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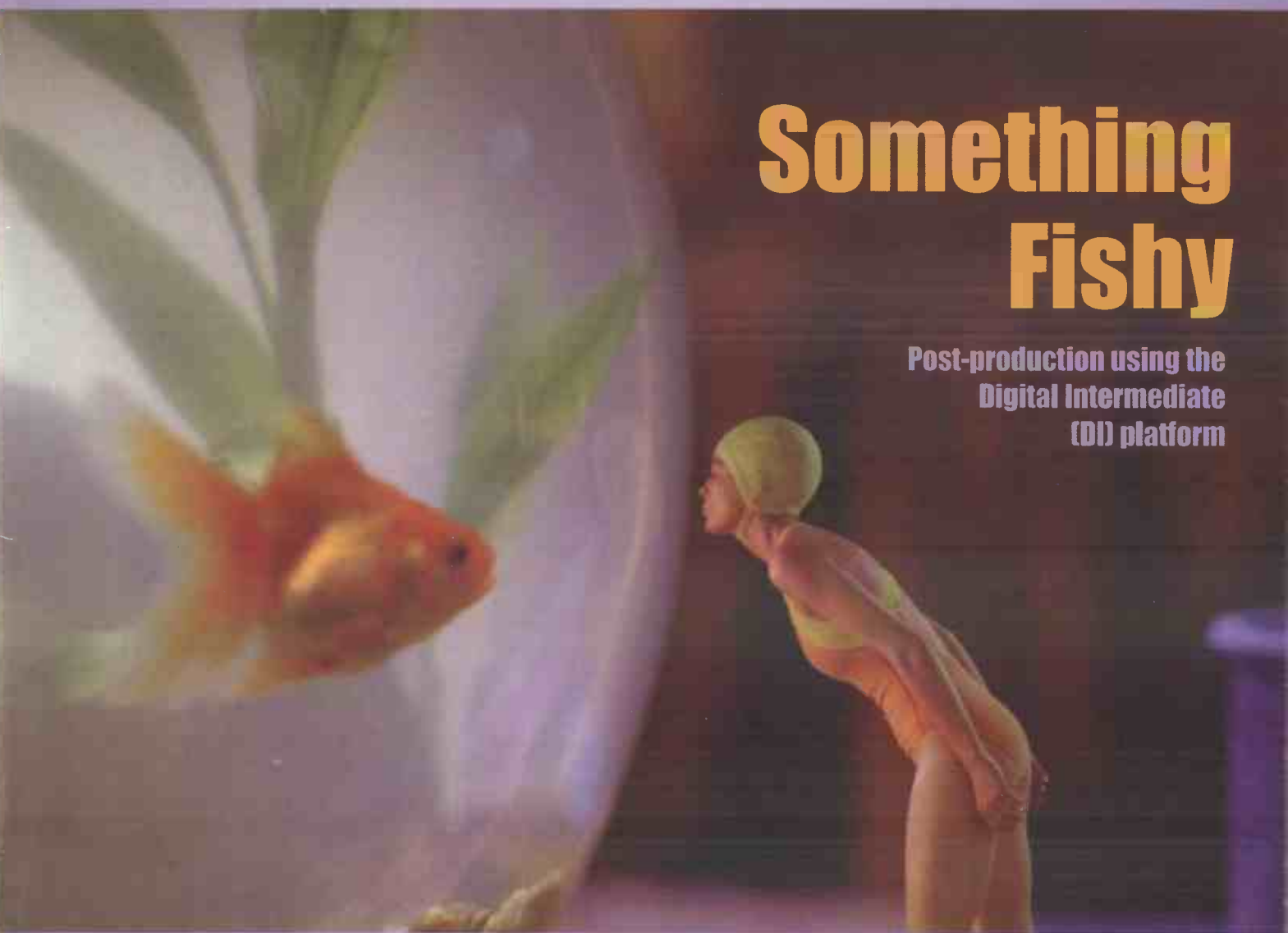

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NEXUS
MEDIA COMMUNICATIONS

## Go on, get a Mac

I had never used a Mac before joining my present company. I learnt Quark XPress on the previous magazine I worked for - this is page layout software that is available on a PC, but is in reality happier in a Mac environment.

As a PC builder for several years, I have always thought the Mac a bit exhorbitant, and I still do.

But I finally succumbed and splashed out over a grand out of my own pocket after suffering frequent shutdowns and restarts, and several irrecoverable breakdowns caused entirely by Windows on PCs.

Windows XP was supposed to stop all that, and before it, Windows 2000, Millenium, 98, and so on.

So now, I have a couple of usable (but for how long I don't know) PCs and a few others lying around in various states of disrepair, and one iMac.

Well, I must say that for a 64-bit machine costing £1.2K, the performance does not seem a whole lot better than my self-built 32-bit AMD 2.4GHz PC with half a gig of memory.

Even though I upgraded the iMac memory from half a GB to 1.5 GB, the performance does not seem to have improved markedly. Having said that, I now enjoy totally virus-free computing. I don't have to shut down every time I make some system change.

But that is not the only reason why I moved to a Mac. Macs dominate the television production industry. Macs are also quieter than the average PC, making them ideal for audio recording. There are PCs out there as well, to be sure, but they tend to be dedicated to specific tasks.

However, I am still kept quite busy as a PC builder and repairer because of the vast number of cheap and cheerful machines out there. Therefore this month I am introducing a PC section for service engineers, to be followed by PC repair and servicing in future months.

For service engineers, the hardware side of a PC should be a doddle. It's when you get to installing Windows that the fun and games start.

## Get it right, Bill!

When he launches the new version of Windows, Vista, later this year will Bill Gates get it right this time with Windows?

The track record speaks for itself. How many of you were ambushed by viruses when you installed Windows XP or 2000 and used Microsoft's Windows Update website? Have any of you bought a Windows PC that does not break down?

Please let me know. I publish practically all letters sent in by Television readers, provided I or some other member of my staff can read the handwriting. Better still - email me at the above email address.

## Only $10,000 per seat

Now turning back to the Mac, in future months I am planning to run a rolling review of Apple's Final Cut Studio, which has taken the television production industry by storm.

Industry rumour has it that Apple may be bringing out Final Cut 6, Final Cut Extreme and Xserve RAID Extreme at the National Association of Broadcasters convention, which takes place April 22-27 in Las Vegas.

NAB sets broadcast standards internationally, so Apple obviously wants to show how serious a contender it is. The full version will cost around $10,000. Final Cut Pro 6 is said to include 5.1 surround sound editing, 1080/24p and 1080/30p DVCPROHD support. Final Cut Extreme is said to be targeted at current Avid users.

At present, Avid is seen as being superior for multi-camera shoots and for its ability to share projects, resources and footage between multiple edit stations.

# Telewest broadband leads in customer satisfaction survey

Telewest has topped a list of the UK's six leading broadband ISPs while NTL, currently in the process of buying Telewest, came last in the 2005 UK Residential Broadband Internet Service Providers Satisfaction Study by JD Power and Associates.

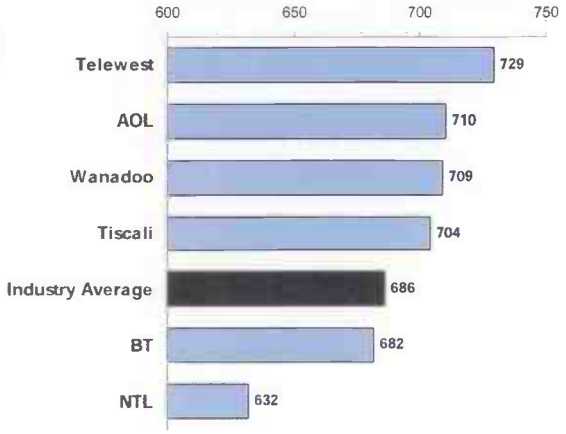
According to the survey of some 935 broadband users, Telewest (which has more than 920,000 broadband users) scored well on broadband performance and reliability, customer service/technical support, and billing, beatingAOL UK in second place.

A Telewest spokesman responded: "We're over the moon that broadband users have backed this approach in the JD Power survey."

Wanadoo came a close third followed by Tiscali, with all four ISPs scoring 'above average' marks for their overall performance.

BT came fifth and was clobbered for being too pricey. NTL scored 'significantly below the industry average on all factors except cost of the service', said the report.

Despite today's findings, the report also revealed that punters are prepared to switch broadband suppliers to take advantage of new deals and services.




And with regulator Ofcom keen to make switching all telecoms providers much easier, ISPs need to ensure that they remain on top of their game to retain customers.

Gunda Lapski, director of European telecommunications research at JD Power, said: "While lower prices may be enticing, we find that the more satisfied customers are, the less likely they are to switch providers.

"A similar correlation is also apparent between switching intent and the likelihood of customers to recommend their provider to other people.

"Because customer loyalty and advocacy are so critical to telecommunications providers, it is vital that ISPs go above and beyond to listen to their customers and make sure satisfaction levels are high."

Even though NTL has taking a pounding in this survey, there is something that might prove of interest.

It seems customers have a keen interest in receiving bundled services on one bill with BT, NTL and Telewest emerging as the "most popular choices for providers."

Should NTL's merger with Telewest and its takeover of Virgin Mobile go-ahead, it will be able to offer quad-play bundled offering of TV, fixed-line phone, broadband and mobile.

Back in December, Telewest became the first provider in the UK to launch a HDTV service to consumers, delivered in conjunction with the company's new PVR box, TV Drive, which allows 80 hours of storage, will cost £10 per month for customers taking the top tier package or £15 otherwise.

Around 400 'selected' customers are now sampling both services in advance of their nationwide launch early in 2006.

Early HD content comprises free shows from BBC Worldwide including Pride, The Blue Planet and Wild Weather, as well as movies from FilmFlex.

All shows are accessible on demand through new VOD service Teleport. Broadcast HD channels are expected to follow mid 2006.

"Our new PVR is streets ahead, with generous storage, the flexibility of being able to record up to two channels while watching a third, and breath-taking HDTV," said Telewest president Eric Tveter.

"With both TVDrive and Teleport, our customers will have complete control, freedom and choice with their TV viewing.

"Combined with HDTV, it's the ultimate TV experience and leaves the current Sky+ box on the starting line."

Fighting talk indeed! Pre-registration for the service is now open at: **telewest.co.uk/tvdrive**

# Orange showcases video goggles

Orange France has released video glasses for Samsung SGH-D600 mobile phones, using a cable link that will play videos stored on the 128MB SD card, as well as letting customers check and send texts, photo messages and e-mails.

Content is downloaded from a PC via Bluetooth or USB. The launch price was ?299 (£210) in France, where stocks rapidly moved off the shelves, and now Orange UK is looking into the possibility of stocking them later this year. They will make their British debut at the 3GSM Congress, the annual gathering of the mobile industry, in February.

The television image from the phone appears as two images in each of the lenses; these form a single, larger-than-life picture for the viewer.

Although television on a mobile has been hyped as one of the 'killer' 3G applications, the tiny size of the screen can make for uncomfortable viewing.

# BT unveils broadcast TV service ambitions

BT has signed up the BBC, Warner Music and the Paramount film studio to help it enter the television market this year.

It will launch a pay-TV service in the summer together with more than 30 FreeView channels.

Dan Marks, chief executive of BTTV services, who is leading negotiations for BT's pay-TV deals, said the group was targeting the millions of homes in Britain that do not subscribe to pay-TV.

"Our view of the market is that everybody will have a digital TV and the question is how many will be using a subscription service. There are 78 million TV sets in the UK, of which 11 million are connected to a pay-TV service, which leaves a lot of TV sets," he said.

There will be no monthly subscription fee. Its premium content will be made available for a one-off charge either as a pay-per-view service, which is available at set times, or as an on-demand service.

Customers will have to buy the set-top box at a price yet to be disclosed, which will include an 80Mb hard drive.

Marks confirmed that the Paramount film deal will include recent releases, available at the same time as they appear on BSkyB's pay-per-view channels, as well as classic films.

Philips has been contracted to make the set-top box for the service, which will be attached to a BT phone line to deliver pay-TV content.

Freeview is in five million homes out of 24 million homes with a TV, with 7.8 million taking BSkyB and 3.3 million receiving cable TV.

# Film London develops East

Developing EAST is a new scheme from Film London offering specific project and business support to east London based film-makers to develop their projects, careers and businesses.

The programme combines bespoke one-to-one consultancies with top industry professionals, as well as group workshops and seminars on topics such as distribution, getting your film financed, casting and directing actors, technology, co-production, copyright and legal issues.

There is a particular focus on the importance of good business practice for film-makers and opportunities to establish relationships with industry professionals.

The project takes place from January to April 2006, and is open to freelancers, partnerships and companies.

Film-makers can apply individually or as a team, must have a proven track record in the film industry and be based in the East London target areas.

This support is worth £750 but will be provided free of charge to successful applicants.

## Skills update for integrated digital television

Many service engineers have already had iDTV sets for repair.

A series of one-day lectures/workshops are being organised by Fawzi Ibrahim of the College of North West London. The first such lectures/workshops will take place on Monday, February 13.

If you wish to attend, please contact Fawzi on 07976 350724 or email Fawzi.Ibrahim@cnwl.ac.uk.

## Vestel adds DAB to home theatre

Consumer electronics manufacturer Vestel, has been working with RadioScape to create a Home Theatre System with integrated DAB (Digital Audio Broadcast) capability.

By using RadioScape's Software Defined Digital Radio modules, the product was designed in only three months and is available in the shops now as the Wharfdale 400HT priced at £99.99.

"Putting DAB into our Home Theatre design proved to be a much easier task than we thought it would be," said Erdem Gunduz, Product Manager at Vestel.

"RadioScape's module provides all the DAB functionality in one package that is easy to integrate into the system as it is controlled via the I2C interface."

## Ready for HD

Digital TV Group (DTG), the industry association for Digital Television in the UK, has launched a website **www.hdready.org.uk**, which provides database of television sets that have achieved the 'HDReady' logo.

"We're delighted that this website has become a reality." said Richard Lindsay-Davies (above), the Group's Director of Public Affairs.

# 130,000+ visitors pack CES

2,500 exhibitors offered internet services, digital music players, cell phones, flat-panel televisions, and even refrigerators and washing machines at last month's Consumer Electronics Show (CES) in Las Vegas.

At the time of *Television* going to press, more than 130,000 people from 110 countries were expected to have attended the four-day show, as well as 4,500 members of the media, twice the number that covers the Tour de France.

Hosting the show, the Consumer Electronics Association predicted that industry sales will climb from $125.9 billion last year to $135.4 billion this year.

There were all the usual claims of being the first and/or biggest in something or the other. Samsung boasted about its 80 inch giant plasma TV, until Panasonic swooped with its 103 inch monster.

*Philips's Provoost (left): "We recently announced our cooperation with Skype and KPN for VoIP service."*

## Sony/Toshiba clash

What probably sparked the greatest interest was the impending clash between Sony and Toshiba over the next generation DVD technology.

Sony supports Blu-Ray while Toshiba is championing a cheaper and less advanced HD-DVD.

The Harman Kardon 7.2-channel AVR 740 audio/video receiver.

The fight has been precipitated by the worldwide growth in high-definition TV (HDTV), which offers far clearer images than traditional television pictures but is much more memory-intensive.

Toshiba said it would be launching its first commercial HD-DVD player in March at $499 (£284).

HD-DVD fits three times more information on a disc than DVD and uses an existing manufacturing process, so will be cheaper and quicker to produce.

Blu-Ray has backing from Hollywood studios and electronics firms. Philips and Panasonic among others, announced new players at CES, but for delivery somewhat later this year, and they are likely to be much more expensive.

Also, Microsoft's chairman, Bill Gates, confirmed his company would be making a plug-in HD-DVD drive for the Xbox 360 games console. All this is reminescent of the VHS-Betamax video battle of the 80s.

## Google Video Store

Gates is becoming increasingly wary of Google, which announced a pay-per-download video service, Google Video Store. Users will download free software providing an iTunes-like interface.

Initial content will include television shows from CBS, music videos from Sony BMG and news from ITN, as well as material from the National Basketball Association.

Samsung Electronics has launched a 1080p 46-inch LCD TV with what is claimed to be world's highest dynamic contrast ratio. Samsung's LN-S4662D is said to be the world's largest commercially available LCD TV, which features 1080p, built-in ATSC tuner, Cable Card slot, and two HDMI connections (among others).

Microsoft also plans to launch Urge, an alternative music downloading service which will not be compatible with Apple's iPod.

With a touch of the showbusiness glamour usually employed by Apple's chief executive, Steve Jobs, Gates invited the pop singer Justin Timberlake on stage to showcase the service. Urge will offer two million tracks for purchase.

## Unlimited downloads

Unlike iTunes, which charges customers a fixed amount per song, Urge will offer a subscription for unlimited downloads.

It will be built into the successor to Microsoft's Windows XP operating system, Vista, later this year.

Continued...

# Samsung sues Matsushita

Samsung has launched a legal battle with Matsushita over disputed flat-screen technologies. In a separate case, Matsushita is suing Samsung for infringing another set of patents relating to the same plasma screens.

Samsung claims that Matsushita's technology, which is used in Panasonic-branded televisions and sold around the world, violates nine separate patents that it holds in the US.

Matsushita is particularly sensitive about threats to its plasma television business, which is making up for difficulties elsewhere in the group. The company expects its sales of plasma televisions to hit a trillion yen (£4.8 billion) by 2010.

Samsung has also instigated disputes with Fujitsu and LG Electronics over plasma patents. Matsushita recently unveiled the world's largest production plant for plasma display panels (PDPs), a factory that will increase its output by 44%.

Samsung's attack on Matsushita comes after its settlement with Fujitsu in June, in which the two groups agreed to share the disputed patents. The pact came only after Samsung and Fujitsu had mounted a series of suits against each other, one of which demanded an injunction on Samsung imports to Japan and was upheld by the Tokyo Customs Office.

Matsushita's fight with LG was also solved with a cross-licensing pact.

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... Continued

Microsoft recently signed a deal with Rupert Murdoch's BSkyB in the UK and DirecTV in the US for a video on-demand service through a PC with Windows operating system or through its Xbox console.

Presenting his company's new products at the show, Rudy Provoost, CEO of Philips Consumer Electronics, said: "Every day, more people are choosing broadband as their preferred way to connect with one another.

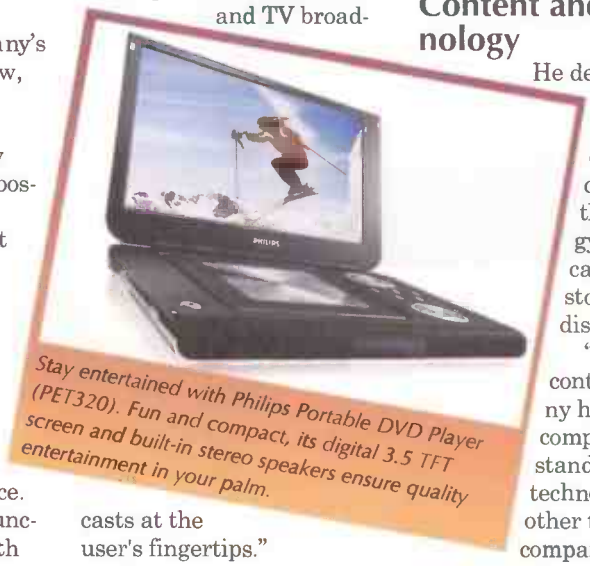
## Skype deal

"They like the freedom, the mobility, and the ease of use of VoIP. We recently announced our cooperation with Skype and KPN for VoIP service.

"Today, we are announcing our collaboration with Microsoft for VoIP on the PC. Our two new hard-disk, GoGear audio jukebox products give consumers a great way to discover and share new music, using Microsoft's PlaysforSure technology.

"We are also intending to extend our Connected Planet relationship with Yahoo!. Previously, we've brought you Yahoo!'s LAUNCHcast radio on Philips' Home Entertainment products.

"We are also announcing our relationship with vTuner. vTuner recognized the need for a product that would put Internet radio and TV broadcasts at the user's fingertips."



Stay entertained with Philips Portable DVD Player (PET320). Fun and compact, its digital 3.5 TFT screen and built-in stereo speakers ensure quality entertainment in your palm.

Also announced by Philips was the Philips Home Theater that features wall mountable 6.1 surround sound speakers and wireless rear speakers.

Play Big IN74 by InFocus Corporation is a digital projection display providing native 16:9 resolution in the US and Wide PAL countries.

Sir Howard Stringer, promoted last June as Sony's first non-Japanese chairman and chief executive, outlined four entertainment 'pillars' on which the group would focus: high definition video and audio technology; digital cinema; video gaming and 'e-entertainment'.

## Content and technology

He defended Sony's ownership of both content and the technology used to capture, store and distribute it.

"No other content company has such a complete understanding of technology and no other technology company has Sony's insight into content," he said.

"Content and technology are strange bedfellows but we are joined together," he added.

"Sometimes we misunderstand each other, but isn't that the nature of a marriage?" he asked.

In spite of fears of a format war, he insisted: "Blu-ray has momentum and it is happening now. Content is no longer pushed at consumers, it is pulled by them," he said.

Paul Otellini, chief executive of Intel, launched its Viiv (pronounced 'vive') brand and unveiled Intel's Core Duo chip - a processor that consumes less power and is cooler and quieter.

The chips for the new Viiv platform are designed to enable high-definition video and surround-sound.

Intel has partnered with AOL, DirecTV, NBC Universal, Turner Broadcasting's GameTap gaming service and the ESPN sports channel.

Sony's KDL-V40XBR1 40-inch BRAVIA flat-panel LCD television.

Grupo Televisa, the largest media company in the Spanish-speaking world, Eros, an Indian film distributor and Shanghai Media of China were named as international partners.

Denon's AVR-4306 is a multi-source, multi-zone IP addressable audio/video receiver.

# 50 years ago

*By Keith Wilson*

Though the BBC may have carried out colour television tests in 1954, as reported in recent issues, it seems that more formal tests started towards the end of 1955. At least that's the impression created by the cover feature in our February 1956 issue.

Right from the very earliest days of mechanical television, there had always been a keen interest in colour. It's not surprising, therefore, that the BBC - then one of the leaders in television developments - decided to set up an experimental colour transmission system at Alexandra Palace which was, at the time, the organisation's main London studio complex.

Practical Television reported on the arrangements in some detail, stating that the BBC's intention was to carry out a series of experimental tests of colour transmission systems, and that these tests had started on 10th October 1955. Despite the mention of 'transmission systems' in the plural, the remainder of the article discusses only a 405-line derivative of the NTSC system, and it seems likely that no viable alternatives were available at the time.

## Twofold objective

According to the report, the objective of the tests was twofold: to explore the degree of compatibility with existing black-and-white receivers, and to see whether the system was cable of producing consistently good colour pictures. It was noted that addressing the second objective would not be easy, as hardly anyone was in a position to receive pictures in colour!

The article was at great pains to point out, no doubt at the behest of the BBC, that the tests in no way constituted a public service, and that they did not indicate that the start of such a service was imminent. In fact, the BBC was reported as having no definite plans for the introduction of colour.

The complexity of the NTSC colour system, which was described in detail, must have come as something of a shock to television service engineers of the era, many of whom were still struggling to come to terms with the transition from steam radio.

There's little of interest in this description for modern readers, however, except for the odd anomaly - 2.6578125 MHz colour subcarrier, anyone? This unfamiliar frequency was, of course, necessary since it is related to the line scanning frequency, and hence to the old 405-line picture standard.


*Above: The colour control room at Alexandra Palace in 1956. Below: The BBC's first colour camera, supplied by Marconi Right: The camera with the amplifier assembly for one colour channel swung out.*


The Alexandra Palace colour installation was no lash up, as the accompanying illustration shows. The main items of equipment were a flying-spot slide and film scanner, a colour camera, signal-coding equipment, colour picture monitors and colour test equipment. All items were designed and manufactured by Marconi, with the exception of the flying-spot scanner which was made by the BBC Research Department.

## Photomultiplier tubes

The scanner used dichroic mirrors to separate light which had passed through the slide or film into red, blue and green components, each component then being focussed on its own photomultiplier tube to produce the necessary colour signals. At the time the original article was written, it seems that this scanner, rather than the camera, was the main source of images for the test transmissions.

The camera also made use of dichroic mirrors, this time directing images to three image orthicon tubes which, the article notes, were of a type specially developed for colour work.

Not only was the camera itself huge, a whole floor-standing cubicle was needed to house its associated electronic equipment. It's astonishing to realise that today's equivalent will easily slip into your pocket!

Two colour monitors were provided. One used what we would today consider to be a fairly conventional design with a 15" RCA shadow-mask tube. The BBC was, however, possibly not totally convinced about these newfangled tricolour tubes, as the other monitor used a more primitive arrangement with three separate CRTs. The images from these are optically combined for viewing by those seemingly ubiquitous dichroic mirrors.

The installation's test equipment included, as might be expected, amplitude and phase monitors for the colour signal. Also provided was an electronic colour-bar generator, the design of which was probably quite a challenge in those pre-semiconductor days.

Later reports suggest that the BBC's colour tests were, in the main, very successful. However, the cost of the equipment needed together with uncertainty over the colour system to be adopted and the change in line standard ruled out an early public service. For that, we had to wait until the launch of BBC2 in 1964.

