

# TELEVISION

## & consumer electronics

May 2008

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***What to look for  
when servicing LCD  
and Plasma TV's***

**FAULT  
REPORTS**  
over 7 pages!

***More extracts from Fawzi Ibrahim's book***

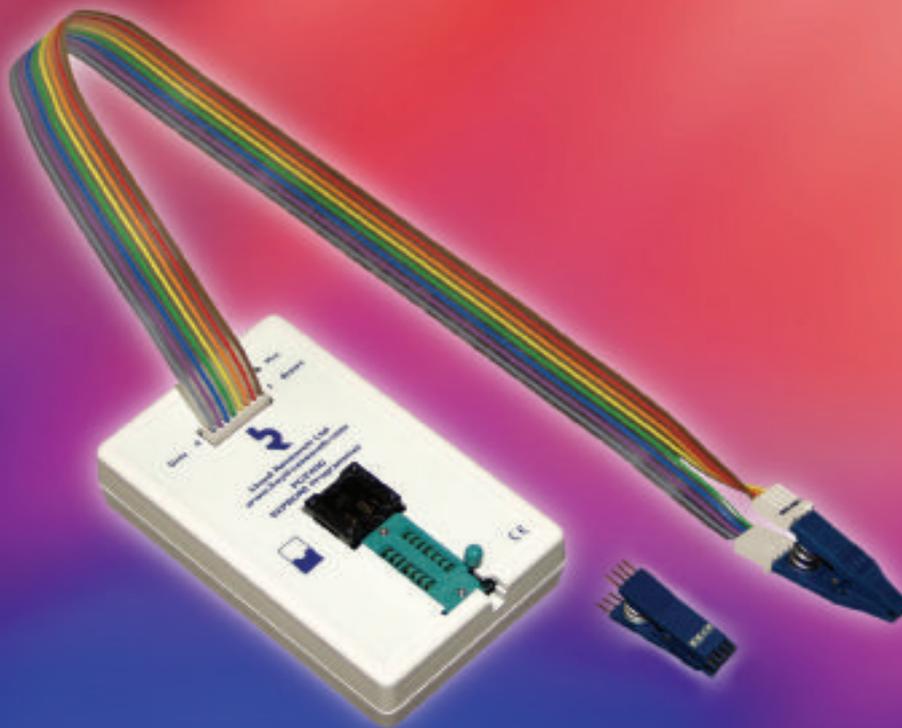
***Dealing with EEPROMS***

***Test case number 534***

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

**FAULT FINDING FOR TV • AUDIO • SATELLITE • VIDEO • IT**

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



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## • OPTIMISED FOR FIELD SERVICE

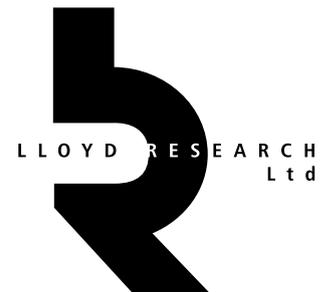
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Please note that we are unable to answer technical queries over the telephone and cannot provide information on spares other than that given in our spares guide.

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



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**W**elcome to the fifth issue of Television magazine. Once again, I have chosen a good variety of articles for your enjoyment. I try to mix the serious and less serious sides of your business in each and every issue.



#### Some of the highlights this month are:

Tony Thompson's "Race for Television" concludes in this issue. The question is was Baird unfairly unrecognised for his outstanding contribution to developing Television as we know it today?

Michael Dranfield shares his knowledge of what to look for when repairing LCD and plasma screens. The recent series on Digital reception using set top aerials continues. Long distance TV reports findings throughout the world, from Derby to Vietnam. Pete Dolman's "Day in life" suggests that sometimes you need to think more like a woman when thinking about how to repair something! Whilst we are on the subject of Women, a new author to Television magazine, Dilys Taylor, explains why wives and mothers should encourage and help their "TV collecting man".

Arthur Jackson's memoirs continue in this issue. This month Arthur recalls the exploits of one of the most disorganised engineers he can remember.

In What a life this month Donald Bullock tells the tale of when he had a customer known as "kind Mr Woodhall, easy terms you can afford".

A further extract from Fawzi Ibrahim's chapter on "Multi Media convergence" finalises and there is also a biography of Fawzi penned by Donald Bullock

There are plenty more articles for your enjoyment along with news from around the industry and a varied selection of faults.

The Television Directory and index is nearly completed. Thank you to all readers who have expressed an interest. I will get back to everybody as soon as it is available.

Response to our subscription campaign has been tremendous, although there are still many readers of the old Television magazine who either don't know it is being published again or, have only just found out that it is.

Please spread the word.

Television magazine is not available in news agents, but, copies can be purchased through Charles Hyde and son, PJ Hill and Grandata.

One, two and three year subscriptions can be bought directly from Television magazine. Back issues are available from our first issue and, when you subscribe, you can choose between starting from the first or the current edition.

Tony Greville  
Publisher

# Ofcom unveils DTT upgrade plan

Communications regulator Ofcom has unveiled details of a major upgrade of the UK DTT platform that will allow viewers using new receiving equipment to receive up to four high-definition channels as digital switchover is completed in the UK in 2012.

According to the regulator, the upgrade can take place without the loss of existing television services currently available to viewers on DTT.

The statement follows a request from the Secretary of State for Culture, Media and Sport to Ofcom for advice on how these technologies could best be adopted. Ofcom published a consultation on its

proposals in November 2007.

Ofcom proposes to clear one of the three multiplexes currently used for public service broadcasting (Multiplex B, licensed by Ofcom to BBC Free to View Ltd).

The existing channels on this multiplex will be relocated to use the spare capacity on the other multiplexes.

Once this is complete, Multiplex B will be upgraded to use new technologies and standards. The extra capacity on the reorganised multiplex will allow broadcasters to introduce new services, including high-definition channels.

One of the slots on the multiplex will be overseen by

the BBC Trust and it is expected that this will be used to broadcast the BBC high-definition channel.

The other three slots will be awarded to commercial public service broadcasters (ITV, Channel 4, five, S4C) through a competitive bidding process to be run by Ofcom.

Ofcom is recommending that the Secretary of State for Culture, Media and Sport make the necessary changes to the Broadcasting Act to facilitate the necessary legal process required to allow Ofcom to implement these changes. Following this, the broadcasters will be invited to apply for the first two slots on Multiplex B.



Ed Richards, Ofcom Chief Executive, said: "This is a once in a lifetime opportunity to upgrade digital terrestrial television. It offers benefits for broadcasters—who will be able to launch new services without using any new spectrum—and viewers—who will have access to new channels and services on free to air."



## Microsoft rules out Xbox Blu-Ray

Software giant Microsoft has no plans to release a Blu-ray add-on for the Xbox 360 and is instead backing digital delivery, the head of Xbox in the UK has said.

Microsoft stopped production of its HD-DVD player following the decision by Toshiba, the format's creator, to concede victory to rival Blu-ray.

Microsoft's Neil Thompson said physical media would give way to downloads in the next two to three years.

"We have always said online is the way to go," he said, but he denied that Microsoft had abandoned customers who had purchased the HD-DVD add-on for their Xbox 360 consoles.

## PIONEER UNVEILS THIRD BLU-RAY PLAYER

*Pioneer has launched the BDP-LX71 player, which should be available in the UK this summer.*

*The main improvements to its third BDP model include BonusView Profile 1.1 for interactivity, a 12-bit deep colour support, 297MHz 12-bit video encoder, and it offers 1080p at 24fps. And that's just the visuals!*

*The audio has been given a heavy upgrade, now supporting bitstreaming and decoding of all the audio formats, including Dolby TrueHD and DTS-HD Master Audio, which is added through a firmware upgrade after launch.*



## CEDIA offers courses for dealers

CEDIA, the Custom Electronic Design and Installation Association, is offering a new course aimed at electrical retailers who are interested in getting involved in the custom installation industry.

'Introduction to the UK Custom Installation Industry' is aimed at people interested in the integrated home business and is presented by industry guru Steve Moore.

A residential course, it will provide a thorough grounding in all aspects of this growing industry and takes place at CEDIA's HQ on May 28 and 29.

It consists of seven 90-minute modules, with two one-hour workshops with topics including 'The industry and marketplace', 'Subsystems', 'Working with specifiers and developers', 'System design and



'planning' and 'Managing projects'.

In order to focus the training appropriately, all delegates complete a simple questionnaire when they book and are invited to submit any particular questions ahead of the event.

Peter Aylett, CEDIA's educational manager, said: "This course is ideal for people considering entering the custom installation industry.

"Those with experience in electrical retail are ideally placed as their skills prove very useful and are highly transferable when it comes to smart home technology."



## C4 launches free-to-air on Astra 2D

Free-to-air broadcasts of Channel 4, Film 4 and Film 4+1 have appeared on the Astra 2D satellite.

The feeds have been visible since Friday at 10.729GHz V, 22000 symbol rate, FEC 5/6 with Channel 4 labelled as 8350.

It is the first time Channel 4 has been available free-to-air on satellite and strongly suggests the channel will be part of the launch lineup of subscription-free service Freesat.

All the broadcaster's channels except Film 4 have previously been part of an exclusive digital satellite carriage deal with Sky. However, the broadcaster signaled its interest in joining

Freesat last year.

Encrypted feeds for Channel 4's bouquet, except Film 4, are continuing on Astra 2A and regional versions of Channel 4 for advert purposes are not yet available on Astra 2D.

The BBC moved its channels from Astra 2A to Astra 2D in 2003, ahead of taking them FTA.

Broadcasters consider Astra 2D more appropriate for free-to-air feeds because its footprint is more closely focused on the UK.

Freesat, a new free-to-air digital satellite proposition from the BBC and ITV, is expected to launch next month though its backers have only confirmed it will start this spring.

National Grid Wireless, has also been a director of Freeview for the past three years.

In June, he will take over at the DRDB from Paul Brown, who has been in temporary control since the departure of Ian Dickens in November.

The DRDB is backed by all the large radio groups and multiplex operators involved in DAB and aims to promote its

## HUMAX TO LAUNCH EXCLUSIVE FREESAT HD STB

Humax will be the only company offering a high definition Freesat box when the service launches.

Information about the digital satellite service is being kept under wraps until official publicity begins, and manufacturers cannot yet release much detail on their products.

However, Humax commercial director Graham North told Digital Spy that it hopes to take advantage of HD as Freesat's key selling point over Freeview.

BBC HD and a high definition ITV channel will be on the service from the beginning, possibly joined by Channel 4 HD.

Sky currently offers 17 linear HD channels and Virgin Media's cable service has one, while none will be available on digital terrestrial until, at the

earliest, next year.

"There are so many HDTVs being sold now and there is so much demand for HD content," Mr North told Digital Spy.

"Also, not everyone wants to be a Sky customer for whatever reason - financial or anything else. There is definitely an opportunity in the market."

The non-subscription market is currently dominated by Freeview, with more than 27 million digital terrestrial boxes having been sold since its launch.

Humax believes there is significant potential for bringing these to the new satellite service, effectively meaning that the firm's first Freesat box will not be exclusively aimed at so-called "high end" customers.

"There will be quite a lot of Freeview customers who might take up Freesat," Mr North said.

"I don't think they will drop Freeview altogether, perhaps keeping it in a different room, but they will take it. Mainly because of the HD on offer."



## Moretta to head DRDB

The Digital Radio Development Board has appointed a new chief executive to lead its efforts in promoting DAB.

Tony Moretta, currently general manager of broadcast at transmission operator

"wide accessibility and swift adoption in the UK with consistent and effective marketing".

The service has had a tough six months with several stations closing down.

In February, GCap announced plans to close the Jazz and Planet Rock and sell its stake in Digital One, the DAB multiplex operator.





## BBC launches new news ID

The BBC has revamped the title sequences and graphics on its TV news programmes.

Its weekday bulletins on BBC One have been renamed The BBC News at One, Six and Ten, while BBC News 24 became BBC News.

Under the changes viewers outside the UK now watch BBC World News, rather than BBC World, and all news programmes feature a revised globe graphic.

Having the same look on all TV news output offered

“maximum value for the brand”, BBC director Tim Davie said.

The visual changes were “not radical” but gave bulletins “more of a family feel”, he added.

And Peter Horrocks, who heads the BBC’s multi-media newsroom, described the redesign as being about “giving coherence for the audience”.

The new graphics can also be seen on the BBC’s local news programmes around the UK and on the BBC News website.



## LG refuses to rule out Sony pricing strategy

Plasma screen maker LG Electronics has said it could not rule out the possibility that the aggressive pricing strategy by Japan’s Sony Corporation could eventually impact its display unit.

The move, however, is not having any major impact on the

company for now, an executive said.

The South Korean mobile phone and appliance maker posted strong first quarter profit last month, swinging from a year-ago loss, due to sparkling earnings at its handset unit and LCD panel venture.

## SMEs feeling bite of credit crunch

SMEs operating in the retail sector are really feeling the bite of the credit crunch according to a new study.

Retail businesses admitted that their suppliers are increasing their prices (73 per cent), they aren’t expanding as quickly as they would like (67 per cent) and are actively looking to reduce their own costs (50 per cent).

With the ever-increasing dominance of the supermarkets and out of town retail parks, plus the heavy burden of business rates, the future of the small and medium sized businesses operating in the retail sector are feeling the pressures more than ever.

However, despite this customer downturn, and tough trading condition for retailers, many small and medium sized businesses (SMEs) appear to be reacting bullishly to the credit crunch.

When asked if they had to start their business again in today’s economic climate, 61 per cent of SMEs would do it all again tomorrow, while 45 per cent of retailers said they would.



## IFA show to grow in 2008

The organisers of the IFA show claim that the 2008 event will be “an even broader platform for doing business”.

Speaking at last month’s launch press conference in Majorca, for the show, which takes place in Berlin from August 29 to September 3, Dr. Christian Göke, chief operating officer of organisers Messe Berlin, said “The IFA gathers key industry players at international level, inspires its audiences and moves markets.”

“By closely combining products and services from sectors ranging from consumer electronics to home appliances we are reflecting market structures and creating further potential for trade and industry.”

Mr Göke said: “As the world’s leading consumer electronics trade show, IFA 2008 will showcase the complete array of fascinating news from a dynamic and innovative market.”

“From the gigantic flat TV screens down to the minute TV mobile phones, from mobile media gadgets up to the complete sets of home cinema devices – IFA will present the highlights from all areas of entertainment.”

Mr Göke revealed that exhibitors to this year’s IFA will show a large number of LCD displays that are only 1.5in deep.

And this is just the beginning.

Prototypes demonstrate that even thinner displays are feasible: 0.4in is the next step in the evolution of flat TV.

# Sky axes component video out on HD STBs

Satellite broadcaster Sky has confirmed that it has dropped component video output from its latest high-definition set-top boxes.

Sky said the move would not cause a problem for subscribers.

The company said the connections had been removed because of "obligations to some content owners".

An amended Sky user guide says it will "help prevent the illegal copying of HD programmes and movies".

Sky estimates that only one per cent of HDTVs in the UK rely on a component connection.

However, the company said it would ensure anyone in that



situation could have "the appropriate box".

"Sky Digital HD set-top boxes with HDMI-only HD outputs are being introduced as part of our phased removal of boxes with HD component connections," a Sky spokesman said.

"This is in line with Sky's obligations to some content owners, which mean that Sky is

phasing out the manufacture of any new HD boxes with HD analogue component outs."

Previous models of Sky HD box have both HDMI and component outputs, but only the HDMI connection supports HDCP - high bandwidth digital content protection - which is designed to make copying content in high definition more difficult.

## West Country next for switchover

Digital UK has announced that the West Country TV region will start the switch to digital terrestrial television on April 8, 2009.

Analogue broadcasts will be turned off first at the Beacon Hill transmitter group, followed by the Stockland Hill transmitter group on May 6, 2009.

The remaining transmitter

groups will follow between July and September 2009 to complete switchover in the region.

The West Country will follow the Scottish Borders, which will become the first television region to switch to digital television on November 6.

On that date the first analogue TV signals will be turned off from the Selkirk group of

transmitters and replaced with a stronger digital signal; the rest will switch a month later.

The remaining areas of the Border television area will switch in the second quarter of 2009.



## BBC to launch PS3 iPlayer

Following earlier news that an unofficial way of watching the BBC iPlayer on the PS3 had been launched, the BBC has confirmed it is developing an official version for the console.

The head of BBC Digital Media Technology Anthony Rose confirmed the news on his official blog, revealing a PS3

iPlayer will be released "in due course".

His statement read: "As you know, our aim is to make BBC iPlayer available on a broad range of devices.

"We need to divide our development time between expanding the platforms iPlayer is available on versus all

the other cool things that we're working on better video quality, personalisation, and new site features.

"We're investigating the optimal video profile and browser proposition to enable us to officially make iPlayer available on PS3 in due course."

The Nintendo Wii was the first console to benefit from an official iPlayer.



## Philips hit by drop in TV sales

Consumer electronics firm Philips Electronics has reported a slowdown in first quarter profits, after being hit by a slump in TV sales.

Profits fell 28 per cent to 219 million euros (£175m), in the first three months of this year, from 875m euros a year earlier.

Overall sales rose by one per cent, helped by a rise in healthcare and lighting goods, but North American sales fell nine per cent.

The firm recently said it would stop producing TVs for North America, after seeing sharp losses in the region.

Speaking to the BBC, chief financial officer Pierre-Jean Sivignon said that within the lighting segment, sales of more efficient goods using new technology had done especially well.

In light of the recent US slowdown, Mr Sivignon said: "All in all, what is important is the resilience of emerging markets," adding that the firm had a diverse portfolio catering to both the consumer and specialist professional markets.



# What a life!

By Don Bullock

**A**re you sitting comfortably? Then I'll begin. A long, long time ago, when Great Britain was pretty-well right, there was a very old and very thin man called Kind Mister Woodall, Easy Terms You Can Afford, who had made a huge fortune out of the door-to-door selling of very cheap clothes to people who were so poor and aimless that they would pay any price at all for a new pair of shoes or trousers to look nice – as long as they didn't have to pay it now. Their cost was simply added to their payment card, off which they had to pay Kind Mister Woodall, Easy Terms You Can Afford, no more than their usual two Shillings a week for ever and ever.

Now the Kind Mister Woodall had a very strange and ugly wife called Mrs Woodall, and a vile fat dog called Prince. Now retired, the odd couple spent their lives playing Let's pretend. He was a tall, thin and whining hypochondriac who pretended to be a ridiculously old and feeble helpless whiner, and she was a sympathy grabber who pretended to believe him so that she could fuss over him and pretend to everybody that she was a plucky and long-suffering martyr, driven to worry and distraction, who had long since settled to the role of his worn-out and long-suffering lackey.

She didn't present a pretty picture, Mrs Woodall. She was very ugly and hairy, with a pair of moustache-like eyebrows, an eyebrow-like moustache, and a crooked mess of putrid, yellowed teeth. She sported shiftily eyes and rounded shoulders, too, and a discordant smokers' cough. She looked like a wild-eyed, white-faced poltergeist who had just crawled from

her grave and was upset by the daylight. She cultivated her dry grey hair to drape down over her leathery china face, and dressed in lots of layers of expensive but ridiculous bunched shrouds that she bought with all the two-Shillings a week that the kind Mr. Woodall, easy terms you can afford, had brought home over all the years. And her voice sounded like a rusty saw on a rusty sheet of tin.

"Allo, Mr. Bullock!" she called, whenever I appeared, and the grating of her voice closed my eyes, drew my neck into my shoulders and made my teeth go rough and on edge.

The couple owned a very big and tall house in the very expensive and leafy Honeysuckle Square, but they chose to live in its tiny dark basement, down lots of steps, so that they could rent all the other rooms to other poor people for lots and lots more Shillings a week.

Because it was a long time ago, and the world was pretty-well right, there was only two television programmes on the Air. One was the BBC, which counted, and the other was ITV, which didn't. The BBC transmitted proper programmes for intelligent people then, because quality counted and there were no such things as rating figures, but ITV, who needed to sell lots and lots of advertising to people who didn't care about television programmes, transmitted rubbishy programmes specially for riff-raff thick-heads, because there were lots and lots of riff-raff thickheads about, and the thicker they were, the more they glued their silly faces to ITV's rubbishy television and the more ITV could charge for its rubbishy advertising. Do you all understand that?

(Yes, Mary, if you must, but *do* be quick, dear...)

Now, because BBC Television had come first, they had snapped up the Band One channels, which meant that they were very lucky indeed, because Band One frequencies, with their long waves, easily travelled a long way, and everybody could watch their proper programmes. But because ITV had come last, a long time afterwards, (and after a long, long row in Parliament) they had to have the only ones left, which were Band Three channels. Now this made them very unlucky and cross, because Band Three frequencies, with their shorter waves, didn't Easily travel a long way over the country's surface.

Now, because the BBC's signal was strong and powerful, their programmes could be got on a cheap and simple aerial. Most of them consisted of a tall dipole and a single reflector, and they looked like a big letter H. But because ITV's signal was weak and pappy, their programmes couldn't be received at all in lots and lots of areas. And even in localities where they could be received, a dipole and a reflector simply wouldn't do. And there were two reasons why! One was that the signal was weak and pappy, like their programmes! Now, can anyone tell me the other?

Yes, Cecil! Quite right!

The other was that because Band 3 signals were of higher frequencies and shorter wavelengths, so their aerials had to be physically shorter in order to resonate with those of their transmitters, and little aerials gather less signal than big aerials!

(Er... Cyril - don't do *that* to Fiona. Hm? Because it isn't very *nice*, Cyril!)

Now, the clever people who made

aerials did their very best to help, because there was money in it. Because the ITV dipole with its reflector was so small, they added extra rods in front of the dipole, and called them directors. Now, an area where the signal was good might get away with, say, a three element aerial. This would comprise of a dipole with a director in front of it, and a reflector behind it. An area where the signal was not so good might get away with a six element aerial. This was a dipole with one reflector and four directors. There were lots of variations on these; why, I remember eight element and ten-element aerials on their cross-bars, and these were referred to, in the trade, as 'Single Eights' and 'Single Tens'.

But for bad signal areas, there were 'Double Six' aerials, having two rows of six elements side by side, and I even heard of Double Eight aerials!

In the town where I lived, the ITV signal was very poor indeed and subject to fading, so most dealers used Double-Six aerials as standard. And where the signal was even worse, they fixed clever devices to the aerial. These were tiny signal amplifiers, powered by a twelve-volt power pack (usually clipped to the back of the set) whose voltage was fed up the cable that was there to bring the radio frequency signals down the Cable and to the set!

(Wasn't that a cunning ruse, Amrose?)

