed in that one was a 32in. type and the other a 42in. type. So the resolution also differed. Although the two media boxes looked identical, there was a slight difference in the model number, one being specifically for 32in. and the other for 42in. screens.

Swapping over the two media boxes cured the problem. We don't expect it to be the last time we come across this type of 'sales' problem.

Pixel problems

A complaint we still get quite often with plasma panels is of pixel drop-out. If you examine a plain red, blue or green raster, you may well notice an occasional 'dead' pixel that shows as black. This is entirely normal with a plasma panel: currently no manufacturer is prepared to guarantee plasma panels against dead cells.

These are actually sub-pixel errors. With a white raster a missing red sub-pixel shows up as a tiny cyan pixel that's not easy to see at a reasonable distance.

The same thing occurs with LCD/TFT screens. A number of sub-pixel errors are allowed despite the price of the screens. If you are not prepared to accept an occasional sub-pixel error, don't buy a plasma or LCD screen.

Buzzing

We occasionally get the complaint that a plasma panel buzzes. High-energy scan-drive panels often generate an audible buzz, which can be made much worse when the panel is installed near wood panelling or on a wooden AV cabinet.

On one occasion I had to fit a length of felt beneath an annoyingly audible plasma panel after its owner had paid a small fortune for an AV cabinet of antique design, and then found that it amplified the scan buzz very effectively.

Screen burn

Plasma panels can suffer from screen burn or, to quote one manufacturer, 'image retention'. Unlike a projection set however the burn is usually not permanent. The gases in a plasma panel can overcharge in the bright areas of a stationary picture, leaving a faint after-image that lasts for maybe some hours. Some panels have a

screen-wash facility, available via the user menus, to counteract this. It can be activated to remove any after-image quickly.

Plasma panels that do not have this facility can simply be used with normal moving pictures for a few days, after which the image should disappear. If the image is still there after a week of normal use however the panel has suffered an irreversible phosphor burn. The only cure is to replace the panel.

Single lines

A problem we've encountered a few times is single-line defects on a plasma panel, either horizontal or vertical. This means one thing only: a defective gas plasma display. Such panels are returned to the manufacturer by the appointed agent. Repair is then attempted by replacing the relevant addressing IC on the flexible connectors or by repairing the track to the glass display. If this fails, a replacement plasma display will be required, usually costing more than the original complete panel.

Installation issues

When our shop sells a plasma panel, the installation is carried out by the manufacturer's local agent. This often results in a follow-up call out for various reasons, the main one being a poor picture.

A CRT TV set generally doesn't have great focus, especially as it gets older. A plasma panel always has perfect focus however, even when it ages – only the brightness decreases. This of course emphasises any imperfections with the aerial installation, especially when it's a 42in. screen.

Add to this an installation that's arranged on a composite-video basis and you will see, in addition, amplified dot crawl and patterning on edges and lettering. Most plasma panels will provide a greatly improved picture when configured on an RGB basis.

So most of our follow-up call-outs involve selling the customer a new aerial installation complete with solid-screened cable and a Freeview receiver of some type that provides an acceptable RGB picture.

If the customer has a Sky installation it should be set to RGB and widescreen via the installation menu, and the dish should be checked for alignment and signs of rust.

Another means of improving the off-air picture where Freeview is not available could be to sell the customer a DVD recorder, as these generally have RGB outputs from an analogue tuner.

An additional sales opportunity is to sell a five-channel surround-sound system to complement the plasma panel installation. If it includes a DVD player, make sure that there is an RGB option – not all surround systems have this.

Finally, to finish the job off properly good-quality, individually-screened scart leads should always be provided.

Transportation warnings

Because they are very thin and rigid, plasma panels should always be transported vertically. If they are laid down, they may flex when jolted or knocked. This can cause irreversible damage. Symptoms vary from greatly increased sub-pixel drop-out to no display at all if the glass is fractured.

Also bear in mind that there is approximately two-thirds of an atmosphere of gas inside a plasma display panel. Do not fly panels anywhere unless they are in a pressurised container, as this can also cause irreversible damage. For the same reason most manufacturers limit plasma panel installations to below 2,650-3,000m (depending on manufacturer).

Vintage radio: tuning indicators

Tuning indicators were often a feature of the more up-market receivers that graced the nation's homes from the Twenties to the Seventies. Several different types were used over the years. J. LeJeune describes their mode of operation and circuitry

Tuning indicators were never really necessary with the AM receivers that graced the nation's homes from the Twenties to the Seventies. They were nevertheless often a feature of the better class of receiver, along with push-pull output stages and, in later models, band-spread tuning on some wave ranges.

Early indicators

The very first indicator was the Tuneon. This was a long, thin neon lamp with two wire electrodes inside, a fairly short one and another that extended almost the length of the tube, see Fig. 1. One electrode was grounded while the other one was connected via a resistor to the anode of a variable-mu IF valve to which AVC (automatic volume control, i.e. AGC) was applied.

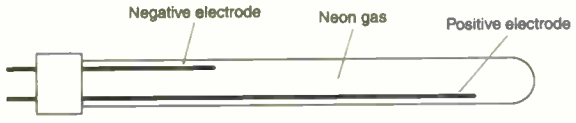

Fig. 1: The Tuneon neon tuning indicator.

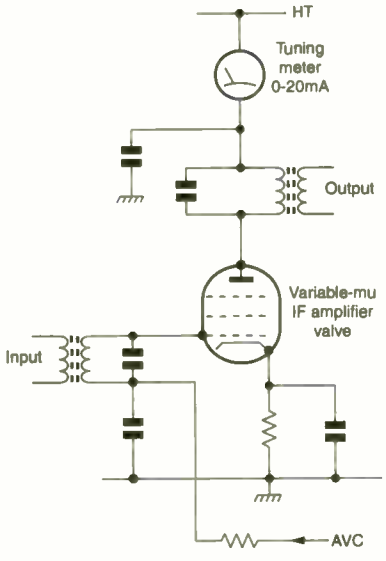

Fig. 2: Tuning meter in the anode circuit of a variable-mu IF amplifier valve.

The negative-going AVC voltage increased as a station was tuned in, biasing back the valve and thus reducing its anode current. As the valve's anode voltage rose, the length of the glowing neon gas increased. So you tuned in for maximum length of the orange-pink glow. The arrangement worked fairly well, but reduced the effectiveness of the AVC action because of the change in anode voltage required to operate the indicator.

Less troublesome was the simple current-meter connected in series with the anode of the gain-controlled IF valve, see Fig. 2. The meter was at full-scale deflection under no-signal conditions, the needle sliding back as a station was tuned in. You simply tuned for a minimum meter reading.

The magic-eye

By the Thirties the magic-eye tuning indicator had become extremely popular. This was a thermionic device, basically a triode with a conical anode. The open end of the cone faced the top of the glass envelope, which was coated with a fluorescent powder on the inner surface, similarly to a CRT screen. The grid was a pair of wires or, sometimes, small blades that were spaced 180° apart and close to the cathode. It was connected to either the AGC line or the output from the AM detector circuit. The latter was generally preferred, a high-value resistor being included to reduce loading on the detector circuit. When the grid voltage became more negative, an increasing shadow was cast over the fluorescent anode coating. As a result the 'eye' closed. A small disc at the centre of the aperture hid the hot cathode from the user's view. Fig. 3 shows the display and Fig. 4 a typical circuit. The most common types used were the EM4, EM34 and Y61. After a time the fluorescent coating lost is brightness and the eye began to dim.

FM tuning indicators

A variation on the magic-eye device appeared in the US to enable FM receivers to be tuned accurately. Its type number was 6AL7GT. The end of the glass envelope was again coated with fluorescent powder, but inside there were two tetrode electron guns side by side. They produced a pair of illuminated green strips on the 'screen'. The anodes of the guns were connected to a supply of some 250V. Fig. 5 shows the idea. The grids controlled the brightness of the strips, while the deflection plates varied their length.

The grids were biased so that the beams were cut off when no signal was present. This was easy to arrange, using the AGC line and

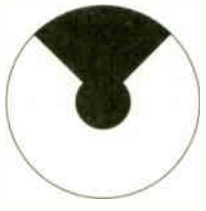

Fig. 3: The magic-eye display.

a polarity-inverter stage. When a viable signal was found the grids were driven positively and the screen was illuminated. The deflector electrodes were connected to each side of the FM ratio detector circuit so that, when the tuning was slightly off to one side of the centre frequency, one deflector was more positive than the other, making the illuminated strip longer. As the correct tuning point was reached, the two fluorescent strips became of equal length. Should the tuning drift to the other side of the centre frequency, the strips would change in length in the opposite sense. The user of this type of tuning indicator would know whether the receiver was tuned high or low of the correct point.

These indicators were never used in the UK, despite being a very useful addition to a domestic FM receiver. The moving-coil meter with a centre-zero took over from this indicator which, as with the magic-eye type, suffered from display fading with time. The meter arrangement is shown in Fig. 6.

Battery-operated receivers

Before the advent of the LED, battery-operated receivers used the DM70, DM71 and DM160 indicators, which had 1·4V filaments. The DM70 and DM71 had a display like an exclamation mark, which was actually the shape of the control-grid aperture through which the fluorescent strip could be seen. The single filament passed directly in front of the aperture, so that the fluorescent display was viewed through it.

The DM160 could be classed as a sub-miniature display and was again a triode. But instead of an aperture-plate grid it had a helical grid between the filament and the fluorescent anode. At only 5 x 25mm the DM160 fitted easily into the miniature receivers of the day. The DM70/71 were 9 x 45mm. Fig. 7 shows the two types with a Y61 magic-eye indicator for comparison.

Tape recorders

For a time these indicators and the EM80 series were very popular both as tuning indicators and as inexpensive recording-level indicators in domestic tape recorders. The EM80 had a fluorescent strip along the side of the envelope. This narrowed as bias was applied to the control grid. In tape recorders the two separate illuminated ends moved towards each other until the edges met, indicating excessive recording level.

In many recorders these devices were replaced by a cheap moving-coil meter movement, often driven from simple transistor circuitry. A meter didn't deteriorate and need replacement. The advent of reasonably good automatic level control in cassette recorders finally eliminated the need for a record-level meter.

Tuning-scale indication

There were other arrangements of course, but perhaps the one most worthy of mention was that used in some early valve receivers. It appeared as a strip of light across the top of the tuning scale. As a station was tuned in, the length of the strip varied. The shutter that produced it was a curved vane of lightweight material which was painted black. This was mounted on the needle of a moving-coil meter: when there was no signal, the vane (shutter) blocked the light from a dial bulb – the light from this was projected through a slot aperture on to the rear of the translucent tuning dial.

As a station was tuned in, the meter needle moved and the shutter allowed light to reach the tuning scale: the length of the illuminated strip varied with signal strength. The meter movement was, of course, included in the anode circuit of a variable-mu IF valve.

In conclusion

These are all now relics of a bygone age. In radio sets they were marks of a 'de-luxe' receiver, along with other desirable accessories that were aimed at tempting prospective purchasers to spend a little more than they had originally intended.

A look at today's audio equipment shows that little has changed in this respect. Marketing people call them "features" and, amongst themselves, speak of "bells and whistles", the product being a "mug's eyeful". Ostentatious in presentation, and when in operation flashing like a fairground in full spate, much modern consumer audio equipment works well enough without any need for such extras – which can make servicing a nightmare.

In comparison, the old tuning indicators were examples of good taste and moderately useful extras. ■

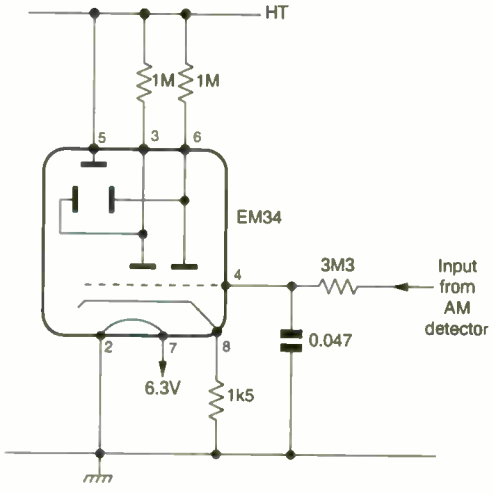

Fig. 4: Typical EM34 magic-eye indicator circuit. Grid drive could be obtained from the AVC line or the output from the AM detector.

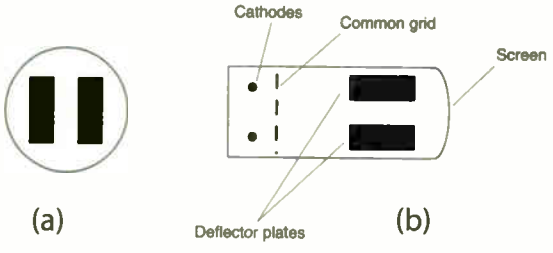

Fig. 5: The US dual-beam indicator for tuning FM receivers, (a) display, (b) internal arrangement of the indicator.

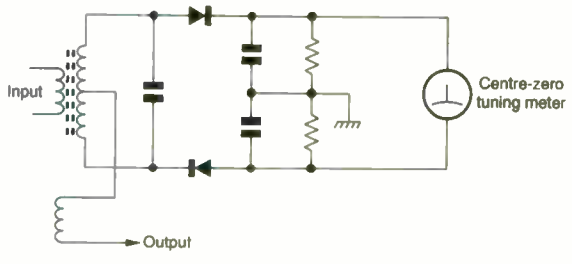

Fig. 6: FM tuning-meter connections in a ratio-detector circuit.

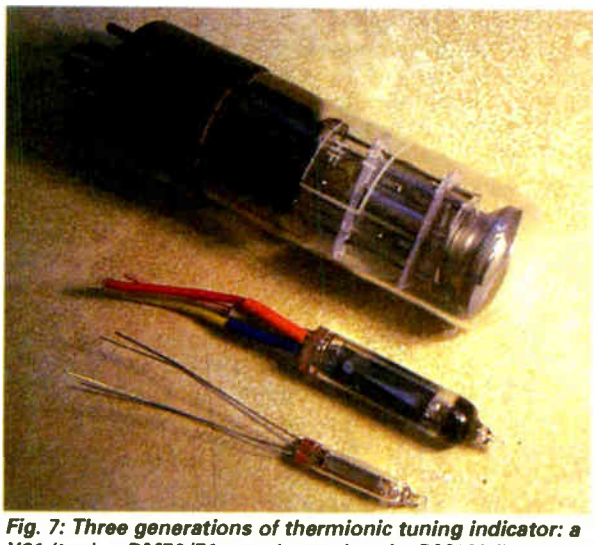

Fig. 7: Three generations of thermionic tuning indicator: a Y61 (top), a DM70/71 type (centre) and a DM160 (bottom).

TEST REPORT:

The Roberts Gemini 6 FM/DAB radio receiver

Roger Bunney tries out this mains-operated radio that provides FM (Band II) and DAB (Band III) reception

Initially the options for receiving DAB radio transmissions in the UK were to use either a portable-type receiver or a full-blown HiFi tuner, the latter being expensive and requiring an audio amplifier to drive the loudspeakers. A combined FM (Band II) and DAB (Band III) table-top, mains-operated receiver has recently been launched in Europe however. It's available in the UK as the Roberts RD6/Gemini 6 and elsewhere in Europe as the Sangean DDR3. The specification suggested that it had considerable potential, so I decided to buy one and give it a try. While the Band III DAB facility was the main reason for the purchase, for a DXer its Band II range provides the bonus of SpE monitoring. The frequency allocations for DAB are in Bands III and L. The Gemini 6 is not fitted with a Band L (1·452-1·491GHz) tuner however as only the French are testing this at present.

Front view of the Roberts Gemini 6 DAB/FM radio.

Initial impressions

Initial impressions were encouraging. Though present UK DAB transmissions are within the multiplexes 11B-12D (see Table 1), the RD6's coverage is from multiplex 5A through to 13F, i.e. the whole of Band III. The receiver displays the multiplex number and the frequency of the multiplex. A rear-mounted, plug-in telescopic whip aerial is provided, with connection via a standard F socket. So a large, outdoor aerial can easily be connected for DAB-DX.

DAB operation

DAB operation is relatively easy once the rather rudimentary handbook has been read. The receiver is mains-operated via a two-metre standard Telefunken (figure-of-eight) lead. Push the 'on' button and 'Roberts' appears in the orange LCD screen. The 'band' button selects either FM (RDS) or DAB, while the large right-hand 'tuning' control provides simple scroll detent tuning up or down the band.

When the tuning button is depressed, 'manual tune' will be displayed. In the DAB mode you can then tune through the Band III multiplexes – the LCD screen confirms the multiplex number and frequency. Having found a multiplex with activity – say a programme is heard with multiplex 12B – you press the tuning knob to retain the multiplex and rotate it to scroll through all the radio programmes in the multiplex. With my local Rowridge transmitter, multiplex 12B contains all the BBC radio channels.

More information on a given DAB radio channel can be obtained by depressing the 'info' button repeatedly: a scrolling text message appears with the programme content, e.g. pop music; the multiplex name; a signal-strength bar; and the time and date. Up to five programme channels can be stored in memory in both the FM and DAB modes – there are five 'station preset' buttons on the front panel. The

Rear view of the Roberts Gemini 6 DAB/FM radio.

nearby 'auto tune' button provides a low-to-high or high-to-low frequency scan in both modes, stopping at signals of 'sufficient strength'.

DAB performance was an experience when faced with three strong local multiplexes (5kW ERP) from the Rowridge transmitter some 25 miles away, all providing full signal-scale readings. The nil-

gain discone aerial I use is far from being suitable for DAB-DXing at a valley location under 'flat' conditions, and wouldn't lead to decoding of signals from other regions even with the help of a Mutek preamp. The total Band III coverage is a decided advantage for future DAB-DXing from Europe as DAB coverage gradually expands.

FM operation

The FM coverage, 87·5-108MHz, is tuneable in the 'manual tune' mode, with the frequency shown to two decimal points, e.g. 103·75MHz. RDS is provided for station identification and, in general, the DAB controls are replicated for FM.

FM performance is reasonable, and I found that fringe reception was possible using my discone aerial. This is not a truly selective receiver however when a local power-house FM transmission and an adjacent fringe-level distant transmission are present: the FM facility should be regarded as a bonus to the DAB facility. Currently the Sony SA3ES is perhaps the best FM DXing receiver, with its dual-selectivity when narrow-band filtering for DXing is used – check at www.dxradio.co.uk/sony/

General comments

The LCD screen illumination can be switched on or off. There are front volume and tone controls and a rear slide-switch for 'deep bass boost' (DBB). The latter is next to a 3·5mm stereo headphones socket, which can also be used for feeding a hi-fi system. An optical output Toslink covered socket is provided for use with equipment that accepts an optical input. The output from the 75mm 8Ω speaker is quoted as 3W. The DBB switch, stereo socket and aerial input F socket are all in a recessed section of the rear panel. Powering is AC mains only.

Listen closely with either headphones or the loudspeaker and you will hear a very low hum plus sharp buzzing when no programme is present. This doesn't increase as the volume-control setting is advanced, suggesting a power supply and synthesiser design anomaly. I spoke to Roberts' technical support about this and was told that the noise was "fairly normal"!

The moulded replica-wood (looks like teak) cased RD6 weighs 2·3kg, its dimensions being 240mm wide, 115mm high and 155mm deep – allow a further 50mm at the back for plugs. As an alternative all receiver operations can be carried out using the remote-control unit, which measures approximately 88mm long, 55mm wide and 6mm deep.

The Roberts RD6 costs about £180. In late June it was available from John Lewis at £179. The Sangean version is advertised at ¤199 in Holland. A Google check at the kelco site led to QED-uk.com where the cheapest price quoted was £141.65 including delivery in the UK (phone 08700 620 500).

Illuminated LCD screen with multiplex details.

I recommend that anyone interested in DAB should go to the British FM and TV Circle website at www.skywaves.inco/dab.html where there is detailed practical discussion on DAB, equipment, aerials etc.

A detailed listing of UK transmitters, output powers etc. will be found at the BBC Online radio reception site, which is at www.bbc.co.uk/reception/radio_transmitters/digital_radio.shtml

DAB frequency allocations

Table 1 provides a complete list of the European Bands III and L DAB multiplex frequency allocations. Only part of Band III is allocated to DAB in the UK (see above). Band L is currently not used other than for experimental transmissions in parts of France.

Our thanks to the Benelux DX Club for this information. ■

Table 1: European DAB multiplex frequency allocations

Multiplex	*Frequency*	*Multiplex*	*Frequency*
5A	174·928MHz	12D	229·072MHz
5B	176·640MHz	13A	230·784MHz
5C	178·352MHz	13B	232·496MHz
5D	180·064MHz	13C	234·208MHz
6A	181·936MHz	13D	235·776MHz
6B	183·648MHz	13E	237·488MHz
6C	185·360MHz	13F	239·200MHz
6D	187·072MHz		
7A	188·928MHz	LA	1·452960GHz
7B	190·640MHz	LB	1·454672GHz
7C	192·352MHz	LC	1·456384GHz
7D	194·064MHz	LD	1·458096GHz
8A	195·936MHz	LE	1·459808GHz
8B	197·648MHz	LF	1·461520GHz
8C	199·360MHz	LG	1·463232GHz
8D	201·072MHz	LH	1·464944GHz
9A	202·928MHz	LI	1·466656GHz
9B	204·640MHz	LJ	1·468368GHz
9C	206·352MHz	LK	1·470080GHz
9D	208·064MHz	LL	1·471792GHz
10A	209·936MHz	LM	1·473504GHz
10B	211·648MHz	LN	1·475216GHz
10C	213·360MHz	LO	1·476928GHz
10D	215·072MHz	LP	1·478640GHz
11A	216·928MHz	LQ	1·480352GHz
11B	218·640MHz	LR	1·482064GHz
11C	220·352MHz	LS	1·483776GHz
11D	222·064MHz	LT	1·485488GHz
12A	223·936MHz	LU	1·487200GHz
12B	225·648MHz	LV	1·488912GHz
12C	227·360MHz	LW	1·490624GHz

Reminiscences of a TV engineer's wife

Elaine Everest reflects on her time served as wife of a TV engineer and the changes she has seen

What's this then? A woman writing in *Television and Consumer Electronics*! How come? Well, stop and think for a moment. Who's been there all through your years of training? Who takes the phone calls for all you self-employed TV engineers? Who keeps the dinner hot while you fit in that 'one last call' on the way home? I'll tell you. It will be either your wife, your mum, your partner, your sister, your gran or maybe 'er indoors. Nine times out of ten it will be a woman.

As a time-served TV engineer's wife, I've been reflecting recently on the changes I've seen in this industry – from the female angle.

Apprenticeship

I began my apprenticeship at the early age of fifteen, my new boyfriend being one year into a five-year apprenticeship with one of the major electronic repair companies of that time. "Five years!" I hear the younger of you exclaim. But that's right. And during every year there were day releases, evening classes, exams, visits to head office for appraisals – and a forty-five hour working week as well.

Apprenticeship papers meant that the company had more control of your soul than the devil himself. If, back then, you tried to get out of an apprenticeship it involved a legal wrangle. Fathers also had to sign on the dotted line to guarantee that their sons would fulfil the five years. Luckily apprentices were paid at that time – they hadn't always been. My boyfriend received the princely some of £3.4s.6d (£3.23) each fortnight. It was paid into his bank account.