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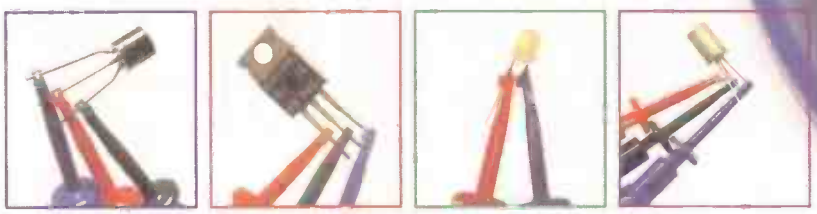


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# WILTSGROVE LTD

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***Opening Times:*** *9:00am - 6:00pm (Monday to Saturday)*

**VALID UNTIL THE END OF JUNE 2005**

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|---|---|
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| DVD150AS | 7.95 |
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| **AIWA** | |
| HVDH1EK | 5.95 |
| HVDH1K | 5.95 |
| **AKAI** | |
| CT2100TXT | 5.95 |
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| ADV111S | 5.95 |
| ADV131S | 5.95 |
| ADV13S | 5.95 |
| ADV142S | 5.95 |
| ADV143S | 5.95 |
| ADV144S | 5.95 |
| ADV145S | 5.95 |
| ADV146S | 5.95 |
| ADV147S | 5.95 |
| ADV14S | 5.95 |
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| ADV15S | 5.95 |
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| ADV16S | 5.95 |
| AODV151RS | 6.95 |
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| APDTV150S | 6.95 |
| APDV149TS | 6.95 |
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| STB1 | 5.95 |
| STB1X1 | 5.95 |
| STB1X | 5.45 |
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| 5374975 | 5.95 |
| 5375558 | 5.95 |
| 5375730 | 5.65 |
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| 5376210 | 5.65 |
| 5376811 | 5.95 |
| 5376825 | 5.95 |
| 5376832 | 5.65 |
| 5376849 | 5.65 |
| 5376856 | 6.95 |
| 5376942 | 5.95 |
| 5377077 | 5.65 |
| 5377268 | 5.95 |
| 5377312 | 6.95 |
| 5377350 | 5.95 |
| 5377367 | 5.65 |
| 5377446 | 5.95 |
| 5377556 | 6.95 |
| 5377611 | 5.95 |
| 5377817 | 6.95 |
| 5377824 | 6.95 |
| 5377831 | 6.95 |
| 5377848 | 6.95 |
| 5377893 | 5.65 |
| 5378067 | 5.65 |
| 5378081 | 5.95 |
| 5378562 | 5.95 |
| 5378586 | 5.95 |
| 5378593 | 5.95 |
| 5378603 | 5.95 |
| 5378641 | 5.95 |
| 5378658 | 5.95 |
| 5378706 | 5.65 |
| 5378713 | 5.65 |
| 5378878 | 5.95 |
| 5378940 | 5.65 |
| 5378957 | 5.65 |
| 5378971 | 5.95 |
| 5379004 | 6.95 |
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| 5379217 | 6.95 |
| 5379451 | 5.95 |
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| 6693D | 6.95 |

| MAKE/MODEL | PRICE £ |
|---|---|
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| DTJ28G6F | 5.45 |
| DTJ28G7F | 5.45 |
| DTJ28G8F | 5.45 |
| DTP25 | 5.45 |
| DTP28 | 5.45 |
| DTP28A7GB | 5.45 |
| DTP28G8GB | 5.45 |
| DTW28W210 | 5.45 |
| DTW28W210 | 5.45 |
| DTW28W2F | 5.45 |
| DTW28W2F | 5.45 |
| DTW28W2GB | 5.45 |
| DTW28W2GB | 5.45 |
| DTW28W2GB | 5.45 |
| DTW28W2K1 | 5.45 |
| DTW28W2K1 | 5.45 |
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| MAKE/MODEL | PRICE £ |
|---|---|
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| DTX637[illegible] | 7.95 |
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| DBRS2001 | 5.45 |
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| DBRT200GB | 5.45 |
| DBRT200GB | 5.45 |
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| SBR200 | 5.45 |
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| 28LW92 | 6.95 |
| 28LW92H | 6.95 |
| 32LF92H | 6.95 |
| 32LW92H | 6.95 |
| DV740 | 6.95 |
| DV740H | 6.95 |
| G0247AJ | 5.45 |
| VCM301HM | 5.45 |
| VCM301LM | 5.45 |
| VCM302HM | 5.45 |
| VCM302LM | 5.45 |
| VCM303HM | 5.45 |
| VCM304 | 5.45 |
| VCM304HM | 5.45 |
| VCM311AHM | 5.45 |
| VCM311HM | 5.45 |
| VCM311LM | 5.45 |
| VCM312HM | 5.45 |
| VCM312LM | 5.45 |
| VCM314 | 5.45 |
| VCM315 | 5.45 |
| VCM321HM | 5.45 |
| VCM332HM | 5.45 |
| VCM333HM | 5.45 |
| VCM522HM | 5.45 |
| VCM711HM | 5.45 |
| VCMH704HM | 5.45 |
| VCMH705 | 5.45 |
| VCMH711AH | 5.45 |
| VCMH711HM | 5.45 |
| VCMH711LM | 5.45 |
| VCMH712LM | 5.45 |
| VCMH713HM | 5.45 |
| VCMH715 | 5.45 |
| VCMH71GM2 | 5.45 |
| VCMH721HM | 5.45 |
| VCMH721LM | 5.45 |
| VCMH722HM | 5.45 |
| VCMH814 | 5.45 |
| VCMH815 | 5.45 |
| VCMH834HM | 5.45 |
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| **SONY** | |
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|---|---|
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| KD28DX150 | 5.95 |
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| KD28DX50U | 5.95 |
| KD28L10U | 5.95 |
| KD32DX100 | 5.95 |
| KD32DX100 | 5.95 |
| KD32DX150 | 5.95 |
| KD32DX40 | 5.95 |
| KD32DX40U | 5.95 |
| KD32DX50 | 5.95 |
| KD32DX50U | 5.95 |
| KD32DX51U | 5.95 |
| KE32TS2E | 5.95 |
| KE32TS2U | 5.95 |
| KE42TS2 | 5.95 |
| KE42TS2E | 5.95 |
| KLV15SR1 | 5.95 |
| KLV17HR1 | 5.95 |
| KV24LS35 | 5.95 |
| KV24LS35B | 5.95 |
| KV24LS35E | 5.95 |
| KV24LS35U | 5.95 |
| KV28DX40 | 5.95 |
| KV28DX40U | 5.95 |
| KV28FX68 | 5.95 |
| KV28FX68T | 5.95 |
| KV28FX68U | 5.95 |
| KV28L5385 | 5.95 |
| KV28LS35 | 5.95 |
| KV28LS35B | 5.95 |
| KV28LS35E | 5.95 |
| KV28LS35U | 5.95 |
| KV28LS36 | 5.95 |
| KV28LS36U | 5.95 |
| KV28LS60 | 5.95 |
| KV28LS60B | 5.95 |
| KV28LS60E | 5.95 |
| KV28LS60U | 5.95 |
| KV29FX64B | 5.95 |
| KV29FX64E | 5.95 |
| KV29FX64K | 5.95 |
| KV29FX66E | 5.95 |
| KV29LS30E | 5.95 |
| KV29LS30K | 5.95 |
| KV29LS30U | 5.95 |
| KV29LS35B | 5.95 |
| KV29LS35E | 5.95 |
| KV29LS35K | 5.95 |
| KV29LS60B | 5.95 |
| KV29LS60E | 5.95 |
| KV29LS60K | 5.95 |
| KV32FX68 | 5.95 |
| KV32FX68B | 5.95 |
| KV32FX68E | 5.95 |
| KV32FX68K | 5.95 |
| KV32FX68U | 5.95 |
| KV32LS35B | 5.95 |
| KV32LS35E | 5.95 |
| KV32LS35U | 5.95 |
| KV32LS36U | 5.95 |
| KV32LS60B | 5.95 |
| KV32LS60E | 5.95 |
| KV32LS60K | 5.95 |
| KV32LS60U | 5.95 |
| KV38FX68 | 5.95 |
| KZ32TS1E | 5.95 |
| KZ42TS1E | 5.95 |
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| RM932R | 5.95 |
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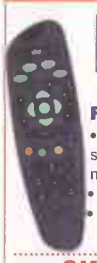
| 28ZD26B | 5.65 |
| 28ZD26P | 5.65 |
| 28ZH36P | 5.65 |
| 28ZH37 | 5.65 |
| 28ZH37B | 5.65 |
| 28ZH37D | 5.65 |
| 28ZH37P | 5.65 |
| 28ZT29B | 5.65 |
| 32WT98B | 5.65 |
| 32ZD26B | 5.65 |
| 32ZD26P | 5.65 |
| 32ZD36P | 5.65 |
| 32ZH36P | 5.65 |
| 32ZH37B | 5.65 |
| 32ZH37P | 5.65 |
| 32ZP18Q | 5.65 |
| 32ZP38B | 5.65 |
| 32ZT29B | 5.65 |
| 34VH26P | 5.65 |
| 36ZD26P | 5.65 |
| 36ZD36P | 5.65 |
| 36ZP18P | 5.65 |
| 36ZP18Q | 5.65 |
| 36ZP38 | 5.65 |

| MAKE/MODEL | PRICE £ |
|---|---|
| 36ZP38B | 5.65 |
| 36ZP48P | 5.65 |
| 36ZT29B | 5.65 |
| 38VH26P | 5.65 |
| 42PW23P | 5.65 |
| 42PW33P | 5.65 |
| 42PW33Q | 5.65 |
| 42WH18B | 5.65 |
| 42WH18D | 5.65 |
| 42WH18 | 5.65 |
| 42WH38B | 5.65 |
| 42WH38P | 5.65 |
| 42WT19B | 5.65 |
| 42WT29B | 5.65 |
| 43VJ13P | 5.65 |
| 43VJ22P | 5.65 |
| 43VJ33P | 5.65 |
| 43VJ33Q | 5.65 |
| 50VJ22P | 5.65 |
| 50VJ23P | 5.65 |
| 50WH18 | 5.65 |
| 50WH18B | 5.65 |
| 50WH18P | 5.65 |
| 50WH18T | 5.65 |
| 50WT19B | 5.65 |
| 50WT29B | 5.65 |
| 5376100 | 5.65 |
| 5376227 | 5.65 |
| 5377642 | 5.65 |
| 57WT29B | 5.65 |
| AV28WFT1EK | 6.95 |
| CT90101 | 5.65 |
| TLPB2E | 5.65 |

## SKY REMOTE'S



OrderCode **IR-1086G**

1 £7.86
5+ £7.45
10+ £6.95

**Features**
- Ideal for digital satellite viewers in multiple box homes
- Operates Sky Digibox and television.
- Easy to use.

### SKY PLUS REMOTE

OrderCode **IR-2274G**

1 £12.75
5+ £12.25
10+ £11.75

**Features**
- Operates your Sky+ and television
- Simple to use.

## MAGIC EYE - FOR SKY DIGITAL

OrderCode **SPS-3200**

1 £2.95
10+ £2.75

**Feature:**
Replacement Magic Eye allows operation of Sky Digi-boxes from different rooms in the house.

## SCART LEAD

**Feature:**
.Scart to scart lead
.Length 1.5M
.21 pin

OrderCode **LDS-1003**

1 £0.67
10+ £0.63

## FLYBACK TRANSFORMERS

| OEM NO. | HR | ORDER CODE | PRICE £ |
|---|---|---|---|
| 1352.5008 | HR7927 | LT-537P | 7.50 |
| 1142.5057 | HR7880 | LT-434P | 7.45 |
| 1142.5077 | | | |
| FSA36012M | | | |
| FSA28013M | | | |
| 1142.5081 | | | |
| 1142.5079 | | | |
| 10500980P1 | HR8317 | LT-157P | 11.75 |
| 15314460 | | | |
| 40347A16 | | | |
| 10608670 | | | |
| 1352.5033 | HR8320 | LT-844 | 7.45 |
| 1352.5058 | | | |
| 40438A01 | | | |

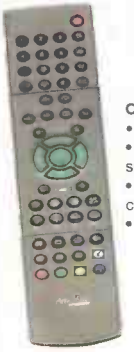
HR DISTRIBUTERS

NOW!

**WIDE RANGE IN STOCK**

## ruwido REMOTE CONTROL

Amadeus symphony



*The revolution in the field of 1:1 replacement remote controls!*

**Only thing You need:**
- PC with serial port.
- The supplied interface adapter and a CD containing the software.
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# Letters

**Send letters to Television, Nexus Media Communications, Media House, Azalea Drive, Swanley, Kent, BR8 8HU**

**Email – TVeditor@nexusmedia.com**

***using subject heading 'Television Letters'***

## PC maintenance

On reading Adrian Gardener's articles on PC maintenance, I would like to add that there are other ways of keeping your PC free of spyware, one of which is very simple – don't use Internet Explorer, the default Microsoft browser.

Although there is a new beta version of Explorer (IE7), there are plenty other free and open source browsers out there, two of which are Mozilla Firefox and Opera. Mozilla Firefox is a relatively small download at about 5MB, and can be downloaded at www.mozilla.org.

The greatest advantages of these alternative browsers are that they are far more secure than the older versions of IE in use on many PC's, which seem to have many flaws that are exploited by spyware creators to allow spyware to install itself automatically – usually all it takes is to innocently browse a dodgy site.

Also, some 'free' software can be bundled with spyware, so be careful of what you download, and if unsure, read the small print that is usually shown when installing software – it may actually mention the fact that it contains spyware.

Beware of any advertisements or pop-ups on websites that offer to 'scan' your computer – these are almost always spyware installers.

Although the free spyware scanners mentioned in the article are very effective, they must also be continuously updated for new spyware and this along with virus scanning is time consuming.

Of course, the usual security measures of a using a firewall and anti-virus software apply also in keeping crapware at bay.

*Owen O' Reilly,*
*Mullingar, Co. Westmeath, Ireland.*

## Licence to steal?

I have been taking Television for a few years now although I'm not in the trade I thoroughly enjoy your magazine. Having read the comment in the December 2005 issue headed 'Licence To Steal?' prompted me to write to you.

Every year for as long as I can remember, the BBC have whined on about the fact that they must raise the licence fee to fund the programs it puts out etc.

This time they seem to be whining on about the cost of providing all the extra digital channels, which are nothing but repeats, broadband and mobile services it has to fund.

Hang on a minute! Did we ask for digital channels? No we didn't. They are being forced upon us by this so-called government, who is bemoaning that there is not enough air space to cope.

Personally I don't see any improvement in visual quality from my Sky freesat box, but that may just be me. As for providing good drama and comedy, all we seem to get are constant repeats.

The alarm clock went off in the sixties when pirate radio stations started up. How did they fund their broadcasting? By Advertising. Come on Aunty BBC it's time you woke up and smelled the coffee. Go commercial like everybody else.

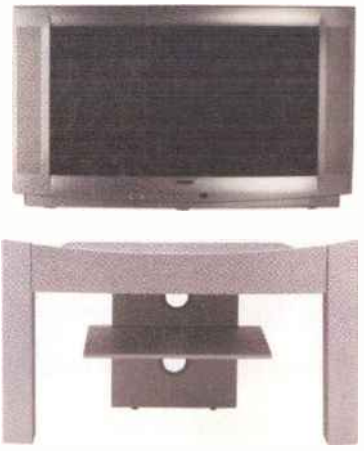
You already advertise your own products, probably funded by cross charging, but that's not real money. It's money taken out of the budget of other departments. So it's BBC funny money.

We're use to seeing programs interrupted by adverts. If we don't like them we go and make a cup of tea or get some other drink or let the cat out or whatever takes two to three minutes.

There I've said it. There's bound to be backlash in response to this letter but to me it makes perfect sense for Aunty BBC to go commercial and thereby make mountains of money to fund whatever they like. Who knows, we might even get some decent TV programmes out of it.

*Allan Day (by email).*

## Bush 32" WS7673



I usually write the odd letter to Television with comments and help on TV Faults, but this time I am appealing for help instead!

A Bush 32" WS7673, AK37 has come in and it is causing me to pull my hair out. In short, the customer says his child (It is never the customer, it's always the child isn't it?) pressed all the buttons and now they can't tune the TV

I found that on 'menu' you get 'sound, picture, feature', but no 'Install' line, and when the volume is raised it only goes up to a fairly low level and stays there although the bar–graph goes up to maximum.

Now all this shouts at me 'Hotel mode.' I have tried 'menu +4725' which does absolutely nothing.

Has anyone got an answer?

I have since been given the set and it would go nicely in the bedroom. Many thanks.

*Chris Plaice, Winch Wen, Swansea*

# I read *Television* magazine because ...

**Last month, as part of a competition draw for a new Horizon HDSM satellite meter (right), we asked our readers why they read *Television* magazine. Initial response has been enthusiastic and here we print a few of the early entries.**


*The Horizon HDSM digital satellite meter*

Patrick Laurence Travers of Newcastle says: "The information on TV and video is great." WK Renton of Egremont in Cumbria uses *Television* for keeping up to date with industry.

Colin Gillies of Aerial and Communication Systems in Alderley Edge, Cheshire, declares: "It's the only one worth reading."

Mr Frost of Alders TV in Holland-on-Sea, Essex, buys the magazine for its "good fault finding reports and humorous articles."

## "I am a nerd really"

Dr BH Smallwood of Garway, Herefordshire, confesses: "I am a nerd really."

J D Lee of Worsley in Manchester says: "It keeps my 50 Year association with the TV trade alive."

C Thorne of Judgecard Ltd in St Austell reads the magazine because it "supports my life-long interest in TV & Radio."

Mr F Pickersgill, of Pickersgill TV Services in Langold, Nottinghamshire, adds: "It keeps me up to date with developments and faults."

Mr J Manning of Digitest in Plucknett, Somerset, enthuses: "Monthly Television makes one wiser - I am."

## Essential reading

Chris Raymond of Chris Raymond Television in Brighton, Sussex, explains that "TV Faults, etc. are essential reading for any engineer."

Mr G Scarrott in Chatham, Kent, a long standing reader, states: "It provides me with excellent technical/repair information since 1955."

Mr G Giannoni of R Jones Elecronics Centre in Whitton likes the "up to date information on technology development and is ahead of the game.

Lee Archer of Wigan, Lancashire, adds some Spanish flavour: "IES de muy Buena calidad!"

Nick Cecchi of Cheltenham says: "I always find very useful information and enjoy reading it."

D J Head of Stevenage, Herts, says: "It is informative and Interesting," while Steven Hopkinson of Mobile Music in Harrogate adds: "I can keep up-to-date with the latest Technology."

Ewen MacKenzie of Aerial & Satellite Service in Larkhall, Scotland, reads *Television* because; "It has interesting and useful features."

## Better than watching

Andy Goloskof of Tewkesbury, Gloucestershire adds: "It is better than watching it!"

David Smith of Leigh finds it useful for its "up to date technology and service information."

Alexander Macleod of Thurso, Caithness, still reads it because he is an 'Ex-engineer.'

Alan Satchell of Satchell Electronics in Cambridge says: "It's very up to date with the interest in Electronics."

## Down to earth

RJ Spratt of RJS Electronic Services in Portland, Dorset says he reads *Television* because: "I want up to date, down to earth, practical information and advice."

Paul Jewell of Fault Busters in Plymouth, reads it "to keep abreast of present and future developments and service tips"

Mr M Barnes of Sheffield, South Yorkshire, adds that: "Providing information is key to future trade."

G Morrison of G Morrison Aerials in Lochinver, Sutherland says: "It is the nearest I could find to a trade magazine for Aerial Distribution installers."

D Robinson Tiverton in Devon asserts: "I am always kept up to date on the latest technology."

Finally, Philip Stevenson of Belfast, affirms: "It provides up to date information on TV and consumer electronics."

Competition

# Win a Horizon HDTM terrestrial meter

*This month Television is offering its readers the chance to say what kind of reading matter they would like to see in future issues, plus the chance to win a new Horizon HDTM terrestrial meter. Just fill in the form below and return it to us. You don't even have to cut it out – if you like, you can use a photocopy instead.*

Horizon has developed a new version of its DVB-T meter for terrestrial services like FreeView. It shows UHF signal strength (RF level), DVB-T Mux indication and signal to noise in dB.

It also has simple quality of service indicators. The meter comes pre programmed with channels 21-69 and can hold up to 32 transmitter Mux groups allowing for customising of the meter.

Horizon's HDTM Digital Terrestrial Meter uses a similar platform as the HDSM satellite meter offered as a prize in last month's competition.

## Specifications

- Displays Signal Strength (R.F level) and Pre and Post BER together
- Fast and accurate Pre BER in real time for easy pointing of aerial via built in COFDM in real time. 4 quality star indicates the quality of service
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- 7 or 8 MHz channels
- 2K and 8 K mode
- Automatic constellation
- VHF (band3) and UHF bands
- RF input range 167-862 MHz
- Input dynamic range -72dBm~-20dBm
- Input connector BNC. Input imp 75 ohms. Loop through
- Built in universal charger 100-240V AC 12W intelligent charger (CE approved) with delta V delta T detection. Fast charge, then trickle.
- Run time with full charge: Minimum 5 hours from 2.4 Ah NiMH battery
- Figure of 8 mains input connector. 2.1 mm Female PSU plug for external charge via supplied car charger
- Computer interface: Serial port (Com 1-4) for upgradeable software on transmitters.
- Supplied with leather case, mains lead, programming lead, car lead, IEC to BNC adapter and 2 off 10db attenuators.


*You can win this new Horizon HDTM Digital Terrestrial Meter.*

*The new version of HDTM*

**To enter the competition, please fill in the form below and return it before 31st January to:**
Television Satellite Meter Competition, Nexus Media Communications, Nexus House, Azalea Drive, Swanley, BR8 8HU.

Name, Company & Address: .....

..... Daytime Telephone: .....

I would like to read the following kind of material in *Television* magazine:

.....

The winner will be anounced in the May 2006 issue of *Television* (on sale from April 2006). The Editor's decision is final.

*What is PAT testing, where is it needed, and who is responsible for it? Is offering PAT testing services a good way for service engineers to generate extra profit? What is involved in setting up a PAT testing service? Mark Hadley of Megger has some answers.*

Almost everyone in the servicing trade will know that there's a huge demand for portable appliance testing or, as it is usually called, PAT testing. Some, however, may be less clear about what is behind the requirements for PAT testing, and which equipment is covered by those requirements. Let's start by looking at these points.

The motivation behind PAT testing is straightforward. It is simply a way of helping to ensure that portable electrical equipment used in a non-domestic environment is safe. As might be expected, this need for safety is backed up by legislation and regulations.

For example, PAT testing helps responsible persons to meet their obligations under the Health and Safety at Work Act 1974, the Provision and Use of Work Equipment Regulations (PUWER) 1998, the Management of Health and Safety at Work Regulations 1999, the Workplace (Health, Safety and Welfare) Regulations 1992, and the Electricity at Work Regulations 1989.

Note the reference to responsible persons, which naturally raises the question of who is responsible for PAT testing. The answer may be a surprise – everyone at work has responsibilities for ensuring safety. In practice, however, it is employers who are expected to shoulder most of the responsibility.

This is not a definitive statement and, for further information, readers should obtain a copy of the Code of Practice for In-Service Inspection and Testing of Electrical Equipment. Published by the IEE, this is essential reading for everyone who is in any way involved with PAT testing.

## Asset testing

Now let's look at which equipment needs to be PAT tested. As a rule of thumb, if an item of electrical equipment, usually described as an asset, is connected to the supply via plug and socket, it will need PAT testing.

If it is permanently wired, it will fall outside the scope of the PAT testing requirements. PAT testing is not needed for battery-powered equipment, although mains-operated battery chargers must be tested.

These statements are a guide only, and are intended to help when, for example, deciding how many assets to include in a quotation. When deciding whether or not an individual asset needs testing, reference should always be made to the IEE Code of Practice.

*A full QWERTY keyboard allows asset names and identity information to be entered quickly and easily*

Let's make it clear that PAT testing is not a one-off event. Assets must be re-tested at regular intervals, as defined in the IEE Code of Practice. These intervals vary according to type of asset, and the environment in which it is being used.

Businesses, schools, hospitals and other users of portable electrical equipment can, of course, carry out their own testing, providing that they have appropriate equipment and skills. Many, however, prefer to subcontract this work, and there are companies that provide nothing but PAT testing services.

But what about service engineers who are thinking about PAT testing as a way of generating extra income? On the plus side, there is potentially a large amount of business available and the consensus is that the market is growing, albeit slowly.

## Intensely competitive

On the negative side, PAT testing is intensely competitive, with typical per-asset testing charges in the range £1.50 to £3.50. To operate profitably at these prices, it is typically necessary to test upwards of 100 assets per day. Bearing in mind that these assets are likely to be distributed around a building or site, this is very fast work!

The conclusion is that it is certainly possible to operate a PAT testing service profitably, but that it is by no means easy money. In particular, for those new to the PAT testing market, considerable effort is likely to be needed to secure worthwhile contracts, as these are fiercely contested.

Let us suppose, however, that the decision has been made to offer a PAT testing service. What is involved in terms of training and equipment? Addressing the first point, those who provide PAT testing services professionally should ideally hold the City and Guilds 2377 qualification, which is specifically designed to ensure proficiency in PAT testing.