There was a reason why the amplifiers were put so close to the aerials. It was that the signal there was 'Cleaner'. In fighting its way down the cable it was set to displace lots of molecules in the cable, and this caused disturbances, or 'Noise', in the signal.

Well, now that we understand the nature of the television signals of the day, we can come back to Kind Mister Woodall, Easy Terms You Can Afford, who, you might remember, owned a very big and tall house in

the very expensive and leafy Honeysuckle Square, but who lived, with his very strange and ugly and sickening and hairy wife, in its tiny dark basement, down lots of steps, so that they could rent all their other rooms to other poor people for lots and lots of Shillings a week.

(Er – Have you a hanky, Helen? No, not to lend to me! Just use it, my dear!)

Now, all of Kind Mister Woodall's tenants loved to watch television, because after paying all their rent-Shillings to Kind Mr. Woodall, Easy Terms You Can Afford, they couldn't afford to go out! And Kind Mister Woodall wanted them to watch television too, so that their rent Shillings would keep coming in for his very strange, ugly, sickening and hairy wife to keep buying more ridiculous and bunched shrouds which kept her mouth shut.

And because he had ten young and poor couples in the ten rooms over his basement, and not much ITV television signal, he asked us to install a very powerful amplifier, with lots of co-axial output sockets, in a top landing cupboard as close as could be to his great big aerial system just above it on his roof, and to feed a fat plugged-in cable to every single room, including their tiny dark basement.

The Kind Mister Woodall, Easy Terms You Can Afford, liked us very much indeed, because when his television needed attention, we called very quickly and made it work very quickly, because he always paid us all the Shillings we charged him. And he told all his tenants how good we were, and they called us too, and paid us quickly, because they were afraid that if they didn't, The Kind Mr. Woodall, Easy Terms You Can Afford, would kick them out.

Now, the very strange and ugly and hairy Mrs. Woodall, who looked like a wild-eyed white-faced poltergeist who had just crawled from her grave and was upset by the daylight, *loved*

watching ITV, because it was very rubbishy, like her. She flew very cross when her signal faded some evenings, and ran up all the stairs to the amplifier in the cupboard, and pulled out every co-axial cable plug except her own, so that her set could have all the signal.

(Yes, Simon, she was very unkind and self-centred...)

And in the morning, whilst our telephone was ringing ten times in ten minutes to register ten calls at ten flats at 6 Honeysuckle Square, the very ugly and hairy Mrs. Woodall was slyly creeping upstairs again to plug back in all of the co-axial plugs she'd pulled out the night before.

I didn't like having to keep calling at 6 Honeysuckle Square to lug ten 'Intermittent ITV' sets down the stairs and into the van, nor unloading them all and lugging them up the stairs to the workshop and soak-testing them until I was blue in the face, so one day I quietly advised the mouthiest of the ten couples to check that their aerial plugs were firmly plugged into the box next time it happened, before calling us. And they took to pulling Mr. and Mrs Woodall's plug out whilst they were plugging theirs back in.

Oh, they could be very troublesome people, Mister Woodall, Easy Terms You Can Afford, and his Ugly Wife. Another time, they called me because, they said, their picture needed constant adjustment as they watched it, and since my good friend Bob, one of nicest fellows and most canny engineer I ever knew, had dropped in, we called there together.

We showed up in their basement to find The Kind Mister Woodall, Easy Terms You Can Afford, looking pained and long-suffering, as usual. He was garbed in wads of warm invalid clothes and securely packed by cushions, pillows and hot water bottles into his grandfather chair, immediately in front of the 23" screen. She, looking suitably and totally martyred, was

standing beside him, feigning her determined anxiety to serve him in spite of her exhaustion.

"Turn off the lights, dear, and close the curtains!" he whined in his withering voice, and as she swished the curtains shut and lifted the switch to plunge the room to blackness, he turned the set on, and set his face twelve inches in front of its giant screen. My eyes were still well stopped-down from the bright sunlight outside, and when his vile roaming dog Prince nosed me, I managed to fall over it and bring Bob down too – onto the old boy. As we scrambled up and pulled him back to rights he looked at us as though we had pulled guns on him. A picture came up on his set, and we looked at it. It seemed excellent to me.

"What seems to be the trouble?" asked Bob.

"Why, I have to keep *adjusting the picture!*" he whined in his weak and tremulous voice. "*All the time!*" and he suddenly shot his thin arm out like a chameleon's tongue at one of the little preset control buttons that grew out of the set's centre-front. I saw no reason why he did it, nor why he brought his hand back and fingered his chest and started wheezing and rocking to and fro in his seat as though he was trying to recover from a half-mile run. I looked at Bob through the gloom, sensed he was looking at me, and prayed that he wouldn't indulge in a spate of his infectious japing, for our humour was on identical wavelengths.

Mister Woodall, Easy Terms You Can Afford, endlessly repeated his unnecessary flicking adjustments, treating us to a good wheeze every time, and I noticed in the gloom that Bob was gently leaning and sagging too, in perfect unison with Woodall's wheezing, and so, by degrees, I joined in, and as we leaned and sagged together, the humour got to us and we sank into peals of silent laughter.

But the very strange, very ugly and

hairy Mrs. Woodall, hearing our squeaks and fearing that her vile dog Prince was perhaps having a fit, suddenly switched the light on, to reveal us in our mirth.

"S..Sorry!" guffawed Bob, his face wet with tears. "I was – er – just thinking of that funny devil I saw in...er... Stroud the other day, and I had to have a laugh!"

Woodall looked at me. "Were you there too?" he cooed. I nodded vigorously through my tears of laughter. "Yes!" I lied.

As time went on, the odd couple of 6 Honeysuckle Square became the bane of my life, and I was secretly glad when the Kind Mr. Woodall, Easy Terms You Can Afford, was called by his maker and the house was sold.

(Colin, not under your seat, Dear. Use you hanky. And Glenda, don't keep putting your hand *there!* Hm? Just *don't*, Glenda!)

A few months later, on a sunny blue-skied day, I was called to a vast mansion in its five-acre parkland, and as I drove up the tree-lined drive and neared the palatial dwelling, so music filled the air and its host of scented shrubs swayed to the rhythm, and bluebirds played happily in their blossoms. I was a little early, and as I sat there waiting, I saw a slender, blonde, alluring vision slowly sashaying up the drive toward me, presenting a dreamlike apparition of beauty, good taste and elegance, dressed in dainty pinks and soft sky-blues, and wearing a delightfully wide-brimmed and garlanded straw hat. Beside her, and holding her hand was a slender lad, tall and suntanned and also blonde.

Could this be the Lady of the mansion, perhaps with her son? Their movements sang of grace and rhythm, and I warmed to them, and I smiled easily as they neared me. I knew that Lady's face! Or, had it been her Mother's face? She was clearly a sweet, unlined and unspoiled young woman, yet reminiscent of the way

that the very strange, ugly and hairy Mrs. Woodall might have looked in her youth, had she never met the Kind Mister Woodall, Easy Terms You Can Afford. But the Woodalls' never had a daughter, as far as I knew!

"Allo, Mr. Bullock!" the vision barked as she drew near me, and the grating of her voice closed my eyes, drew my neck into my shoulders and put my teeth on edge. It was Mrs. Woodall, in some clever and diabolical disguise!

"Meet Hans, my Toy Boy!" she rasped, and I shrunk again as her jarring voice pierced my chest. He smiled and kissed her, and the air soft music swelled I witnessed the rustling static charge of young love.

He was young alright, and the fool loved her (or her money!) But she wasn't young! Where were her round shoulders? Her shifty eyes? Her grey hair, her lined face, her pair of moustache-like eyebrows and her eyebrow-like moustache; her mess of putrid, yellowed teeth and her discordant smokers' cough? And why did she no longer look like a wild-eyed and white faced poltergeist who had just crawled from her grave and was upset by the daylight? And where were her lots of layers of expensive but ridiculous bunched shrouds?

Money, desire, plastic surgery, dentistry, make-up, fine clothes and happiness-found, I concluded. I felt I ought to say a word about the past...

"I was sorry to hear of the Kind Mr. Woodall, Easy Terms You Can Afford," I ventured.

"Wuz yuh?" she grated. "Well, I wuz delighted!" And as I emulated a tortoise again, she trilled out a curdling laugh. "I only married the sap 'cos he was goin' places – but, God, he did take so long about his last move!" she rasped. And her toy boy smiled and kissed her again as he scanned his thin and tear-soaked bank statement.

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# Test Case 534

*“So, the disc player and the TV were both switching correctly at least. Was the problem down to the player, the TV, the customer or what?” Find out the solution to this, and the TV/VCR combi conundrum on page 22*

**P**am handed Todd his job cards for the morning. Just two to be going on with, but more to follow, no doubt, when he called in later. The first call was to a school where a rented 14” TV/VCR combi was claimed to be in trouble. Todd decided to skulk in the Dug Out cafe for half an hour or so until things should have settled down in school. When he got there, he was conducted to the little machine and told that its recordings were awry because there was no sound when they were replayed in the JVC deck in the hall. A few minutes playing with the machine and a pre-recorded tape Todd had brought with him established that this little Thomson machine could play back the vision and sound of its own recordings OK – this seemed to exonerate them – and those of recordings made elsewhere. Off he went, then, to the JVC VCR. Sure enough there was no sound from that when the Thomson’s recordings were run through it – but it played Todd’s other tape (101 Dalmations!) perfectly; sound and vision.

Now Westgate C of E Primary is no place for VCR fault diagnosis or repair, so Todd brought the combi back to the workshop, promising to return it soon. It soon got to the bench of Sage, whose first action was to play a known good recording; and then to make and replay an off-air recording. No problems were revealed. Next, then, the Thomson’s

recording was played in a couple of VCRs which were hanging around the workshop. No problem! By this stage Sage had a very good idea of what and where the fault was. Do you?

Meanwhile, Todd had gone on to his second call, where a new 40” Sony Bravia LCD TV had been installed the previous week. The customer, a rather aggressive man, claimed that there was something wrong with its rendering of DVD replay images because he could not see any difference between pictures sent to it (from an old Tesco/Dansai player!) in composite video and in RGB. This player has a V-MODE key on its remote control to switch between these modes, and yes, Todd saw that there was no discernible difference in picture quality between them. But was the set really getting an RGB feed? The disc player’s Scart output was looped through a middle-aged VCR on its way to the TV. Did that provide an RGB path? In fact, it did. Maybe the cable wasn’t wired for RGB? It looked very thick and heavy, but still Todd went to the van for another with which to check. Results were the same.

Our exasperated field technician



called up Sage and put the problem before him. Sage got the TV’s user instruction book up on the workshop PC and told Todd to watch the symbols in the top left corner of the screen as he toggled between composite and RGB on the Dansai player. Sure enough he saw the symbol alternate between an arrowed ‘empty’ screen (PAL input) and one containing three dots to indicate RGB: this set has auto-recognition of the Scart input signal type. So, the disc player and the TV were both switching correctly at least. Was the problem down to the player, the TV, the customer or what?

The solution to both puzzles is on page 22.

# Fault finding reports

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

## TV FAULT FINDING

### Ferguson model WF70401 chassis ICC20

**Fault:** Dead.

**Cure:** The first check is the mains input fuse if this as blown check the chopper FET TP020 (H13NB60F1) for short circuit condition, also replace IP050 (TEA2262) 15 volt zener diode DP053 (15v). Beware before switch on ensure there is no damage to the print around the connections of the FET transistor TP020 repair if necessary to restore normal operation.

**John Coombes** *TV Ref: 9*

### Maxim model 1154 LCD chassis CTV100/CINEX

**Fault:** Dead.

**Cure:** This chassis is also used in the Bush and Medion LCD and there is a power supply modification available from Charles Hyde (CHS) part no; MODKIT63 this includes.

F300	3.15 amp fuse.
D315	12 volt zener diode.
D318	2.4volt zener diode.
D325	IN4007 diode.
Q300	BC337.
IC21	FSD200.
IC30	ICE1QS01.

Also replace capacitors C322 and C356 (2 x 47µf 50v) which are not included in the kit. Replace all components in the kit to restore normal operation.

**John Coombes** *TV Ref: 10*

### Bush model IDLCD26TV22HD chassis 17MB11 Vestel

**Fault:** Picture disappears/backlight is alright.

**Cure:** If the picture disappears with interference lines intermittently on screen this can also be heard on the sound it is necessary to replace all the capacitors on the DC/DC convertor PCB. Replace C106, C108, C117, C122 and C124 (5 x 100µf 16v) replacement of all the capacitors will cure fault.

**John Coombes** *TV Ref: 11*

### DM Tech model DML4117

**Fault:** No picture.

**Cure:** If there is a loss of picture which can also result in just lines across the picture after a short time switched on check for faulty Q811 3.3 volt regulator which can be located at the top of the Main PCB.

**John Coombes** *TV Ref: 12*

### Bush model LCD26TV005 LCD chassis LM/Beko

**Fault:** Dead.

**Cure:** If the set is completely dead then check the power supply for faulty SMD zener diode ZD903 (16v) check for short circuit or by replacement.

**John Coombes** *TV Ref: 16*

### Bush model PDP42TV003 Plasma chassis P7 Beko

**Fault:** Dead.

**Cure:** If the set is dead then this can usually be due to a faulty power supply for which there is a modification kit part no; MODKIT60.

IC2001	FSD200.
D2001	B250/1500 Bridge Rectifier.
D2005	FUF4007 Diode.
R2002/R2003	2 x 22 kilo Ω 3w resistors.

Before completion also replace the 12 volt zener diode if used and the snubber capacitor 2.2nf 2Kv in the primary circuit of the power supply. After replacement of the mod kit also replace SMD resistor R1001 for open circuit.

This chassis is also used in the Goodmans GTV42P4 and Grundig.  
**John Coombes** *TV Ref: 17*

### LG model RZ-23LZ20 LCD

**Fault:** No results.

**Cure:** If the set does not come on but the Led is green check for a fault in the DC to DC converter in this case IC954 or IC955 (MP1583) there should be 24 volt input and 3 volt and 5 volt output. In this case IC954 voltage was correct but IC955 had no 24 volt input on pin of IC a careful look revealed IC955 was cracked with no contact to print and a replacement restored normal operation. On a couple of sets I have had since if IC955 as blown this can result in an increase of voltage not only destroying IC955 but also the video processor and scaler ICs which makes the set beyond economical repair.

**John Coombes** *TV Ref: 18*

### Samsung model SP42W5EFX Projection

**Fault:** LED flashing.

**Cure:** If the set is dead with just the LED flashing check the line stage for 200 volt output and if present check volts both sides of resistor R437 (1.8Ω) if open circuit check for short circuit on HT line. If there is a short circuit as in this case we traced fault to Blue output IC501 (TDA6111Q)

but after replacement set still failed to operate which we traced to faulty Blue CRT part no (AA91-04079A) replacement of all components restored normal operation.

**John Coombes** TV Ref: 19

## **Toshiba model 40PW8DB Projection**

**Fault:** Dark picture.

**Cure:** If the picture is very dark or just loss of picture then this can be traced to a faulty blanking transistor Q915 (2SC1815Y) which can be found on the green CRT base.

**John Coombes** TV Ref: 20

## **Philips model 32PW9527 chassis EM5E**

**Fault:** No start-up.

**Cure:** If the set fails to start and the power supply starts to trip finally going into protection mode, check the line output transistor for short circuit, this is usually the result of incorrect line drive causing the line output transistor to overheat if this is the case then replace capacitor C2492 (100µf) and also upgrade the line output transistor to (BU2520DX).

**John Coombes** TV Ref: 22

## **Goodmans model LD2655HD**

**Fault:** Dead.

**Cure:** If the set is dead then check the power supply, the FET transistor Q803 (FQPF9N5) goes short circuit and resistor R830 (4.7Ω 1w) goes open circuit.

**John Coombes** TV Ref: 23

## **Toshiba model 20WLT56B chassis 17MB16 Vestel**

**Fault:** No backlight.

**Cure:** If there is no picture but the sound is alright then replace the inverter PCB (V30051027). If after replacing the inverter PCB there is still no backlight suspect the 12 volt LT line is varying so replace the 12 volt 6.6amp power supply to restore normal operation.

**John Coombes** TV Ref: 24

## **Phillips FL1.0 Chassis**

A dead set using this chassis is likely to be a result of the stand by power supply blowing up.

You will have to replace wickman fuse 1250 (250Ma), chopper transistor 7250 (BUX85F), smd transistor 7251 (BC848), smd transistor 7201 (BC857C), smd diode 6201 (LL4148), smd diode 6251 (LLZC5V6) and resistor 3250 (62Ω) which rises in value and causes the chopper transistor to go short circuit.

**Michael Dranfield** TV Ref: 41

## **Sharp 66FW53H**

If you have an intermittent crackling from the centre speaker do the following modification on the centre speaker driver pcb.

Remove diode D1303.

Remove diode D1304.

Short out with solder all pins 1,2,3,4, on surface mounted IC 1300.

A faulty IC1300 can also cause a dead set, to check just unplug the centre speaker pcb from the main board.

**Michael Dranfield** TV Ref: 42

## **Goodmans GTV42P6. Plasma T.V**

This set uses a Beko chassis and a common cause of a dead set is failure of the stand by power supply, no 5Volt rail, the chopper control chip IC1004 (FSD200) will usually have exploded, the stand by power supply is very simple consisting of only 7 or so components, Charles Hyde do a repair kit order code MODKIT 60 but beware there are two different versions of this board, when replacing zener diode ZD1002 on the secondary check which part you take out, the kit comes with a 12 volt zener BZX55-C12 but some versions are fitted with a IN4746 which is a 18 volt zener, if you fit a 12 volt zener place of the 18 volt the set will work normally for a while then the diode will go short circuit.

**Michael Dranfield** TV Ref: 43

## **Toshiba 28W23B - Vestell 11AK37 chassis**

For a tripping power supply look no further than C827 (4700 Microfarad 16 Volts) tripping will occur if its value falls below 2000 Microfarads.

**Michael Dranfield** TV Ref: 44

## **Toshiba 28W33B - AK 37 Chassis**

It makes a change when a customer makes a mistake. A few months previous his aerial fell off the roof, however this was not a problem because he had a Telewest cable box, and he used this for his viewing purposes. Recently his cable developed a fault where the picture had a video problem. For some unknown reason he decided to have a new aerial fitted, only to find the installer could not get any terrestrial stations. After using his signal strength metre he promptly told the customer the set was faulty. At this point I was called in; looping the aerial through the video recorder via scart proved the aerial installation was working. Once I had the set on the bench and located Pin 2 on the tuner unit TU201, the tuning voltage was present and change with channel change. Then confirming the five volt LT supply was present on Pin 7, it was time to suspect a tuner unit fault. A scrap chassis supplied one and when replaced restored stations. After all; this effort he still had the problem of the cable box which was eventually replaced. At least now he can watch the cable, as before, but also record terrestrial stations.

**Philip Salkeld** TV Ref: 45

## **Hitachi C32W460N**

When this customer phoned me, he explained that he bought this set two days earlier from an ex-catalogue dealer. When he got it home the picture was too wide, could I help? I did suggest taking the set back, but he was not too keen. After talking to him I assumed it was the usual A7 chassis, but then I started to think I

have never had this fault on this chassis before. Next day I called out fully expecting to bring the set in. However, I was pleasantly surprised, after observing the remote control I realised it was the vestel AK37 chassis. This is the first time I have come across this chassis with a 32 inch screen. My enthusiasm rose immediately, off with the back and straight to one of the east/west diodes D606 and BYW95C where I checked it in circuit and confirmed a short-circuit reading across it. This reading is normally due to the 12 nfd 1600 volt capacitor. The type of capacitor in this set looked a better type, so I decided to snip one end of D606 and re-check it out of circuit. This proved the right thing to do as it was the cause of the short circuit reading. It is amazing how things turn out in this job, some days you are lucky and some days not.

**Philip Salkeld** *TV Ref: 46*

## **Bush 2867NTX**

This set has found its way on to the work shop bench three times in the last year, with the same fault, that being dead, not only that the same component faulty. In the power supply R805 330K  $\Omega$  1 watt goes open circuit which prevents the chopper IC starting up which results in no drive to the BUZ90 chopper transistor. The outcome, total destruction of the transistor which in turn blows out R809 .47 $\Omega$  .5 watt. Recently I had read an article on resistors which indicated that they also have voltage ratings like electrolytic capacitors. Bearing in mind that R805 receives its supply from the smoothing capacitor which has 330 volts across it, I fitted a 180 k  $\Omega$  and 150 k  $\Omega$  1 watt in series in an upright position onto the circuit board and after also replacing the faulty components mentioned restored the set back to a working condition.

**Philip Salkeld** *TV Ref: 47*

## **Bush WS6674 - PT92 Chassis**

I have come across this fault three times in ten days. The customer complains the picture is flickering. What is happening is that the picture is blanking out and then re-appearing. If you look very closely you normally notice that the reds in the picture have become cherry in colour. If you select teletext that is perfect as teletext use mostly saturated colours. The diagnosis is a low emission CRT, replacement due to the cost is out of the question. A Temporary cure is to go into the service menu and select CL (cathode level) which is normally on 8 and reduce it to 3. To enter the service menu press teletext sub page on the remote and at the same time -vol on front of the set. Select and adjust in the normal way. Press TV button on remote to store and come out of the service menu. At least this will give the customer some thinking time to choose their new set.

**Philip Salkeld** *TV Ref: 48*

## **Hitachi C28W440N - AK33 Chassis**

Hitachi have two ranges of this chassis, W440/540, they are starting to come in with the no go faults, where you find the HT line is either zero or low volts. The faults themselves are not too difficult, but checking for shorts or visible signs is a non-starter. To diagnose the faulty stage a good tip, is to disconnect the protect line which is on Pin 18 of the micro IC500 SDA555XL, this will prove the power supply is running alright. If you observe a frame collapse you can go straight to IC600 STV9379FA.

**Philip Salkeld** *TV Ref: 49*

## **Bush RP40TV Projection Set**

This set came in with severe east/west distortion which gave the impression that it could be corrected in the service menu. To enter service menu:- reduce the volume to zero and press the mute button on the remote, wait

until the red mute on the screen changes to yellow. Then press the menu button on the front of the set. To enter the service menu mode, "P+" or "P-" to select ew-para etc "V+" or "V-", to adjust in the normal way. To exit the service menu, press the "still" button on the remote control.

**Philip Salkeld** *TV Ref: 50*

## **Hitachi C2119T**

An old model, this black 21" TV, but very precious to its elderly owner. It was dead on arrival at the workshop for the very good reason that protective zener diode ZD903 was short-circuit. That was replaced, along with 39k $\Omega$  resistor R909 and the set-HT pot, the usual causes of sufficient over-voltage to wreck the zener. After this treatment the set ran well, but it transpired that when switched on from cold it sometimes failed to perk up. 82k $\Omega$  resistors R902 and R903 were changed even though they measured OK, but the culprit turned out to be electrolytic capacitor C908 (33 $\mu$ F 100V) which was low in capacitance and had excessive ESR.

