



# TELEVISION

## & consumer electronics

Mar 2008

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Price: £4.10

## ***Future implications of GPS***

***The digital switchover***

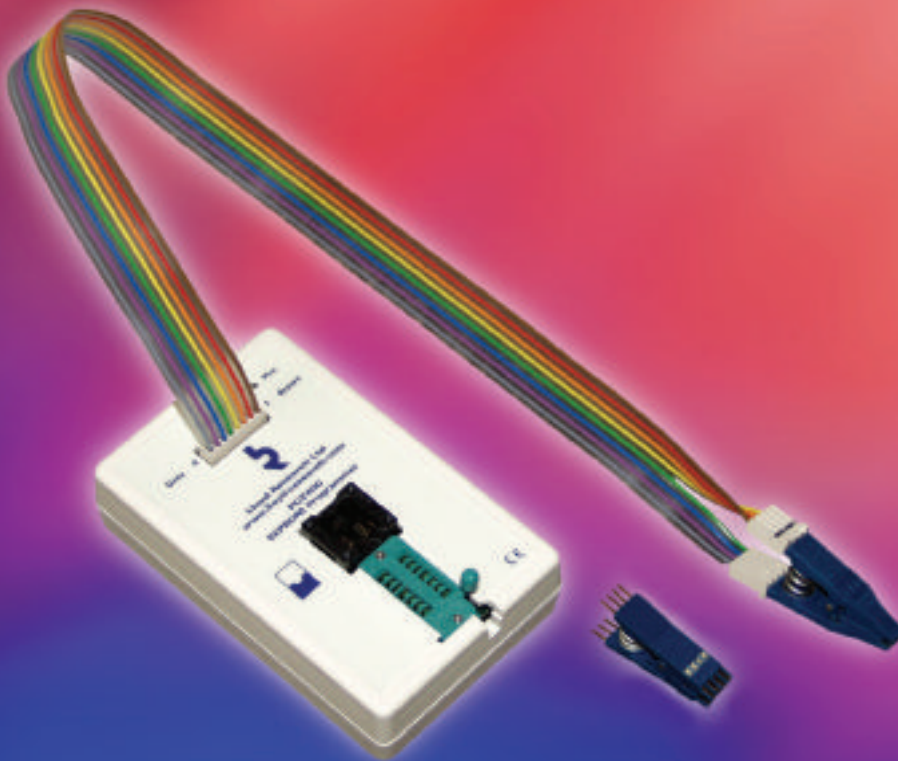
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***Much more inside...***

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# PC2400 I<sup>2</sup>C FIELD SERVICE PROGRAMMER



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Extensive protection against wrong connection

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The device type can be automatically indicated from the data file

Easy-to-use file viewer with edit facility



## SPECIFICATIONS

### PHYSICAL

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Weight: 125g

### ACCESSORIES

USB lead

In-circuit programming lead

8-pin DIL clip

8-pin SO clip

CD-ROM

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Please note that we are unable to answer technical queries over the telephone and cannot provide information on spares other than that given in our spares guide.

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Winners of The Queen's Award For International Trade 2007, Horizon Global Electronics is a UK Company established in 2001 specialising in the design and manufacture of hand held test equipment for the digital satellite and TV sector. Our strength lies in being able to find innovative solutions to leading technology issues.



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## SUBSCRIPTIONS

*Television* magazine is not available in the newsagents.

All subscription enquiries should be addressed to Subscriptions Dept, Ashurst, Ham Manor Way, Angmering, West Sussex, BN16 4JQ.

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**W**elcome to the third issue of the newly re-launched Television magazine. Once again there are plenty of great interesting articles within for your enjoyment.

We have an excellent restoration article on the Sansui AU717. Donald Bullock is back with “What a life” in which he looks a little closer at the life of Roy Wallace the stereo pioneer. As always, fault reports are a big part of the magazine with plenty of faults across the whole spectrum of brown goods products. You may recall that the last issue had an article called “an introduction to GPS. This issue includes part two of that series entitled “the implications of GPS.

Peter Dolman’s feature this month has been written as a result of my February comment where I talked about the “throw away era”. He looks at the subject of disposability, how it affects us, your customers and of course our planet.

Mike Leach continues his feature on Reality TV, manufacturers and their service departments come under close scrutiny and they don’t come out smelling of roses!!

We had a lot of positive feedback from readers about LeJeune’s article in the first issue which looked at the introduction to digital transmission technologies. I hope you enjoy part two.

There are plenty of other articles for you to read and enjoy.

Please continue to let me know what you like and dislike about the magazine. I will endeavour to answer all of your emails and, of course, listen to your comments.

Tony Greville

Publisher



# Ofcom gives HD DTT red light

Media regulator Ofcom has confirmed that it will not reserve spectrum currently being used for analogue terrestrial television for the broadcasting of high-definition digital-terrestrial services after digital switchover is complete in 2012.

Spectrum that becomes free

will initially be 112MHz, consisting of channels 31-35, 37, 39, 40 and 63-68, plus other frequencies to be made available later. This will be auctioned off producing a "digital dividend" of between £5 billion and £10bn in terms of economic benefits over 20 years.

The auction will take place

next year. It is being advertised as suitable for wireless broadband, mobile TV, local TV, digital terrestrial TV, wireless microphones, and low power applications based on wi-fi.

Ed Richards, Ofcom's chief executive, said, "The digital dividend will be one of the most significant and valuable

spectrum releases in the UK for 20 years.

"Our approach is designed to maximise these considerable benefits for UK citizens and consumers as a whole.

"We can expect the benefits of the digital dividend to include more choice, fresh competition and technological innovation."

## LOEWE'S NEW 'JACK OF ALL TRADES'

'Connect' is a new range of multimedia high-definition televisions from Loewe that allow people to view more than just TV, by linking to various mobile devices such as digital cameras and music players.

One push on the remote takes viewers from the show they are watching to an easy-to-use interface, which provides instant access to their MP3, film and photo files.

Uploading files to the TV is also simple by using the USB port or transferring them directly from the home PC network with a standard Ethernet cable.

And, if users find themselves engrossed in their photos or music while their favourite programme is on, they can record it and play it back at a later date.

An integrated hard disk recorder lets them record, play and pause live TV simply by choosing the DR+ option.

It features stylish, convex-shaped side panels and is available in three finishes – high gloss black or white and matt chrome silver. There are also three sizes to choose from – 32, 37 and 42in – with the 37in model expected to retail for around £1949.

A selection of stand options, including floor and table mounts, is also available.



One member of Loewe's new range is the 94cm HD+ Connect 37. It provides direct access to all multimedia on the home network, including PhotoViewer and MusicBox, via USB.



## Sony first with OLED TVs

Sony is the first set maker to introduce a TV set that uses an organic light-emitting diode, or OLED, display.

The company has been working on OLED technology since the early 1990s. It launched the set, which has an 11in screen, in Japan in early December, at a yen price equivalent of about £850. Production will initially be some 2000 sets a month.

One advantage of an OLED display is its low energy consumption. An LCD screen acts as a colour filter with a backlight while plasma displays

rely on gas discharges. The OLED though is electroluminescent.

Sony's OLED screen is 3mm thick. Other firms that have been working on OLED displays include Toshiba, Matsushita, Sanyo and Eastman Kodak.

The small-screen TVs are expected to be used mainly as secondary sets in a kitchen, study or bedroom. At the present stage of development, large-screen OLED displays would be uneconomical, with the price of LCD and plasma TV sets still falling at 25-30 per cent a year.



XEL-1

Organic LED TVs boast a contrast ratio of better than a million to one. Being based on electroluminescence allows them to be very thin as they need no backlighting. This also makes them energy efficient.

## Free advice to aid the digital switchover

Impartial information for consumers about easy-to-use TV equipment received a boost today. BERR – the Department for Business, Enterprise and Regulatory Reform – has awarded a contract for consumer testing of digital television equipment to Ricability, working with Intertek. The contract will enable Ricability to continue to provide reports on the key features and comparative merits of domestic digital receiving equipment in the UK market.

Consumers thinking of buying equipment to see them through digital switchover will continue to have an independent and impartial source of advice on how well different equipment works. There are reports on over 100 products, including digital televisions, indoor aerials, set-top boxes and digital TV recorders. These are available free of charge at [www.ricability-digitaltv.org.uk/](http://www.ricability-digitaltv.org.uk/)

Lindsey Etchell, the project's Principal Researcher at Ricability, said, "UK consumers can get the results of thorough, independent tests on a large range of digital TV products, absolutely free. Our reports make choosing equipment for digital TV easy and save consumers money."

# Environmental concern?

How important are environmental concerns to consumers of domestic electrical and electronic equipment?

Most of those who take them into account when making purchases seem to feel that they are not being given sufficient emphasis by manufacturers in their promotional material. At any rate, eighty per cent of those who responded to a survey carried out by Populus

for *The Times* make this claim.

Their main concerns are recycling at the end of a product's life, which is now catered for by the EU's WEEE directive, and minimal power consumption. According to an Energy Saving Trust estimation, eight per cent of domestic electricity consumption is accounted for by equipment operating in the standby mode. The government has proposed a ban on standby facilities in

new equipment.

Consumers who responded to the Populus survey claim that manufacturers give them insufficient information on these points. Brands that came out well in the survey included Sony, Panasonic and Philips.

It seems that investment spent on creating an established brand image helps to persuade customers about a manufacturer's environmental concern.

## Miniature projector

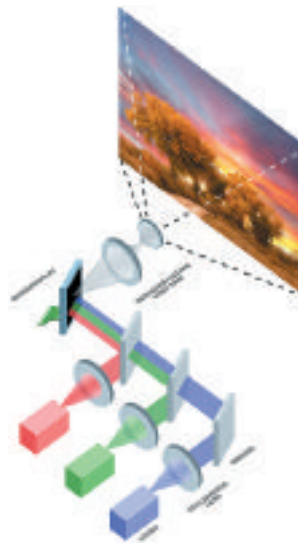
Cambridge firm Light Blue Optics is working on the development of a miniature, laser-based projector that could be incorporated in a mobile phone. For this application the projector would be especially useful for internet TV reception: the display could be projected on to a wall or table top.

Other applications for the technology include head-up displays in cars, where dashboard information is projected on to the windscreen,

and aircraft cockpit displays.

Prototype projector units are currently the size of a cigarette packet. Light Blue Optics aims to reduce this to the size of a sugar cube. The company has recently secured over \$25m funding for the development, and sees a market of over \$5bn by 2012.

*Involving a miniature, laser-based projector, Light Blue Optics' technology may one day allow us to watch big TV pictures using our mobile phone.*



## PVRs are set to include Freeview Playback features

Humax has released an update for its PVR-9200T personal video recorders. This update will enable new Freeview Playback features such as series link recording.

Version 1.00.21 brings the device up to Freeview Playback Group 2 standard, offering three key features: series link, whereby it will record every episode of a series when selected; split recording, allowing users to link programmes recorded in two parts, such as where a film is

interrupted for a news bulletin; and alternate instance recording, where users are alerted to other showings of programmes in the event of a recording clash.

Also offered are several bug fixes and performance enhancements to Freeview Playback Group 1 functionality.

The electronic programme guide populates and is available for use during recorded programme playback, and a bug with consecutive recordings

while using the ChasePlay feature has been resolved.

The update is available now on digital terrestrial multiplex 1, and will be downloaded to compatible boxes (PVR-9200T, PVR-9200T/B, PVR-9200TBX and PVR-9200T/S) in standby mode overnight.

It is also available by manually initiating an update or downloading it and uploading it to the box via a null modem/serial cable.



*The 'electronic-programming guide' in Sky HD boxes is set to receive a significant overhaul during 2008.*

## Sky to unveil new HD 'electronic programming guide'

SKY has confirmed that its high-definition boxes will get a new version of electronic programme guide software this year.

Details of the new guide software first emerged in November. At that time, it was understood that newer Sky+ and Sky HD boxes would be upgraded.

Now Sky has confirmed that only HD boxes will receive the upgrade.

The current four top-level options – namely TV Guide, Box Office, Services and Interactive – are to be replaced with 10 options, in which television, radio and interactive services will be listed separately.

Other alterations, including a 1/8th size mini-TV display showing video from channels as they are selected in the TV Guide, are also planned.

Sky has told broadcasters that it, "expects to introduce a new version of its EPG software for HD set top boxes at some time during 2008".

The broadcaster added, "The new version of the EPG software will have separate menus for television channels (the TV Guide menu), radio stations (the Radio menu) and interactive services (the Interactive menu)."



The TDS850NV is a twin tuner HD PVR, which combines H.264 compression with DVB-S2 demodulation and comes with NDS middleware and content security.

## Viasat chooses Pace for Nordic HD PVR service

Yorkshire-based consumer electronics company Pace has been selected by Modern Times Group's Viasat Broadcasting to be the launch partner for its high definition PVR service. Viasat is the leading digital satellite payTV broadcaster in Scandinavia and the Baltic states.

Viasat will be deploying the Pace TDS850NV high-definition personal video recorder, or HD PVR, to households across the Nordic countries. The TDS850NV is a twin tuner HD PVR, which combines H.264 compression with DVB-S2 demodulation and comes with NDS

middleware and content security.

"Launching HD in the Nordic countries is an important part of our strategy as the premium payTV operator in this region," said Bartek Gudowski, Chief Executive Officer, Viasat Satellite Services. "It was

important that we chose a supplier we could rely on to deliver the product on time and to the required quality. With Pace's proven developments in HD deployments, as well as their long relationship with Viasat as a trusted and key supplier they were the natural choice."

## Sky to increase shopping centre kiosks

Satellite broadcaster Sky is to expand its network of retail kiosks in shopping centres across the country.

A new deal between the broadcaster and one of the UK's largest shopping centre owners, Land Securities, will enable Sky to expand its current portfolio of 170 kiosks to 250 during 2008.

William Mellis, Sky's director of customer acquisition, said, "Retail stores are an increasingly important part of our marketing capability, delivering an engaging experience for consumers who value face-to-face contact.

"Their success is demonstrated not only by the number but by the quality of



A new deal between the Sky and one of the UK's largest shopping centre owners, Land Securities, will mean 80 more Sky shopping-centre kiosks during 2008.

customers joining Sky in this way.

"With services such as Sky+ and Sky HD changing the way people watch TV, the opportunity to demonstrate our products to millions of consumers each week is a huge asset."

## Matsushita to be renamed Panasonic

### Panasonic

The Japanese parent of Panasonic UK, the Matsushita Electric Industrial Company, is to change its name to Panasonic Corporation.

And it is not only the Matsushita name that is being dropped. The company said it would also stop using its local brand, National, for such products as rice cookers, washing machines and refrigerators by March 31, 2010.

The change of company name is not the only big redirection to sweep through Panasonic. The company is also drawing up plans to start selling Panasonic-branded white goods – refrigerators and washing machines – to Europe, including the UK.

At Panasonic UK, a spokeswoman told *Television Magazine*, "We are currently finalising our 2008 planning and how we will approach 2009 is under review.

"The expansion of home appliances in the UK in 2009/2010 is currently being studied, so we cannot confirm anything at the moment."

It is 90 or so years since the Osaka-based company was founded by Konosuke Matsushita, and the name change underlines the importance, said the company, that brand power plays in a world where competition is intensifying.

The change, still to be approved by shareholders at a meeting in June, will come into effect on 1 October.

It will affect all Matsushita companies around the world, so that those that still carry Matsushita or National in their names will drop them in favour of Panasonic.

"Together with the brand unification in Japan, the company will lead all its resources and activities to enhancing the value of the Panasonic brand," said a company statement.



# Standby: Intellect sets the record straight

Recent flack targeted at the energy-inefficiency of standby buttons took little account of the fact that makers had been working for 10 years or so to make them more efficient.

The result has been a 60% improvement in standby energy consumption – a point ignored by the critics but brought up by Laurence Harrison, director of consumer electronics at makers' association Intellect.

To put politicians, civil servants and the media straight about the role of technology in tackling climate change, Intellect has published a major report on the role of technology in tackling one of the big issues of our time.

Intellect director-general John Higgins said, "The questions we are constantly asked by media, government and consumers focus on the energy efficiency of our products. What receive less attention are the beneficial environmental effects of technology across the whole economy, which are reducing energy consumption and emissions whilst improving productivity and competitiveness: a positive contribution that is too often forgotten or simply taken for granted."

In its report "High Tech: Low Carbon – the role of technology in tackling climate change", Intellect acknowledged recent critical reports.

Last spring, Gartner estimate that the information and

communications technologies (ICT) sector was responsible for around two per cent of global CO<sub>2</sub> emissions – about the same as the airline industry.

On top of this an Energy Saving Trust report predicted by 2020 that 45% of domestic electricity would be consumed by ICT and consumer electronics products in what it described as a new ICE age.

However, the Intellect report pointed out, "We are in a unique position, whilst on the one hand our products consume energy, on the other hand we provide technologies that help other sectors become more efficient."

The report is focused on energy efficiency, said Intellect, because energy efficiency is at the heart of the three biggest environmental problems that the world now faces – climate change, resource degradation and pollution.



*What critics of electronic goods' 'standby mode' fail to take into account is that standby energy consumption has dropped dramatically over the past decade due to the efforts of manufacturers.*

# Producer liability back on EC agenda

Manufacturers could be directly responsible for products that go wrong in their guarantee period, according to new proposals.

The European Commission will shortly revisit the case for introducing direct producers' liability, after shelving such plans in 1999.

At that time, proposals for direct producers' liability were

contained within Directive 1999/44/EC, which looked into certain aspects of the sale of consumer goods and associated guarantees.

The Commission found, "There is not enough evidence to determine whether the lack of European Union rules on direct producers' liability has a negative effect on consumer confidence.

"For this reason, the Commission has decided not to submit any proposal and to explore the issue further."

Well, that time has apparently come.

A spokesman for the Department for Business, Enterprise and Regulatory Reform (DBERR) said that direct producers' liability is an idea "that the European Commission has floated around".

The spokesman said: "This is very preliminary.

"The European Commission is rewriting consumer law and this is an idea that it has put forward, but it is very early stages."

As current UK law stands, when consumers buy goods from a retailer, whether on the high street or online, they enter into a contract with that

retailer. This contract is controlled by many laws including, the Sale of Goods Act 1979 (as amended by the Sale & Supply of Goods Act 1994 and the Sale and Supply of Goods to Consumers Regulations 2002).

The law gives consumers certain implied, or automatic, statutory rights, under this contract.

One manufacturer said, "On the face of it, direct producers' liability seems like yet another piece of ill thought out European nonsense.

"We seem to have had a perfectly good system operating for many years, but as usual these interfering idiots have to create new legislation to keep themselves, and their friends in the legal profession, in jobs for the next few years."



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# Restoring Sansui's AU-717

*This once highly popular 85 watt integrated amplifier, produced between 1977 and 1979, can still give excellent results - with a little care and attention. Phillip Rosbottom explains*

**S**ansui's AU-717, which was produced in about 1977, is just one of a series of audio amplifiers. Many of these are still in use.

The amp uses 4 smoothing capacitors rated at 15 000µF 63V. These are prone to leaking, and should be replaced if you have one of these amplifiers in for repair. Unfortunately, these cost around £16 each from RS or Farnell but as the ones available now have far better electrical characteristics it is a worthwhile expense.

If cost is a factor then smaller ones, for example 10 000µF could be used. These will be far smaller in diameter – 35mm as opposed to 40mm of the originals. They are also shorter, at 50mm length as opposed to about 80mm for the originals. Sonically there will be no significant difference.

## Glue hardening

Another common problem in amplifiers of this type – not just those from Sansui – arises the glue used to fix larger PCB-mounted capacitors.

This glue hardens and carbonises with age and heat. It tends to spread over the adjacent PCB components. When it does, it conducts electricity

from one component to another, upsetting the voltage conditions.