When we started courting he was still learning to drive, which was another requirement of the job – fortunately the company did pay for this. He had to spend his own time travelling long distances by public transport to the college. Once he passed his test however he could borrow one of the vans to get to classes until the time when we had our own car. This was a brilliant cream-coloured Morris Oxford with leather upholstery. The bodywork was held together with filler that we religiously rubbed down and painted every Sunday.

Once he'd passed his driving test the company wanted its second pound of flesh: evening calls. When he'd finished the shift at 10 p.m., the van had to be returned to the workshop and our car collected. During much of our courtship I was picked up at six and map read for my budding engineer. I read a book by torchlight, in all weathers, while he attended to his calls – heating and lighting not being provided in most of the inside of a TV engineer's van. By the time we had collected the car it was time to go home, my curfew time being 10.30 p.m. Any later was not allowed for good girls in those days.

Prospects

All TV engineers were time-served in the late Sixties: it would have been unthinkable to take on an untrained engineer. But it was a very good job to get into. You had prospects, a comfortable future to look forward to. How little we knew about the impending Japanese invasion. First the sets began to appear in the shops. Eventually they took over most of the UK manufacturers.

This all took place at the time when transistors were replacing valves in TV sets, first in the signals stages and then throughout. Reliability increased, so the need for servicing decreased. The cost of sets started to fall relative to other goods, and the time eventually came when they could be picked with the weekly groceries at throw-away prices.

Other changes affected us. Takeovers within the UK rental industry meant that we all started to

work for only one or two big corporations. Then there was the decline of the rental market: how many people do you know who rent a TV set nowadays?

Colour

But I'm getting ahead of myself. A big divide amongst technicians occurred when colour TV sets first came on the market. Those with colour-TV qualifications were more in demand than those who could handle only black-and-white sets. Until recently we still knew elderly engineers who never made the transition and stayed with mono sets.

A big perk of being an engineer was that you could borrow a set for special occasions. My mother was given this honour one Christmas when my husband, as he was by then, brought home a colour set. She was so terrified of this monster in her living room that it spent the whole holiday covered in her best tablecloth in case someone should dare touch it. She never once switched it on. And she didn't live to see the first colour set dad bought. It came complete with a highly-decorative wooden cabinet and brass handles, reminiscent of a mausoleum. We would all sit there watching the horse racing, amazed at the greenness of the grass – it was very green, as the colour control was set to maximum in order to get value for money!

Problems of yesteryear

I must admit that I much prefer a simple wooden cabinet to the black or silver plastic you usually get with today's models. One problem that engineers came across was the number of people who used the warmth produced by a set to dry nappies. As a result the wood warped and cracked. And for all the high-tech specifications thrust down our throats today, the old sets had a much better sound system. The reason for this was the use of very large diecast speakers and valve sound.

Speaking of valves, I also recall the amount of equipment engineers in the field had to carry. One large suitcase would contain the vast array of valves you might need. Strange that customers always thought just two valves were made – the 'sound valve' and the 'picture valve'. It makes me laugh when I hear today's anorak brigade rave on about valves in high-fidelity amplifiers. Sorry, been there, done that, and got the dustpan-and-brush for the broken glass!

It wasn't so bad

All in all I feel that TV engineers were treated much better forty years ago, not only by customers but also by their employers.

We still have memories of a fifteen-shilling (75p) merit pay rise. It was awarded after a letter of gratitude had been sent by a satisfied customer. This gave us the opportunity to be within the pay scale that enabled us to buy our first home, for £7,000. But that's another story! ■

LETTERS

Send letters to "Television", Highbury Business, Media House, Azalea Drive, Swanley, Kent, BR8 8HU or e-mail t.winford@highburybiz.com using subject heading 'Television Letters'.

Please send plain text messages. Do NOT send attachments. Be sure to type your full name, address, postcode, telephone and e-mail address (if any).
Your address and telephone number will not be published but your e-mail address will unless you state otherwise.

Power saving

In the Toshiba C8SS power supply arrangement shown in the May issue (Fig. 1. page 401) a relay (SR81) is used to short out the soft-start surge-limiting resistors (R820/1) during normal operation, to avoid unnecessary power consumption. I've noticed that in power supplies in other items of equipment it's more usual to find a thyristor used for the purpose, instead of a relay and contacts. The problem with this is that if the thyristor isn't triggered, because of a fault in its drive circuit, the surge-limiting resistor(s) burn out. Small electrolytics in the thyristor's drive circuit are sometimes the cause of failure of the device to be triggered.

I am at present repairing an Icom 970 transceiver power supply that uses this arrangement.
Mark Garton,
Broomsgrove.

Mains supplies

I clearly recall the Wylex plugs mentioned by Bill Wright in his letter (June): the 13A (15A?) plug did indeed have a piggyback 5A socket on the cover. They were commonly seen around the Swansea area, where I worked in the radio/TV trade in the 1950s. There were two large pre-war housing estates nearby, Townhill and Mayhill, where houses were fitted with unfused 5A and 15A plugs and sockets of the type once common all over the UK, and still found in certain Commonwealth countries. What was uncommon about these ones however was that not only the patresses but also the insulated parts of the connectors were turned out in wood. I haven't made that up! The standard Bakelite types were fast replacing them of course, but there were still quite a lot of wooden ones around.

I also remember the DC mains supply at Llanelli, Carmarthenshire. DC supplies were on the way out, and a major burn-up could occur when equipment fitted with a mains transformer was accidentally plugged in. AC supplies at 50Hz were not universal: I seem to recall that Blackpool was at 44Hz, and that other places had odd frequency supplies.

Who remembers the Rediffusion system that piped the BBC Home Service and Light Programme around the houses at AF via two closely-spaced pairs of insulators, hopping from chimney to chimney on brown china insulators? Subscribers paid a few pence a week to hire a loudspeaker with a tapped transformer matched to the 100V line. Japanese transistor radios knocked that on the head. I also met the system in Hong Kong, where a mix of BBC and Rediffusion-sourced (commercial) programmes was distributed in English and Chinese.

I could go on about what passed for electricity on ships in Swansea docks, but perhaps not!
Jon Talbot,
Tewkesbury, Glos.

Editorial note: We feel we just have to get in on this interesting correspondence! Amongst the various publications on the editor's bookshelf there's a treasured copy of *The Trader* yearbook for 1939. This contains, along with a huge amount of other information, a list of the mains supplies in the UK (and elsewhere!) at that time. Places with non-standard frequency AC mains supplies included:
Altringham 100/200V 80 c/s
Ambleside 100/200V 100 c/s
Blackpool 200V 50/83 c/s
Bolsover 240V 30 c/s
Caerphilly 230V 25 c/s
Crook 250V 40 c/s
Keswick 100V 100 c/s
Killarney 100/200V 100 c/s
Lynton and Lynmouth 100/200V 100 c/s
Newcastle upon Tyne 240V 40 c/s
Tynemouth 240V 40 c/s
Windermere 100/200V 100c/s

In the spirit of things, we've kept to c/s. Newcastle upon Tyne had two suppliers.

DTT reception

In the July Satellite Notebook Hugh Cocks wonders why an old ONdigital receiver wasn't successful in finding the Spanish DVB-T signals. The reason for this is that the UK was a very early adopter of DVB-T. Early ONdigital receivers can demodulate only COFDM signals that use a 2,048-carrier FFT (Fast Fourier Transform). All non-UK implementations of DVB-T use COFDM with an 8,192-carrier FFT.

The FFT is the way in which a DVB-T channel uses thousands of carriers (the Frequency Division Multiplex) so that the effects of reflections and pulse interference can be mitigated. Each piece of data is transmitted on several carriers distributed throughout the channel: if one carrier is corrupted, the data can still be extracted from one of the other carriers. Because the allocation of data to carriers is deliberately not regular, there is an extremely high level of immunity to reflection.

Larger FFTs are more expensive in terms of silicon, and would have made ONdigital receivers even less competitive with satellite DVB (DVB-S) which uses a simpler modulation technique (QPSK/QAM). Use of COFDM with a higher number of carriers means that interference from noise and reflections can be handled in a more finely-grained way, providing an increase in coding gain. Later DVB-T implementations generally use an 8,192-carrier FFT.

Confirmation of this can be seen in Hugh's off-screen picture of the channel-search sequence (Fig. 10, page 566). This describes the modulation parameters, including the crucial FFT mode.
Jasmine Strong,
Received via e.mail

ESR meter

Jim Littler's idea (Letters, August) of adding an inductor across the test leads of my ESR meter design to provide protection is, to my knowledge, unique and also a good one. It's important to use the lowest value that you can without getting a meter reading when there is not a capacitor under test. Although a relatively high-value inductor, in the mH region, will show as open-circuit and give no meter deflection due to its high impedance at the test frequency of 100kHz, it will also present a high impedance to the rapid initial surge of the discharge process. To

reduce the amplitude of this spike a value of 150μH is appropriate: a suitable high-current inductor is available from CPC at about £2, part no. PW00037.

It cannot be stressed enough that diode protection (two diodes back to back) as recommended in my original article should continue to be included. Avoid hefty diodes – type 1N4007 is OK. Fit them on long leads so that they can be snipped off if they need replacement. With diode protection included, the only damage that will occur will be limited to R4 (2·7Ω). To avoid damage elsewhere, this resistor should not be uprated. If damaged, replace it with one on long leads. Replacement of components on stripboard is a bit fiddly. Symptoms of R4 being open-circuit and/or the protection diodes short-circuit are full-scale deflection with the buzzer sounding. Check by measuring the resistance across the test leads with the meter off. Allowing for the combined test lead resistance, the reading should be a little over 4Ω. If R4 has changed value (gone high) because of damage, the symptom will be that all capacitors tested give quite noticeable low ESR readings.

A golden rule is: don't use an ESR meter to check the main smoothing block! There are better ways to test this particular component. Although it's best to avoid live checks, this one is the exception. Get used to the voltage readings, both AC (ripple voltage) and DC, directly across the block. If this capacitor is failing, the ripple voltage will be high and the DC voltage low.

An updated ESR meter design will be published in these pages shortly.

Alan Willcox,
Cardiff.

A holiday at Murphys

A correction note in the July issue (page 543) referred to some errors in my earlier article, as published, on training at Murphy Radio in the early Fifties. In fact I didn't supply the pictures that accompanied the article. The set involved was actually Model V118, which was a console with full-length doors (see the accompanying photograph). It was fitted with a 12in. CRT, type CRM121.

I believe it was the first superhet TV receiver that Murphy had produced, previous models having been of the TRF type. The local oscillator could be tuned by inserting a screwdriver at the back to adjust the core.

The front of the set could be removed by taking the knobs off, unscrewing the brass surrounds for the preset controls then inserting your fingers in the holes. The entire birch plywood front could then be sprung out of the cabinet. You had to do this to clean the CRT and the glass safety screen, which was regularly required.

The Murphy V118 console model, which dates from the early Fifties.

The CRT and valves were of Mazda manufacture. There were numerous 6F1s on the IF deck. A gas-filled triode (thyratron) was used in the field generator stage, while the line timebase used a blocking oscillator.

The bottom chassis held the heavy stuff. There was a huge transformer, a UU8 HT rectifier valve (which would often arc over at switch on because of the heavy current surge), a U26 EHT rectifier valve for the mains-derived 6kV supply, and huge smoothing capacitors.

I hope this clears the air!

Ron Bourne,
Cheddleton, Staffs.

The Televideo email group

It has become much more difficult, with the ever decreasing number of service engineers, to get help when you have a 'stinker' in for repair. In older days you could in many cases pop round to the opposition's workshop for a cuppa and ask the resident sage. There is nowadays much less chance of two businesses being active in one area.

Fortunately the internet provides a modern way for us to help each other – with advice and general discussion based on a specialised email group. The Televideo group now has nearly 150 engineers who swap tips and supply help to one another, and we are always looking for new members. Our discussions cover only products in the PAL areas of the world: overseas members are welcome, but those in NTSC lands will probably find little of interest to them.

Some other internet help groups now charge an annual fee. Our group feels that help should be given freely however. We make no charge for membership, relying on the goodwill of members to help each other out when they can. Freeloaders who ask but never help others are discouraged.

Don't be put off if you don't have a shop. Many of our group work part-time or from home. Applicants should however be able to demonstrate a good understanding of their speciality, whether this is TV, video, satellite or audio (or all four!), and be prepared to help other members if they can. In exchange, you can pick the brains of some 150 experienced engineers, one of whom may have just solved your present problem!

If you would like to join the fellow engineers in the Televideo group, please drop me an email outlining your experience. I will then be in touch.

Robert Philpot,
televideo@horstedkeynes.com

Reception problems in earlier times

Many years ago I heard about an extraordinary TV reception problem in a Yorkshire town where there were numerous back-to-back and other terraced houses. One lady was delighted with her TV set. But it worked properly for only six days a week, not on Mondays when reception was terrible. Why? A set-top aerial was in use, providing excellent reception except on Mondays. It was mounted on the wall as this was found to be an ideal position.

By luck the engineer who was investigating the problem had an idea, washday being the clue. The couple next door were old-fashioned in many ways, and still used a large galvanised bath for bathing, washing etc. This had a hook on the shared wall and, being a foot from the aerial on the other side, acted as a massive reflector that played havoc with TV reception when moved.

I seem to recall another similar case, where replacement of a metal water tank with a plastic one caused problems for a neighbour. The metal one had been acting as an efficient reflector.

I have many memories of TV reception in fringe areas, or lack of it, in those days. In the Fifties I did business with a part-time engineer in Felixstowe, where reception from London, at about 90 miles, was problematical. Ted solved the problem by using a telegraph pole as the aerial mast. Delivery and installation were a challenge! The pole was mounted in a cradle by the house, to permit maintenance, painting etc. It could be lowered by means of ropes operated from the upper windows. I shudder at the thought of the weight!

The telegraph pole served its purpose well and was never affected by the high coastal winds. Its use became unnecessary when the Mendlesham transmitter opened.

Philip H. Bearman,
New Barnet, Herts.

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: Semiconductor type PG965. or does anyone know of a source of this device? The only source I've found has a £50 minimum order. Alternatively has anyone data on his device, which appears to be a high-power FET, or a diagram of the control electronics of the Booster Town and Country mobility scooter. for which the device is required? Good price paid. Tony Blakemore. 26 Jubilee Avenue, Ripley, Derbyshire, DE5 3GP. Phone 01773 746 385.

Wanted: Old half-inch diameter ferrite rods. Must be six inches or more long. Will pay very good money for them. Peter Tankard, 16A Birkendale Road, Sheffield, S6 3NL. Phone 07931 463 823 (mobile).

Wanted/for disposal: Require a working panel for a 32in. Bush set fitted with the 11AK19 chassis. Have the following for disposal: a quantity of EHT trays, all new, some universal; some new panels for the Philips G11 chassis; and some new line output transformers for the Philips G8 and G11 chassis. Peter Hackett. 20 Harold Road, Southsea, Portsmouth, Hampshire, PO4 0LR. Phone 02392 811 105.

For disposal: A Decca CTV Model CS2032 (Bradford chassis); a JVC CR-6000E U-matic VCR: and the following unused CRTs A66-510, 560DYB22 (56-001) and 560BWB22. Free for collection (South Normanton, Derbyshire). Phone Michael Ashley on 01773 813 569 or email mick@mickash.fsnet.co.uk

Wanted: Truvox R102 or R104 open-reel recorder, dating from the late Sixties. I would also like the deck mechanism for one of these machines. I believe this was manufactured by Magnavox and sold separately for those wishing to build their own system. It's characterised by a row of function keys that, unusually, run north-to-south on the left-hand side. Peter Dolman, Berhill's Lane Farm, Sells Green, Seend, Melksham, Wilts, SN12 6RR. Phone/fax 01380 828 524 or email peterdolman@beeb.net or dolmanav@beeb.net

Wanted: *Practical Television* issues dated January and February 1969 – would buy whole year if available. Ted Jones, 12 Bryngwyn Road, Six Bells, Abertillery, Gwent, NP13 2PD. Phone 01495 320 648. Web address tvted@tiscali.co.uk

For sale: *Television* magazines from 1987 to 1992. Total 62 copies (a few issues missing). Contact Mike on 01758 613 790.

For disposal: Copies of *Television* from 1975 to 2003, U-View circuit books, manuals, parts and test equipment. Phone David Miles on 01519 321 419 (Merseyside) for details.

Wanted: Volume control for a Ferguson hi-fi System 30 stereo amplifier Model 3943. Please phone Mr England on 01277 630 534.

For disposal: Because of an impending house move I have for disposal a large quantity of TV sets and VCRs for spares or repairs. Phone Brian Pinches on 01743 878 511 (Shrewsbury, Shropshire).

Wanted: Quad 44 preamplifiers and 303 or 405 power amplifiers for spares, also boards and modules for these, in any condition. Contact Mike on 01758 613 790.

For disposal: Grundig 2x4 Plus VCR (Video 2000 system). Records and plays OK but has control-panel fault. Also second machine for spares and photocopy of the service manual. All free if collected (Shropshire). Phone Steve Sheppard on 01588 660 519 for more information or email steve@sca72.free-online.co.uk

For disposal: Free to a good home. working Sony KV2022UB TV set. One owner since new (1981). Excellent condition with mint remote-control unit and original instruction manual. Space needed. Phone Steve Cunio on 0774 0098616 or email me at steve.cunio@bt.com

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10612280	LOT1814	£16.50
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BU184	£1.00
BU208A	£0.75
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BU2506DX	£1.00
BU2508A	£1.00
BU2508AF	£1.10
BU2508AX	£1.30
BU2508D	£1.30
BU2508DF	£1.20
BU2508DX	£1.50
BU2520AF	£1.70
BU2520AX	£1.40
BU2520DF	£2.25
BU2520DX	£2.00
BU2522AF	£2.00
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BU2525A	£3.25
BU2525AF	£2.20
BU2525AW	£2.50
BU2525AX	£1.90
BU2525D	£2.40
BU2525DF	£1.75
BU2527AF	£4.00
BU2527AX	£2.50
BU2527DF	£2.00
BU2527DX	£2.00
BU2532AL	£3.25
BU2708AF	£2.00
BU2708AX	£2.00
BU2708DF	£2.00
BU2708DX	£2.00
BU2720AX	£2.00
BU2720DF	£2.00
BU2720DX	£2.00
BU2722AF	£3.30
BU2725AF	£2.00
BU2725DF	£2.00
BU2727A	£2.00
BU2727AF	£2.00
BU2735AS	£11.00
BU326A	£0.75
BU406	£0.60
BU406D	£0.85
BU407	£0.55
BU407D	£0.75
BU408	£0.60
BU408D	£0.75
BU409	£0.85
BU415A	£1.70
BU415B	£1.70
BU426A	£0.70
BU4508AF	£2.00
BU4525AX	£3.00
BU505	£0.90
BU505D	£0.90
BU505DF	£0.90
BU506	£1.00
BU506DF	£1.00
BU508AF	£0.60
BU508APH	£0.60
BU508AXI	£0.90
BU508D	£0.75

Part No.	Price
BU508DF	£0.85
BU508DFI	£2.00
BU508DR	£1.30
BU808DF	£2.10
BU808DFI	£2.50
BU826A	£1.60
BUH1015	£4.25
BUH1215	£4.50
BUH515	£2.00
BUH515D	£2.50
BUH517	£2.75
BUH517D	£1.75
BUH715	£4.25
BUK436 / 800B	£2.75
BUK437 / 400B	£2.75
BUK437 / 600B	£3.00
BUK438 / 800B	£3.10
BUK444 / 500B	£2.00
BUK444 / 800B	£2.00
BUK445 / 600B	£2.00
BUK446 / 800B	£4.00
BUK454 / 800A	£2.00
BUK455 / 600B	£2.00
BUK456 / 200B	£2.00
BUK456 / 600A	£2.00
BUK456 / 60A	£2.00
BUK456 / 800A	£2.00
BUK457 / 600B	£2.00
BUK555 / 60B	£2.00
BUL310	£1.25
BUL381	£1.50
BUL381D	£1.25
BUT11A	£0.35
BUT11AF	£0.35
BUT11AX	£0.50
BUT12	£0.80
BUT12A	£0.80
BUT12AF	£0.90
BUT18	£0.80
BUT18A	£0.80
BUT18AF	£0.65
BUT56A	£0.65
BUT56AF	£2.00
BUZ71	£0.75
BUZ71AF	£1.00
BUZ72A	£1.00
BUZ72AF	£1.00
BUZ73A	£1.50
BUZ73AF	£0.60
BUZ76A	£1.10
BUZ77A	£2.00
BUZ77B	£2.50
BUZ80	£1.35
BUZ80AF	£2.00
BUZ83	£2.00
BUZ90	£1.50
BUZ900	£10.00
BUZ900P	£10.00
BUZ901	£15.00
BUZ905	£10.00
BUZ905P	£10.00
BUZ906	£16.00
BUZ90A	£1.80
BUZ90AF	£2.80
BUZ91A	£2.60
BUZ93	£1.50
IRF120	£2.25
IRF130	£4.75
IRF140	£5.50
IRF230	£5.50
IRF240	£4.25
IRF250	£3.75
IRF251	£6.50
IRF3205	£2.00
IRF330	£6.00
IRF340	£3.25
IRF350	£7.50
IRF440	£5.50
IRF450	£6.50
IRF510	£0.70
IRF520	£0.75
IRF530	£0.75
IRF540	£1.00
IRF5450	£5.00
IRF5740	£3.00
IRF5840	£3.00
IRF610	£0.80
IRF611	£1.20
IRF620	£1.00
IRF630	£0.75
IRF630S	£2.00
IRF634	£1.25
IRF640	£1.50
IRF644	£2.00
IRF650	£2.00
IRF710	£1.50
IRF720	£0.85
IRF730	£1.25
IRF740	£0.90
IRF740F	£3.00
IRF820	£0.90
IRF830	£0.85
IRF830F	£1.60
IRF840	£0.85
IRF840F	£1.75
IRF9140	£10.00
IRF9230	£4.00
IRF9510	£1.50
IRF9511	£1.50
IRF9520	£1.50
IRF9530	£1.25
IRF9531	£2.00
IRF9540	£1.75
IRF9541	£2.00
IRF9610	£0.95
IRF9620	£0.85
IRF9622	£2.00
IRF9630	£1.30
IRF9640	£2.30
IRFBC20	£1.10
IRFBC30	£1.20
IRFBC40	£2.10
IRFBE30	£2.25