**Eugene Trundle** *TV Ref: 51*

## **Philips 42PW6006/25 (L01.E chassis)**

This set was dead, with its line output transistor 7460 short-circuit. After fitting a new BU4508DX we cast round for reasons for its failure, and came across dry joints at two legs of the EW coil 5400. The usual cause of line output transistor failure in this model is 47 $\mu$ F capacitor C2455, so that was replaced as well. There has been no further trouble since the set was returned.

**Eugene Trundle** *TV Ref: 52*

## **JVC AV21F1EK**

While sound continued, this set produced a thin wisp of smoke from the region of its line output stage. We found damage to the network of components at the bottom end of the EHT overwind: capacitor C529 was

split in two, and resistors R530 and R531 were burning, perhaps as a result of the duff capacitor no longer bypassing pulse energy from them. After replacing all three of these components the resistors burned again; the flyback transformer was faulty. We got a replacement from Seme for £13-50 net under part no. HR6549.

**Eugene Trundle** *TV Ref: 53*

### Hitachi C2846TN

There was sound but no picture here, but thankfully no burning on this one. In cases like this it's helpful to turn up the A1 control (after carefully marking its original position, perhaps with a pinpoint burn from a soldering iron!) to see what shows. In this case it was a thin horizontal line due to the collapse of the field scan. This led to the discovery that there was no voltage at the field timebase chip. Feed resistor R710 was dry-jointed to the PCB land under a blob of glue.

**Eugene Trundle** *TV Ref: 54*

### Schneider STV2007T

Another straightforward repair here. There was no sign of activity at all because the power supply failed to oscillate, even though operating voltage was available. Resistor 3507 (150k $\Omega$  1W) was open-circuit, while capacitor 2515 (1 $\mu$ F 100V) gave a very high ESR reading. Replacement of these two got the set going again.

**Eugene Trundle** *TV Ref: 55*

### Philips L01.1E chassis

We have had several of these sets with elusive 'shut-down' faults, usually soon after switch-on, sometimes after a run. When the error codes are called up, there's typically a nonsensical selection like x-ray and over-voltage protection (USA only!), beam current, black current loop protector and tuner I?C ident error – 10, 11, 1, etc. In many such cases we have found by substitution that the Philips picture

tube is faulty, and have had to write the set off as a result. There's no doubt that the A1/G2 pot was set correctly in these instances.

**Eugene Trundle** *TV Ref: 56*

### Bush 2868NTX - AK19 Chassis

This set was brought to me by one of my television acquaintances with a right tale of woe. The original fault was that the set was dead which turned out to be a short circuit line output transistor. Replacement and a general soldering of dry joints brought the set back to life. Only to find it had an east/west fault. He admitted to removing a few components before finding the culprit, which was L604, the east/west loading coil, shorted turns. When switched on again it had a straight black line down the side of the screen, about 2 cms wide. Going in to the service menu and selecting horizontal shift made no difference. I must say, that I have never had this fault on this chassis before. I did have the advantage of a scrap chassis and eventually noticed that L603, a black two pin coil, with a white polarity line down its side, was the wrong way round. Reversing it put matters right. L603 has got something to do with the line phase.

**Philip Salkeld** *TV Ref: 60*

### DAEWOO Digital/Analogue CRT TV - Model DUB2850

**Fault:** A replacement Digital Analogue was fitted to the above TV and when switched on the words HEAT RUN showed on screen. Contact was made with Daewoo Technical department and the problem identified as follows.

**Cure:** This problem occurred because the PCB had been taken off the production in Poland line too soon before final checks were completed and then issued to Daewoo spares dept. in the UK ..

The only way to remove this HEAT RUN is to use a Daewoo Service

Remote Control type R30-SV7 and pressing the "Normal" button.

**Charles Arundel** *TV Ref: 132*

### Sony model KD-28DX40 CRT - chassis FE2

**Fault:** Red/Green LEDs flashing only.  
**Cure:** If the set intermittently tries to start-up but there is no EHT rustling check for faulty line output transistor Q533 (BU2515DX) and the line output transformer T511 for shorted turns on the primary section.

**John Coombes** *TV Ref: 141*

### Beko 14272TD8 - 12.7 chassis

Stepped black horizontal lines were on top of an otherwise normal picture with this portable. C410 which is a 1nF surface mounted capacitor hiding away just off centre of the PCB was to blame for this. It is also nearly always to blame for almost any obscure fault that appears even remotely field related.

**Pete Graves** *TV Ref: 170*

### TOSHIBA 1480TB

**Fault:** dead.

**Cure:** This one was traced to the power supply. Surge limetor resistor R872 4.7 $\Omega$  5 watt was o/c

This was caused by snubber capacitor C817 470pf which was S\C after replacement all well.

**Uel Harte** *TV Ref: 173*

### JVC AV-28WFTIEKS

**Fault:** TV would revert to standby after a few seconds before the TV shutdown I could see that picture Width was slightly reduced.

**Cure:** Fault was eventually traced to capacitor C817 2.8 nf part no QFZ020- 282. Located in the line stage cured the fault.

**Uel Harte** *TV Ref: 174*

### JVC AV-28T5BR JW CHASSIS

**Fault:** Primary of the power supply blow up.

**Cure:** The following components were faulty:

IC 901 (ICE IQ SO1)  
D902 (FR 107GT-T3)  
R903 (QRF104K-3R9)  
Q901 (STP13NK60ZFP)  
PC901 (PC123Y22FZ)

the above component failure was caused by Resistor R909 1.8 meg  $\Omega$  which was O\C.

**Uel Harte** *TV Ref: 175*

## DAEWOO DYT 2200

**Fault:** Dead.

**Cure:** Mains fuse was O\C. This was due to transient capacitor C810 value 470 pf being S\C. This capacitor has been upgraded to 1000pf. Located in the primary of the psu.

**Uel Harte** *TV Ref: 176*

## WHARFDALE 320S

**Fault:** Dead.

**Cure:** Unable to ID this chassis. This one was traced to the primary of the power supply. Resistor R360 120k was O\C. I also replaced resistor R361 also 120k. It was showing signs of distress.

**Uel Harte** *TV Ref: 177*

## Samsung LE 19/26/32 R8 series

**Fault:** No sound, but a very quiet cyclic clicking noise from one or both loudspeakers.

**Cure:** This is usually caused by one leg of the speaker wiring becoming grounded.

The audio output of these models is part of a DSP IC containing A-D, D-A and a stereo output amplifier. The amplifier operates in bridge mode and objects to having its output grounded.

Check with a DMM, with the receiver un-powered, there should be a very high D.C. resistance to chassis. Dependent on what has caused the fault, a reading of anywhere between  $8\Omega$  to a dead short may be encountered. The two most likely causes are:

1. That the L/S tags are touching the chassis, - particularly on the smaller

models. I had one where the speaker had been put in back-to front, with the tags forcibly jammed up against the chassis. Current production units have now sleeved speaker connections, but the problem can still occur.

2. A wiring loom short-circuit. This is invariably caused by the wiring having been trapped under either the LCD mounting, or under the stand-fixing bracket.

Erratic channel changing and/or intermittent selection of external input sources. TV entering menu mode by itself, volume control going from zero to maximum by itself, all accompanied by the relevant OSD display.

This bizarre range of faults can usually be attributed to one of two causes.

The most likely cause is again a partial short circuit in the wiring loom. These models use a hand-capacity touch sensitive control panel on the right hand side of the set.

Dependent on the exact model, this may or may not also incorporate the on/off /standby switch. Sometimes, just removing the rear cover of the set will provide a temporary cure.

Check the ribbon cable from the touch-panel, where it emanates from the small connectors on the PCB. Sometimes, the cable has not been dressed correctly, and it will be found that a back-screw has damaged the cable. If this is not the case, check that the cable is not trapped under the LCD panel, where it is clamped to the front of the cabinet. The second cause is a malfunction of the control panel PCB itself. This can be easily checked by carefully unplugging the ribbon cable, whereupon the fault should cease. The panels are obtainable as a spare part, together with the relevant ribbon cable assembly.

**Dave Stone** *TV Ref: 262*

## AUDIO FAULT FINDING

### Accuphase p-300, amp

This week it's the turn of the Accuphase p-300, amp from the middle 70s; this is a 150w\ch power amp.

The amp was designed by a subsidiary of kenwood, and weighs about 25kg so do a risk assessment before lifting?

Anyway the transistors used in certain positions will need to be changed they are the fuji 2SA809\2SC1451 which are becoming faulty causing dc drift and other problems, they are the 4 grouped together in the middle of the driver pcb, they have circular clip on aluminum heatsinks, I replaced them with 2SA1208\2SC2910, there are also some non polarized caps which could do with replacing, the 2 large main smoothing caps could be leaking but finding replacements could be difficult as the case isn't high enough to fit the ones available unless lower value ones are used but this is not advisable in this instance as they smooth both channels and the high power the amp develops, dry joints will be abundant on all the pcbs.

There is a psu board behind the meters with several caps that will need to be replaced as they will have dried out with the heat developed, they are under a cover and as such will be fried,

The case size of this amp is quite small for it to develop 150w X2 and it's a good idea to remove the 8 sets of driver\output transistors from the heatsinks and replace the h\s compound.

**Philip Rosbottom** *AUDIO Ref: 69*

## COMBI FAULT FINDING

### Durabrand (ASDA) DCT 1481 DVD/Combi

Fails to start up. Red L.E.D. flashing, may start if single probe is connected to OPTO-coupler!

Change C416, C417, C417 both 470MF 25V.

**Matt Marrs** COMBI Ref: 169

## Hitachi model DVPF4E DVD/VCR

**Fault:** Dead.

**Cure:** If the Combi is dead and the power supply is working correctly then suspect and replace a faulty capstan motor.

**John Coombes** COMBI Ref: 15

## DVD FAULT FINDING

### Panasonic model DMP-ES5EB DVDR

**Fault:** Intermittently goes dead.

**Cure:** If the unit runs for a few minutes then turns off then this due to a faulty Power Regulator IC001 which will eventually go completely dead due IC001 (STR-G6353) gone short circuit.

**John Coombes** DVD-R Ref: 21

## SATELLITE FAULT FINDING

### Amstrad DRX100

This box had sound but no picture the cause was traced to the power supply, the 12 volt rail was missing,

D11 (IN4937) read fine on a cold check but never less was faulty, also read the voltage on the anode of D101 on the main pcb if you have less than 8.5 volts replace C17 330 Microfarad on the power supply otherwise the customer may report a no sat signal fault when he gets the box home and its cold.

**Michael Dranfield** SAT Ref: 37

### Pace DS430N

If the power supply is tripping and the red stand by led is flashing you first have to determine if the problem is on the primary or secondary side, first take a good look at the chips, if any have pin holes in the top the box has probably been struck by lightning and usually not worth repairing, if all looks o.k. here check D2540 on the secondary side, it can go short circuit, check for a low resistance across all the other secondary diodes also, if no low readings are found the fault is usually on the primary side, D2502 (BAS2502) can go Leakey causing tripping, A totally dead power supply can be cured by replacing the chopper control chip U2501(TOP234Y).

A common power supply fault on this model where boxes have been used in Spain where the mains voltage can go up and down is failure of the transient suppressor vdr (VDR2500) this and/or the mains smoothing block C2500 (68Microfarad 400 v) will have exploded, in addition to these components you will have to replace fuse FS2500 3.15A, R2500 20Ω, U2501 TOP234Y.

**Michael Dranfield** SAT Ref: 38

### Pace 2600

This box had gone off during a thunderstorm and displayed no satellite signal, as the box came on the damage would probably not be to great, on inspection it was clear lightning had struck the dish, there was no LNB voltage because the feeder choke L204 (10NH) had disappeared in a puff of smoke, decoupling capacitor C275 (100NF) was also short circuit, replacing these two components brought the LNB voltage back on but the box still said no sat signal received, it was also necessary to replace the ZIF tuner chip U200 (CX24108-20ES).

**Michael Dranfield** SAT Ref: 39

## Fault index by model

- Accuphase p-300, amp
- Amstrad DRX100
- Beko 14272TD8 - 12.7 chassis
- Bush 2867NTX
- Bush 2868NTX - AK19 Chassis
- Bush model IDLCD26TV22HD chassis 17MB11 Vestel
- Bush model LCD26TV005 LCD chassis LM/Beko
- Bush model PDP42TV003 Plasma chassis P7 Beko
- Bush RP40TV Projection Set
- Bush WS6674 - PT92 Chassis
- DAEWOO Digital / Analogue CRT TV - Model DUB2850
- DAEWOO DYT 2200
- DM Tech model DML4117.
- Durabrand (ASDA) DCT 1481 DVD/Combi
- Ferguson model WF70401 chassis ICC20
- Goodmans GTV42P6. Plasma TV
- Goodmans model LD2655HD
- Hitachi C2119T
- Hitachi C2846TN
- Hitachi C28W440N - AK33 Chassis
- Hitachi C32W460N
- Hitachi model DVPF4E DVD/VCR
- JVC AV-28T5BR JW CHASSIS
- JVC AV-28WFTIEKS
- JVC AV21FIEK
- LG model RZ-23LZ20 LCD
- Maxim model 1154 LCD chassis CTV100/CINEX
- Pace 2600
- Pace DS430N
- Panasonic model DMP-E55EB DVDR
- Philips 42PW6006/25 (L01.1E chassis)
- Philips L01.1E chassis
- Philips model 32PW9527 chassis EM5E
- Phillips FL1.0 Chassis
- Samsung LE 19/26/32 R8 series
- Samsung model SP42W5EFX Projection
- Schneider STV2007T
- Sharp 66FW53H
- Sony model KD-28DX40 CRT - chassis FE2
- TOSHIBA 1480TB
- Toshiba 28W23B - Vestel 11AK37 chassis
- Toshiba 28W33B - AK 37 Chassis
- Toshiba model 20WLT56B chassis 17MB16 Vestel
- Toshiba model 40PW8DB Projection
- WHARFDALE 320S

# Long-distance television

by Keith Hamer & Garry Smith

**T**here was an impressive amount of DX-TV activity throughout February, which is unusual for the time of year. Tropospheric reception occurred at least twice during the month causing an influx of FM and TV signals from France and the Benelux countries. Sporadic-E was evident too, with a few minor openings taking place from the 8th.

## Reception round-up

The Sporadic-E log for February can be summarised as follows:-

08.02.08: Portugal (RTP-1) E3 (55.25MHz); Italy (RAI UNO) ChA (53.75MHz).

09.02.08: Moldova R2 (59.25MHz); Unidentified R1 (49.75MHz).

10.02.08: Portugal E3; Spain (TVE-1) E2 (48.25MHz); Unids E2 and E3.

In the Algarve, Hugh Cocks comments that Band I has been relatively quiet recently, but towards the end of the month there were two fluttery carriers on 53.76 MHz and another just below 53.74 MHz, suggesting the presence of Italian stations. The carriers, peaking at around 1900 UTC, have been too weak to provide images but listening to them, they sound rough and suggest an unusual type of propagation.

Cameroon has started to re-appear on Channel E2, due to T.E.P. (Trans-Equatorial Propagation). On the 29th, the station was visible between 1700 and 1830, peaking at 1745. Hugh has posted a film clip on YouTube of the reception.

T.E.P., which infiltrated Northern India the previous month, died down after February 5th. During the first few

days of February, Rana Roy reports fluttery, smeary pictures from a south-east Asian station, thought to be Thailand, and Vietnam on R1 which strangely appears to use a modified USA 525-line 60Hz standard with the vertical hold needing adjustment to steady the image. Signals have usually appeared between 1500 and 1730, local time. Chinese video was present on the 4th between 1600 and 1745. An interesting encounter on the 5th occurred at 1300 on R1 from the west when an analogue clock showing 0930 was seen. The clock featured a girl's face in the centre. Another clock, also with a 3½ hour time difference, was seen last January 25th and 31st with an identification, possibly E5807E, to the lower-left of the clock.

## Tropospheric enhancement

A build-up of high-pressure brought chaos to FM and TV broadcasts throughout the United Kingdom with total disruption in many locations caused by severe co-channel interference with multiplexes clashing with local analogue services reducing them to snow.

Here in Derby, Band III signals were romping in throughout the 18th with Belgium on E8 (RTBF-1/La Une) and E10 (VRT TV1/éen) appearing at high levels. Canal Plus (France) on L5 (176.00 MHz) was strong enough for the video to invert via a D-100 DX-TV converter thus producing a viewable picture.

At around 2300, Ketnet Canvas, the Belgian Flemish-language second network channel, had completely wiped out ITV1 (Yorkshire Television) from Belmont on E25 (Channel 25),

the offending transmitter being St. Pieters Lieuw. Just out of curiosity, various UHF channels were checked for DVB-T signals which are not normally present. Down on D22 (Channel 22) there was a healthy digital signal and a scan on this channel produced Belgian networks één and Kenet Canvas, albeit with picture break-up. A bottle of extra-strong bubbly (well, a can of lager) was cracked open to celebrate this historic event – a Continental DVB-T signal being received in Derby at long last!

Other digital signals were decoded from Sandy Heath and Tacolneston, the latter strong enough to watch the regional BBC-1 Look East news programme the following morning on D63 (Channel 63).

Danish signals were logged on the 9th by Cyril Willis in Kings Lynn. In Band III, these included DR-1 E7, E8 and E10 plus the second network at UHF on E25, E29, E32 and E39.

Danish DVB-T programme banners were received confirming the following services: DR-1, DR-2, STB Opdateringer, TV2 (Midt-Vest) and Tegnsprogstolkning. Cyril isn't sure of the actual channel as his Philips set-top box scans too quickly. During the evening of the 13th, DVB-T and DAB reception from Belgium was possible.

On the 17th, Denmark E5 (Sydvestjylland) was identified. On the same day, the Belgian VRT multiplex (MUX 1) was decoded on D40 with a repeat performance the following evening. In addition, Belgian analogue broadcasts in Band III and UHF were received at overload levels.

Conditions rapidly deteriorated and by the 21st the Belgian signals



Fig. 1

TV Oost, a Dutch regional service, received before the analogue network was switched off in December 2006

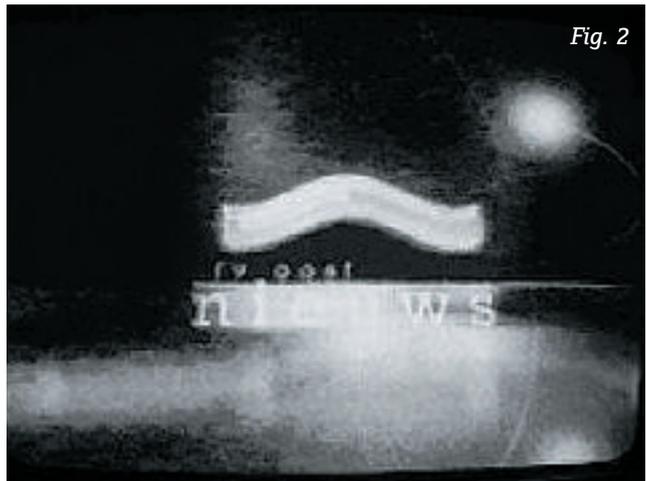


Fig. 2

The TV Oost news opening graphics captured in Bristol by Stephen Michie during a tropospheric lift



Fig. 3

A D-100 DX-TV converter inverts French video before it enters the TV receiver



Fig. 4

Teide TV (Tenerife) received on Channel E63 by Hugh Cocks in the Algarve

had dropped back to their usual noise-level.

At 1815 on the 19th, Chris Thatcher (Walsall) rang to say that the local 'Five' broadcasts from the nearby Lichfield mast were being completely overridden by those of Croydon.

Tom Crane (Hawkwell, Essex) and John Langley (Eastbourne) have both successfully decoded digital multiplexes from various countries including The Netherlands, Belgium, France and Germany. The main problem is reliable published information regarding channel allocations. Some frequency changes have taken place and so has the service line-up within each multiplex.

John also confirms that Calais TV, a French local analogue station on L58, is back on-air after disappearing last summer.

## Feedback!

Please send news, comments and any off-screen DX-TV photo's, particularly any unusual test cards and captions, to: **Garry Smith, 17 Collingham Gardens, Derby DE22 4FS.**

Our E-mail address is: [Television@dx-tv.fsnet.co.uk](mailto:Television@dx-tv.fsnet.co.uk)

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



Fig. 5

A Moroccan test pattern with Arabic script, received by Hugh in the Algarve via an elderly Sony receiver (Model TV8 301W) dating back to 1960

# Solutions to Test Case 534

*This is the solution to test case 534 detailed on page 13*

**T**he DVD playback problem, relatively trivial though it was in effect, was beginning to loom large! Surely the new Sony TV could not be faulty in any way? Surely it would not have to be lugged back to the workshop for testing? It was true to say that picture rendition in both composite and RGB was excellent, especially with a good disc (rather than the customer's somewhat fuzzy old movie transcriptions) and this gave Service Manager an idea. The next day he went personally to the house with a Burosch video calibration disc (Video Essentials

would have done as well) and in A-B tests, was able to demonstrate a relatively small increase in RGB-mode definition to the sceptical customer. The great detail and absence of cross-colour in the PAL picture was really a tribute to the excellent (digital) decoding and comb-filtering abilities of the Sony Bravia design!

How about the VCR sound problem? The little 14" combi, falsely accused as it turned out, has no dealings with hi-fi or stereo sound – it only has one small speaker. Thus its audio recordings are confined to the longitudinal (mono) tape-edge track.



Normally they are quite amenable to replay in any other machine, provided with an audio edge-track head for compatibility. In the school's JVC deck this head had a big blob of dirt on it! Cleaning that off solved the problem....

## NOTICE BOARD

Please email your notices to: [info@televisionmagazine.co.uk](mailto:info@televisionmagazine.co.uk)

### HELP WANTED

With jvc sp-pws9 subwoofer which has no audio o/p this amp is part of the DVD cinema system ths9. Could purchase a working amp. If one available.

**Please phone Brian Long  
01670 783192 or email  
hendersons190@  
btinternet.com**

### WANTED

Good video head drum for **Philips N1500/N1502**. Also wanted for the later version of **Philips N1502**, Tape Servo pcb U221, or at least the IC RV4136DB for that panel. Alternative devices do not work properly. A scrap machine would be good too.