The main example of this in the 717 is on the PSU board. This PSU is the vertical board between the transformers and capacitors. It holds four 220µV, 63V capacitors and several 100µF, 63V types, around which this glue will have been spread.

The capacitors should be removed and the glue cleaned off. There are several ways to do this. If the glue has hardened enough, then it will easily fall off with little persuasion. If not, then a plastic scraper can be used.

Glue also spreads under resistors and other components. It may have corroded the leads if the conditions are right. In this case, the capacitors should be replaced as a matter of course. The 100µF, 35V types at the top of the PCB should be replaced at the same time,

This board is also good at producing dry joints on all the connections so a blanket resolder may be a good idea.

## Power amplifier boards

On to the power amp boards. These also have the glue around the two larger capacitors which should be removed. I've found several of the

capacitors across the zener diodes open circuit. It is best to replace these as well as the 100µF, 35V capacitors.

The screws holding the driver transistors work loose so check them for tightness

On the power-amplifier PCB there are two 150Ω fuseable resistors. These can change value, going high resistance and removing the bias from the output section and making the sound 'weak', 'thin' and distorted.

## Pre-amplifier section

Pre-amplifier sections are much less troublesome. There are some 82Ω resistors that can change value. These are used as emitter resistors in the phono stage. This is the right-hand vertical board.

On the pre-output section on the PCB, behind the lever switches, a general resolder is usually needed here too.

Finally, on the rear panel, the 'Separate/Connected' slide switch on the rear panel can result in loss of either or both channels. This is usually because it has sat there for 30 years doing nothing and got bored.

*Photos courtesy Vintage Audio .Com .Au, Marrickville, Sydney Australia, <http://www.vintageaudio.com.au>*

# Test case 532

*Cathode Ray is the most versatile man in the Test Case workshop. Up the ladder in the cold fixing dishes, repairing washing machines in the workshop and in the field, servicing TV sets at the bench - he's an asset indeed to the firm! When not otherwise engaged he may be found on the road with Todd doing installations, collections and deliveries. Very often these days the installation jobs involve big flat-screen TVs, which need setting up on site, and thereby hangs a tale or two....*

**T**he first delivery of the day involved a 42" LCD screen.

From the lads' point of view one advantage of LCD over plasma is that it doesn't have to be kept vertical all the time. A Schneider 28" CRT TV in the customer's living room was taken to the dining room where it displaced a 22" set, an Expert model 2261 in fact, perhaps 30 years old, and still working well! We had to take it back for WEEE disposal. Now the big cardboard box could be unpacked and the new set put into initial search mode. It found all five analogue channels and lots of digital ones, so they moved on to satellite reception. The Sky box was a standard-definition type, so there was no question of an HDMI hook-up here. They programmed the box for the best available video coupling system, RGB, and connected it to the new set via a Scart lead. Now to program the Sky remote control to operate the TV. The customer had lost his Sky instruction book, so Todd phoned the shop for the four-



digit code appropriate to the new TV. Very soon the Sky handset was operating that as well as the set-top box, but what was this? Every time they switched on the latter, or selected the TV guide feature the new TV screen would revert to terrestrial Channel 6! What ailed? Ray had to make a return visit to solve this one, putting an irrelevant TV code into the Sky handset meanwhile to release the new TV from its influence.

Not a good start, was it?

Cathode Ray and Todd pressed on to the next port of call, a few miles out of town, where there was another LCD TV to install, this time a 32" LCD type. Here there was no Sky box, so no risk of another embarrassing cock-up – or was there? The autoscans of the UHF band brought up a wide selection of Freeview channels, and as they completed the paperwork on the coffee table the set was displaying the ITV1 programme. The picture started to break up, with squares, streaks and blocks of

bizarre colours and patterns flashing at random over the picture!

Dismayed, they flicked through all the available terrestrial digital channels, and found more or less the same image disturbances on ITV2, ITV3, Channel 4 and Channel 5, also More 4. The BBC channels were fine and solid, as were the Sky programmes and others. Switching back to analogue operation, all five available channels appeared to be fine, with little noise and no ghosting or other nasties. Wondering if this was some temporary problem, our men carried out another (straightforward!) delivery and then returned. The situation was the same, but the customer reported momentarily losing two of the troublesome channels in the interim! How was this horror resolved?

The solutions are on page 25.



# Fault finding reports

*Save time and money by benefiting from the experience of some of the repair business's most respected voices*

For convenience, each report is categorised by its relevance to a particular appliance, e.g. TV, satellite, etc. In each appliance section, reports are grouped according to their author, whose name and details appear at the end of their respective report group. First off, Eugene Trundle...

## TV FAULT FINDING

### Daewoo T204

The problem with this set – a rental one – was intermittent failure to come on, or cutting out in mid-flight, as it were.

Nothing happened on three days' running, so we took the back cover off and scrutinised the printed circuit board.

We came up with suspect dry joints at resistor R<sub>802</sub> in the power-supply primary circuit. There were also 'rings' around three of the soldered legs of the chopper transformer secondary windings.

Since we re-flowed all of these, we've heard nothing more...

### Bush WS6680SL

On this set, the picture was very impure: the centre of the image was pinkish while the colours near the edge of the screen looked reasonably correct.

A finger held on the degaussing posistor showed that it was warm. A continuity test indicated that the degaussing coils were intact though.

In fact the degauss 'posistor' was faulty, as we found when we cracked it open. The 'heater' disc was OK, but all the metal on the outer face of the 'feed' disc was burnt off.

A replacement posistor restored a healthy buzz at switch-on and a properly-coloured picture.

### Akura AV28W-S - 11AK37-11 chassis

Here, the only sign of life was a pulsing of the standby light. There was no response to the remote control.

An oscilloscope test showed that the power supply section was pumping at about 50Hz, and the HT line – which should be 145V – pulsing to about 20V on each cycle.

The line-output transistor was intact, but we found that D<sub>805</sub>, a 12V rectifier off the chopper transformer, was short-circuit. Its type number is FR103, but the set ran happily with a BYV27-200 in its place.

### Sony KV-X2552U - AE-1C chassis

A golden oldie indeed, this one, in for repair due to a frame collapse. Initially suspecting the field-scan chip or its jointing, we found that both were OK, and that the whole shebang was at zero voltage.

This problem was traced to an open-circuit fusible 0.47Ω resistor, R<sub>802</sub>, off the LOPT. It had probably died of old age because a replacement ran cool while providing good field scan.

We weren't out of the woods yet with this one, though. The sides of the picture were bowed in due to lack of pincushion correction. Geometry controls for E-W correction on the J<sub>1</sub> (rear) PC board had no effect.

The TEA2031A E-W correction IC was running too hot to touch and its top surface was cracked. Replacing this little eight-legged chip put all to rights except the picture hue. This was brought to best-possible by tweaking the G and B drive controls on the CRT base panel.

### Bush 6690D - AK19 chassis

When this set got warm – typically after a couple of hours' running – the picture would flick to and from a narrow horizontal scan with pincushion distortion at both sides. This was due to a dry soldered joint at one leg of coil L<sub>601</sub>.

### Toshiba 40WH08B

Failure of the large heat-sinked convergence drive chips is now a common cause of chronic colour misregistration and raster distortion in these rear projection sets. Their failure can also, if it overloads power supply lines, prevent the set from working at all. This is easy to prove by pulling off power-supply plugs.

The dynamic convergence correction menu can be hard to find if you don't know where to look. Press the menu key on the user's remote control and highlight features. Now scroll down, off the bottom of the screen so to speak, until you get to 'convergence', then press enter. You get a self-generated

crosshatch pattern whose centre registration can be achieved with the up/down/left/right keys.

The screen areas are numbered; keying in the corresponding number enables you to overlay the colours there with the same four keys. It's quite intuitive.

To lock the settings into memory, press the exit key. All this needs to be done with the set warmed up and exactly in the position in which it will be used.

## Matsui 25N10

The complaint with this set was that the picture 'faded away'. Convinced that its CRT heaters were starting to fail, we ran it long enough to see that the picture darkened almost to vanishing point – while the tube heaters glowed perfectly normally!

Meter testing indicated that the picture tube's  $A_1$  voltage dropped back to about 300V – even with the  $A_1$  control on the LOPT turned fully up. With the lead to the CRT base panel disconnected, however, the available voltage tripled.

The same happened when  $A_1$  decoupling capacitor  $C_{206}$  was disconnected; this was a 22nF, 2kV disc-ceramic type.

Ohmmeter tests on this component revealed no leakage, but when an AVO 8 was set to read direct current flowing through it to ground we registered 50 $\mu$ A, corresponding at 300V to a resistance of 6M $\Omega$ . This is not a lot of leakage, but enough to be significant with such a high source impedance in the transformer.

A new capacitor enabled the setting to be properly made, with the  $A_1$  potential sitting at about 450V. This is an unusual fault these days – especially in a capacitor that's not stressed by pulse voltages.

## Toshiba 259D9BZ

We had another big TV with the 'no-go' symptom. This time though, we could hear a slight snick, as the

mains switch closed, and the degauss thermistor was warm to the touch.

Although the inductors in the power supply were quiet, an oscilloscope test showed that the PSU was oscillating. Soon it became clear that line-scanning transistor  $Q_{404}$  was short-circuit, and that the 0.82 $\Omega$ , 2W resistor  $R_{444}$  was open-circuit.

These two were replaced, but before switching on a careful check was made on the PC board. This check revealed almost-invisible dry joints on the lead-out pins of the line-output transformer. Solder on these was re-flowed, along with that of the pins of the line-driver transformer – even though the it looked OK. It's unlikely that we'll have any more trouble there.

## Goodmans TVC14VP

Another no-go job, this one had wrecked its 2SD2499 line-output transistor. A replacement did not restore normality.

Testing with an ESR meter revealed no fewer than five bad capacitors in the non-isolated primary section of the power supply. Capacitors  $C_{811}$  and  $CF_{01}$  in particular gave very poor readings.

## Samsung CI-5373T - SCT13B chassis

Erratic sound level was the problem with this set. It would come on loud from cold, then the volume jumped to and fro between full and zero as the volume-down key was pressed.

Leakage in the control tact-switches was discounted because the on-screen sound level indicator went up to 208 – its normal maximum is 100. The culprit turned out to be the EEPROM chip, an eight-pin 24C04 type.

*Eugene Trundle*

## Toshiba 30WL46 (LCD)

**Fault:** No start-up.

**Possible solution:** If the set will not start-up, usually from cold only, then check for high ESR in 100 $\mu$ F

capacitors  $C_{460}$  and  $C_{461}$ . Alternatively, try replacing them.

## Matsui LM17N1 (LCD)

**Fault:** Blank Raster.

**Possible solution:** If, after switch on, there's a blank raster but operation via a scart lead is ok, a tuner/IF fault is likely. In this case we traced the fault to an open-circuit SMD coil  $L_{703}$ , which supplies 5V to the tuner unit.

## Bush 30TV005 (LCD)

**Fault:** Backlight intermittently fails.

**Possible solution:** This fault can be intermittent or on a more or less permanent scale depending on the dryness of the joint on resistor  $R_{47}$  on the power-supply PCB.

## Toshiba 32ZD09 (CRT) - COOS chassis

**Fault:** Dead.

**Possible solution:** Here, the set was dead but the LED was lit. After the normal checks and start-up circuitry all proved OK, we finally traced the fault to 330 $\mu$ F, 160V capacitor  $C_{884}$ . A replacement returned normal operation.

## Toshiba 32ZP38B (CRT)

**Fault:** Vertical lines on screen.

**Possible solution:** If there is intermittent colour with vertical lines appearing, usually after the set as been on a long time, this is probably due to a faulty HX01 scan-converter module.

## Toshiba 43VJ33 (Projection)

**Fault:** No sound or picture.

**Possible solution:** Here there was loss of sound and picture but the red LED was lit. A quick check revealed the LT lines in the power supply were correct and the CRT heaters were lit. This is a strange fault with the microprocessor having been shut down due to dry-joints on the Text PCB. This can be traced to the text memory chip  $QT_{09}$ . Be sure to resolder all the pins carefully to restore normal operation.

## Sony KV28LS35 CRT - FE2 chassis

**Fault:** Dead.

**Possible solution:** In this case, if the set is dead and the LED is not lit, with a loss of click from the relay, the fault may be traced to a TOP209P chip, namely IC<sub>609</sub> and 4.7Ω resistor R<sub>627</sub> in the standby circuitry in the power supply.

## Sanyo 32WN4 - EB6 chassis

**Fault:** Dead.

**Possible solution:** This fault is usually in the power supply. Check TDA4505 chip IC<sub>801</sub>, pin 3. If there is no voltage, check 750kΩ resistor R<sub>805</sub> for open circuit. If the voltage proves to be correct on pin 3, check voltage on pin 2. If this is missing, check 470kΩ resistor R<sub>806</sub> for open circuit.

## Goodmans LD2001 (LCD)

**Fault:** Set dead.

**Possible solution:** This fault initially looked easy, with possibly just a wickman fuse open circuit due to the FET transistor having gone short circuit. It wasn't. Neither the red nor the green LED were lit. We finally traced the problem to a faulty 1200P60 chip, IC<sub>900</sub>. A replacement restored normal operation.

## Goodmans LD2002 (LCD) - Vestel 17MB18 chassis

**Fault:** Intermittent picture or none at all.

**Possible solution:** If there is a loss of picture, or it comes and goes intermittently with a ticking noise and the LED flashing red to green, then check for dry-joints on R<sub>72</sub> and diode D<sub>55</sub>. If this fails to cure the problem then check the print side of the PCB and remove any glue or sticky material around components R<sub>72</sub>, D<sub>55</sub>, R<sub>27</sub> and R<sub>30</sub>.

**Fault:** No start-up.

**Possible solution:** If, when switched

on, the set fails to start-up but the 12V start-up voltage is correct, check 200kΩ resistor R<sub>930</sub> for open circuit or an increase in value.

## Philips 42PD9944 (Plasma) - FM24 chassis

**Fault:** Trips. The set trips and the LED goes green along with a bright flash on the screen then finishing up with the red LED flashing continuously.

**Possible solution:** This may be traced to an open-circuit SMD capacitor C<sub>49</sub>. This is a 10μF, 16V type mounted the PDP board.

**Fault:** Dead.

**Possible solution:** If the set is dead and the relay keeps tripping, check capacitors C<sub>2133</sub> (22μF, 25V), C<sub>2210</sub> (47μF, 25V) and C<sub>2508</sub> (4.7μF, 50V) for high ESR. They are all to be found in the power supply.

## Philips 42PD9944 Plasma - FM24 chassis

**Fault:** No start-up from cold.

**Possible solution:** If the set will just not start-up from cold and the relay starts to chatter, check 100μF, 25V capacitor C<sub>2540</sub> for a high ESR. This component can be found in the power supply.

## Philips FTR9965 (Plasma box) - F22RE chassis

**Fault:** No start-up/LED flashing.

**Possible solution:** This unit is a box used with Plasma sets containing tuner and control functions. If there is no start-up and the LED flashes red to orange and then to green back to red, this due to faulty 220μF, 25V capacitor C<sub>2011</sub> having a high ESR. Replacement restores normal operation.

## Philips 32PF7520 LCD - LC4.3E chassis

**Fault:** Dead

**Possible solution:** If the set is dead

but the power supply output is OK, check the 3.3V line on the start-up circuitry. If it's missing, check the SMD coil L<sub>5204</sub> for open circuit. If still in trouble then check the FET, T<sub>102</sub>, and 1Ω, 0.5W resistor R<sub>100</sub>. Replacement is advisable as a faulty reading may not be obvious.

## JVC LT-32DX7 (LCD) - FL3 chassis

**Fault:** Dead.

**Possible solution:** If the set is completely dead with the mains fuse blown, check the 1000pF, 50V power-supply capacitor C<sub>9001</sub> for short circuit. If this proves to be negative then check diode D<sub>9001</sub> – an EC30HA03L-X – for short circuit. Replacing these components should restore all functions.

## Sony KV28LS35 (CRT) - FE2 chassis

**Fault:** Poor east/west operation.

**Possible solution:** This fault is more likely to occur after the line-output transformer has been replaced, after which 2.7kΩ SMD resistor R<sub>518</sub> may go open circuit. It is positioned at pin 11 of the transformer on the corner of the main PCB.

## Philips 30PF9946 (LCD) - LC4.6E chassis

**Fault:** No picture.

**Possible solution:** If there is no picture but the screen lights up for a split second and then disappears, but the audio still remains on and the LED stays green, check the inverter PCB. First, resolder all eight transformers and check the plug/sockets to the backlights.

If the fault persists, check transformer T<sub>107</sub>. It may be open circuit between pins 5 and 8. Unfortunately a replacement from Philips is not available so the inverter complete PCB has to be replaced. But the cost of the replacement is a reasonable.

**John Coombes**

## Samsung WS32Z306

**Fault:** Excessive width.

**Possible solution:** This fault was traced to 120nF, 400V capacitor C<sub>425</sub>. It was open circuit.

## JVC AV-32T77SK

**Fault:** The set would work fine until the 4.3 aspect ratio was selected. It would then cut out.

**Possible solution:** Replacing 2.3nF, 1.5kV capacitor C<sub>521</sub> cured this fault.

## Vestel AK37 chassis

**Fault:** Stuck in stand-by, stand-by LED flickering.

**Possible solution:** This fault is becoming quite common on this chassis due to capacitor C<sub>822</sub> across the HT rectifier diode burning out. It is a small 1kV, 220pF component.

## LG DI-28Z12

**Fault:** This was an intermittent fault. A large black box would appear in the middle of the screen.

**Possible solution:** This was cured by replacing the megatext IC holder. This fault is becoming quite regular on these sets.

## Panasonic TX26LXD60 (LCD)

**Fault:** Buzzing noise heard from the rear of the receiver.

**Possible solution:** Panasonic has produced a modification kit that cures this, part No TZS9EK062.

## LG RZ37LZ55 (LCD)

**Fault:** Power supply failure.

**Possible solution:** We have had many of these sets with blown up power supplies. LG has produced a repair kit for this problem. It consists of IC<sub>904</sub>, ZD<sub>911</sub>, R<sub>920</sub>, F<sub>901</sub>, C<sub>920</sub>, C<sub>921</sub>, & C<sub>924</sub>. It is also worth checking 22Ω resistor R<sub>925</sub>. The part number for this kit is EAY33043001.

## Samsung WS32Z306V

**Fault:** Set completely dead due to sorted line output transistor. After fitting a replacement FLJ6920 and

checking HT voltage, set still failed on switch on. This fault was traced to 150nF, 400V capacitor C<sub>425</sub>. We have had this fault a few times now.

## Philips 32PW6720D

**Fault:** Set worked on analogue reception. Digital reception resulted in good picture but no sound.

**Possible solution:** This fault was traced to an open-circuit 10Ω smd safety resistor, circuit ref. 3528, part No 5322-117-1726. This component is in the digital module.

## Vestel AK49 chassis

**Fault:** Gradual loss of picture after 2-4 hours. Text and graphics remained OK. Increasing the A1 voltage produced a blank raster.

**Possible solution:** The fault was traced to a faulty D<sub>115</sub>. It is in the beam current-limiter circuit.

**Malcolm Scott**

## Goodmans K2105 21in TV, 11AK30 chassis

**Fault:** Failure of Q<sub>603</sub> BU808DFI. Replacement ran very hot.

**Possible solution:** Try changing 3.3μF, 160V capacitor C<sub>628</sub> and 10μF capacitor C<sub>613</sub>.

## Pacific PTV-55-200 (Philips CTU-AB)

**Fault:** Dead set.

**Possible solution:** Failure of bridge rectifier D<sub>6502-5</sub>. Replace 1nF, 1kV capacitor C<sub>2510</sub>.

## Cello DTA1490 TV/video combo

**Fault:** Dead set.

**Possible solution:** Failure of 2SD2499 transistor U<sub>401</sub> and/or dry joint on L<sub>403</sub>

## Grundig WF70-3020

**Fault:** Bottom frame fold-over.

**Possible solution:** Suspected frame chip STV9306 IC<sub>401</sub>. This was innocent. Fault was 10μF, 100V capacitor C<sub>407</sub>. Also, 10Ω resistor R<sub>465</sub> was high in value at 1kΩ.