Part No.	Price
IRFD120	£1.00
IRFD9120	£1.20
IRFD9220	£1.00
IRFF120	£3.00
IRFIBC40	£1.00
IRFIBC40G	£2.00
IRFP054	£4.00
IRFP064	£5.00
IRFP140	£2.50
IRFP150	£2.40
IRFP240	£3.00
IRFP250	£2.80
IRFP260	£3.50
IRFP340	£2.50
IRFP350	£3.25
IRFP360	£8.00
IRFP450	£2.70
IRFP460	£4.00
IRFP9140	£4.50
IRFP9240	£3.00
IRFPC40	£3.00
IRFPC50	£4.50
IRFPC60	£6.00
IRFPE40	£5.50
IRFPE50	£4.50
IRFPF40	£5.50
IRFPF50	£4.50
IRFS740	£1.75
IRFS840	£1.25
IRFZ42	£2.75
IRFZ44	£1.60
IRFZ46N	£1.50
IRFZ48	£2.75
MJ1000	£1.00
MJ10001	£7.00
MJ10005	£4.00
MJ1001	£2.00
MJ10012	£2.00
MJ10016	£7.00
MJ11015	£2.50
MJ11016	£3.00
MJ11032	£8.00
MJ11033	£8.00
MJ15003	£2.50
MJ15004	£3.00
MJ15015	£2.50
MJ15016	£3.50
MJ15022	£4.00
MJ15023	£4.00
MJ15024	£3.00
MJ15025	£3.00
MJ2955	£0.55
MJE13004	£1.00
MJE13005	£0.60
MJE13007	£1.00
MJE13009	£1.00
MJE15028	£2.00
MJE15029	£2.00
MJE15030	£2.50
MJE15031	£4.00
MJE16002	£3.00
MJE18004	£1.25
MJE18006	£1.20
MJE18008	£1.50
MJE243	£0.60
MJE253	£0.85
MJE340	£0.25
MJE350	£0.80
MJF16206	£4.50
MJF18004	£1.75
MJF18006	£2.00
MJF18008	£1.75
MJF18204	£2.50
MJW16018	£5.50
MJW16206	£6.00
MJW16212	£5.00
P16NE06	£1.25
P16NE06F	£1.50
P3NA60	£1.50
P4NB100	£3.50
P4NB80	£2.50
P4NB80FP	£2.00
P4NB90FP	£4.00
P4NC60	£1.75
P4NC60FP	£2.00
P5NB60FP	£2.00
P5NB80	£2.50
P5NB80FP	£3.00
P6N60	£2.00
P7NB40	£1.75
P7NB60FP	£2.00
P9NB60	£2.00
P9NB60FP	£4.00
S2000A	£1.75
S2000A3	£1.75
S2000AF	£0.90
S2000N	£1.50
S2055A	£1.75
S2055AF	£1.75
S2055N	£1.50
S2530A	£1.00
STA301A	£2.00
STA341M	£1.80
STA401A	£2.20
STA402A	£2.00
STA403A	£2.70
STA434A	£2.70
STA441C	£2.20
STA451C	£2.80
STA471A	£2.00
STA8012	£2.70
STA901M	£2.80
STK0025	£4.20
STK0039	£8.00
STK0040	£5.20
STK0049	£5.10
STK0050	£8.00
STK0059	£5.00
STK0080	£6.00
STK0100 II	£12.00
STK015	£4.40
STK020	£11.00
STK025	£4.00

Part No.	Price
STK040	£7.00
STK078	£18.00
STK080	£5.50
STK082	£20.00
STK084	£6.00
STK085	£9.00
STK086	£10.00
STK1039	£4.60
STK1040	£5.00
STK1049	£5.00
STK1050	£6.50
STK1060	£6.50
STK2025	£6.20
STK2028	£5.00
STK2029	£6.00
STK2030	£7.00
STK2038	£7.00
STK2058 IV	£16.00
STK2101	£5.00
STK2110	£3.50
STK2129	£7.50
STK2230	£7.00
STK2240	£7.40
STK2250	£6.50
STK2260	£9.50
STK3044	£5.00
STK3082	£4.00
STK3152 II	£9.00
STK3156	£5.00
STK350-030	£7.00
STK392-020	£8.00
STK392-040	£12.00
STK392-110	£8.00
STK400-040	£8.00
STK401-040	£7.00
STK401-050	£8.00
STK401-080	£9.00
STK401-120	£10.00
STK401-130	£7.50
STK401-140	£12.00
STK4017	£4.00
STK4019	£3.00
STK402-040	£7.00
STK402-070	£7.00
STK402-071	£7.00
STK402-090	£8.00
STK4021	£3.80
STK402-100	£9.00
STK402-120	£9.00
STK4024 II	£5.50
STK4025	£5.30
STK4026	£4.80
STK4026II	£4.80
STK4036	£4.70
STK4036V	£8.00
STK4038	£6.80
STK4040 II	£6.50
STK4042 II	£8.00
STK4046	£9.50
STK4048	£12.80
STK4048V	£12.00
STK4050 II	£16.00
STK405-030	£7.00
STK405-040	£6.50
STK405-050A	£12.00
STK405-070A	£8.00
STK405-090	£7.00
STK4050V	£15.00
STK405-100	£7.00
STK405-120	£11.00
STK4060	£4.00
STK4065	£6.50
STK407-040	£7.00
STK407-050	£8.50
STK407-070	£8.50
STK407-090	£8.50
STK407-710	£8.50
STK4101	£5.00
STK4111	£3.00
STK4112	£3.00
STK411-210	£10.00
STK411-220	£10.00
STK411-230	£12.00
STK411-240E	£14.00
STK412-010	£12.00
STK412-040	£10.50
STK4121	£4.80
STK412-150	£18.50
STK412-170	£18.00
STK4122	£5.60
STK4130 II	£5.00
STK4131	£3.00
STK4132 II	£8.00
STK4133 II	£7.50
STK4140 II	£4.00
STK4141 II	£4.20
STK4141 V	£6.00
STK4142	£5.30
STK4147 II	£14.50
STK4150 II	£8.50
STK4151	£6.80
STK4151V	£10.00
STK4151X	£10.00
STK4152	£6.50
STK4154V	£14.00
STK4161	£6.50
STK4161V	£8.50
STK4162	£5.50
STK4164 II	£11.75
STK4171	£6.50
STK417-120A	£10.00
STK417-130	£15.00
STK4171V	£8.00
STK4172 II	£6.80
STK4181	£6.80
STK4181V	£7.00
STK4182 II	£9.00
STK4191	£9.00
STK4191 X	£14.00
STK419-130	£15.00
STK419-140	£16.00
STK419-150	£10.00
STK4191V	£8.00

Part No.	Price
STK4192	£7.00
STK4197 II	£9.50
STK4199 II	£6.50
STK4204 II	£7.00
STK4211 II	£10.00
STK4211 V	£8.00
STK4221 II	£8.00
STK4231 II	£10.50
STK4241 V	£12.50
STK4272	£4.00
STK4273	£5.00
STK4274	£3.00
STK4301	£3.00
STK433	£3.00
STK4332	£3.00
STK435	£3.00
STK4352	£2.50
STK436	£4.30
STK4362	£4.50
STK437	£4.00
STK4372	£3.50
STK439	£5.00
STK4392	£4.00
STK442-110	£8.50
STK442-120	£11.00
STK442-130	£11.00
STK443	£7.00
STK4432	£4.00
STK457	£3.00
STK459	£5.60
STK461	£6.00
STK463	£9.50
STK465	£9.00
STK470-040	£10.00
STK4773	£8.20
STK4793	£5.50
STK4803	£9.00
STK4813	£5.50
STK4833	£8.50
STK4843	£7.20
STK4873	£4.00
STK488-010	£8.00
STK488-020	£6.50
STK488-050	£8.00
STK4893	£10.00
STK490-010	£7.00
STK490-040	£5.00
STK490-070	£8.00
STK490-310	£7.00
STK501	£5.50
STK5314	£3.00
STK5315	£4.00
STK5323	£4.00
STK5324	£2.00
STK5325	£3.00
STK5326	£3.00
STK5330	£4.00
STK5332	£1.50
STK5333	£3.00
STK5335	£2.00
STK5336	£2.80
STK5337	£2.00
STK5339	£4.00
STK5342	£1.00
STK5343	£1.00
STK5352	£2.50
STK5353	£2.50
STK5361	£3.75
STK5362	£4.00
STK5364	£1.50
STK5371	£2.50
STK5373	£2.20
STK5383	£3.00
STK5392	£5.00
STK5422	£3.75
STK5431	£4.10
STK5434	£3.50
STK5436	£3.00
STK5441	£2.60
STK5443	£3.00
STK5446	£3.50
STK5451	£3.90
STK5461	£3.00
STK5462	£2.30
STK5464	£2.50
STK5466	£3.00
STK5467	£4.00
STK5468	£3.00
STK5471	£5.00
STK5472	£2.00
STK5474	£2.50
STK5476	£2.00
STK5477	£4.00
STK5478	£1.75
STK5479	£2.60
STK5481	£3.00
STK5482	£1.50
STK5483	£3.00
STK5486	£3.50
STK5488	£3.50
STK561	£3.00
STK563	£3.00
STK5632	£2.40
STK5720	£2.50
STK5725	£2.50
STK5730	£2.50
STK583	£3.20
STK6316	£3.00
STK6324B	£3.80
STK6327	£4.00
STK6328A	£2.80
STK6431	£3.80
STK6607	£4.00
STK6722	£5.50
STK6732	£5.00
STK6822	£6.00
STK6875	£3.50
STK6932	£3.60
STK6962	£2.75
STK6972	£1.80
STK6981B	£3.50
STK6982	£3.00
STK6982H	£3.20

Part No.	Price
STK7216	£2.80
STK7217	£1.50
STK7225	£5.00
STK7226	£17.00
STK7233	£7.00
STK7251	£5.00
STK7253	£6.50
STK730-010	£5.00
STK730-020	£5.00
STK730-060	£6.50
STK730-080	£6.00
STK730-090	£6.00
STK730-110	£6.50
STK7308	£2.00
STK7309	£2.80
STK7310	£2.70
STK73405 II	£3.00
STK73410	£2.00
STK73410 II	£2.00
STK7348	£2.00
STK7356	£4.25
STK7358	£4.40
STK7359	£4.25
STK73605	£3.75
STK73907	£7.00
STK73908	£2.50
STK7402	£4.00
STK7404	£2.00
STK7408	£4.00
STK7410	£6.50
STK7458	£12.50
STK746	£4.50
STK752	£0.70
STK7554	£3.00
STK7561	£6.50
STK7561A	£7.00
STK7562	£10.00
STK7563	£4.00
STK7563F	£4.00
STK7573	£1.80
STK7576	£15.00
STK760	£4.00
STK761	£1.00
STK770	£2.80
STK7703	£10.00
STK7707	£4.00
STK772	£5.00
STK772B	£3.00
STK780	£2.70
STK78603	£5.00
STK78617	£24.00
STK795	£1.60
STK79917	£4.00
STK8050	£16.00
STK8250	£5.00
STK8260	£7.50
STK8280	£4.00
STR10006	£4.50
STR10008	£6.00
STR1096	£2.75
STR11006	£3.25
STR1195	£3.50
STR12006	£3.50
STR1229	£3.25
STR13006	£4.20
STR15006	£4.00
STR16006	£5.00
STR17006	£5.00
STR20005	£4.50
STR20012	£3.00
STR20013	£3.00
STR20015	£3.00
STR2005	£3.00
STR2012	£2.60
STR2013	£2.20
STR2015	£3.50
STR2024	£3.00
STR2105	£4.00
STR2124	£6.75
STR30110	£3.30
STR30115	£2.75
STR30120	£2.50
STR30123	£3.50
STR30125	£2.50
STR30130	£2.50
STR3105	£4.50
STR3113	£2.25
STR3115	£4.00
STR3123	£4.00
STR3125	£4.80
STR3126	£3.50
STR3130	£5.00
STR3135	£2.50
STR3212	£2.75
STR3214	£2.75
STR3215	£2.75
STR3315	£2.75
STR370	£2.50
STR371	£3.00
STR380	£3.50
STR381	£3.90
STR383	£3.10
STR384	£3.50
STR40090	£3.50
STR40115	£3.00
STR4090A	£6.50
STR41090	£3.30
STR4142	£4.50
STR4211	£3.15
STR43111	£4.00
STR440	£3.00
STR441	£9.50
STR44111	£3.50
STR44115	£4.75
STR442	£9.00
STR450A	£5.00
STR451	£8.00
STR45111	£4.00
STR4512	£4.00
STR452	£4.00
STR453	£4.00
STR454	£3.00
STR455	£4.00

Part No.	Price
STR456	£3.00
STR457	£4.00
STR470	£2.00
STR50020	£3.50
STR50092	£5.50
STR50103A	£2.60
STR50112A	£3.00
STR50113	£4.00
STR50115	£5.00
STR50130	£3.50
STR5015	£5.00
STR50213	£3.00
STR50215	£3.50
STR50330	£3.00
STR5100	£5.50
STR51041	£3.50
STR51213	£3.00
STR51424	£7.00
STR5214	£4.75
STR53041	£2.50
STR5315	£5.75
STR54041	£3.20
STR5412	£1.25
STR55041	£3.00
STR56041	£5.50
STR58041	£2.50
STR59041	£3.00
STR60001	£5.25
STR6008X	£5.75
STR6020	£1.20
STR61001	£3.00
STR7001	£6.00
STR80145	£3.00
STR81145	£2.00
STR81159	£4.00
STR8124	£3.00
STR83145	£2.00
STR83159	£4.00
STR9005	£2.00
STR9012	£2.00
STR90120	£4.25
STRD1005T	£3.00
STRD1206	£3.50
STRD1406	£3.50
STRD1706	£2.30
STRD1806	£3.60
STRD1816	£3.50
STRD1906	£3.50
STRD3035	£2.30
STRD4412	£2.00
STRD4420	£2.00
STRD4512	£3.00
STRD5095A	£6.00
STRD5441	£4.75
STRD5541	£3.00
STRD6008	£3.00
STRD6009E	£3.00
STRD6108	£4.50
STRD6202	£4.00
STRD8601	£3.50
STRD6602	£4.75
STRD6801	£2.50
STRD6802	£2.50
STRF5654	£6.00
STRF6454	£6.50
STRF6523	£7.00
STRF6524	£4.00
STRF6535	£6.50
STRF6552	£2.00
STRF6653	£7.00
STRF6654	£4.50
STRF6655	£4.50
STRF6656	£8.00
STRF8707	£8.00
STRG6153	£5.50
STRG6351	£5.00
STRG6352	£6.00
STRG6651	£9.00
STRG6653	£5.00
STRM 6511	£7.50
STRM6511	£7.50
STRM6523	£5.00
STRM6545	£5.00
STRM6546	£5.50
STRM6547	£4.50
STRM6549	£5.00
STRM6559	£3.00
STRS5041	£3.00
STRS5041	£3.00
STRS5141	£3.00
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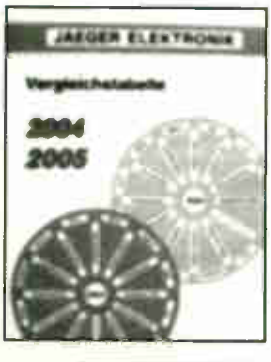

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PANASONIC		
IC561	TDA 8175	PANKIT1
TX25XD60	VERT OUTPUT	PANKIT2
TC28XD60	VERT OUTPUT	PANKIT2
TX28XD70	VERT OUTPUT	PANKIT2
TX29XD70	VERT OUTPUT	PANKIT2
TX-W26D3	VERT OUTPUT	PANKIT2
PHILIPS		
28PT4457/05	PSU	MODKIT50
28PW5407/05	PSU	MODKIT50
28PW6006/05	PSU	MODKIT50
310.10708		PHILKIT3
310.20491		PHILKIT2
310.20496		PHILKIT10
310.31994		PHILKIT6
310.32252		PHILKIT5
310.32253		PHILKIT4
310.32254		PHILKIT9
310.32255		PHILKIT7
310.32262		PHILKIT8
310.62264		PHILKIT1
ANUBIS A	SOPS	PHILKIT2
CP110 CHASSIS	SOPS	PHILKIT8
G90A CHASSIS	SOPS	PHILKIT10
G90B CHASSIS	SOPS	PHILKIT10
G110 CHASSIS	SOPS	PHILKIT3
GR2.1 CHASSIS	SOPS	PHILKIT1
GR2.2 CHASSIS	SOPS	PHILKIT1
D-16 CHASSIS	SOPS	PHILKIT6
HSM VIDEO	SOPS	PHILKIT5
JSM VIDEO	SOPS	PHILKIT4
KSM VIDEO	SOPS	PHILKIT9
LSM VIDEO	SOPS	PHILKIT7
L01.1E CHASSIS	PSU	MODKIT50
SAMSUNG		
CI5944	FRAME	SAMKIT2
CI6844	FRAME	SAMKIT2
VIK310	PSU	SAMSUNGKIT
VIK320	PSU	SAMSUNGKIT
VIK350	PSU	SAMSUNGKIT
VI375	PSU	SAMSUNGKIT
VI395	PSU	SAMSUNGKIT
WINNER 1	PSU	SAMSUNGKIT
SHARP		
51CS03H	PSU	SHARPKIT1
51CS05H	PSU	SHARPKIT1
56FW53H	PSU & DOLBY	MODKIT45
59CS03H	PSU	SHARPKIT2
59CS05H	PSU	SHARPKIT2
59CSD8H	PSU	SHARPKIT2
59DS03H	PSU	SHARPKIT3
59FW53H	PSU & EW	MODKIT49

MAKE & MODEL	KIT TYPE	CODE
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66CS03H	PSU	SHARPKIT2
66CS05H	PSU	SHARPKIT2
66CSD8H	PSU	SHARPKIT2
66FW53H	PSU & DOLBY	MODKIT45
66FW53H	PSU & EW	MODKIT49
66FW54H	PSU & DOLBY	MODKIT45
66FW54H	PSU & EW	MODKIT49
76FW53H	PSU & DOLBY	MODKIT45
76FW53H	PSU & EW	MODKIT49
76FW54H	PSU & DOLBY	MODKIT45
76FW54H	PSU & EW	MODKIT49
DA-100 CHASSIS	PSU & EW	MODKIT49
SONY		
SLV715HB	VCR - PSU	MODKIT40
SLV777UB	VCR - PSU	MODKIT40
THOMSON		
35029400		THOMKIT2
35065920		THORNKIT1
FV70	PSU	THORNKIT1
ICC7 CHASSIS	TDA 8178FS	THOMKIT1
ICC7 CHASSIS	FRAME	THOMKIT3
ICC8 CHASSIS	TDA 8178FS	THOMKIT1
ICC8 CHASSIS	FRAME	THOMKIT3
ICC9 CHASSIS	EAST/WEST	THOMKIT4
ICC17 CHASSIS	PSU	MODKIT41
ISS20 (TV-DVD)	PSU	MODKIT46
R3000	PSU	THOMKIT2
R4000	PSU	THOMKIT2
TX92F CHASSIS	EAST/WEST	THOMKIT4
VESTEL		
11AK31 CHASSIS	PSU	MODKIT51

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RC85	IR9700
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SRD550	IR9386
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2535DD	IR9852
2537DD	IR9852
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2545DD	IR9852
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2557DB	IR9953
2563DB	IR9953
2563DD	IR9953
2573DB	IR9953
2577DB	IR9953
2579DB	IR9953
2636B	IR9953
2835DB	IR9852
2837DD	IR9852
2852DB	IR9953
2853DD	IR9953
2855DD	IR9953
2857DB	IR9953
2857DD	IR9953
2863DD	IR9953
2866DD	IR9953
2873DB	IR9953
2877DB	IR9953
2879DB	IR9953
3327DB	IR9953
3339DB	IR9953
3357DB	IR9953
3377DB	IR9953
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3787DB	IR9953
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6800uF	CAP51	£3.90	2
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100uF	CAP56	£0.85	10
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1000uF	CAP60	£4.35	10
1500uF	CAP173	£4.00	5
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2200uF	CAP174	£1.80	2
2200uF	CAP175	£2.00	1
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220uF	CAP86	£2.80	10
330uF	CAP87	£4.00	10
470uF	CAP88	£5.25	10
680uF	CAP89	£5.00	10
1000uF	CAP90	£5.40	5
2200uF	CAP182	£2.20	1
4700uF	CAP183	£4.00	1
100 Volts			
0.1uF	CAP184	£0.80	10
0.22uF	CAP185	£0.80	10
0.33uF	CAP186	£0.80	10
0.47uF	CAP91	£0.50	5
1uF	CAP92	£0.85	10
1.5uF	CAP93	£0.70	5

VALUE	CODE	PRICE	PER PACK
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3.3uF	CAP95	£0.50	5
4.7uF	CAP96	£0.50	5
6.8uF	CAP187	£0.80	10
10uF	CAP97	£0.95	10
22uF	CAP98	£1.05	10
33uF	CAP99	£1.55	5
47uF	CAP100	£1.75	10
68uF	CAP188	£1.30	5
100uF	CAP101	£2.10	10
220uF	CAP102	£6.00	5
330uF	CAP189	£3.00	2
470uF	CAP103	£6.00	5
680uF	CAP190	£3.00	2
1000uF	CAP191	£3.00	1
160 Volts			
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1uF	CAP193	£0.45	10
2.2uF	CAP146	£0.45	10
3.3uF	CAP194	£1.00	10
4.7uF	CAP195	£1.00	10
10uF	CAP147	£1.40	10
22uF	CAP148	£1.80	10
33uF	CAP149	£2.30	10
47uF	CAP196	£2.20	5
100uF	CAP150	£3.25	5
220uF	CAP197	£3.00	2
470uF	CAP198	£3.25	1
200 Volts			
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100uF	CAP151	£3.25	5
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220uF	CAP155	£2.00	2
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350 Volts			
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22uF	CAP159	£3.40	10
33uF	CAP209	£2.60	5
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100uF	CAP211	£3.00	2
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4.7uF	CAP109	£3.15	5
10uF	CAP110	£4.00	5
22uF	CAP111	£2.50	2
33uF	CAP215	£2.50	2
47uF	CAP112	£3.50	2
68uF	CAP216	£3.50	2
100uF	CAP160	£4.00	2
150uF	CAP217	£3.20	1
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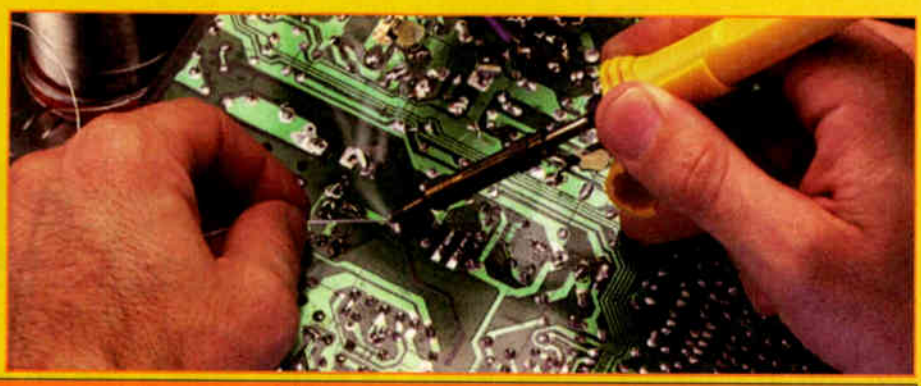

Bench Notes

Adrian Gardiner describes line output stage problems with the Vestel 11AK52 and Thomson TX807CS chassis

A SEG CT2913

A recent field call involved a SEG Model CT2913, which turned out to be fitted with the latest offering from Vestel, the 11AK52 chassis. The chassis has a host of features that are normally reserved for top-end brands, and I'd not come across one before. It has digital picture processing, a frame store, 100Hz scanning, progressive scanning, twin tuners with picture-in-picture, rotation etc.

The processing features are built into a large tin box, which is fitted to a more traditional-looking main chassis. Fortunately the fault was reassuringly Vestel: the set was tripping. I wasted no time, homing in on the line output transistor which was short-circuit. In addition the scan-correction capacitor was dry-jointed. Some things never change! I attended to the dry-joint and fitted a replacement transistor, using type BU2508D. Then I switched the set on again. The result was another reassuringly Vestel fault: the power supply promptly blew up! At this point I decided to take the 29in. monster back to the workshop for more detailed investigation.

Back at base I checked all the secondary-side supplies carefully, paying particular attention to the power-supply feedback. As no fault could be found, the power supply was rebuilt. This included fitting a replacement control IC and chopper FET. When power was applied the set started up normally, so what had happened I don't know. The set was then reassembled and taken to the soak-test bench. Unfortunately it wasn't there long before it shut down and started tripping again!