Now let's turn to equipment. The essential tests for most assets are earth bonding and insulation resistance – tests which can be carried out using the everyday test equipment that service engineers already have. It is unlikely, however, that this equipment will allow testing to be carried out sufficiently quickly and efficiently to make it profitable.

A dedicated PAT tester is, therefore, virtually essential. These products are widely available and can be divided into two main groups. In the first group are simple pass/fail testers. A typical tester of this type

provides facilities for checking earth bonding at 25A and, perhaps, 10A, as well as for testing insulation resistance at 500V DC.

The instrument is used simply by plugging in the asset and pressing the appropriate button for the test required. While numerical results are usually provided, these instruments frequently also offer some form of clear pass/fail indication to guide users with limited experience.

## Limited test range

It may seem that their simple, fast operation would make these basic, inexpensive instruments a good choice for service engineers offering testing services, but this is not the case. First, the range of tests offered is limited. For example, high-voltage insulation testing is likely to damage IT equipment, and alternative methods of checking insulation integrity have to be used.

Further, the pass/fail limits, as defined in the IEE Code of Practice, vary for different types of asset. In order to simplify operation, however, the limits used by basic testers are usually factory set to correspond with those that apply to the most commonly encountered types of asset.

Finally, basic testers don't automatically record test data. Jotting down the results manually may not sound much of a problem, but when 100 assets a day are being tested, recording and archiving results soon becomes a real concern. In fact, efficient data handling can easily make the difference between profit and loss in PAT testing operations.

Basic PAT testers undoubtedly have their uses, but those who offer professional testing services need something more sophisticated.

*Left – Assets must be re-tested at regular intervals, as defined in the IEE Code of Practice*

*Above – The best instruments allow direct connection to a printer to generate pass/fail labels*

## Premium models

This brings us to the second group of testers, the versatile premium models. These provide more tests, including earth continuity, earth leakage and even flash testing. They may also allow test parameters and pass/fail limits to be set by the user. They are even quicker to use overall than their simple counterparts, because the test process can be automated and they store test results automatically.

The best instruments of this type have a full QWERTY keyboard for data entry, allowing asset names and identity information to be entered quickly and easily. They also allow direct connection to a printer, so that the generation of pass/fail labels – an essential part of the PAT testing process – is fast and convenient.

The internal database facilities of the best PAT testers often go beyond simply storing results. They may, for example, interface with a plug-in bar-code reader. When routine re-testing is carried out, the user simply scans the asset label. The tester automatically retrieves the asset's details and the required testing routine, virtually eliminating the need for manual data entry.

Some testers also have the capability of comparing past and current test results. This comparison, performed at the same time as testing, reveals any slow, long-term deterioration, and provides an early warning of possible future problems, even if the test results are currently within the acceptable pass band.

Turning to prices, in round terms, users might expect to pay about £300 to £400 for a basic tester, and about £950 for a top-end model. The difference is, of course, significant, but the extra convenience and flexibility of the top-end tester means that those offering professional testing services will quickly recoup the extra cost.

## Test archiving

Finally, reference needs to be made to the production and archiving of test documentation. In a busy testing business, even testers with a generous internal memory quickly run out of space to store results. The solution is to transfer the test data periodically to a PC, where it can be used to produce reports for the owner of the assets, the requirements for which are, unsurprisingly, detailed in the IEE Code of Practice mentioned earlier.

Several software packages are available for downloading and managing test data. Results can be imported directly into a printable document, with details of the customer, the testing company and the test itself. A single PAT operator can easily exceed 20,000 records a year for hundreds of clients, but the use of PC makes results easy to store and retrieve.

In conclusion, one thing that's certain is that PAT testing will be around for the foreseeable future. Providing PAT testing services is not an easy way of making money but, for those service engineers who are prepared undergo the right training, invest in good equipment and work efficiently, it undoubtedly offers opportunities for profit.

***www.megger.com***

# Something fishy

**In the old days all film post-production was on actual film. Director of photography Jon Felix, who started as a film editor at the BBC, shot Fishy in 2003, a film directed by Deva Palmier starring Shirley Henderson. The film tells the tale of Glenda, an unemployed misfit who falls in love with Freddie, her goldfish. Post-production employed the Digital Intermediate (DI) platform.**

Fishy was shot on Super 35mm at Three Mills Studios and on location in London. Post-production via the DI route, was scanned at 2K resolution by Digital Film Lab, conformed on an Inferno, and out-putted back to 35mm. The Dolby Digital sound was mixed at Twickenham Film Studios.

Fishy has featured in several festivals, awards and screenings including:

- Edinburgh International Film Festival 2003
- London Film Festival 2003
- AFI Fest LA 2003
- Chicago International Film Festival 2004
- Brief Encounters Film Festival 2003
- Palm Springs 2004
- Foyle Film Festival 2004

Awards include:

- Chicago International Festival, Silver Plaque Award 2003
- BBC Talent, joint Runner-Up
- Raindance East Film Festival, Second Place
- London Production Fund Award
- Awarded a print grant by the British Council
- Stuart Mackay Best Sound Editor Broadcast Young Talent Awards

Photograph by Spencer Murphy

*Jon Felix and Shirley Henderson contemplate life inside a goldfish bowl.*

With film post-production, the original camera negative was very carefully cut to match the edit done on a 'workprint' by the editor, and then prints were made from this cut negative in a film laboratory. While films are still done this way - Digital Intermediate (DI) is becoming much more common as it becomes cheaper.

According to Steve Shaw of Digital Praxis, the move toward DI as an alternative to the chemical lab, and more, is now well under way.

This is not just because it is a cleaner, quicker and more flexible alternative to the traditional approach but also because it is a far better fit for the modern media world.

Films are rarely viewed only in the 'film' cinema; a few cinemas have already gone digital and many people see films at home via high quality

*The shot used for the poster to promote Fishy.*

Jon Felix (left) favours Digital Intermediate.

DVD or via digital broadcasting, both SD and increasingly HD.

DI creates an edited and graded digital master from which it is easy to make the highest quality film deliverables as well as the highest quality versions for all other media.

## DVD additional content

For example, DVDs tend to offer more than a simple home viewing version of a movie, containing additional content such as deleted scenes, director's cuts & extended versions, making of documentaries, interviews, games, etc., making DI an appealing and effective operation in streamlining DVD authoring requirements.

At the same time a well-designed DI system can offer an easy and cost-effective path to create different versions, such as for airlines and foreign language distribution, including trailers and additional promotional requirements for the movie.

In the past the DI route was applied to films originated on actual film (35 or 65mm) and then digitised at a suitably high enough resolution. Editing and effects work was done on computers.

The final product was then laser scanned back onto film. This is in fact how Fishy was made. Nowadays films are also shot on very high-resolution digital cameras (eg. Star Wars), but the post-production route is essentially the same.

"Originally it was said that if you shot on 35mm film - you had to do digital post-production at around 4K resolution (around 8m pixels) to achieve a pixel size as small as film grain," Felix explains.

"This was very expensive and the first movie to work at 2K resolution to save money was Pleasantville. Everyone thought that this would not look right but nowadays many films are done at 2K, although the big blockbusters prefer more data to work with. Fishy was done at 2K."

In his primary roles as a director of photography, Felix advises on the various stages of the creation of the images (choice of origination medium, shooting techniques - especially if shooting for effects and CG sequences, post-production route).

He also has hands-on experience of

## From Wikipedia, the free encyclopedia

Digital intermediate (DI) describes the process of digitising a motion picture and manipulating colour and other image characteristics to change the look, and is usually the final creative adjustment to a movie before distribution.

It is distinguished from the telecine process in which film is scanned and colour is manipulated but only intended for video and television distribution.

A digital intermediate is also customarily done at higher resolution and with greater colour fidelity than telecine transfers and utilises only digital tools (no analog video devices).

Although originally used to describe a process that started with film scanning and ended with film recording, digital intermediate is also used to describe colour grading and final mastering even when a digital camera is used as the image source and/or when the final movie is not output to film. This is due to recent advances in digital cinematography and digital projection technologies that strive to match or exceed the quality of film origination and film projection.

In traditional photochemical film finishing, an intermediate is produced by exposing film to the original camera negative.

The intermediate is then used to mass-produce the films that get distributed to theaters. Colour grading is done by varying the amount of red, green, and blue light used to expose it.

The digital intermediate process uses digital tools to colour grade, which allows for much finer control of individual colours and areas of the image, and allows for the adjustment of image structure (grain, sharpness, etc).

The intermediate for film reproduction is then produced by means of a film recorder. The physical intermediate film that is a result of the recoding process is sometimes also called a digital intermediate.

## Shirley Henderson

Shirley Henderson has appeared in high profile TV roles like Kate in *The Taming of the Shrew* and Catherine of Braganza in *Charles II: The Power and the Passion*, co-starring with Rufus Sewell.

Since graduating from the Guildhall School of Music and Drama in 1986, Shirley Henderson had an early role playing Sally in costume drama *Clarissa* (1991), alongside Sean Bean, but her real break into TV came with a part in *Hamish Macbeth* in 1995.

She played Isobel Sutherland, a love interest for the show's star Robert Carlyle.

Other TV roles for Shirley include Marie Melmotte in Andrew Davies adaptation of Anthony Trollope's *The Way We Live Now* (2001), alongside David Suchet and Matthew MacFayden.

She also played Charlotte in *Dirty Filthy Love* (2004), a drama about a sufferer of Obsessive Compulsive Disorder and Tourette's Syndrome, which won the 2005 RTS Drama award for Best Single Drama.

Shirley plays feisty politician Katherine Mignola in David Nicholl's updating of Shakespeare's *The Taming of the Shrew, in which she once again co-stars* with Rufus Sewell, playing Petruchio.

Despite having no plans for marriage, Katherine finds Petruchio's forceful ways impossible to resist. But he is determined to tame his rude and agressive bride, whatever it takes.

This glamorous production also stars Jaime Murray, Twiggy Lawson, Stephen Tompkinson and David Mitchell.

Among the many films Shirley has been in are the Harry Potter series, in which she plays toilet-based ghost Moaning Myrtle, and the two Bridget Jones films, in which she plays Briget's weepy friend Jude.

She also played Gail in Trainspotting (1996), Leonora Braham in Mike Leigh's Topsy Turvy (1999), Lindsay Wilson in 24 Hour Party People (2002), and Alice in Wilbur Wants to Kill Himself (2002).

*The camera never lies, but it can certainly tell a tall tale. 'Glenda' is about to take the plunge.*

these stages. Unlike many of his colleagues, for example, he often colour-grades ('time') his own work, and as a former editor gets much more involved in post-production than a cameraman usually does.

His particular experience is somewhat unusual in that he has a wide ranging skillset across many areas of TV and film production. In the old days one was just a cinematographer, or an editor, or a director.

Today - so much work is done on software that incorporates modules covering many different stages that it pays to have a working knowledge of other departments.

For example Final Cut Pro is not only an editing program, but also includes excellent sound post-production tools and sophisticated colour grading (timing) controls too, such that one operator can learn the skills associated with different areas that were once handled by many different technicians.

At his office in San Francisco, Felix works on an HD Final Cut Pro system with many effects programs and music and sound creation tools. He also writes music.

"I believe that the job of a director of photography now requires a good understanding of modern digital technology," he adds.

"The job should not be undermined by an inadequate understanding of these techniques.

"Just as when video and then non-linear computer editing took over from film editing - and many excellent editors were left behind - unable to learn the new technologies, so too there were cinematographers whose experience was limited to film-based work, and who resisted the new digital possibilities.

"Actually, given the choice, my preference is still to originate on film - it is still the best 'high definition' medium there is. All this is relevant to the amateur and low-budget film-maker too.

"The small DV cameras are excellent (can look as good as 16mm film), and the software is relatively cheap. It is therefore conceivable for low-budget work to end up on 35mm film prints, and actually look OK. In fact there are many film-makers in San Francisco doing exactly this."

**www.jonfelix.com**
**www.devafilms.com**

## Déva Palmier

In her own words, Déva Palmier makes quirky humorous films that challenge preconceptions of the contemporary world.

Déva was born in New Zealand and lived in India and Switzerland as a child before moving to England.

She trained as an actress at Guildhall School of Music and Drama with a BP Scholarship and graduated in 1986.

After ten years of working as an actress, Déva felt she wanted to develop her own ideas through film.

One day while on set, she asked the director and the whole crew if they would help her shoot her first film Swing, which they did.

That marked the beginning of her film-making career.

Déva prefers to shoot on 35mm, HD or HDV with a digital post-production route, as her films tend to have special effects.

She happily embraces the digital revolution as it gives her an increased opportunity to actualize all her films.

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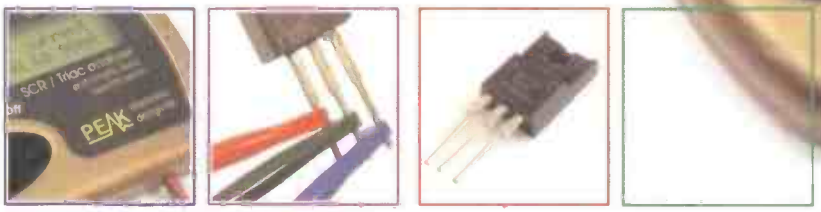

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| 100uF | CAP124 | £0.60 | 10 |
| 150uF | CAP168 | £0.65 | 5 |
| 220uF | CAP125 | £0.80 | 10 |
| 330uF | CAP30 | £1.75 | 10 |
| 470uF | CAP31 | £1.75 | 10 |
| 680uF | CAP32 | £2.10 | 5 |
| 1000uF | CAP33 | £2.10 | 10 |
| 1200uF | CAP169 | £1.50 | 5 |
| 1500uF | CAP170 | £1.50 | 5 |
| 2200uF | CAP34 | £5.25 | 10 |
| 3300uF | CAP35 | £5.00 | 5 |
| 4700uF | CAP36 | £6.10 | 10 |
| 6800uF | CAP171 | £4.50 | 5 |
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| 22uF | CAP38 | £0.45 | 10 |
| 33uF | CAP126 | £0.40 | 10 |
| 47uF | CAP39 | £0.48 | 5 |
| 68uF | CAP127 | £0.55 | 10 |
| 100uF | CAP40 | £0.70 | 10 |
| 120uF | CAP128 | £0.85 | 10 |
| 150uF | CAP41 | £0.95 | 5 |
| 220uF | CAP42 | £1.20 | 10 |
| 330uF | CAP43 | £1.40 | 5 |
| 470uF | CAP44 | £1.90 | 10 |
| 680uF | CAP45 | £3.15 | 5 |

| VALUE | CODE | PRICE | PER PACK |
|---|---|---|---|
| **25 Volts...continued** | | | |
| 1000uF | CAP46 | £3.65 | 10 |
| 1500uF | CAP47 | £3.90 | 5 |
| 2200uF | CAP48 | £2.00 | 2 |
| 3300uF | CAP49 | £2.20 | 2 |
| 4700uF | CAP50 | £3.65 | 2 |
| 6800uF | CAP51 | £3.90 | 2 |
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| 1uF | CAP130 | £0.40 | 10 |
| 3.3uF | CAP131 | £0.40 | 10 |
| 4.7uF | CAP132 | £0.45 | 10 |
| 10uF | CAP52 | £0.50 | 10 |
| 22uF | CAP53 | £0.45 | 10 |
| 33uF | CAP54 | £0.50 | 5 |
| 47uF | CAP55 | £0.85 | 10 |
| 68uF | CAP133 | £0.55 | 10 |
| 100uF | CAP56 | £0.85 | 10 |
| 150uF | CAP57 | £0.95 | 5 |
| 220uF | CAP58 | £1.45 | 5 |
| 330uF | CAP134 | £1.60 | 10 |
| 470uF | CAP135 | £1.75 | 10 |
| 680uF | CAP59 | £6.50 | 10 |
| 1000uF | CAP60 | £4.35 | 10 |
| 1500uF | CAP173 | £4.00 | 5 |
| 2200uF | CAP61 | £2.45 | 2 |
| 3300uF | CAP62 | £10.00 | 5 |
| 4700uF | CAP136 | £3.50 | 2 |
| **40 Volts** | | | |
| 2200uF | CAP174 | £1.80 | 2 |
| 2200uF | CAP175 | £2.00 | 1 |
| **50 Volts** | | | |
| 0.47uF | CAP176 | £0.35 | 10 |
| 1uF | CAP137 | £0.35 | 10 |
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| 3.3uF | CAP139 | £0.35 | 10 |
| 4.7uF | CAP140 | £0.35 | 10 |
| 6.8uF | CAP177 | £0.45 | 10 |
| 10uF | CAP63 | £0.50 | 10 |
| 22uF | CAP64 | £0.70 | 10 |
| 33uF | CAP141 | £0.85 | 10 |
| 47uF | CAP65 | £0.85 | 10 |
| 68uF | CAP142 | £0.90 | 10 |

| VALUE | CODE | PRICE | PER PACK |
|---|---|---|---|
| **50 Volts...continued** | | | |
| 100uF | CAP66 | £0.85 | 10 |
| 220uF | CAP67 | £1.75 | 10 |
| 330uF | CAP68 | £2.45 | 10 |
| 470uF | CAP69 | £4.35 | 10 |
| 680uF | CAP70 | £4.90 | 5 |
| 1000uF | CAP71 | £5.25 | 10 |
| 1500uF | CAP143 | £4.50 | 5 |
| 2200uF | CAP72 | £3.25 | 2 |
| 3300uF | CAP144 | £3.25 | 2 |
| **63 Volts** | | | |
| 0.22uF | CAP145 | £0.45 | 10 |
| 0.33uF | CAP178 | £0.35 | 10 |
| 0.47uF | CAP73 | £0.35 | 10 |
| 1uF | CAP74 | £0.35 | 10 |
| 1.5uF | CAP179 | £0.35 | 10 |
| 2.2uF | CAP75 | £0.35 | 10 |
| 3.3uF | CAP76 | £0.50 | 10 |
| 4.7uF | CAP77 | £0.35 | 10 |
| 6.8uF | CAP180 | £0.50 | 10 |
| 10uF | CAP78 | £0.50 | 10 |
| 15uF | CAP79 | £0.95 | 5 |
| 22uF | CAP80 | £0.75 | 10 |
| 33uF | CAP81 | £0.85 | 10 |
| 47uF | CAP82 | £0.95 | 10 |
| 56uF | CAP181 | £1.10 | 10 |
| 68uF | CAP83 | £1.30 | 5 |
| 100uF | CAP84 | £1.20 | 10 |
| 150uF | CAP85 | £2.80 | 5 |
| 220uF | CAP86 | £2.80 | 10 |
| 330uF | CAP87 | £4.00 | 10 |
| 470uF | CAP88 | £5.25 | 10 |
| 680uF | CAP89 | £5.00 | 10 |
| 1000uF | CAP90 | £5.40 | 5 |
| 2200uF | CAP182 | £2.20 | 1 |
| 4700uF | CAP183 | £4.00 | 1 |
| **100 Volts** | | | |
| 0.1uF | CAP184 | £0.80 | 10 |
| 0.22uF | CAP185 | £0.80 | 10 |
| 0.33uF | CAP186 | £0.80 | 10 |
| 0.47uF | CAP91 | £0.50 | 5 |
| 1uF | CAP92 | £0.85 | 10 |
| 1.5uF | CAP93 | £0.70 | 5 |

| VALUE | CODE | PRICE | PER PACK |
|---|---|---|---|
| **100 Volts...continued** | | | |
| 2.2uF | CAP94 | £0.50 | 5 |
| 3.3uF | CAP95 | £0.50 | 5 |
| 4.7uF | CAP96 | £0.50 | 5 |
| 6.8uF | CAP187 | £0.80 | 10 |
| 10uF | CAP97 | £0.95 | 10 |
| 22uF | CAP98 | £1.05 | 10 |
| 33uF | CAP99 | £1.55 | 5 |
| 47uF | CAP100 | £1.75 | 10 |
| 68uF | CAP188 | £1.30 | 5 |
| 100uF | CAP101 | £2.10 | 10 |
| 220uF | CAP102 | £6.00 | 5 |
| 330uF | CAP189 | £3.00 | 2 |
| 470uF | CAP103 | £6.00 | 5 |
| 680uF | CAP190 | £3.00 | 2 |
| 1000uF | CAP191 | £3.00 | 1 |
| **160 Volts** | | | |
| 0.47uF | CAP192 | £0.45 | 10 |
| 1uF | CAP193 | £0.45 | 10 |
| 2.2uF | CAP146 | £0.45 | 10 |
| 3.3uF | CAP194 | £1.00 | 10 |
| 4.7uF | CAP195 | £1.00 | 10 |
| 10uF | CAP147 | £1.40 | 10 |
| 22uF | CAP148 | £1.80 | 10 |
| 33uF | CAP149 | £2.30 | 10 |
| 47uF | CAP196 | £2.20 | 5 |
| 100uF | CAP150 | £3.25 | 5 |
| 220uF | CAP197 | £3.00 | 2 |
| 470uF | CAP198 | £3.25 | 1 |
| **200 Volts** | | | |
| 22uF | CAP199 | £1.60 | 5 |
| 100uF | CAP151 | £3.25 | 5 |
| 220uF | CAP200 | £2.50 | 1 |
| 330uF | CAP201 | £2.50 | 1 |
| **250 Volts** | | | |
| 0.47uF | CAP202 | £0.60 | 10 |
| 1uF | CAP152 | £0.60 | 10 |
| 2.2uF | CAP203 | £1.30 | 10 |
| 3.3uF | CAP104 | £1.75 | 10 |
| 4.7uF | CAP204 | £2.00 | 10 |
| 10uF | CAP105 | £2.60 | 10 |
| 22uF | CAP153 | £2.30 | 10 |

| VALUE | CODE | PRICE | PER PACK |
|---|---|---|---|
| **250 Volts...continued** | | | |
| 33uF | CAP206 | £1.75 | 5 |
| 47uF | CAP106 | £4.35 | 10 |
| 100uF | CAP154 | £4.50 | 5 |
| 220uF | CAP155 | £2.00 | 2 |
| 330uF | CAP206 | £2.50 | 1 |
| **350 Volts** | | | |
| 1uF | CAP156 | £0.70 | 10 |
| 2.2uF | CAP207 | £1.20 | 10 |
| 3.3uF | CAP157 | £1.50 | 10 |
| 4.7uF | CAP208 | £1.10 | 5 |
| 10uF | CAP158 | £2.25 | 10 |
| 22uF | CAP159 | £3.40 | 10 |
| 33uF | CAP209 | £2.60 | 5 |
| 47uF | CAP210 | £1.50 | 2 |
| 100uF | CAP211 | £3.00 | 2 |
| 330uF | CAP212 | £5.00 | 1 |
| **400 Volts** | | | |
| 0.47uF | CAP213 | £0.60 | 10 |
| 1uF | CAP107 | £2.15 | 5 |
| 2.2uF | CAP108 | £2.25 | 5 |
| 3.3uF | CAP214 | £2.25 | 5 |
| 4.7uF | CAP109 | £3.15 | 5 |
| 10uF | CAP110 | £4.00 | 5 |
| 22uF | CAP111 | £2.50 | 2 |
| 33uF | CAP215 | £2.50 | 2 |
| 47uF | CAP112 | £3.50 | 2 |
| 68uF | CAP216 | £3.50 | 2 |
| 100uF | CAP160 | £4.00 | 2 |
| 150uF | CAP217 | £3.20 | 1 |
| 220uF | CAP161 | £7.00 | 2 |
| 560uF | CAP162 | £4.00 | 1 |
| **450 Volts** | | | |
| 1uF | CAP113 | £2.80 | 5 |
| 2.2uF | CAP114 | £3.20 | 5 |
| 3.3uF | CAP218 | £3.20 | 5 |
| 4.7uF | CAP115 | £4.95 | 5 |

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# Cinematised reality in 3D

*Itaru Kitahara of ATR Intelligent Robotics and Communication Laboratories in Japan contends that the purpose of cinematised reality is to record unexpected moments in people's lives. Since of course nobody knows when a particular unexpected event is going to take place, there is no guarantee of capturing that moment.*

The key concept of cinematised reality is to continuously record unexpected moments by applying the technique of virtualised reality to multiple videos captured by suitably positioned cameras.

Without a cameraman working 24 hours a day, it is not possible to record all the moments we want to capture. On the other hand, a fixed camera can capture footage continuously. Video productions for film and television attract audiences by changing camera positions.

We have to arrange cameras in ways that facilitate prediction of future events. Instead of future prediction, we can see the world of the past from arbitrary viewpoints using virtualised reality technique.

Virtualised reality makes it possible to regenerate video captured at arbitrary viewpoints in a 3D space. The technique reconstructs 3D models in the space by merging multiple videos using a computer vision algorithm, and generates 3D free-viewpoint videos by applying computer graphics technology to the reconstructed model.