## Sanyo 21MT2

**Fault:** Set was dead with a burning smell.

**Possible solution:** Fault was 470pF capacitor C<sub>631</sub>, which was leaky. It's in parallel with D<sub>631</sub>.

## Panasonic TX-28DK2, Euro 4 chassis

**Fault:** Dead set.

**Possible solution:** Failure of 2SC5517 transistor Q<sub>552</sub>. Check 47μF capacitor C<sub>509</sub> is low in value.

## Alba CTV4851, 11AK19 chassis

**Fault:** Dead set.

**Possible solution:** Checks revealed 10kΩ resistor R<sub>806</sub> was open circuit.

## Toshiba 28YT5, 11AK49 chassis

**Fault:** Frame collapse.

**Possible solution:** Frame feed missing due to D<sub>610</sub> being short circuit and 0.47Ω resistor R<sub>529</sub> being open circuit.

## Sony KD28DX40, FE2 chassis

**Fault:** No sound or picture but green led on front is lit.

**Possible solution:** Check whether 330kΩ resistor R<sub>610</sub> is open circuit.

## Daewoo DWF2881

**Fault:** Front led lights green, but set remains dead.

**Possible solution:** Check whether S7805PI chip IC<sub>1820</sub> is open circuit.

**Gary Laidler**

## DVD/VCR FAULT FINDING

### Panasonic DMRE55B (DVDR)

**Fault:** Self check runs continuously.

**Possible solution:** If the self check just keeps cycling, this is probably due to a faulty STRG6353 main voltage regulator, IC<sub>001</sub>. Check by replacement.

The regulator can also give many different fault symptoms like dead



unit after a few minutes operation, or the display flashing '00' for a few seconds before going dead.

## JVC HR-XVS20EK - (VCR/DVD COMBI)

**Fault:** No rewind or fast forward.

**Possible solution:** After checking the clutch assembly and drive mechanism all proved OK, so we looked deeper into the mechanism. There we found a small latch broken on the control bar. Fitting a new bar restored normal operation.

**John Coombes**

## Oritron DVD100 DVD player

**Fault:** Dead set.

**Possible solution:** Check 33µF, 400V capacitor C<sub>802</sub> and TOP223 transistor U<sub>801</sub>.

**Gary Laidler**

## AUDIO FAULT FINDING

### Peavey Blues Classic

The reported problem with this one was, 'Obvious noise at power up'.

When it had warmed up, it produced a violent hum. The hum

was unaffected by the master volume control. This indicated that the problem lay either in the power supply or in the output stages.

A quick oscilloscope check revealed that the HT supply rail to the output stage was clean, and free from any significant ripple.

The power-output stages employ four EL84 output pentodes in a parallel push-pull arrangement. This means that it will run quite happily if two of them are removed – albeit with a 3dB reduction in output power. It has to be one from each 'side' of the stage, of course.

So my first move was to go ahead and do this. It still hummed, so I removed the other two, and put the first pair back in. This time when the amplifier was powered, it was 'normally' quiet.

I then swapped the two valves that were out, back in, one at a time. One performed normally, the other produced the violent hum. This proved conclusively that it was a defect within the valve that was causing the problem.

In PA equipment, valve heaters are

invariably supplied by AC derived straight from a mains-transformer winding.

The only way that a valve can produce this sort of problem is if the heater supply is managing to modulate the DC current through the valve. This usually occurs as a result of a breakdown in the insulation between the heater and the cathode cylinder. This cylinder surrounds the heater very closely.

In fact, in the case of this particular valve, when the inside was examined closely through the glass with a powerful magnifying glass, the breakdown could actually be seen.

A thin metal 'strap' which should have joined the cathode to the base pin was fried and open circuit. This left the cathode's ground return via the short to the heater circuit, which had resulted in the fried strap.

It was this short that caused the valve's cathode voltage to be modulated by the alternating 6V heater voltage. This was then amplified and reproduced as the audible hum on the output.

**Geoff Derby**

## Fault index by model

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- JVC LT-32DX7 (LCD) -FL3 chassis
- LG DI-28Z12
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- Panasonic TX-28DK2, Euro 4 chassis
- Panasonic TX26LXD60 (LCD)
- Peavey Blues Classic
- Philips 30PF9946 (LCD) -LC4.6E chassis
- Philips 32PF7520 LCD -LC4.3E chassis
- Philips 32PW6720D
- Philips 42PD9944 (Plasma) -FM24 chassis
- Philips FTR9965 (Plasma box) -F22RE chassis
- Samsung CI-5373T -SCT13B chassis
- Samsung WS32Z306
- Samsung WS32Z306V
- Sanyo 21MT2
- Sanyo 32WN4 -EB6 chassis
- Sony KD28DX40, FE2 chassis
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- Sony KV28LS35 (CRT) -FE2 chassis
- Sony KV28LS35 CRT -FE2 chassis
- Toshiba 259D9BZ
- Toshiba 28YT5, 11AK49 chassis
- Toshiba 30WL46 (LCD)
- Toshiba 32ZD09 (CRT) -COOS chassis
- Toshiba 32ZP38B (CRT)
- Toshiba 40WH08B
- Toshiba 43VJ33 (Projection)
- Vestel AK37 chassis
- Vestel AK49 chassis

# Fault report extras!

*John Coombes with some last minute extra fault reports to help you save time and money!*

## TV FAULTS

### **Samsung model LW17M24CPX LCD**

**Fault:** No result. The LED flashes in synchronisation with a tripping noise from the set.

**Possible solution:** This is probably due to 1000µF, 25V capacitor C<sub>241</sub>. Check for high ESR reading or low capacitance.

### **Philips model 28PW6508/05 chassis L01.1E**

**Fault:** No sound or picture. In this case the set was dead. Before it failed completely though, according to the customer, the picture flickered and the width came from the side.

**Possible solution:** If the set is dead then check the BU4508DX line-output transistor (7460) which can short circuit.

The line-output transistor fails due to overheating. This is caused by drive being unstable due to faulty 47µF, 50V capacitor C<sub>2455</sub> exhibiting high ESR or, in most cases, being open circuit.

### **Panasonic model NV-VHD1B DVD/VCR Combi**

**Fault:** Dead.

**Possible solution:** If the unit under test is dead, this can be traced to zener diode D<sub>1180</sub> (MAZ751000C) being short circuited. Before turning the repaired set back on, also replace the PC123 shunt regulator Q<sub>1200C</sub>. This is usually short circuited between pins 1 and 2.

### **Philips model 15PF9936/12 chassis LC03**

**Fault:** No picture. When switched on the LED is green. Sometimes the sound is present but there is no picture due to loss of backlight.

**Possible solution:** Check the capacitors in the power supply C<sub>2920,2913,2910,2933</sub>. These are all 470µF, 25V. Also check 1000µF, 6.3V capacitor C<sub>2923</sub>. All of these may be exhibiting low capacitance. To ensure correct operation you should also check the capacitors on the Scaler circuit board. These are namely C<sub>2007-10,2015,2024,2026,2027</sub> and all are 470µF, 25/35V types.

### **Sanyo model CE28WN5 CRT chassis EB6-A28.**

**Fault:** Frame collapse.

**Possible solution:** The first check is ensure the LA7846N frame output chip IC<sub>501</sub> is not short circuit or dry-jointed. If this proves negative, check the LT input voltage on IC. This should be 15V. In our case it proved to be only 9V. This was due to the feed 3.3Ω resistor R<sub>515A</sub> which had increased to 88Ω.

### **Bush model WS6679SIL**

**Fault:** Dead.

**Possible solution:** If the set is dead but there is just a slight tripping noise, this may be accompanied by a light puff of smoke. This is due to 222nF, 2kV capacitor CD<sub>18</sub> having gone short circuit in the line stage.

### **JVC model AV-28GT1S/JF CRT chassis 11AK45B5**

**Fault:** LED switching red to green.

**Possible solution:** When there is no sound or picture and the LED is flashing red to green this due to a faulty 24LC16B eeprom IC<sub>502</sub>, with Part No VE-20120620.

### **Goodmans model GTV34T8 chassis BEK0127.**

**Fault:** Dead.

**Possible solution:** When switched on, if nothing happens, then check the line output for short circuits. If this is the case then usually the HT has gone high due to faulty 47µF capacitor C<sub>909</sub>. In our case however, the set was dead and failed to start-up but then main HT was present across the main electrolytic capacitor. The fault was finally traced to a 1N4148 surface-mount diode, D<sub>604</sub>, which had gone short circuit.

### **Philips model 37FD9944 Plasma chassis FM33.**

**Fault:** Rapid flashing of LED.

**Possible solution:** If after switch on the set goes immediately into protection mode with the LED flashing, it is necessary to check all the vertical capacitors in the power supply. Their component references are:

C <sub>2113</sub>	470µF, 16V
C <sub>2230,C2231</sub>	47µF, 16V
C <sub>2508</sub>	100µF, 63V
C <sub>2510</sub>	1000µF, 16V
C <sub>2540,2663,2664</sub>	100µF, 25V

All capacitors should be replaced to prevent a recurrence of the problem.

**John Coombes**

# Implications of GPS

by Mark Paul

**T**he last edition looked at global positioning satellite systems – this month considers some performance limitations and future implications.

Received GPS signal levels are invariably weak so let's start by looking at other sources of electromagnetic radiation and tropospheric conditions that can reduce this signal level even further making acquiring and tracking of the satellites tricky.

## GPS natural interference

Solar flares are one such naturally occurring emission with the potential to degrade GPS reception.

Their impact will affect reception over the that half of the Earth facing the sun. Then there is interference experienced as satellites pass through the Van Allen Belt, plus the naturally occurring geomagnetic storms predominantly found near the poles of the Earth's magnetic field.

The velocity of GPS signals can be affected passing through through the earth's atmosphere and ionosphere where the atmospheric conditions are variable. Such effects are smallest when the satellite is directly overhead and of course increase to maximum on approach to the horizon.

Correcting these errors is a significant challenge – a mathematical model can be used to estimate and compensate

once the receiver's approximate location is known – but it's not easy.

A further variable delay, resulting in errors similar to ionospheric delay, is caused by humidity. It is more localised, changes more quickly, and is not frequency dependant as in ionospheric disturbance.

Receiver altitude also changes the amount of delay, due to the signal passing through less of the atmosphere at higher elevations. As the GPS receiver computes its approximate altitude this error is relatively simple to correct.

Then there is multipath reception. Here the satellite signal reflects off surrounding terrain; buildings, rock faces, hard ground, water, etc,

generating delayed signals which can cause inaccuracy. A variety of techniques have been developed to alleviate multipath errors. For long-delay multipath, the receiver itself can recognize the wayward signal and discard it. To address short-delay multipath reception design of the antenna can help reduce this signal power but, they are hard to filter out from the true signal, causing effects almost indistinguishable from routine fluctuations in atmospheric delay.

Multipath effects are much less severe in moving vehicles. When the GPS antenna is moving reflected signals fail to converge with only the direct signals be processed. I guess this means if you're hiking with your GPS - and have the obligatory large sac on your back - then running very fast might generate a proper solution..... if not a cardiac arrest!

### Selective availability

Selective Availability (SA), touched on last month this is currently disabled yet still a feature of GPS. Activated SA intentionally introduces slowly changing random errors into the navigation signals, typically of up to about 10 metres horizontally and 30 metres vertically. This is designed to screw up, for example, enemy precision targetting by long range guided missiles - but of course it also screws up civilian usage. When enabled, the accuracy is still available in the signal, but in an encrypted form that is only accessible to the United States military and its allies. Even those who have managed to acquire such military GPS receivers would still need to obtain the daily key, the dissemination of which is tightly controlled.

During the Gulf War, the shortage of military GPS units and the ready availability of civilian ones caused many U.S. and friendly troops to buy their own civilian GPS units - their wide use among personnel resulted in a decision to disable SA. This was

rather ironic, as SA had been created specifically for such situations – to allow friendly troops to use the signal for accurate navigation, while at the same time denying it to the enemy. However, the assumption underlying this policy was that all US troops and enemy troops would have military-specification GPS receivers and that civilian receivers would not exist in war zones. Ah, the clarity of the military mind. Always so comforting.

In the 1990s, the US Federal Aviation Administration (FAA) started pressuring the military to turn off SA permanently to save money spent every year in maintenance of their own navigation systems. The military resisted for most of the 1990s, ultimately it took an executive order by US President Bill Clinton to have SA removed from the GPS signal. The amount of error added was 'set to zero' at midnight on May 1 2000 allowing all users access to the error-free signal.

This said, SA is still a system capability of GPS and in theory could be reintroduced at any time – it is this uncertainty which is foundational to Galileo. However, in practice it is unlikely to be reintroduced and various government agencies, including the FAA, have stated that it will not be reintroduced. In any case, the US military has developed a new system that provides the ability to deny GPS (and other navigation services) to hostile forces in a specific area of crisis without affecting the rest of the world or its own military systems.

### Clock errors

According to the theory of relativity, due to their constant movement and height relative to the Earth-centered inertial reference frame, the clocks on the satellites are affected by their speed (special relativity) as well as their gravitational potential (general relativity).

For the GPS satellites, general

relativity predicts that the atomic clocks at GPS orbital altitudes will tick more rapidly, by about 45,900 nanoseconds (ns) per day, because they are in a weaker gravitational field than atomic clocks on Earth's surface. Special relativity predicts that atomic clocks moving at GPS orbital speeds will tick more slowly than stationary ground clocks by about 7,200 ns per day. When combined, the discrepancy is 38 microseconds per day. To account for this, the frequency standard onboard each satellite is given a rate offset prior to launch, making it run slightly slower than the desired frequency on Earth; specifically, at 10.22999999543 MHz instead of 10.23 MHz.

Key to GPS is the the clock accuracy and although the onboard clocks are extremely accurate, they do suffer from some clock drift, however this problem tends to be very small and correction is fairly straightforward by ground station control.

### Jamming

Jamming of GPS signals by man-made interference can also occur. In one well US documented case, an entire harbour was unable to receive GPS signals due to unintentional jamming caused by a malfunctioning TV antenna preamplifier!

Intentional jamming is also possible, stronger signals can interfere with GPS receivers when they are within radio range, or line of sight, indeed the U.S. government believes that such jammers were used during the 2001 Afghan war. The US military claimed to have destroyed a GPS jammer with a GPS-guided bomb during the Iraq War - such a jammer is relatively easy to detect and locate, making it an easy target for radiation- seeking missiles. Incidentally, it is claimed that the UK Ministry of Defence tested a jamming system in the West Country mid-2007.

Due to the potential for both

natural and man-made noise, numerous techniques continue to be developed to deal with such interference. The first is to not to rely on GPS as a sole source – ‘Receiver Autonomous Integrity Monitoring’ is a feature now included in some aircraft receivers, which is designed to provide a warning to the user if jamming or another problem is detected. The US military has also deployed their ‘Selective Availability/ Anti-Spoofing Module’ in the Defense Advanced GPS receiver which, it is claimed, is able to detect jamming and maintain its lock, during interference, on the true encrypted GPS signal, when civilian receivers would lose lock.

### **Fly-tipping in space**

While on Earth the worry is burgeoning landfill sites overflowing with rubbish, in space it is orbiting junk – nearly half a century of junk! Is this a threat to GPS? Even more dramatic - is it a threat to all future space activities? Some experts think so!

For decades, those with an eye to the economic and technical development of space have worried that their dreams may not be realised because of the so-called ‘Kessler Syndrome’, named after NASA consultant Donald J Kessler.

As a doomsday scenario, the Kessler Syndrome is straight out of Sc-Fi. It is especially menacing because of the so-called ‘domino effect’ where any impact between two objects of sizable mass will create additional shrapnel debris from the force of collision. Each piece of shrapnel now has the potential to cause further damage, creating even more space debris and so on – the condition expanding chaotically for centuries.

With a large collision, the amount of cascading debris could be enough to render Low Earth Orbit essentially impassable. This growing orbital

junk could eventually make space exploration, and the use of satellites, too prone to loss to be feasible for many generations.

The Kessler Syndrome presents a unique problem to human space travel. Space debris is very difficult to deal with directly, as the small size and high velocities would make retrieval and disposal almost impossible. Given thousands of years, most debris in Low Earth Orbit would eventually succumb to air resistance in the upper atmosphere and plunge to the Earth. If magnetically susceptible of course the debris could fall in a few decades due to the pull of the Earth’s magnetic field

Designers of new vehicles or satellites are frequently required to demonstrate that they can be safely disposed of at the end of useful life being boosted into a graveyard orbit or a controlled atmospheric re-entry... in the meantime...

It’s only in the last decade or so that scientists have accepted that the present number of objects in orbit has passed the ‘critical spatial density’ – that point at which a chain reaction becomes inevitable and is sustained.

It was earlier this year that the US published an official list of ‘detectable’ objects swirling around the planet. These were defined as four inches wide or larger including such as dead satellites, spent rocket stages, and scrap-yards of whirling leftover bits and pieces from chance explosions and destructive tests – some 10,000 pieces in all! This was a figure that was accurate until Jan 11 07.

On January 11 07 China changed the delicate rules of the game by successfully sending an anti-satellite rocket to explode an old satellite into hundreds of large fragments. This was a very serious move with the feared chain reaction now lurching into focus. US Federal and private experts say that early estimates of 800 pieces of detectable fragments from

the shattered satellite will probably grow to nearly 1,000. It is thought that China has as many as 39 satellites of its own – the question is how many more does it intend to blow up?

The clock is ticking experts say with a certainty that some piece of whirling junk is going to trigger the cascade.

“It’s inevitable,” said Nicholas L Johnson, chief scientist for orbital debris at NASA. “A significant piece of debris will run into an old rocket body, and that will create more debris. It’s a bad situation.”

Further, this deliberate destruction was in an orbit some 530 miles high meaning that the debris will remain in space for tens, thousands or even millions of years. The target may have been set deliberately high to avoid any direct threat to the International Space Station and its astronaut crew, which orbit at a height of about 220 miles. However, in an explosion flying debris has the habit of moving in all directions, everywhere, upwards and downwards!

In a recent interview, Mr Kessler tried to be reassuring and called the worst-case scenario an exaggeration. “It’s been overdone,” commenting on the “syndrome”. Still, he warned of an economic barrier to space exploration that could arise. To fight debris, he said, designers would have to give spacecraft greater shielding to protect the craft from destruction thus making them heavier and so costly to lift-off and even more costly to manufacture. “It gets more and more expensive,” he said. “Sooner or later it gets too expensive to do business in space.”

I seem to remember a Sc-Fi novel that spoke of the end of a frustrated humanity due to the fact mankind was unable to get off the Earth. I’m so glad we’re far too clever for this ever to be a reality..... We are!..... Aren’t we?

# What a life!

By Don Bullock

**M**y notes in the last issue about Roy Wallace, the stereo pioneer who had just died, attracted some interest, particularly from John C Priest, of Blackpool in Lancs. It will be remembered that Wallace, or 'Wally' as he became known in the recording industry, was drawn to music in his early years, and soon acquired a wide selection of the gramophone records of the day.

A capable technician with a searching mind, he took a keen interest in the ongoing technical advancements that improved recording quality over the years. But he noticed that even at their best, the records exhibited a certain missing dimension. This discontentment led him to a series of Heath-Robinson technical experiments. His potential was evaluated by Decca records and the firm snapped him up with alacrity. And it was in their laboratories that he eventually perfected his 'binaural sound' inventions to produce the stereo system that is commonplace today.

## Alan Dower Blumlein

John Priest, after expressing his delight at the resurrection of Television Magazine and his interest in the column, went on to refer to the achievements of a separate stereo pioneer, Alan Dower Blumlein.