As expected, the new line output transistor had failed. Careful checks were carried out in the line output stage, paying particular attention to the scan-correction and EW capacitors, but nothing seemed to be amiss. Another transistor was then fitted, and once again the set worked. The replacement transistor was running very hot however, so out came the oscilloscope to check the line drive waveform.

It was clean and correct, but the drive level seemed to be rather low. After failing to find a cause for this I came to the conclusion that the drive had been optimised for the type of line output transistor originally fitted, a 2SC5302 device. So I ordered the correct part and fitted it. After that the set ran correctly and the transistor remained cool.

Quite why Vestel has decided against using the common types of line output transistor I don't know. But clearly when you get this fault it's essential to fit the correct type. I'm sure we are going to come across this fault quite often over the coming months. So order some 2SC5302 transistors now!

A pain-in-the neck Thomson!

A Thomson Model 28DG17UG arrived on my bench as a 'Monday-morning' job. This modern set is fitted with the TX807CS chassis, which has been pulled out of retirement for use in a range of inexpensive sets that produce very good results.

The fault seemed to be pretty ordinary: the set was tripping because the S2055N line output transistor TL035 had failed. A replacement was quickly fitted, and the soldering of various items in the line driver and output stages was reflowed. Power was then applied, and the set ran normally. So off to the test bench it went. Two days later it was returned to the customer – but failed immediately when the delivery driver switched it on. I somehow knew that the set was going to plague me when he brought it back!

How right I was! The set ran correctly when another line output transistor was fitted. Furthermore the transistor stayed cool, even after running for an hour. Then, when my back was turned, pop: off it had gone! Another device was fitted, with the intention of monitoring the line drive. But this time it failed immediately. What could I do? A fourth transistor went in, and this time the set ran. Scope checks failed to reveal any problem with the line drive – even when the latest transistor bit the dust after about ten minutes!

Having decided that the line drive was not the cause of the problem, I replaced the tuning capacitor CL021. In typical Thomson fashion, its value is unusual – 14·6nF. An exact replacement was therefore used, part no. 10042750; also, for good measure, an exact replacement line output transistor, part no. 20578760. This seemed to do the trick initially, as the set ran for several days. Just when we thought it was safe to return the set however it decided that it wanted to stay and ate another transistor. This was becoming expensive!

Offering assistance, a colleague suggested that it would be an idea to rebuild the power supply as, in the past, he had known it to produce high voltages. A repair kit is available from Thomson, part no. 35135370. It contains lots of parts, and takes about an hour to fit. In it all went, along with another S2055N transistor. On went the power, pop went the transistor!

I was now at the stage where half of me wanted to get to the bottom of this difficult problem and the other half wanted to wield a sledge hammer around the workshop! There were no other symptoms, and nothing ever seemed to be amiss at the moment of failure. Furthermore there was no consistency about the length of time the set would work before the destruction occurred.

It seemed logical to conclude that there was an intermittent connection problem somewhere, perhaps a hairline crack in a PCB track. But it could be in only a few parts of the circuitry: EW, scan-correction, the scan coils or perhaps the line drive. A vast amount of banging the chassis and prodding various parts had already been carried out. Sometimes this would cause failure, but more often than not it wouldn't. While prodding around again however there was suddenly a breakthrough that led to the cause of the trouble.

In this chassis the EW circuit is on a separate panel that's mounted close to the line output stage. The two are connected together by a thick, three-wire ribbon cable with plugs at both ends. When this cable was touched there was immediate failure of the line output transistor. The connections at both ends were sound, but the cable itself was intermittent!

A replacement cable, from a scrap set, and yet another S2055N transistor cured the fault. This was confirmed by a lot more prodding and an extra-long soak test. At last the set was happy and prepared to leave my bench – to make way for another horrible item!

What's next?

Next month I will let you in on the horrible fault that took over from the Thomson set. It involved a long, in-depth relationship with a Sony hi-fi unit! ■

WHAT a LIFE!

Some fishermen call in – with TV sets. More TV faults then a return to Spain. Donald Bullock's servicing commentary

It's nice to see old fishing friends again, especially when they come in bearing gifts. Or, the next best thing, TV sets with nice easy faults. So it was when Walter and Toby called in and met at the shop the other day.

After they'd exchanged greetings I booked their sets in. Walter's was a 21in. Matsui, Model 2107R, while Toby's was a 28in. widescreen Hitachi, Model C28W511NA (A7 chassis). It wasn't long before they started swapping yarns, while Paul and Steven tackled their sets.

"I did go up to the old Brickpits the other day" said Walter, "and catched a whackin' good tench under the Old Man's Willow. Turned the scale at over nine pound, 'e did."

Toby's eyes narrowed. It was a minute before he spoke. "I chucked my line in at the same spot las' Sunday" he said. "an' straightaway I catched an old lantern."

Walter nodded wisely. "Ah, the gypsies do throw their rubbish in there at times" he replied.

"Ah yes, but this lantern's wick was alight" Toby added.

Walter paused. "Now don't thee get taking the Mickey out of I, Toby" he continued.

Toby shuffled on his feet a bit. "Tell you what I'll do" he said, "thee knock six pounds off your tench, and I'll blow me lantern's light out."

The sets

By that time Steven had the back off the Matsui, which was dead with no standby light. Paul was having more difficulty with the Hitachi set – it wouldn't fail. Then the speaker crackled and the set cut out. "I bet it's the usual dry-joint trouble with the regulators" he commented as he made for the power supply. He was right about the dry-joints, which had caused start-up problems. The cause of the crackle on sound however was complete lack of solder at one end of R4005 (47Ω, 0·25W), which is in the left channel feedback circuit. It had left the factory in that state.

The cause of the trouble in the Matsui set was R529 (1MΩ) in the start-up circuit. When I glanced at the meter movement it didn't move. The resistor was wide open.

In no time the two sets were working and boxed up. Their owners paid up with a grin before making to carry out their sets.

"'Ere Walter, d'you ever fish Twyford's pond these days?" asked Toby.

"Not no more" said Walter, "it'd flow too fast."

"Flow too fast? What do you mean?" exclaimed Toby, "ponds don't flow."

"This 'un did" Walter replied, "last time I chucked my line in it tore the rod outa my 'ands. And left me with a strained back."

Hairdryers

As they went off Mrs Bellwick stumped in with a modern hairdryer. "Gotta be quick" she said, "my old man's in bed wiv his bad chest. He've had the ammonia for years."

"This hairdryer looks new!" Steven exclaimed.

"'E be that" Mrs Bellwick replied, "I bought 'im last Thursday week from Snoddies. 'E lasted a week an' when I took 'im back that tall thin chap said to take 'm to you as they don't mend 'airdryers."

Off she bowled, and Steven soon found that the mains lead was loosely connected. It didn't take him long to get it working, but I'd never heard such a clatter and yelled out.

"They all make this noise nowadays" Steven said.

"Can't think why, or how they make 'em do it" I commented. "Fifty years ago I used to get lots of Morphy-Richards hairdryers in. Always dead, because of a huge paper capacitor that was housed in the handle. Went short-circuit. Good money-spinners they were. And silent running. Just a small motor and an element. How do they make the present ones kick up such a horrible clatter?"

A Seg

Before he could answer Walter Wingnut came in. He's a widower and ex-fishmonger, and has the most musical Welsh accent and the highest-pitched voice I've ever come across.

"'Ello Mr Bullock bach" he piped, "Walter the Fish 'ere. I'm calling for my neighbour, Mrs Digby."

"Well, she ain't here, Walt" I replied.

Walter collapsed in peals of supersonic laughter, then recovered and went out to get his neighbour's set from his car.

"Funny name, ennit?" he piped, "a Seg."

We'd had several of these sets in however, Model CT7800. It uses the Vestel 11AK19E3 chassis. When Paul plugged it in he found that it was stuck in standby. So he took the back off to check the BU2508AF line output transistor Q605.

"Boy, look at all those dry-joints in the line circuit!" he exclaimed.

He resoldered them carefully then, as expected, found that the transistor was short-circuit. After fitting a replacement Paul tried again, but the set was still stuck in standby. Further checks showed that there was no 8V supply, because the regulator IC805 was dead short. There had to be a reason, so Paul got busy with his meter. A few minutes later he found that pin 37 of the TDA8843 jungle chip IC401 was shorted to chassis. After fitting a replacement and a new regulator the set worked perfectly.

"Oh thank you Paul" piped Walter the Fish, "Gladys, er Mrs Rigby, will be pleased. I tries me best and I reckon 'er fancies me..."

An 11AK37 Bush

"Hello there boys" said a solid and deafening voice. We span round – and saw Mr Sparrow. He's a tiny, slight fellow, but has this powerful voice.

"My misfortune is your good fortune" he continued. "I've got my telly in the car here. Went wonky last night. You should have heard the missus kicking up! Told her 'to shut up or get out'."

"Which did she pick?" I asked.

"Well, 'er shut and went. Not seen 'er since."

The set turned out to be a Bush Model WS6673SIL, which is fitted with the 11AK37 chassis. When we

plugged it in there was excessive width and severe EW distortion.

Steven went to the components rack and took out a capacitor, then unboxed the set and checked C622 (15nF, 630V). It's the earthy side capacitor in the EW diode modulator network, and was short-circuit. He replaced it with the one he'd taken from the rack.

"You, er, suspected that capacitor, didn't you?" I asked.

He nodded and smiled, then tried the set. His smile faded. The picture was the same. So he got to work with the meter and soon found a dry-joint a few inches away. It was effectively causing the same trouble. He soon had the set put to rights.

"Thanks for a good and quick job, old son." Sparrow's voice again filled the shop. "Now if the missus do come back, 'er might pay attention to it and not carry on!"

All by myself

"Paul and I have to go out and fit an aerial this afternoon" Steven said as our dinner hour approached, "but I don't suppose we'll be away long."

So I would be on my own-ee-oh at the start of the afternoon. This was a pity, because I had no moral support to help me deal with Mrs Hargreaves-Smith when she arrived – just as I opened the doors.

"Ah, Mr Bullock!" she gushed as she entered, "ai've got mai television set in mai cahr. Can you bring it in foe me? You're so kaind Mr Bullock."

Her set was a Goodmans 256NS. It was nearly the size of her car.

"It daid on me last naight" she breathed, "they can be such exasperating things, cahn't they? And, ouh, the prowgrammes!"

"I'll give you a ring" I said, pulling my face into a polite smile and willing her to depart.

But she lingered and smiled more, as if we had a secret. Then, tweaking her fingers into her handbag, she handed me a gold ring minus its diamond and a tiny packet with the diamond inside. "When you do mai set, would you repair the ring?" she asked, "ounly you're so clever, Mr Bullock."

Then, holding my eyes with hers, she backed out.

The set is fitted with the Philips L6.2 chassis. We get quite a lot of them. It was dead, so I fitted the power supply repair kit. I also checked the line output stage and replaced the BU1508AX output transistor Tr7906. Then I switched on, smiled happily when a picture appeared, and glowered when, five seconds later, it collapsed and the set died. I glowered even more when I discovered that my nice new line output transistor had snuffed it.

Further checks in the line output stage revealed that C2912 (2·2nF, 2kV) was open-circuit. So I fitted a new one, replaced the transistor, and smiled when the picture came up. I glowered afresh when it collapsed again. I was beginning to hate Mrs Hargreaves-Smith.

I fitted yet another line output transistor, was pleased to find that the 2·2nF capacitor was all right, and checked around for further component failure. This brought me to L5420, a 15μH coil, which was open-circuit. We didn't have such a thing. But, after studying it, I was able to carry out a repair. This time, when I tried the set again, it worked properly.

After boxing the set up I had a look at the diamond ring and decided to glue the stone back in with epoxy resin. Then I phoned Mrs Hargreaves-Smith and invited her to call round to collect.

She came not long after, complete with smile. I wedged the set into her car, then handed her the repaired ring.

She glowed with happiness until her mouth began to twitch, then slipped it on to her finger. After that she plucked a small cloth parcel from her handbag.

"I knew you'd manage to repair the ring, you clever man!" she said. "And ai've brought you some more little repair jobs!"

She then undid her little parcel, revealing a dozen more items of broken jewellery.

"Er, we don't usually repair jewellery, Mrs Hargreaves-Smith" I stammered.

"Ai know you doun't, Mr Bullock" she gushed. "And that's why I appreciate your mending main so cheerfully." Then she backed out, again holding my eyes with hers to acknowledge our little secret…

The return

Most UK settlers in Spain will tell you that this is no time of the year to be there. The endless heat is too wearing. Those who can head back to the UK for the moderate summer weather. So it beats me why we found ourselves landing at Alicante airport the other day, to a heatwave that even the Spanish papers were alarmed about.

We were soon in one of our favourite bars. While I was ordering a couple of beers and trying to see the news on a bawling TV set with no field sync, Greeneyes idly thumbed through that day's Spanish paper.

"Ho" she said as I was opening last month's *Television* magazine, which I'd snatched up as we were leaving Paul's house. "This paper devotes its front page and two inside pages to the heatwave. Hospitals and the public services have apparently been alerted to expect a stream of casualties. It says that those most vulnerable are old folks, the overweight, and alcoholics. So you're in danger on all counts. You'd better call for a Joshua Juice."

"Never mind the funnies" I said, "most people who see us about together reckon that I'm your toy boy."

Then the barman came across with our drinks.

"Hace calor (it's hot)!" I said in my best Spanish.

"Yeah, and it's going to get hotter" he replied in perfect English.

I looked him up and down as he sauntered off. "Pumped-up sod" I muttered.

Looking through the magazine, I came to Michael Maurice's article on field servicing. He seems to get away with it, but I found that customers don't like paying for repairs that take only a short time to carry out. I would always get the same response when I presented the bill.

"But you were in the house for only a couple of minutes!"

And "how much is that little part then?"

Then I spotted Charles Coultas's letter "is Sky worth it?"

"I wouldn't waste time on it if it was free" I blurted.

Greeneyes put down her paper and looked at me. "What?" she asked, then "is the heat getting to you?"

I next saw A. Lloyd's letter about spares and service information availability. It reminded me of my troubles with Goblin. "Swines!" I said.

Greeneyes again put down her paper, and gave me another look.

I hurried on to Peter Nutkins's trade comments about, amongst other things, our diminished profits these days. He's dead right. Everything we sell is too low priced.

When colour first came we bought a new Commer Cob van. At the same time I bought myself a Philips G6 colour set. It cost the same as the van. Had the price of colour sets kept pace with that of vehicles (and almost everything else), they would now sell for a fortune. Not only would the sales mark-up be sensible, we'd also be able to charge properly for repairs. It's a sad fact that the more complex domestic electronic equipment becomes, the less we can charge to repair it.

Finally, as mentioned on previous occasions, I welcome your comments, particularly by email. You can reach me at donald@wheatleypress.com ■

An AV/IT glossary

With the increasing convergence of consumer electronics and computer technology many additional terms – for new formats, features and systems – have appeared in the AV world. Acronyms and abbreviations such as VHS, Scart, Nicam and PDC have been joined by a host of newcomers. If you find it a bit confusing this glossary, compiled by George Cole, should help

A DVD-cam from Hitachi.

16-QAM Quadrature Amplitude Modulation with 16 possible states. Uses phase and amplitude modulation of a carrier to vary between the states, each of which denotes a unique group of four bits that's known as a symbol (hence symbol rate). Used by some Freeview DTT multiplexes, including the BBC's. 16-QAM is more robust than the alternative 64-QAM system but provides fewer channels per multiplex.

3G Third Generation, a mobile phone technology that includes facilities for video streaming and downloading.

64-QAM Quadrature Amplitude Modulation with 64 possible states. Provides more channels per multiplex than the alternative 16-QAM but is less robust. Used by some Freeview DTT multiplexes.

AAC Advanced Audio Coding. An audio compression system developed by Dolby, Sony, Nokia and others. Provides superior performance to MP3.

AC-3 A multi-channel audio encoder that forms the basis of the Dolby Digital surround-sound system.

ADSL Asymmetric Digital Subscriber Line. Type of DSL technology that enables data to travel at high speed along ordinary telephone lines. Used by many broadband services. Asymmetric refers to the fact that the download transmission speed is faster than the upload speed.

Algorithm A powerful mathematical code used for compression and decompression of data and data manipulation.

ATSC Advanced Television Systems Committee. The HDTV system used in the US. Provides 720- or 1,080-line vertical resolution with interlacing or progressive scanning.

AVI Audio/Video Interleave. A PC file format for playing audio and video.

Bluetooth A short-range (10m) wireless format designed as an alternative to the use of cabling.

Blu-ray A high-definition video optical disc system based on the use of 405nm blue-violet lasers. Developed by Sony, Philips, Panasonic and others. Can store up to 27GB on a 12cm disc, offering up to two hours of high-definition video.

Broadband Nowadays used to refer to a high-speed internet connection.

Browser Short for web browser. Software, such as Internet Explorer, used for accessing the World Wide Web.

Burner Device used for recording data on an optical disc such as CD-R or DVD-R. Can be built into a PC or used as a peripheral device.

CAM Conditional Access Module. Found in set-top boxes and other items. Works in conjunction with a smart card to decode encrypted TV transmissions.

CI Common Interface. System used with many set-top boxes and other devices to enable them to use smart cards designed for different conditional-access systems.

Codec Coder-decoder or compressor-decompressor. A coder-decoder converts analogue signals to digital form and also works the other way round. A compressor-decompressor is used in audio and video formats like Dolby Digital, MP3 and DivX for compressing audio or video files and decompressing them for playback.

COFDM Coded Orthogonal Frequency Division Multiplex. Modulation system used by services such as DAB and DTT. Coded simply means encrypted. OFDM means that a large number of orthogonally-related (in quadrature) subcarriers occupy the channel bandwidth, each carrying some of the modulation. This means that the bit rate for each carrier can be reduced. The modulation itself is in QAM form. The result is a robust

transmission system with good protection against the effects of multipath signals.

CompactFlash A memory-card format used by some digital cameras and camcorders. See also Flash memory.

Compression Process by which a quantity of data is reduced, mainly to increase storage capacity, conserve bandwidth or provide faster data transfer. Most compression systems are, strictly speaking, data reduction systems: they remove unnecessary data then use algorithms to reconstruct the original data. MPEG, JPEG and MP3 are examples of compression systems.

Conditional access System for controlling access to encrypted or protected TV transmissions. Access is usually by use of a smart card.

Copy-protected CD A music disc encoded with a system that prevents users from copying it, e.g. on to a PC hard drive. Strictly speaking such discs are not CDs, as they do not conform to the CD Red Book standard set by Philips and Sony.

CPRM Content Protection for Recordable Media. System designed to protect digital content stored on a DVD disc, hard drive, flash memory card etc. Often used to prevent further recording or copying.

CSS Content Scrambling System. Digital copy-protection system used with DVD discs.

DAB Digital Audio Broadcasting. The standard used for digital radio transmissions. Uses MPEG Audio Layer II to achieve a compression ratio of 7:1 and provides high-quality audio, text, data, graphics and even video transmissions.

Defragmenter System used with hard-disk based systems, such as PCs and PVRs, to 'tidy up' scattered clusters of related data to improve operating speed and efficiency.

DHWG Digital Home Working Group. Previous name of the DLNA.

Digital 8 Camcorder format developed by Sony. Can make digital recordings on Hi-8 (8mm) tapeand play back analogue Video 8 and Hi-8 recordings.

Digital music player Generic name for a portable music player that uses a hard-disk or memory-card storage system and plays compressed-music files such as MP3.

Digital text Enhanced version of teletext developed for digital TV services.

D-ILA Digital Direct-drive Image Light Amplifier. High-quality video projection system developed by JVC. Based on LCOS technology.

DIST Digital Image Scaling Technology. Proprietary system developed by JVC to enhance picture quality. Uses a suite of technologies that includes converting interlaced video to a progressive-scan format.

DivX A compression system that uses MPEG-4 technology to transmit highly-compressed, high-quality video over the internet.

DLNA Digital Living Network Alliance. Consortium of more than 140 companies in the computer, consumer electronics and mobile phone industries. Develops interoperability standards for devices linked to a domestic network.

DLP Digital Light Processing. Digital projection system developed by Texas Instruments. The heart of the technology is a DMD (Digital Micromirror Device), a processor that's covered with over a million micro-mirrors. These deflect light to the screen. Used in some video projectors.

DNR Digital Noise Reduction. AV system used with TV sets and VCRs to reduce picture noise caused by poor signal reception.

DOGS Digital On-screen Graphics. Graphics or logos superimposed on a TV picture. Often used with digital TV transmissions.

Dolby Digital Surround-sound format that provides 5.1 audio channels (five normal range plus one [subwoofer] bass only).

Dolby Digital EX A 6.1-channel version of Dolby Digital with an additional rear-centre audio channel.

Dolby Pro-Logic II System that produces 5.1-channel sound effects from a two-channel stereo source.

DRC-MF Digital Reality Creation-Multifunction. Proprietary digital-signal processing algorithm developed by Sony. Enhances screen resolution by increasing the number of scanning lines and/or pixels.

DSD Direct Stream Digital. Digital audio coding system developed for SACD use. Is claimed to be superior to the PCM (pulse-code modulation) system used for formats such as CD and DVD-Audio.

DSL Digital Subscriber line. Broadband telephony-based system that enables high-speed data to be sent via standard copper telephone lines.

DTS Digital Theatre System. A multi-channel surround-sound format that's available in various configurations. Standard DTS provides 5.1-channel sound. DTS-ES provides 6.1-channel sound. Virtual DTS down-converts multi-channel sound to stereo. TS Neo:6 converts a stereo source to multi-channel sound.

DTT Digital Terrestrial Television. Uses terrestrial transmitters to broadcast digital TV and radio programmes to appropriately-equipped receivers and STBs via a standard aerial connection.

The Philips DAB/FM pocket radio Model DA1000.

A prototype Sony Hi-MD Walkman.

DTVA Digital TV Adaptor. Device used to enable an analogue TV set to receive digital TV channels and services.

DualDisc Disc being promoted by some companies in the US. Has a DVD-Audio recording on one side and a CD music disc on the other side.

DV Digital Video. Digital tape-recording format that includes MiniDV, a system used with some digital camcorders.

DVB Digital Video Broadcasting. The digital TV broadcasting system used in Europe and elsewhere. There are different versions for terrestrial, cable, satellite and mobile (DVB-H, the H standing for Handsets) transmission. The DVB Project is the body responsible for setting standards. DVB specifications are mainly based on MPEG-2 and MPEG-4 compression.

DVD Digital Versatile Disc. A family of optical disc formats that includes DVD-Video, DVD-Audio and DVD-ROM, plus recordable and rewritable discs. Standards are set by he DVD Forum. DVD-Audio discs can also store multimedia content such as text and images.

DVD-Cam A camcorder that uses 8cm recordable DVD discs instead of tape for storing sound and video. The camcorders use DVD-R, DVD-RW or DVD-RAM discs.

DVD Multi A specification that enables DVD equipment to read all official DVD format discs (DVD-Video, DVD-Audio, DVD-ROM, DVD-RW, DVD-RAM and DVD-R.

DVD-R DVD-Recordable. A write-once optical disc that stores up to 4·7GB of data. An official DVD format.

DVD+R DVD+Recordable. A write-once optical disc that stores up to 4·7GB of data on a single-layer disc or 8·5GB of data on a dual-layer disc. An unofficial DVD format. Dual/double-layer discs are sometimes referred to as **DVD+R DL**.