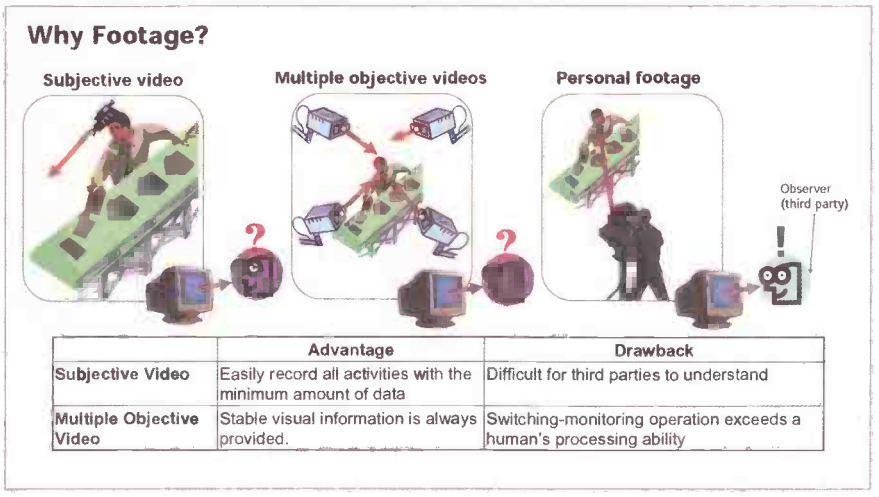
## 3D Video Generation

For regenerating 3D video by using multiple videos, we set up multiple environmental cameras on the wall and the ceiling to surround the target object. All cameras are oriented toward the centre of the space to capture almost the same area.

## Camera calibration

One of the most difficult problems for camera calibration is setting up an accurate 3D world coordinate system and effectively arranging a series of landmark points, because there are many variations to space size and there may also be many obstacles in that space.

If we cover the space with a single scale or a single calibration board, accurate camera calibration is difficult because the scale is too large, or obstacles occlude some landmarks in the captured image.




| | Advantage | Drawback |
|---|---|---|
| Subjective Video | Easily record all activities with the minimum amount of data | Difficult for third parties to understand |
| Multiple Objective Video | Stable visual information is always provided. | Switching-monitoring operation exceeds a human's processing ability |

Our solution is to combine mobile calibration markers and a 3D laser-surveying instrument similar to that used in civil engineering. It is easy to increase the number of 3D coordinate data (X,Y,Z) with linear interpolation of the actual measurement values. The landmark point can be almost automatically detected in the captured images by painting with a discriminative colour.

To accurately calibrate the camera, it is necessary to obtain many pairs of 3D coordinates (X,Y,Z) in the scene and 2D coordinates (u,v) on an image, thus by using the 3D laser-surveying instrument, we can easily and accurately obtain the location of the calibration board in the 3D space.

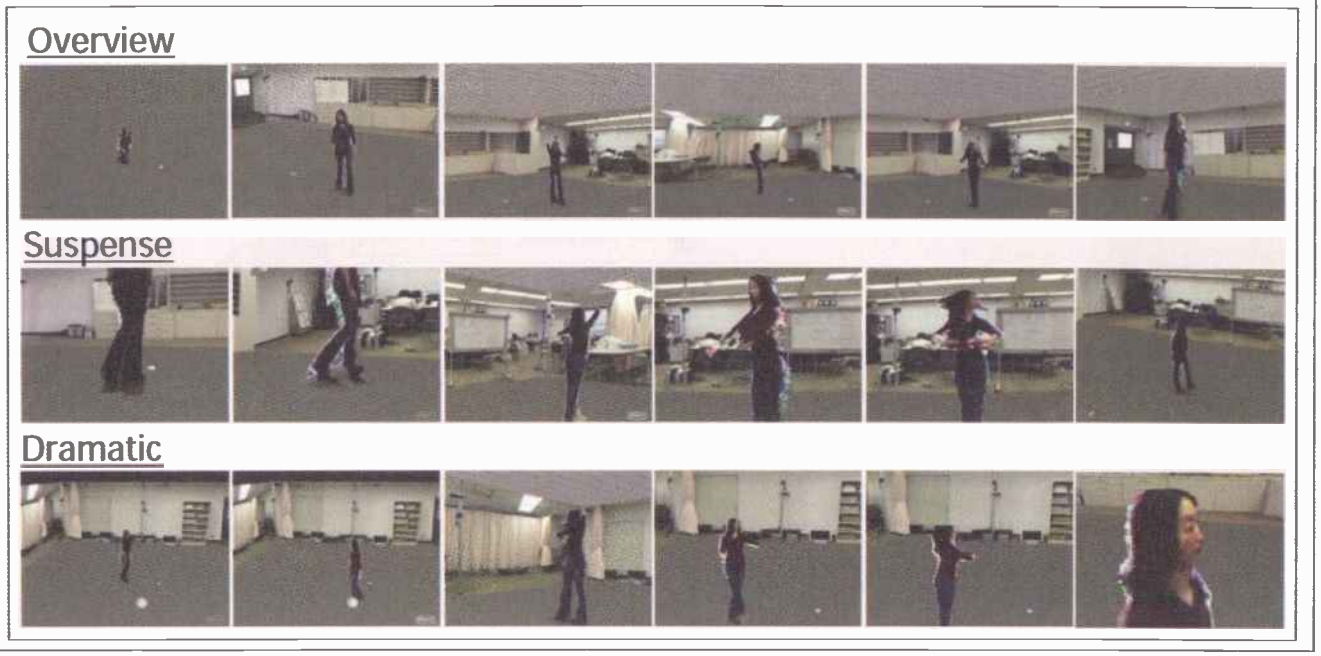
In fact, the measurement error is less than 0.1 mm. By moving the calibration markers to cover the entire 3D space and by measuring its 3D location accurately, it is possible to virtually realise a calibration scale which possesses high shape freedom.

Our camera calibration method has two advantages. Firstly, it is easy to increase the quantity of 3D coordinate data (X,Y,Z) with linear interpolation of the actual measurement values. Secondly, it is possible to almost automatically detect the landmark point in the captured images by painting it with a discriminative colour.

## 3D shape reconstruction

To reconstruct the 3D shape of the captured object, we employed the 'shape-from-silhouette' method to estimate the 3D shape, since this method is robust to differences of the observed pixel value. If the 3D position of voxel V is inside the captured object, V is always projected onto the

## Video Streams of Cinematized Reality




foreground region in all images.

On the other hand, if there is a single projected point located in the background region in multiple images, the voxel V is carved off the 3D shape model, because the voxel V is not included in the 3D object. Finally, we can estimate the entire 3D object's shape by examining every possible position of the voxels V(x,y,z).

When the position and orientation of the virtual camera are specified, the projective relation between a scene point M(X,Y,Z) and a point on the image is defined with a projective transformation matrix.

The 3D model represents only the correspondence among the input multiple videos concerning a scene point M(X,Y,Z). The model tells us where a point M(X,Y,Z) exists in each captured image. Furthermore, when the position and orientation of the virtual camera are specified, the projective relation between a scene point M(X,Y,Z) and a point on the image is defined with a projective transformation matrix.

To choose the most suitable image for obtaining the colour information to be used for rendering, we investigate occlusion among objects and the orientation of objects' surfaces.

### Micro-facet billboarding

To accurately reconstruct a 3D shape by the 'shape-from-silhouette technique', many synchronised capturing cameras are required, and all the captured images need to be correctly segmented. To fulfil these requirements, we assume that in the experimental capturing environment it is easy to control the background colour or the lighting condition.

In daily living however, it is impossible to obtain such favourable conditions. As a result, the reconstructed 3D shape includes many computational errors. On the other hand, the basic 3D rendering method described above assumes that there is no error in the estimated shape.

Thus, when we render a 3D video with the method, these computer errors affect the quality of the generated image. A 3D model which employs a micro-facet billboarding technique was originally developed in photometric rendering research to express a 3D object that has fine texture, like a flowing coat or a jagged shape.

Nevertheless, though the advanced 3D laser range finder can accurately measure 3D shape, the measurable spatial resolution is still lower than that of a high-resolution digital camera. Therefore, if the 3D object is described at a lower resolution, appearance information on the captured images will be wasted.

On the other hand, the billboarding technique approximates a 3D object's shape to a single plane and expresses the object's appearance by mapping its captured image. This technique has the advantage of not wasting the resolution of captured images, even if an accurate 3D shape is not available.

The micro-facet billboarding technique, which installs the advantage of the billboarding technique into 3D modelling, can express more complicated shapes by encrusting micro-facet billboards onto the surface of the estimated 3D shape, while still applying all the advantages of the billboarding technique.

Since the normal vector of each surface of a voxel is much different from the correct normal vector of the 3D object's surface, when we generate a virtual image with mapping captured images onto the estimated voxel volume, the order of the appearance of the 3D object is not often retained.

As a result, many dots and cracks are observed on the surface of the 3D object. On the other hand, micro-facet billboard absorbs the difference with controlling the orientation of each billboard. Then, the order of the appearance of the 3D object is always maintained.

Goldlücke *et al.* utilised the micro-facet billboarding technique to render high-quality 3D videos in real time. To reduce the computational cost, the number of cameras was cut and the resolution of the voxel data was down-sampled.

As a result, the reconstructed 3D shape suffered lower accuracy. However, if fine texture information on the modelled 3D object is captured, the micro-facet billboarding method does generate good expressions by using rough 3D shape and fine texture information. We noticed that our 3D modelling process operates in a similar manner.

### Cinematographic Camera Control

The grammar of film language is based on a constrained condition for switching sequential camera shots. Since each single shot is nothing more

than a video fragment, it is necessary to combine many shots to generate an entire video. We call such sequential combination of shots a 'scene'.

Camera shot information comprises two types of information for camera control: initial camera parameters and camera actions. The initial camera parameters are set to appropriately capture the target objects in the initial state.

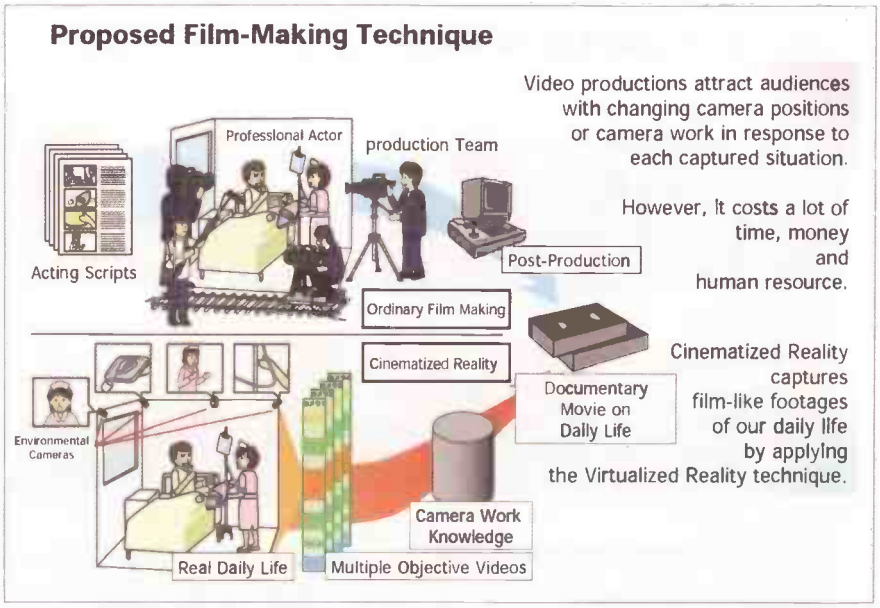
Labelling these values with aliases, for example, 'bird's eye' or 'super low', makes easier to add new shot information. The camera action describes variation of the camera position and the zoom parameter.

It is possible to set the values in the following two ways: one is to set the values by time-series relative difference from the initial state, while the other one is to calculate the values by interpolating the initial state and the exit state which are given as input information. The camera shots are pre-configured and stored in the capturing knowledge base. Currently, our system under development affords twelve sets of camera shots.

The constrained condition for switching camera shots explains contraindication of continuity between a current shot and the next shot. We provide the following two contraindications of camera shot switching to produce easily understandable and attractive videos by referring to the grammar of film language.

1. Do not set the next camera shot to stride across the imaginary line. It confuses the audience.

2. Do not choose a following camera shot that is similar to the current shot because the similarity reduces the effectiveness of the switch.




## Applying Camera Shot Knowledge

The system generates a scene by declaring a set of camera shots that maintain the constraint on switching shots. If a suitable set of camera shots is searched from among the preserved shots' film knowledge base, the user declares the searched scene. If the user cannot find a suitable set of shots, the system creates a new set of camera shots and stores it in the shots' knowledge base.

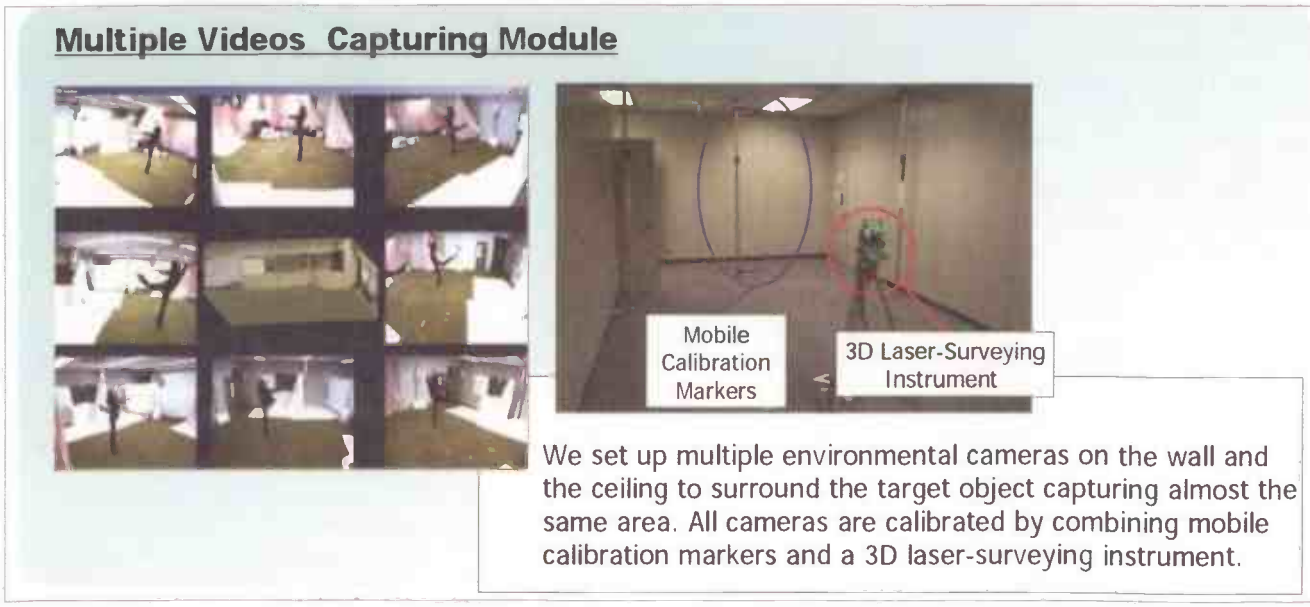
The declared or created set of shots is then nicknamed for easy future access, for example, Dramatic, Suspense, etc. To apply the camera shots' knowledge base to the cinematised reality system, it is necessary to know the positions of the target objects/actors and to know the capturing time-code.

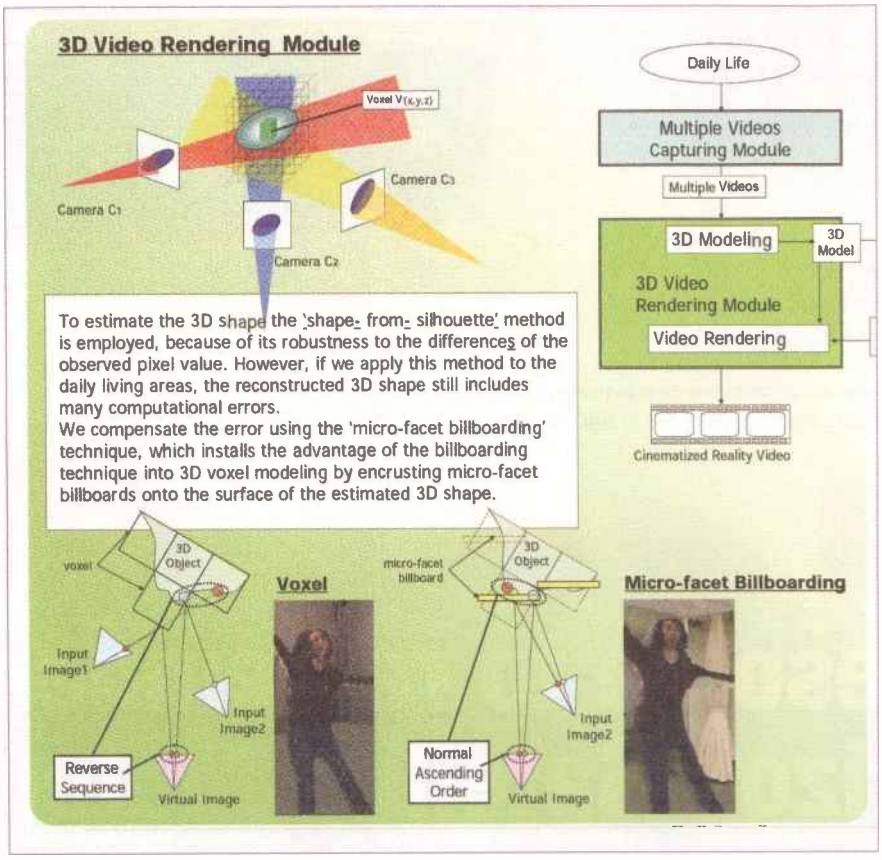
Our solution to this problem is to use annotation information to note the positions and time-codes for notifying the system. Annotation is assumed to be made not only by humans but also by various sensor inputs such as IR sensors and pressure sensors. An imaginary line is also estimated by the annotation information.

Our pilot system of cinematised reality consists of a multiple-video capturing module, a 3D video rendering module, an annotating module and a cinematographic camera-controlling module.

We have implemented a distributed system using nine PCs and eight calibrated colour cameras. The areas of the capturing space and the target space for 3D modelling are about $5.5m^2$ and $2m^2$, respectively, and the height of both spaces is 2m.

Cameras are set at almost equal intervals on the wall to surround the capturing space, and each is connected to a PC by a USB2 port. All cameras were oriented to observe the center of the space.






Eight portable Pentium-M 1.4-GHz PCs are used to capture a video stream from each camera and segment objects at 20 frames per second (fps). A colour-based background subtraction method is used to segment the foreground and background regions in the input multiple images.

The segmented information is sent via UDP over a 100Mbps network to a modelling and rendering PC. The modelling and rendering PCs each have Pentium-4 CPU and a GeForce-4 FX5200 graphic accelerator.

## 3D Video Rendering Module

By using the algorithm described above, our system synthesised a 3D video from a virtual camera. First of all, the 3D shape of the target object is reconstructed as a voxel volume with the 'shape-from-silhouette' method.

In this system, the side length of a voxel is set to 1 cm, which is almost equal to the spatial resolution of the captured images . Because our system is installed in an environment which has unfavourable conditions for 3D modelling, the reconstructed 3D shape includes many computational errors.

Thus, if we just map the captured image as texture information, the quality of the generated 3D video suffers seriously. As a solution, we employ the micro-facet billboarding technique to curb the improper influence of such errors.

Each micro-facet billboard corresponds to a voxel. In other words, the centre of both corresponding components of the 3D model should lie at the same 3D position.

The orientation of the micro-facet billboards is set to ensure that the normal vector of the billboard and a virtual camera's line of sight are parallel, just as with the ordinary billboard technique.

The micro-facet billboarding technique covers the deficit of appearance generated by errors in 3D shape estimation.

Texture mapping is one of the most time-consuming processes in this system because it is necessary to repeat the micro-facet billboarding technique a number of times. To lighten this burden, we reduce the number of micro-facet billboards by calculating the distance from the virtual viewpoint to each billboard prior to applying the texture mapping.

If a given billboard is occluded by another, the occluded billboard is deleted from the 3D model. Finally, the captured multiple images are mapped onto the modified 3D model and a 3D video is captured from an arbitrary viewpoint with rendering of the 3D model.

## Annotating Module

When a camera shot decides the capturing parameters of a virtual camera, annotation information is necessary in order to indicate target objects. Annotation information consists of spatial information and temporal information.

A spatial annotation is explained by the 3D positions of the target objects and their 3D regions, while a temporal annotation is described according to its frame-number. A spatial annotation is defined to drag with a mouse, and the temporal annotation is defined to click a point of the time scale bar.

These annotations are recorded with index information and an extra user's area described in free format. The annotations are assumed to be manually input, although it is not practical to input all temporal annotations in this way because there are simply too many frames in a captured video sequence to be processed by humans.

We solve this problem to save labour by interpolating two different temporal annotations that have the same index information.

## Camera-controlling module

In this example, the capturing module captures multiple videos of a girl dancing gracefully, where the 3D video-rendering module realises observation of the scene from an arbitrary viewpoint.

The annotating module adds the beginning/end time as a temporal annotation, and adds rectangles that include the target object's face and whole body as spatial annotations. Finally, we generate footage of our daily life by piecing all the generated 3D free-viewpoint videos together.

An example of a cinematised reality video is shown in which two types of camera shot information are used: 'dolly with zooming in' and 'spin around'. More precisely, 'dolly with zooming in' consists of two camera shots, 'dolly' and 'zoom in'.

Those two effects are utilised in a scene when an actor comes into the picture, and 'spin around' has the effect of impressing the audience. It is easy to generate another cinematised reality video of the same scene. In this case, the director, aims to generate a more dramatic video and suspensive video, respectively.

***The above is an excerpt from a paper recently presented by Itaru Kitahara, Ryuuki Sakamoto, Mika Satomi, Kaoru Tanaka and Kiyoshi Kogure at the IEE's CVMP 2005 conference.***

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# FAULT REPORTS

## TV and DVD Faults


Beko 26414R
Bush 2876NTX PT92 CHASSIS
Bush DVD142TV (11AK46 Chassis)
Bush WS6667 (4400 Chassis)
Daewoo DDT-21H9S/DDT-14H9S chassis CP099F
Daewoo DTH-2881GB-100D chassis CP830F
Daewoo DTY 2880GB - CP520 chassis
Daewoo DTY2880GB chassis CP520
Daewoo DTZ2481GB chassis CP520F
Goodmans Compact 110
Hitachi C1420VT (Philips televideo)
Hitachi C14D25 (Vestell 11AK46 chassis)
JVC AV-28GT1BJF (vestell 11ak45 chassis)
JVC XV-S302SL
Panasonic NV-FJ630B-S
Panasonic TC14S3R
Panasonic TC21S1 (Z5)
Panasonic TX21-GV1
Philips 24PW6005/05 (A10 chassis)
Philips DVD634
Philips GR2.2 chassis
Philips model 24PW6006/05 Chassis L01.1E.
Pioneer A-400
Samsung SP42W5HSX
Sanyo CE32WN4-B
Sanyo CE32WP5-B
Sony KV28LS60U.
Sony TA-3200F
Tatung T32W250S
Technics su-7700
Thompson 32WX411 (ICC20 chassis)
Toshiba 24W33K (11AK37)
Wharfedale 350

Charles Arundel
Phillip Rosbottom
George Cooper
John Coombes
Gary Laidler
Michael Dranfield
Glyn Dickenson
Test Case 518
Solution to Test Case 518

**Reader offer:**

# x1, x10 switchable oscilloscope probes, only £21.74 a pair, fully inclusive*

*Additional pairs as part of the same order, only £19.24 each pair.

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- two x1, x10 switchable probe bodies
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***Media House, Azalea Drive,***
***Swanley, Kent BR8 8HU***

Readers outside Europe, please add £2.50 to your order.

**Specifications**

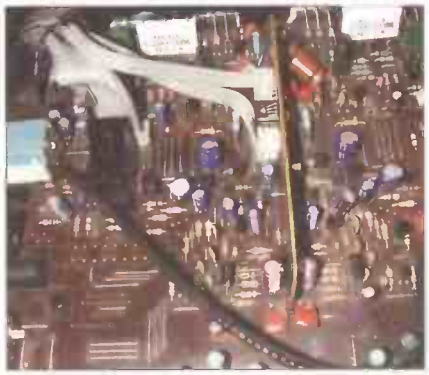
| | |
|---|---|
| **Switch position 1** | |
| Bandwidth | DC to 10MHz |
| Input resistance | 1MΩ – i.e. oscilloscope i/p |
| Input capacitance | 40pF+oscilloscope capacitance |
| Working voltage | 600V DC or pk-pk AC |
| **Switch position 2** | |
| Bandwidth | DC to 150MHz |
| Rise time | 2.4ns |
| Input resistance | 10MΩ ±1% if oscilloscope i/p is 1MΩ |
| Input capacitance | 12pF if oscilloscope i/p is 20pF |
| Compensation range | 10-60pF |
| Working voltage | 600V DC or pk-pk AC |

**Switch position 'Ref'**
Probe tip grounded via 9MΩ, scope i/p grounded

## Phillip Rosbottom

### Pioneer A-400

The relay was not working, 35V DC was on one speaker output, the 2sc2705 transistor was faulty, (the one near the relay large t092 case), the CCT is a mirror image so the other chanels are easy to pick out. The input phono sockets seemed to be causing some problems, the centre pin pushes back into the amp, a dribble of epoxy provides a low tech solution.



Pioneer A-400

### Sony TA-3200F

An early 70s high power amp. It had several faults on one channel, the output voltage was varying by about 1V with no signal. This was cured by replacing the input transistor of the differential pair. The transistors in the protection circuit had to be replaced as well, (the 2sc633\2sa678) along with the sps885, the main voltage amp driver. The amp powered up and worked fine after setting the quiescent and output 0V.

Sony TA-3200F

### Technics su-7700

This would not switch the speaker relay on, and I thought the output stage was faulty.