Blumlein was an exceptional man, too, and signs of both his technical and commercial skills came at an early age. When he was only seven he presented his mother with a bill

for repairing the family doorbell, signing it 'Alan Blumlein, Electrical Engineer'. And by the time he was twenty he had won a degree and graduated with first class honours as a Bachelor of Science (BSc).

The following year he began working for the prestigious company now known as STC – Standard Telephones and Cables, where his duties included the measuring of the human ear's amplifying capabilities and frequency responses, and co-authored two papers on the latter. He also co-authored a series of seven highly technical articles in *Wireless World* – then, but no longer, an extremely prestigious and world-renowned publication.

He was also responsible, with a colleague, for developing an improved loading coil for reducing cross-talk in long distance telephone lines, as well as a markedly improved AC measuring invention that soon came to be known as the Blumlein Bridge. These were patented by STC, as were five of his other inventions.

He then joined the Columbia Graphophone Company which was to become EMI. While there, he invented a moving-coil disc-cutting head which not only greatly improved the quality of the recorded sound, but also absolved his company from paying royalties to STC – his previous employer – for the use of their patented moving-iron cutter. One wonders how STC felt about this.

## The early 'Thirties

In the early 'Thirties Blumlein,

working with Herbert Holman, revolutionised the industry by developing the moving-coil microphone, which immediately became the standard in the studios of both EMI and the BBC.

A visit to the cinema prompted his next project. Cinema sound systems were then universally monaural, and he noticed that while an actor was speaking on one side of the screen, his voice came from the other. He interrupted his wife's watching of the film to point this out to her, declaring that he had thought of a way to make the actor's voice 'follow' him as he traversed the screen.

There is no report of her response, which might have been icy, but within months EMI had patented the binaural sound inventions which his perception had generated. These included the back-to-back pairing of two moving coil microphones units, known as the 'Blumlein Pair'; the recording of two separate sound channels in a single record groove, one on each 'wall' at 45° from vertical; a suitable cutting head, and a transformer matrix to sum the difference between the left and right signal channels. His intention of getting the sound to 'follow' an actor as he moved across the screen was fully realised and proved in two short test films: 'The Walking & Talking Film' and 'Trains at Hayes Station'.

## Sparkling diamond

With such a sparkling diamond as Blumlein tossed into its lap, EMI's recalcitrance of response was nothing short of astonishing. The

company failed to exploit any of Blumlein's inventions. Instead, they concentrated solely on the development of both the 'new' 405 line 'High Definition' television, and on Radar (RADIO Detection And Ranging). Then the start of the 1939-45 World War came along, arresting all such activity.

After the war, the British Patent Office permitted EMI, among others, to extend their pre-war registered patents until 1952. And as though their former naivety weren't enough, the Company failed yet again to take commercial advantage of Blumlein's sterling research. Their patents expired in December of that year.

Meanwhile, Decca, EMI's arch-rivals, seemingly unaware of Blumlein or his work of twenty-four years earlier, took steps to patent Roy Wallace's system, which they now called 'stereophonic sound'. And although that Company found that EMI had got there first, Decca forged ahead and pioneered the production of the first stereo records in 1958.

### **Killed on duty**

Sadly, the brilliant Alan Blumlein never saw the materialisation of his dreams. He was killed on duty in June, 1942, three weeks short of his thirty-ninth birthday, when his Halifax bomber crashed while he was testing his latest Radar developments.

I have always found it interesting, as I said to John Priest, that so many budding inventions were being worked upon, quite separately and insularly, by two or more people or entities, at roughly the same period in history. This applies, for instance, to the advent of photography, which was being separately but simultaneously developed in different countries. It seems almost as though there is a predetermined order for new inventions. The key, I

suppose, lies in the preparation of the ground following earlier achievements. Many apt illustrations occurred in the Second World War, which spawned a plethora of far-reaching practical developments. Magnetic sound recording was one. Although well preceded by much earlier patents, it was only in the 'Forties that practical examples came fully developed. And tape soon ousted them.

### **The Dreaded BRC 2000**

I found it interesting, though excruciating, to see Steve Pendlebury's article on the restoration of a BRC 2000 colour set in last month's issue. My memories of that model are well seared into my brain. For a start, it needed two strong men to carry it and a third to clear the way. The mere mention of its power module could be guaranteed to slip hardened engineers to tears – with its wealth of semi-conductors and dry joints, and the merest whisper of its line panel caused many a pair of stout legs to buckle.

We eventually came to realise, of course, that its devil-black electrolytic condensers were capsules of wickedness, but until we did, the strange fault symptoms they caused in all departments were confusing and maddening. Particularly worrying was the one on the video board with two hundred volts across it.

Its mechanical tuner with its fly-away spring and crack-open solder joints was just about stable enough, at its best, to embrace the channels' full bandwidth and hold the picture's chroma content – when it was judiciously set, but, as was the case with the 3000 chassis, it was the deteriorating insulation properties of its plastic gun switches, with the gradual, and ever-varying colour casts they introduced, that aged

many poor workshop souls. Suitably confused, in those early days of colour, I recall solemnly pronouncing, to one ancient and bedridden soul who was writing me his cheque, that his 23" tube was on its last legs.

"Start saving your sixpences!", I jauntily advised (ah, what a salad-green fool I was!)... He closed his eyes and slumped into a death-wish, and I thought I'd killed him. I was instantly filled with remorse – at my careless timing. He hadn't finished writing his cheque!

I opted, at that time, for a Philips G6, which cost me, I think, the trade price of £276 or so. True, it was a hybrid set, and its extensive, solenoid operated system-switching shot the cat out every time. True, also, that the thin, single-stranded conducting-wires that rose from its power section kept breaking off every time I folded the chassis up and down for access, leaving me wondering just which of the tag strips they'd come from. True, it consumed its pretty purple line-loading coils like crazy, putting an increasing bite on the succession of giant line output valves, and true again that we seldom saw two G6 sets with identical chassis – BUT the G6 colour picture was out of this world for quality.

Ah, happy days! All the signs of the hell to come were there. Why didn't I run?

### **Those early days...**

Years ago, when I was but a callow youth, I worked for the local Broadmead radio and television shop, the second that Jimmy James opened after leaving the army with his gratuity payment. This was a wad of money that the government pressed into the hands of its soldiers before kicking them back into what was called 'Civvy Street'.

Jimmy had always loved tinkering old radio sets back to life, and now

there were plenty about, for production of new sets – new everythings, in fact – had stopped for the duration of the war. He set himself up as a repairman and made a bomb at it, and then he opened his first sales shop in Bristol's Broadmead area. He followed this by opening more, and became a millionaire when he later sold the lot.

He was a practical chap, and not all that bothered about tidiness. When our shop needed stock, he'd pile a stack of sets into a van, drive them from Bristol, and stagger them to our shelves. There was no paperwork. He selected his managers from people that he met in the pub and took to. One day our manager telephoned him to say that he felt that our shop needed decorating. The next, Jimmy showed up with a few of his mates and some paint, and they set about painting as the customers came and went. He didn't know formality, Jimmy...

I was the Outside Engineer, or van-boy, and my job was to repair sets in the house if they were under guarantee, to bring them in if they were chargeable, and to be sure to collect the money when I took them back after their repair. But there were exceptions. We did repairs in the house for our better customers, particularly if they lived way out in the surrounding villages.

### **The Carters and Bonzo**

Every reader who has read this column over the years knows that just as Greeneyes loves dogs, I detest them. They bring out the worst in me. For one thing they take the attention and affection that a wife ought to lavish on her Master. And for another they get under my feet as I walk across a room. I don't meander about, studying the floor. I stride to where I want to go, and all too often I end up on the floor with

my face being licked by a slimy and smelly dog which, Greeneyes insists, loves me in spite of my nastiness...

But to get back to the point. In those days I used to occasionally call on Mr and Mrs Carter, an utterly decent and kindly pair who lived in a mansion of a country house. They were keen gardeners, and every time I called there, I left with a wealth of produce – cabbages, potatoes, carrots... the lot. They had a massive English Electric television console with a lethal metal-coned tube (I wonder how many remember them?).

I always tried to repair their set without removing its chassis from its roomy cabinet, which often meant my laying on the carpet, with my head inside the set, while I busied myself with the soldering iron. This could be a tricky caper, and I never really took to the way the solder used to drip off the iron onto my face and neck.

Now the Carters worshipped their huge and shaggy dog. They called it Bonzo and talked to as though it was a lovable but slightly backward child. It was nearly three feet tall and easily opened the doors by twisting their handles with its big black slimy mouth. I hated the sight of it.

"You sit there and watch Mr. Bullock!" the ample Mrs Carter would say to it as she left me to get on with the repair. The moment she left, it would plod over and nuzzle me and I'd jab it with one of my bigger screwdrivers to make it fly to the other end of the room. It was, I figured, a reasonably good arrangement.

One day, when I had my head well into the set, it nuzzled me unmercifully in Private Places. I skinned my elbows on the walls of the cabinet whilst my head played host to several dollops of liquid solder, and in my struggles I managed to take a few fair charges

of DC voltage from its tube bowl. When I finally crawled out and tottered to my feet I saw that my clothes were sodden and darkened in unreasonable places from its nuzzling.

Understandably I wanted revenge, so I patiently packed everything back into my oblong attaché-case toolbox, smilingly beckoned the dog over, and as soon as it made to lick its new friend, I swung the toolbox round and caught it a beauty across its wet snout. And as it spun round I caught it another in its nether regions, upon which it yelped crazily and accelerated around the room. The heavy Mrs. Carter trundled in.

"Why, Bonzo! You silly old thing!" she cried as she mixed an admonishing look with her smile. "What are you carrying on about? Mr Bullock isn't going to hurt you! He's a family friend! You know that!"

"They're funny things, aren't they?" I said as I sang my goodbyes while strategically sailing my toolbox to the van. "Goodbye, Bonzo, old chap," I smiled.

"If only they could talk!" said Mrs. Carter, wistfully. "I often wonder just what he's thinking! Oh, if only he could talk!"

"Perhaps it's just as well that he can't!" I smiled as I slipped the van into first and looked ahead.

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# Test case 532 solution

*This is the solution to test case 532 detailed on page 12*

**W**hat a morning! Modern technology can be a bit too clever

sometimes, and perhaps that was true of the first problem Ray and Todd encountered. The Sky remote control is a clever beast indeed: it ensures that whenever you turn on Sky TV or go to its programme guide, the TV jumps to it, prompted by a near-simultaneous command from the Sky handset direct to the TV.



Now it just happened that the old Schneider TV's 'channel 6' had been programmed to be AV1 in, and this go-to-6 command was still lying in the Sky handset, even though it now had a different TV manufacturer code. They had to reprogram the Sky zapper to suit the new TV: press TV, hold down select and the green key simultaneously for two red flashes, then key in the TV channel number required (or nothing at all) for Sky, then press select for two more red flashes. All done!

How about the problems at the second site? Very simply, all the afflicted channels were in digital



Multiplexes 2 and A (operated by ITV) which can carry about 25% more channels than the others, but which use the less robust 64-QAM modulation system. In a situation of borderline signal strength these are more vulnerable to data corruption than the 16-QAM system used on the other multiplexes. An aerial upgrade solved the problem completely.

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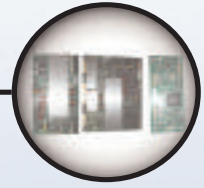
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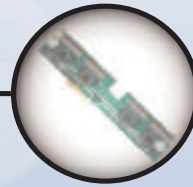


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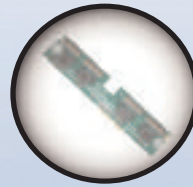
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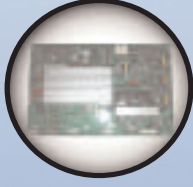
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AB-A501-7-01.....	INV04.002R	£22.00
AB-A501-7-01.....	INV04.022R	£22.00
AB-A502-16.....	INV04.003R	£27.00
AB-A504-17.....	INV04.004R	£37.00
AB-A504-18.....	INV04.005R	£37.00
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AI-0059.....	INV06.013R	£27.00
AI-0067.....	INV06.014R	£27.00
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AIP-0108.....	INV06.020R	£21.00
AIP-0122.....	INV06.021R	£27.00
AIVP.0006.....	INV06.026R	£40.00
AIVP-0001A.....	INV06.022R	£33.00
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AIVP-0003 A.....	INV06.025R	£33.00
AIVP-0009.....	INV06.027R	£40.00
AIVP-0017.....	INV06.028	£40.00
AIVP-0017.....	INV06.028R	£40.00
AIVP-0017.....	INV06.029R	£40.00
AIVP-0026.....	INV06.030R	£48.00
AIVP-0026A.....	INV06.031R	£48.00
AIVP-0032.....	INV06.032R	£40.00
AIVP-0035.....	INV06.033R	£75.00
DAC-12M018B1F.....	INV03.001R	£62.00

Part Number	Code	Price
DAC-12M019A0F.....	INV03.002R	£66.00
DAC-12M019C0F.....	INV03.003R	£66.00
LI.2206.....	INV06.006R	£18.00
LI-1045.....	INV06.001R	£14.00
LI-1047.....	INV06.002R	£14.00
LI-1048.....	INV06.003R	£14.00
LI-2165.....	INV06.004R	£12.00
LI-2205.....	INV06.005R	£18.00
LI-4018.....	INV06.007R	£16.00
LIV-1050.....	INV06.008R	£12.00
LIV-2209.....	INV06.009R	£12.00
LIVP-6009.....	INV06.010R	£30.00
LIVP-6010.....	INV06.011R	£30.00
QF131V1.00.....	INV04.006R	£44.00
V0.21148.101.....	INV01.045R	£16.00
V0.88070.001.....	INV01.011R	£82.50
V0.88070.101.....	INV01.012R	£82.50
V0.89144.001.....	INV01.046R	£87.00
V0.89144.102.....	INV01.001R	£74.00
V0.89144.103.....	INV01.015R	£87.00
V0.89144.303.....	INV01.007R	£87.00
V0.89144.401.....	INV01.004R	£82.50
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V0.89144.601.....	INV01.018R	£82.50
V0.89144.602.....	INV01.005R	£82.50
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VIT71008.92.....	INV05.004R	£80.00
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VIT71010.53.....	INV05.006R	£75.00
VK.21148.101.....	INV01.002R	£16.00

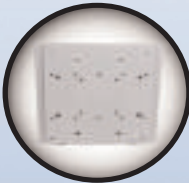
Part Number	Code	Price
VK.88070.101.....	INV01.041R	£82.50
VK.88070.102.....	INV01.042R	£82.50
VK.88070.702.....	INV01.039R	£65.00
VK.88070.703.....	INV01.040R	£65.00
VK.88070.901.....	INV01.003R	£65.00
VK.88070.S01.....	INV01.031R	£92.00
VK.88070.S02.....	INV01.032R	£92.00
VK.89144.103.....	INV01.044R	£87.00
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VK.89144.C03.....	INV01.010R	£87.00
VK.89144.E01.....	INV01.020R	£82.50
VK.89144.H02.....	INV01.026R	£87.00
VK.89144.H03.....	INV01.029R	£87.00
VK.89144.H05.....	INV01.027R	£87.00
VK.89144.H05.....	INV01.028R	£87.00
VK.89211.001.....	INV01.030R	£87.00
VK.8A183.001.....	INV01.037R	£100.00
VK.8A183.041.....	INV01.033R	£92.00
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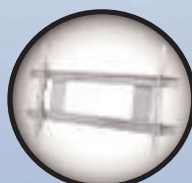


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# Reality TV

by Mike Leach

**I**t has become a standing joke in TV service departments over the years; when you are seeking the advice of a manufacturers' technical department and they don't have the answer to your query.

"Sorry we haven't got that symptom listed," booms a voice down the phone.

"Let us know what it was when you've fixed it!"

You feel just great at this point. You've just spent over half an hour trying to get through and they have no idea why your line drive disappears erratically and destroys the line output transistor. You press on and when you've found the fault you deliberately keep it to yourself so as you can impress your colleagues the next time someone complains of the same problem!

Yes this has been the case for many years. We can't always expect manufacturers service departments to have the answer, it's just inconvenient when they don't. But things are changing and don't necessarily for the better.

## Have you got a service manual?

A technical department will often ask you if you have a service manual for the product. You explain to them that you tried to download one from their technical website and you've managed to print off the complete circuit diagram for a 42 inch plasma onto a sheet of A4 paper and the end product is totally illegible. The reason for this of course is because we don't have computer printers capable of reproducing something the size of a broadsheet newspaper!



*We never had all this trouble with Dansette record players. Or did we?*

At one time the manufacturers used to bear the costs and take responsibility for their dealers being issued with the relevant service manuals to their products. Now they bung it on a website and leave their dealers to pick up the pieces. And in some cases they charge you an annual fee for the privilege!

You must be getting an idea here of where I'm coming from. There has been a slow "drip drip" over the years of costs being offloaded by manufacturers on to service departments. Just look at what they save in the long term. They employ some web wizard, give them a remit and then tell all of their service outlets that unless they do this, that and the other, they can't play anymore!

But I digress, my main points in this issue are technical help and the availability of certain spares and printed circuit boards.

We've all had the pleasure by now of attempting to service those

supermarket LCD TV's with the intermittent faults and dim, low quality performance. They have become a household commodity just like the Dansette record player of the 1960's and the fondue sets of the 1970's. To keep up with the Jones's years ago you would possibly invest in a Hostess trolley for your entertaining or have a new bog standard Ford Cortina every two years. These days you just go out and buy a flatscreen TV before the neighbour does!

"Not as good as the old one is it" they say after they've called you out to tune it in. They then blame you for the lesser quality picture and harp on about how "digious" should be better. But they're absolutely right for once. Repairing these things can be a tad difficult: lack of spares availability; no or poor quality service info' referred to earlier or, in many cases I've found, no fault symptom evident when the sets are put on test. Well

OK you may say, the supermarket range will always be sub-standard in terms of quality; you can't expect top notch for less than two hundred quid. Quite right. But what of the real "top notch" stuff. How easy is that to fix? Well that can vary from one manufacturer to the other.

### It must be the PDP!

I was recently asked to take a look at a 42 inch plasma set that was under three years old. The set cost the best part of £2000 when new and had not been any trouble. To save embarrassment and litigation I will go as far as to say that the manufacturer was one of the more up market and well known Japanese brands.

The fault symptom was unusual; it produced something akin to a "barcode" effect on the screen, quite thin vertical black stripes that changed to white when the picture content was of a high contrast. This effect would start on the left hand side of the screen and slowly move across until it filled the whole area. It certainly seemed like a drive fault. I disconnected the address lines from the plasma (PDP) panel individually but the symptom remained active in other areas of the screen. The inside of the set was a bit of a nightmare: several boards all sandwiched together with short interconnecting leads and a multitude of large IC's on each board. Which one was it? Despair felt heavy on my shoulders so I decided to speak to the makers' technical department.

"Sounds like the PDP to me," said the knowledgeable voice.

"But the address lines make no difference – it's still the same," I replied.

"Must be the PDP. We haven't had any problems with that model."

As soon as he said that, I knew I was flogging a dead horse. Whenever a manufacturer says they know of no problems then they are telling the truth. Or, another way of putting it

would be to say they haven't a naffin' clue!!

Quite by chance a similar set came in a day or so later with a broken PDP. After much PC board swapping I was able to locate the source of the problem to one board in particular. We then phoned the manufacturer for a price for a replacement board. It turned out that these boards are not available and the faulty ones have to be returned to a famous holiday destination in Europe for repair. They will then send it back to you when they've fixed it for a three figure sum. They give you no idea of time scale though. We sent these boards off over six weeks ago and they still haven't been returned. Luckily I was able to use the one out of the broken set but scrap plasma TV's are not always available when you need one. Without it, my customer would be raising the roof by now and asking for some sort of compensation. Such a shame this set wasn't an LG make.