DVD-RAM An official recordable DVD format. Offers a variety of storage capacities from 2·6-9·4GB. The discs may be bare or in a caddy, and single- or double-sided. Gives fast access to data, like a hard disk.

DVD-ROM A read-only DVD disc used for games and PC applications

DVD-RW DVD-Rewritable. An official rewritable DVD format. There are two forms of recording. Video Mode produces recordings that can be used with a standard DVD player. VR (Video Recording) has various track editing facilities, but the recordings will not play on an ordinary DVD player.

DVD+RW DVD+Rewritable. An unofficial rewritable DVD format.

D-VHS Data VHS. A domestic digital VCR system developed by JVC. Can record high-definition images and stores up to 49 hours of video on a VHS cassette.

DVI Digital Video/Visual Interface. An interface designed for carrying both analogue and digital signals. Used as a digital-to-digital connection on some video projectors and flat-screen TV sets.

DVR Digital Video Recorder. Records video as digital code. Often used to refer to hard-disk based recorders.

EPG Electronic Programme Guide. On-screen guide for selecting programmes and/or services.

Ethernet System for local area networks (LANs). Ethernet networks may be wired or wireless (see IEEE 802).

Euro 1080 Europe's first HDTV channel. Screen resolution is 1,920 pixels x 1,080 lines with a 50Hz interlaced display. The transmissions are currently available only via satellite.

EVD Enhanced Versatile Disc. An alternative, backed by the Chinese, to the forthcoming high-definition DVD formats. A compression technology known as V6, developed by the US company On2, stores up to two hours of high-definition video on a 4·7GB disc, using red laser technology.

Finalisation Process by which recordings stored on a recordable or rewritable disc are converted to a file format that can be read by standard players or drives.

Firewall Security system used by computers or computer networks that are connected to the internet. Controls data traffic.

Firewire Term commonly used for an IEEE 1394 connection.

Flash memory Form of RAM that provides fast access with retention of contents when the power is switched off. Flash memory technology is used by various cards such as CompactFlash, Memory Stick and SD.

FTA Free To Air. TV channels/programmes that are available without the need for a subscription or a pay-to-view fee.

Freeview DTT service run by the BBC, BSkyB and Crown Castle International. Currently provides up to thirty free TV channels and twenty radio services.

Gigabyte 1,024 Megabytes.

GuidePlus+ An interactive programme guide developed by Gemstar. Licensed to a number of consumer-electronics companies for use in DVD recorders, PVRs and other products.

H.264/AVC Advanced Video Codec developed by MPEG, now part of the MPEG-4 specification.

HDCP High-bandwidth Digital Content Protection. System developed by Intel to protect digital content that uses a DVI interface.

HD DVD High-definition version of DVD developed by Toshiba and NEC. Uses a 405nm blue laser. Disc capacities range from 15-30GB.

HDMI High Definition Multimedia Interface. An industry-standard digital interface for transmitting uncompressed digital audio or video between two devices such as a DVD player and an LCD TV set. Used by some AV products.

HDV High Definition Video. Digital camcorder format developed by Canon, Sharp, Sony and JVC. Resolution is 720 lines progressive or 1,080 lines interlaced. Uses MPEG-2 compression.

Hi 8 Analogue camcorder format developed by Sony. Uses 8mm metal tape.

HighMAT High-performance Media Access Technology. Developed by Panasonic and Microsoft to improve the playback of optical discs that contain a mixture of data such as image and sound files.

Hi-MD Multi-layer MiniDisc format with a storage capacity of 1GB.

Home LAN/Network Originally meant a small group of PCs connected together but now includes a mixture of devices – PC, TV, DVD and audio. Many home networks use WiFi wireless interconnection.

Home Server Device that receives and stores digital content such as images, music and video and makes it available to AV and PC equipment around the home.

HTML HyperText Markup Language. Programming language used to create web documents.

http HyperText Transfer Protocol. Protocol used for transferring data via the internet. Enables web browsers to communicate with web servers. An extra 's' on the end denotes the secure encrypted form.

Hybrid disc Type of SACD disc that's backwards compatible with standard CD players. Contains an SACD and a standard CD recording layer.

Hyperlinks Links embedded in web pages. Clicking on a hyperlink loads content from another web page.

IDTV Integrated Digital Television set. One that has a built-in digital tuner.

IEEE 1394 High-speed digital connection system that provides data speeds between 400Mbits/sec (IEEE 1394a) and 800Mbits/sec (IEEE 1394b). Also known as a DV, Firewire or i-Link connection. Used by devices such as digital camcorders and DVD recorders.

IEEE 802.11 A wireless networking standard sometimes called wireless Ethernet. There are various specifications, the most commonly used being 802.11b which has a maximum data speed of 11Mbits/sec and 802.11g which provides data speeds up to 54Mbits/sec. Equipment is marketed under the WiFi banner.

i-Link Sony's name for an IEEE 1394 data connection.

Internet Global network of connected computers.

iPod Digital music player system developed by Apple Computer.

iTV Interactive Television. TV that enables the viewer to interact with a TV programme or service. Examples include teletext, tele-voting and internet access via a TV set.

Java Computer programming language developed by Sun Microsystems.

JPEG Joint Photographic Experts Group. A compression standard for still pictures. Commonly used by digital cameras.

LAN Local Area Network. A small-scale digital networking system.

LCD Liquid Crystal Display. LCD displays consist of a sandwich of liquid-crystal material between polarisers. Application of a voltage twists the liquid crystal molecules, controlling the passage of light. Used for flat-screen displays and some video projectors.

LCOS Liquid Crystal On Silicon. Microdisplay technology that combines liquid-crystal elements with a processor chip to modulate light. Used by some video projectors and projection TV sets.

LFE Low Frequency Effects. A channel (.1) used in multi-channel systems such as Dolby Digital and DTS for low bass sounds that are fed to a subwoofer loudspeaker.

Linux Computer operating system based on Unix technology. It's freely available, open-source software. Linux is robust and is being increasingly used in consumer-electronics products such as set-top boxes.

Macromedia Flash Animation technology developed by Macromedia. Widely used on the internet.

Macrovision A system used to protect video recordings from unauthorised analogue copying. Macrovision disrupts VHS playback. It's used to protect prerecorded VHS tapes and DVD discs.

Media Center PC Standard developed by Microsoft for a new generation of PCs designed for home entertainment purposes. A Memory Center PC typically includes a TV tuner and can be used as a PVR.

Memory stick A memory-card format developed by Sony. Used for digital cameras, digital camcorders, DVD players etc. There are various forms including Memory Stick Duo, a miniature version, and Memory Stick Pro which can store up to 2GB of data.

MHEG Multimedia and Hypermedia Experts Group. Standards body for the display of multimedia and interactive content.

MHP Media Home Platform. Specification developed by the DVB Project for interactive services and internet content displayed on a TV screen.

MicroMV Digital camcorder format developed by Sony. Uses MPEG-2 compression and miniature cassettes.

MiniDV A digital camcorder format.

M-JPEG Motion JPEG. Moving images produced with JPEG compression.

A Philips 42in. plasma set.

MLP Meridian Lossless Packing. A compression system developed by Meridian to deliver high-quality audio. Used for DVD-audio.

MMC Multimedia card. Small memory card used by some digital cameras and camcorders.

MP3 Audio compression system using MPEG-1 Audio Layer III. Reduces the file size by a factor of ten. Widely used by digital music players and internet music sites.

MP3 Pro Enhanced version of MP3. Reduces file size by a half. Is backwards-compatible with MP3.

MPEG Moving or Motion Picture Experts Group. Standards body that has developed a number of compression systems including MPEG-1 (Video CD), MPEG-2 (DVD and digital TV) and MPEG-4 (higher compression).

Multiple PIP Multiple Picture In Picture. TV system for displaying several video images simultaneously.

NICAM Near Instantaneous Companding And Multiplexing. Digital stereo sound system used with terrestrial analogue TV transmissions.

NTSC National Television Standards Committee. Set the 525-line, 60Hz TV system used in the US, Japan and other countries and the subsequent compatible colour system.

NTSC playback Technology used by many TV sets, VCRs and DVD players to enable NTSC tapes and discs to be played by PAL TV equipment.

OLED Organic Light Emitting Diode. Flat-screen technology that works by applying a voltage to organic layers to produce light.

Operating system PC software that controls the hardware and programs. Examples include Windows, Macintosh and Linux.

OSX OS Ten. The latest version of the Macintosh operating system.

PAL Phase Alternation by Line. Analogue colour-TV encoding system used in most European and many other countries. Inverts the phase of one colour-difference signal on alternate lines to cancel hue errors.

PAP Picture And Picture. A feature with TV sets that have two tuners. Enables pictures from two different channels to be displayed simultaneously.

PAT Picture And Text. Feature that enables teletext information to be displayed alongside a TV picture.

Patch See software update.

PDC Programme Delivery Control. System that transmits start and stop flags at the beginning and end of a programme. PDC-equipped VCRs use the data to record programmes at the correct time.

PictBridge USB-based standard for connecting digital cameras to a printer.

PIP Picture In Picture. TV feature that displays images from two different sources on screen simultaneously.

PixelPlus Proprietary digital video signal processing system developed by Philips. Improves screen resolution by increasing the number of pixels and/or scanning lines.

Plasma A flat-screen display technology. Works by applying a charge to plasma gas, which produces UV light. This reacts with phosphors to produce visible light.

PolyLED Polymer Light Emitting Diode. Display technology based on the use of light-emitting polymers.

Progressive scanning Display technology that scans all lines in a frame consecutively instead of as two interlaced fields. This reduces flicker and other artefacts. Increasingly used by TV sets and DVD players.

PPV Pay Per View. A pay-and-watch service.

PVR Personal Video Recorder. A hard-disk based digital video recorder. PVRs can provide a number of features not possible with VHS recorders and most DVD players, such as live pause.

Q-Link Type of smart-link technology developed by Panasonic.

Q-S-VHS PB Quasi S-VHS Playback. System that enables a standard VHS recorder to play back S-VHS recordings with VHS quality.

QuickTime Codec developed by Apple for playing audio and video.

RCE Regional Coding Enhancement. A stronger version of Regional Coding used with some discs to prevent them being played by region-free DVD players.

RCTC Rewritable Consumer Time Code. Time-code system developed by Sony.

Real Player Codec developed by RealNetworks for playing audio and video.

Regional coding System used with DVD-Video to tie DVD discs to players supplied for specific territories. For example a Region 1 (US) disc will not play on a Region 2 (Europe) player unless the player has been hacked (using an on-screen menu and the player's firmware) or physically modified (chipped).

Region-free DVD Player A DVD player that has been modified to play any DVD-Video disc automatically regardless of its regional coding.

RS232 A standard computer interface for serial data operation. Used with devices such as modems. Being replaced by the USB.

SACD Super Audio CD. An audio format developed by Sony and Philips as a replacement for standard audio CD. Provides multi-channel audio and stereo sound.

SCART A 21-pin AV connector.

SD Secure Digital. A memory card developed by Panasonic, Toshiba and Sandisk. Used by various devices including camcorders and digital music players.

SECAM Analogue colour-TV encoding system developed in

France. The two colour-difference signals are transmitted on alternate lines. A delay line is used in the decoder to provide an input to the two colour demodulators at all times. AM is used for the colour subcarrier, thus removing the hue distortion that can occur with phase modulation.

Sky+ A PVR developed by BSkyB for use with its SkyDigital services.

Smart Link A scart-based connection system that enables two or more devices, such as a TV set and a VCR, to work together. It has been marketed under a number of names. See Q-Link.

SmartMedia Memory card used by some digital cameras.

Software Update Software designed to cure bugs or add new features or functionality. Sometimes called a patch.

S/PDIF Sony/Philips Digital Interface. An interface that enables digital audio files to be transferred between devices without undergoing analogue conversion.

Streaming Media Audio or video fed via the internet in near real time instead of being downloaded as a file. The content is sent to a PC's RAM rather than its hard drive.

Super Bit DVD A system for improving picture quality with standard DVD discs by allocating almost all the data bits to the images and removing extras such as deleted scenes.

SVCD Super Video CD. An enhanced version of the Video CD format. Stores about 35-60 minutes of video on a CD disc. Provides better picture quality than Video CD, also stereo sound, subtitles, chapters, menus and slide shows.

SVGA Super Video Graphics Array. Display with an 800 x 600 pixel resolution.

S-VHS Super VHS. Enhanced version of the VHS format providing a resolution of about 400 lines.

S-VHS-C An analogue camcorder format that uses miniature S-VHS cassettes.

TIFF Tagged Image File Format. An uncompressed image data file.

TFT Thin Film Transistor. Type of transistor used for active-matrix LCD displays. Each pixel is controlled by an individual transistor, providing a fast response time.

THX A quality-control standard set by LucasFilm for cinemas and home-theatre systems.

Time Slip A feature provided by some DVD-RAM recorders. Provides hard-disk type features such as the ability to watch the beginning of a recording while the rest of the programme is being recorded.

TiVo A PVR brand name.

Top Up TV An optional pay-TV service with the Freeview DTT system.

TOSlink An optical cable that carries audio data as light pulses.

USB Universal Serial Bus. A plug-and-play connection system used with all modern PCs. Provides easier connectivity than the older parallel and serial ports. There are two main types of USB connector. The original USB 1.1 provides a maximum data speed of 12Mbits/sec. USB 2.0 provides data speeds up to 480Mbits/sec.

VBR Variable Bit Rate. A technique that enables the available data to be used more efficiently, by adjusting the encoding data rate to suit the content. For example a still image requires fewer bits than a scene with lots of fast-moving action. Some DVD recorders have a control to enable the user to adjust the VBR operation manually.

VC-9 Compression technology developed by Microsoft.

VHS Video Home System. Analogue domestic VCR format developed by JVC.

VHS-C VHS Compact. VHS camcorder format that uses compact-sized cassettes.

Video 8 Analogue VCR/camcorder format that uses 8mm tape.

Video CD Format that stores about 74 minutes of MPEG-1 video (VHS quality) on a CD.

VideoPlus Timer setting system. Uses a series of numbers for programming the timer.

Virus (1) A rogue program that can damage, disrupt or disable a PC or network. Viruses are so-called because they replicate themselves within the infected computer or network. (2) A generic term for programs that can harm or disrupt computers or networks. These include Trojan Horses (harmful programs hidden inside an apparently innocuous program) and Worms (self-replicating programs).

VISS VHS Index Search System. Indexing system used by VHS VCRs for fast location of recordings.

VITC Vertical Interval Time Code. Time-code system used by many non-Sony camcorders.

WiFi Name under which IEEE 802.11 equipment is sold.

Windows XP Latest Microsoft PC operating system

WMA Windows Media Audio. Windows audio encoding/decoding system.

WWW World Wide Web, often known simply as the web. Global collection of servers that carry documentation formatted in HTML. Many documents include hot links to other documents or web pages.

xD A memory card used by some digital cameras.

XGA eXtended Graphics Array A display with 1,024 x 768 resolution.

XML eXtensible Markup Language. Programming language that enables web page or interative TV designers to tag information. ■

Sony's Location Free TV, a portable LCD system that can be carried and used anywhere in the home.

DX and Satellite Reception

Terrestrial DX and satellite TV reception reports. Broadcast and satellite TV news. The new DVB-S2 standard. Roger Bunney reports

Count-down for an FR3 VTR programme insert. Received via Telecom 2D (8°W).

The 2004 Sporadic E season eventually started. Unusually, it was quite a drawn-out business. In fact it was quite unlike any other season I've experienced over the years. Sometimes the season opens with a bang and fades out within weeks. For it to lift in late June is unusual. Reception has also decreased in comparison with previous years. At the time of writing, the Spanish (TVE) Band I transmitters are still being received here. We'll see how long this lasts – they were due to close at the end of June. The following is the log of SpE pictures identified on-screen:

5/6/04	RAI (Italy) ch. IA; Italy (private) ch. E2– (48·23MHz); TVE (Spain) ch. E3.
10/6/04	TVE E2, 3; BTV (Belarus) R1, 2; LTV (Lithuania) R2; +PTT (Switzerland) E3.
11/6/04	TVE E2; RTP (Portugal) E3; BTV R1; MoTV (Moldova) R2.
14/6/04	RTP E2, 3.
15/6/04	RAI IA, B; Italy (private) E3; LRT (Latvia) R2; SVT (Sweden) E3; YT (Ukraine) R2; BTV R1; TVE E2; CP+ (Canal Plus, France) L2.
18/6/04	TVE E2, 3; ETV (Estonia) R2; Tele-A (Italy) E2–; RAI IA.
23/6/04	RAI IA, B; Italy (private) E2– (47·72MHz).
24/6/04	TVE E3; RAI IA, B; Italy (private) E2– (47·72MHz); NRK (Norway) E4; RTL Klub (Hungary) R2.
25/6/04	RAI IA, B; Italy (private) E2– (47·72MHz).
26/6/04	TVE E2, 3.
27/6/04	TVE E2, 3; RIA IA, B; CRO (Crotia) E4.
28/6/04	RAI IA.
29/6/04	TVE E2, 3.

Several of the SpE openings lasted for hours, with low-level signals. There have been no reports to date of reception from Arab transmitters. There were several reports of an Italian commercial station being received at 47·72MHz: this is either a new channel or Tele-A, previously at 47·96MHz, has moved to a lower frequency. Peter Schubert (Rainham, Essex) mentions that during the June 19/20 weekend there was interference in Band I from a land-based pirate station.

Very settled, hot weather across the UK from June 12 produced a tropospheric lift, with French TV being received in the south and Band III and UHF stations in Germany, Denmark and the Benelux countries being received in the south and south east.

Hopefully conditions will have improved by the next time I report.

Satellite sightings

It has been a busy period in the Clarke Belt, with President Bush travelling to Italy, D-day, the Pope on his travels, the EU elections and, of course, Iraq.

The UP4 feeder for APTN fired up during the late evening of June 3, at 10·972GHz V (symbol rate 4,167, FEC 5/6) via Eutelsat W1 (10°E). Eventually, at about 2300 hours, approaching aircraft lights were seen in the sky. It was Air Force 1, but with his staff and entourage rather than the President himself. Perhaps ten minutes later Air Force 2 landed, this time with the President. There were two lots of long black limos, perhaps a security measure. He opted for the second and was quickly whisked into the darkness. He had arrived for talks about Iraq with the Italian president, before moving on to France for the D-day events.

On June 25 the President paid a visit to his old friend Bertie Ahern, the Irish prime minister, and attend the EU summit meeting, which was being hosted by Ireland. Landing at Shannon Airport on AF-1, he was quickly driven to Dromoland Castle, Co. Clare. There was the usual security: a long procession of support vehicles, with an ambulance at the rear. But there a new one, a black communications van with four tall, thick base-

mounted aerials, suggesting higher-gain co-linear arrays instead of the usual loaded whip aerials. President Bush popped up again on the 27th, this time arriving at Ankara, Turkey. UP4 again presented the pictures, via W1 as above.

The Pope was also on his travels, starting just up the road from the Vatican in Switzerland on the 5th. He appeared at a sports hall near Berne. There was extensive news coverage, particularly via Eutelsat W3 (7°E), with three EBU circuits at different frequencies identified as Pope 1 through to Pope 3 and Eurovision. The Swiss uplink truck SUI-9 provided the pictures, at 10·961, 10·967 and 10·973GHz H with an unusual SR of 4,433 and FEC 7/8. The Italian truck Videopui was also present in Berne, with output via Eutelsat W3 at 11·192GHz H (5,632, 3/4).

Eutelsat W3 has a set of three EBU feeders that uplink from Baghdad at 11·098, 11·104 and 11·110GHz H (4,433, 7/8). They are called Path 1, 2 and 3 and tend to close down later at night.

On June 3 I was very lucky to catch a rare Serbian digital feeder via W3, with a short live report at 11·091GHz H (6,666, 7/8). The identifications were 'YSM 001' and 'RTV Serbia DSNG1'.

BFBS (the British Forces Broadcasting Service) makes extensive use of Eutelsat W3. If you check at 11·327GHz V (27,500, 3/4) you will find several encrypted TV channels – mainly compilations of UK TV network programming – and numerous radio services. These all identify their target audiences, such as the Falklands, Bosnia, etc. The radio channels are unencrypted, so it's easy to catch up on *The Archers* if you missed the last episode!

Telstar 12 (15°W) is not a very active satellite, but an interesting offering is available at 12·610GHz H (19,265, 2/3). There are about eleven TV channels and six radio channels (at mid June), mostly unencrypted. These seem to be mainly TV channels produced off-shore – London, the US etc. – aimed at specific countries across the Middle East and SE Asia. 'Omid Iran' and 'Via Persia' are obvious, but 'Tzuchi' and 'Tamasha' are more difficult to identify. The Iranian channel includes commercials for US banks, services and other products. It's a strong signal with a 1m dish, but the selection of programme channel sources is very odd.

As President Bush was flying into Shannon Airport on the 25th a minor drama was being played out in Southampton Water. A few days previously the Queen Mary 2 was found to have had highly inflammable duct outlets fitted throughout, and additional fire-patrol teams stood by during her recent voyage. While on her twelve-hour stopover at Southampton, a large number of fire experts replaced nearly 1,700 alarms across the vast liner. The Meridian 8MBI TES-43 satellite truck set up its dish at Hythe, taking pretty pictures of the QM-2 in sunny Southampton Docks, with cloudless blue skies, and reported on fire alarms live for Meridian Tonight. All this was relayed via Telecom 2B (8°W) at 12·540GHz V (5,632, 3/4).

On the 21st Granada truck HTV BT TES-41 provided more drama on the shores at Milford Haven. Greenpeace activists had landed on the MVA12 (a navy tanker?) and were delaying its departure. A helicopter could be seen trying to land four security men, but was fended off. Meanwhile a lifeboat and pilot cutter were ploughing through the water at speed to attempt to board a pilot via a rope ladder. He too was unable to gain access to the ship. The next plan was to attempt to move the ship at 2200 hours. This was carried live for Harlech at 12·544GHz V (5,632, 3/4). Incidentally the Harlech identification, on colour bars, is now 'ITV WALES NEWS UKI-596 T41'.

With the loss of the CNN Newsource feeder via NSS 7, I've been spending less time on the Atlantic circuit. But Alan Richards (Skegness) suggests checking PAS-6/PAS-3R (43°W) for occasional news circuits. He has found that RTL NY often leases time via this slot at 12·650GHz H (30,800, 7/8), on an 24-hour ad hoc basis, usually relaying in NTSC form. One evening RTL NY engaged in on-screen editing: during a vox-pops type item on US Iraq policy the shooting down of an Apache helicopter was cut out.

World Cup football in Portugal and the EU elections dominated much of airwave time. The less said about these events the better,

A French satellite uplink truck at an OB location. The active caravan aerial on the small mast is used for terrestrial off-air cueing purposes.

Broadcast news

DTT expansion: The official start of DTT broadcasting in France will be on 1 March 2005, with 15 FTA channels available. By the autumn of 2005 15 pay-TV channels will be added and at least 50 per cent of the population should have access to DTT. The aim is for 85 per cent coverage by 2007, from 117 transmitter sites.

An EBU identification caption via Eutelsat W3A (7°E).

The last post played at a US cemetery during the D-day anniversary on June 6, 2004. An FR3 OB feed for French TV via Telecom 2D (8°W).

Spanish broadcasters have asked the government to rethink digital TV, which at present only a small percentage of the population receives. Few watch the stations that have started transmissions, such as TVE, Tele-5 and Antena 3. The suggested analogue switch-off date is 31 December 2011.