**Colin McCormick, Plymouth, Devon.**  
[www.video99.co.uk](http://www.video99.co.uk)  
**colin@video99.co.uk (01752) 881652**

### DISPOSAL

Free to good home Brand new Thorn A51-161X new life CRT with scan coils, collect for free or pay for postage.

**Michael Dranfield - Digifix Ltd**  
**16 Terrace Road, Buxton,**  
**Derbyshire SK17-6DU.**  
**Tel: 01298-73989**  
[www.digifixltd.co.uk](http://www.digifixltd.co.uk)

### WANTED!

Can anyone supply me with a Panasonic Euro-8 Technical Guide? I've problems with a TX28DT30 IDTV. It forgets stations over 88. Teletext on 100 and analogue stations can be tuned in but are not stored. I suspect the X/V board as a software upgrade through the CI slot doesn't work. Any suggestions would also be welcomed.  
**Paul Hardy, Oxfordshire. T: 01844 354878**

# Dealing with EEPROMS

by Michael Dranfield

One of the biggest problems for the television engineer these days is deciding whether the fault is caused by a hardware or software issue, a TV with an east west fault could have the parabola wave form missing from the base of the east west driver transistor but this does not necessarily mean the jungle chip is faulty even if it is producing no output, all modern sets are now software controlled and the missing parabola waveform could very well be just due to bad data in the sets eeprom, when eeproms first started to appear in TV sets in the '80s they were used just to store the tuning data, but in modern sets the eeprom stores not just this but the whole set up of the TV, working with the micro controller it downloads start up routines at power up and just one bad byte of data can stop a TV from coming out of stand by. Eeproms are fairly reliable devices and rarely go faulty but they are very sensitive and things such as an EHT flashover or internal sparking in the degaussing thermistor can corrupt their internal data, I once had a Sony TV that would not come out of st/by and the problem was caused by the eeprom, however, after sorting this out the set ran for a while on test before the same thing happened, after many days on test I caught the set just before it crashed, a flashover in the tube, caused by a heater cathode short in the red gun was responsible for corrupting the eeprom.

So how do we decide if the fault you are trying to repair is hardware or software related? This is not a big problem with most Vestell produced sets as they will come on with the eeprom removed, so if your set is stuck in st/by and comes on when you remove the eeprom you have found

the fault, good old Vestell making fault finding easy, however, for the majority of sets remove the eeprom and the set will be stuck in st/by. As I said earlier the eeprom is unlikely to be faulty but could well be suffering from data corruption and may only need re-programming to cure the fault you are looking for, how is this done? Well you will need to invest in an eeprom programmer, these are available from about £50 upwards for a basic unit that will program most 8 pin serial eeproms that you come across in television sets, the one I have cost £480 but it does not just reprogram eeproms, using a variety of horrendously expensive adaptors I can program upwards of 3000 different devices, however, most television engineers will not require this type of power and a cheap programmer will be sufficient for most sets encountered, in fact I notice in last month's Television magazine a company called Lloyd Research advertising a serial eeprom programmer that looks like it would satisfy the requirements of most television engineers. My programmer, the one in the picture, is an excellent piece of kit and normally at this point I would give the manufactures a plug but the technical back up is nothing short of appalling so I am not going to mention the makers name.

With so many cheap sets coming on to the market these days an eeprom programmer is a very valuable piece of test equipment, for most supermarket TVs even getting simple spare parts is difficult let alone pre programmed eeproms so here's the trick, every time I get a set in the workshop and the fault has been repaired I will remove the eeprom and read out the contents, I then store this on my PC in a file called "TV eeproms" then in the event I need



Chip programmer

to reprogram an eeprom either to see if it cures some obscure fault or because it is faulty, the job can be done in seconds. There are a few points to note, however, some identical looking chassis can contain different micro/eeprom software versions so don't just assume that if you readout the contents of say an eeprom for a Hitachi C28WF560N it will be suitable for every C28WF560N you come across, another deciding factor is the CRT, the same set fitted with a Phillips tube will require different software to a set fitted with a Thompson tube, so my advice is read every EEPROM you come across even if you already have a file for that model. Due to circuit tolerances, in most cases you will still have to enter the service mode and make slight adjustments to geometry, tuner option codes and so on after reprogramming a set's eeprom from a known good file. Before making any changes to the eeprom data always read the old one first and store the contents on your PC, then if anything goes wrong you can simply write back the original contents to the eeprom.

To get you started please take a look at my website [www.digifixltd.co.uk](http://www.digifixltd.co.uk), from here you can download my current eeprom data base which currently extends to some 300 eeprom dumps in binary.



# TV collectors: a survival guide for wives and mothers

*This is a survival guide for the womenfolk of vintage TV collectors. It also applies in the most part to the loved ones of followers of other related hobbies. Dilys Taylor tells you ladies how to survive...*

**I**t's been brought to my attention that war has been declared on a number of TV Collectors by their insensitive womenfolk. Indeed, I hear that some have even been disowned by recalcitrant mothers, wives, partners and girlfriends, who steadfastly refuse to develop any kind of enthusiasm for mains droppers, line output transformers and the like. This is an



intolerable situation, not least because it casts a bad light on those of us who love our eccentric men. So if you're a TV Collector with a recalcitrant lady in your life, leave the magazine open on this page and hopefully she'll read what follows and mend her ways... Living with a TV Collector is a constant challenge. Anyone can make Moussaka a la Greque in a nice tidy kitchen; to make it on a table which

is already loaded with a stripped TV set; its parts and panels (all spread out and neatly labelled); bits that have blown up; bits that are going to blow up; valves; technical manuals; screwdrivers; soldering irons; and, of course, the four screws from the back, takes considerably more imagination. The only thing to do is to just get on with it; and if a few interesting metallic bits surface in the finished dish, the minerals in them will probably do your dinner guests more good than harm, and it'll also

be a great conversation starter, so DON'T WORRY!

Then there are the many and varied skills you'll have to acquire, because your man is too busy to do them for you: decorating; DIY; car maintenance; and gardening, to name but a few. It'll be up to YOU to undertake all these tasks and, in time, you'll become expert in them all. But think how impressive they'll look on your CV and, who knows, they might even open up previously undreamed of career opportunities.

Housework presents its own challenge, of course. Dusting and polishing more than a hundred vintage radios and fifty-odd TV sets can be a time consuming and, some might say, a time wasting exercise, but you can turn it to your advantage. Treat it as a labour of love – as a way of showing your TV Collector that you know he's mad but you love him anyway – and you'll gain his undying respect and admiration, and that will make you feel really good. And if you polish to music, it won't be a chore at all, but a pleasure. 'Test Card Classics' provide a particularly pleasant accompaniment.

A word of caution though; beware when doing the hoovering. Resistors, capacitors and all those other little fiddly bits, and vacuum cleaner motors, are not the happiest of bedfellows. But, the chances are that your man will be able to mend the Hoover if you do have a disaster, so once again, DON'T WORRY! By the way, you'll learn from experience which household products you'll need to keep a supply of at all times: air freshener is essential, so that when those bits that smell like rotten cabbage when they blow up finally explode, you can mask the smell; and copious amounts of disinfectant, for when he brings home the contents of a skip, are two obvious examples.

The real problem with TV Collectors, unlike train spotters or stamp collectors, is the vast amount of



space their obsession takes up. You are bound to reach a point when it becomes patently obvious that your current home is no longer large enough to house his hobby whilst engaging in even the most primitive of life

styles. There is only one solution: MOVE HOUSE, preferably to one which is so large it will take him years to fill it, and with lots of sheds, double garages, lofts, attics and similar out of the way areas, where he can indulge himself to his heart's content.

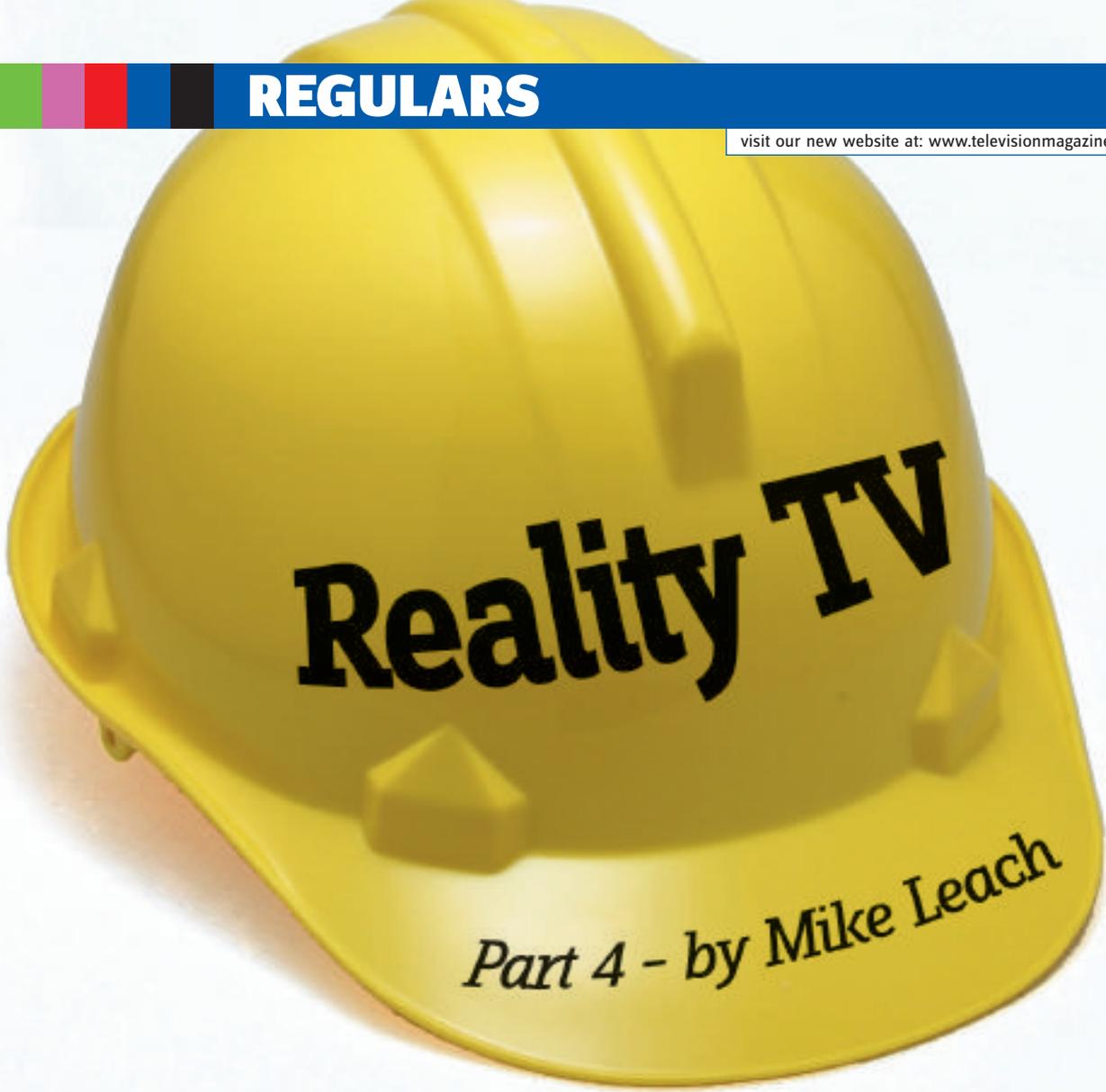
Despite your accomplishments in the DIY field, NEVER even consider trying to build an extension to your present home. This will almost certainly end up in your having to engage a builder to help you; and the ensuing temptations of having fit young men playing around with your brickwork and making all sorts of suggestions about your plumbing, will probably end in tears, so don't even think about it!

One of the more positive benefits of living with a TV Collector is the prospect of travel, as you join him at swap-meets and auctions, or accompany him on collection/delivery runs all over the country. So far, I've been to Birmingham, Harpenden, Bristol, Huddersfield, Leeds, Doncaster, Bedford, Swindon and Accrington. Criccieth in North Wales was a delight; but why don't people



in Torquay or Brighton or the Lake District ever have TV sets worth having? In my opinion, people in NICE places should be encouraged to join in the TV swapping business, so that we ladies can have some really good trips!

Finally, one thing to understand and to hold on to about 'TV Collecting Man' is that, in pursuing his hobby, he demonstrates that he possesses the most noble qualities; tenderness, devotion, gentleness, courage, determination, steadfastness, loyalty, consideration and thoughtfulness. Admire his patience as he caresses a TV set to coax it into working for him; share his concern for the set that is sick; listen as he talks to it as if it were an old and trusted friend; and as you watch him lavishing all this love on what, to you, is just a heap of scratched bakelite and dusty old scrap metal, don't fight him – accept that this is not just a hobby; it's a sacred trust; share in the pleasures and the success; sympathise with the problems; and soon you'll discover that deep-down, in his eyes, YOU are the most beautiful set of all!



# Reality TV

*Part 4 - by Mike Leach*

**M**y first taste of solo field service came as a rude awakening during the late 1970s when, as a budding engineer in my late teens, I was given a line output transformer for a Pye 569 series chassis and I was booted out of a Ford Escort estate, armed with only a Weller soldering gun, solder pump and a screwdriver. As I was picking myself up off the pavement a reel of “barbed wire gauge” solder came hurtling through the car window and almost knocked me out!

“I’ll be back in ten minutes,” shouted Big Ron from behind the steering wheel. “I’m just round the corner – I think it’ll only be a mains filter cap so I won’t need the iron!”

Let me just take a minute to explain this situation: I was an

apprentice with a large national firm and I used to go out with the field engineers if they required help with a big set. They had seen me changing transformers on the bench and knew my capabilities. Having an extra pair of worthwhile hands while they were doing their daily calls must have seemed like pennies from heaven. Eventually one of them decided to take the plunge and throw me in at the deep end!

I picked myself up and then bent down to retrieve the solder. As I did so, something whistled past my ear.

“You might need this as well,” I looked up and saw the puthering Escort was already ten yards up the road. A 27k 2W resistor had landed on a drain cover behind me. I picked it up and made my way to the address which was scribbled in pencil

on the corrugated cardboard packing around the transformer.

I looked up at the number on the back gate of the property. It read “91” but my address should have been 61! Next doors’ gate read 59 and the other side was 63. I took a closer look at the numbers on the gate and soon realised that a couple of the screws which held the plastic numbers in place had gone amiss, leaving both numbers upside down!

I opened the gate and fought my way through the lines of sweet smelling newly washed towels (must have been OMO I suppose) and tripped over several odd pram wheels scattered about the garden.

The customer led me through the kitchen and into the lounge where the TV was situated. The back cover was perched on the end of the glass

coffee table and the chassis was swung down, in readiness for the new transformer. There were several cigarette butts laying in the bottom of the TV cabinet with the usual tell tale burn marks in the wood just next to them. Typical Ron! In the corner of the cabinet was an expired PCL85 valve showing the obvious signs of exhaustion: a white top! I had to crouch rather than kneel as the carpet was sticky.

I fitted the transformer and checked the picture width on the test card on BBC2, replaced the back cover and did battle with all the nik-naks and ornaments that used to adorn TV cabinets years ago. I swung the set round and back into the corner taking care not to trip over the books and shoes that had fallen off the metal magazine rack which formed part of the stand. I made my way back out and onto the road to meet up with Big Ron again.

### The here and now

Last week I went out on a call. My customer called me out to rectify her projection TV which had faltered shortly out of guarantee. The back gate had a bell ring push button next to it and the house number was nicely etched into a slice of varnished tree bark in the very centre of the gate.

There was no washing – not even a washing line. A small landscaped area had replaced the grassy terrain of the 1970's and a low flung gazebo was right where I would have tripped over the pram wheels thirty years ago. I banged my head on it as I crouched to walk through. Well it's not as painful as a reel of solder!

"Come through," shouted my attractive host from the kitchen. "The TV is through there but you'll have to be careful of the....." At that point my feet were swept from under me as I slipped on the highly polished, newly laid wooded floor. No sticky carpet to deal with this time!

The set was a 42" rear projection Samsung which had displayed poor colour convergence a few weeks after the five year guarantee had expired. A couple of STK-392 convergence ICs and some 3.9Ω safety resistors put matters right. Taking care not to scratch the floor with the supermarket trolley type castors fitted to the set, I cleared up and she asked for the bill.

"Call out, parts and labour come to eighty five pounds please," I said, taking care to string out the sentence.

"How much?" Here we go again!

### So what's new?

Well not much really. Certainly the on site hazards have changed a little. We still need to wear hard hats for some of the more dangerous households and we always know when to accept the offer of tea and coffee. Well up to a point we do. I was once given a mug of tea from a very well to do lady but the mug had egg yolk around the rim. The rubber plant benefitted greatly from that visit!

The biggest change has come with the advent of flat panel TVs. A good friend of mine runs a largish servicing company and every effort is made to equip field engineers with laptops for software upgrades.

The problem arises when a big set has to come into the workshop for attention. An engineer will go out initially and if he can't fix the set he will book it for a two man pick up. The set gets fixed (possibly!) in the workshop and then two people have to take it back. This in itself is a big strain on a company's resources as the fixing of the set has effectively been four jobs. One for the field engineer, one for the two man pick up, one for the bench engineer and one for the guys who return it to the customer. All of this has to be paid for out of the profit from one job. And we're all aware of how little we get paid via the manufacturers' claim

back system to cover these costs. Once upon a time an engineer could pick up a 26" wooden cabinet TV and take it to the workshop himself. Not anymore.

It's even more difficult for the small servicing outlet like myself. Anything over the size of a 37" flat panel and I'm stuffed. Too big. Then of course there's the problem of back cover removal. Why do manufacturers of flat panel TV's insist on making them so as you can't take the back off without first laying the set down and removing the stand? With the exception of some manufacturers, this is one of the things that really annoys all engineers. With just a hint of common sense on the part of the designers, these problems could be avoided and the sets could be serviced by one person as opposed to two. That's providing you can get the spares and the customer agrees the estimate.

### So where's the money?

Last month I promised to find ways to make all of us down trodden, under paid "repair executives" lots of money. Well sorry but I'm not the Chancellor – just a small self-employed teccy trying to earn a crust and keep up with whatever is going on in our trade. I would like to think that my thoughts and comments over these past few months have generated a bit of debate, especially in the tea rooms and canteens of the manufacturers where the stroke of a pen can make a huge financial difference in terms of gains for them, and even more losses for us!

The phone just rang. Some bloke with a 42" plasma of unknown make that goes off after four hours. Would someone pass me a pint of that Watneys please?.....if there's any left!

# The race for television

*The 3rd and final part of Tony Thompson's TV history*

**T**hey then announced in a letter to the Postmaster General that they were ready to provide a programme of 180-line television to serve the greater London area. After consideration of the systems on offer and the future possibilities, the committee decided that high definition transmissions should replace the 30-line system as soon as practicable and that an advisory committee be set up to guide the development of such a public service, which should be the responsibility of the BBC.

The 'new' committee, known as the Television Advisory committee, held their first meeting in February 1935. It consisted of exactly the same members as the original committee with only one addition! At least some of the members were keen to close down Baird's 30-line system but the Postmaster General was loathe to do so for fear of a public outcry (it had an estimated audience of between 8000-15,000, in most regions of Britain and parts of continental Europe) so it was that due to political expedience rather than perceived merit that the Baird low-definition transmissions were continued, although reduced in air time, into 1935. By then, after delays due mainly to limitations of facilities rather than the actual equipment, Baird had succeeded with experimental transmissions from the BBC's Broadcasting House, using both 120-line and 180-line spotlight systems and finally he brought his 240 line high definition system into experimental use. A high definition television service was planned for London. Baird now realised that he had a fearsome competitor in the

form of the mighty Marconi-EMI group and from this time on, the two high definition systems ran diverging paths; as Baird struggled effectively alone, Marconi-EMI profited from the ample funds and the superb talent within their ranks.

By the time Baird finally had accepted that the cathode ray tube was the most satisfactory method of display, EMI, an organisation much more secretive than the always ostentatious and self-publicising Baird, were far advanced with both camera and receiver display technology; by 1932, their laboratory experiments with electronic image 'pick-up' tubes had produced promising enough images to prompt an early decision to abandon mechanical scanning systems.

## Shoenberg's 'Emitron' camera

Gradual improvements led to the development of the Emitron camera as early as 1934, heralding the arrival of all-electronic television. The following year, EMI's Sir Isaac Schoenberg<sup>5</sup> chose 405 lines to be his high definition standard; a daring leap of faith as at the time, no receiver was available that could handle the bandwidth requirements. In fact he considered it unimportant that early pictures lacked a certain amount of definition as it allowed 'headroom' for later developments that he was convinced would happen. Naturally, not everyone agreed; to accommodate the difference between the 240 line standard and the 405 line standard required a large increase in transmitter bandwidth and added considerably to what was already a difficult task and caused problems such as ghosting and echoes due to mismatching.

In late 1936 the EMI system was run in tandem with the Baird 240 line system in tests from Alexandra Palace. EMI used their new Emitron camera and Baird operated with his 'electron camera', an image dissector camera obtained from the American inventor Philo Farnsworth, together with a flying spot camera and an intermediate film processing system. Cathode ray tubes were used for receiver display. These were copies under licence of Farnsworth's magnetically focussed CRTs, providing a 15" square screen.

Baird lost the unequal struggle. In 1937, the Marconi-EMI 405 line system was adopted as the standard television system for Britain and remained so for many years, eventually operating together with the 625 line system of the 1960s, received via 'dual standard' receivers. Even the earliest colour receivers were capable of displaying the venerable 405 line pictures, a testament if one be needed to the far-sightedness and engineering skill of its creators.

## An epitaph needed

June 1946; in a letter to The Times, a reader stated that 'one is struck by the fact that Baird's almost life-long devotion [to television] seems to have gone unrecognised as far as the conferment of any honour is concerned.' Baird never was so honoured; despite his labour, his tireless creativity and his flair for publicity he could never hope to match the enormous resources and brilliant scientific team of the Marconi-EMI consortium backed by support from the mighty American RCA conglomerate. Thus it was that having 'invented' television, having

been (arguably) the first in the world to show television pictures, stereoscopic television pictures, colour television pictures, demonstrate a large screen 600 line colour television system as early as 1940 and even invent a colour CRT – the ‘Telechrome’ – described by RCA in their patent for the shadowmask CRT as ‘prior art’, John Logie Baird died in semi-anonymity on June 14th 1946 at the early age of 58. The obituary in the Times recognised his claim to be ‘the father of television’ but tempered the praise by describing the triumph of the EMI system in 1937, an event that effectively cancelled everything Baird had striven for throughout his life.