I dismantled the front panel and removed the PCB (no access from underneath) and began to check the solder and components.

The relay had a bad connection somewhere. I noticed the lamp in the meters illumination was not working. The amp worked by replacing the lamp.

# Test Case 518

Around here, it seems, Hitachi A7 TVs are like buses: you don't see any for a while, and then two come along together. Last month's was bad enough. This one was the subject of a rental customer's phone call and a home visit, culminating in collection to the workshop. Its model number was C28W410TN, one of the widescreen variants using a version of the A7 chassis. The problem was a common one: intermittent shutdown, almost certainly caused by the bad joints at various regulators, transistors and other components which are well known for causing this symptom. Some of them are mounted on the central heat-sink. We do not attempt to deal with this problem on site, even with a big and heavy set, because of safety and other risks, poor lighting, the possibility of some other cause being responsible, etc.

So this one got onto the bench of 'Real Technician', who re-soldered all the suspect joints with care, using desolder braid, liquid flux and lead-free solder, stronger than that with which they were originally made in the factory. After the operation RT switched on to find that the set worked OK, but to be sure that the problem was cured he wanted to thrash the underside of the PC board with a screwdriver. Accordingly he stood the panel vertically on its front edge, print side out, and took the set out of standby mode with the remote control. As he pressed the zapper key resistor R808 on the CRT base panel literally burst into flames! It was touching the grounded heat-sink on the chassis leaning against it. Real Technician hastily switched off the mains power and replaced the charred resistor, which feeds video signals to the green cathode of the picture tube.

With the set switched on once more Real Technician found himself in trouble. There was no sound, a very dim purple raster without picture, and after about 30 seconds the set shut itself down. What had he done? With these three simultaneous symptoms, our man decided that one of the power supply lines must be missing or incorrect. In turn he checked out the 18V, 8V and 5V lines: all were present and correct, as indeed was the 200V RGB amplifier supply on the CRT base panel. RT was starting to get wound up. How could he have been so stupid as to short the heat-sink to the tube base panel? Why did they print the circuit diagrams so small that you have to hold them under an illuminated magnifier to see any damn thing on them? Why did the service manual have so many circuit diagrams in it, all looking the same?

Since both sound and vision were absent in the short period before the set shut itself down the place to check seemed to be – since power supplies were OK – in the stages common to both: the tuner and IF amplifier sections. Accordingly RT started some half-hearted tests around demodulator chip IC501. He found nothing coming out of it in terms of video or audio carrier signals.

Maybe he had somehow blown the chip up? Could that possibly cause shutdown after half a minute? A check showed that the IC was not running hot. In the end Sage came to the rescue, and soon the problem was solved. What was the cause of this one? The solution is on page 228.

## George Cooper

**Philips 24PW6005/05 (A10 chassis)**
This set came into the workshop dead, and indeed it was completely dead. A quick check with the AVO across the mains smoothing capacitor read a dead short. The mains fuse was intact, but not so the surge limiter resistor R3609 (1.5 ohm, 7W) which was open circuit. The input pin of the power regulator IC 7921 (STRF6454) also read short as did two of the four bridge rectifier diodes D6912 and D6914 (1N5062). I could not find anything else amiss elsewhere in the power supply so I replaced the faulty parts, including the two good rectifier diodes and a capacitor C2919 (47uF, 50V) which sits too close to the regulator chip and heat sink for its own good. It was to my great relief that when I applied power the set started and worked fine.

**Wharfedale 350**
When this set was switched on, a noise that sounded like a helicopter came from the loudspeakers. There was no stand-by light and the secondary voltages from the power supply were all very low. I had a hunch that the capacitors in the primary of the power supply may be the cause, as was proven when they were replaced. C11 (47uF 25V) and C12 (1uF 50V) are the ones in question.

**Goodmans Compact 110**
This small portable came in with sound but no picture. I thought I saw a faint line across the screen which was confirmed when I turned the A1 up. The frame chip in this set is a TDA3653B, and a check with my AVO showed that there was no supply voltage to it. As I did not have a circuit diagram for this set I followed a few of the tracks from the IC looking for a feed resistor, and quickly found RV01 (4.7 ohm 0.5W) which had a voltage on one side but not the chip side. There was no short on the chip so I replaced the resistor and the frame opened up at power on, with no sign of problems. There was a capacitor CV07 (220uF 35V) on the chip side of the resistor so I replaced this just in case.

**Beko 26414R**
I have repaired many Beko sets with this chassis, though they always have different model numbers. This 14 inch portable came in dead. I tested for a short at the chopper transistor but it was all right. I then checked the line output transistor but no shorts were found here either,. As I did not have a circuit for this set attention was turned to the primary of the power supply and R107 (330k ohm) and R106 (890k ohm) but they were also all right. The power supply chip (TDA4605-2) was replaced along with C110 (1uF 100V) and C114 (47uF 25V) but the set remained dead. Eventually I found that R104 (47k ohm was open-circuit. The set worked well after that and I left the other parts fitted to provide a reliable repair.

**Bush WS6667 (4400 Chassis)**
The complaint with this set was a white flooded screed with flyback lines. There was no HT to be found on the tube base so I traced its source back to the main PCB where I found resistor RL18, (33 ohm, 0.25 ohm fusable) open circuit. As I could not find any shorts I replaced the resistor along with capacitor CL12 (4.7uF, 250V) for good measure and was rewarded with a good picture, and after a long soak test declared the set repaired. The resistor and capacitor are to be found just to the left of the LOPT.

## John Coombes

**Panasonic model TC14S3R**
**Color lines on picture.**
If looking at the color lines on picture which is negative like it is set on a different system NTSC or SECAM. This fault can be traced to eeprom IC1205 ( ST24C0ZAB1 )

**Philips model 24PW6006/05 Chassis L01.1E.**
**Dead.**
If the set is dead and there is no red LED check the diode D6560 (BYV29-500) for short circuit. This may give a loud ticking sound from the power supply to give an indication has to ware to look for the fault.

## Gary Laidler

**Bush 2876NTX PT92 CHASSIS**
The customer had this set for 4 years and all was well with a video connected to it but she had bought a freeview box and couldn't get a picture. When tried the scart did indeed produce a blank raster. When the set was stripped down just behind the scart socket a surface mounted resistor re24 (75 ohm) had a splash of solder on it effectively shorting it out. Removing the splash restored normal scart operation

**Sanyo CE32WP5-B**
This dolby pro logic monster was completely dead. After trying the usual 120k resistors to no avail I remembered the standby transformer troubles in some Sanyo sets. This one is marked t681 and marked 1av4l50b20400 it had an o/c primary it's available from Seme at £6.81 Part No. PTX6188.

**Sanyo CE32WN4-B**
This set suffered from intermittent sound. Touching the main panel almost anywhere would instigate the fault. However, it did seem more sensitive around IC801 micro. I reflowed the connections and, after a long soak test, no amount of flexing could make the sound go off.

**Panasonic NV-FJ630B-S**
This video refused to accept remote commands. Front panel buttons worked, the RX unit in the machine marked IC2 was at fault.

## Michael Dranfield

**Tatung T32W250S**
This set was dead, the cause was a dry joint on the line scan coil socket. However, this is more likely to cause damage in the line drive department than to the line output transistor. In this set, as with most with this fault, a surface mounted diode was leakey in the line drive circuit DL15 (PRLL5158). It had a low reverse reading. Take care when testing because this diode is a schottky diode with a very low forward reading.

**Thompson 32WX411 (ICC20 chassis)**
For intermittent switching to stand by take a look at capacitor CL033 (0.51 Microfarad). I have had this several times now and although it does not look dry jointed, if you take a look with a magnifying glass you will see a crack around the solder. It is always a good idea not to just re solder

however. Remove it and check its value first as internal heating can lead to a loss of capacitance causing further problems.

### Hitachi C14D25 (Vestell 11AK46 chassis)

A common fault with these TV/DVD combos, is failure of the HT rectifier diode D808 (UF5402). You will find it short circuits. Sometimes only this component needs replacing, and other times it will blow up the power supply. You will need to replace the chopper ICQ 801 (FQPF8N60C), surge limiting resistor R828 (2.2 Ohms 5W) all four bridge rectifier diodes and the chopper control chip MC44608-40. However, after replacing D808 although the set appears to work OK, you will find the new diode gets very hot within 10 seconds. This diode is rated at 3 amps, so this puzzled me, that is until I hooked my digital storage scope onto the anode and found an unclipped overshoot larger than my scope can display, at 50 V/cm. Checks on the snubber capacitors connected to diode failed to reveal any problem, so the answer can only be poor circuit design. A simple cure is to replace D808 with a UF5408 which can stand off a PIV of 1,000 volts, the diode will then run cool and no more problems will be encountered.

### JVC AV-28GT1BJF (vestell 11ak45 chassis)

As soon as the picture started to appear, this set would switch to standby. I traced this to a faulty serial eeprom IC502 (24C16). I re-program most chips myself and currently have over 240 serial eeprom files available free. Download from my website **www.digifixltd.co.uk**. I use a high end chip programmer and when I erased the old eeprom and re-programmed it, my programmer read, verify error at address 1DF. I tried several times, with the same result, so the eeprom was actually faulty and not just suffering from bad data as I originally thought. A replacement was ordered and programmed, which cured the fault.

### Sony KV28LS60U.

Failure of the line output transformer is very common in this set, but it is rarley the end of the matter. You may also have to replace one of the line driver transformers, the line transistor 2SC5696 Q8805, the frame output chip STV9379, FET Q8805 (IRF614) and, when you have exhausted all other possibilities, and the set still trips out at switch on lift link JW8037, near connector CLP8001 on the line scan panel, the X RAY protect line, if the set comes on, replace surface mounted transisors Q8822 (MSD601-RST1), Q8823 (MUN2111T1) and Q8807 (MUN213T1), all part of the over voltage trip circuit.

## Glyn Dickinson

### Panasonic TX21-GV1

This televideo is a badged Daewoo. It had worked very hard and was now dead. There was a blown 5A plug fuse in the internal holder – not very encouraging! Luckily there was a dead short due to C835 (2n2, 630V) having blown its side off. Replacing this brought back life of sorts, but the LEDs flashed and the relay clicked in sympathy. Eventually a picture appeared. There's a standby power supply as well, and C840 (47uF, 25V) in the primary was found to be low in value.

### Hitachi C1420VT (Philips televideo)

This set was dead. As I was removing the back cover I powered it up to see how dead it was – and was rewarded by a degaussing thermistor that literally exploded. I wondered why the fuse hadn't blown – well, it won't if it's been wrapped in silver foil! In these days of people being told they can sue for almost anything, I wondered whether I would have had any redress had I been injured.
At least the customer is now in no doubt as to the differing purposes of fuses and foil.

### Samsung SP42W5HSX

This projection set has one main problem – one of the two convergence amplifier ICs fails with drastic misconvergence and jumping colours. They are each on a large heatsink on the left of the main PCB – some dismantling is needed to remove them. For this reason I replace them as a pair despite their price. There are eight pairs of parallel-connected 150R resistors feeding them – check for overheating here, also two SOC-type fuses. The ICs are usually type STK392-040, although -010 might be fitted – I use the type originally used. A word of warning – only use genuine Samsung parts as pattern components drift wildly as they heat heat up and correct convergence cannot be achieved. To adjust the convergence, enter mute, 1, 8, 3 in quick succession. This displays a crosshatch and cursor which can be navigated and adjusted by the joystick buttons. Colours are switched on and off by the two buttons adjacent to the zero button, and active colour select is by keys 7 and 8. Store is via S-MODE I-II. After completion, carry out the 'perfect focus' adjustment (top left under flap). The service manual is available via the Samsung service portal. The 47 inch version has the ICs and associated components on a separate PCB which is more economic to replace as a complete unit

### Philips GR2.2 chassis

This oldish set had a picture which was shifted to the right with severe foldover. The TDA2579B causes many faults on this set, but the cost of a replacement led me to carry out further checks before ordering one. There was a very low waveform at pin 12 which is the feedback from the collector of the line output transistor. Checking back to see why I stopped at a nasty brown patch on the print side – C2559 (100uF, 25V) had leaked through the print. This is the decoupling capacitor for the line driver stage. Replacement and a clean-up resulted in a good picture.

### Panasonic TC21S1 (Z5)

This set was dead, although voltage was present at the 'top' of IC801. The chip was leaky, but a replacement (STR51424-M) caused the set to make a metallic thumping noise, although standby worked. There's a thorough explanation of the workings of this power supply (it uses the then fashionable 'hot' line output stage) in the August 1996 issue of *Television*, which led me to the HT rectifier thyristor D820. It wasn't turning on sufficiently because transistor Q803 (2SD1272) was leaky.

### Toshiba 24W33K (11AK37)

Time was you could rely on those nice shiny reddish-brown high voltage capacitors. Not any more! If you get a line output stage fault go straight to the capacitors – usually at least one will have changed value. C618 (3n9, 1.6kV) will blow the BU2508 instantly and C625 (typically 0.12uF) can short causing severe E/W distortion

## Charles Arundel

### Daewoo model DTY 2880GB – CP520 chassis

**Dead**
The STR and several components in the power supply section blown. There is no kit of spares available to rebuild the power supply but some component changes have been made to improve reliability, as follows:
The STR type F6653 remains the same. R804 Fusible resistor changed from a 1W 0.18 ohms to a 2W 0.18 ohms. Part number RF02Y188K-
C810 ceramic capacitor changed from a 470pf 1kV to a 680pf 1kV part number CCXR3A681K.
C820 ceramic capacitor changed from a 1000pf 1kV to a 470pf 1kV part number CCYR3A471K.
C850 ceramic capacitor changed from a 820pf 50V to a 1000pf 50V part number CCXB1H102K.
C808 ceramic capacitor changed from a 10uF 50V to a 10uF 100V part number CEX2A100V.
Also check I804 opto-coupler C805 180uF main smoothing cap R808 and R804.

**No Audio**
Faulty I/C circuit reference I501 type TDA12021H1.
**No Colour after a while**
Check C503 and C504 1000pf 5V chip ceramic capacitors if not replace I501 I/C type TDA12021H1.

### Daewoo Model DTA-3220EGB-100D chassis CP822F

**Recorded fault.**
Over scanning on each side. Check C405,C406,C407and C409.

### Daewoo model DTH-2881GB-100D chassis CP830F

**Dead**
Faulty LOPT, Line output transistor and double diode D404.
**High pitched whistle**
Dry joint on L501.
**CTV switching off automatically**
Check I/C regulator I820 from company PJ is not version "C" because this version sometimes suffers from a drop in output voltage and in consequence, switches off the TV. You can find the version in the bottom right hand corner e.g 4A1,4C1. You should exchange it for another version made by PJ version D or another maker e.g. KIA or AUK.

### Daewoo model DDT-21H9S/DDT-14H9S chassis CP099F

**No video only raster**
Faulty EEPROM.
**No switch on from Stand-by mode**
Faulty Q402 Line Output Transistor type T2SD2578T.
**Dead**
Faulty F801,C818,D808,R801.
**No Picture**
Dry joint on C823.

### Daewoo model DTY2880GB chassis CP520

**Picture shifted left by about 8cm.**
The cause was found to be faulty ceramic capacitor C521 2200pf 50V.

### Daewoo model DTZ2481GB chassis CP520F

**Picture shifted to the right**
The cause was found to be resistor R420 o/c 10k 1/4W.

# DVD & Home Cinema

## George Cooper

### Philips DVD634

This DVD player came in dead, and a quick test showed that there was nothing happening in the primary of the power supply. Power was reaching the chopper chip but that was it. "Fit a new chopper chip," I said to myself, so the manual came out to get a part number, only to stun me to silence when I saw written on the power supply circuit: "For information only – no service parts will be available."

Philips only supply the complete power supply board as a service part, at a cost no so far removed from the cost of the whole player. The day was saved however when I checked the SEME CD catalogue where the chip (TY70211P2 ) was listed and when I obtained one the DVD player worker a treat.

### Bush DVD142TV (11AK46 Chassis)

This TV/DVD combo came in with the complaint of no sound, picture fine. This was correct, although I discovered that when the set was in stand-by there was a cyclic tripping noise which came from both the set and the right hand speaker. When asked to start it did, with no sound and some hum from the right hand speaker.

I did not have a manual for this set but as the hum and tripping noise only came from the right hand speaker the audio output chip went straight to the top of my list of suspects. The chip was replaced, and the set now had perfect sound from both speakers, and the set no longer made any tripping noise in stand-by, though why it did at all remains a mystery. There must be power still fed to the audio chip in stand-by for this to happen. The audio chip IC404 is a TDA7496.

### JVC XV-S302SL

This DVD player came in stuck in stand by. When I removed the top cover my eyes were drawn to a capacitor on the power supply board, C934 (1000uF, 10V) which had a very domed top. On its replacement the player came out of stand by and worked well. As a precaution against a bounce I also replaced the two capacitors in the primary of the power supply, C912 (1uF, 50V) and C914 (39uF, 25V) which also looked to be the worse for wear.

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**Enquiries telephone Caroline Fisher**
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# Solution to Test Case 518

Whenever a fault is introduced by a workshop accident rather than natural causes, as it were, there is very often (around here anyway) a mental barrier to tracing and diagnosing it: what might be called the demoralisation factor. So it was here.

The basic problem was that Real Technician is not really as familiar with the design and features of Hitachi's A7 chassis as he might have (should have?) been.

And he was thoroughly misled by the no-vision and no-sound symptoms: he should have concentrated on the original and very spectacular happening, the violent burning of resistor R808 on the picture-tube base panel and the subsequent absence of green in the dull unmodulated raster on screen.

The effect of grounding R80 was to wreck video output transistor Q815 (type BF422) which had gone short-circuit between collector and emitter.

No other damage was done in the G-output stage, but the set's over-zealous control system, in its 'polling' checks at switch-on (see page 462, June 2004 issue) detected the situation, suppressed both sound and vision and – after a delay – shut down the show.

Many technicians feel that some sets have far too much in the way of monitoring, safety and shutdown systems; they often mask faults and make diagnosis unnecessarily difficult.

They can even develop faults of their own, further muddying the waters.

**We welcome reader's fault reports.**

**Send your reports to: TVeditor@nexusmedia.com**

**Preference will be given to reports emailed as Word.doc attachments, and reports submitted on CD. Send to: Television Magazine, Fault Reports, Nexus Media Communications, Azalea Drive, Swanley, Kent BR8 8HU**

**Please do not send handwritten reports.** **Payment will be made after publication**

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# LCD Technology

## Part Three

By Fawzi Ibrahim

So far we have looked at the main elements comprising the TFT LCD TV receiver, the construction of the panel itself and its operation in terms of the production and control of light and colour.

Part two dealt with the backlight assembly and the necessary DC-AC inverter circuit to drive the cold cathode fluorescent tube, CCFT. Part three will consider the complete block diagram of an LCD receiver and propose some fault finding techniques.

But first, let's have a look at the basic elements of a practical backlight converter as used by a Panasonic set shown in Figure 1. The control chip provides the pulse-width modulated (PWM) signal to drive two separate inverters, one for each CCF tube. The control chip itself is controlled by control signals from the microprocessor.

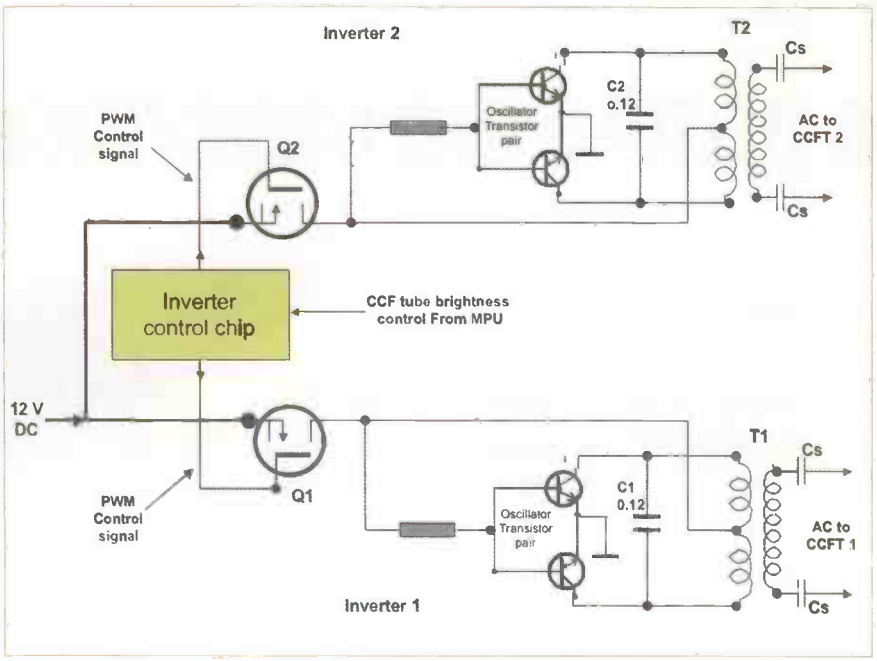
For inverter 1, a centre-tapped step-up transformer is used to feed 700V RMS to drive CCFT1. The tuned circuit is formed by C1 and the primary of the transformer and a pair of transistors is used to oscillate back-to-back.

The DC power to the oscillator is obtained from switching transistor Q1. While Q1 is on, oscillation is produced and the tube lights up. However when Q1 is off, the oscillator turns off and with it the tube itself.

Switching transistor Q1 is controlled by a pulse-width modulated, PWM signal from the control chip. The width of the pulse controls the ON/OFF ratio of Q1 and with it the brightness of the tube.

For Inverter 2, Q2 is the switching transistor and C2 is the tuning capacitor. The tuning capacitors may be recognised by their non-nominal values, in this case 0.12 µF. Capacitors marked Cs are the series capacitors that ensures the CCF tube presents very high impedance to the inverter.

It is normal to include over voltage/over current protection as well as a Panel Enable from the microprocessor controller. See Figure 2.




### Backlight and transmissive scaling

Light, which is emitted from the LCD panel, is a function of two parameters: light intensity of the backlight and the transmittance of the liquid crystal cells. The later is the amount of polarisation the LC imposes on the light passing through it.

Therefore, by carefully adjusting these two parameters one can achieve the same perception in human eyes at different values of the backlight intensity and the LCD transmittance.

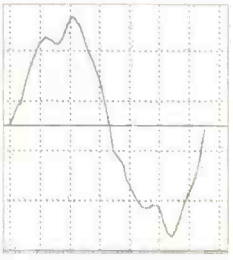
Since the changes in energy consumption of the backlight lamp are higher than that of the LCD panel, energy may be saved by simply dimming the backlight and increasing the LCD transmittance.

This is known as brightness enhancement. Alternatively, contrast enhancement may be used to compensate for the dimming of the backlight. Apart from power savings, a dramatic improvement in brightness and contrast ratio as well as black reproduction is achieved.

Transmissive scaling invariably introduces distortion which may be minimised by the use of a histogram.

*Above Figure 1*

*Figure 2 showing a typical CCFT waveform*



A histogram estimator is used to calculate the distortion produced by transmissive scaling and if it is above a specified threshold, both the backlight and the LC pixel values are readjusted to bring the distortion down to an acceptable level.

### Panasonic AI technology

Panasonic employs the above techniques in what it calls LCD AI (Adaptive brightness Intensifier). In 'Brighter Scenes', the backlight strength is increased to increase the maximum brightness of the scene and with it its range so providing an improved picture on the screen.

For 'Darker Scenes', the opposite is introduced with reduced backlight strength to obtain a reduced grey gradations resulting in a high contrast picture on the purely blackish screen. See Figure 3.

## Fault finding on LCD panels

Fault finding on LCD TV receivers unsurprisingly follows along similar lines to fault finding of Plasma receivers.

**Test equipment:**

- DVM
- 100 MHz analogue oscilloscope or 1GS/s digital storage oscilloscope.
- Test pattern generator
- Logic probe

The logic probe (right) detects the presence of a pulse at a node. In the absence of a pulse, it detects whether the node is High or Low. Its only drawback is that it requires a 5V supply taken from the board-under-test itself.

## Process

The first stage is to identify which of the following sections is faulty:

- Video processing section
- Display and formatting section
- Power supply unit
- CCFT inverter
- LCD Panel

## Fault Symptoms

The following fault symptoms may be encountered in servicing LCD panels although the majority of the faults will occur in the power generation and inverter sections:

- vertical or horizontal single black line
- vertical or horizontal black band
- Faulty pixel or pixels
- Picture break-up
- No picture

Before looking into faults, their symptoms and fault finding techniques, let us examine the sequence of events following a cold switch on of an LCD television receiver.

Figure 4 shows the main component parts of an LCD TV receiver capable of receiving analogue terrestrial broadcasts. The audio section is not shown as it is relatively independent once stereophonic audio is extracted following demodulation by the tuner.

Most modern LCD receivers include a DVB decoder circuit which can then receive and decode digital terrestrial TV broadcasts, commonly known as Integrated Digital Television, iDTV or Freeview. iDTV receivers will be dealt in a separate article.

When the TV receiver is switched on, DC power builds up in the normal way which is followed by the microprocessor startup routine. First the microprocessor will download the startup program from the Flash memory chip into SDRAM to commence the startup routine.

If Flash is faulty or the program is corrupted, the process will be halted and the set will go into standby. The microprocessor will also examine its non-volatile RAM, VNRAM (not shown) for individual and other specified settings to incorporate them into the startup routine.