According to the Azerbaijan Communications Ministry DTT tests are to start shortly in the capital Baku, with four-five channels. A Chinese company, Fushan Television Ltd., is to open a DTT service for the North of the Fiji island group, with twenty channels. The Czech telecommunications authority is upgrading the network to enable digital TV and radio services to be carried.

SBS Broadcasting: This company is to open a Flemish-language TV channel in Belgium during the autumn. It already operates VT4, which the new channel will complement. SBS also now owns 100 per cent of TVNorge (Norway), and has become a major player in the Scandinavian media field.

Turkey: TRT now provides Kurdish-language radio and TV services – the start was on June 7. The organisation has also started to provide Bosnian and various Arabic and Asian services, initially for a few hours weekly. The government is encouraging the private section to provide broadcasting in Kurdish and other languages.

Afghanistan: The new commercial TV channel opened in Kabul on May 23, and will soon be broadcasting for 18 hours a day. Other commercial interests propose to start TV broadcasting. As a result the national channel RTA plans to increase its output to an eventual 24 hours a day, with satellite transmission to cover the entire country.

Satellite news

The new Intelsat satellite 10-02 was successfully launched on June 16, slotting in at 1°W. It will become operational during August, with 36 Ku-band and 70 C-band transponders giving coverage of Africa, the Middle East, Europe, Asia and parts of North and South America. Traffic will consist of data, broadcasting, internet operation and video. The Norwegian company TelenorSatellite Broadcasting is to take 50 per cent of the Ku-band capacity for use across Scandinavia. Once services have been transferred to 10-02 from Intelsat 707 the latter will be moved to 53°W for operation across the Americas and the Atlantic path.

Eutelsat has leased twelve Ku-band transponders aboard the Russian satellite Express AM22 at 53° E. The organisation also leases Express 3A capacity at 11°W.

Eutelsat and Intelsat have given approval to the Swe-Dish terminal package. This suitcase-sized equipment can be carried and used by a single operator to provide uplinking of broadband video, SNG and data content.

CCTV (Chinese Central Television) is to start up to four TV channels for overseas services during the next twelve months. Initially there will be a French- and a Spanish-language channel, to be followed by one or two Chinese-language channels in early 2005. The channels will provide news, entertainment and programmes about Chinese life and culture. There is already an English-language channel, CCTV-9, and an overseas Chinese-language channel, CCTV4.

In early June Dubai TV launched a 24-hour service providing news and entertainment for Middle Eastern viewers. Since the opening of a major TV production centre (Media City) Dubai has raised its broadcasting presence. The centre produces the al-Arabiya 24-hour news channel.

If government agreement is obtained, a commercial TV channel is to be started in Bahrain.

Two Nigerian satellite pay-TV services have been launched, trendTV and Frontage Satellite Television (FSTV), offering over sixty channels that are produced in and uplinked from the UK. They will be in competition with the established South African MultiChoice pay-TV service.

The DVB-S2 standard

A note on the new DVB-S2 standard for digital satellite broadcasting appeared in our May issue News pages (see page 388). Its use of ACM (adaptive coding and modulation) enables the transmission parameters to be varied to suite requirements. Some further information on the standard appeared in the June 2004 issue of the New Zealand trade magazine *SatFACTS*.

The standard enables individual channels within a multiplex to use their own symbol rates (SR) and forward error correction (FEC). Those used to chasing after various satellite feeds will have experience of the wide variety of digital transmission parameters in use, but until now individual broadcast multiplexes have used a common standard. FEC has an increased range of 1/4 to 9/10. The changes will enable more programming to be squeezed into a multiplex. A 'blind-search' technique may be needed in DVB-S2 receiving equipment.

DVB-S2 could be with us some time over the next eighteen months. ■

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Carl T. Heinlein
Chris Bowers
Roy Blaber
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and
Geoff Darby

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Sony HCD-XB6

There was no audio output from this hi-fi system though the audio amplifier was OK. I discovered that audio wasn't reaching the output stages because IC102 (MC14052) was faulty and didn't switch the audio through. **A.R.**

Kenwood A71

This 15-year old amplifier didn't work because of a blown and inaccessible thermal fuse in the primary winding of the mains transformer – the cause had been a shorted speaker line. An official Kenwood agent had been unable to repair the amplifier as the transformer is no longer available. It was otherwise in good condition, and is the vital link in a system that consists of a graphic equaliser, tuner, turntable and cassette player.

The transformer has two secondary windings, one providing a 16V output and the other 34/25/0/25/34V feeds. The supply obtained from the 25/0/25V winding is fed to all the early stages of the amplifier and also the output stage when the loudspeaker load switch is set to 4Ω. The higher supply obtained from the 34/0/34V tappings is used by the output stage when the loudspeaker load switch is set to 8Ω.

I drew up a specification for the transformer with the intention of having a replacement wound, but unfortunately a one-off transformer would have cost over £100 (half a dozen would have cost £25 each). So an alternative approach was necessary. I found that feeding the amplifier with 24/0/24V produced an acceptable 36W into an 8Ω load, the output into a 4Ω load being in the 40W range. So I decided to fit two separate RS transformers to provide 15V and 24/0/24V. The ones selected were the RS 805-316 (24/0/24V at 2A) and RS 805-142 (0-15V at 3·3A), the total cost being just over £20 plus VAT.

The transformers were fitted with external hum-reducing copper bands before installation. This was done because the original transformer had one, and it was safer to fit them as a precaution rather than having to remove the transformers later and fit bands if hum had been found to be a problem. It's advisable to link out the 4/8Ω load switch: I did this on the PCB. The modification was a complete success.

It must be remembered that the amplifier is of double-insulated construction and that the original transformer had a thermal fuse while the RS ones require separate fuses. The need to ensure the integrity of the double-insulation must be kept in mind when rewiring. The ratings of the two fuses inserted in the live mains feeds to the new transformers were 315mAT for the 15V unit and 630mAT for the 24/0/24V unit. **C.T.H.**

Sony CDP-XE370

The drawer of this CD player would open automatically when the unit was switched on or when the play button was pressed. A check on the CD loading assembly revealed the cause: the loading belt was slipping on the loading mechanism pulley, because excessive grease from the pulley had got on to the belt. Once the belt and pulley had been cleaned there was normal loading and playing. **C.B.**

Sony TA-VE100

This unit would switch itself off intermittently. The cause of the problem was dry-joints at connector CN505 on the small power switchboard on the front panel. Resoldering the pins cured the trouble. **C.B.**

Sony MDS-JE520

This unit was stuck in standby. A check on the printed side of the main board revealed the cause, which was dry-joints at C411 (15,000μF, 16V, 85°C working). Normal power-on operation was restored once the capacitor had been resoldered. **C.B.**

Sony CFD-S38L

The CD player simply showed 'no disc' in the display. A look inside the unit revealed the cause: a fine layer of dust or talc on the optical pickup. The lens was cleaned using a Sony CD lens cleaning solution and a cotton bud. This restored normal playback operation. **C.B.**

Sony CFD-S28L

There was no CD operation and distorted audio with this unit. A check inside soon revealed the cause: poor soldering at transistor Q955. Once it had been resoldered there was normal CD playback and sound output. **C.B.**

Sony HCD-101

This compact hi-fi system wouldn't accept a CD or play one if it was loaded manually. The cause was no 7V supply to the motors. There are several fusible resistors that can go open-circuit in this unit, but on this occasion replacing the 28-way ribbon cable between the power board and board BD cured the fault. **R.B.**

Sansui AU505

The complaint with this unit, which dates from 1975, was crackles and pops from the speakers. I found that there were dry-joints on the filter board and the transistors were noisy – they were replaced with BC184LCs obtained from Farnell. In addi-

tion the preamplifier transistors in both channels, on the preamplifier board, needed replacement (they must have had a bad batch of 2SC871s) and the power amplifier board needed a general resoldering. **P.R.**

Sony TA1140

This unit, which dates from 1973, was cutting out on one channel – the small thermal cutout Sony used in the early Seventies was tripping. Checks on the power amplifier transistors showed that they were OK, and resoldering the PCB provided a cure initially. Then, after resoldering the other channel, the amplifier started making pops etc. through the speakers. I ended up by removing the old solder from the transistor connections, and all the old solder flux. This, followed by resoldering, cured the faults in both channels. The solder Sony uses, even now, leaves something to be desired. I suspect that the old flux had become conductive. **P.R.**

Technics SU-V60

This amplifier worked when using the 'CD direct' facility but none of the other inputs worked. The preamplifier/main amplifier links were missing! **P.R.**

Harman Kardon Citation 16

This monster amplifier (see photo) that dates from 1977 had a fault in one channel, whose output was at –60V with an unnerving current capacity: any speaker connected to it would have been vaporised. There are no fuses nor offset protection – it dates from the time when amplifiers were amplifiers and speakers were nervous. The output from the UA739 input op-amp was at –10V (its supplies are ±10V), while the output to the speakers was as above. Not quite right!

I suspected a fault in the op-amp circuit and replaced the chip (it's a high-gain, 14-pin device with a bandwidth of 1MHz – I obtained one from CPC). This cleared the output offset, but the quiescent current was non-existent. All the Uniwatt transistors on the PCB were replaced, and the MJE340/350 pair. The two neon 'on' indicators had to be replaced, and one of the relay contacts had been bridged with a solder blob.

After sorting all that out the amplifier produced stunning dynamics! For the sake of my speakers' sanity, I added a couple of 5A fuses in the outputs.

Subsequently I found that setting the quiescent current as specified in the service data, i.e. for 10mV across the 0·5Ω resistor at the top of the heatsink, resulted in the output transistors running excessively hot. The voltage had to be set a lot lower. I then found that the resistor's value was lower than the 0·5Ω it should have been. **P.R.**

Technics SL-P1

This 1984-vintage CD player wouldn't play discs because the traverse rails were jammed with dust. All that was required was cleaning and lubrication. **P.R.**

Denon UD-M3

There was no mechanical action with the CD deck. When the open/close button was pressed the display said "open" but that's as far as it went. The cause was simple: the 500mA protector PR003 for the 8V motor supply was open-circuit. It's not so simple to replace however, being buried at the very bottom of the unit, on the underside of the PCB, where you can't get at it.

Failure of this protector is quite common, and has been mentioned before. It has been suggested that the basic cause is a dodgy motor associated with the traverse assembly. All I can say is that I have replaced several of these fuses and have never had a comeback. **G.D.**

Philips CDR765

This CD recorder/copier has two decks, one record/playback and the other playback only. It arrived dead, with a note that said "power supply fault". When I applied power there was very little activity from the chopper power supply apart from some gentle pulsing. It was much the same as what you get with various Philips DVD models when one of the rectifiers on the secondary side of the power supply has failed.

In view of this, my first move was to check each of the diodes in the power supply with an ohmmeter. D6120, which produces the 5V supply, proved to be short-circuit. A replacement got the unit working again but, in my humble opinion, this device runs far too hot for its own good. So I added a small, flat heatsink to its plastic flatpack. The result was a significant drop in the diode's case temperature. Hopefully this will ensure future reliability. **G.D.**

Panasonic SJ-MR200

This personal MD unit read and played discs perfectly – provided it was left alone on its back. If it was picked up it could be shaken in the horizontal plane quite violently without problem, but as soon as it was tilted by about 45° in any direction it stopped playing and the disc could be heard and felt running up to a high speed.

The Harman Kardon Citation 16 amplifier.

I thought this was going to be a really nasty problem but, when the lower cover was removed, a surface-mounted crystal of some 16MHz or so fell out on to the bench! It was easy to see where it had come from on the PCB – the circuit reference number is X101. There was plenty of solder on the PCB pads, but none at all had adhered to the component's feet. Once these had been tinned and then solder-mopped flat I was able to reposition it and, with a fine-tipped iron, reflow the solder. The player then behaved faultlessly, tipped at any angle and shaken as hard as you like! **G.D.**

Denon DC35

When power was applied to this unit the tray of its CD three-changer kept ejecting and returning every few seconds. After removing the covers I noticed that two screws were missing from the top part of the changer assembly. So I guessed that it had been off recently, probably to remove a jammed disc or to clean the laser.

When I looked a little closer I saw that a small white flexiprint on the left side of the changer was disconnected. Its socket is hidden under a little sub-board. It appears to carry data from the deck position sensors, so this would account for the symptoms.

Whoever had removed the top had probably inadvertently pulled out this cable and not spotted it during reassembly. Plugging it back in restored normal operation, and two screws to replace the missing ones completed the repair. **G.D.**

VCR CLINIC

Reports from
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JVC HRV605

This machine, still under guarantee, was brought in with the complaint that pictures from its own recordings played back with vertical juddering. On test we found that the symptom was confined to the LP mode, in which the off-tape carrier envelope was 'bottle-necked' at the beginning of the head scan. The cause was low back tension. It was cured by fitting a new tension band and adjusting its regulator. **E.T.**

Sony SLV-SE830G

Mode-switch problems usually occur when a machine has been in use for some years, as the contacts become oxidised or the wiper fingers lose their spring tension. Sometimes, in relatively new machines, problems are caused by grease that's packed into the switch assembly during manufacture. And so it was in this case, the result being odd misbehaviour of the deck mechanics. A typical symptom was failure to eject the cassette fully. **E.T.**

Sony SLV-SE730G

The complaint with this VCR was poor playback and record. A visual inspection of the cassette mechanism base assembly revealed the cause: the straight guide pole that leads on to the capstan had snapped. All that was required was to bond the guide pole back in place. This restored normal playback and record operation. **C.B.**

LG N30I

I have experienced a couple of faults with these machines. First, intermittent deck operation and weird symbols in the display can be caused by the 31DQ04 diode DP08, which forms part of the 5V sys arrangement. Don't be tempted to fit any old diode in its place. If you can't obtain a 31DQ04, use a BY329-800. This is a fast-recovery type and is rated at 8A. Fitting a BY229-800 will result in a loud explosion after about a minute, as I discovered!

The second fault is failure of the tuning voltage because the 33V zener diode ZD701 and the associated 470Ω resistor R701 is faulty. For some strange reason the diode goes short-circuit and the resistor low in value, not open-circuit.

I've had both of these faults, which have developed at the same time, in some of these models. Strange! **S.R.**

Ferguson FV71

There was no operation because the power supply was dead. This fault was cured by replacing CP07 (10μF), CP08 (100μF) and CP71 (10μF). But I wasn't happy with the display, which was almost invisible in standby and only marginally brighter when the machine was switched on. I suspected further capacitor problems and, for once, was right: CP41 (220μF) had dried up and lost most of its capacitance. A replacement restored normal display brightness in both the standby and live modes. **D.I.S.**

GoldStar RQ293I

This fault was easy to diagnose but not so easy to repair. The owner complained that TV reception and the recordings made by this VCR weren't very good, though it played back recordings made by other machines without any problems. When he connected the aerial lead to his TV set directly reception was OK. So it had to be the VCR.

Its aerial socket was broken of course, though this wasn't immediately obvious. The outer and inner conductors appeared to be solid physically, but the insulator between them had cracked and there was a resistive path across them, possibly because water had travelled down the cable from the roof-mounted aerial. This was the cause of the severe signal degradation.

Unfortunately a complete strip-down was required to replace the socket. **D.I.S.**

Sony SLV-SF90UX

There was no colour with this VCR's own recordings while good prerecorded tapes produced poor, grainy colour. As with all modern machines, it's difficult to do serious work while they are running. I took a stab in the dark and plumped for the LA1561 YC processor chip IC200, which is a surface-mounted device. Fortunately the replacement provided a complete cure. **M.L.**

Panasonic NVHD600

This machine was dead with the STP3N60F1 chopper FET Q1101 short-circuit. In addition I had to replace IC1101 (TDA4505-03), C1115 (47μF), C1116 (47μF) and C1134 (680μF). C1134 is on the secondary side of the power supply and was leaking. **R.B.**

Ferguson FV21 etc

A problem you can get with these oldies is that the cassette doesn't load properly and is a loose fit in the carriage. Ferguson added 3mm strips of felt or chamois leather, sticking them with double-sided tape to the two springs in the top of the carriage. This holds the cassette firmly in place while loading.

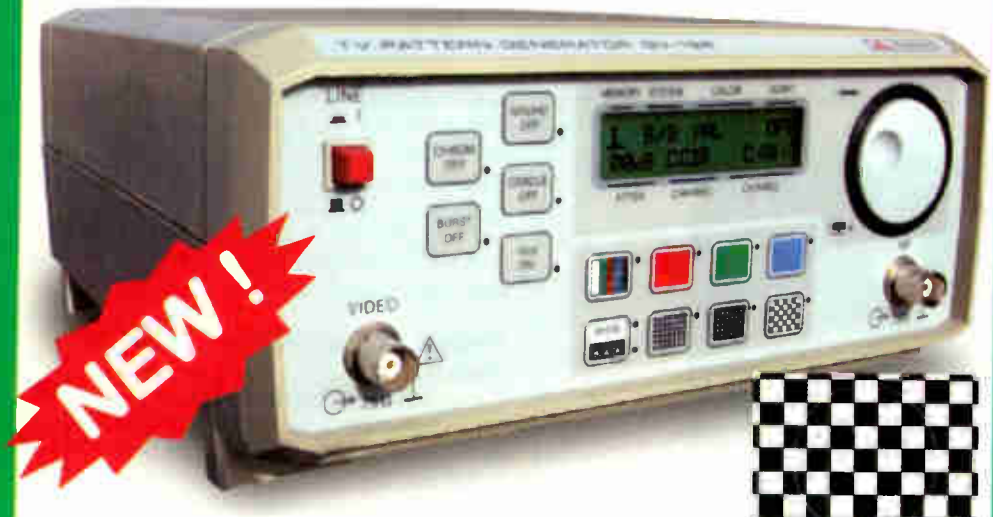
I've used this modification with other VCRs as well. **R.B.**

Grundig TVR3815

The problem with this combi unit was with the tape section. It would accept a tape, lace up then power down. After removing the back cover I could see that there was no drum rotation while it was lacing. I removed the TV section to get at the tape deck, then replaced the drum motor – obtaining one from a unit in our scrap yard department. A good soak test showed that the unit then worked without any problems. **A.D.**

GV 198

PROMAX



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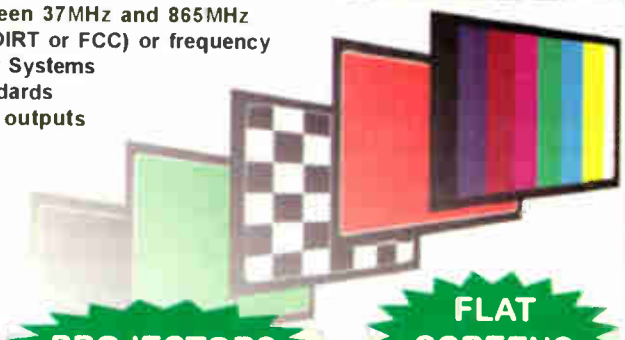

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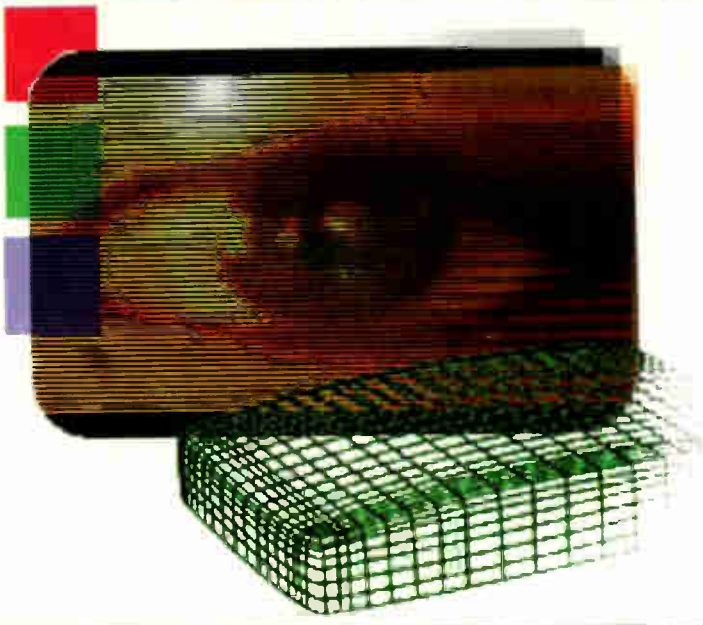

TV FAULT FINDING

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Bush WS7674 (PT92 chassis)

I've had two dead sets with the green LED on, giving you the impression that there is either no line drive or it's being pulled down. In each case however the line output transformer was the cause of the problem. So when this one came in with the same symptoms I immediately ordered a new LOPT, only to find that it made no difference.

After clearing my head I started to check the outputs from the transformer, and found a short-circuit across the output from DD01. This provides the 200V supply for the TDA6107Q RGB output chip on the CRT base panel. Disconnection of R006 (47Ω, 0·5W) on the base panel proved that the short was at pin 6 of the IC. The set was back in working order once a new TDA6107Q chip had been fitted – and I now have a spare line output transformer! **P.S.**

Sony KV32FQ75U (AE5 chassis)

This set was dead with the usual short-circuit 2SC5480 line output transistor (Q6804). I had one in stock, so I fitted it nervously without replacing the line output transformer, fully expecting it to fail at switch on. To my amazement it survived, but I then noticed that the LED at the front of the set was blinking four times. This indicates that the set is in the vertical protection state.

A quick check at the field output IC proved that there were no shorts, and further checks brought me to the feed resistors R6895/6 (0·47Ω, 0·5W) which were both open-circuit. They provide the ±15V feeds for the field output IC. Once they had been replaced the set came back to life with no further problems. Sony sets are the most unpredictable ones I work on. **P.S.**

Philips 28PW6006/05 (SL01.1E chassis)

The customer complained about a flickering picture with a clicking noise. When the set was brought into the workshop I found that the symptoms were as described, and was quite surprised that the clicking noise came from the CRT base socket. The clicking stopped when I disconnected the lead from the first-anode control to the base. A check at the lead with my voltmeter produced a reading of over 1kV – it should have been about half that.