What should we make of Baird? Has he been unfairly ignored, or was he simply an enthusiastic and creative inventor with a flair for self-publicity? He himself stated in the early 1930s that there was no future in the development of television using the cathode ray tube. So convinced was he that mechanical television could and would be brought to a high degree of practicality, of picture quality, that he chose to ignore the warning signs that were there for others to see. The inevitable result was that, for all his brilliance, his inventive mind led him in the wrong direction. Still, despite the fact that nothing Baird invented is to be found in the television systems of today, most British people, when asked ‘Who invented television?’ would answer ‘John Logie Baird.’

## Conclusion

With such a complex story, the author has moved through the times of the early 20th century in a somewhat cavalier fashion, the better to unravel the many strands of human endeavour that resulted in the creation of television. I hope this has helped and not annoyed the reader. This has perforce been a brief outline of the development of television, mainly concentrating on British achievements. In doing so the author

is aware that many experimenters and scientists the world over concurrently developed viable television systems, often working alone and isolated from advances made in other countries; apologies to all those omitted from mention due to brevity. The development of television is a fascinating subject and further research would surely reward the interested reader for the time spent.

## Notes

*Throughout this article the term ‘television’ has been used because of its universal familiarity. Baird referred to his 30-line scanner as a ‘televisor’. Viewers were once called ‘lookers-in’, presumably as a parallel to the radio ‘listeners-in’ term.*

*Becquerel had apparently already discovered the main properties of Selenium many years previously, prompting the question: why would rediscovery be needed? For this reason, I consider the story about the telegraph operator’s discovery of them to be of doubtful origin. At best, he might be said to have ‘rediscovered’ them.*

*Mullard Ltd, in their film (see below), consider Paul Nipkow to be Polish by birth, despite the fact that he was born in Lauenburg, a town now in Schleswig-Holstein, Germany but at the time of Nipkow’s birth, Pomerania, part of which was Polish. Take your pick!*

*1. Alan Archibald Campbell Swinton, FRS (1863–1930). Scots by birth, Campbell Swinton remained an eminent figure in British scientific circles throughout his life. In a letter written in response to an article about television by Shelford Bidwell in the June 4, 1908 issue of Nature, he said that ‘It was recognised that ‘The final, insurmountable problems with any form of mechanical scanning were the limited number of scans per second, which produced a flickering image, and the relatively large size of each hole in the disk, which resulted in poor resolution’. In other words, he had noted the blind alley into which the pursuit of mechanical scanning methods must eventually lead the experimenter. He repeated this warning after Baird showed his 30-line system to the public. Campbell Swinton’s own all-electronic theoretical system proposed the use of a cathode-ray pick-up tube as a camera with the image focussed onto an internal mosaic photo-electric screen, the back of which would be scanned by a beam of electrons. The*

*varying current from the photocell mosaic would then modulate the beam of a display tube in synchronism with the cameras scanning signal. Close, in fact, to the Farnsworth Image Dissector and even closer to the successful Emitron camera of the 1930s.*

*2. The orthicon and image-orthicon camera tubes were developments of the original iconoscope. The improved sensitivity meant that lower light levels were needed together with a simpler practical operation.*

*3. The actual date of this visit seems to be in some doubt: some sources give the Von Ardenne demonstration as 1931.*

*4. The principle of the CRT type flying spot scanner is in theory straightforward: a bright CRT is set up to operate with a raster of scanning lines (for example 405). This raster is focussed onto the film being scanned. After the light passes through the varying density of the monochrome image on the translucent film it is detected as a modulated electrical signal by means of a photomultiplier tube. This vision signal can then be processed to drive a display CRT.*

*5. Sir Isaac Shoenberg is credited as being the principal creator of the first high-definition television system, which was used by the British Broadcasting Corporation (BBC) for the world’s first public high-definition telecast (from London, 1936). In fact, inventive as he was, Schoenberg was more than ably assisted by a superb team of scientists, of whom perhaps the most well known was the brilliant though tragically short-lived Alan Dower Blumlein.*

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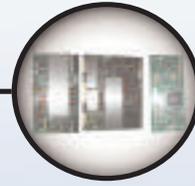
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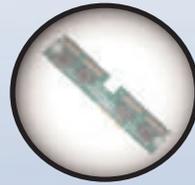
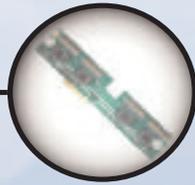


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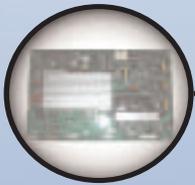
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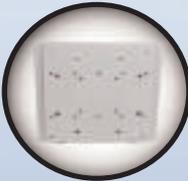
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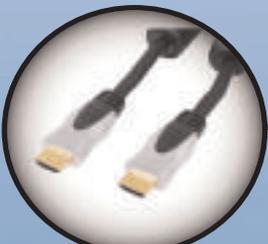
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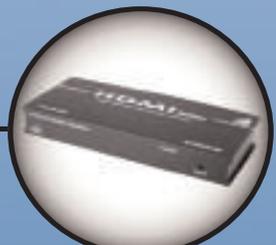
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## Grandata has moved !!

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# Digital Television brings its opportunities

*The advance of digital television is unstoppable and so it should be. The variation in picture quality many viewers have endured is about to come to an end. Experience shows that even in the most expensive hotels and apartment blocks picture quality has been seen as absolutely dreadful! That is not to say well installed analogue signal receiving set up will be inferior to a television image derived from a digital television (DTT), the fact is digital quality is consistent*

One of the main advantages to digital over analogue is that **stable picture images** can only be decoded from a stable quality digital signal, that is to say if the signal quality is poor the viewer will suffer a blue screen or annoying picture break up. Which introduces another benefit, there is only one picture quality produced from digital television receivers and that is 'good'. There are no longer the snowy pictures as with poor analogue reception, with digital you either get it or you don't.

There are many developments in

**high definition (HD)** broadcasting and are now available from DTT and satellite TV (DVB-S2) providers, this is a separate issue and one we will address elsewhere.

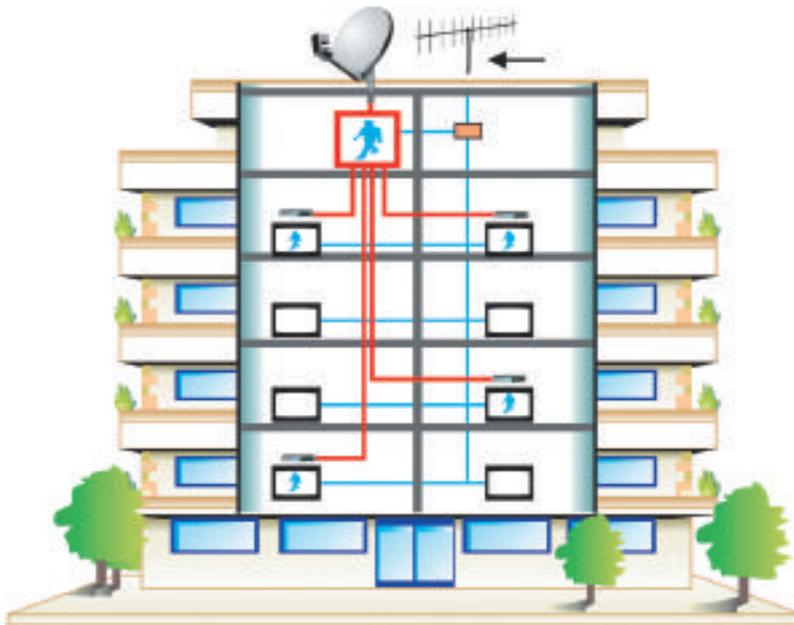
The purpose of these notes is to show ways where the viewer, installer and the owner of the premises can benefit from the new **COFDM technology** now developed by **PROMAX**. We suggest the days of trying to watch 'absolutely dreadful' television pictures are numbered!

Having satisfied that need broadcasters and digital television manufacturers then identified their need for an agile VHF / UHF

COFDM test signal generator. This brought about the **MO-170 Agile Modulator**, which serves the need for both COFDM multiplex test generator and as a high quality modulator.

By adding into the product range an **audio and video encoder**, the **IC-065**, we could then create a COFDM signal to mimic the DDT transmissions of BBC, NTL and other broadcasters.

These modulators are now to be found in many applications such as testing 'Freeview' boxes and iDTV (**integrated Digital Television**) sets where the addition of a calibrated



*In an apartment block, hotel, conference centre or similar, the advantages of COFDM signal distribution can be of real value*

noise source, controlled levels of error injection and controllable calibrated output level makes these ideal for Test Houses and Quality Assurance departments to ensure digital receiver quality and performance.

The MO-170 and IC-065 can also be found as the heart of digital signal distribution systems within many hotels, conference centres, cruise liners plus countless other applications.

With the unique knowledge and ability to produce COFDM equipment there appeared other spin off applications. For instance where a hotel feels the need to offer many TV channels yet are unwilling to pay subscription charges to service providers, we have introduced the MO-162/163 series of QPSK (satellite TV signals) to COFDM transmodulators. The installer can cherry pick 'free to air' television programmes from an incoming satellite transponder and produce a COFDM DTT signal.

The system allows a minimum of four television programmes to be

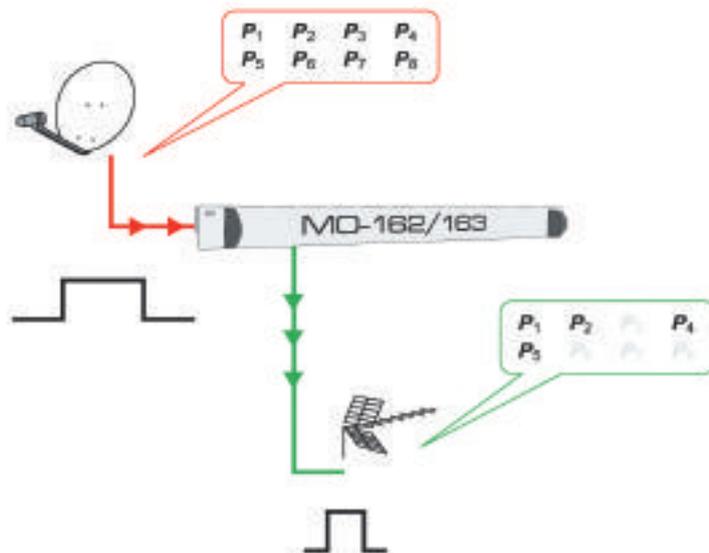
distributed with a broadcast quality or up to double depending on the original resolution of the satellite channels. The hotel may wish to have its own television channel to publicise a special service being offered to their clients.

The installer can if required add this signal to incoming 'off air' DDT signals just like any other signal. All the viewer requires is a "Freeview"

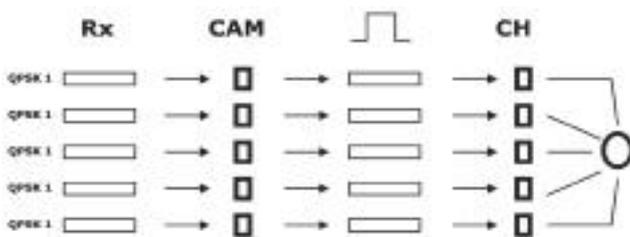


*Manufacturers of iDTV sets can now create DTT signals of high quality anywhere in the world*

box or iDTV set to enjoy high quality pictures where selection of the programme is via the standard remote control. This system dispenses with the need to distribute analogue television channels giving more spectrum space for other applications.



*The MO-162 series creates a DTT signal from QPSK satellite transponders*



The built in CAM decodes the incoming satellite digital signal



The ET-850 Universal Digital TV Receiver Trainer, ideal for teaching practical and theory



The "TV Explorer II+" captures the essential measurements associated with QPSK, QAM and COFDM signal applications



Digital Television is entering everyday in life

There are many situations where the customer demand programmes from several transponders or even different satellite television platforms. When the signals come from an encrypted source, you can use a satellite receiver with ASI output and a CAM interface to drive the MO-160 / MO-161 modulators. The signal can then be combined with channels from adjacent modules to produce a standard COFDM DTT plan of channels.

This signal like as with the MO-162 / MO-163 applications can then be distributed throughout the building to be received and decoded by a standard "Freeview" box or iDTV set. We think for the first time the installer can now at a reasonable cost, access encrypted QPSK signals, decode them and produce a COFDM DTT signal with all the benefits of a consistent picture quality and performance.

The successful implementation of these exciting opportunities and the exploitation of the benefits of DTT and DVB-S and S2 does depend on

the skill of the installer. However, more important is his use and understanding of the right signal analyser, for unless he can measure accurately all the parameters of the digital signal he will most likely face a series of "blue screens or picture break up".

The "TV Explorers" were launched and became an immediate success story. This was no lucky accident, for the design of this ground breaking analyser was developed in parallel with our modulators and our intimate knowledge of all things related to the latest COFDM, QAM and QPSK transmission technology.

With the introduction and wider application of QPSK, QAM and COFDM signals there is a need for the educational establishments as well as television set manufacturers and the like to offer technical training.

As part of the **Education Equipment** product range **PROMAX** is now supplying Universal Digital TV Receiver Trainers, Model ET-850 and Flat Screen Television Trainer,

Model ET-892. These packages include manuals both tutor and student plus all the software and hardware for them to really understand these new important technologies.

All these applications and equipment are helping the television manufacturing, broadcasting and installation industries to speed up the transition from analogue to digital television. We have faced with them many advanced technological challenges and for as much as we believe in the future, we feel confident we are offering equipment now that will stand the test of time.



*The advance of digital technology is rapid and already we are all benefiting from the implementation of the technology in the field of television and COFDM signal distribution. The opportunities are here to stay.*

*[don.stoddart@promaxelectronics.co.uk](mailto:don.stoddart@promaxelectronics.co.uk)  
[www.promaxelectronics.co.uk](http://www.promaxelectronics.co.uk)*

# Pipped at the post!

*Donald Bullock tells the story of a superior audio recording system that lost its way*

**E**very week, on the BBC Light Programme, Desmond Carrington presents a programme of gramophone records of the past. Some of them sound their age, but for many with memories of the past, their melodies are golden, and thanks to recent technical advances they no longer suffer from the pops and clicks of their time.

I have to confess a long felt bitter-sweet conviction in this connection, one that's prompted, I suppose, by the cruel laws of 'inverse proportion'. It seems to me that as recording techniques have improved over the years to their present excellence, the talents of most of the 'artists' who today mince into the recording studios have sadly declined. The same thing applies to cinema films to a phenomenal extent. If you want to see charismatic actors whose speech can be understood, led by talented directors using brilliant photography, awe-inspiring lighting and worthwhile stories or comedy, you have to hasten to the past. Today's films, most of which are tasteless and many of which are repugnant to normal people, are mostly made on cheap, undersized stock and seem unedited and unthought-out to me. They often look as though they were taken by an itinerant drunk pointing his cheap and steamed-up camera at an assortment of wine-soakers on a foggy day...

## Django Reinhardt

But some worthwhile popular music can still be heard. Desmond

Carrington, in his Radio 2 programme the other week, announced as 'something special' an early-'Thirties record of a long-dead, illiterate yet self-taught Belgian gypsy guitarist, banjoist and violinist called Django Reinhardt. I turned the volume down a bit, expecting a session of audio distortion and waterfall-track noises.

But I soon turned it up again, for the rendering of the jazz melody, which in itself was a lifting tonic, was clean and sparkling, scarcely short of the most vivid of high-fidelity. Carrington afterwards sang out the reason, explaining that he had just given an airing of an early experimental studio recording made by means of a unique system that once held the promise of a hitherto undreamed quality for its time, yet was destined to come to nothing. It struck a chord with me, for I'd recognised the system's characteristics.

The unique orchestral rendering, of course, with its exceptionally wide frequency range, its richness of harmonic frequencies and its extreme decibel excursions, was chosen purposely by the technicians to present an extremely demanding test of the recording system under trial. It passed memorably.

The system was known – and is remembered today by enthusiasts, as the Philips-Miller method, a process that used no discs or any system then known or since resorted to. Its creation owed its spirited and highly noteworthy life to the technical aspirations, in 1931, of an enthusiast called Mr J A Miller, whose over-

riding quest was that of higher quality sound recording, and who experimented in his shed at his hometown, a tiny neighbourhood called Flushing, in New York.

Miller knew and fully understood the (then) recently abandoned techniques used in the production of the earlier phonograph cylinder recordings, and of those currently being used to produce the widely popular shellac '78' gramophone records which had superseded them. He was highly conversant with the new Talkie Movies, too, with their totally different recording method. They used the then novel photo-optical system to capture their sound, and he respected its ingenuity; but he found himself unimpressed by the limitations inherent in both systems, and was disappointed with the quality they yielded.

It is easy to imagine this artistic yet pragmatic man, sitting and sifting their competing features and carefully weighing the 'movie film' system's advantages and disadvantages against those of the shellac gramophone records of the day. And the more he thought about it, the more he aspired to the discovery of an alternative, better system.

## Far reaching ideals

An essentially practical man, Miller accepted that any system he managed to come up with might fall well short of his far-reaching ideals, but he saw no harm in aiming high, even though it courted the likelihood of his stubbing his toe on the moon.

Ideally, he mused, a sound

recording system should be capable of producing, as closely as possible, all of the sound frequencies that had been heard in the live sound; and of reproducing their entire frequency range at a volume consistent with the original, that is, with a negligible decibel 'falling off' at its extreme frequencies. This would render the sound more realistic, for all natural sounds of a given basic frequency are laced with additional harmonic overtones of lower amplitude but of a wider frequency spectrum that imparts their character, lustre and clarity.

He mused further... Any extraneous noise produced within the processing and heard with the recorded sound should be as quiet and unobtrusive as possible.

All audio recording systems then known depended upon the sound disturbances, or modulations being applied to a travelling medium, and nobody, at that time, could envisage a viable alternative to this. The travelling movement of the medium, he knew, should be as linear and as free of random variations as possible.

To guard against the introduction of phase distortion, heard as the 'blurring' of the sound image, the modulation-dispenser should at all times remain at a precisely fixed angle to the travelling medium; and this, he considered, would be best served by a definite right-angle. The ideal system should require a minimum of complex or time-consuming processing before the recorded sound could be played back, and it should be both recoverable more than once and be easily edited. And if it could be conveniently stored and was easily portable as well, this would be an important bonus.

### Movie soundtrack features

At first sight, the new movie sound system of the day seemed appealing for its ability to record for very much longer periods than those allowed by

the commercial gramophone records of the day. He went on to consider the other aspects of the movie sound system.

Their photo-optical sound tracks were integrated into their emulsions, which presented important factors to take into account. One was their currently variable background noise-level, and another was the inconsistency of the sound quality along their length. Both were related in one respect, this being the structure of the film's 'grain'.

'Grain' is a photographic term which refers to the size of the suspended chemical specks that, suspended in gelatine, compose a film's emulsion. Generally speaking, the 'faster' a film (that is, the less light it needed to register a picture), the more predominant was its grain.

Other factors too affected the grain size. One was the extent of the chemical development which made its latent image visible. The longer, or more forceful its development; the greater would be its grain size. Apart from the obvious effect of this upon the picture, it adversely affected the recorded sound photographed into it, for early emulsions were thickly coated and the sound could only be recovered by their efficient penetration by their reading light sources.

A grainy film would present a constant and intrusive 'white noise', or background disturbance, and also limit the potential of its audio frequency response. And whilst this might be unnoticed or easily tolerated in a movie film, as part of the sum of the overall picture, sound and story content, it was unlikely to be acceptable when used solely for a sound recording.

### Film stock problems...

Further, whatever the extent of the processing care, no constant was attainable. Film supplied to the studios came in relatively short

lengths, and the grain of any given strip was liable to variation, so presenting unpredictable uncertainties.

It has to be remembered that these were early days. Not so very long before, photographers used to make their own film stock by coating celluloid with their 'home-made' emulsions. Whilst those days had largely passed, the manufacture of film stock was a new and continuously-developing process, comparatively uncertain and unscientific as yet. Even continuously produced batches of film from the same factory could vary widely in emulsion thickness, grain, sensitivity and contrast, so presenting both sound and vision problems aplenty to early movie-film makers.

### Birth of a legend - 1

A further general consideration was that the 'speed' of the film was tied into its contrast ratio and, inter-alia its grain size. The type of film selected for various shots could noticeably change its grain structure. A film consisted of both dull and bright 'takes'. A close-up of a face could be softened (for, say, a pretty girl) or hardened (for a reprobate thug) by the 'speed' of the film used, and these considerations, together with various uncontrolled (usually outdoor) lighting conditions in the film's making, encouraged the use of varying 'speeds' of film, all of which affected the ongoing grain size.

One incidental result of these problems was the creation of the 'Hollywood' legend. Hollywood, as a film-making location, wasn't selected for the draw of its name in a distant and unthought-of future, it was favoured because it was an isolated and elevated location of clear and unpolluted light in an area of stable weather conditions, and slow film emulsions. Only because it became a natural draw to those who were sinking their money into film

productions was it destined to become an incidentally-created legend in its own right.

A measure of the film problems of the day lies in the fact that a consortium of leading film studios, wearied by the necessity of their having to make continuous test-films from every twenty-yard batch of fresh stock, commissioned the expensive services of the eminent Oscar Barnack, a skilful, dedicated and highly regarded German precision engineer associated with Ernst Leitz, the foremost optical company in the world. Their brief was for him to design a 35mm 'still' camera of the ultimate precision and perfection for the testing and precise evaluation of the film-stock batches that they bought.

### **Birth of a legend - 2**

It might as well be noted here that as a by-product of the studios' brief, the camera that Barnack designed proved

to be the birth of a further legend. A wonder of sophisticated perfection at the time (and still revered today), it fully satisfied their needs, for with its compact, precision-engineered and remarkably advanced features, together with its astonishing ultra-high-quality high-resolution lens, it afforded them the perfect means of evaluating every aspect of their successive film batches.

It became the first Leica, a name still highly regarded today as the pinnacle of perfection in the camera industry. It rapidly became the byword for the ultimate in 35mm camera design and quality workmanship, so spawning a world-wide demand for a succession of further Leica models, and so enriching the Ernst Leitz Company beyond its wildest dreams. And if I might, at this point, add a personal observation, it is that I used a Leica professionally for years when young, and still marvel at the sense of

wellbeing that it brought to my assignments.

### **Miller's conclusions**

After substantial examination of the two available systems, and considerable thought, Miller concluded (in the light of the then available technology) that neither, even if modified, offered the capability of even nearing his criteria. Each had unacceptable advantages and disadvantages, and in his determination to formulate his own improved recording and reproduction method, he settled to the listing, in turn and in depth, their individual qualities. And he came to some interesting and far-reaching conclusions, with which we'll continue next month.

*Donald Bullock's analysis of the sound recording scene of the 'Thirties and 'Forties continues next month. \**

(\* If the editor so desires....)