Once again, if NVRAM is faulty or its contents are corrupted, startup will be halted and the set will go into standby. The startup routine involves testing and initialising all programmable and processing chips to be ready to receive and process the video and audio information.

This process is invariably carried out by $I^2C$ (Inter IC) serial control bus. More than one $I^2C$ is used. $I^2C$ a 2-line serial control bus, one line used for a serial clock and the second for the control data.

As a result of increased integration, some of the chips shown as discrete units may be incorporated into a single chip as was indicated in previous articles. For instance Flash and NVRAM may be imbedded into a massive microprocessor chip.

In this case, upgrading or reprogramming Flash is no longer a simple matter of changing the memory chip itself with an already programmed Flash. Upgrading must now be carried out by running software on a PC and downloading it on the imbedded flash via a serial port.

Other advanced integration includes incorporating the scan,the interlace/progressive and the format converters into a single image scalar chip.

***Next month Fawzi Ibrahim will investigate various fault categories***

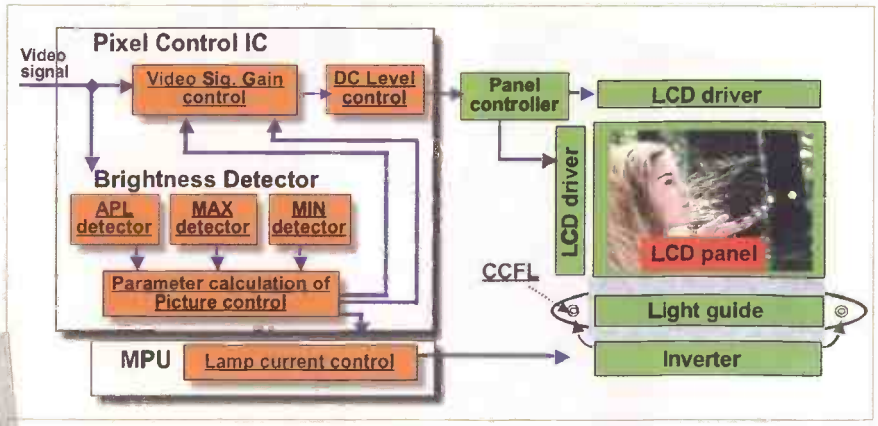



Figure 3

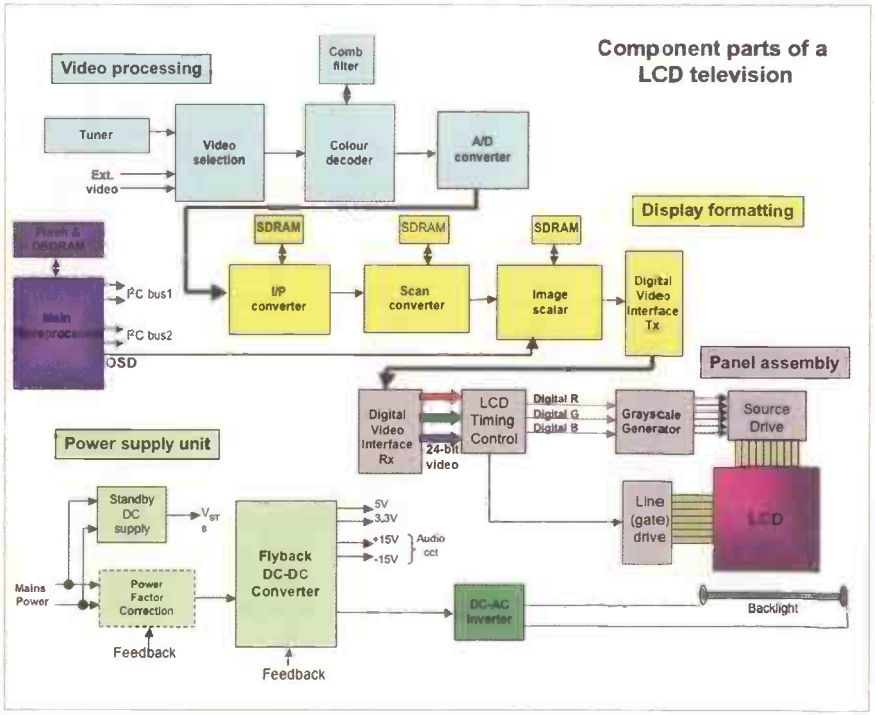



Figure 3

# What a life!

## Donald Bullock's servicing commentary

*"No flies on me", says Mr Nimble ✐ Bulky Ted Tonks makes a funny ✐ A sack of cats going to the river ✐ Winston Mbongo calls*

"Take a card!" urged Mr. Nimble as he pranced about the shop pushing his fantail of cards into one face after another. "Go on! Take a card! Look at it! Don't show me..."

Nimble had called in with his Teletech T1402TS television set, the one that uses the 11AK36 A8 chassis, and placed it on the floor in the middle of the shop whilst he bounced and pranced around it, stabbing the air with his cards.

"Never mind the cards, Nimble." I said, dryly. "We'll have the jugglers and midget acrobats in next. What's up with this set of yours?"

"In a minute, in a minute!" gasped Nimble as he pranced on. Just then the evil and pouchy-mouthed Miss Prim plodded in, looking down her antiseptic nose as always, and nursing a torch battery in her milky hands. Nimble sprung over and tapped her shoulder, and she spun round, narrowed her slit eyes, tripped over his set on the floor, and flipped her battery into our tray of new ones as she stumbled. Nimble didn't even notice.

*Take a card!*

"Take a card! Take a card!" he blurted into her face. Miss Prim breathed in deeply then drew back, stroking at her shoulder and eyeing him malignantly.

### Concise BBC accent

"I don't want any of your disgusting cards, young man!" she said, in her concise 1930's BBC accent. "I've never touched such a thing yet and don't propose to start at my time of life! Paul stepped forward.

"That'll be enough, Nimble." he said. "Leave Miss Prim alone. Nimble spun round.

"I'll take one of your cards, then we must get on." Paul said. Nimble screwed his eyes shut as Paul took a card, and I saw that it was the King of Hearts. Then he put it back into the cut pack, as invited, and Nimble quickly dealt the cards onto the counter until he reached the Ten of Spades.

"That's your card!" he announced, triumphantly.

"Dead right!" said Paul. I looked at him. Nimble grinned and rubbed his nails on his lapel. "No flies on me!" he said. "By the way, me set's dead!"

Paul bundled him out and got the set onto the bench. Steven eyed it. "Dead?" he asked. "Then you'll need to replace R821, the 2.2 ohm safety resistor, and C813, the 330 pf 1KV capacitor. They always go together. C813 arcs within itself and the resistor can't take the spiky current surges. Oh - the manual quotes R821 as .33 ohms, but every A8 version I've seen uses a 2.2 ohm one."

"Never mind the 'Clever Me' commercials!" said Paul as he settled to the power board. But Steven was right. Sure enough the capacitor had caused the trouble by arcing within itself, and a few minutes later he'd replaced that and the resistor and the set was working well. Steven winked at him.

"Any other problems?" he smiled.

"Stick around." said Paul

"Dreadfully coarse beast, that man Nimble!" Miss Prim was muttering as she made to leave with her new battery. "I think you should ban him! He doesn't fit in with you gentlemen!"

As she left, Steven pushed out his chin, half-shut his eyes and pouched his mouth in imitation of Miss Prim, pottering about and flipping imaginary batteries into the tray. And Paul grabbed a wad of job cards and started dancing about, imitating Nimble and imploring him to 'Take a card'. Whilst they were at it Miss Prim came in again, and I rushed towards her, fussing and smiling falsely to take her attention from their display.

"Oh, just throw my old battery away when you find it, Mr. Bullock." she said. "I don't want it!" I smiled and nodded, and after glancing briefly at the boys' cavorting, she left. As my eyes followed her out, I saw the bulky Ted Tonks galloping towards the shop with a Sony KVM2131U television set - one that uses the BE1 chassis. He was carrying it with the screen away from his chest, as they do, and it was slipping as he ran, which they do. I swiftly opened the door, and he managed to run the set onto the counter. Since he was red-faced and gasping well, I gave him a minute to cool down before speaking.

"I take it your set's giving trouble!" I said.

"Nah, I'm just taking it for a walk." he said. I looked at him. His head was gently rocking sideways as it does when he thinks he's made a funny. He never was quite the ticket. His father was a traffic warden and his mother a social worker.

"The sound's been troublesome for weeks, intermittent-wise, and I've had to keep banging the set-top to make it come back." he said. "Then it went for good last night, and caused me a bit of gyp, missus-wise. All a bit much, worry-wise."

"And a pity, wallet-wise." I said, reaching for a job card and grinning cruelly. As I waved him out, Steven hoisted the set onto the bench.

"Sounds like a dry joint," he said as he scanned the chassis. "Ah! There's a diode here sat in a little burn-hole. D202, a 1SS133. And it's short-circuit. It looks as though it started off as a simple dry-joint at one end, and gradually burned the panel as old Tonks tapped away at the set." At that the door flew open.

"Good Morning, Donald," boomed our next caller. "You are looking well, my son!" It was the bulky Reverend Goode. Behind him, clutching a video recorder in his crossed arms was his assistant, Curate Blande.

"...looking well, my son..." trailed the curate in his pipey voice as he put the recorder onto the counter.

## A footing in Snoddies

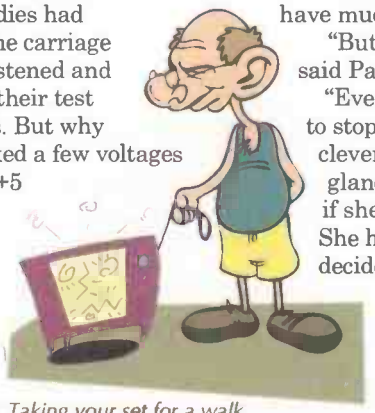
"Tidy machine! Donated by Mrs. Aggs for our next jumble sale!" said the Reverend. "It gave up the spirit, you know, so he took it to Snoddies. They kept it five months, then charged him well for looking at it, but when it came back she couldn't get a tape into it. I feel that the Devil has a footing in Snoddies!"

"...A footing in Snoddies..." trailed the Curate.

"Reverend, it's their Cabin in the Sky," I said, wondering whether he'd ever seen a video or a CVD of the magical 1943 film with its all-black cast. And nipping any further unkind Snoddies thoughts in the bud, I smiled and nodded them out and on their way. As they left I noticed that the Reverend had put on quite a bit of weight around his nether regions. He looked like a sack of cats going to the river, and the curate, running after him, looked like its bit of string coming undone.

I put the machine onto the bench, and saw that it was an Aiwa HVGX935K. And that it was dead.

I soon found out why it wouldn't accept a tape. Snoddies had started to remove the carriage and had left it unfastened and askew, so trapping their test tape specially for us. But why was it dead? I checked a few voltages and found that the +5 volt line, which is rectified by D106, was down to +1.2 volts. Why? The diode checked perfectly, which I'd expected, and, when tested on the bridge, so did its reservoir capacitor C116, which I hadn't expected. Then I checked it on our new ESR meter, and all was explained. Its reading was high. It's a 1,000 mfd electrolytic, 16 volt working, and fitting a new one cured the trouble.



*Taking your set for a walk*

Our next caller was Winston Mbongo, who had his wife on his arm.

"Man, I got a Black Diamond here!!" he rasped. I looked at her.

"Then you're a happy man!" I said, brightly. Mrs Mbongo smiled.

"No I ain't, Man," he said. "Keeps going dead." I stopped, took a bite at the side of my index finger, and looked at her again. She seemed alright. Then I saw that he was carrying a Black Diamond BDS29S television set - one that uses the 11AK19PRO chassis. When they'd gone Steven had a look at it.

"Dead as a door-nail" he announced. "Ah - R817 is open. It's the 2.2 ohm 5 watt surge limiter."

"Check the rectifier, then," I advised. He did. It was alright. Nor could he find an obvious HT short-circuit, so he replaced the resistor, muttered a prayer, and switched on. The set remained dead, but the resistor remained intact and cool.

"Progress!" he said.

"Yeah?" I asked. He soon moved to Q605, the line output transistor, and found that it had no line-drive waveform on its base.

"Ha-HAA!" he cried. "I've had this before. It'll be one of the fusible resistors – R628, 2.2 ohms, or R866, .33 ohms. They feed the 8 volt regulator IC805 (Ref 7808) and the line driver stage respectively." But they were both alright.

He eventually found that the base of the EW driver transistor Q603 had never been soldered, and when he properly soldered it the fault was cured.

"My daughter's chap assures me that it's impossible to mend this set," cried Mrs Lardiface as her husband ran a Sharpe 66FW-53H television set to our counter. "It's dead, so you won't have much luck!"

"But nothing's impossible." said Paul.

"Ever seen a bandy man trying to stop a pig in a passage?" I cleverly quipped. Then I glanced at Mrs Lardiface to see if she thought that was funny. She hadn't even heard me. I decided I didn't like her.

"He's Head-Knackerman at Fred's Fatworks, my daughter's chap is." she said. "And he's ever so clever!" He can do crosswords and sing like Elvis Presley." Her husband made a choking noise and skulked out. Mrs Lardiface grinned.

"My Horace gets ever so jealous," she smiled as she made for the door, patting at her hair. The set used the DA100 chassis, and Paul had a go at it.

"Hm! It's got the usual dry joint on C613, the line scan coupler," he said. After checking it he re-soldered it and gingerly switched on, and was surprised when the set came to life. But there was East/West distortion.

"It's usual to expect more trouble than this, after that particular dry joint," he said. "I daresay the cause of the E/W distortion will be Q506, the 2SD2391 E/W driver transistor." But this tested alright, so he next checked L603 and L604, in the E/W correction circuit, for shorted turns. These were alright too, and after a good spell checking various components, he found the trouble to be a leak in D516, the 47 volt zener diode. Fitting a new one brought up an excellent picture.

"So much for Lardiface's daughter's chap," said Paul.

"I'm with the old man." I said. Just then the 'phone rang.

## Steeped in vinegar

"Geoff, Fish!" A woman's voice stung the air, and it came steeped in vinegar. Then she hung up, I stopped and thought, then put the 'phone down and stopped and thought again. Was she telling Geoff to go fishing? Possible, I thought, but unlikely, at this end of the day. Telling him that he was a fish? That seemed unlikely too. Surely, if he was a fish, he'd have found out ages ago. Reminding him to bring some fish home for tea? Maybe that was it. But since she's told me rather than him, he was unlikely to. One way or another, I reckoned Geoff had it coming when he got home.

Just as we were approaching the end of another busy day with its run of oddballs, the door flew open and Reg Reever danced in. A thin and dapper chap, Reg seems to walk on springs, and as if this isn't enough, he keeps jerking his head into the air and reeving his nose up. He was carrying a Philips VR260 video recorder. Reg Reever with a dreaded Philips recorder. It was all a bit much at the end of the day. I looked at him as he loped to the counter.

"Dead, Don, and my missus wants to watch an Esther Rantzen tape tonight. Says she'll give you a big kiss if you can get it done in time." Picturing both the ladies he mentioned, I ought to have tossed the machine into the bin, but being big-hearted, kind, and short of beer-money I opened it on the spot and made for D6301. It's a BYV127-200, and as I'd expected, it was short-circuit. I quickly replaced it, tried the machine, boxed it up and exchanged it for a brown note.

"Thanks Don," said Reg as he reeved his nose up and circled the air with his head. "My missus'll be in tomorrow to thank you."

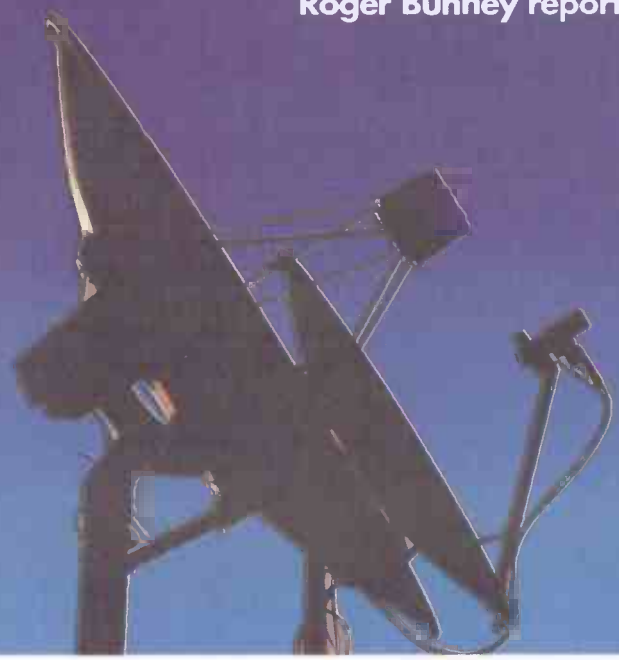
"I'm out all day tomorrow, Reg." I gabbled. "It was Paul who discovered this remedy. Get her to ask for Paul! D'you hear me? Paul."

**Donald@wheatleypress.com**

# DX and Satellite Reception

- **Terrestrial DX and satellite TV reception reports.**
- **Broadcast and satellite TV news.**

**Roger Bunney reports**



*Earthquake debris in Kashmir (via Eutelsat W2)*

Terrestrial TVDX reception through December to Christmas was the seasonal 'blank' and the often hoped for mid December Sporadic E activity hasn't materialised this year, or has gone unseen. What however was very evident during weeks 2 and 3 were increased meteor shower/scatter pings across Band 1 resulting from Geminids and Ursids activity. Meteor shower/scatter is discussed later together with the 2006 main MS activity period dates.

Though the Spanish TVE chs. E2 and E3 have been reported during November, it's certain that these stations will eventually close. With Western Europe generally moving out of VHF/UHF analogue and into UHF DVB-T (Germany has mostly converted to digital), terrestrial TVDXers need to re-assess their hobby, Eastern Europe will move eventually into digital and with the exception of Tropospheric DTT reception on a few days annually, terrestrial TVDX will cease. Many enthusiasts have already hung up their yagis whilst others have converted to satellite 'DX' which offers variety, 24/7 activity, the dish sits at ground level [avoiding the council planning Gestapo] and its a relatively inexpensive hobby. A TVDX column has been featured in this magazine since 1963 and I took over in 1971, technology has advanced and we've changed too with a greater emphasis on digital satellite. But 2006 will still offer many challenges.....

## Broadcast News

**Australia.** Once Band 1 analogue TV has been closed down, the future use of this spectrum (45-50, 56-70MHz) will be for digital radio broadcast transmissions (DRM+). The government have reserved the band to allow wider coverage by digital radio across the wider areas of the outback whilst adopting Band 3 DAB for the cities and highly populated regions. They further comment that DAB will never achieve the regional coverage that analogue radio reaches and that DRM will enable widespread digital coverage - perhaps an eventual dual standard digital radio will appear switching DRM or DAB. DAB should be on test by 2008 in the main cities once Band 3 spectrum is available.

*Oil depot blaze, Hemel Hempstead (W2)*

**China.** The China Central Television Service (CCTV) has opened its first HDTV service on a PAY-TV basis and available in the larger cities around the country, distribution via satellite and cable. CCTV have gained the co-operation of major TV receivers Hitachi and Panasonic in promoting both receivers and the HDTV programme service itself.

**UK.** The Isle of Wight RSL TV station 'Solent TV' has delayed its arrival on Sky via Astra due to 'software problems' with Sky's EPG system and an on-air date is now suggested as March. Local programming has been reduced on the station in preparation for the new 'national' coverage. The ch. 54 analogue transmissions continue from Rowridge until analogue switch-off. Check www.solent.tv on internet for latest updates.

**In brief...**The closedown of all analogue public TV channels in Holland of the Nederland 1,2,3 channels billed for January, 2006 has been delayed. The Himalayan state of Bhutan is expanding its TV centre in the capital city Thimpu to increase programming. Using a new satellite uplink facility programmes of the Bhutan Broadcasting Service will be transmitted across the hole state, finance being provided by the Indian government. Radio New Zealand is currently running DRM transmission tests to assess reception quality in its more distant coverage areas. The Communications Ministry in the Belarus are seeking tenders to construct a new TV and radio broadcasting tower in the capital city of Minsk, the highest structure in the country at 425 metres high.

## Digital Update

The latest French digital updates can be studied on http://www.tnt.gratuite.fr and on http://www.csa.fr. The

PAY-TV TNT channel is available from March 2006 in MPEG-4. In December 2005 research confirms that over 1 million French households are equipped for DTT (actually 1.035million).

The New Zealand government is being pressurised to make decisions on the country's move into digital broadcasting by spring 2006

The Spanish government has sanctioned the opening of new digital FTA DTT capacity to provide 20 national TV channels across the whole country. By the end of 2005 some 850,000 homes were receiving DTT rising to +1 million annually over the next 2 years. The 95% population coverage is the bench mark for analogue switch-off, thought to be in 2010. Spanish broadcasters are seeking more government cash to promote DTT across the country such as investment into programme making and promotion, over that of the €10 million already paid out by the Spanish authorities.

*American horse racing events in the clear (Intelsat 905)*

The Swedish government has halted the expansion of DAB radio until further notice with only 35% of the country able to receive the state broadcasts in digital from Sveriges Radio. No commercial licences have been issued with none being available in the near future, the reasons for the temporary halt in DAB expansion has yet to be advised.

The USA will fully adopt digital TV transmission on February 17th 2009 and TV stations must cease analogue transmission by April 7th, 2009. The Senate have approved funding to $1.5 billion for low income folk to purchase digital converter boxes to extend the life of analogue only TV receivers.

## Vintage TV

Several times each year I spend a day at Gosport, Hampshire and it was during an exploration of Stoke Road that I came across 'C and S Electronics', a small shop premises that operates as a TV/radio repair business, open on Thurs-Sat only. But in the window were several 1950-60, 405 line TVs, old radios including a classic Bakelite Bush. A notice advised that any local residents emptying their attics and finding old receiving equipment should contact C and S for preservation in the owner's collection. A notice also said that they had their own 405 line video generator for supplying signals to the TV collection. If any reader is disposing of equipment then drop a line or pop in to 67, Stoke Road, Gosport, Hants PO12 1LS.

## Satellite News

The new kid on the block this year may well be Kazkomas. This is the communications group that will be launching up to four satellites for Kazkakhstan over the next six years and will provide distribution of telecom services and of their own TV services to the remotest parts of the country. This should produce a significant cost saving compared with the leasing of craft from external organisations. And another group planning to launch their own satellite is the UK company Avanti which will downlink broadband and DTH HD television content across Europe. Planning the launch for 2008, the ESA have provided funding and the construction contract will be awarded shortly. The as yet un-named satellite will have a 12 year minimum life and slot at 33.5° West. Avanti is a media production provider for business and the corporate market and will be the first company of its type to own and operate its own satellite.

STN (The Somali Television Network) is a US based broadcaster in Atlanta and provides Somali language programming 24 hours a day via satellite over North America. Future plans allow for the inclusion of other African languages, a greater mix of news, politics, culture and entertainment, and to expand TV programming into Africa, the Middle East and Europe. STN also provides the link between Somalis in America and their homeland. STN currently use Globecast capacity for pan-American distribution and it's likely that they will use the same operator for feeding content back into Europe - such as via AB-1.

The Elam-NTT TV transmissions from PAS-12 (formally Europe*Star) @ 45° East have now been ended, following pressure from the EU. The The Paris based Elam-NTT (National Television of Tamil Eelam) represents a brutal terrorist organisation, their programmes being relayed across Asia and in parts of Europe. The EU reacted to the request from a Sri Lankan peace and human rights group who highlighted the activities of the LTTE and of the propaganda being transmitted over the 45° East satellite.


*War Crimes trial in Baghdad, Saddam in cage, front right (W1)*

Programming of the RTNC (Congolese National Radio-Television) could appear on the TV screens in Europe following the signing of an agreement between the RTNC and African United TV. Under the agreement the African United TV will provide the RTNC content for broadcast via satellite and/or cable in Europe for three years. The confused news release also suggests that RTNC programming is being pirated by 'compatriots' that are not following the correct procedures in procuring the programme content mainly it suggests in Germany.

The Intelsat group have further expanded their global coverage options with the recent signings of an agreement with APT Satellite Holdings which will give the two groups mutual use of each others satellites. Intelsat will gain useful Asian-Pacific coverage and through-put connection via the new Apstar 5 and 6 satellites, and to provide "the ability to seamlessly carry its customers' traffic" when and where-ever service access is required. And SES Global and New Skies Satellite have joined hands under a new operating agreement to further increase the presence of SES on the World satellite stage, particularly across India, Middle East, Africa and central America.

December 2006 is the date when the French international news channel will come on stream providing 24/7 news and current affairs via satellite in French, English, Spanish and Arabic. 'CII' has already cost €80 million in setting up activities and when on-air will be subsidised by the government by €70 million annually. The news operation will be independent of other TV news rooms, the service will carry commercials to generate additional funding and described by the French culture minister as "CNN – the French way".

Finally on a radio note, 'Worldspace' satellite radio, a provider of digital radio programming via subscription (PAY-RADIO) has now passed its 100.000th subscriber with its coverage across the Americas, Europe, Africa and more recently South East Asia.

# FPGA solution in digital displays

*Bart Borosky of Lattice Semiconductor gives ideas of how to best select an FPGA with DSP functions for digital display design*

The majority of variable costs in a digital display today is the panel itself. For this reason, supply chain management is an important factor in digital display design. Also, there's a growing interest in the ability to support evolving image processing algorithms and standards to address the needs of different geographies, over time. The goal of supply chain management is to ensure all components in the OEM end-product are procured at the lowest cost and are available to meet demand, while minimising inventory.