Replacement of the line output transformer, part no. 312813821341, restored the correct first-anode voltage. You don't often get too much of something. **P.S.**

Hitachi C28W511N/311 (A7 chassis)

This set was dead. My first step, to disconnect R751 in the HT feed to the line output stage, restored the 150V supply. A check on the BU2508AF line output transistor Q751 then revealed that it was short-circuit base-to-emitter (this was done with the transistor removed from the set). It's a sure indication that there's a line-drive fault, and a dry-joint was duly found at one of the pins of the line driver transformer T702. **P.S.**

Hitachi C28WF540N

This in-warranty set had sound but no raster. When the setting of the first anode control was advanced there was a picture with lack of contrast. I have to thank Hitachi technical for assistance at this point: I was told that the 100pF surface-mounted capacitor C385 was short-circuit. It's next to the tuner unit, under two black wires. **P.S.**

Sony KV25K5U (FE1 chassis)

When one of these sets comes in dead with the LED blinking four times then a pause then the LED does it again, the set is in the excess-current protection mode. The usual cause of the trouble is that the line output transformer T511, part no. 145326411, has developed shorted turns. **P.S.**

Samsung CI3352XT

This colour portable came in with the red LED on. When it was brought out of

standby with the remote-control unit the fault could be seen: smoke was coming from the side of the line output transformer. The part no. is FCM-2014FL. An HR replacement is available, so I ordered one of these. When it was fitted the set produced a good picture. **J.F.**

Sharp C1430H

This portable produced a full picture at switch on, but once it had warmed up there was field collapse. A check around the field output chip IC501 revealed a number of dry-joints. The set worked reliably once these had been attended to. **J.F.**

Bush 2571NTX

This set was dead with a faulty power supply. The following items had to be replaced: D802, D804, D826, D827, R817 and Q802. Once this had been done I was rewarded with sound and a picture. **J.F.**

Sharp 66ES03H

There was no picture and the LED was flashing between orange and green. Cold checks showed that the BUH515 line output transistor Q602 was short-circuit. No other shorts were found, but C613 and C608 were dry-jointed. I fitted a new BUH515, resoldered the connections, crossed my fingers, switched on and was rewarded with good results. For good measure I checked the scan-coil plug, as dry-joints tend to develop here. **J.F.**

Decca/Tatung F chassis

A number of sets fitted with this chassis have come my way with the following fault symptom: reverts to standby with the LED flashing four times. This indicates that the set has been unable to achieve black-level clamping/auto grey-scale tracking. The cause is usually one or more of the three 180kΩ resistors R909, R913 and R922 on the tube base panel. It's best to replace all three with high-stability, metal-film resistors. **P.L.**

Philips 25PT4493 (L6.3 AA chassis)

This set seemed to be lifeless but checks showed that the power supply was running and the HT voltage was correct. Further investigation revealed that the 5V supply for the microcontroller chip was missing. The culprit was transistor Tr7505 (BC337) which was open-circuit. **P.L.**

Panasonic TX32PK3 (EURO-4 chassis)

This set would come out of standby for about six seconds then revert to standby. During its on time an EHT rustle could be heard and a faint blank raster was visible when the setting of the A1/G2 control was advanced.

I checked the various protection lines and found that the voltage at pin 71 (VPROT) of the main microcontroller chip was low. This led me to the VDP chip, where the field flyback pulses were missing at pin 11. As I knew that full field scanning was possible, I followed the path of the VFLB pulses and found that chip capacitor C454 (220nF) was open-circuit. **P.L.**

Decca D20TFG5

If the symptoms are stuck in standby with a whistling power supply, check the HT voltage which, even in standby, should be near its correct value. If it's low at about 40V, replace C809 (100μF, 250V). **P.L.**

Philips 25PT482 (GR2.2 AA chassis)

"Goes off" said the fault report that came with this set. It remained on once the usual dry-joints around the line output transformer had been attended to. But, while it was on soak test, the picture occasionally faded to snow.

The tuner wasn't at all sensitive to tapping, so I was able to take some voltage readings in the fault condition and found that the AGC voltage fell from a nominal 6V to zero. I followed the source back to the large IF module, where this was the only voltage that varied. Inspection with a magnifier revealed that the joint at R3013 was cracked – this resistor supplies bias to pin 10 of the IF chip. Resoldering provided a lasting cure.

I subsequently had another Philips set with a similar IF module and the same fault. **P.L.**

Sharp 21HS50H

The fault sympton with this fairly new set was colour smearing and ringing, somewhat like a delay-line problem. I eventually traced the cause to R804 (100Ω) which was open-circuit. **R.B.**

Amstrad CTV280

For intermittent Nicam sound with some crackling, try replacing Q1. It's a 6·522MHz crystal. **R.B.**

Grundig WF70-3020

After two minutes the field scanning started to cramp then fold over at the top of the screen. Checks around the field output chip IC401 showed that the 12V supply was low. The cause was R465, which had gone high in value. It feeds the 12V regulator IC403. **R.B.**

Sharp 21HS50H

The complaint was no sound. Going into the service mode to make sure that the set was working to the correct standard, I wondered whether this could be another EEPROM fault. It was. I obtained a replacement from Willow Vale and, after reprogramming, there was perfect sound. **R.B.**

Hitachi A7 chassis

I repaired two sets that were fitted with this chassis on the same day, so perhaps it's a common fault. They were both stuck in standby because the 18V regulator, which receives a line output stage derived input, was dry-jointed. This is not unusual. But, after resoldering the regulator, the first set produced a picture only a couple of inches high at the bottom of the screen while the second one had excessive width and poor EW correction. Both these faults were cured by replacing the TDA8843 jungle chip IC501. So be careful when you give an estimate for a straightforward regulator dry-joint repair – you may need to include the cost of a TDA8843 chip. **D.H.**

Beko 26414R

This set was dead with the 1·25AT fuse FU102 blown. Suspecting a power-supply blow up, I checked across the chopper FET which read short-circuit. When I took it out a little voice said check it again. I did, and it read OK. But the short was still present on the board. It disappeared when the chopper transformer TR101 was removed. I obtained a replacement from SEME, part no. PTX6075, at a very reasonable cost. **G.L.**

Goodmans 255NS (Daewoo CP775 chassis)

The fault symptom with this set was field collapse. In addition to a TDA8351 field output chip (I301) I decided to quote for a new line output transformer, as it was the original one and I have had so many of them fail. When I fitted the replacements I found that there was field foldover across the top three inches of the screen (I love this job really!). To cut a long story short, C305 and C403 (both 470μF) were low in value and had damaged the new TDA8351 chip at switch on. They are right behind the nice warm field output stage heatsink! **G.L.**

Matsui 2196N

I didn't recognise the chassis in this set – it looks very like a Beko one. The set was dead and checks showed that the 5N90 chopper FET Q101 was short-circuit and the 5·6Ω, 5W surge-limiter resistor R101 was open-circuit. In this situation it's always a good idea to check the high-value resistors in the power supply. R109 (330kΩ) was open-circuit. R108 (220kΩ) read all right, but I decid-

ed to change it anyway.

The set worked once the replacements had been fitted, but came back a week later – the mains bridge rectifier's reservoir capacitor C105 (100μF, 400V) had failed. Fortunately the components I had fitted were all OK. I replaced C105 and gave the set a long soak test, which proved that all was now well. **G.L.**

Hitachi C28WF540N (11AK33 chassis)

This set was tripping. I suspected the line output transistor, but this proved to be OK. So I checked the rectifiers on the secondary side of the chopper transformer and found that D118 (UF5402) was short-circuit. A replacement restored normal operation. **G.L.**

Matsui 1091X

All that happened when this set was switched on was that the relay clicked. It didn't take me long to find that D552 was short-circuit – it was a bit discoloured. I couldn't find any reason for its failure, and the set worked when a replacement had been fitted. But I decided to replace C651 (100μF), C653 (1μF) and C654 (33μF) as well as they looked very tired. They live in the shadow of R651, a 10W wire-wound resistor in the power supply. **G.L.**

Wharfedale T2801

This set produced a faint whistle from the line output stage but little else. Visual inspection revealed that a once blue capacitor was now a charred wreck. It was CD27 (2·2nF, 2kV). A replacement cured the fault. **G.L.**

Grundig TVR5540FT

I've had a number of these sets in recently, all with the same fault. The standby relay clicks and the set will not come on. Check the voltage at the output of the standby power supply. If this is low, at less than 6V, replace C840 (47μF, 25V). It's in the feedback circuit to the TOP210PFI standby power supply IC. This usually cures the fault. If not, replace the IC as well. **J.G.**

Philips 28PW6615 (MG1.1 chassis)

This widescreen set went into standby, the relay clicked, then a few seconds later the relay clicked out with the standby light flashing. The power supply is basically similar to that in the MD1.1 chassis so, having ascertained that the 320V supply was present at switch on and found that there was no drive to the chopper FET, I fitted a repair kit.

At switch on there was no difference! Pin 1 of the control IC receives a feed from the AC supply, and this was missing. Much investigation revealed the culprit – the relay! It contacted long enough to charge the mains bridge rectifier's reservoir capacitor, but not long enough for the IC to start. It's a 5V, 10A item, circuit reference 1002, part no. 4822 2801 0375. Willow Vale stocks it under code 16375RH. **G.D.**

Hitachi C28W440TN (11AK33 chassis)

The description of the fault with this set was "bang"! This meant that the mains fuse had blown and Q100 (PN80) had exploded. I replaced these items, also IC107 (MC33260), then started the set via a variac. The result was a controlled explosion.

Looking at the manual, I found that these components form a power-factor correction circuit that's not fitted in all sets. The main power supply tested OK, so it appeared that there had been damage to components in Q100's gate circuit. Checks revealed that R103 (22Ω), R105 (33Ω), R154 (1kΩ) and D107 (LL4148) were open-circuit. They are all surface-mounted items. The service manual lists R103 and R105 as 39Ω with R154 deleted. To be on the safe side I replaced all the components as they were originally. This restored normal operation. **G.D.**

Proline 28N1 (F19 chassis)

The picture was shifted down a few inches and the sound was very low. There was obviously EEPROM corruption, but where to start? The internet seemed to be a good idea and, with some searching and experimentation, I eventually found the service menu. You press and hold vol+ while switching on, then press standby on the remote-control unit. Scroll and adjust are provided by the channel and volume keys respectively. To store, use the yellow (swap) key.

This procedure put the picture right, but the sound was still a problem. It was eventually restored to normal by reinitialising the IC and readjusting the parameters. To do this, scroll to the 'version' line in the menu and press V+. It will display 'busy' then reset. **G.D.**

Blaupunkt PM45-15VT (Grundig CUC7303 chassis)

The customer's complaint was sound OK but no picture for twenty minutes. When I switched the set on I heard a healthy buzz from the field scan coils and, turning up the A1 control on the LOPT, obtained a blank white raster with flyback lines. After turning the A1 control back I decided to have a look at the underside of the PCB, and found dry-joints at the regulators and the field output chip IC400 (TDA3653B). But resoldering these items didn't cure the fault.

Time to get out the hairdryer and freezer. Heating around IC400 brought the picture back, but a replacement IC didn't make any difference. Replacing the flyback boost capacitor C402 (100μF, 35V) cured the fault: when I checked it with an ESR meter it was open-circuit. I hadn't checked C402 previously because when it goes low in value it usually causes field cramping at the top. **C.R.**

Beko 20420T (AT4 chassis)

This set was dead and I soon found that the start-up resistor R104 (47kΩ, 1W) was discoloured and open-circuit. The set seemed to work all right when a replacement had been fitted – until I moved it to plug in the aerial. It then reverted to standby. I had already resoldered any suspicious joints in the power supply. There was HT at C104, but not at pin 7 of the chopper transformer. The only item between these points is fuse FU102 (1·25A). The fuse was OK, the problem being the fuseholder. Once I had retensioned the contacts the set behaved correctly.

In hindsight it was obvious why R104 had failed: as there was no supply from the feedback winding, R104 had been continuously trying to supply pin 6 of IC101 (TDA4605-2). **C.R.**

A faulty plug top

An under-guarantee Panasonic set, Model TX14B4TL (Z185 chassis), was dead with the 5A fuse in the moulded plug top open-circuit. The internal fuse F801 was OK however, and no discernible shorts could be found in the power supply. I replaced the fuse, plugged the set in again and switched on at the socket. The fuse blew instantly. This was odd, because the set itself wasn't switched on at the time.

To save my dwindling supply of 5A fuses, I decided to connect a 500W halogen lamp across the fuseholder in the plug top instead. I then removed the switch (SW801) from the PCB in the set and switched on at the socket. The lamp lit up at full brightness. With the mains lead disconnected from the set the lamp still came on at full brightness. The plug top was faulty, a replacement restoring normal operation.

When I examined the plug top it looked OK. A meter connected between the live and neutral pins produced a reading of 10kΩ. I can only assume that the plug top had become carbonised internally and was breaking down when the mains voltage was applied. **C.R.**

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and
Martin McCluskey

We welcome fault reports from readers – payment for each fault is made after publication.

Reports can be sent by post to:

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Azalea Drive, Swanley,
Kent BR8 8HU

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Fault

Philips 29PT5321 (GR2.4 chassis)

This set was dead apart from a faint pulsing noise. Initial checks revealed that fuse F1534 (315mAT), which is in series with the EW drive to the line output stage, was open-circuit. Looking for a reason, I found that D6561 (BZX55C68) in the protection monitoring line was leaky. As a precaution I also replaced D6546 (BY228) in the EW diode-modulator circuit. The set then produced a picture, but with bowed sides.

The EW drive circuit is on the tube base panel. Checks here showed that the driver transistor Tr7533 (BD440) was short-circuit. So this was replaced along with Tr7530 (BC846B), which can also fail. The result was a perfect picture – for about ten minutes. F1534 and Tr7533 had both failed again, this time with a smell of burning.

The cause of all the trouble turned out to be the scan-correction capacitor C2550 (680nF, 250V), which had a small pinhole at one end of its casing. **B.F.**

Bush 2871NTX (11AK19 chassis)

This chassis must have been designed to keep TV repairmen in a job! "Stuck in standby" was the complaint with this set. When it was switched on via either the remote-control unit or the front panel the HT voltage rose to over 140V. But the set remained 'dead' because there was no line drive. A check on the 14V supply, which feeds the line driver stage, produced a reading of less than 3V at the cathode of D812. It looked distressed, and a new BYD33D increased the supply to 9V. But there was still no line drive, and there was a smell of burning from somewhere though no smoke could be seen.

To cut a long story short, Q500 (BC548) and Q504 (BC558), which are inside the screened IF section, were burnt to a crisp. It's not clear from the circuit diagram what their function is: they are connected to pin 42 (phase-2 filter) of the TDA884* jungle chip IC401. The two transistors are DC coupled, and their failure had created a dead short-circuit across the 8V supply, which is derived from the 14V supply via regulator IC805. Hence the failure of D812.

Normal operation was restored once these two transistors had been replaced. Make sure that you have the correct circuit diagram when repairing these sets. There are several versions of the 11AK19 chassis, depending on the size and aspect ratio of the tube. **M.McC.**

Bush WS6673 (11AK19PRO chassis)

This widescreen set had received attention elsewhere, and had been returned to the customer unrepaired. The original complaint had been 'dead'. An inspection of the chassis revealed that the chopper MOSFET Q802 (MTP6N60E) and the chopper control chip IC802 (MC44604) had been replaced.

When mains power was applied there was a chirp from the power supply and the HT voltage rose to about 60V. This is not enough for normal operation, but is too high for standby. I noticed that the red front-panel LED was out. This was because the microcontroller chip's 3·3V supply was missing at pin 2 of the LM317 regulator chip IC804.

I decided to start by investigating this problem. When the set is in the standby mode, the voltages on the secondary side of the power supply are much lower than for normal operation. A small thyristor, Q810 (MCR22-6), rectifies pulses from the chopper transformer's 150V secondary winding, providing a supply of about 12V at the input (pin 3) to IC804, which in turn produces 3·3V for the remote-control circuitry. There was hardly any voltage at this IC's input pin as Q810 was short-circuit cathode-to-gate.

I fitted a replacement thyristor and switched on. This time the front LED flashed from red to green repeatedly and a tripping sound came from the power supply. Much time was wasted checking for overloads, and checking the circuitry around the chopper control chip IC802, before I discovered that Q806 was leaky. This BC548 transistor is part of the standby switching system. It controls the opto-coupler to provide switching between standby and full-power operation.

Much to my relief a new BC548 transistor restored normal pictures and sound, and a long soak test proved that no further faults were present. **M.McC.**

DVD AND HOME CINEMA

Fault reports from
John Talbot
Chris Bowers
Geoff Darby
and
Mike Leach

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Sanyo JCX-TS750

This machine, just out of warranty, worked sometimes but not often! There's a row of big regulators on a separate PCB at the back: they are cooled by a metal block with a fan inside. I found that they were rather poorly hand-soldered. The input pin of IC405 (7805) was dry-jointed, but I resoldered the lot to be sure.

I was careful when unsoldering the mains lead, to avoid having to fight one of those plastic clamp things for an extra few mm of cable length when reconnecting it. **J.T.**

Sony HCD-DP1000D

This unit played CDs but not DVDs. The cause of the trouble was traced to the KHM-240AAA optical pick-up assembly, part no. 8-820-144-06. All was well after fitting a replacement followed by an auto adjustment set-up. **C.B.**

Sony HCD-S300

There was no FM reception right after powering on. The cause of the trouble was C602 (100μF, 16V) on the audio board. Initialisation data was being sent to the tuner before the FM +7·5V supply had stabilised. Removal of C602 restored normal radio reception after power up. **C.B.**

Sony HCD-M700

This DVD/CD machine would play DVD discs but not CDs. The cause of the problem was the KHM-240AAA optical pick-up, ref. 277, part no. A6062705A. A replacement and setting up restored normal operation. **C.B.**

Sony HCD-S300

There was no monitor output with this unit. Multimeter checks inside revealed that IC701 and R705 were faulty. Replacements restored the monitor-out display. The part nos. are 875966394 (IC701) and 121602200 (R705). **C.B.**

Sony HCD-C700

The fault symptom with this unit was as follows: when the RDS information changed, parts of the previous display remained visible. Checks inside, on the DVD board, and a call to Sony technical confirmed that the microprocessor IC901 would have to be replaced. Normal display operation was restored by fitting an S500 IC kit (V113) assembly, part no. X-4954-876-1). **C.B.**

Philips DVD733/051

The fault ticket with this one said "had power surge – now dead?" The mains fuse was intact and there was no sign of any distress in the power supply, so I began to look for a start-up supply. There isn't one! The very ordinary-looking 14-pin DIL chopper chip, type TY72011AP2, is connected directly to the 380V DC supply across the mains bridge rectifier's reservoir capacitor.

Scope checks showed that this chip's pins were all devoid of voltages and waveforms, so a replacement was ordered. When this had been fitted there was an improvement in that there were now voltages at some pins, but the power supply remained stubbornly quiescent.

I then carried out meter checks on the secondary side of the power supply. These revealed that diode D6280, transistor Tr7280, and the surface-mounted transistor Tr7282 connected to its base were all short-circuit. The purpose of this little lot appears to be to produce a negative low-voltage supply. Once replacements had been fitted the machine sprung to life and worked normally. **G.D.**

Toshiba SD220E

The complaint with this first-generation DVD player was "intermittent power". It came on when taken out of standby, then the display scrolled a message across itself from right to left. This got as far as "welcome to t" then the unit returned to standby, with a faint squeak from the power supply.

The supplies were all present and correct while the unit was on, so the power supply was not shutting down because of an overload. A check at pin 4 of connector CN801 showed that the power supply control signal went back cleanly from high to low when the machine shut down. I followed the source of this signal back to pin 12 of connector CN603 on the MPEG board. This connector goes via a flexiprint to the front-panel micro and display controller. There's a tiny 5-pin chip, IC602,

between pin 12 and the power supply. It contains a single and logic element.

As soon as I applied my meter probe to pin 12 the unit came to life properly. It could, with a certain amount of provocation, be made to go off again. But it was impossible to say exactly what I did, or quite how I poked it, to achieve this result.

The connector is a surface-mounted type, so its pins are clearly visible. I couldn't see any soldering problems here, even with the aid of my magnificent new long-reach stereo microcope. While the board was out I also checked the connections to IC602, which is on the reverse side, and all its associated components.

Eventually I just went ahead and reflowed all these connections, using new solder. All was well once this had been done and the board had been refitted, and no amount of provocation would made the unit go off again.

Incidentally the stereo microscope, an excellent piece of kit that's extremely well made and optically superb, is available from Farnell at only £199. The order code is 722232401. **G.D.**

Sony TA-VE25

This home-cinema system's chopper power supply had suffered a fairly catastrophic failure. It's housed in the SS-MS25 subwoofer unit. The STR-F6267D hybrid chopper chip IC901 was short-circuit between pin 3 (drain) and pin 2 (ground). Instead of input fuse failure two parallel-connected resistors, between pin 2 of the IC and the mains bridge rectifier's negative terminal, had exploded. These resistors are R903 and R904: their value depends on the exact model – either 0·15, 0·12 or 0·22Ω. In addition two variants of IC901 are listed. When ordering replacements from Sony, be careful to check in the parts list the correct resistor value and IC type for the machine you are repairing.

When the replacements had been obtained and fitted I covered my eyes, steeled myself for the bang, and switched on. There was no explosion, but the unit still didn't work. There was some gentle pulsing at the various pins of IC901, but nothing to suggest that it was making much of an effort to start up.

I spent a few minutes checking various diodes and other semiconductor devices in the area, but everything seemed to be OK. Eventually, more by luck than judgement as the voltage at pin 1 of the IC was more or less correct at 0·5V, I measured the resistance between this pin and ground (the bridge rectifier's negative pin). It read very high. This was obviously wrong, as the pin is returned to ground via R901, which is a minuscule 220Ω surface-mounted resistor. It looked fine, but was open-circuit.

The power supply sprang to life once this resistor had been replaced, and a long soak test proved that all was now well. **G.D.**

Sony HCD-S300

The fault description that came with this combined DVD player/tuner/amplifier said "no sound". When you get this problem it's a good idea to take a close look at the audio output ICs, in case any of them are cracked across the middle. If one of them is cracked the protection circuit may shut down the audio completely, though the other output stages are OK. In this case however the output chips appeared to be all right. A circuit diagram and a bit of logical thinking would be required!

The oscilloscope told me that the output stages were working, as there were audio 'squiggles' at the output pins of the ICs. This is before the audio outputs go to the relays then on to the speakers of course. The relays weren't switching over because transistor Q405 on the amplifier board was faulty. It's a surface-mounted device, type 2SC2712. A replacement restored the sound. **M.L.**

Test Case 501

Home cinema is catching on very rapidly as large-screen TV becomes better and more affordable and high-quality surround sound is available from signal sources such as DVD discs and digital TV transmissions. Wide screens are now accepted as the norm for anything other than a portable set: in fact it's hard to find new, large 4:3 aspect-ratio sets in the shops nowadays. The combination of a large 16:9 screen, a first-class audio decoder/amplifier and a good film creates – with the lights out! – a very good impression of the cinema.

A customer of ours, Jerry Davies, is now well into home cinema. As his budget permits, he has been building up an outfit that consists of an LCD projection TV set, a DVD player, and a modest 'separates' audio system with five loudspeakers and a subwoofer, able between them to deliver some 200W of audio power – more than enough for his little sitting room! But he wanted to get good surround sound from the Sky Movie and Box Office channels, and was somewhat put out when shop manager Colin Doc told him that the only way of receiving Dolby Digital sound with Sky transmissions is to use the Sky+ personal-recorder box, which is not the cheapest type of receiver. Jerry didn't want its disc-recording capability, nor did he like its price tag. But buy it he must if he was to get the full sound-stage glory of those blockbuster films. Is this a deliberate ploy by BSkyB, which closely controls the design and marketing of the boxes that receive its transmissions?