## **The new 2007 Television Index/Directory on CD-ROM will be available soon**

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# Day in the life

by Peter Dolman



**F**or some folk, a quarter of a century may seem an eternity, but for those working in this trade it passes in the twinkling of an eye. Even the legendary James T. Kirk, aided by the able Spock and Scotty would be hard pressed to chart the time shifts that apply to our industry; one that moves at warp speed in some ways, yet paradoxically remains pretty much stationary in others. Fascinating.

Take the other day for example. I was lost in thought, toying with a cunning alternative to replacing the painter IC in an A10, when Dear Heart sidled up distractingly, waving a newspaper at me. “Bet you a cuppa you can’t guess the record time for a boomerang to return?” she smirked with a superior air. With some effort, I transferred my limited intellect

from the ins and outs of the Philips muting circuit in front of me to the topic of antipodean physics. Even though the glint in her eye told me I had no chance, I did my best; after all the stakes were high. “Er, about half a minute?” I responded hopefully. “Wrong! Listen to this: ‘Brisbane, Australia – boomerangs really do come back – even after 25 years’”. She paused for effect. “Well, don’t you want to know how? It says here: ‘Officials in an Australian outback town were surprised when a boomerang arrived in the mail, along with a note from a guilt-ridden American who admitted stealing it years earlier from a museum. ‘I removed this back in 1983 when I was younger and dumber’, read the note, ‘It was the wrong thing to do, and I’m sorry’. Quarter of a century! Knew you

wouldn’t get it. Coffee for me”.

As the kettle heated, I reflected on the way some familiar products have evolved since that boomerang began its 21,000 mile round trip; the mixes of old and new technologies and how time flies when you’re trying to have fun in this job. 1983 was the year that the Philips/Sony compact disc format was officially launched in the UK. The new medium had pulled together PCM audio, the laser, digital error correction and optical disc technologies for the first time, producing a full 20Hz –20kHz audio spectrum (unlike the ubiquitous I-Pod, with its resort to psychoacoustic fiddle factor and bandwidth limiting). My recollections of struggling through one of the first gruelling two-day CD courses, presented by Ferguson in London, reminded me just how hard it is to

find real technical information – and educators – nowadays. Then there was the day when we shut up shop to attend a memorable IEE technical seminar hosted by several audio manufacturers, all enthusing on the virtues of their latest toy. Amongst them was Huntington-based audio manufacturer Boothroyd Stuart, whose Meridian brand was, and still is, second to none. Never one to toe the line, Bob Stuart, the company's technical manager introduced his lecture as the 'wild card' of the event...and in his quiet and reasoned manner, boldly went where no manufacturer had gone before, questioning the whole premise that CD and high fidelity were inseparable. You could have heard a pin drop – his words were tantamount to heresy! It turned out that his company had identified a form of digital distortion known as 'jitter', which abounded in many CD player designs of the day (and still does today if left unchecked). The effect arose from sampling errors brought about by reference clock instability and through careful design techniques the problem was dramatically reduced in the hand made Meridian products that he spoke to us about.

Padding back into the workshop, tray in hand, I spotted my companion gazing inquisitively into a pricey Audio Note AN-CD1 CD player which refused to spin up on rare occasions and had been clogging up the audio bench for a couple of days as a result. "Mind you don't burn yourself," I called, spotting her fingers reaching toward the rear right hand corner of the machine. "That's a sub miniature valve you've almost got your grippers on!" Seeing her look of disbelief, I tried to explain a bit about the wacky world of high-end audio. "This particular British manufacturer feels that we're losing something in the headlong rush for all things digital and solid state, so

their designs try to make the most of analogue processing and valve technologies". Unconvinced, she peered suspiciously, first at me, then at it, in equal measure. "See, you've got a fairly normal looking Sony based transport mech, some solid state servos and digital processing, a bit of basic 16 bit D-A conversion, apparently without oversampling, topped off by that hot little valved line-level drive stage. As I understand it, they've also applied their minimalist approach to the subject of low pass output filtering – if so it may well deliver some sonic products which a modern solid state amplifier, say like the Yamaha DSP-AZ9 with its 100kHz bandwidth, would drive right through to the speaker terminals! Nasty. Then again, how often do we come across valved audiophile power amps with bandwidths much beyond 20kHz? I guess

that infers that it's important to choose something appropriate for this type of player to drive". Dear Heart looked nonplussed. "So is this the kind of thing they mean when they talk about adding 'musicality' with these really expensive products? A case of less is more?" "You said it," I replied. "Less in all but price! I'm afraid I can think of better ways of spending my hard earned cash".

Outside, a squeal of brakes heralded our next visitor. Dear Heart brightened visibly as she spotted the Interflora van skidding to a halt. Seconds later a big hairy guy hurtled in, carrying something under wraps. "Oh, how absolutely lovely" she

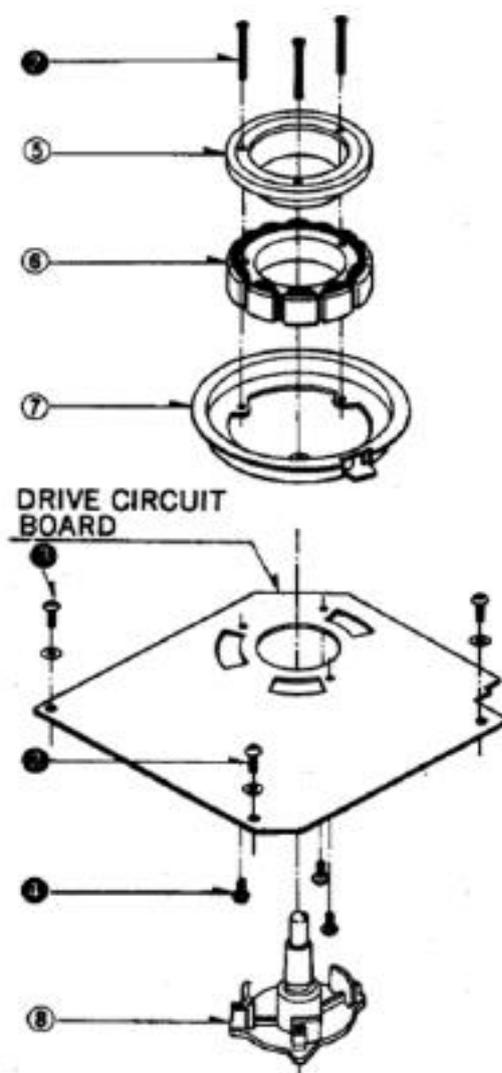


Figure 1: Technics SL1200 DD motor exploded view

gushed, gesturing him over. "Here, let me..." Moments later her rhetoric seemed to take on a more earthy form, enough in fact to make two grown men blush. I must say I've never known the sight of a Technics SL1200 Mk2 turntable to have such a profound effect on a gal. Finally, once she'd stamped out, I set about discussing the fault with its owner. "Goes at 78 when it should be doing 33, always in a hurry, just like me," he boomed. "Same age too! Name's Jim Budd". He moved swiftly to the door whilst I followed apace, scribbling down his details and 'check servo' on the job card. His sense of urgency made the act of booking in a repair

seem like an extreme sport. “Won’t be long will it, only I’ve just got hold of a Hawkwind original vinyl master recording,” he bellowed over his shoulder. “Just can’t wait ‘til I can hear it like it ought to be heard”. The van door slammed. “Except for all the knocking of course,” he called, through a cleft in the bouquet of tulips, which quivered nervously at the nearside window. ‘Check bearings,’ I wrote as he roared away. Despite digital technology, even 25 years on, all is still not lost for vinyl, I reflected... what a joy! A healthy and profitable CD-versus-vinyl, analogue-versus-digital debate still rages amongst both audio buffs and also by many less driven souls who are simply still very fond of their old music collections.

A quality turntable of the 1980s, the Technics SL1200 boasts servo controlled direct drive in which the heavy platter is an integral part of the ‘motor’. It’s a very capable and much sought after deck, featuring a pitch controllable quartz lock system and high torque operation, making it ideal for professional use. In this instance there was no servo control, resulting in runaway operation. A glance at my well-thumbed manual showed that FG feedback, derived from a set of windings under the stator, is taken to Pin 22, 23 and 24 of motor control chip IC201, an

AN6680, via common-emitter amplifier Q203. Making ‘scope checks on the servo board means extending out any measuring point with a short length of wire, because during operation everything’s obscured by the rotating platter! In this case it turned out that the motor’s FG winding was open circuit.

One nice thing about this sort of well-made product is the fact that it comes apart without protesting too much! That even extends to the motor winding assembly. First release the stator coil assembly (item 6 in figure 1) by unsoldering its connections to the drive circuit board and removing the three fixing screws as shown at the top the diagram. You’ll see the FG flexible printed circuit strip wrapped in a single turn around the former (item 7), and connected to the drive circuit board via four soldered pins mounted in a plastic base. Unsoldering them directly risks damaging the delicate winding, so it’s best to proceed by removing the former itself from the circuit board, then whilst heating each joint on the strip from the top of its respective pin, push each one down through the plastic base as quickly as possible, until the FG strip can be removed intact. The open circuit will be located near the connection points

where the strip curves most sharply, and can be repaired with a thread of tinned copper wire.

To my relief the servo repair was a total success, although there was no sign of any knocking noise. Even my companion regained her composure as a vinyl rendition of ‘Bridge over troubled water’ filled the air. Leaving her looking in to the Audio Note’s problems, I returned to my bench to continue my pursuit of the unthinkable; a budget repair on a Philips A10. Intermittent sound had been the problem here, and although the painter IC is a favourite cause, this particular model initially had me fooled. It’s equipped with a sub-woofer, which is actually an active device with its own in-built power amplifier mounted in the back cover. When the fault occurred, the left and right speakers fell silent, but the sub continued on, unaffected. Filled with hope, I’d checked around IC7702, the AN5277 stereo power amplifier on the main PCB and found that pin 8 (muting) went high when the fault was present. Figure 2 shows the basics. Although the manual shows no circuit diagram for the active sub-woofer, I’d spotted that its mute line was derived from pin 98 of the painter IC, the same as for IC7702, so I directed my attention to measuring the conditions around muting switch TR7701. As I was doing so, the sub-woofer cut out! Powering the set off and on again would sometimes produce perfectly normal audio, sometimes just the sub, and occasionally silence. Confused by the intermittent symptoms, not to mention an unplanned diversion into the dynamics of boomerang flight, it had taken a while for the penny to drop. Although the ‘sound enable’ rail is common to both the main L/R and sub muting, it turns out that the specific threshold voltage at which each audio circuit un-mutes is actually different. Whilst a value of 3.5V corresponds to normal sound

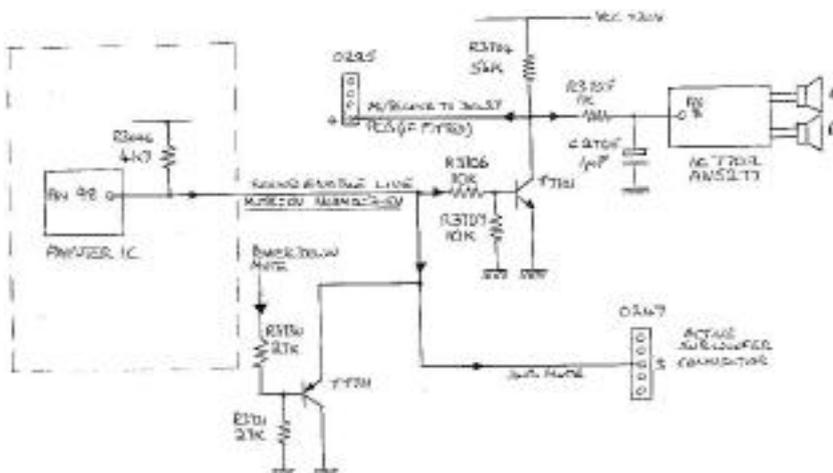


Figure 2: Philips A10 muting circuit

and 0V corresponds to mute, any intermediate voltage levels here will cause muting of the main L/R channels to occur more readily than muting of the sub-woofer. By now you're probably ahead of me; when I looked closely at the sound enable rail, it was wandering about, due, you've guessed it, to a faulty Painter IC.

So now, feeling like I'd lost a pound and found a penny, I lifted pin 98 of the painter IC, which solved the problem at the expense of the set's mute function. When I phoned Alfred, its owner, he was happy as a clam. "Leave it like that then my boy," he enthused when I explained how much money he'd save. "That'll do us proud. My missus reckons you've got things in your head that won't come out in a comb..."

As I put the handset back on its rest, I caught sight of Dear Heart carefully extracting the Sony CD mechanism from the Audio Note player. "Found something then?" I enquired hopefully. For the second time that day, she regarded me with a superior air. "Bet you a cuppa you can't guess...". A feeling of déjà vu set in. "Listen dearest, if this is going to involve boomerangs or time travel, I'm not playing," I interrupted; then as curiosity got the better of me, I accepted the bet and heard her out. "Look, it's all just down to careful observation at the end of the day," she grinned. "First of all, note that once this player is running, it never falters, no mistracking probs or anything. Right? Secondly, whenever you shut the drawer, disc or no disc, the pickup is always tracked right back until it closes that parking switch – so its system control knows where it is – then it's sent out a little way, ready to read the TOC track. Thing is, by listening really carefully, you can hear it executing these little manoeuvres, providing no noisy oaf's creating a racket nearby". She



shot me a glance but I remained expressionless, assuming what I hoped was an air of quiet dignity. "Go on then," I encouraged, "so what's the buzz?" "The buzz is that once I got to know the sounds it makes, I realised that on the rare occasions it wouldn't recognise a disc, it hadn't moved the pickup properly," she replied. I could definitely predict when it wasn't going to read, how about that? So then, by opening and closing the drawer repeatedly, but without a disc, I eventually saw why. When the fault's about to happen, although the pickup travels back and pushes the little leaf switch, it doesn't move away again, so I reckon the cheap and nasty switch is past it".

It's all clever stuff, this observation malarkey, I thought as I watched her replacing the faulty switch. I made a mental note to find more time to stand and stare...after all, getting somewhere slowly sure beats getting nowhere fast!

The sound of gravel being torn up outside signalled the return of Big Jim the florist, proud owner of the

now repaired Technics turntable. "That's just the greatest thing ever, man," he enthused, shrouding it lovingly in bouquet wrapping, whilst spilling fivers all over the counter and presenting Dear Heart with a bent tulip. "I tell you, my system's gonna go into overdrive this weekend". I suddenly remembered his parting comment as he'd sped off that morning. "Oh, just one thing," I called as he was halfway through the door, "about that knocking, we couldn't...". "Not your problem pal," he interrupted, turning back, "but it's real grief for me". I looked at him blankly. "Flippin' kids," he continued, "they got no proper sense of right and wrong nowadays. Makes my life hell it does". "Noisy are they?" sympathised Dear Heart. "Shame that, no respect for others. I guess that's life, Jim". Jim looked confused, then light dawned. "Naw, you don't understand love, they're the ones doin' the complaining, see? My music's so loud that the kids playing outside keep knocking on my door and asking me to turn the noise down. Miserable little sods!"

# What to look for when repairing LCD and plasma TVs

by Michael Dranfield

**W**ith LCD and Plasma TVs well out of their warranty period I am seeing more coming into the shop for repair, a couple of dealers I know are reluctant to move into repairing this type of set and although CRT repair jobs will be around for many years to come, quite a few shops have now discontinued sales of convention CRT televisions, remember Betamax? You don't see any now, one day this will happen to CRT televisions, it may even happen quicker than expected with constant TV advertisements suggesting unless your TV has the digital tick mark it will not work after the digital change over.

A move into any new technology brings with it many challenges, the first time I took the back of an LCD TV it was like starting all over again, even though I have been in this business for over 25 years.

Experience is something you build up over the years and LCD and Plasma sets are here to stay so now is the time to start learning, remember when CD players were first launched, a new technology no one ever thought they would grasp, fault finding to component level was complex and involved yet it soon emerged that 90% of faults were caused by the laser, similarly in CRT television of years gone by, most faults would be either in the line output or power supply and LCD and Plasma sets are no exception where a similar pattern of faults are starting to emerge.



## LCD sets

With LCD sets the most common fault is caused by the inverter panel, typically the display will flash up for a split second but then go off and leave sound but no picture. This is a very common fault on sets that use an inverter manufactured by Darfon and diagnosing the problem is easy, the chopper transformers suffer from a design flaw, the primary winding usually consists 4 windings in parallel, but close to the exit point where they are wrapped round the tag they pass round a 90° bend, constant heating and cooling stretches the windings and eventually causes one of them to snap. The symptom can be confusing as it does not cause the CCFL tube to strike, but instead upsets the balance of the circuit and causes the inverter to trip out after the CCFL tubes have struck up. As I said diagnosing the fault is easy there are 8 separate inverter

transformers, just measure the resistance of the windings, the one that measures different to the other 7 is the dud one. The biggest problem here is that parts on the inverter panel are not available separately, you just have to swap the whole panel usually at a cost of £60- £80 but all is not lost, an old inverter panel with one faulty transformer will yield 7 good transformers that can be removed and used to repair other boards.

Picture Faults can usually be cured by unplugging the LVDS cable at the screen end, cleaning the contacts and plugging the cable back in so nothing difficult here.

Power supply faults are also very common, capacitors drying out, obscure numbered chips with the top blown off may seem a bit daunting at first but have no fear, get yourself an account with Charles Hyde and Sons ([www.charleshyde.co.uk](http://www.charleshyde.co.uk)) they have

an enormous amount of spare parts and brand new panels for LCD and Plasma sets and quite often while searching for some obscure chip I have found a mod kit on their website containing not only the chip but all the other bits that fail with it, so in a lot of cases you won't even need a service manual to complete a successful repair.

### Plasma sets

Large sets draw an enormous amount of power from the mains, 350-400W is quite common so it goes without saying internal dissipation is high, along with the failure rate, dried up capacitors are very common. The Plasma Display Panel itself draws a large amount of current usually at some 70-90V, so failure of the driver panel is common, especially in LG sets and there many variants. Not a difficult problem to diagnose; the fuse on the panel will be blown and you can measure a dead short to ground, don't even bother attempting to repair the panel, the large chip under the heatsink has no number on it and a repair kit is available consisting of a brand new Ysus, Xsus and control panel costing less than £60 for the 3 boards which make up nearly half the TV, this is a potential £200 repair.

One of the biggest problems when dealing with such large TVs is getting it into a position where you can work on it, not a problem when the set comes in with its own stand, but a lot of these are wall mounted and while it is possible to lay it down flat on the bench this is not an ideal servicing position for two reasons, one you can't see the picture and two if you are taking measurements from, say, the power supply mounted at the top and the rest of your body is leaning over the other panels, it is not ideal from a safety point of view.

Again Charles Hyde came to the rescue, they now sell a repair stand,



*The Charles & Hyde TV stand is specially made to hold a TV from 21 inch to a massive 60 inches wide in the vertical position, enabling you to view the screen from a mirror while working on the set*

part number 8998877, which you put on your work bench and is specially made to hold a TV from 21 inch to a massive 60 inches wide in the vertical position, enabling you to view the screen from a mirror while working on the set, it didn't look that impressive in the catalogue, but when it arrived it soon became clear that pictures can be very deceiving, this stand is made of very heavy gauge steel and sat rock steady on my bench while working on a 50 inch Pioneer plasma set, the only gripe I had was that the two adjuster knobs for some odd reason are at the back of the stand rather than facing forwards making it slightly difficult to set up, however that aside if you are serious about working on large screen flat panels sets then you need to invest in one of these, at the time of writing the cost is £97.77 plus VAT but experience has shown that the bigger the set the more the customer expects to pay for a repair so the initial outlay could easily be recouped in repairing a couple of sets.

Finally big sets have lots of screws, a large Beko plasma I did had more

than 60 screws that needed to be undone before the back could be removed, this requires the use of a good quality screwdriver as a minimum, but even then your hands will soon get tired, get yourself a cordless battery operated screwdriver, I use a rechargeable Black and Decker one costing under £20.

So there we have it, the new technology is here to stay, it's the future and now is the time to start learning. Don't be frightened to have a go, the rewards can be great, I once charged someone £350 to repair a massive plasma and with more fault reports on LCD and Plasma sets starting to appear in Television magazine you can't go far wrong.

### Contact details for Charles Hyde and Son:

1 Hallifax Way,  
Pocklington industrial estate,  
Pocklington,  
York,  
YO42 1NR.  
Telephone 01759 303068.  
Email [sales@charleshyde.co.uk](mailto:sales@charleshyde.co.uk)  
[www.charleshyde.co.uk](http://www.charleshyde.co.uk)



# The Lyon's Den

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

**I**t was Monday morning I could see the first customer of the day parking his car in the car park outside, sadly I remembered the car and the customer only too well as I had bade him goodbye on Friday and struggled to get his 32" Toshiba model no. 32W8DB into the back of his Ford Escort. When the set came in before it was dead, and it took some time for us to diagnose that the set was infact in protection mode due to a faulty centre sound o/p amp IC. The IC in itself was very expensive and the customer was not willing to pay for a replacement. Rather than scrap the set we suggested to the customer that we could remove the IC and that he could have the set back working but without the centre speaker. We would do the work for £65.00. This gentleman though was of, shall we say extremely limited intelligence, and his reply to our suggestion of a repair was "I couldn't give a s\*\*t what yu does to

***"look pal don't try and confuse me with long words I aint interested at all, get my telly working would yu it's not rocket science ere is it I wants my telly"***

*it, jus get it working for the weekend, I as to watch the wrestling see, you've already ad im two days an I needs me telly back pal"*

I tried again to explain what it was we were proposing to do as I wanted him to understand that the centre speaker would not work when he got the set home "So do you understand what I," I couldn't finish my sentence though, he countered "*look pal don't try and confuse me with long words I aint interested at all, get my telly working would yu it's not rocket science ere is it I wants my telly*".

Under normal circumstances and in

normal times I would probably have shouted back and told him to come and pick his set up and take it somewhere else. This unpleasant character swore a lot and I am one of those old fashioned people who doesn't normally tolerate swearing on the telephone. These, however, are not normal times for our business so I just put up with the man. We removed the centre sound amplifier and as I said earlier he picked the set up on Friday and left relatively happy.

Now, however, it was Monday, the weekend was behind us and here he was darkening my doorstep again,



surely the set hadn't developed another fault over the weekend had it? I checked my watch, it was ten minutes to nine, we don't open until nine I said to myself and discretely locked the door just in time to stop him barging in. I could hear him swearing on the other side but I was going to make him wait (I can be awkward like that sometimes, so my wife tells me). He started knocking, I ignored him, he started thumping, I still ignored him, swearing profusely he returned to his car, sat down and lit up a cigarette. He's not coming in here one second before nine I thought to myself whatever he wants.