The earliest supply chain management decisions are made during system definition. At this point in the design cycle, a decision to proceed with a platform-based display design can reduce procurement costs significantly (***Table 1***). By supporting multiple panel sizes, OEMs can achieve higher volume discounts from one supplier. By supporting multiple panel vendor specifications, OEMs can create a competitive sourcing situation, which typically leads to lower prices. These two savings more than offset the increase in price due to the additional components required, such as a field programmable gate array (FPGA), to enable platform-based display design. In addition, multiple vendor support reduces risks to continuity of supply.

To maximise the savings and flexibility provided by a platform-based approach, system designers must select components for the system electronics, based upon the following criteria:

- Graphics processor requirements vary widely by geography-programmable support for multiple standards and formats throughout the world.
- Overall system I/O interface and control logic integration for support of bridging functions from existing designs/ASSP chipsets such as 802.11a or HiperLAN2 and customised user interface logic.
- Field re-programmability support for changing standards and incremental upgrades in image processing algorithms.

## Evaluating the components

A key factor in system design is the balance of tradeoffs among CPU/software, application specific integrated circuits (ASICs), application specific standard products (ASSPs) and FPGA solutions, and determining which functions are best served by programmable solutions in a platform-based display design. In general, three circuitry requirements need to

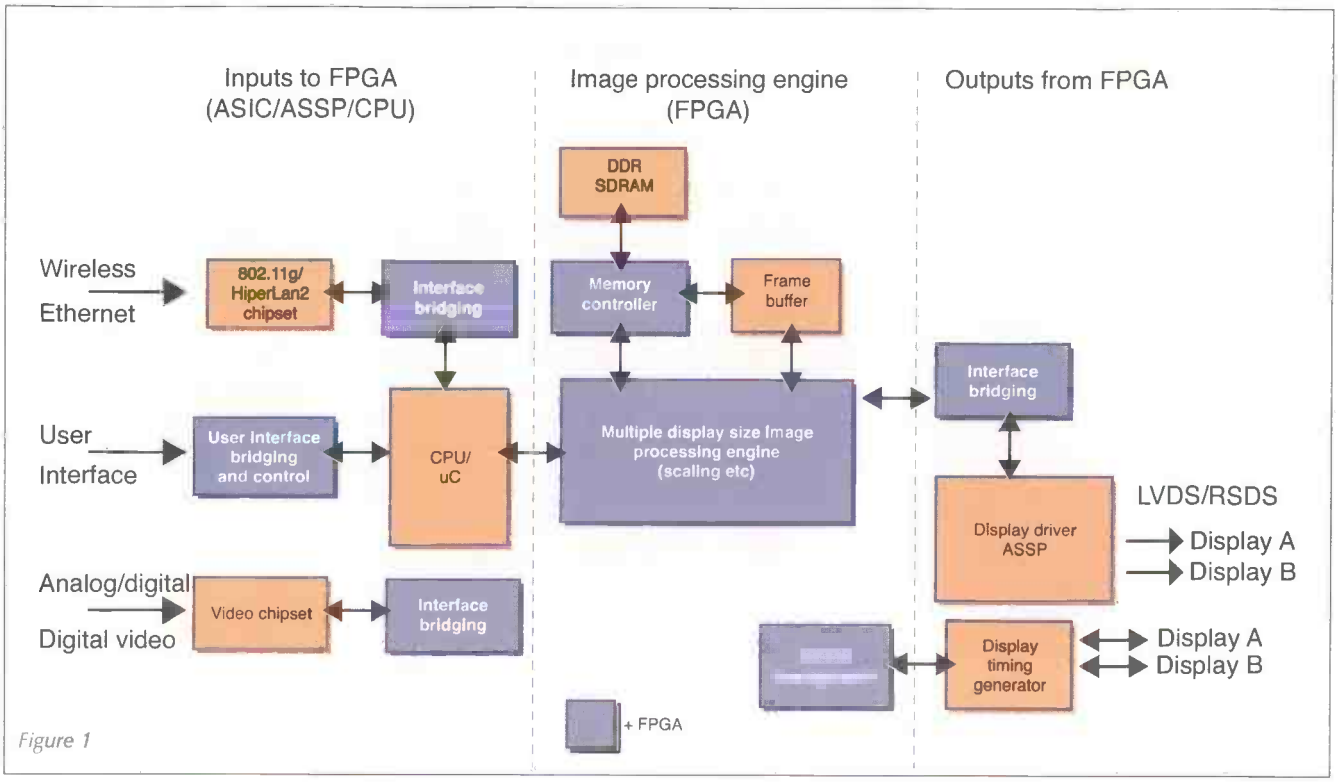



*Figure 1*

be evaluated in the selection of programmable components:

- RSDS (Reduced Swing Differential Signalling) and LVDS (Low Voltage Differential Signalling) support for the panel interface.
- DDR (Double Data Rate) SDRAM support for image processing memory.
- DSP functionality and performance for image processing functions.

***Figure 1*** illustrates an FPGA solution that meets these requirements. Inputs into the FPGA include a graphics processing chip and other ASSPs such as wireless Ethernet. Outputs include the panel driver circuitry and display timing generator. In addition, the FPGA block in the middle of the figure performs image-processing functions to support multiple panel vendors, sizes and geographical requirements.

For the input section, FPGAs help designers bridge ASSP functions to the graphics processor or system processor. Examples of bridges include wireless Ethernet (802.11a/g, HiperLAN2) and user interface control logic. Next generation displays and projectors may support wireless Ethernet via 802.11a or HiperLAN2, depending upon geography. In addition, customised user interface logic helps differentiate displays from competitors.

Both functions are bridged / controlled with an FPGA solution.

For the image processing section, FPGAs provide scaling, aspect ratio conversion, colour space conversion, noise reduction and other DSP functions on the video frames to support multiple panel sizes and vendors. Some of these image-processing algorithms, such as sharpness enhancement, can be proprietary and lead to product differentiation, particularly with incremental improvements to the algorithms over time.

This re-programmable image processing is facilitated by FPGAs that have embedded DSP. Some FPGAs with embedded DSP in the range of below $10 support over 3,000 million multiply and accumulates (MMACs). This is less than 0.3 cents per MMAC – a cost-effective solution for image processing functions. Typically, FPGAs with embedded DSP functions include several blocks of multipliers, but some FPGAs also have embedded adders, subtractors and accumulators that can significantly increase image-

**Table 1: Platform-based display design lowers supply chain costs**

| | 30 inches | 32 inches | 37 inches | 42 inches | 46 inches | Total |
|---|---|---|---|---|---|---|
| Price Per Inch | $50 | $55 | $60 | $65 | $80 | $57 |
| Panel Price | $1,500 | $1,760 | $2,220 | $2,730 | $3,680 | $1,932 |
| %Discount[1] | 2% | 2% | 2% | 2% | 2% | 2% |
| Panel Savings | $30 | $35 | $44 | $55 | $74 | $39 |
| Extra Component Costs[2] | $10 | $10 | $10 | $10 | $10 | $10 |
| Total Savings Per Display | $20 | $25 | $34 | $45 | $64 | $29 |
| Annual Units Sold | 100,000 | 50,000 | 50,000 | 25,000 | 10,000 | 235,000 |
| Total Annual Savings | $2,000,000 | $1,260,000 | $1,720,000 | $1,115,000 | $636,000 | $6,731,000 |
| | 30% | 19% | 26% | 17% | 9% | 100% |

Notes: [1] Due to competition and volume discounts during procurement

[2]FPGA cost to support platform-based design

processing performance. Although low-cost FPGAs typically operate at less than 300MHz-system clock frequency, the high DSP throughput (3,000 MMACs) can be achieved by performing multiple DSP functions in parallel in the multiple DSP blocks on the chip.

In addition, FPGAs can provide memory control and interface for the image processing frame buffer, which is often DDR SDRAM. DDR memories capture data words both on the rising and falling edges of the system clock, effectively doubling the throughput over traditional SDR (Single Data Rate) memories at the same clock speed. DDR SDRAMs are often used for frame buffer memory, in which a large amount of cost-effective, faster speed memory is required to store entire frames for image processing.

## Manipulating data

The DM data-masking capability of DDR SDRAM devices is used to simplify the manipulation of data for graphic display applications. Instead of performing READ-MODIFY-WRITE cycles to change part of a wide word, masked WRITE cycles are used in conjunction with the DM mask signals to enable and disable the writing of individual bytes within the wide word. Since the READ-MODIFY-WRITE cycle is replaced with a single WRITE cycle, the benefit to the system performance is obvious. Masked writes simplify changing selected bits in a block of data and increase the performance of tasks such as color management of the display.

At lower (100MHz and below) clock speeds. the DDR memory controller interface is straightforward and can be implemented in an FPGA using the general- purpose I/O and logic capabilities. At higher frequencies, however, FPGAs with dedicated circuits are required to ensure a robust DDR memory interface. These dedicated circuits include special routing and DLL-based phase shifting for the DQS strobe, DQ data-valid circuits to signal the start of memory READ bursts, preamble and postamble detectors to correctly handle the DQS strobe as it exits and re-enters tristate, and on-chip termination circuits to provide maximum signal integrity. Not all FPGA families contain these dedicated circuits and the cost and complexity of implementing high-speed DDR memory interfaces varies considerably, depending on the specific FPGA family.

During memory READ cycles, the DQ data and DQS strobe signals are driven edge-aligned by the memory device. To allow the FPGA to capture the data using the strobe, the strobe must be phase shifted by exactly 90 degrees relative to the data, then routed in such a way that it captures all data bits simultaneously. Since the DQS strobe is not a free-running signal, a master-slave DLL approach can be used in the FPGA in which the master DLL is locked to the system clock and is then used to control a slave delay line that shifts the strobe by exactly 90 degrees.

**Table 2: RSDS and LVDS electrical characteristics**

| *Characteristic* | *RSDS* | *LVDS* |
|---|---|---|
| VOD, Output Voltage Swing | +/- 200 mV | +/- 350 mV |
| RTERM, Termination | 100 Ω | 100 Ω |
| IOD, Output Drive Current | 2 mA | 3.5 mA |
| Content | RGB Data | RGB Data & Control |

## Monitoring activity

The round-trip device and circuit board delays from the FPGA to the memory device, and back to the FPGA, are usually unknown and can vary with temperature and voltage. The time from issuing a memory READ command until valid data arrives at the FPGA is therefore uncertain. A DQ data-valid circuit in the FPGA can be used to monitor activity on the DQS strobe and signal the start of a READ burst, and therefore the start of valid data. Generally, this requires some method of detecting the transition of the strobe from tristate to active at the start of the READ burst preamble.

Since DDR memories use stub series-terminated logic (SSTL) and high speed transceiver logic (HSTL) electrical interfaces that are parallel terminated to half supply, signals in tristate always float to the threshold voltage of the input buffer. This can result in spurious oscillation of DQ data and DQS strobe signals unless dedicated circuits are available to prevent this behavior. FPGAs may include dual threshold input buffers and minimum pulse width detectors to prevent oscillation of the DQS strobe prior to the READ preamble and after the READ postamble.

DDR SRAM and SDRAM devices use various combinations of single-ended and differential SSTL and HSTL electrical signalling. The clock inputs to these memories are differential, so the skew between the positive and negative signals must be minimised by the FPGA output driver. Also, to ensure maximum signal integrity at the memory interface, FPGAs with on-chip series and parallel termination capability should be used to drive and receive the various signals that constitute the interface.

Current generation DDR memory systems use static parallel termination that is always present, either on the circuit board or on-chip in the memory controller. To reach even higher speeds, while reducing system termination power at the same time, newer generation DDR2 memory devices make use of switchable parallel termination and controlled output impedance drivers in both the memories and the controller. FPGAs targeted towards DDR2 applications may include these capabilities.

For the output section, FPGAs interface the image processing to the panel driving circuitry via LVDS or the newly emerging RSDS standard. LVDS and RSDS are low-noise, low-power, low-amplitude differential signalling methods for sending high-speed (gigabits per second) data transmission over copper wire. RSDS has a lower voltage swing and output drive current than standard LVDS, resulting in lower EMI and lower power consumption, as shown in ***Table 2***.

## Choose wisely

Choosing an FPGA that supports differential signalling standards such as LVDS and RSDS makes integration of the panel driving circuitry into the FPGA a possibility.

Supply chain management starts at the display system architecture level and is driven by OEMs' desire to reduce costs. In addition, system designers look to FPGA manufacturers for intellectual property and easy to use design tools to further reduce costs and speed time-to-market.

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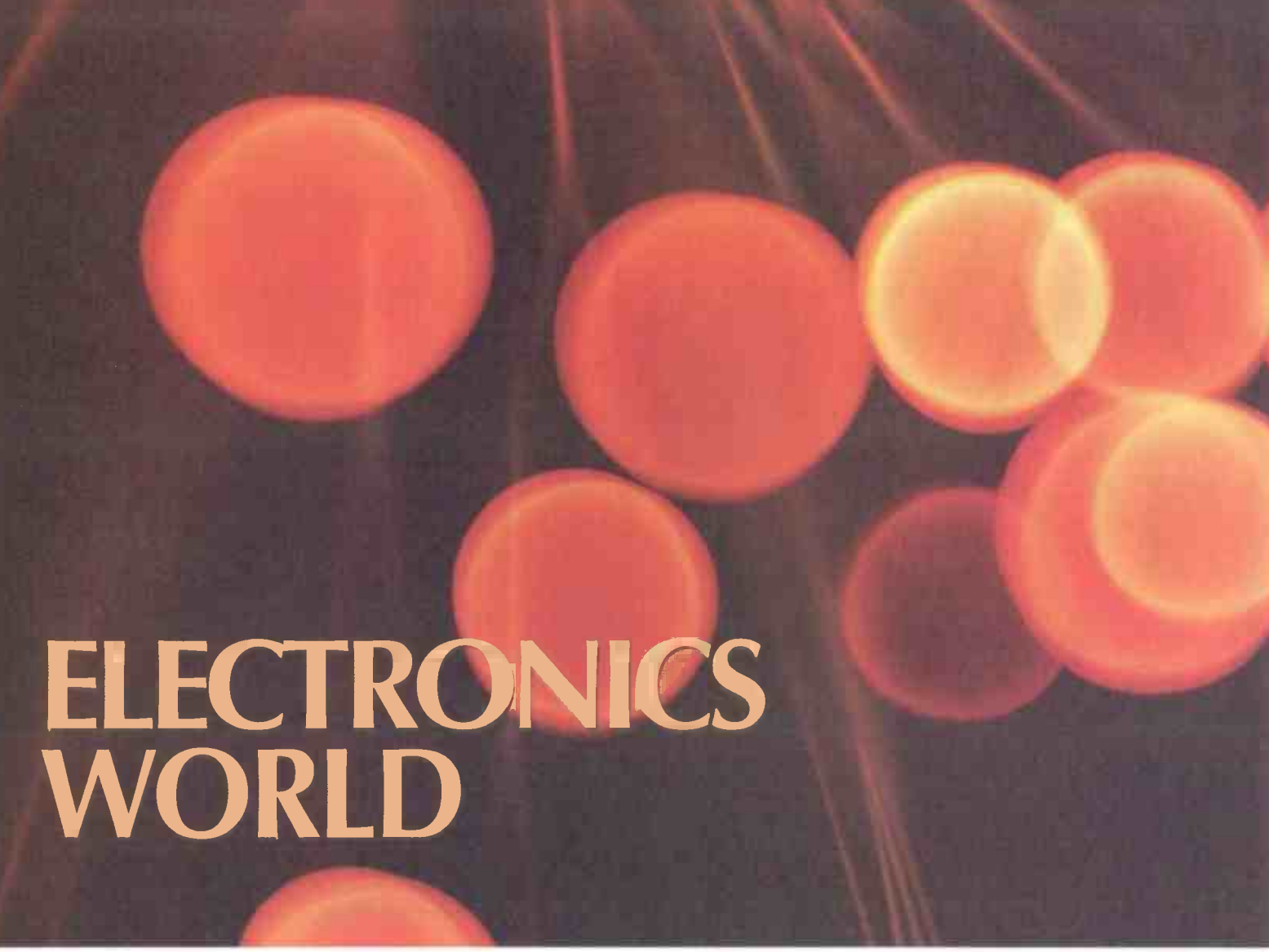


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# My First Television Restoration Project

*By Colin Boggis*

Having restored many radios over the years and steadfastly ignored televisions on the grounds that there were no useable signals to drive them, I was unexpectedly bitten by the 405-line bug at the beginning of 2003.

I bought a 1950s Ultra console TV with built-in radio and I obtained the service data in the form of the 'trader' sheet. When I finally took the back off, I was pleased to see that generally the condition wasn't too bad – a little surface rust, some very swollen electrolytic capacitors, a missing U25 and a broken steel drive cord on the radio.

I ran all the other valves past my trusty Taylor 45C and found that both the UL41s and the CRM152B tube, were faulty. At this point my original euphoria fast decayed, finding the most expensive and difficult to obtain components were faulty.

Looking on the bright side, the good news was that the mains transformer tested out OK, the chassis looked untouched, the cabinet was intact and the decorative plastic speaker fret excellent, although very dirty.

The radio dial plate was in perfect condition and the CRT perspex mask perfect. Also the mains transformer, scan coils, RF coils, various other transformers and chokes and the speaker voice coil measured OK for DC resistance. The LOPT windings appeared undamaged, (more on this later).

## Replacement CRT

My first project was to find a replacement CRT and I located a brand new, boxed, Mazda Nu-Life CRM152B tube at a very reasonable price. The first thing I did, having removed the chassis from the case, was to take out the speaker fret and baffle board along with the Perspex CRT escutcheon, and to strip the case of all old varnish since the condition was too poor for touching-in.

After stripping all varnish the case was thoroughly sanded down and any

*A little surface rust*

badly damaged veneer cut out and replaced. I found it relatively easy to do this since most damage was on the narrow areas adjacent to the speaker fret, and it was possible to replace complete sections avoiding grain-matching issues.

Once I was satisfied with the appearance of all the surfaces of the case, I replaced the foil lining inside and sprayed the remaining internal surfaces matt black. I had to re-glue the blocks that supported the castors, as these had all come adrift.

The top and sides of the case were then painted with a water-based wood stain. I chose 'Wickes Quick-drying Deep Mahogany' finish, which seemed close to the original colour. Several layers were applied, flatting down with fine glass-paper in between coats, until a solid finish was obtained.

The front panels each side of the speaker aperture were treated with 'Light Oak'

*Case being repaired*

spirit based stain to enhance the graining on the veneers. The speaker and radio dial surround was also stained 'light Oak' and the plastic grille sprayed gold as per the original. Great care had to be taken with this grille, as the plastic had become very brittle and easily broken. To strengthen it I glued it to the plywood speaker board.

Finally the stained wood panels were treated with 'Antique Oil', which hardens off over time, giving a satin finish similar to the original. Although not exactly as it originally was, the cabinet was perfectly acceptable to 'live' in my house, and so I now started restoration of the chassis.

At that time, realising I could not do very much without a suitable signal, I purchased a 625/405 converter, known as 'Domino'. This is a superb piece of equipment, requiring audio and video signals from a VCR or DVD player, and producing from them a 405 line Band 1 VHF TV signal on channel 1 (recently a Channel 4 version has also been released).

Generally the chassis was in good condition, although there was surface corrosion. But since the main chassis is made of aluminium, it was relatively easy to clean off with wire wool.

Rebuilt chassis

## Rubber band

The rubber band holding the CRT in place was rotten, and the fuse holders somewhat the worse for wear. A replacement rubber band was made from a cycle inner tube, and fortunately I had two paxolin fuse holders in my spares box.

Restored case

It was very obvious that the main electrolytics were not useable as the rubber seals were extremely swollen. Most of the de-coupling capacitors were small brown encapsulated units made by Hunts, and I knew from experience that they were almost certain to be electrically leaky, if not short-circuit.

The resistors all looked to be in good condition and a few random measurements indicated that values were within tolerance. I decided to do a blanket change on the Hunts capacitors, rebuild the electrolytics and replace all large value paper capacitors, but leave the original resistors, inductors and transformers in place.

The electrolytics were cut open by carefully easing up the turned-over lips on each can, and the innards removed for disposal. After cleaning the cans out, modern capacitors of suitable value and working voltage were fitted inside, and the end caps replaced with undamaged items from other discarded units. Once re-assembled the aluminium can edges were bevelled over again to hold the caps in place.

The Hunts capacitors were all replaced with mylar film units and the large paper capacitors with polycarbonate types. Small value ceramic types were not replaced. While replacing the capacitors the entire chassis was cleaned and polished up, as well as all the wiring.

The radio dial back plate was resprayed with cream cellulose, and after an extensive internet search, suitable steel drive cord was obtained to reconnect the radio tuning gang capacitor to the front panel tuning spindle.

The re-gunned CRT was then fitted, feeding the neck carefully through the scan coils and the focus/shift magnet assembly. Once correctly seated, the fixing band was put in place, the neck clamp tightened and the tube base plus EHT lead connected.

A few final visual checks were made, looking for any obvious faults before the chassis was connected up to a variac transformer, making sure first that it was set to zero.

Because this receiver uses a non-isolated chassis, care was taken to ensure that the mains neutral lead went to the chassis metalwork, and that it was correctly connected in the power plug. A suitably rated isolation

transformer was also inserted between the mains supply and the variac.

The TV was then turned on, and the variac advanced slowly, stopping at around 120 volts. Nothing untoward having happened, the volts were further increased to about the 200 level. As this receiver has a valve rectifier, it was necessary to let the heaters warm up before any semblance of high tension appeared. No problems being obvious, the variac was wound up to full supply, and after a very short wait, things began to happen.

## Screeching noise

As soon as the line timebase started up, a loud screeching noise accompanied by strong ozone smell emanated from the line transformer. A quick look showed a massive discharge from the overwind to an adjacent tag on the LOPT tag panel.

Power was quickly disconnected, and close examination of the EHT lead out to the U25 rectifier anode showed that there was both a crack in the pitch insulation and also that wire was broken.

Previous resistance measurements had not indicated a problem, so the wire probably burnt off when the discharge took place. A new piece of high voltage silicone covered wire was fitted connecting the EHT to the U25 anode terminal.

Then the insulation was built up around the overwind exit point, using some pitch reclaimed from other old transformers together with the soldering iron. Once this work was completed, power was re-applied.

This time there were no nasty noises, just a faint burble from the loudspeaker. There was no sign of a raster on the screen even with the Brightness and Contrast set to maximum. There is no Ion Trap on the CRT, so it seemed most likely there was no EHT.

The TV was turned off again, and the EHT lead shorted to chassis just in case EHT was present. A very small spark suggested the diagnosis was correct, and there was either very little, or no, EHT. As there had been a problem in this area at initial switch-on, the LOPT was the known to be able to produce EHT, so attention was given to the U25 rectifier and the EHT capacitor.

The EHT smoothing capacitor was warm to the touch, indicating some current flow. As this shouldn't be the case, the original large Dubilier can unit was removed, and a modern high-voltage ceramic capacitor fitted

First pictures

instead, ensuring all solder joints were smooth and without any spikes.

Third time lucky proved to be the case, as when the power was turned on this time, an offset, unfocused raster appeared. Judicious adjustment of the shift magnets and focus lever, together with the Brightness control enabled a steady clear white raster to be centred up on the screen.

At this point some signals were needed to finish the setting up, although a quick test of the radio only function was possible with just a short piece of flex connected to the aerial socket. Radio was selected, and immediately the speaker burst into life, causing a frantic grappling to turn the volume down to an acceptable level. The radio worked perfectly on both Medium and Long wavebands, indicating that the audio output stages and at least the sound IF stages of the restored TV were working correctly.

The Domino converter was connected up to an old VCR. A UHF aerial was fed into the VCR, and the Domino VHF output connected to the TV. On with the power again, only to find there was still just a white raster and no more sound than without any signal.

## The penny drops

After a bit of head scratching, the penny dropped – When I'd bought the Ultra I'd noted it was a Band 4 model, and I'd bought a Band 1 modulator!

Fortunately the remedy was very simple as exactly the same chassis was used for both models.

The only changes were that the cores the aerial and RF transformers (L7 & L9) needed to be replaced with iron dust cores (they were brass on Band 4) and a fly-lead (switch S1) needed to be connected to an additional capacitor to amend the local oscillator range. Plus, of course, the RF stages would require re-aligning.

Suitable iron cores were extracted from another scrap set, and fitted. The fly-lead switch was re-connected, and the power yet again applied. This time there was some faint sound, and some evidence of vision, but not a picture.

The aerial and RF transformer cores were adjusted, and within a very short time decent sound was obtained, but there were still vision problems. The picture now being displayed was almost negative and very white, no dark areas being apparent. No amount of knob twiddling or RF core adjusting made any improvement.

A quick read through a number a books on TV servicing confirmed my suspicion, there was instability somewhere in the vision IF stages. Now instabilty is most often caused by inadequate de-coupling, and all the capacitors had been replaced.

Peering again into the depth of the IF strip, I spotted an old brown encapsulated Hunts capacitor that I had missed. Replacing it with a modern equivalent effected a total cure, and now decent pictures could be received alongside the sound. A final tweak of Focus, Contrast, and Brightness resulted in a fully acceptable picture.