They seem to be one of the best at supplying boards at very reasonable prices. Well you have to give credit where it's due, don't you!

### To summarise

I and many other engineers find it annoying that the attitude of some technical departments seems to be one of disinterest sometimes. Their main concern is to get you off the phone if they don't understand your problem. And if they want their customers to buy another plasma TV from them then they should make sure that their repair back up is faster than six weeks. A lack of spares from a major manufacturer at less than three years old is wholly inadequate.

Why is it always this trade that has to suffer like this? Would the public accept it if a part had to be removed from their car and sent across the English Channel to be repaired? Would they roll over and gratefully accept no transport for over six weeks? I think not.

### Where next?

I wonder just how much the public will accept before they bite back in some way. Most of the old CRT sets lasted ten years or more. I often come across people who bought a new flat screen set two or three years ago and are now changing again for the latest technology because a repair to their set is either too expensive or spares not obtainable. Are the public slowly seeing television as a throw away item if they get trouble after a couple of years?

Myself and other colleagues I've spoken to all agree that the hike in the price of a TV set, which occurred when plasma's first came onto the market, would do us all the power of good. It could only be good for the trade to have expensive sets out there in order for us to start making a decent living once again when the things went wrong. That doesn't seem to be the case for many reasons. Firstly some manufacturers are charging huge amounts for spares (the price of a PDP for instance). How can the price of a DVD player come down so drastically over a few years when you consider the technology that goes into it and yet the price of a PDP or LCD panel remains astronomical in terms of a spare part? Someone is making a lot of money and it's not the engineers! Even the employers who have often been accused of profiteering out of technicians' low wages are beginning to feel the pinch. Some companies I know of have to make a small "call out" charge to the customer to do a service call under first year warranty. This is because they are not paid enough to cover their costs by the manufacturers and have to recoup it from elsewhere. I don't think anyone will disagree with me on that point – except probably the makers themselves!

But I tell you what: we never had all this trouble with Dansette record players. Or did we? Happy fault finding. See you next time.

# Aspects of digital switchover

by Keith Hamer and Garry Smith

**D**igital TV is the future terrestrial broadcasting format as viewers in the Whitehaven area of Cumbria found out towards the end of last year. The analogue BBC-2 programmes disappeared from their screens on October 15th, followed by the other three channels a month later.

Three relay stations in the area were affected, namely Whitehaven, Eskdale Green and Gosforth.

By now, viewers will have had chance to experience the virtues of this long-awaited government-enforced switch-off procedure. Well, one of the 'virtues' is a scaled-down version of Freeview with fewer programmes than the main transmitters provide, thanks to the use of only three multiplexes assigned to each relay affected. The fourth frequency has disappeared due to the government's eagerness to make a fat profit on the



Fig. 2

*The Wrexham-Rhos (Brymbo) relay station waiting to deliver eager viewers with 'TV of the future'*

sale of certain nominated analogue channels in much the same way as they did with mobile telephone frequencies when the government reaped billions of pounds from telecommunication companies by doing absolutely nothing!

Viewers have also been robbed of a full Ceefax teletext service as the digital version does not fully replicate all the analogue pages. For example, with the analogue Ceefax service there is a readers' letters section on page 145 – the digital offering does not feature this popular item.

## Technophobia

Technophobia is a problem that particularly affects the elderly. Time after time we hear the comment, "Well, we probably won't be here by the time we have to change to digital".

On-screen menu selection of the receiver's settings has been around for sometime but usually once the tuning is set no further adjustment is necessary, at least with the good old analogue service. This is not the case with digital as periodic re-scanning is necessary to take into account service changes, such as new channels becoming available. Few people are confident enough to carry out a re-scan, never mind a software download, even if they are aware of one, if and when one becomes available.

It is our experience that many set-top box users tend to abandon or discard them whenever there is the slightest malfunction, even when a simple cure such as re-scanning would do the trick. This is fine while analogue is still available but when digital is the only option, what will the public do then?



Fig. 1

*Fortunately, there's more to life than Sky TV with reception from a different satellite*

With the price of some set-top boxes costing the equivalent of a round of drinks in a pub these days, the viewer is going to be reluctant to call out a service technician and pay £20 plus for someone to press a button to effect a re-scan because the sound has mysteriously disappeared from ITV-3!

## Plug-And-Play

Current set-top boxes are usually relatively simple to install with the self-installation process often referred to as 'Plug-and-Play', to coin a phrase dating back to the days of OnDigital. This means that a man in a van no longer turns up at your home to install and demonstrate the equipment and its potential offerings – a sort of PR stunt and educational session rolled into one to hopefully reduce call-backs due to simple and often silly problems.

## Instruction Book Howlers

Self-installation is fine, provided that the instructions are clear and concise. This is not always the case, especially when English is translated from another language, particularly one from outside Europe.

In the past, translations have frequently been the cause of workshop

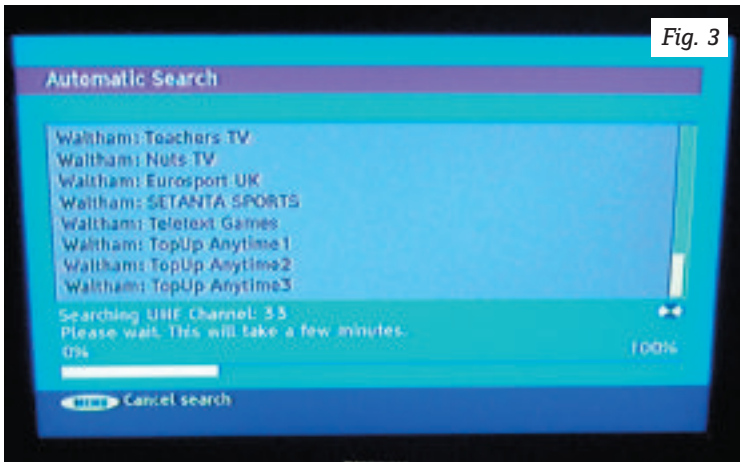


Fig. 3

A typical Freeview set-top box tuning menu



Fig. 4

The DMTECH WT17XTS receiver: nice set, shame about the instructions!

amusement, if not downright fits of laughter. We remember vividly the vertical-hold setting-up procedure in an Hitachi service manual dating back to the early Seventies which advised: ‘Turn the knob, watch the picture and stand as still as you can’, or words to that effect! Another Hitachi manual at the time referred to the set as having ‘Push Bottom’ tuning.

With one generic multi-language instruction leaflet supplied with some equipment these days, things are bound to confuse the user, or even the installer. We recently had a call from the proud owner of a DMTECH WT17XTS LCD receiver who wished to re-scan the digital channels to receive the new ‘Dave’ service on Freeview Channel 19. There was virtually no reference to the DVB-T function in the instruction manual supplied. In fact, reading the booklet, you would be hard pushed to tell whether it was actually equipped to receive digital broadcasts!

Analogue tuning was easy to carry out: “Press the TV MENU button (number 22 according to the handset instructions) and follow the on-screen prompts”. However, switching to Freeview and pressing the TV MENU button displayed the prompts as anticipated but ‘SET UP’ and ‘PC’ were highlighted green, but the cursor would skip these selections.

Maybe somewhere along the line

these functions had become disabled but all the electrical retail outlet (or ‘shed’ as they are often referred to) from where it was purchased could offer was, “there might be a security code/parental lock but failing that contact the manufacturer”. So much for friendly after-sales help and service these days!

The only reference to a security or password code in the instruction manual referred to the DVD facility so that certain categories of DVD could be made inaccessible from the younger members of the family. Beneath this instruction was a heading ‘Default’ which read: ‘If user selects the reset from the setup menu, all the value of set-up menu will be initialised by factory setting value’. We got the gist of what it meant but would the user?

Trawling through the

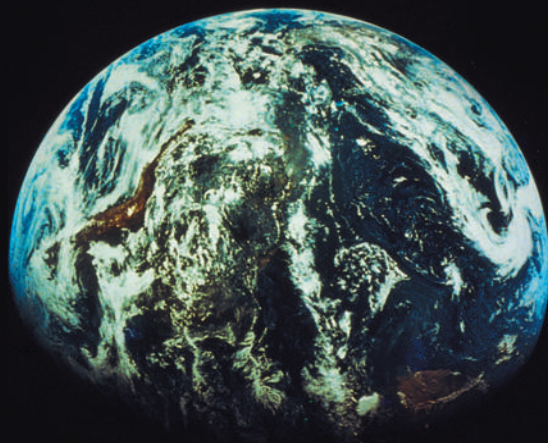
Troubleshooting section failed to shed any light on the issue. In fact, it only covered obvious simple problems and gave virtually useless advice such as ‘No Colour in a colour picture—the colour density is adjusted to 0 or almost 0’. And so it went on...

At the bottom of the handset is another button marked ‘MENU’ but described in the instructions as ‘HOLD/PROGRAM’ (button number 37) which, according to the instructions, is assigned for ‘Teletext Page/For playback in a specified order’. It transpired that the button also allows access to the digital tuning menu but the instruction booklet fails to tell the user this fact or even make any reference to it!

Hopefully, viewers in Whitehaven will have had better luck with their instruction booklets!

## BEFORE AND AFTER SWITCH-OVER CHANNEL COMPARISON

	ANALOGUE			DIGITAL			
Relay	BBC1	BBC2	ITV	CH4	PSB1	PSB2	PSB3
Whitehaven	40	46	43	50	43	50	46
Eskdale Green	22	28	25	32	25	28	22
Gosforth	58	64	61	54	61	54	58
Multiplex	Operator						
PSB1	BBC						
PSB2	Digital 3 & 4						
PSB3	BBC						



# A day in the life

by Peter Dolman

**D**on't blow it – good planets are hard to find! I'd noticed the headline in the morning paper, and now the words just wouldn't go away. So when I arrived at work, somewhat later than planned, it was gratifying to find Dear Heart already hard at it, simultaneously defending our corner and the environment. Multitasking, that's what she calls it. "Well, of course, Mrs Sharpe, it's booked in to be looked at today," she was saying brightly through gritted teeth as she glanced reproachfully, first in my direction then at the clock. "Yes, naturally it's worth repairing. You've bought a good product from a reputable manufacturer and, as you say, it's really not that old. No, Mrs Sharpe, I have to disagree with you on that, it would be terribly wasteful if we were all to discard things so readily. Yes, our engineer will contact you within the hour. Goodbye to you." She shut

off the phone and shrugged her shoulders. "What are people like? Surely this so-called 'disposable age' attitude has got to stop soon? Folk seem to have double standards and money to burn. One minute they're wearing their green hats and defending the environment, then when it suits them, they're supporting some polluting far eastern outfit by buying replacement grimmies and discarding perfectly good items without a second thought. Why can't they see that having products repaired can be a win-win situation – oh, and that reminds me", she continued apace. "It's about time we finished our little 'Television: To Scrap or not to Scrap' article that you promised for the parish magazines. I'm certain there are loads of people around who don't realise that there's still an alternative to writing products off ad infinitum. Good news for them, good news for us too, don't cha know?"

As she seemed to have forgotten about my late arrival, I gallantly offered her a hand with the Aiwa NSXAV90 on her bench, which seemed to be giving her a tad more trouble than these usually do. "It's Desperate Fred's," she explained. "Apparently there's some smartass website which so-say tells people how to repair these and save a fortune. So instead of coming here as he normally would, he thought he'd try a little DIY. They've sold him a cheap pattern laser pickup and these useless instructions for more than the cost of the genuine item! Now one channel's missing, the unit won't play CD's at all and the disc changer's possessed by demons. At least he hasn't electrocuted himself I suppose."

She'd already checked the new laser and sure enough, found that the static protection solder blob was still in place. That dealt with, we turned our attention to the changer section,



where we found that there was no mechanism control because, on refitting the CD PCB, its unfortunate owner had crumpled the tiny sensing levers against the tops of the tact switches. Then, having replaced them and reassembled everything, we noticed that the changer still suffered the occasional brainstorm; after much head-scratching I finally realised that in his efforts to manoeuvre the board, Desperate Fred had managed the near impossible and fractured the stiff plastic clips which hold it in position. Their positions are critical to ensure alignment between the switches and the changer mechanism above. Finally things were set to rights and, having resoldered all the dry joints on the rear sockets, Dear Heart pronounced the unit fit for purpose. As she tested the tuner, an imploring radio evangelist's voice filled the room. "And friends, I say unto you, let my online crusade help unlock your business potential. Sow unto our good soil with Paypal..." Groaning inwardly, I escaped to the sanctuary of my bench and occupied myself by dismantling Mrs Sharpe's offending DVD recorder. Let's just say it bore the name of a major manufacturer. What a pity it wasn't a Philips G8, I mused, remembering simpler times when products were prized by their owners and we were kings... Then as the phrase 'good planets are hard to find' returned to my thoughts, I could have sworn I heard that radio voice again...

"And the evening and the morning were the seventh day... and on the eighth day He slept over and lo! Man created television. And the BBC moved on the face of the deep, and saw the light, blessing the good ether with an outpouring of wondrous images. And cherished were the goodly souls that tended the flocks of magic boxes so diligently. For it was in this way that the Good Earth remained unsullied, so coveted was

each to the bosom of the family. And Man saw that it was good, especially on Thursdays..."

Then the Earth spake: "Blessed are the set makers. But suffer whosoever fashioneth the boxes to yield sustainable products, which shall commandeth a proper retail price to boot. May they cleave unto the goodly souls, yielding them ample technical training and decent spares support, not to mention an helpful attitude. For they are the saviours of generations and will surely inherit a whole lot of flak otherwise..."

But then the Almighty opened one eye and clocked the time. And He spake unto the multitude. "Verily, I say unto you, this art a wake-up call for all concerned. Let not ye worship the serpent of product disposability, for it is at odds with my green and pleasant Earth. They who blithely sullieth the environment shall suffer an outpouring of CO<sub>2</sub> emissions and much hand wringing, not to mention a gnashing of teeth. And as for the wailing..."

As the echoes of the raging evangelist faded into obscurity, the sound of the Beatles 'Eight Days a Week' brought the present sharply back in focus. Then, powering off the Aiwa, Dear Heart whisked it from her bench, elbowing me painfully in the side as she passed by, to check if I was still awake.

The DVD recorder in question displayed a fault code and following a few musical sounding attempts at disc reading, would power off despondently. I slipped the plastic cover off the top of the mechanism and checked that the laser was free to move. Then in hope more than anything I did a Google on the model and was amazed to find numerous reports of the same symptoms by owners and engineers, their 'solutions' including resetting the unit, prodding the laser to a new position and replacement of the laser itself. As a system reset had no effect,

I came down in favour of the latter approach, and a quick parts search revealed that the pick up was listed separately, and at a very affordable price. As I reassembled the unit to await spares, I could hear Dear Heart over at the desk, triumphantly telephoning Mrs Sharpe with the good news and reassuring her that repair was the ideal option. It was as she came off the phone that I broke the bad news to her. Whereas the manufacturer's parts search screen showed a 'yes' in the active column, I'd just realised that their spares order screen said 'discontinued' for the same item. Grimly, I called the spares desk. "Yes, that's correct, those parts aren't available," cooed a voice trained in making bad news sound good. "What you'll need is the complete drive unit. Let's see, yes I thought so, trade price one hundred and forty six pounds sixty nine plus VAT". Dear Heart coyly suggested I should be the one to make the call revising the estimate as she feared her multitasking skills were suffering from over exposure. "So much for my having gone for one of your so-called good makes then," responded Mrs Sharpe once she'd picked herself up off the floor. "Sounds like you'll be saving the planet on your own at this rate," she added grimly. Then she brightened a little. "Mind you, after my chat with your lady technician earlier, I must say I did see the sense in what she was saying. Not your fault I suppose and it did give me a fresh take on waste and stuff... you certainly wouldn't expect to find impartial advice like that in the average High Street store". "Well, don't forget we're not totally impartial either," I reminded her. After all, we have a vested interest in repairing products remember. So you have to take that into consideration too". "Already have," she replied. "Doesn't stop you being right, does it?"

Pleased with her approach, we

rustled up a quick brew, but at the moment I was dunking the one and only custard cream, in strode Dudley our eco-friendly accountant with a Sony RDR-VX410 DVDR/VCR tucked under his arm and a solemn look on his face. Using a delicacy of touch befitting a Ming vase, he set about meticulously aligning its cabinet with the edge of the workbench. "Ah, Peter..." he winced goatily, teasing out the words. "If we could just perhaps ah...investigate, but spend no time on it of course, do you see?" "Ah, Peter, if we could just perhaps charge his fees for booking the job in, we wouldn't need to bother with the actual repair, do you see?" mumbled Dear Heart under her breath as she spooned out the submerged remains of the biscuit. Yes, he could well afford early retirement, Dudley was telling me a full twenty minutes later; unlike his less opulent brother who, he regretted, laboured for lesser rewards at the other end of the country...as a television engineer! By the time he'd departed, I'd somehow agreed to provide a detailed estimate at a fraction of our standard rate. Together, we tore the machine apart at the speed of light and identified the cause of its intermittent AV performance to be nothing more than a full complement of dry joints on both Scart sockets, probably as a result of constant fiddling with the faulty budget lead which he'd so grudgingly left in our care. Surely the job had to be worth at least an hour or so's labour; shrugging aside memories of a whopping invoice for his recent professional services, I phoned with the good news. Dudley was unimpressed. "Oh, Peter..." he responded gravely, "I don't think so, do you? I did see a pile of new ones rather like it at EnviroMart for rather less than a hundred guineas but then, ah...do you not see?" Baffled at his logic, and feeling I had nothing to lose, I pressed him further. "Well

actually Dudley, no, I don't see. By having this unit repaired, you'll have saved yourself well over fifty quid compared to buying even a budget replacement model, in fact more when you take into account those charges we discussed for our time already spent on it". Pausing for these words to take effect, I racked my brain for a convincing one-liner that might appeal equally to the snob, the technophobe and the environmentalist within.

"Furthermore, don't you see, you'll be getting back a quality product with which you're familiar, and best of all, doing the planet a favour by saying no to both unnecessary manufacture and landfill," I heard myself saying. Try answering no to that lot I thought while Dudley winced and groaned excruciatingly. At length, after pondering the options in his powerful brain, he announced his decision. "Thank you for your efforts Peter, but I think I'll just drive over with a cheque for your time and, ah, you can do what you will with my machine..."

After years in the trade, human nature rarely surprises me, but here I couldn't see the slightest logic in his decision. But Dud had one last surprise up his tweedy sleeve... "He said WHAT?" gasped Dear Heart incredulously as I recounted the final part of my conversation with the self-styled environmentalist. "Well, he then decided to switch his so-called green credentials back on again at the eleventh hour, because it suited him," I replied. "Do you know, he actually began to quiz me on how we intended to recycle his machine! I said I'd keep him informed, and believe me I'll make sure we do just that.

By mid-afternoon, having finally compiled some jottings for the local parish magazine HQ's, we were multitasking with Desperate Fred and Mrs Sharpe when I heard Dudley's powerful car roar to a standstill outside. His visit couldn't have been

better timed. As he entered, Fred was commending us on his newly repaired Aiwa. "Should have just come to you in the first place," he grinned. "Didn't want to get rid of the old gal just yet, the new ones in the shops aren't a patch on this one and besides she sounds like new now. I've always observed that cheap doesn't pay in the long run, so next time I'll be taking my own advice!" Just along the counter, Mrs Sharpe was clutching Dudley's disowned Sony machine. "Once again, I can't thank you enough," she was saying to Dear Heart as she completed her cheque. "This has a far better spec than my last one – and you've actually saved me money into the bargain. Beats me why anyone in their right mind wouldn't want to have it repaired. Ah well, their loss, my gain!" Dudley squirmed and examined his cufflinks keenly as she swept past him. "Do allow me madam," volunteered Fred, fetching the back of his hand a glancing blow with the Aiwa in his haste to open the door for a lady. "First-rate service here, sonny," he remarked genially. "Need to look after people like these". Dudley met his gaze and shrank back; for once his stay was mercifully brief. "Your cheque, Peter," he said flatly, summoning up as much dignity as he could muster. "Your receipt, Dudley," responded Dear Heart with a flourish.