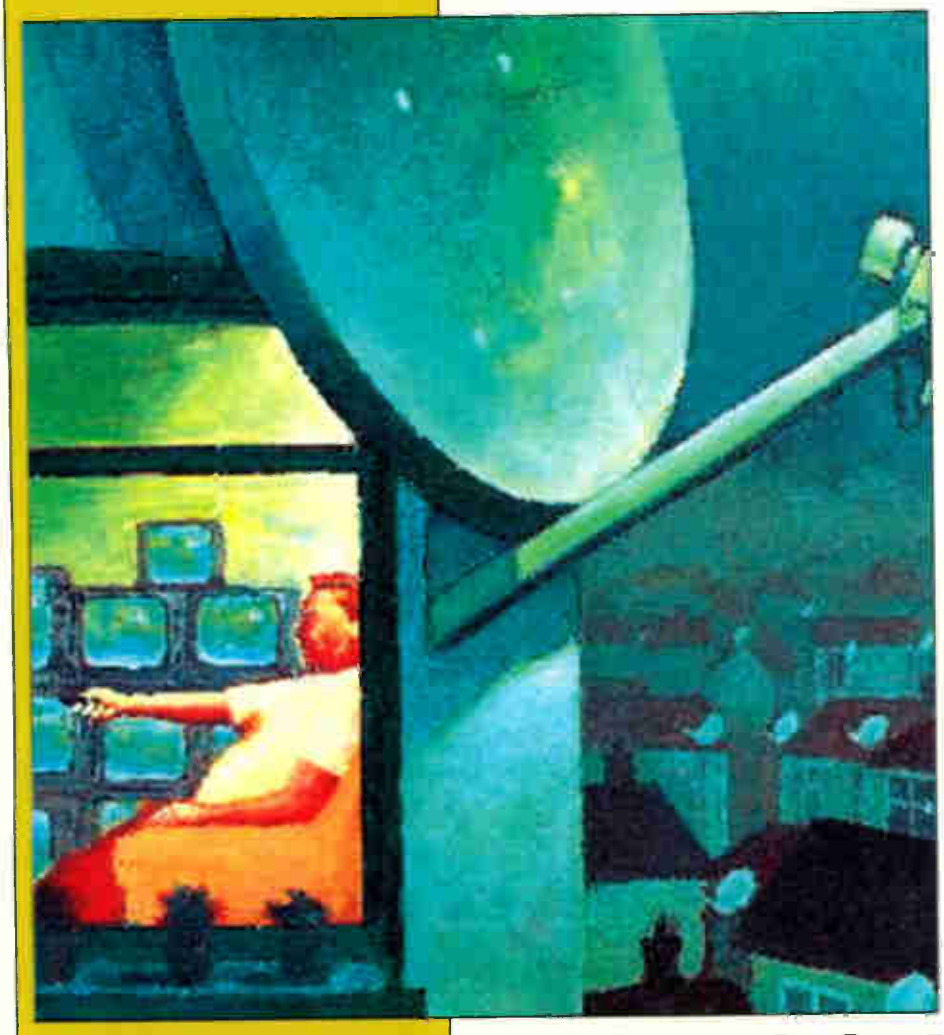
Anyway, a Sky+ box was subsequently bought and borne home triumphantly, where a dish was already installed. The box was connected to the TV set via a scart adapter cable, and to the surround-sound amplifier via a high-quality twin phono lead. It was also connected to the telephone socket, and a subscription to Sky was arranged. Very soon it was all happening in the front parlour of No. 27 Acacia Avenue.

Initially Jerry was quite pleased with the whole effect. But he came to realise that the surround-sound effect was not as good as that obtained with his DVD player. It seemed less sharp, less focused, more woolly. Was this a characteristic of TV-derived surround sound, or was something wrong?

Colin Doc was consulted, and provided a solution straight away. Indeed Jerry might have realised the cause of the problem himself had he looked more closely at the connections between his audio amplifier and his DVD player; consulted the instruction books provided with the audio amplifier and/or the Sky+ box; or perused some copies of his favourite home-video magazines.

Our Colin, who was considering the purchase of a TV projector himself, went to the customer's house in person that very evening (not in the big white van he used to drive about during his installation and servicing days!), ostensibly to help but really to see for himself how well the projection TV set performed. It was a relatively inexpensive 'clone' model bought from an advertiser in *Essential Home Cinema* magazine.

Though the projector had its roots in the world of PCs and business presentations, for the money it didn't do too badly with TV pictures. A few days later however, working with a gadget recommended by Colin, it was doing much better. Can you guess what this was all about? The answers are on page 699, but should be at the fingertips of any installation technician worth his salt!



SATELLITE NOTEBOOK

Reports from
Christopher Holland
Hugh Cocks
Michael Dranfield
Pete Haylor
John Coombes
and
J.S. Ogilvie

Digibox reception without a card

Since encryption of the BBC channels ended a year ago, some viewers are content with the number of channels available without a viewing card in the slot. As the free-to-view card service ceased at the end of January, the encrypted 'terrestrial' channels ITV1, Channel 4 and Channel 5 are no longer available to those who want to view them without subscribing to a Sky package, though existing FTV cards and expired (dark blue) Sky cards still work for them. Sky is now offering a new free-to-view service, including a card, for an installation charge of £150 – but it's not clear whether the card is to be made available generally.

A brand-new digibox produces BBC1 London at EPG no. 101 and BBC2 England at EPG no. 102 by default. If a digibox has been used previously with a viewing card BBC1 and BBC2 will appear at these EPG nos. even though the card may have long since disappeared. Without a card ITV1, Channel 4 and Channel 5 (EPG nos. 103, 104 and 105)

Photo 1: The EBU Unilateral caption.

Photo 2: The EBU Multilateral caption.

Photo 3: The RTP (Portugal) broadcasting control centre caption.

Photo 4: Shot from the US/European summit held in Ireland at the end of June.

Photo 5: Shot from the US/European summit held in Ireland at the end of June.

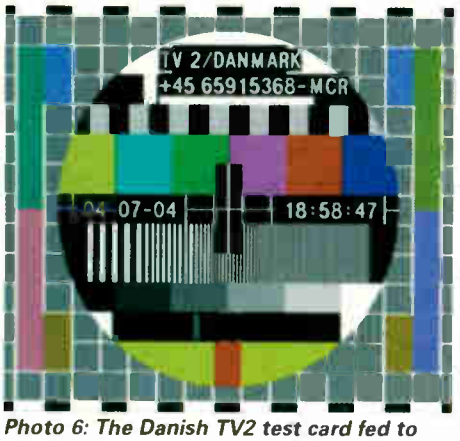


Photo 6: The Danish TV2 test card fed to Eurovision.

Photo 7: The TVP (Poland) test card fed to Eurovision.

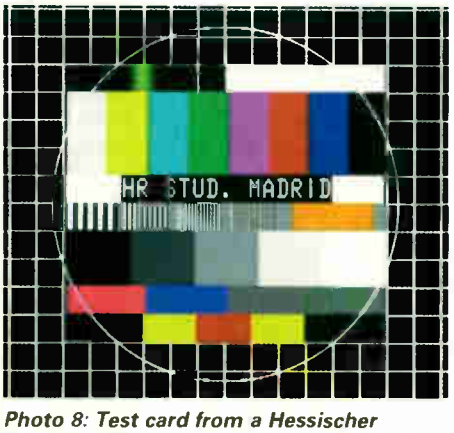


Photo 8: Test card from a Hessischer Rundfunk Madrid studio feed to Germany.

Table 1: EPG nos. for BBC1 and BBC2 regional programmes

941	BBC1 Scotland	952	BBC1 East (West)
942	BBC1 Wales	953	BBC1 South East
943	BBC1 N. Ireland	954	BBC1 South
944	BBC1 London	955	BBC1 Oxford
945	BBC1 North East	956	BBC1 West
946	BBC1 Yorkshire	957	BBC1 South West
947	BBC1 Yorks and Lincs	958	BBC1 Channel Is
948	BBC1 North West	960	BBC2 Scotland
949	BBC1 West Midlands	961	BBC2 Wales
950	BBC1 East Midlands	962	BBC2 N. Ireland
951	BBC1 East (East)	963	BBC2 England

won't be seen in the EPG: if a viewing card is removed from the slot the 'please insert card' message will be seen at these EPG nos. until the digibox is rebooted by interrupting the mains supply, when they will disappear completely.

All BBC regions are now transmitted by satellite, but not some sub-regions: for example BBC1 South West gives only the Plymouth version, not the Eastern local news within the Spotlight regional news programme transmitted from Stockland Hill and its relay transmitters. If your local region isn't at EPG no. 101, it can be found above EPG no. 941, see Table 1. One channel in the BBC1 and BBC2 list will be missing, appearing at EPG nos. 101 and 102 respectively. Having regional variations available via satellite is handy for those who want to look at local news for a region other than their own local terrestrial TV one. Irish digiboxes have BBC1 N. Ireland at EPG no. 169 and BBC2 N. Ireland at EPG no. 170. **C.H.**

Digital channel update

The latest channel additions at 28·2°E are listed in Table 2. Where allocated, the EPG number is shown in brackets after the channel name. **C.H.**

Eurovision feeds

There were many Euro 2004 football championship feeds via Eutelsat W3 (7°E) during June and early July. Photos 1, 2 and 3 show EBU Unilateral, Multilateral and the RTP (Portuguese) broadcasting control centre captions respectively. These transmissions all used the MPEG4:2:2 standard, which can't be decoded by a conventional digital satellite receiver – you need a PC-based receiver.

Photos 4 and 5 relate to the US/European summit held in Ireland at the end of June.

Photos 6, 7 and 8 show that real test cards are still alive and well, though they are rarely shown on broadcast TV these days! Photo 6 is from a Danish TV2 feed to Eurovision while Photo 7 is from a Polish (TVP) feed. Photo 8 differs slightly: it comes from a Hessischer Rundfunk Madrid studio feed to Germany.

Virtually all satellite feeds are nowadays digital and can suffer from motion problems and the sound-vision being out of sync. Photo 9 is from ORF (Austria). The background moves continuously to show that the feed is live (if the feed went off-air unexpectedly a still picture could be left on-screen): the movement should be smooth, without any jerking effects. Photo 10 shows a rotating clock display: when the hand is at the 12 o'clock position a white flash and an on-screen tone should coincide.

Photos 11 and 12 show the more commonly used EBU colour bars, first received from Lithuanian TV in Riga and secondly during an RAI (Italy) feed from London to Rome. **H.C.**

Grundig GDS200/1

Should the power supply in this digibox be dead, check for voltage across C3. If there is no voltage here, either R40 or R5 is open-circuit. Their value varies in different versions of the power supply. In this one, type DSO-0375 revision A, both were 220kΩ, 1W. **M.D.**

Sony VTXS750U

This digibox was dead with the top blown off the VIPER50 chopper chip. Normally a new IC and fuse will bring the box back to life, but not this time. I found that the surface-mounted 3·6kΩ resistor R800 was open-circuit.

The box came on when a replacement resistor had been fitted, but the picture was pixellating – though the info banner was OK. I then found that the 3·3V supply was high at 4·4V. A new PC123 optocoupler (PH800) cured this problem and, thankfully, no damage had been done by the overvoltage. **M.D.**

A replacement job

You know that trouble is brewing when the phone call starts with "A friend of mine recommended you as you're an

Photo 9: An ORF (Austria) digital feed: the background moves continuously to show that the feed is live.

Table 2: Latest digital channel changes at 28·2°E

Channel and EPG no.	*Sat*	*TP*	*Frequency/pol*
Advert channel (694)	EB	C1	11·223GHz/H
BT tests	EB	C6	11·390GHz/V
Channel 4 feeds	2B	21	12·110GHz/H
GlobeCast radio	EB	D9S	11·623GHz/H
Kingston Inmedia tests	2B	36	12·402GHz/V
Soundtrack channel (686)	EB	C5	11·390GHz/H

TP = transponder. 2B = Astra 2B. EB = Eurobird.

Photo 10: A rotating clock display.

Photo 11: EBU colour bars from Lithuanian TV, Riga.

Photo 12: EBU colour bars in an RAI (Italy) feed to Rome from London.

expert"! This job should have been a simple one: to fit a motorised system, remove the old satellite system with two LNBs, and reuse the customer's EchoStar receiver.

I removed the old system and installed a new 1m dish, 0·6dB LNB and a "Silent Gold" H2H motor. The cable I usually use is specially made for motorised systems. But none could be found, so I had to use the local wholesaler's cable instead. This is a five-core cable with a soft PVC sheath.

The final part of the job was to connect the receiver to the cables and tune in. This was the start of my troubles! I asked the customer to connect his receiver to the mains supply and switch it on. Bang went the power supply, as parts of it came through the top grille. I was glad I hadn't touched the receiver, as it would have been 'my fault'. The power supply was a mess, with bits of transistors all over the PCB. As repair couldn't be done there and then, the customer decided to phone around to find a similar model. I went on my way to the next job.

Later the customer phoned and asked me to return to his house and just set the limits. He would do the rest. Like an idiot I agreed to return, but by then the Birmingham rush hour had started and I had to cross from one side of the city to the other. Over an hour later I arrived and set the limits. Several satellites were found, and everything seemed to work. Payment was made, and a late-night finish was soon forgotten.

At 8 a.m. the phone rang. "The satellite you fitted yesterday is faulty. Did you tighten the dish correctly, as I keep losing the satellite settings? A visit confirmed this description. If you had say five satellite positions, the dish would sometimes return to the correct position, with the same position no. and a picture showing, while at other times the position no. was correct but there was no picture, everything being OK again when adjusted to a new position no. The supplier of the receiver was contacted: their 'expert' said the cause of the trouble was use of incorrect motor cable.

Capacitors were bought and fitted across the reed-switch connections at both ends and across the 36V supply. This seemed to improve the situation at first, but the fault soon returned. I promised to come back next day with the correct cable and a spare receiver.

Bright and early next day I replaced the previous cable with screened cable. The receiver was moved so that less cable was used, and was then retested with high hopes. But the problem was even worse! When a similar receiver was fitted everything worked correctly. The new receiver was defective, and was returned. The customer hasn't phoned since, so I can only hope that all's well.

Beware the call saying you are the expert! **P.H.**

Some quickies

Grundig GDS3000: There was no colour on the PAL setting and no RF output. The cause was the 27MHz crystal X1.

Pace 2500: The "no satellite signal being received" message was displayed. The ZIF tuner was faulty.

Humax 5400: This receiver was dead. The repair consisted of replacing the power supply capacitors, the 30V zener diode and the 100Ω resistor. **P.H.**

Grundig GDS200

If this digibox's LEDs are all flashing, the cause is capacitor C3 (47μF, 25V). Check its capacitance and/or ESR reading. **J.C.**

Humax F1-C1

This digital satellite receiver came into the workshop from the local pub with a card saying it was dead. It certainly was. I carried out some checks in the power supply and found that C14 (1,000μF, 6·3V) and C35 (100μF, 35V) read very low. Replacement of these two capacitors restored normal operation. **J.S.O.**

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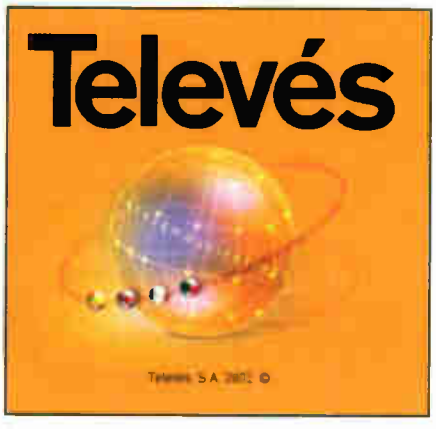

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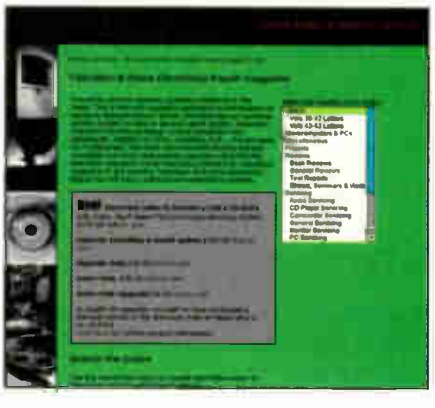

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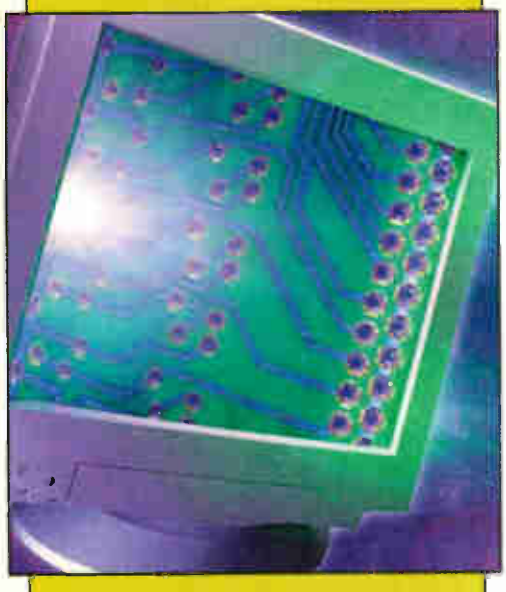

MONITORS

Fault reports from
Gerry Mumford
Ian Field
and
Chris Bowers

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Elonex MN044 (Acer chassis)

This old 17in. monitor would switch off randomly. As tapping the unit produced the fault, I inspected the PCBs for dry-joints. The chopper transformer T601 was found to be the cause of the trouble, with many of its secondary-winding pins badly dry-jointed. Resoldering them all cured the fault, and the result was a surprisingly good display for such an old unit. **G.M.**

IiyamaVision Master 503 (Model S103MT)

This huge 21in. monitor powered up all right but produced no display at all. As the EHT was normal, attention was turned to the CRT neck board, where I discovered that there was no supply to the video output IC because fuse F601 (3/8A wire-ended) was open-circuit. As there were no short-circuits present I simply replaced the fuse. This cured the fault **G.M.**

Taxan Ergovision EV975TCO95

This 19in. monitor produced a yellow display because blue was totally absent. This was true of the OSD as well as the video, so attention was turned to the CRT neck board. Scope checks here showed that all three colour drives were present right up to the VPS12 video output chip IC1. As there was no blue output from this device a replacement was fitted. This produced a correctly-coloured display. **G.M.**

Digital PCXBU-BC

These monitors are fitted with a Philips chassis. As the PCB is impossible to test in situ, the only option when one comes in dead is to disable the line output stage so that the PCB can be laid flat on the bench and powered up. Test measurements can then be made. To ensure safety, it's best to unsolder all the pins that are connected to the primary side of the line output transformer, also the line output transistor(s). While you are doing this, check for shorts between the primary winding and any earthed winding. If you find a short, your diagnosis is complete!

With this particular monitor there were no such shorts and the power supply still refused to start. On closer examination I found that it's a self-oscillating circuit that uses a bipolar chopper transistor. There was a low, slowly-varying voltage at the collector of the transistor, but little else was happening. A check back through the reservoir capacitor, the rectifier and switch didn't take long as everything here was OK. The cause of the failure to start turned out to be broken print around the solder pins on the mains input connector.

The solder pad area had broken cleanly at the border of the green solder-resist coating. One pin was holding on by a sliver while the other had separated all round. The conduction path that produced a low-voltage reading at the reservoir capacitor was provided by slightly carbonised PCB material under the severed pad. The body of the connector is fixed to the rear metal bracket by self-tapping screws that were both tight. The bracket was fairly wobbly however. It's secured to the PCB by means of twisted lugs, and there is little that can be done to improve the stability of the structure. As it was impossible to stop the connector moving I repaired the connections with wire links. I made these as long as possible and coiled the wire around the solder pins. This repair will eventually fatigue, but I did my best to make it more reliable than the original design!

The monitor could then be powered up. This wasn't the end of the story however. Although the display was bright enough the contrast was very poor, with comet tails after any bright image on a dark background. There was nothing amiss in the contrast, beam-limiting and control grid circuitry, the cause of the trouble being the fact that the CRT's emission was on its last legs. This wasn't surprising, as the heater voltage was only 5·25V.

There are two electrolytic capacitors (1,000μF and 100μF, both 16V) in the heater supply, separated by a choke. Both produced acceptable though not marvellous ESR readings, and replacements did little to help. The next tactic, to upgrade the rectifier, clipped only a few tens of mV off the forward voltage loss. The best improvement was obtained by replacing the three small electrolytic capacitors on the primary side of the power supply: one 4·7μF capacitor rated at 50V and two 470μF capacitors rated at 16V. One is the feedback coupling capacitor to the base of the transistor.

With every component in the heater supply optimised I still had to set the preset control in the power supply at close to maximum to obtain adequate heater voltage. **I.F.**

Sony GDM-20SE2T5

This monitor produced a bright raster with flyback lines. There was also reduced width. Voltage checks inside revealed that the CXA1907S video drive chip IC420 was faulty. A replacement restored correct operation. **C.B.**

Sony PVM1444QM

The top half of the display was flipped. I carried out some voltage checks in the frame output stage and found that Q547 was faulty. There was a normal display once a replacement had been fitted. **C.B.**

Sony CPD-15SF1

This monitor would, intermittently, fail to power up when switched on: the power on LED and power save LED would both flash. Investigation inside revealed that transistor Q001 was faulty. A replacement restored reliable operation. **C.B.**

Solution to Test Case 501

– see page 693 –

Home-cinema equipment – its sale, installation, connection and commissioning – has become big business of late, as witness the specialist magazines of which our customer Jerry is so fond. It's very easy to spend a five- (even six-) figure sum on a custom-installed outfit. Dedicated rooms, often a garage or big loft conversion, are becoming common. But even with such an unpretentious ensemble as the one described here, care has to be taken if full advantage of the equipment's capabilities is to be achieved.

Dolby Digital surround sound (DD5.1) can be carried only by a data stream. It is decoded, then converted to analogue form, by a complex digital processor that produces separate and tightly-targeted audio signals for all six loudspeakers involved (left, right, centre, left-rear, right-rear and subwoofer). Fitting an audio data cord, optical or coaxial, brings all this to life. It produces a huge improvement on analogue Pro-Logic surround sound, which is all that can be had using a twin phono lead. Jerry's DVD player was already connected via a data cord!

The projection TV set had only composite- and component-video input ports. It was, of necessity, fed with a composite-video input, as the Sky+ box has no component-video output facility. Colin's suggestion of adding an in-line RGB-to-component converter box gave better and sharper pictures by avoiding use of the PAL codec.

NEXT MONTH IN TELEVISION

Satellite TV distribution systems

New TV distribution systems nowadays almost always include satellite reception. Bill Wright provides a detailed, practical guide to this type of installation work, starting with small systems then going on to the medium-sized ones typically found in apartment buildings.

The Proview BM568 LCD monitor

This monitor, released in 2001, has proved to be very popular amongst serious computer users because of its sharp detail, good contrast, attractive design and reliability. J. Quentin Bullock describes its operation and the repair of some faults that were present in one he obtained cheaply because of them.

Servicing JVC HRJ200 series VCRs

John Coombes provides a detailed fault-finding guide for these popular VCRs.

Yura Microsonic keyring radios

These little Soviet radios were imported in large quantities during the late Fifties. They use six germanium transistors and provide MW reception only. Pete Roberts describes the sorts of faults you can expect to find and ways of dealing with them.

Published on the third Wednesday of each month by Highbury Business, Media House, Azalea Drive, Swanley, Kent. BR8 8HU. **Highbury Business** is a division of **Highbury House Communications PLC**. **Filmsetting** by Impress, Unit 2. Parkway. Southgate Way. Orton Southgate, Peterborough PE2 6YN. **Printed** in England by Polestar (Colchester) Ltd., Newcomen Way, Severalls Industrial Park, Colchester, Essex CO4 4TG. **Distributed** by Seymour Distribution Ltd, 86 Newman St, London, W1T 3EX. **Sole Agents** for Australia and New Zealand, Gordon and Gotch (Asia) Ltd.; South Africa, Central News Agency Ltd.

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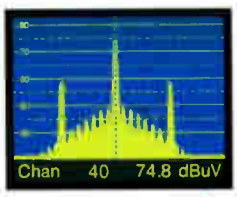

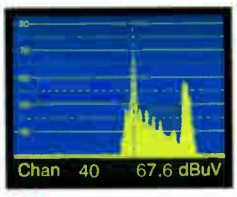

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