The chassis was then re-fitted into the case, and the back panel put on for safety, as the TV would from now on be used without the isolation transformer. Finally, in order to simplify the connection of the VCR, 625/405 converter and associated power supply, I decided to fit these beneath the TV. I accomplished this by constructing a wooden plinth into which the VCR slotted at the front, with the converter and PSU hidden behind. On the top panel of the plinth I cut 4 large holes to accommodate the castors on the TV. This made for a firm and safe fit. By virtue of the VCR, it was possible then to use the remote control and to watch all five TV channels as well as the additional channels fed into my home distribution system (DVD, Satellite, Main VCR). I could also feed tapes into the local VCR, which was very useful to view test cards and period programmes from the 50s.

The TV was used regularly for a period approaching 12 months until the bug to restore another hit me again! To make space, I sold it on Ebay – I believe it is now "living" in a museum of 1950's life in North Hampshire.

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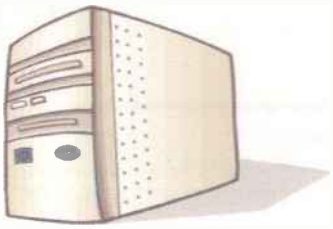
# PC Building for service engineers

**If you can service a television, then you can build a PC. Boris Sedacca shows you how.**

Looking at each component in turn, a typical PC consists of:

Case



Power supply unit (PSU) with leads

Motherboard

CPU

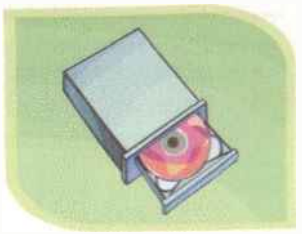
Heat sink & fan

Memory (Memory.jpg)

Diskette drive

Hard disk drive

CD or DVD drive



The following cards are also common for many motherboards:

AGP video card

Modem

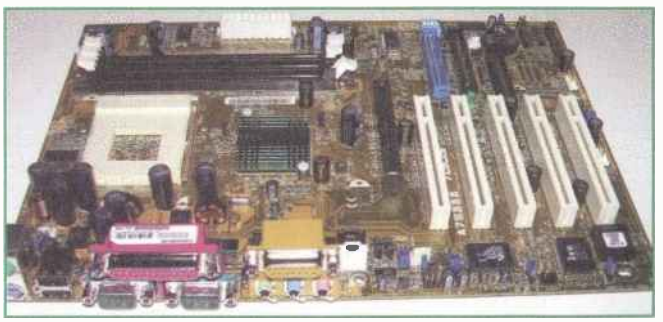
Network interface card

Sound card (Soundcard.jpg)

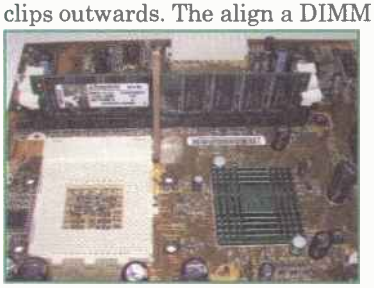
Let us first start with the tools. All you really need most of the time is a crosshead screwdriver, but it you want to make life easier, do yourself a favour and buy a battery powered screwdriver like the one shown below. You can get one for around a fiver from Woolworths.

Below the power driver are some useful extensions for getting the driver bit into tricky and otherwise inaccessible spaces, partcularly when using a mini tower case as we will be doing here.

Now let us turn to the motherboard, an Asus A7S333. When installing, take care to orient it correctly within the case. The edge with external ports go to the rear of the case, usually under the power supply. It may be more convenient to install major cables, the CPU, and DIMM memory before fixing the motherboard inside the case.



First, unlock a DIMM socket by pressing the retaining clips outwards. The align a DIMM on the socket such that the notch matches that in the socket. Then firmly push the memory into its socket and secure it with the levers at both ends as shown in the photo below.



Before placing the CPU into its socket, remember to pull the

lever up on the zero insertion force (ZIF) socket.

There is a hole missing on two of the corners of the socket, which makes it impossible to fit the CPU the wrong way around. Once the CPU is in its socket, remember to return the lever to the lock position, as shown left.

Remember also to use a small blob of thermal paste on the CPU before securing the heatsink/fan assembly with the spring lever.

I always find it easier placing an assembly than removing it. Do not forget to push the CPU fan connector into its socket on the motherboard. I did forget once and cooked a perfectly good CPU: 60 quid down the drain - I could have kicked myself.

Finally, fit the IDE and diskette cable connectors into their sockets on the motherboard as shown left.

As I am working with a mini tower case, I have to screw down the motherboard and CPU, fan and other components before mounting the power supply.

A midi tower would have allowed me to mount the power supply first and still give me bags of room to work in, with less need for the use of flexible screwdriver extensions.

The motherboard is secured to the case by pushing mounting screws though holes in the motherboard and screwing them into standoffs, which will need to be aligned with these holes.

The power supply is secured to the case with four screws as shown in the photo above.

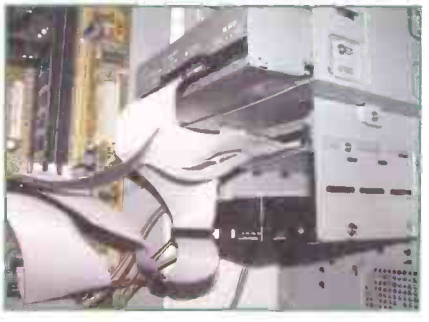
A PC case will typically come with punch-outs for the various motherboard connectors, which are shown to the left of the power supply. Make sure that you punch out all required holes for your motherboard connectors before attempting to fit it into the case.

Now, place the motherboard so that its connecters go through the punch-outs comfortably.

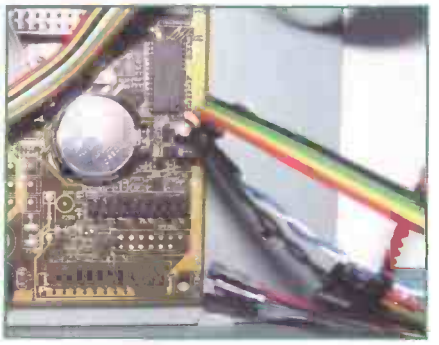
Next, you need to mount the diskette, hard disk and CD drives into the case, making sure you secure them adequately with sufficient screws, particularly the CD drive, which can cause vibrations.

Note the position of the sockets on the various drives. The IDE drives (hard disk and CD) have sockets for power supply cables to their right as shown above, and for the IDE ribbon cables to their left.

Also ensure that you have selected the correct Master/Slave jumper positions on the IDE drives. The diskette drive uses a different power supply connector socket, located to the left of the diskette ribbon cable connector. The final connections should look something like the photo below.



Now comes the tricky part: connecting the front panel cables. Here you will have to refer to the motherboard manual for specific details. The connectors for the A7S333 are shown just below the motherboard battery in the next photo.

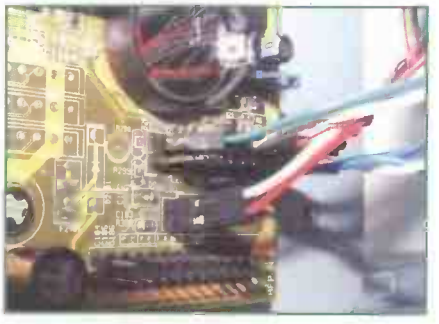


The most important convention to observe on most connections is that of the black or white cables going into the earth or ground or negative (-) pins, while just about any other colour will signify a power, signal or positive (+) pins.

The easiest is the speaker connector. Nowadays, the case speaker does little more than beep when the machine starts up. Many motherboards will have on-board sound, as this one does, or if they do not, they should have sufficient PCI slots for a sound card.

Now you have to take care! What you need to connect are the power on-off switch, reset switch and power LED. You can conect switches any way around but it is important to observe the correct polarity for the LED or it will not work otherwise.

The mnemonics used by the motherboard connectors will probably not match those used on the case connector shells exactly.



The A7S333 provides additional connectors for infrared port, front panel audio, and front panel USB, among others. The final connections should look something like the photo above.

Now connect the power connector from the power supply to the connector on the motherboard as shown in the next photo. This should also be straightforward.

Before installing the AGP card you need to punch out a space for it on the case as shown in the photo below.

Now insert the AGP card and any other cards, in this case a network interface card, into their slots and secure them to the case as shown below.

The next photo shows the installed cards from the outside of the case. This is not a normal case, where each card is screwed into position in the case.

Instead, all the cards are pushed into their slots, and then secured in their positions by a bracket fixed in place by two screws.

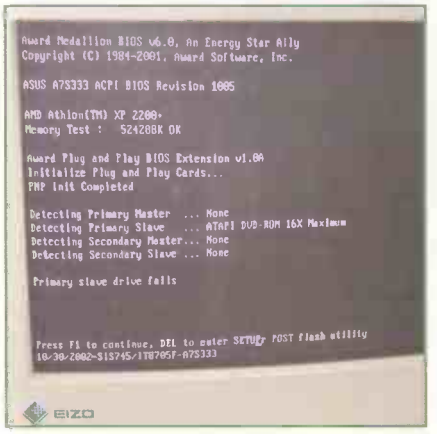
The final connections are shown in the photo below.

The next photo shows the completed assembly with side panels in place. Now you do not need to replace the side panels on the case yet because you never if you need to open it up again, but you are ready to connect the external devices and cables, including the monitor screen, keyboard and mouse, and finally the IEC power cable into the power supply socket.

Some power supplies may include a switch, which you will need to switch to the ON position, but this is not always provided because on ATX motherboards, the machine is switched on from the front panel ON/OFF switch.

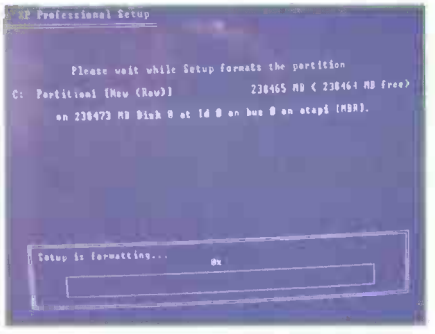
If everything is connected up correctly, the A7S333 has a useful onboard LED that goes on in confirmation before switching the machine on.

That's it. Now you can switch on. Good luck!




A look at the screen in the above photo will explain why you should not replace the side covers too hastily. The motherboard BIOS has loaded up correctly, but it did not detect the primary master disk.

Remember my saying earlier: "Ensure that you have selected the correct Master/Slave jumper positions on the IDE drives." Well in this case I hadn't, so I had to remove the side covers and reposition the jumper on the hard disk drive.




Once I did that everything seemed to work fine hardware wise, as the above screen shows. This is not the end of your problems however, but only the beginning, because installing Microsoft Windows is notoriously error-prone.

When you start Windows for the first time after installing the motherboard, Windows detects all Plug-n-Play devices. Follow the 'Add new hardware' wizard to install the necessary device drivers.

The support CD that comes with a new motherboard usually contains drivers for things like AGP, on-board audio, and so on.

If you bought the motherboard secondhand without a driver CD, you can invariably download the drivers from the motherboard manufacturer's website.

# Additional notes

## General

Ensure the selected motherboard is appropriate for the processor model and frequency you are planning to use.

Ensure that you are properly grounded at all times during the system construction to protect the delicate electronic components from static electricity damage.

Never touch a processor without wearing a functioning grounded antistatic strap. All unpacking and installation should be done on a grounded antistatic mat.

Both the antistatic wristband and the antistatic mat must be grounded at the same point. After removing the processor from its package, place it directly on the antistatic mat.

## Case

When acquiring a computer case, make sure it has the following features:

- Designed for an ATX power supply and motherboard
- Has room for an additional rear cooling fan in the area of the processor
- Has the proper number of standoff posts for mounting your motherboard correctly and that they are aligned properly as well
- Has easy side access that doesn't require removing all of the cables first
- Has good air ventilation for proper air circulation in the case

Use as many of the mounting post-holes in your motherboard as possible. If you cannot use all the mounting holes in the motherboard, place non-metal spacers between the bottom of the motherboard and the case (of the same size as a standoff) to take up the slack.

Do not over-tighten the metal standoffs into the computer case, and do not over-tighten the metal screws that fit into the metal standoffs.

Do not use screws for the metal standoffs that are the same size or larger than the solder ring around the mounting hole in the motherboard. This could lead to damaging or shorting out of your motherboard.

Check the motherboard for any jumper settings, although most motherboards today do not require jumpers.

## Power supply

For a minimally configured low power-consumption system, a 250-watt power supply is the minimum but you need to estimate the system configuration requirements to ensure system stability. Minimally configured means: 128-Mbyte RAM, 16-Mbyte AGP graphics, internal V.90 modem, 10/100 NIC, floppy drive, CD-ROM or DVD, and 5400-RPM hard disk.

If you are not certain of the final user-configuration, it is safer to install a 300-watt (or larger) power supply.

## Heat and Cooling Issues

AMD advises that you have a least one fan, not including the power supply fan. The fan should be in the back of the case, drawing air over the processor, and exhausting the air out the back of the case.

Many midi tower cases allow at least one fan in the bottom-front. Since the power supply fan exhausts air out of the case, the additional fan in the bottom-front must draw air in.

Muffin fans (case fans) are very inexpensive and easy to install. Just be sure to mount the fan in the proper direction based upon the airflow arrow that you will find on the outer fan housing.

If you can install more than one fan, it is recommended that you have at least the same number of exhaust fans as draw fans.

For example, in a full-tower case you can install two draw fans in the bottom-front and have two or three exhaust fans including the power supply fan in the top-back of the computer case.

This arrangement provides excellent airflow throughout the case and reduces heat build-up. Be careful not to block the intake or exhaust of your fans.

## Memory

Use unbuffered memory only. The AMD Athlon processor does not run on EDO memory or 66-MHz DIMM memory. It requires, at a minimum, PC-100-MHz memory.

It is not advisable to mix different brands of memory because some brands of memory are incompatible with others regardless of whether the speed is the same or not.

AMD recommends a minimum of 64 Mbytes of PC-100 memory to operate minimal software, but strongly recommendeds that you have 128 Mbytes or more in order to enjoy all of the benefits of the Athlon processor.

The company recommends that you do not use generic or no-name memory modules because you really don't know what you're getting or what type of quality control your memory chip was subjected to.

There is no way to tell compatibility of one generic or no-name memory module with another module. Use well-known and approved memory modules for the following reasons:

- Uniformity and consistency of the memory module
- Compatibility issues
- Warranty and technical support
- Verified specifications

## Athlon CPU installlation

Notice the rubber pads on each corner of the processor. These pads are required to ensure the proper installation of the heatsink.

They should never be removed. There must be four pads. If a pad is missing, please return the processor to your supplier. Do not use it—die damage may result.

Also notice the lugs on the motherboard socket. The center lugs will be used for the heatsink isntallation.

When engaging the heatsink clip with a flat-head screwdriver, use extreme care when pressing down on the clip. If the tool slips off the clip, the system motherboard can be damaged.

Better quality heatsink and fan assmblies will have a removable plastic film on phase-change thermally conductive compound, removing the need to apply thermal paste to the surface of the CPU.

The phase-change thermal compound is very important to the efficiency and success of the heatsink. The compound must be applied evenly to the surface of the heatsink so it can basically melt and fill any microscopic voids in the surfaces of the processor and heatsink with a thermally conductive material.

Do not tilt and push the heatsink onto the processor because doing so increases the chances of cracking the processor die.

Instead, install the heatsink carefully with the bottom of the heatsink nearly parallel to the top surface of the processor.

When properly installed, the heatsink will rest on the four rubber pads. The heatsink will come in contact with the processor die only when the retaining clip is fully installed.

# Notice Board

*Please email Notices to – TVEditor@nexusmedia.com*

**HELP**
I have recently been given a complete digital satellite system. In fact the unit was brought to Mauritius by an expatriate who was then working in the island, and never could make it work.

In my view, all the instructions in the manual are meant for the UK and is therefore not valid for Mauritius. Moreover the satellites that are preconfigured obviously do not cover this part of the island. I am a regular reader of Television magazine, and have been going through the articles concerning this issue in my copies of the last two years, but all in vain.

I would like to have any information about how to configure the system so as to receive any English channels from any satellite covering the zone. Satellite installation is pretty new to me. I have some experience in TV repairs, and aerial installation.

I have already been on the net to satcoDX and found that there is intelsat 902 at 62.0E beaming at 3938 R tp 13 if 1212MHz. Mauritius`s coordinates are 20S & 58E hence azimuth is 11.55, and elevation is 66.11. How do I use all these data to effectively setup the dish and receiver?

Particulars for the system is: Silver Crest Digital Satellite System, with receiver SL 65, anntenna CO55, and digital twin LNB.

I also have a Satellite finder in the range 950-2150MHz model SF-95LDB.

**BA Ramseebaluck, 33 Palma Road, Quatre Bornes, Mauritius.**

**HELP**
I have a JVC AV32WFP1 television and the line output transformer part no. QQH0053-00 has failed. I am told by JVC that this is no longer available. As I paid £1300 for it I was not very pleased. If anyone can help I would be very grateful. I checked the line output transformer with the tester I built, which was in your October magazine. It was very good. Thank you.
**Doug Bunt**
**doug@radiotv.freeserve.co.uk**

**WANTED**
The diode D801 as fitted in the VCR Thomson VTH 621OU. Also where I can obtain the item marked 'AIC.1084-33CM. 296F6'.
**colin.wadey@ntlworld.com**

**HELP**
We own a 10 year-old Hitachi C 2566TN 311. How can we be so sure of the model number? Because it has suddenly decided to show same on-screen all the time. We would be very grateful for any guidance as to how to get rid of the annoying message. It seems the script arrived one day when I was using the front panel buttons to lower the volume. Many thanks in advance.
**Malcolm Gray**
**(malcolm.gray@zen.co.uk)**

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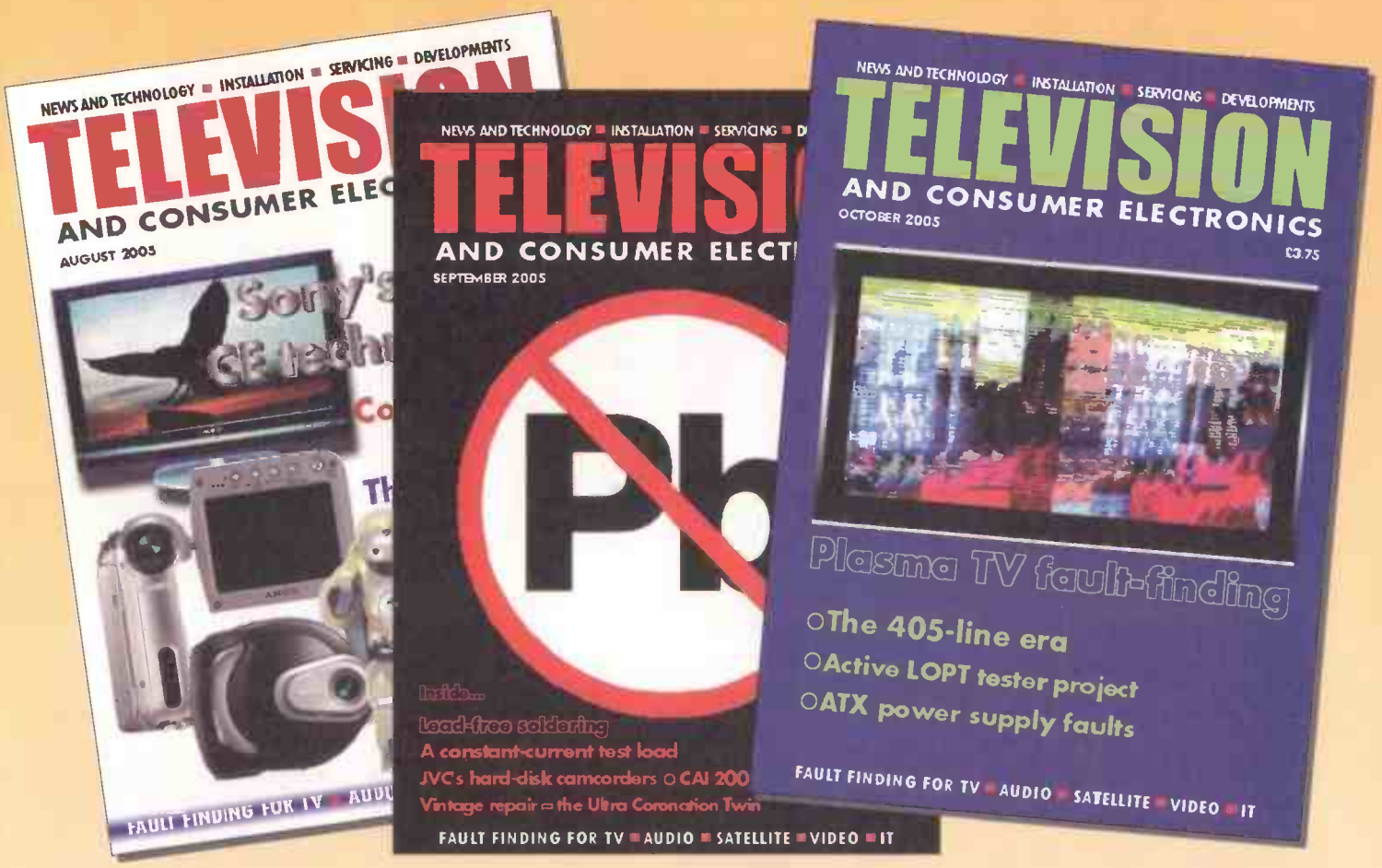


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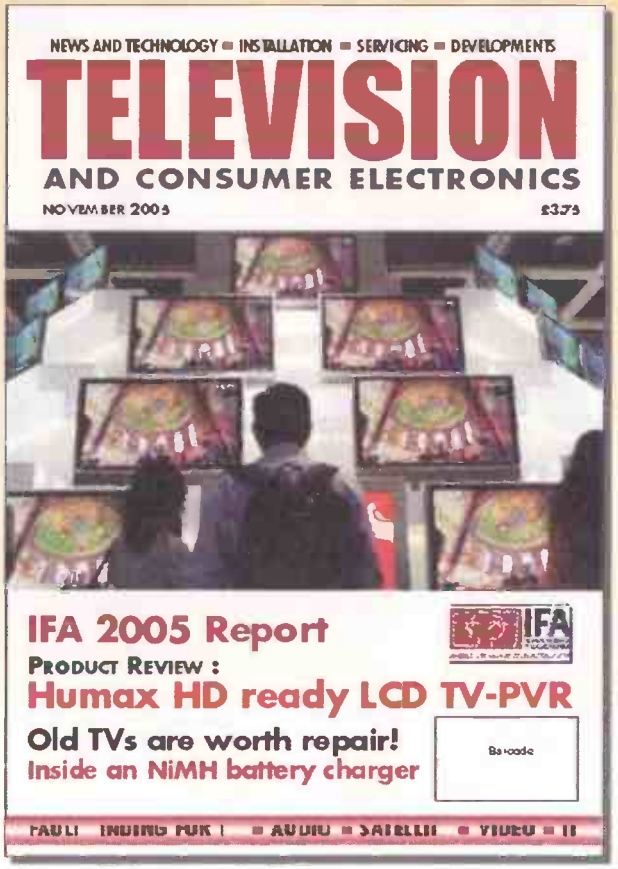

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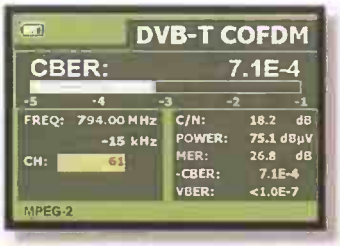


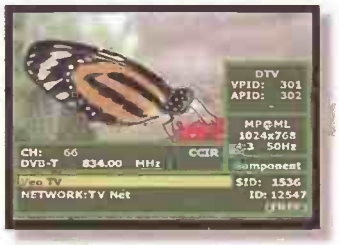


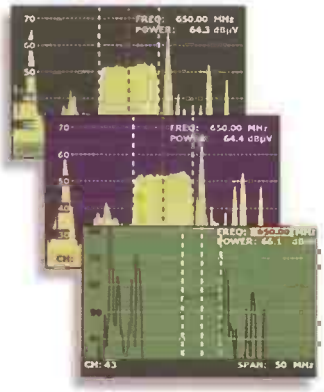


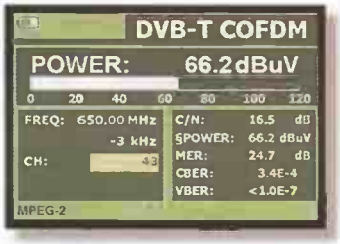


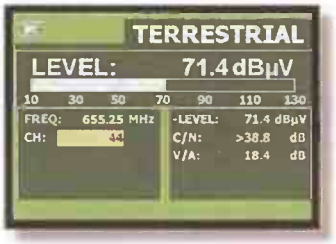



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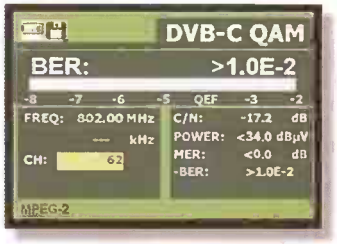


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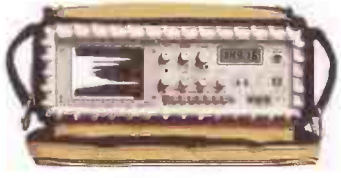

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