He'd almost escaped to the safety of his car when I called him back. "Ah, Dudley, haven't you forgotten something? Look, we've still got your old Scart lead." As I pressed the offending item in to his grip he gave a curt nod. "Obliged, I'm sure," he managed to say. "I wouldn't bank on it," murmured Dear Heart under her breath. "With luck, despite people like your good self, we and this planet may survive to fight another day..."

*To read Peter's letter to the parish magazine go to*  
[www.televisionmagazine.co.uk](http://www.televisionmagazine.co.uk)

# How to Satellite

by Roger Bunney

**T**he afternoon of December 27th and a new flash over Radio 5 announced that in Pakistan, Benazir Bhutto had been assassinated in her vehicular procession on the streets of Rawlapindi both by shooting\* and the suicide bomber then detonating his own car, killing at least 20 supporters and security staff. [A quick check over the Eutelsat W1, 10° East UP4 APTN downlink revealed only their usual corporate identification logo, I had rather expected the live relaying of Pakistan TV networks as happened with the previous bombing attempt on Mrs. Bhutto at Karachi October

18th when pictures from both the GEO and AAJ networks were carried. A rapid 'blind scan' over 10° East found 'SATLINK 9722-5' relaying live programming from 'Dawn News' with updates, on-the-street interviews and reports + hospital footage and with formal presentations from political leaders calling for peace – as riots broke out in the city's streets. The 'SATLINK' feeder appeared @ 10.986GHz Vertical [Symbol Rate 4167 + Forward Error Correct 5/6]. Several checks over IS-12, 45° east found no assassination news activity being carried from the Pakistan region, the news most likely finding its way into Europe over establish C Band feeders. [\* As heard from a live Pakistan based TV report, later government reports on the cause of death differ]



**M**id December provided a flurry of news feeds from Bali covering the UN meetings discussing the future energy and environment situation over IS-12, 45° east. 'WORLD AND SKY' were active @ 11.517GHz-V and 'TCG' @ 11.525GHz-V [both 5632+3/4].

On a lighter note there's increased activity over IS-10 with a multiplex package of 4 TV channels, 3 of which [at the time of writing] are carrying programme content. One channel carries the logo 'The First Russian TV Package in Europe' along with 'Bridge TV' – pop; 'Sarafan' – films; 'Feniks-Art' – arty content. The multiplex airs in the clear and found at 11.55GHz-V [27500+7/8]. When first found on a blind scan the multiplex appeared with an SR 6666+7/8 but changed to 27500+7/8 after a few days.

Curiously a promotional video carried over the Sarafan channel suggests that the multiplex is using 27500+ 3/4; perhaps it will be soon!

The 'I am Legend' film premiere was featured in a live outside broadcast [OB] for Sky Movies evening of December 19th from the Leicester Square Odeon. All the main stars from the film were present for interviews and interaction with the massive crowd of film enthusiasts, prior to moving into the cinema itself for the screening. Intelsat 10-02 @ 1° west carried the transmission back to Sky HQ at Isleworth, down-linking @ 11.485GHz-V [5632+3/4]. The Irish greyhound OBs that regularly feature over 10-02 now are signing as follows – 'VITEL DUBLIN' on 11.501GHz-V [3199+3/4] and 'VITEL CORK' from the Curraheen Park track on 11.504GHz-V [3249+2/3]; a curious variation in parameters!

Noting the Rawlapindi assassination coverage on December 27th above over 'SATLINK-9722-5'

on W1, the same frequency featured 'SATLINK 9722-53' on the afternoon of the 8th when an APTN feeder out of Jerusalem on colour bars went to a red screen and 'SIGNAL LOSS DETECTED', eventually switching to a 'KUWAIT TV' caption inlaid over colour bars. Slightly higher in frequency at 11.053GHz-V, there appeared 'BAHRAIN SATELLITE TELEVISION FEED' with service identification 'DSNG-1' running SR3125+FEC 3/4, this preceding a news package transmission. An interesting change to the live OB feed back to BBC TV Centre was the Thursday night 'Question Time' programme which on December 13th deserted its usual Intelsat 10-02 home and instead linked over Eutelsat W1 signing 'UKI-467 Path 1' – 11.110GHz-V [5632+3/4] and using MPEG-2 rather than the 4:2:2 norm as seen over 10-02. The programme was successfully recorded in at the TV Centre [for playing out later that evening] as the satellite uplink truck ceased its transmission at 2149 hours.

The satellite feed activity continues throughout the year and Christmas Day 2007 produced an interesting 'Merry Christmas' from the 175th Cavalry Troop based at Camp Liberty, Baghdad, Iraq. This 'festive' offering probably for NBC featured a group of GIs gathered around and on armoured vehicles and on cue from the reporter would chorus "Merry Christmas from the 175th Cavalry", rehearsals went well though a 'take 2' was necessary to gain the most effective greeting for the folks back home. The GIs clearly enjoyed their television exposure being somewhat safer than their normal daily routine, the 'live' was carried through Eutelsat W2, 16° east as service ident 'DEFAULT' @ 12.543GHz-Horizontal [5632+3/4], NTSC. A few minutes later – noon UK time] also on 16° east was

another 'live' for the RTL Dutch service. The service identification 'MERRY XMAS VT' was perhaps rather sick in the circumstances since this was a live transmission reporting the fire in a town centre where a shop and living accommodation above was burnt out with 4 lives lost. RTL downlinked this item @ 12.535GHz-H [both the 175th Cavalry and RTL using 5632+3/4].

'ABC IRAQ MOBILE UKI-959' has been intermittently appearing during the period in review using Intelsat 10-02, 1° west, check around 11.674GHz-H [3208+7/8] for transmissions, colour bars etc running NTSC. This is just below the more commonly viewed 'ABC SCOPUS' at 11.670GHz-V [3208+7/8] that often fires up on a 24hour basis if required by the NY newsroom.

Christmas Eve also featured a live feed over W2 over 'DEFAULT' late afternoon UK time in support of US forces, this from Kandahar, Afghanistan. A service was being conducted in the darkness, lit mainly by candles and a campfire, many soldiers holding flickering candles that created a Christmas atmosphere. Carols were sung and an appropriate address given, undoubtedly provoking thoughts of past Christmas' back home and far from the harsh realities of the fight against the Taliban. The warfront midnight service was found @ 12.565GHz-H [5632+3/4]. This same afternoon saw a live transmission over Atlantic Bird-1 [AB-1], 12½° west for the BBC using their usual MPEG 4:2:2 standard and signing 'BBC BAGHDAD P1' @ 11.089GHz-V [4224+7/8].

In a month when a couple of well established advisors are kicked out of Afghanistan, December 22nd saw an impassioned plea by the Afghan president asking France for more

assistance. The packaged report – in English – was monitored over W1 intended for French TV but carried over the Turkish news agency feeder ‘IHA\_SNG\_AFGHAN’ @ 11.044GHz-V [3124+3/4]. This month also saw the impressive annual ceremonies from the Grand Mosque in Mecca where about 2 million Muslim pilgrims perform evening prayers in readiness for the 5 days of the haj. The pilgrims walk 7 times around the Kaaba, a square structure that contains the sacred black stone, showing their faith and solidarity. The haj is preceded with a period of ritualistic prayer during the 2nd week of Dhu al-Hijjah – being the 12th month of the Islamic calendar. Many Middle Eastern TV channels carry the outside broadcasts live from Mecca, provided by Saudi TV. All Arabic TV channels can be checked out in the BADR slot @ 26° east, Saudi TV is found within their dedicated multiplex at 12.015GHz-V [7500+7/8] with one channel carrying full time coverage – though most Arabic TV channels will carry Saudi TV output during this period in part or whole.

Much Christmas activity on December 16th with a multi camera shoot for the Liverpool Nativity play. Several iso cameras were linked over 10-02, 1° west as follows - ‘CAMERA 10 CRUIS’; CAMERA 15 CRUIS’; LIVERPOOL NATIVITY’; and ‘NATIVITY CAM 17’ and using 11.505; 11.521; 11.530 and 11.539GHz-V [6076+7/8] respectively. And an OB for Irish TV was linked from a children’s hospital on the 19th over Eutelsat W2, 16° east – 12.557GHz-H [5632+3/4] – Santa arrived with his sack of presents and gave them away “Ho, Ho, Ho” – ‘TANDBERG SERVICE’ provided the satellite truck.

A very busy month for satellite reception, the above just a

representative selection of signals that can be received on a relatively small Ku band dish. The maximum dish size across the UK now that doesn’t require planning permission is 1 metre; dish prices are relatively low, an H to H mount adds little to the dish price and a blind search receiver can cost below £70. Satellite zapping is an affordable hobby provided there’s room to install a dish, even on a lawn with its own stand and invisible behind the garden fence.

### Broadcast news

In the late 90s the Isle of Wight local TV station ‘TV-12’ transmitted to the Island on ch.54 for some years but lost their franchise to ‘Solent.TV’ which successfully replaced TV12 offering mostly local [Island] originated programming, news etc. Late May 2007 saw the station abruptly close down following insolvency of the parent charity group of which Solent.TV was but a part. A new Island TV channel has launched [December 31st] providing ‘good old fashioned family entertainment’ but it’s available only on Internet from the following [www.ukentertainmentchannel.com](http://www.ukentertainmentchannel.com) site. A local news service for the Island may be included later. The ‘UK Entertainment Channel’ is run by Rodney Hearth who has operated the ‘Mediterranean International Television’ channel in Southern Spain since the early 1990s. There’s no intention [at this stage] of transmitting the new UK TV [IW] service over the former Solent.TV ch.54 transmitter from Rowridge that will limit local viewer numbers.

‘Angel Radio Isle of Wight’ is airing 25 watts of music programming [from the pre 60s] intended for a mature audience across the Island and nearby mainland at 91.50MHz vertical from a transmitter on the high downs to

the East of Newport. Programmes originate from the Angel Radio studio base in Cowes and can be received up to a 15mile radius of Newport.

A new Hong Kong based satellite TV channel will open August 8th, 2008 offering Chinese business news and entertainment on a 24hour basis across S.E. Asia. ‘Eastv’ launch coincides with the opening of the Beijing Olympics though a 3month test period will precede the station’s official opening. And Shanghai opened the ‘International Channel Shangai’ January 1st offering a 19 hour programme day of news, entertainment, imported TV shows in both English, Japanese languages with inlaid Chinese subtitles. This will be another Internet distributed TV channel.

Polish TV has created a TV channel ‘BELsat TV’ that is broadcasting news and other programming into it’s neighbouring state Belarus, following the Belarus authorities attempts at silencing independent news provision and the opposition party. It can be found on the Astra-1 slot @ 19.2° east, 10.773GHz-H [22000+5/6], currently airing evenings but intends to increase output to 16 hours daily.

The digital advance has been delayed in Italy by 4 years with analogue switch-off date now December 2012. Slovakia also reckon a late 2012 analogue close down but at this time there are no official DTT services available but by mid 2008, three major Slovak hope to offer a TV channel each in a shared DTT multiplex. The Gibraltar TV service has confirmed a 2012 analogue close down but will be installing an additional 6 relay transmitters across the ‘Rock’ for DTT. Once DTT is established a total of 8 TV channels will be available locally.

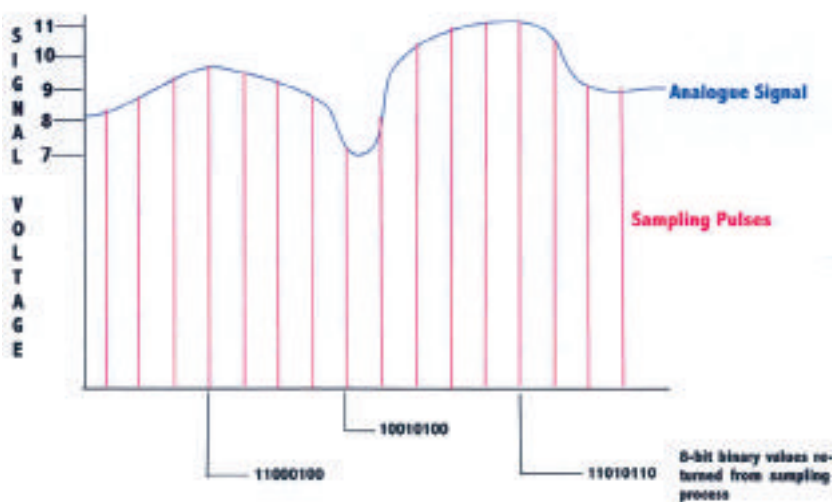
# Digital transmissions

*The second in J. LeJeune's introduction to digital transmission*

**A**nalogue technology became the standard when the telephone became established and by the 1870s there were telephone networks in all of the major cities in the world. Wireless had not yet achieved voice and music transmission, but wired broadcasting had begun in France, The UK, Hungary and America. In the UK the system was known as “The Electrophone” and relayed stage dialogue and music from many leading London theatres and also from the city’s churches. In Paris a system known as the “Théatrophone” brought the sounds of the Paris Opera to specially established listening rooms in stereo! Not bad for the 1870s! The telegraph, using the Morse Code was the earliest electrical digital communication method. Analogue technology advanced further as the triode valve made it’s debut and began to make amplification of audio signals possible, along with other advances like oscillators and modulators to permit radio transmissions. The Electrophone, along with its European and Transatlantic cousins, ceased operation in the mid 1920s as Radio gained popularity. Analogue techniques reached a zenith in the 1940s and 1950s thanks to wartime applications followed by the spread of Television.

Digital technology, as we know it now, really had to wait for the invention of the transistor. Valves were used for digital applications but they were basically analogue devices and did not perform well as switching elements in digital circuitry. The reason for this is that they do not have well-defined ‘on’ and ‘off’ states, and in the large numbers necessary for

Figure 1: Sampling.



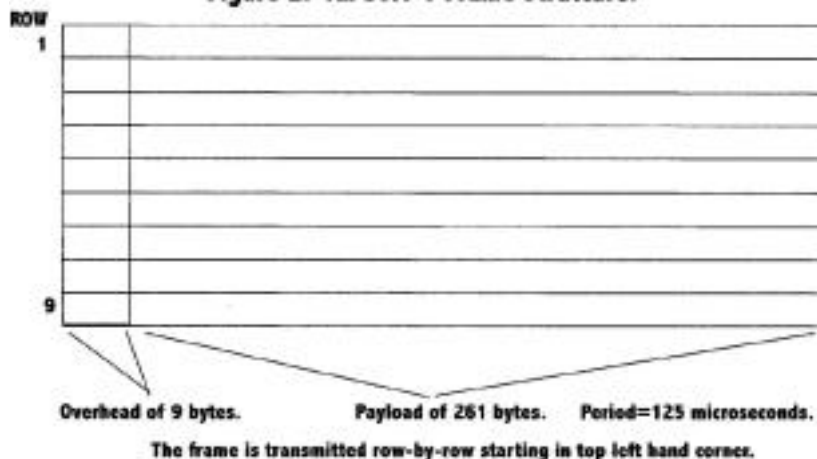
digital switching they consume considerable power. The transistor, therefore, became the vehicle through which digital technology advanced rapidly to its present-day state. In the field of communications digital techniques have created networks that span the globe carrying millions of data signals; telephone, audio, television, internet and email, business data, monitoring and control. Much of this vast network is underground and on the sea bed, but digital technology has also benefited satellite communications making it financially viable by increasing the information carrying capacity of the transponders out there in space.

In an analogue telephone system the microphone in the telephone handset converts the sounds of the human voice into a varying electric current that bears a direct resemblance to those sounds. Microphones and earphones are called “transducers” because they convert sound waves into electrical energy and also back into sound waves, the minute variations in

air-pressure that carry sound across an open space. Present-day public telephone networks do not handle analogue audio signals for great distances. The line between the subscriber and the exchange, the ‘local loop’, is now the only analogue section of the network. Digital conversion takes place at or before the exchange and the data from one single channel is multiplexed with up to 31 other sources using 8-bit Pulse Code Modulation (PCM).

## PCM

All forms of analogue to digital conversion use a technique known as sampling. The amplitude of the analogue signal is measured at uniform intervals and the result quantised and encoded into binary values, then stored momentarily for transmission. Quantising is a process that reduces the amount of data required to represent an analogue waveform by rounding sampled values up or down to a set of fixed steps. However the quantising function should not produce excessive

**Figure 2: An STM-1 Frame Structure.**

unwanted effects such as distortion and noise. The sampling rate is normally set at over twice the highest frequency present in the analogue signal. For telephony, with a top audio frequency of 3.7KHz, a rate of 8KHz is used. This allows 255 different values to be returned by the encoder, permitting a fair speech quality to be achieved. Figure 1 explains the sampling function. The digital data is transmitted on a 64 kilobits per second channel that is multiplexed with 29 others ( plus an additional two for signalling and timing making a total of 32 channels). The multiplexing process is known as TDM (Time Division Multiplexing) and in modern networks is placed as close to the end-user as is feasible, often in a road-side cabinet or within a suitable building. The 64kb/s channels are termed DSOs (Digital Signal Zero) or more colloquially as 'time-slots' because they are subsequently interleaved into a much larger data stream by the multiplexer. From there they are conveyed to the exchange over the access network. The access network and the inter-exchange circuits use technologies known as SONET (Synchronous Optical Network), and SDH (Synchronous Digital Hierarchy). Some older networks use Plesiochronous Digital Hierarchy. SONET and SDH are very closely related, and have the ability to transport earlier transmission standards, such as PDH, and are

themselves able to be transported over ATM (Asynchronous Transmission Mode) or 'Packet Over SONET/SDH' networks.

### PDH, SDH and SONET

PDH is an older transmission standard but may be in use in some networks where the latest techniques are not necessary or have not been adopted for financial reasons. Plesiochronous means "almost synchronous" and refers to the fact that its frames of data are not of uniform length. Both SONET and SDH are synchronous, and this feature makes the process of extracting or inserting data on a network much simpler because timing signals can be used to select the desired slots. The network clock, the heartbeat of the system, is generated from an atomic clock source and allows the entire network across the globe to operate in harmony. SONET and SDH are basically universal transport containers that can move many differing kinds of data from business traffic to voice and video. SDH is bandwidth-flexible and this permits its wide range of usage. The basic unit of SDH is the Synchronous Transport Module – level 1 (STM-1) and this operates at a rate of 155.52Mbit/s. SONET's basic unit is the Synchronous Transport Signal-1 (STS-1) and operates at 51.84Mbit/s, precisely one-third of the SDH unit. The systems are packet oriented, the packet frame has a

header followed by the payload of data and sometimes bearing a trailer for error checking. The frame always has a fixed length. See Figure 2. The STM-1 frame is built up of nine rows of data, each row headed by nine bytes of control data followed by 261 bytes of the 'payload' of data to be transmitted. The entire frame occupies a 125 microsecond time-slot giving a speed of 8000 frames per second, and a bit rate of 155.25 bits per second. The header contains data necessary for the transmission such as source, destination, quality monitoring and current status, etc. The data that follows can be of a variety of applications, and the trailer, if added, is for an error checking purpose such as Cyclic Redundancy Checking. SONET is in use principally in the USA and Canada, SDH in the rest of the world.

Multiples of the lower-speed streams can be combined into one high-speed stream and the highest speed that can be found commonly is just below 10Gbit/s. Higher rates can be achieved and a few operators are offering a 40Gbit/s service. On fibre optic networks SONET signals can be transported on multiple wavelengths of infra-red light making highly economical use of the transmission medium. This technique is called Dense Wavelength Division Multiplexing (DWDM) and is analogous to having a number of frequencies on a co-axial cable. Submarine and other long-haul fibre optic circuits use DWDM. These networks are 'switched' and once communication between the end-points is established the traffic remains on that channel – much like the Plain Old Telephone Service (POTS). We will see later that Internet Communications differ in this respect, the routers finding the first available open channel on a microsecond-by-microsecond basis. Packets arriving out of chronological order are sorted out by looking at their time-stamping data and forwarded to the end-user.