The inevitable happened though nine o'clock came and I had to unlock the door and let him in. In he burst fists clenched, teeth bared, red faced, well you know not very happy really. "Mr Nagasaki how lovely to see you again," I purred, "and what brings you back here so soon?" "What the \*\*\*\* do you think brings me\*\*\*\*\* back ere again? That \*\*\*\*\* tele you didn't fix that's what. And you made me miss me wrestling you owes me pal you owes me big time get it sorted." And with that tirade he left slamming the door closed in his wake.

Ten minutes later he returned realising that he had sped off in such a huff that he still had the set in the boot of his escort, I saw him coming and pretended to be on the phone. He hung around in reception for about ten minutes whilst I conducted an imaginary phone conversation with

no one. He started pacing up and down, swore a few times and then walked out to his car ten minutes later again and he struggled in through the door with his set and put it down on the front bench, I just ignored him, (maybe she's right perhaps I am awkward) he hung around for a few more minutes before cursing and leaving. When I saw his car pull out of the yard I put the phone down and moved his set onto the jobs waiting shelves.

I never got the chance to ask him what the problem was and anyway he was in no mood for a sensible conversation. I had call outs all morning and it was after three when I got back to the workshop and heaved his set back onto the workbench.

I plugged the offending set in and was greeted by a rustle of EHT and shortly afterwards a good picture appeared accompanied by the sound of Dick Van Dyke (Diagnosis Murder). "Great not an intermittent fault," I said out loud. One hour later the set was still running, the back was now off and heat and freezer hadn't provoked any fault into action. My only recourse now was to give the cheery Mr Nagasaki a call and see if I could find out from him in amongst the expletives why he had returned the set.

This by the way is a true story, it is not exaggerated in any way and this as best as I can remember it is the conversation that I had with Mr Nagasaki (the name is obviously made up).

"Mr Nagasaki it's the engineer from Visiontech here calling you about your recalcitrant TV I was just." "Why can't you talk in proper words that people knows about and understands," he interrupted before I had finished my sentence. "Ave you fixed it properly now?" "Well that's what I am calling you for, could you" "Is it fixed?" Losing patience now, I countered "look sir can you just be quiet for a minute and let me finish my sentence please, if you do you will get your set back a lot sooner. Now please can you tell me what the problem with the set is?"

There followed one or two swear words followed by one or two direct insults followed by him telling me that I had forgotten to put the mains lead back onto the television after I had repaired it so he couldn't even plug it in!! And that if I didn't notice that I must be a bl---y moron.

Reeling from this verbal attack and for once being lost for words, I just told him I had had enough of his language, insults and crass stupidity that he could come and pick his TV up and take it elsewhere to get it repaired. The phone went dead and in twenty minutes he was getting out of his car again. He came through the door took one look at his TV which was sitting on the reception table and apologised for his bad language but said that I must understand what it's like when you pay to get something mended then get it home only to find you can't even plug it in. He then asked very nicely if I could put a mains lead onto the set whilst he waited.

"Put one on," I said still not having any idea what he was talking about. I turned the set around so he could see the lead and plug. He stared blankly at the back of the set and said nothing. So I pulled the plug from the plug park on the cover and at that moment realised what he meant. I looked up at him and he had gone bright red again this time though it was embarrassment not anger.

# Multimedia convergence - part 2 & 3

*This article is based on a chapter from Fawzi Ibrahim's recent book, Newnes guide to Television and Video Technology, fourth edition*

**P**art 1 described how digital video broadcasting was used to incorporate internet services using mobile DVB-H (DVB-Handheld) standard specifications. In this second and final extract from Newnes Guide to Television and Video Technology, Fawzi Ibrahim starts by exploring multimedia techniques using Digital Audio Broadcasting, DAB. He then goes on to describe the much talked-about on-line convergence.

DAB easily lends itself to portable and handheld receivers as it was designed with mobile reception and single frequency networks in mind. It was not surprising therefore that it became a favourite in the delivery of digital multimedia broadcasting. Unlike DVB which had to be modified to incorporate the requirements for portable and handheld reception, DAB from its inception was designed for mobile reception with one antenna. With DAB, data is sent in bursts that are part of a frame which lasts 24ms followed by a null frame using time interleaving to overcome the problem of fading. Another advantage of DAB is the use of UEP (Unequal Error Protection) technique in which bits are protected according to their importance in the decoding process. This is very important for mobile and portable reception where hostile reception conditions cannot be avoided.

The DAB system is capable of carrying IP packets (datagrams) using

IP/UDP connectionless protocol. As these packets travel unidirectionally from a service provider to many users simultaneously, it is not necessary to establish a connection between the transmitter and the user prior to the transmission of data.

## Introduction to DAB

Digital audio broadcasting (DAB) was developed in the early 1990's by the European consortium Eureka 147, mainly to replace the widely used analogue frequency modulation (FM) broadcasting system. The VHF band is a scarce resource in many parts of the world, so there was a need for a spectrally more efficient modulation method than FM. In DAB, this is achieved by multiplexing several programmes into a so-called ensemble with a bandwidth of 1.536MHz, where the number of programmes per ensemble is flexible and depends on individual programme bandwidth requirements. Further, conventional analogue techniques do not provide satisfactory performance in a mobile environment, because they are highly affected by multi-path propagation and thus fading. In DAB, orthogonal frequency division multiplex (OFDM) has been chosen to overcome the effects of multi-path propagation, enabling the system to operate in single-frequency networks (SFN). DAB is designed to operate in any frequency band in the VHF and UHF range for terrestrial, satellite, hybrid (satellite with complementary terrestrial), and cable delivery.

DAB is a spectrum-efficient rugged system, not dissimilar to the digital terrestrial TV broadcasting in that the stereophonic audio is digitised, compressed and modulated using OFDM. Audio programme information is incorporated as a digital bitstream, with the system supporting a wide range of options for other data, either associated with or independent from the sound programmes. Compression is performed using MPEG-1 layers I, II or III described in Chapter 6. The encoder can operate in stereo or mono mode and the output bit-rate is selectable between 384kbit/s, for a stereo signal, down to 32kbit/s for a mono signal, with a corresponding reduction in the quality of the reconstructed audio signal. A value of 256kbps has been judged to provide a high quality stereo broadcast signal. However, a small reduction, to 224kbps is often found acceptable, and in some cases it may be possible to accept a further reduction to 192kbit/s, especially if redundancy in the stereo signal is exploited by a process of 'joint-stereo' encoding (i.e. some sounds appearing at the centre of the stereo image need not be sent twice). At 192kbit/s, it is relatively easy to hear imperfections in critical audio material.

The DAB broadcasting system (Fig. 1, right) is not dissimilar to the DVB described in chapter 8. The audio signal is MPEG layer-2 encoded and then scrambled. Forward error correction is applied to the scrambled

bitstream by employing punctured convolutional codes with code-rates ranging 0.25 – 0.89. The bitstream is sent through a time interleaver before it is multiplexed with the other programmes to form an ensemble. The ensemble bitstream is then used to modulate the OFDM carriers using differential QPSK. To achieve orthogonality, the sub-carriers are spaced in frequency by the inverse of the symbol duration, theoretically resulting in zero inter-carrier interference. The relatively high ensemble bandwidth of 1.536MHz gives good frequency diversity, since frequencies are not affected in the same way by fading. Adjacent bits within the MPEG bit-stream are made statistically independent with respect to bit errors by employing frequency and time interleaving, leading to good performance of the convolutional decoder (Viterbi) at the receiving end.

Parameter	Mode 1	Mode 2	Mode 3
number of carriers	1536	384	192
carrier frequency separation	1 kHz	4 kHz	8 kHz
maximum radio frequency	375 MHz	1.5 GHz	3 GHz
transmission frame duration	96 ms	24 ms	24 ms
number of symbols/frame	76	76	153
total symbol duration	1.246 ms	312 $\mu$ s	156 $\mu$ s
guard interval duration	246 $\mu$ s	62 $\mu$ s	31 $\mu$ s
'active' symbol duration	1 ms	250 $\mu$ s	125 $\mu$ s
null symbol duration	1.296 ms	324 $\mu$ s	168 $\mu$ s

Table 25.2 Properties of DAB transmission modes

### Transmission modes

There are three different transmission modes, applicable to different ranges of radio frequency with the number of carriers and several other system parameters depend on the mode. DAB has three main modes with 1536, 768, 384 carriers and guard intervals between 246, 62 and 31  $\mu$ s respectively (Table 25.2). There is a fourth mode

between Mode 1 and Mode 2 with a symbol duration of 623  $\mu$ s used in Canada. In each mode, the carriers occupy a total bandwidth of 1.536MHz, they use DQPSK and time- as well as frequency-interleaving. The maximum radio frequency that can be used in each mode is that at which the system can overcome the Doppler effect while moving at speeds of up to 100km/hr. For mode 1, the maximum RF frequency is 375MHz making it suitable for VHF transmission.

The total symbol duration consists of the principal symbol period and a guard interval. The latter prevents the echo of the previous symbol from interfering with the current symbol. By doing so, inter-symbol interference (ISI) is reduced to almost zero as long as the echoes from the various transmitters and propagation paths do not substantially exceed the guard interval. The maximum permissible difference in the length of the propagation path between two SFN transmitters  $D$  in meters can be calculated from the guard interval  $T_g$  and the propagation speed  $c$ :

$$D = T_g \times c \text{ where } c=3 \times 10^8 \text{ m/s}$$

Mode 1 is intended for terrestrial transmission, particularly using single frequency networks (SFNs). Its comparatively long symbol duration (1.246ms) and guard period (246  $\mu$ s) makes it most appropriate for a large network of terrestrial VHF (Band III) transmitters. Mode 2 is intended

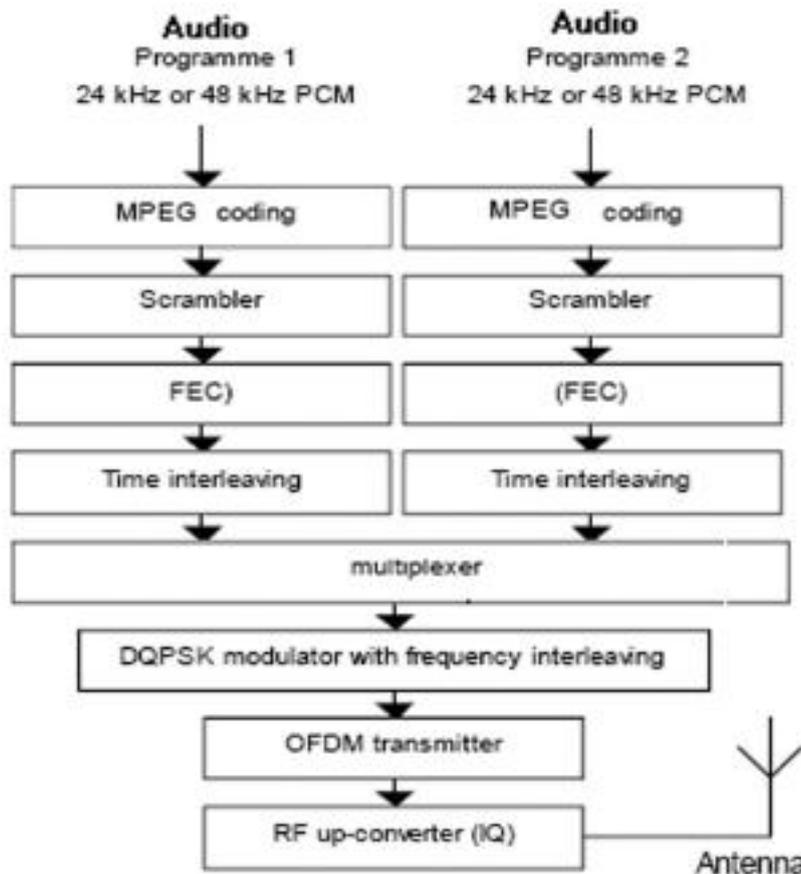


Fig. 1 DAB broadcasting system incorporating two audio programmes

principally for small to medium coverage area (e.g. local radio) using UHF L-Band. The guard interval is sufficiently long to ensure immunity from multipath propagation, but is not really suitable for SFN applications. Mode 3 is intended for cable and satellite transmission where there are no long echoes using the UHF L-Band.

For Mode 1, the available bit rate may be calculated as follows:  
 $1536 \text{ carriers} \times 2 \text{ bits/carrier} = 3072 \text{ bits per symbol}$

With a symbol duration of 1 ms, the number of symbols/s = 1000, resulting in a bit rate of  $3072 \times 1000 = 3,072,000 \text{ bits/sec} = 3.072 \text{ Mbps}$ .

However, not all the bit rate is available because of redundancy for error correction, control, synchronisation and guard period resulting in a useful bit rate of about 2.3Mbps. This can provide, for example, five stereo programme services each at 224 kbps.

## DAB frames

Although DAB is essentially dedicated to the transmission of 'audio' service, it may also deliver other services under the banner of 'general data' service, which may be data for the display of extended text (e.g. the contents of the 'Radio Times'). The partitioning of data into frames representing 24ms periods of the application is retained but, generally, these are referred to as 'logical frames'. It is helpful to consider each logical frame as a burst of data, because when the data for numerous services are multiplexed together they must be compressed in time, so each logical frame is transmitted in less than 24ms and other data are transmitted between these bursts.

## DAB-2

In November 2006, WorldDMB, the organisation in charge of the DAB

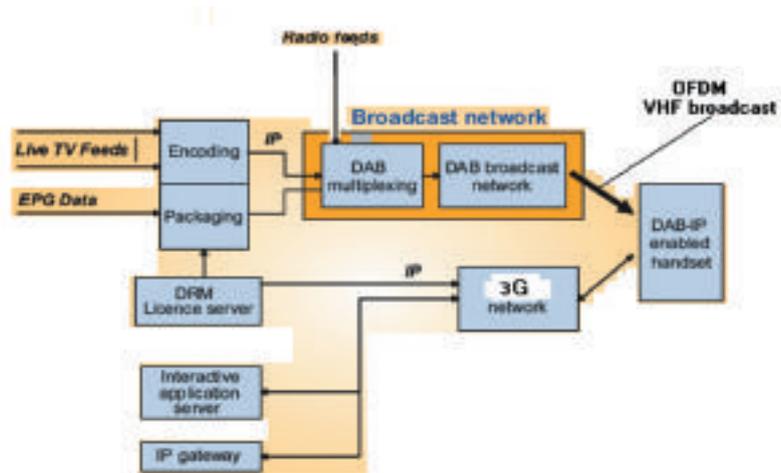


Fig. 2 DAB TV system architecture

standards, announced that the DAB system was in the process of being upgraded, and it will adopt the AAC+ audio codec to improve the efficiency of the system and stronger error correction coding to improve the robustness of transmissions. This means there are two different versions of the DAB system: the older existing one, which was developed in the late 1980s, and an upgraded version, which has been dubbed "DAB+" or "DAB version 2". Existing DAB receivers are incompatible with the new DAB standard, but receivers that will support the new DAB standard will become available in spring 2007.

A DAB-TV system, also known as DAB-IP is illustrated in Fig. 2. Live TV is encoded and encapsulated into an IP frame to be multiplexed with the normal digital radio broadcasts. The resulting transport stream is then fed into the DAB broadcast network and transmitted as a Mode 1 OFDM VHF signal. The IP interface provides an independent platform which supports a wide range of services and applications. TV encoding employs Enhanced Packet Mode (a WorldDMB Forum standard) which enables video and other services such as an electronic program guide (EPG) that are more sensitive to errors than the native

audio services, to be carried.

At the receiving end, the handset decoder extracts the required TV channel from the multiplex, decodes it and feeds it into the small screen display. The handset also receives and decodes the normal interactive services through the third generation (3G) platform.

As can be seen, DAB-TV shares multiplex capacity with DAB digital audio services. This enables operators to use spare capacity on DAB networks to start offering mobile TV without waiting for a new spectrum to become available. This is the main reason for DAB-TV gaining ground over its rival DVB-H system.

## On-line convergence

On-line convergence involves sending video broadcast services on traditional twisted-pair telephone lines. There is nothing new about video streaming, sending video clips down the line to be downloaded on a PC. However, sending live TV broadcasts down the line, usually known as IPTV, is of a qualitatively different scale. These services are often called Broadband TV, ADSL TV, DSL TV or IPTV. First let's look at the telephone system and at the technique known as ADSL.

In the UK alone there are over 30 million twisted-pair phone lines in

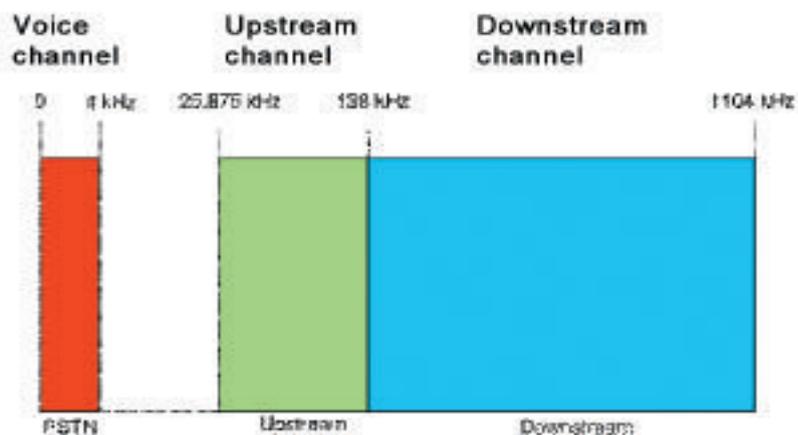


Fig. 3 ADSL works on frequency-division multiplexing using 4kHz wide channels

operation between British Telecom exchanges and individual subscribers' premises. Originally the telephone lines were designed to carry simple command (dialling) pulses and frequency-restricted (300–3500Hz) baseband voice signals. The remaining bandwidth of a copper wire was left unused. With the introduction of electronic exchanges, touch-tone dialling and routing functions became possible. The next step was to use a full digital system where the copper wires from each subscriber terminated in an interface or 'line card' containing ADCs and DACs. This made a wide band of frequencies available to be divided into 4kHz 'telephone channels'. The sampling rate of 8kHz and 8-bit quantisation retained the traditional analogue bandwidth resulting in a 64kbps per telephone channel. First, time-division multiplexing was used in what is known as ISDN (Integrated Services Digital Network) and by combining a number of 64kbps channels, high bit rates were reached. One of the problems of ISDN is that the bit rate is limited and a new cabling from the subscriber to the exchange was needed. ADSL (Asymmetrical Digital Subscriber Line) solved that problem by using frequency-division techniques and dynamic control of the bit rate.

ADSL works on frequency-division multiplexing using 4kHz wide channels (Fig. 3). Twenty five channels are dedicated for the upstream or back channel (subscriber to provider) and 249 for the upstream (provider to subscriber). The different bandwidth allocation for the two streams is the 'A' for asymmetrical part of ADSL. The traditional analogue telephone is retained with the upstream occupying the frequency band above it and the downstream occupying the highest frequency bands. To accommodate the varying quality of the telephone lines, ADSL constantly monitors the conditions of each channel and if a given channel has adequate level and low noise, the full bit rate is used. However, where a channel suffered from attenuation and noise, the bit rate is reduced. By independently coding the channels in terms of bit rate, the optimum data throughput for each telephone cable is obtained. Each ADSL channel is modulated using DMT (Discrete Multitone Technique) in which combinations of discrete sub-carriers are used in a similar way to the OFDM scheme described in chapter 8.

In the downstream, 249 sub-carriers are used, with each sub-carrier QAM-modulated with 0 – 15

bits. With a symbol rate of 4000, the maximum theoretical downstream bit rate =  $15 \times 249 \times 4000 = 14.94\text{Mbps}$ . However, in practice, the maximum achievable downstream bit rate is 8.128Mbps which itself is affected by the length of the telephone line from the subscriber to the exchange. Higher bit rates are obtained with other techniques such as ADSL2.

At the subscriber's home is a band-splitter and a modem, and at the telephone exchange a modem and a Subscriber Access Multiplexer (SAM), which sends the signal into a cable network on its way to the service-provider. Unlike the ordinary telephone system with its line-grabbing and dial-up processes, ADSL is continuously alive and capable of two-way communication; data routing is directed by addressing information within the datastream, and each subscriber's terminal has an individual address.

## IPTV

Internet Protocol Television (IPTV), also known as Broadband Television (BTV) involves accessing multimedia content via a broadband connection and viewing it on a normal TV. IPTV is not the same as Internet TV which accesses TV via a PC. IPTV is sometimes called ADSL TV or DSL TV.

The Internet Protocol as mentioned above is a packet delivery system operating at the Network Layer 3 of the OSI model in which the data load (payload) is encapsulated into a packet with an IP header containing various information and control bits including the destination and source addresses. Since IP networks are bi-directional, IPTV can deliver not only live television but also interactive and on-demand TV. Telecom operators who have been traditionally interested in providing communication services between clients find their role is being expanded to provide what is known as Triple Play:

- communication services (including Voice over IP, VoIP);
- a high-speed Internet connection;
- IP-based television and video-on-demand services.

At the receiving end, playback requires only an Internet connection and an Internet enabled device such as a personal computer, iPod, set-top-box connected to a TV receiver or even a 3G cell/mobile phone to watch the IPTV broadcasts. Apple's iPhone uses mobile phone GSM (Global System for Mobile Communications) quad-band (900MHz, 1800MHz for Europe and 850 and 1900MHz for the Americas) to provide images and television shows and films, internet, email and text messages as well as mobile phone facility.

### Bit rates

One of the main issues concerning broadband services delivered over the telephone network is their reach or coverage area. Generally, the higher the bitrate of the signal, the lower is the reach of the service. As the bandwidth required for minimum TV quality is relatively high when compared with broadband internet (2 - 4Mbps in the case of MPEG-2), the TV reach is more limited than the traditional reach of broadband internet connections. The operators have several options to cope with this problem:

- They can reduce the bit rate and with it picture quality;
- they can use more advanced encoding schemes such as MPEG-4 AVC/H.264 or VC-1 (This will also help to pave the way to HDTV transmission), or
- they can upgrade their networks by introducing more efficient transmission technologies such as ADSL2+ or VDSL (Very high bit rate DSL).

Upgrading the infrastructure requires significant capital

investment and take time to implement which leaves the second option as the favourite since reducing picture quality is not acceptable for the majority of customers.

The bandwidth problem becomes even more severe if more than one TV stream to the home is required. Such a need may arise if there are a number of TV sets in a house (e.g. one in the living room and another in a child's bedroom), each requesting a different TV programme at the same time. More than one TV stream is also required if there is a local PVR (Personal Video Recorder) with one stream being recorded locally while another is being watched.