# The race for television

## Part 1 of Tony Thompson's TV history

**T**he possibility of television – seeing at a distance – was first suggested before radio transmission was a practical reality. The French scientist Alexandre-Edmond Becquerel observed in 1839 that electro-chemical changes occurred in selenium when it was exposed to ultra-violet light. We know this as the phenomenon of photo-electricity, essential for television. A brilliant scientist well ahead of the technology of his time, Becquerel could not put his discovery to use although his experiments later led to the development of photocells.

In 1873, so the story goes, a telegraph operator involved in experiments to do with the Atlantic telegraph cable was using, quote, ‘some high resistances’ made from selenium. He observed that his instruments registered changes when the selenium in the ‘resistances’ was exposed to sunlight, resistance decreasing under illumination. Thus, the properties of Selenium were, in effect, re-discovered with a new and better understanding and subsequently the findings were reported in ‘Nature’, the influential scientific journal. This led to considerable speculation and many fanciful ideas on the possibility of television involving selenium as a light sensitive medium.

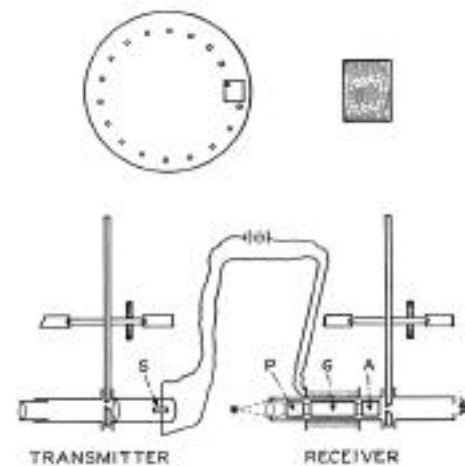
### Early proposals

In 1881, two British experimenters, Professors William E. Ayrton and John Perry, suggested a machine consisting of a mosaic of selenium cells, each connected to a receiver cell of some (unspecified) kind. The selenium mosaic was to have a

picture projected upon its surface from a magic lantern (i.e. a slide projector) and the image would then reappear at the receiving end in a pattern of light and shade. Although this system would be hard wired with matching numbers of selenium cells and receiver devices, there was the suggestion that light from the receivers could be thrown upon a screen, and also that in practice only a few cells at either end might be needed if the selenium cells could be made in some fashion to rapidly move over the field of view: they further suggested that the receiving end could likewise be scanned in principle by ‘a device... involving a metal plate and a system of magnets’. To the best of this author’s knowledge, no practical example was ever constructed; the device remained theoretical in concept.

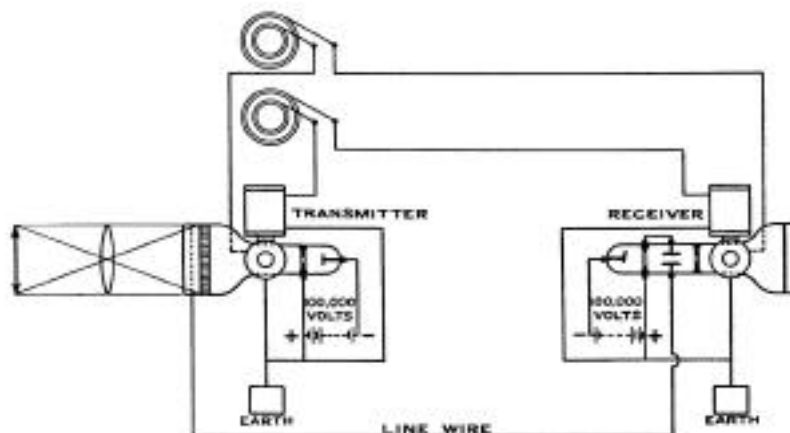
Around the same time, the English physicist and inventor Sheldford Bidwell (1848–1909) proposed the employment of a Selenium cell with a photographic image focused upon it, using an arrangement of some unspecified kind that allowed the selenium to see only a minute portion of that image at any one instant. He considered that by moving the cell across the image in straight lines so as to receive highlights and shadow areas in succession, it might be possible to regulate an electro-chemical drawing system based upon existing copying telegraph principles in such a way as to recreate the image in light and shade.

The Prussian (German) experimenter Paul Gottlieb Nipkow (1860–1940) patented what was claimed to be the world’s first electromechanical television system in 1884 but again this remained



theoretical and as far as is known, Nipkow never attempted to put his theoretical ideas into practice. In essence, his invention was the scanning disc. Many years later he recalled his first sight of television based upon a version of his disk. It was in Berlin, 1928, at a crowded demonstration: ‘I waited... growing ever more nervous,’ he commented. ‘Now for the first time I would see what I had devised 45 years ago... a dark cloth was pushed to the side, and I saw before me a flickering image, not easy to discern.’ What he saw was the TV system devised by J.L. Baird. Even if Nipkow had built his invention (and it is just possible he may have, though there is no evidence of this) he could never have achieved success as the requisite amplification was unheard of at the time. Baird used the then still developing technology of valve amplification to boost the minute fluctuating signals from a selenium cell; the cell was reacting to light variations reflected from an image seen through a Nipkow-type scanning disc. The essential valves amplified the selenium’s varying signal sufficiently to drive a flat-plate neon lamp viewed through a second scanning disc synchronised with the first.





### The beginnings of all-electronic television

Long before Baird's involvement in television came a remarkably far-sighted theoretical suggestion. An all-electronic television system was described by AA Campbell Swinton (1863-1930)<sup>1</sup> in a letter to the scientific journal 'Nature' 1908, suggesting the use of a cathode ray tube for transmitting (i.e. a camera) and receiving images, saying 'Distant electric vision can probably be solved by the employment of two beams of cathode rays, one at the transmitting and one at the receiving station, synchronously deflected by the varying fields of two electromagnets placed at right angles to one another and energised by two alternating electric currents of widely different frequencies, so that the moving extremities of the two beams are caused to sweep synchronously over the whole of the required surfaces within the one-tenth of a second necessary to take advantage of visual persistence. Indeed, so far as the receiving apparatus is concerned, the moving cathode beam has only to be arranged to impinge on a suitably sensitive fluorescent screen, and given suitable variations in its intensity, to obtain the desired result.'

Campbell Swinton's system remained in the realms of theory, awaiting devices yet to be invented, but it formed the basis for the

successful practical system devised by EMI in the later 1930s.

The year before Campbell Swinton's theorizing and surely unknown to the far-sighted Scot, the Russian scientist Boris Rosing (1869-1933) had suggested a system of television that used a Braun tube (a primitive form of CRT) as a receiver, with a mechanical camera consisting of scanning mirror drums. The Rosing design never succeeded due to the crudity of the photocells and display tubes of the time and crucially because of the total lack of any means of amplification – the Braun tube predated the amplifying valve. However, by 1911 Rosing was using potassium photocells for his television experiments. These eventually proved to be superior to Selenium cells in certain important respects.

### John Logie Baird

The Scottish experimenter J.L. Baird (1888-1946) built a Nipkow disk system, using Selenium as a light detector, as briefly described above. He succeeded in capturing shadow images in 1923 and gave the first public demonstration of television in 1926. Selenium was limited by poor sensitivity and by 'lag' – inertia to change – placing an upper limit on image definition. As if that wasn't bad enough, the Nipkow disc was itself very inefficient; after all, other than Nipkow's 15 or Baird's (later) 30 tiny scanning holes, it was a solid disc of

material completely opaque to light and, importantly, definition was inherently low in terms of the number of scanning lines at one for each hole. The holes could be made square, rather than circular, to help slightly in the quest for light, and more could in theory be added to improve definition to an extent but together with practical mechanical limitations and the weakness of Selenium, the very real problems caused by the disc made progress difficult. Substitute scanning devices such as mirror drums, mirror screws and oscillating mirrors offered some improvements in performance compared with the Nipkow disc but they also brought mechanical limitations of their own and remained suitable only for relatively low definition work.

### American experimenters

Charles Francis Jenkins (1867-1934) was another pioneer of mechanical TV, the American equivalent of Baird, experimenting about the same time period with roughly comparable results. By the early 1930s RCA had bought up all interests in his business – which by then was in the hands of the Lee De Forest company – and work on mechanical TV in the USA came to an abrupt halt.

In 1923, Vladimir Zvorykin (1889-1982), a Russian émigré working for Sarnoff's RCA organisation, invented the 'iconoscope', a device which was to be the forerunner of the electronic cameras developed in 1930s by RCA and the Marconi-EMI conglomerate in Britain. According to some sources, Zvorykin had been a pupil of Boris Rosing and had assisted in the latter's early television experiments. Rosing himself had remained in Russia and continued to work on television until he was exiled by Stalin.

Philo Farnsworth (1906-1971) experimented with electronic signal pick-up methods, devising his 'image dissector electron camera', where an image was focused onto a

photosensitive cathode which emitted electrons in proportion to the amount of illumination. The released electron cloud was made by electromagnetic means to 'scan' across an anode in such a way that at any one instant only electrons from a single point of the image were able to escape through an aperture in the anode to create the video signal. This system sounds insensitive and it was, very much so; almost all the emitted electrons were lost. To counteract this failing, Farnsworth developed an 'electron multiplier' said to produce up to one million-fold amplification, but still the camera remained somewhat insensitive.

Farnsworth filed his patent in 1927 and demonstrated the world's first all-electronic television in 1928; but he fell foul of RCA. Certainly there appears to have been some dubious patent-infringing on the part of the electronics giant: Zvorykin visited Farnsworth's laboratory in 1930, probably under false pretences and was said to have 'copied' the apparatus for RCA. Long - but in essence futile for Farnsworth, despite his eventual vindication - legal battles commenced. Finally, in 1939, Farnsworth sold his rights to RCA Victor for \$1 million. His brilliant, inventive mind had for many years been plagued by depression and the prolonged battle with RCA must have made his struggle with the illness even harder to bear.

### A prize offered and a demonstration starts

On May 29th 1923, an advertisement appeared in the classified columns of The Times offering £500 to 'the first British subject who, in the opinion of experts to be appointed, best demonstrates the practical possibility of Wireless Television'. This was in fact an advertisement for the first edition of 'Wireless Review' magazine! Whether the prize was ever claimed is unknown to this author.

March 16th, 1925. Selfridges started their demonstration of Baird's television system on stage in their top-floor restaurant. They claimed success, calling it a 'new wonder, shown in a form which scientifically proves it can be done'. After waxing so lyrically, they came down to earth by admitting that 'Television in the form which it now is may not be so spectacular [i.e. with its cardboard box and bicycle chain construction, comparing it to Bleriot's original monoplane] ... Television is to light what telephony is to sound... the apparatus here is the first to be successful... of course, absolutely in the rough'. They went on to mention financial restrictions but oddly did not actually name Baird, despite having described his equipment quite clearly.

In April of 1925, one Dr. Fournier d'Abbe privately exhibited (an oxymoron, surely) apparatus designed to transmit 30 simultaneous sounds independently of one another and to separate them at the receiving station. This arcane device used musical notes to represent elements of a picture, the notes being reconverted into light at the receiver. This proved to be yet another of the many blind alleys on the errant road to television.

In January 1926, Baird demonstrated his system, with certain improvements, to members of the Royal Institution in Frith Street, Soho. He used his ventriloquist's doll's head as a subject. The images were described as faint and often blurred, but his claim for success was substantiated and having gained financial support, he applied to the Postmaster General for an experimental transmitting licence to carry out first trials. The licence was granted and he proceeded in August of that year to transmit on 220 metres. 'The first television station in the world' was his claim. The following month the Baird television transmitter was exhibited at the Olympia radio show, a week or so after his original

television apparatus, the one built from bits of wood, cardboard, bicycle lamp lenses and assorted odds and ends, went on show in the Science Museum.

In March of the following year, Sir Oliver Lodge gave an address at University College, London. After remarking that physical science had made great strides forward in recent times, he stated that he'd just seen for the first time that very morning, some of 'Mr. Baird's experiments... infantile in development... the promise of more.' Progress for the impatient Baird was tortuously slow. Meanwhile, he must have been acutely aware that other experimenters were catching up. The publicist in him came to the fore again in September 1927, when he demonstrated a phonograph adapted to reproduce 'images of faces, figures and objects' from a recording. Whether he showed the device actually working is in doubt; however in recent times his discs have been subjected to analysis and moving images have been recovered from them with the aid of a computer, so it can be said with some certainty that Baird was the first with recorded video, whether or not he succeeded in replaying them.

On the 8th of February 1928, Baird followed in the footsteps of Marconi's pioneering transatlantic radio transmission and sent images across the Atlantic to New York City. Again, the dim, blurred images could not be recognised as a particular person but it was apparent that they were the heads first of a man then a woman. He quickly followed this publicity coup by opening the world's first television sales department at Selfridges on 20th February. The new department sold kits and parts to enable amateurs to build their own very simple receivers. It was emphasised that it was only a beginning and more technical machines would follow.

Part 2 of the race for television will appear in the next issue...



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- 4 *The Volunteer Organist*, Peter Dawson, 1913
- 5 *Dialogue For Three*, Flute, Oboe and Clarinet, 1913
- 6 *The Toymaker's Dream*, Foxtrot, vocal, B.A. Rolfe and his orchestra, 1929
- 7 *As I Sat Upon My Dear Old Mother's Knee*, Will Oakland, 1913
- 8 *Light As A Feather*, Bells solo, Charles Daab with orchestra, 1912
- 9 *On Her Pic-Pic-Piccolo*, Billy Williams, 1913
- 10 *Polka Des English's*, Artist unknown, 1900
- 11 *Somebody's Coming To My House*, Walter Van Brunt, 1913
- 12 *Bonny Scotland Medley*, Xylophone solo, Charles Daab with orchestra, 1914
- 13 *Doin' the Raccoon*, Billy Murray, 1929
- 14 *Luce Mia!* Francesco Daddi, 1913
- 15 *The Olio Minstrel*, 2nd part, 1913
- 16 *Peg O' My Heart*, Walter Van Brunt, 1913
- 17 *Auf Dem Mississippi*, Johann Strauss orchestra, 1913
- 18 *I'm Looking For A Sweetheart And I Think You'll Do*, Ada Jones & Billy Murray, 1913
- 19 *Intermezzo*, Violin solo, Stroud Haxton, 1910
- 20 *A Juanita*, Abrego and Picazo, 1913
- 21 *All Alone*, Ada Jones, 1911

# Long-distance television

by Keith Hamer & Garry Smith

**F**rom mid-December, anti-cyclonic weather conditions brought chaos to local TV reception as European signals penetrated the United Kingdom. It was a spectacular event, particularly with an influx of Polish signals in Band III and UHF over a three-day period.

## Reception Round-Up

Conditions in the south-west began building up from December 11th, initially with FM stations Magic and Heart from Croydon heard in Bristol by Stephen Michie. By the 14th, French TV stations began appearing, typically Canal Plus on Channel L5 (176.00 MHz) and France-2 on L27 from Lille, the latter with sound only. On the 19th, Belgian networks RTBF-1 on E8 and TV1 E10 were present. On the 21st, Denmark E7 was visible in addition to an E8 signal co-channelling with the Belgian RTBF-1 service; this was thought to have originated from the Danish Århus transmitter. Many transmitters in the United Kingdom were received at high strength including Sudbury which clashed with Wenvoe.

On the 17th, Norwegian and Danish signals were reaching Kings Lynn. On the following day, Cyril Willis discovered NRK-1 on Channels E6, E7, E8, E9, E10 and E11 in addition to the Norwegian TV2 network on E31, E36 and E43. At 0955 on the 20th, Polish signals began arriving with TVP-1 on Channels R7, R8, R9 and R10 plus TVP-2 on R36. On the same day, a Danish digital multiplex was identified. Throughout the period,

many FM and DAB transmitters were logged from the Netherlands and Germany, the latter including AFN and BFBS broadcasts.

Peter Barclay (Sunderland) E-mailed an envious log with TVP-1, TVP-2, TV Polsat and TV Polonia logged over a three-day period from the 19th with fresh transmitters being added day by day. Many Danish DR-1 and TV2 outlets were received during the period with various digital multiplexes from Germany with signal levels high enough to display pictures.

There were two short but sweet Sporadic-E openings during the month. Stephen logged Denmark on the 3rd at 1020 with a subtitled programme on E3 and on the 26th, Cyril identified Moldova R2 from around 1600.

Madeira E5, Algeria E5 and E10 and the Moroccan Laayoune transmitter on Channel M9 (203.25 MHz) have all been received in the Algarve by Hugh Cocks during recent tropospheric enhancement. The Laayoune outlet (opposite the Canary Islands) once operated on Channel E4 (62.25 MHz), mainly in the early Eighties.

A special temporary transmitter installed for the Marrakech December 2007 film festival was received by Hugh on UHF over a distance of around 400 km. The slightly grainy analogue picture displays co-channel interference but its digital equivalent is perfect!

## Bad Season For Some!

Many established DX-ers have voiced their opinion on the 2007 Sporadic-E

Season. It was generally dreadful, not because of fewer transmitters operating but the openings were rather tame with few all-day events at the height of the season in June and July. Some of the better openings occurred unexpectedly during the Autumn. There seemed to be a north/south divide with better reception in the south. Paul Farley down in Newhaven on the south coast experienced several transatlantic openings and now has an impressive collection of off-screen pictures as a result. By monitoring for two-metre openings he was able to capture Band III Sporadic-E on more than one occasion from North Africa, with definite sightings of Algeria on E5.

Iain Menzies in Aberdeen describes the past season as appalling and tropospheric openings seem to be a thing of the past up there. While in France, Iain purchased a DVB-T receiver and as well as being equipped for Band III digital reception, it has a 5V powering facility for an active receiving aerial. All Iain needs now is an invasion of Scandinavian digital signals to try it out on!

## DX Newsdesk

USA: Roger Bunney (Romsey) advises that the USA will abandon analogue transmissions in February 2009. This will affect all major television stations but low-power community stations will continue in analogue for some time. The FCC is trying to force broadcasters to insert scrolling text across the bottom of the picture to advise the unknowing American public as to what will happen. Broadcasters are resisting



The German MDR (third network) News via a digital multiplex during the December tropospheric event



TVP-2 from Poland appears in Sunderland



A temporary Moroccan transmitter received in the Algarve



Something to look forward to in 2008 -the E21 Network on Channel E3

this move despite a survey revealing that only about 25% of the American population are aware that analogue will end in the near future.

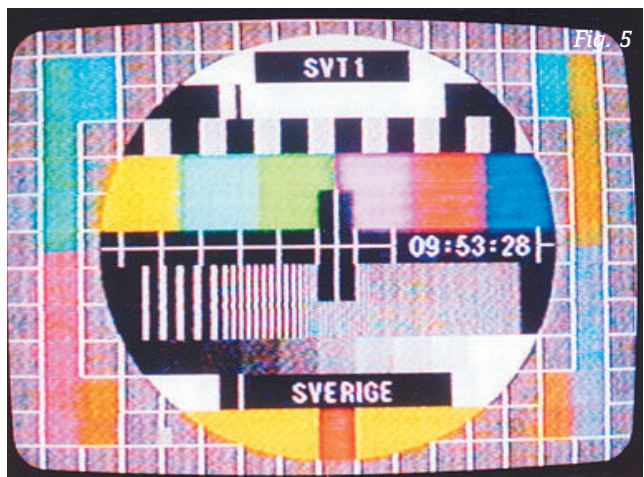
Portugal: Hugh Cocks (Algarve) comments that RTP is showing no interest in operating a digital terrestrial service as finances are somewhat strained. However, a fifth terrestrial licence has been granted which will run from 2009 so a completely independent company may eventually take up the challenge. At the moment it looks as though the analogue outlets will be around for the foreseeable future.

### Feedback!

Please send news, comments and any off-screen DX-TV photographs, particularly any unusual test cards and captions, to:

Garry Smith, 17 Collingham Gardens, Derby DE22 4FS.  
Our E-mail address is: [Television@dx-tv.fsnet.co.uk](mailto:Television@dx-tv.fsnet.co.uk)

If you are interested in archive TV, test cards and identification captions, check out our website at [www.test-cards.fsnet.co.uk](http://www.test-cards.fsnet.co.uk) via the Internet.



A thing of the past -analogue tropospheric signals from Sweden

# Driving down memory lane

*Bill Wright has fond memories of his early modes of transport - including an Anglia van formerly owned by a farmer*

**T**he other day, me and my dad – now 88 – were reminiscing about the vehicles we have used for our TV aerial business over the years.

Dad bought a Jowett Bradford van in the fifties when I was about seven, and my first impression of it was how alarmingly big it seemed inside. The previous transport had been a motorbike and sidecar – and the sidecar had seemed much safer to me.

I saw a Bradford van at a vintage vehicle rally recently and marvelled at what a tiny vehicle it really was, especially when compared to the sort of van we use nowadays. Dad seems to remember that it was air cooled.

Ours was the 'de luxe' version, with a passenger seat! Dad put an old bus seat in the back and sometimes we all went out for a Saturday night treat. We'd drive into Doncaster and get a bag of chips each and sit in the van watching the traffic lights change outside the Co-op Emporium. Nothing like a bit of excitement, eh?

Ten years later I passed my driving test and went straight out the same day in dad's Bedford Dormobile van, to fix aerials by myself, thus nicking Dad's van and job in one move.

He had the last laugh though. The previous night he'd left the van with the petrol gauge on empty. I suffered the ignominy of buying half a gallon of petrol because I'd only got two shillings and threepence on me!

The sliding doors were brilliant in midsummer but freezing for the rest of the year – the back doors weren't too good either.

## Forwards of backwards?

I had problems with the column gear

change. It got so bad that I couldn't differentiate between reverse and second. One day I discovered a cheap fix. I cut a rubber band from an old tyre and used it to apply pressure to the arm that stuck out of the gearbox.

Quite why this worked I don't know, but it did and I had no further problems. I had no idea at all about auto electrics. When the battery holder rotted away, I put the battery inside the van and extended the cables with coax. That's a pretty good way to learn about high currents!

There was a tear in my eye when I finally scrapped that van. We'd had quite a few adventures together, not all of them involving aerial rigging.

Later I had a Ford Anglia van. The previous owner was a farmer who had used it to transport livestock. I never got rid of the smell or the straw, which would keep reappearing no matter how often I cleaned it out.

My dishevelled hippy appearance and the ultra-modern sign writing font were de rigueur at the time. I set out the sign writing very small in Letraset, photographed it, and projected it onto the van so that I could paint round the outlines of the letters. This was done on the street at night, arousing much unwelcome interest from passers by.

## Crank it up

The good thing about that vehicle was that it had a starting handle. It would never start on the battery.

Note the wooden ladders and home-made wooden roof crawler. The ladders soaked up the rain and as the weary sodden winter days dragged on the beastly things became heavier and heavier. The summers were quite different. We made daisy



*I never did get rid of the smell - or the straw!*

chains and talked of flower power and peace rather a lot.

After that I had a Bedford CF which, towards the end of its life, had even worse sliding door problems than the old Dormobile. The doors rotted away completely at the bottom and thus were attached to the vehicle at the top only.

On a roundabout the door on the outside of the curve would swing outwards, the view of the whizzing road alarming grandma no end when I gave her a lift. She didn't like the big hole in the floor either, so I put a piece of plywood on it, but this would lift up so I told her to keep her foot on it.

Later I had two Sherpas, one of which had such severe body rot that when the windscreen needed replacement the man from Autoglass had to admit defeat because there wasn't enough metal to fix the glass into. That was the end of Sherpa number one.

Both Sherpas were terrified of water and would conk out immediately if I drove through a puddle. Apart from that little foible though, they were quite reliable.

Looking back it seems that I spent more time trying to start the van of the moment and keep it running than I did doing actual work. And you tell that to the young people of today and they don't believe you!

I wonder if other readers have similar memories of their early servicing vehicles?

# Sky in Flats

Is *your* apartment wired for Sky+ and Sky HD?

*Penned by Bill Wright, this article is intended to be of interest to technologically-aware flat dwellers - especially those actively looking for new accommodation - and to 'specifiers' in the residential building industry*

All new apartment blocks have television distribution systems, making individual aerials unnecessary. In general the building industry has kept up with the needs of their customers, so systems nearly always include satellite reception. But strangely, although we've had Sky+ for years now, many builders and developers are currently making no provision for it in new residential buildings.

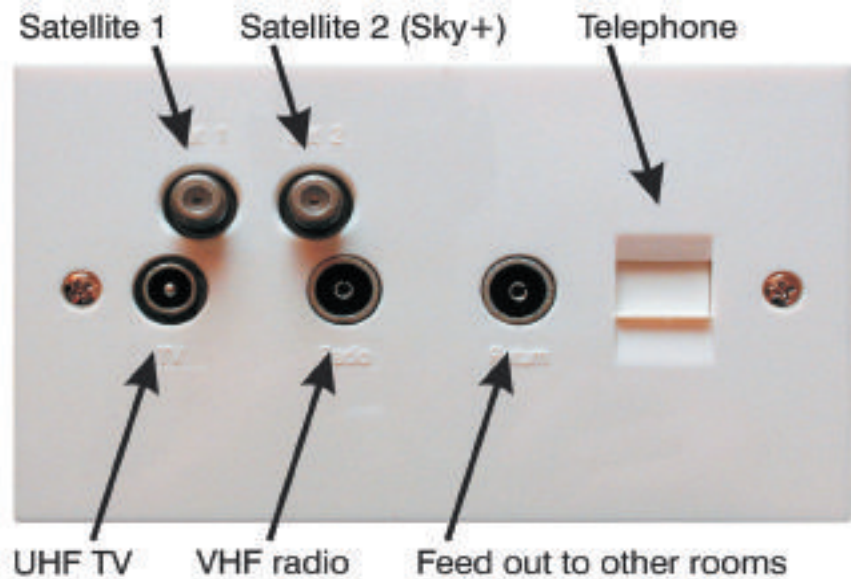
A Sky+ or Sky HD receiver needs two independent satellite feeds. Ideally the builder would ensure that the main amplifier – usually to be found in the loft – provides two outputs per flat, with two cables running to a twin satellite socket in each living room.

Even if they balk at the cost of that – and it's only about £50 for goodness' sake – there is a reasonable alternative. They can install the cable only, and then any resident wanting Sky+ can pay for the extra equipment in the loft.

## Cable infrastructure

The main thing is to get the cable in, because without it a Sky+ installation can be next to impossible in some buildings. No-one wants extra cables fixing either internally or externally on a new building; in fact in most cases this is absolutely prohibited.

I have seen some very unhappy confrontations between new residents and builders, in which the resident had moved in with his Sky+ box only to find that not only is there



The living room wallplate should have a second satellite connection for Sky+ or Sky HD

no second feed, but there is no feasible way one can be provided. In some cases, properties are advertised as complying with the Sky Homes specification, which of course includes Sky+, when in fact Sky+ is not possible. This can lead to nasty situations of the 'Sue, Grabbitt and Runne' variety.

All builders, architects, and building industry clients should give some thought to the RF distribution systems they are paying for. If in doubt they should call in an independent expert to help write the specification, or, if they have a trusted sub-contractor in the field, listen to what he says. Saving roughly £12 per dwelling by not installing a second cable from the head-end to the living room is an extreme

example of false economy.

Anyone considering a new apartment should ask the following questions:

- Is there provision for Sky+?
- Is there a phone socket for the Sky box?
- Does the system carry terrestrial digital TV, VHF FM and VHF DAB radio?
- Are there TV points in the bedrooms?

If so are they connected so one Sky box can feed all rooms and so the Sky remote eye system will work?

Take a close look at the TV wallplate in the living room. Like the one shown here it should include two 'f' connectors, allowing two independent dish feeds for Sky+.

**Every month AD Lyon sums up the highs and lows of life in the Oxford TV service trenches**



# The Lyon's Den

***"Some days go well others are  
\*%\*)\*#ø\*!"***

**I**t was a warm sunny morning the traffic was light and the thirteen mile journey into work was a breeze, 'ah I'm going to have a good day today; I thought as I swung the van into the industrial estate. The alarm on our building was making the most terrible sound, I checked for broken windows but fortunately there were none. With the alarm practically bursting my eardrums, I managed to prise out the bolts from the shutter door and raced to the control panel to stop the noise. The alarm went quiet but the ringing in my ears carried on for some time.

Well, this didn't dampen the unusually good mood that I was in, so

I settled down to make myself a nice cup of tea before starting the day's work. I filled the kettle, switched it on and there was a loud explosion and the top of the kettle plug blew off and landed, black and smouldering, next to my feet. No worries though, it was an old kettle and I used the microwave to boil the water for my tea.

The phone rang, "good morning, Visiontech, how can I help you," I said cheerily. "I don't know what your in such a good mood about" came the terse reply, "the washing machine has broken down and flooded our kitchen," said my wife. "Well just call them, it's under guarantee they'll sort it out, don't worry about it," I said,

believing that as the machine was under 2 months old there would be no problem. This, however, was extreme naivety on my part and the whole thing has turned into a long running and not very funny story, which I hope to keep you filled in on later.

Enter the first customer of the day, as I've said before my memory for faces is poor but I was sure I had seen him before. When he started to speak I instantly recognized him as Mr Angry the subject of a previous article and if you remember he vowed never to enter my shop again. "This remote thing that I purchased from you has failed again," he complained. It certainly was not the same handset he had presented me with earlier in the year, this one looked almost new and had COM3186 stamped onto it. A little investigation told me this was a Toshiba replacement and as luck





would have it, we had a reconditioned Toshiba on display, pointing the handset at the TV I pressed the volume up button and up came the sound, so I changed a few channels, it all seemed to work. "Looks ok to me," I said, Mr Angry's face went bright red. "Don't try to smooth talk your way out of this one as well," he screamed, "it doesn't work my TV and I want a refund". The sky was starting to darken outside and so was the mood in my shop. Another customer walked through the door as Mr Angry was in full flow about how I had refused to exchange his last handset which was only four years old and how he wasn't going to let me get away with another one. As there was a customer waiting to be served I gave in and asked him for his receipt which he promptly produced from his shirt pocket and slammed down on the front desk.

I studied the receipt, which was for £9.99, but it was not one of mine it belonged to a shop on the same road, but about 2 miles further down into town. "This receipt, sir, is not from here," I said. I thought he was going to burst, the veins were sticking out of his neck and his fists were clenched. "Just give me my money back," he screamed. The other customer left the shop. This was my cue to stand up to

this character. "No I can't give you any money back because I didn't take any money in the first place, your receipt is from the shop down the road and I think it would be a good idea if you took your remote and receipt to them." There was a brief silence I could read in his face that he realised his mistake, would he apologise I wondered. The silence continued for what seemed like an age, "well why don't you take it down there," he snapped. "Sir you're just being unreasonable now and I would like you to leave, thank you," I said picking up his receipt and handing it to him. "Don't worry," he said, "I'm going and don't expect to see me again any time soon." I do hope he means it this time.

Well by now my mood had darkened somewhat, I sat at my workbench to tackle my first set for the day, a Hitachi C28WF460N (11AK45) chassis. A nice easy one, I thought it had partial frame collapse. As I was measuring supply voltage someone shouted "SHOP" at the top of their voice it made me jump and the meter probe slipped; I saw sparks across adjacent pins of the frame IC, the TV switched itself into standby. Now I was really fed up. I went to see what the loud voiced character wanted.

"I wants me fuse box moving mate.

We can't get our ironing board in the cupboard where you've stuck it at the minute, we needs it sticking somewhere else." Great, he was in the wrong shop and caused me to damage the Hitachi. "You need the offices next door, sir, we don't do electrical installs." "Well you lot put it in," he sang back. "No, No we didn't it's the company next door you need." "So your not gonna move it for me then." "I can't, I'm not an electrician but the company next door are, so please go there."

"Well you fixes tellys don't you, what's the difference?" The conversation went on and on and on, he did leave eventually and I watched him go next door.

I'd had enough, I'd earned no money, made a few enemies, was hot and fed up. I'll finish the Hitachi tomorrow I thought so I set the alarm and locked up. I joined the rush hour traffic and set off for home, I was just about to pull out onto the A420 when there was an extremely loud and alarming bang from under my bonnet followed by the sound of grinding metal. Then nothing, just the sound of horns behind me. I waited an hour in the heat for the RAC who said my cam belt had snapped and I was looking at a very expensive repair. Why does everything go wrong at once I wonder?

# The TV Man

by Arthur Jackson

One of the worst calls (to date) which I remember was also down in the coast area and late on in the day as usual, it was to another farmhouse but this time with a large family of rosy cheeked children eagerly waiting to watch “Coronation Street” with their parents.

The faulty set was a Philips brand, it was fitted with the popular G11 chassis of that era and it required the usual line output transistor and H.T. smoothing block. This was a common problem with these models and as I carried all the necessary parts required it was quickly put right.

Before I refitted the back cover I decided to turn the set around to view it and see if any adjustments were required, major disaster then struck!

The aerial reception was very poor in this area (in fact most people received their signal from across the sea in Scotland, often commenting on the improved clarity of the picture on a foggy night when a heavy mist was floating above the water) therefore masthead amps were almost always required along of course with their mains powered power supply which left the co-ax plug well earthed.

As I revolved the set the short R.F. lead was tugged from the isolated aerial socket and smacked against the live chassis frame causing the TV to explode in an incredibly violent manner and at the same time blowing the trip in the house which was now of course plunged into total darkness.

Two of the terrified children in

the house started screaming hysterically now and the mother was nearly as bad when she fell over the coffee table trying to get to them in the dark.

Meanwhile the father of the house was stomping about and shouting for, as he called it ‘the battery lamp’.

At this stage I couldn’t get words out and every time I opened and closed my eyes all I could see what resembled a volcanic eruption as I had been just inches away from the point of impact.

When ‘the battery lamp’ was finally found I unplugged the set so that the trip could be reset to restore power and light to the house, not that there was much need to unplug it mind you as all that remained of its mains fuses were their tarnished end caps, the glass and fuse innards being peppered into the wallpaper some three feet away.

When I opened out the chassis to check for damage to the power supply the sight before me was far from pretty and my heart sank as I quickly realised this was now un-repairable in the house as several big runs of copper track were blown off the printed circuit board.

Added to this was the fact that I had no working loan sets left in the car and to top it all the room had fell silent with at least six pairs of eyes burning holes in me, all of these seeming to say “you broke it, you fix it!”

And then when I looked in the direction of the father the fact that he was still clutching tight to his battery lamp seemed to indicate that he had as much confidence in me as

I had in myself at the time.

Finally my luck changed as I had another G11 chassis set in the car with a burnt up line deflection board but fortunately a working power supply panel, I quickly transplanted the donor power board and fuses and also replaced the co-ax plug which had been blown apart earlier, I then prayed that the aerial amplifier and power unit had survived the blast.

As I nervously switched the set on I was never as glad to hear the music of Coronation Street fill the room, unfortunately it was followed by a picture of the credits at the end of the episode. One glance at the mother and it was immediately obvious that there was going to be no tea on offer that night.

That horrific event happened about twenty years ago and as soon as I left the house I headed to the next call barely affected by the whole fiasco!

Its amazing how our interpretation of situations seemed to have much less impact or seriousness in our youth because believe you me, if the likes of that happened to me nowadays when my fortieth birthday is becoming a fading memory I would probably head to the nearest pub and park up for the night! I wonder are we just more aware of stress nowadays or did it simply not affect us in our twenties?

**...story continues in the next issue!**

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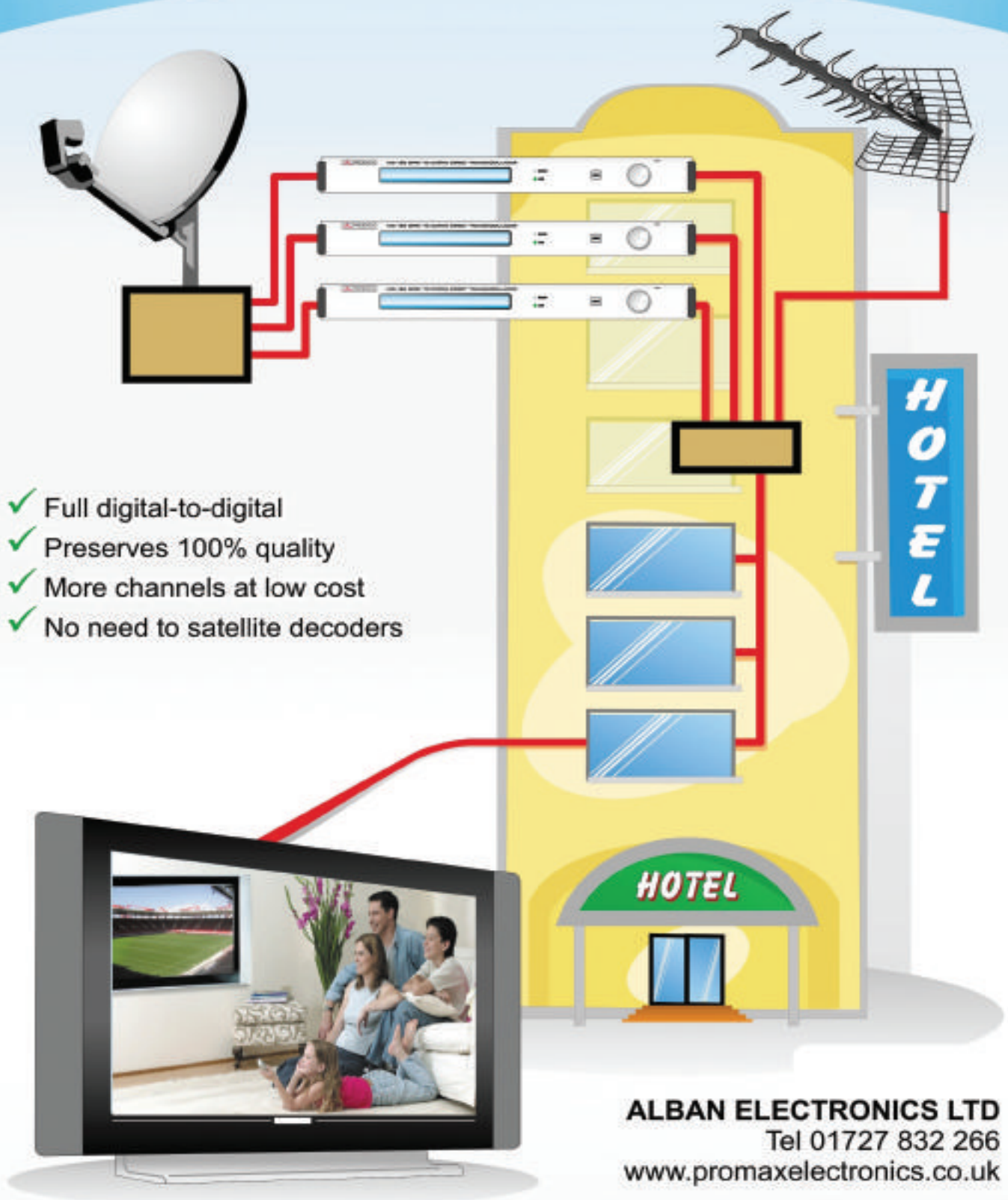
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