One of the main applications of IPTV is 'network-based private video recorder' (NPVR). Network Personal Video Recording is the ultimate time-shifted viewing where real-time broadcast television is captured in the network on a server allowing the end user to access the recorded programs on the schedule of their choice, rather than being tied to the broadcast schedule.

The drawback of IPTV is the inclination of IP connection towards

packet loss and delays in cases where the IP link is not fast enough. While this may be overcome by the inclusion of a video buffer at the receiving end in which case, lost packets may be re-transmitted, to ensure sufficient picture and sound quality, IPTV requires a reliable network with a robust Quality-of-Service (QoS) mechanism. The required QoS can only be met by providers that are able to control all elements of the transmission path from the source through to the user's premises. This is the reason why open Internet is not able to offer IPTV services, as it cannot guarantee QoS. In addition, streaming over open Internet would require some technical measures that address piracy, spoofing, and network congestion. A comparison of the properties of IPTV and Internet video streaming is outlined in Table 25.4.

A block diagram of the essential elements of a closed IPTV network is shown in Fig. 4. It consists of four parts:

- Video Head-End;
- Packet Core, Transport and Network Edge;
- Access Network;
- Home Network.

	IPTV	Internet video streaming
Footprint	Local (limited operator coverage)	Potentially supranational or worldwide
Users	Known customers with known IP addresses and known locations	Any users (generally unknown)
Video Quality	sidecast at high definition television QoS	Best effort quality, QoS not guaranteed
Connection bandwidth	Between 1 and 4 Mbit/s	Generally below 1Mbit/s
Video format	MPEG-2 MPEG-4 Part 2 MPEG-4 Part 10 (AVC) Microsoft VC1	Windows Media RealNetworks QuickTime Flash, and others
Receiver device	Set-top box with a television display	PC
Resolution	Full TV display	QCIF/CIF
Reliability	Stable	Subject to contention
Security	Users are authenticated and protected	Unsafe
Copyright	Media is protected	Often unprotected
Other services	EPG, PVR (local or network)	
Customer relationship	Yes: onsite support	Generally no
Complementarity with cable, terrestrial and satellite broadcasting	Potentially common STB, complementary coverage, common metadata	Pre-view and low-quality on-demand services

Table 25.4 Comparisons between IPTV and Internet video streaming

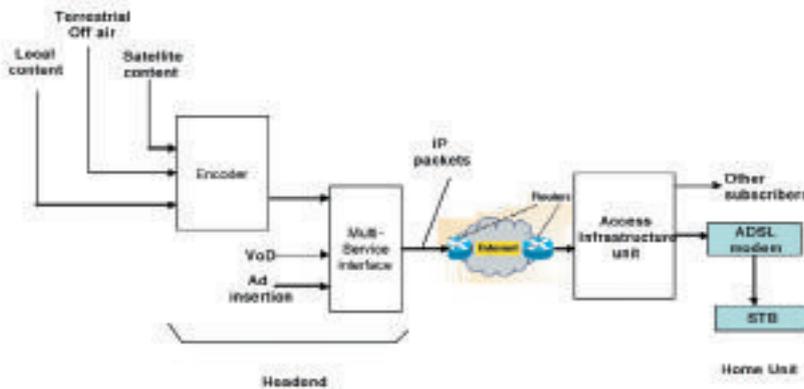


Fig. 4 A closed IPTV network

Content arrives from a satellite or antenna in digital or analogue format, with standard or high definition (or music), encrypted or unencrypted. Once the signal is 'down-linked' or 'down-converted', it may need to be altered. Most digital signals use MPEG-2 encoding and transcoding to MPEG-4 or Microsoft's VC1 is now available to reduce the required bandwidth by up to 50%. Encoding methods intrinsically produce variable bit rates (VBR), in which fast-motion requires more bandwidth. With bandwidth at a premium, the operator usually limits the bandwidth that a channel can consume and converts the signal into a constant bit rate (CBR) packet stream. Cross-conversion may be used to change the resolution of the displayed picture. For example, a signal received in 1080i (resolution of 1920 x 1080) format may be converted to 720p (resolution of 1280 x 720) or into a mobile friendly format before distribution. For analogue signals, an encoder digitises, compresses and packetises the signal. At the stage, high value content is encrypted so that it may be viewed by paying customers only. Encryption also protects against piracy.

The video and audio content from the various sources described above is fed into the multi-service interface where it is IP encapsulated before going into the internet routing and

delivery network. The network must have capacity and QoS reliability to transport massive amounts of simultaneous video traffic from the video headend to central exchange from where it is fed to the subscriber via the Access Infrastructure Unit. The Access Unit is usually the bottleneck in terms of capacity to deliver a reasonable video service. The benchmark for IPTV service delivery over Broadband is 20Mbps per home based on providing two SDTV, one HDTV, voice, high speed data and gaming. In addition, the access network must evolve to include features such as a TV channel change and multicasting.

As was mentioned earlier, DSL is distance-sensitive. Whilst a TV channel can now be delivered over 2Mbps most people consider that 20Mbps downstream is a requirement for offering an array of Video services to the home.

Fibre to the home with Passive Optical Networks (PON) technology is used to deliver service using end-to-end fibre. Equally effective is Optical Ethernet used for point-to-point connection to customers.

### Video-on-demand, VoD

The basic principle of video on demand (VoD) is very simple. Digitised video information stored on magnetic disks is retrieved by a video server and delivered to the home or

office, where it is reconstructed using either a PC or a STP and displayed on a television set. One approach to video distribution is to use a number of channels to broadcast the same video piece such as a film with starting times staggered by say 5-10 minutes. Known as near video on demand (NVOD), this method will allow the viewer to choose the viewing time within specified limits. True video on demand allows the viewer full choice of viewing time, together with VCR-type controls such as fast forward, rewind, replay, and so on. Modern Video on Demand is based on IP unicast stream, which mean instead of broadcasting a signal to everyone, each consumer now has a personalised channel.

One of the greatest challenges to VoD is the amount of bandwidth required. Consider a network providing 150 standard definition multicast television channels (each requiring 1.5Mbps) to 3000 consumers. Without Video on Demand, the operator 'requires 225Mbps (150 channels x 1.5Mbps) on the network backbone to deliver television service to all consumers. The number of channels determine the required bandwidth. If every consumer is watching Video on Demand programming, the operator requires 4.5Gbps (3000 consumers x 1.5Mbps) on the network backbone. Now, the number of consumers determines the required bandwidth.

Because of the bandwidth impact of VoD, understanding the expected penetration rate of VoD service is critical when designing the network. Typically the service mix is 90% Broadcast or multicast TV and 10% VoD.

*See Fawzi Ibrahim's biography on page 55*

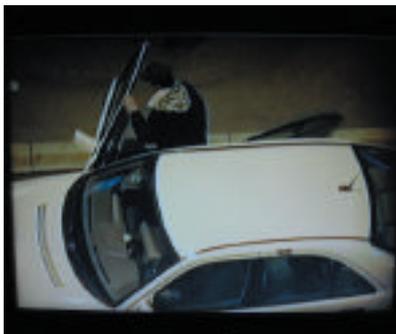
# Satellite DX

by Roger Bunney



*Riots continue in Belgrade City*

**D**ramatic scenes of rioting were transmitted evening of February 21st out of Belgrade Serbia and relayed over the APTN 'UP4' distribution slot over Eutelsat W1, 10° East. A couple of cameras high on buildings overlook streets in the city centre showed police forming and attacking angry crowds with missiles and tear gas canisters flying through the air. Smoke drifted across the pictures and street furniture burned. One remarkable sequence directly below the camera showed a group of men having robbed premises and running across the pavement to a waiting car, throwing a large bag [of cash?] through the door, leaping in as it raced off. These images were seen @ 10.974GHz-Vertical [Symbol Rate 4167 + Forward Error Correction 5/6]



*Belgrade looters make a get away*

following the granting of independence of Kosovo a few days earlier; unrest had built up into violent scenes of disorder. The weekend 17/18th February saw Kosovan independence confirmed and great was the rejoicing in the city of Pristina, the capital of the newly formed state. Several live feeds were carried out of the area showing the crowds celebrating, firework displays and general happiness. 'DEFAULT SERVICE' on W1 @ 10.980GHz-V [4167+5/6] was a sat truck in the city centre relaying the local action for hours, in turn part relayed over 'UP4'. 'ALPHA' was another W1 feeder @ 10.963GHz-V together with 'TV PROG' @ 10.975GHz-V [both 4167+5/6] relayed the Kosovan 'Concert of Independence' on the 17th that ran for at least 2 hours.

Eutelsat W1 @ 10° east is an extremely active satellite and I'll concentrate more on this satellite in this month's column to give an idea of the variety of content that can appear from this orbital slot. A news chopper is relaying pictures of large buildings, people are scurrying from them and gathering in groups, a high presence of black and whites [US police cars], a few ambulances are parked. There's snow on the ground. I've seen this scene several times now and anticipate what will be revealed. It's another US university and a gunman is on the loose, shootings, known casualties – and it's St. Valentines Day. These are live pictures of action unfolding, relayed over UP4 as offered to the American networks as breaking news. It's at the Northern Illinois University in DeKalb, 65 miles west of Chicago. The gunman is a 27 year old ex-



*News chopper view of the Northern Illinois University campus*

student that has flipped [having gone off medication] and took out 5 students, wounded others – then shot himself.

'SATLINK 9722' has provided ongoing news feeds out of Israel from the 'APTIN JERUSALEM' bureau as friction continues in the region [see news report on Israel] and checking 10.986GHz-V on W1 can provide updates on 'the situation', this slot usually alternates with the 'RAMALLAH' office.

Breaking live news from anywhere in the 'States is often carried over UP4 as witness evening of February 22nd @ 2040hrs when an airliner of the 'American' fleet put a call into Miami to advise of a front wheel difficulty. A news chopper gained distant images as the 'plane approached Miami and followed her



*Airliner makes a safe landing following jammed nosewheel*

down onto the tarmac, the camera zoomed into a close up of the nose wheel. Fortunately the structure held and the airplane rolled to a halt as fire trucks converged, luckily they weren't used this time!

Following the assassination of Mrs. Benazur Bhutto in late December, the Pakistan National Assembly elections were delayed, being held mid-February. The elections were closely followed internationally and Eutelsat W1 relayed TV programming from the national PTV network containing the election counts and interviews for many hours through the UK night over 10.986GHz-V [see above re Jerusalem] on the 18th February. 'ABC NEWS ISLAMABAD' also carried content through Intelsat 10-02, 11.674GHz-V [3207+7/8] with their usual test card carried at other times.

Politics apart, the evening of February 9th saw a dramatic and devastating fire sweep through North London's Camden Market. News cameras were quickly on the scene and live pictures were transmitted over the Sky News and BBC 24 channels as over 100 firemen on 20 vehicles converged on the scene. There appeared to be 3 live camera units on site including one offering pictures for APTN that were relayed into Europe over the UP4, Eutelsat W1 slot.



*Camden Market, N. London burns*

A few days later another drama as heavy rains caused extensive flooding in Ankara, Turkey with the 'IHA' news agency providing pictures of flooded buildings, a river pouring its contents into nearby streets and local

folk wading along in the muddy waters. The IHA feed down linked @ 11.076GHz-V [3124+3/4] over W1 with identification 'ANKARA MERKEZ'.



*The Shuttle 'Atlantis' roars into space*

Kevin Hewitt [Kent] watched the launch of the February 7th shuttle mission televised by NASA TV and relayed courtesy of APTN's UP4 feed. Remarkable pictures were relayed at launch from a backwards facing camera on the main thrusters rocket; within minutes the shuttle had reached 17,000mph! Docking and subsequent assembly work with



*'Atlantis' parts company from the main booster rocket*

the Columbus Lab module was covered with brilliant picture clarity plus audio of mission control and the astronauts. The assembly work with the robotic arm ex NASA TV was viewed via a German teleport feed @ 11.1181GHz-V [6111+3/4] and signing 'DLR-OBERPFFENHOFEN'. A Mr. Frost from Felixstowe has written to advise reception of 'BET TEST ARQIVA WASHINGTON DC' during the night of January 26th. He's using just a standard Sky box/dish on Astra 28.2° east and goes into the service menus to check

for channels other than Sky programming. I've suggested he considers a blind scan receiver such as the Manhattan Plaza XT-F that should speed up signal hunting – particularly if he can organise a larger tracking dish of about 80-90cm.

And we have sports. A curiosity tune over Intelsat 903 @ 34½° west night of Feb 15th found Spanish basketball with a hard fought match at Tarragona, linked by the facility truck 'OVERON E-289' – 11.692GHz-V. A tune down the band on 903 found heavyweight men's wrestling in a large sandy arena somewhere in Spain. 'MSAT18via1' was the sat truck identification and the downlink – 11.585GHz-V [both Spanish feeds used 6110+3/4]. The next evening found championship snooker for the 'British Eurosport' channel, down linking on Atlantic Bird-1 [AB-1] @ 12½° west, 11.072GHz-V [6138+7/8] using MPEG 4:2:2 via 'UKI-116 SDI SND'. And the usual 11.522GHz-V spot on IS-12, 45° east on a Saturday afternoon found South African sport on the 23rd – live rugby from Durban, again using MPEG 4:2:2 and with the unusual parameters SR 8874+FEC 3/4.

### Broadcast news

USA. There's been a gradual move of MW [AM] stations to FM in recent years and recent moves by the FCC [the equivalent of the UK's OFCOM] may well allow MW radio stations to use lower power FM translators during hours of darkness. This in turn has created concerns in areas that have or are considering their own LPFM community stations. Most MW transmitters in the USA have to decrease their output powers during the night to minimise co-frequency interference to other stations.

UK. With more DAB broadcast channel operators deserting the

multiplexes coupled with negative press publicity, there are concerns for the future of DAB in the UK – Gcap Media [UK] recently announcing they were opting out of DAB. The policy of squeezing additional channels into the multiplexes with the resultant reduction in bit rates has led to criticism of poor quality compared to that available on analogue FM. With the UK adopting DABv1 that's incompatible with the improved DABv2 – which provides for a much more robust and higher quality signal – puts the future of DAB in limbo. Retaining DABv1 will forever provide a poor quality service; upgrading to DABv2 will create improved quality and better reception in 'difficult' locations – but all DABv1 receivers, perhaps numbering 5 million, would become redundant. The BFBS and 'Bird Song' have taken over recently vacated DAB mpx capacity on an experimental basis in January – 'Bird Song' is actually bird song.

Australia. January 2009 will see the initial start of digital radio in Australia with the ABC and SBS joining with commercial radio interests, manufacturers and retailers in creating the framework for distribution, transmission and supply of equipment for receiving the chosen DAB+ standard. The first transmissions will centre on the main population areas around Perth, Adelaide, Sydney, Melbourne, Brisbane and Hobart [Tasmania]. Legislation has ensured that digital transmission will be Free to Air [FTA].

Israel. The military 'Home Front Command' has spent \$1.3m for the construction of a TV studio to transmit information and direction to the population in the event of major conflict in various parts of the country. The new studio is located at the Home Front Command's HQ at Ramie, central Israel with its own

ch.33 transmitter and additionally using established broadcast channels to provide both national or localised coverage depending on the scale of conflict. The prime minister has voiced concerns that major conflict against Israel could occur in the coming months.

Kenya. Despite the recent political problems and violence that have swept the country, there's a long term, commitment to close all analogue TV transmissions by June 17th 2015 in favour of digital transmission. The government has formed a 'digital committee' to progress the moves into the digital era both from the technical and programme making viewpoints and encouraging more local production.

France. The remit for improving public broadcasting standards in France has been endorsed by President Sarkozy and is seeking the removal of commercials from the 'France Television' broadcasters. An increase in government funding from this year is on the cards for national public networks to compensate for loss of commercial revenue; the president is also seeking to remove public broadcasters from the competitive pursuit of audience ratings and create a greater diversity of programme content.

New channels. The Bolivian government has given permission for an Iranian sponsored and financed programme base to be built in the Chapare region, providing TV programming for this area of Latin America that is expected to air via

satellite. And across the Caribbean to Cuba and the Chinese CCTV network has just completed a 3 year project to bring its programming into nearly 50,000 hotel rooms. Meanwhile the Chinese government has allowed a reciprocal arrangement with Cuban TV cable distribution in 16 Chinese states.

Personal note. September 2008 will see perhaps the last get-together of veteran staff responsible for putting Southern TV onto the air August 30th, 1958 from the former Rank Plaza cinema in Southampton – the 50th anniversary celebration of ITV in Southern England will be at the 'Rose Bowl'. Marconi equipment was a major strand in the original installation though when I joined Southern in 1964 there was still evidence of budget sourcing of technical hardware, the pre-war OBA-7 and OBA-8 BBC audio mixers and even ex-government Air Ministry audio jacks in profusion, purchased for cash apparently from the surplus shops in Lisle Street! Many programmes became pioneering challenges as technical and production boundaries were pushed in attempts to create even more spectacular results from severely limited equipment – no colour then, only 2 channels with 'BBC on one side, ITV on the other' – and 405 lines. The fully loaded 13 channel turret tuner in the TV receiver would have BBC channels 1 to 5 and then ITV channels on channels 6-13 with the coil biscuits loaded in sequence, so your local 2 channels would be diagonally opposite on the turret tuner – the tuner knob escutcheon usually being marked from 1 to 13 (hence the expression when checking programme BBC and ITV offerings – "what's on the other side").



Test card from Pyongyang, N. Korea

# A profile of Fawzi Ibrahim

by Donald Bullock

**A** respected Television contributor for many years, Fawzi Ibrahim is one of that rare breed, a technical intellectual.

Born in Baghdad in 1943, he came to Britain at the age of sixteen to study Electronic Engineering at the University of Greenwich. Upon receiving his degree in 1964 he took employment at the local Siemens factory, but soon moved to British Relay where he worked as a Development Engineer during the advent of the British colour television service.

He interrupted his technical work to study Economics at the University of Westminster, after which, in 1970, he joined the (then) Willesden College of Technology (now the College of North West London) where he studied electronics in all its facets, but specialised in the servicing aspect until his retirement earlier this year.

To gain practical experience in the trade whilst studying, Fawzi spent much of his summer vacation as a technician with Radio Rentals, and whilst he doesn't say so, there can be no doubt that this experience provided him with a good grounding in psychology.

He produced his first book, 'Principle and Systems for Radio and TV Mechanics' in 1976, and followed it with further volumes on the technicalities of television and video repairs and computer repairs. Many of his titles have been translated into several languages.

He has seldom found contentment with the technical status-quo of our trade, however. When, comparatively latterly, electronics courses were widely being discontinued, he fought to retain those that dealt with its servicing. In

the 'eighties he took issue with the lack of current practicality in the City and Guilds teaching philosophy. With the advent of digital technology, programmable systems and high-density chips he complained that this august body was still testing students on obsolete technologies such as the DMAC Satellite System; and by way of bringing its thinking to rights, he and his colleagues developed their own relevant courses and pressed the City and Guilds to approve them. These included their first digital television course and others on DVD players, and later, on LCD and Plasma television and High Definition TV. Further, they developed short one or two-day industrial courses which attracted enthusiasts in Britain, Ireland, Malta, Cyprus and even Australia.

His latest book, 'Newnes Guide to Television and Video Technology' carries in its preface a heartfelt plea for the emancipation of engineering and technology, and pushes home his view that the obsession with the servicing sector is as dangerous and short-sighted a path for colleges as it is for governments. 'Just how many Nail Bars can a High Street sustain?' he asks.

Fawzi's other lifelong interest has been his involvement with the University and College Union, where he was an executive for twenty-five years and its treasurer for seven. 'These two paths,' he told me 'both the academic and the trade-union movement are complimentary and necessary if we are to maintain high quality education and training.'

Stirring stuff indeed! But it would be wrong to regard Fawzi as an unremittingly serious intellectual. He has a lighter side as well. Most of his



servicing knowledge, he recalls, was gained by his experiments in the college workshop, where, by deliberately introducing faults on equipment in order to observe their symptoms, he soon became noted for his exploding sets. These sometimes took the mains fuse with them, so turning the whole campus into complete darkness with the fire alarm deafening its occupants. Indeed, he confessed, the college had to be evacuated more than once and its compliment of students sent home early.

He fondly recalls (as do I) the excitement of seeing colour television for the first time, and, less fondly, I imagine, the BRC 3500 colour television set with its unwieldy, unfriendly and complex power module.

He has been happily married to his wife Valerie for thirty-nine years and they have two daughters, one son and two grandsons. He lives in North West London.

*Fawzi continues to provide training for the servicing industry. He is the principal of KFI Consultancy and Training [Fawzi@talktalk.net](mailto:Fawzi@talktalk.net) and currently provides a two-day course on LCD television which covers all aspects of DVB, HD-Ready LCD receivers.*

# Digital reception using set-top aerials - part 2

by *Keith Hamer and Garry Smith*

**T**here are various types of set-top aerials available, all claiming to be the perfect answer to digital reception.

In reality, some types perform better than others, making all the difference between a picture and no picture at all.

All set-top aerials are wideband, covering the whole of the UHF spectrum (Channels 21 to 69). This generally means a compromise in performance, particularly with forward gain, when compared to an array tailored to a particular aerial group.

## Loop or ring aerials

Set-top aerials come in different guises, the most popular being the ring or loop which were often supplied with portable TV receivers. Loop aerials provide low output levels but their wide capture angle and sharp nulls could be beneficial in some situations where high field strengths are available. Omni-directional designs such as those used for touring are often based on two loops positioned at right angles.

## Yagi

Many set-top aerials, particularly at the cheaper end of the market, are based upon the Yagi design with its parasitic chain of director elements. It has the advantage of possessing forward gain but in the case of a wideband design, the highest gain is developed towards the upper end of its operating spectrum. Also, its directivity is sharper in this section of the band which means that the lower channels may be more susceptible to the effects of reflected or unwanted signals. As Group C/D

signals suffer more attenuation compared with those in Group A, the higher gain characteristic at the upper end of the UHF band can be beneficial.

## Log-periodic

The log-periodic design has made a comeback over the past few years since the introduction of digital television. Each 'element' acts as a dipole which responds to a different frequency throughout its operating spectrum. Such a design features a very clean polar response throughout its operating bandwidth but its relatively lower gain, when compared with a Yagi of a similar number of elements, could be an issue in marginal signal areas. This is one reason why log-periodic arrays are rarely seen on chimney stacks, even though they were commercially available when colour TV was introduced on BBC-2 in 1967. Perhaps that is why it came as no surprise to the authors recently when one aerial rigger confessed to having never heard of them!

## Amplified aerials

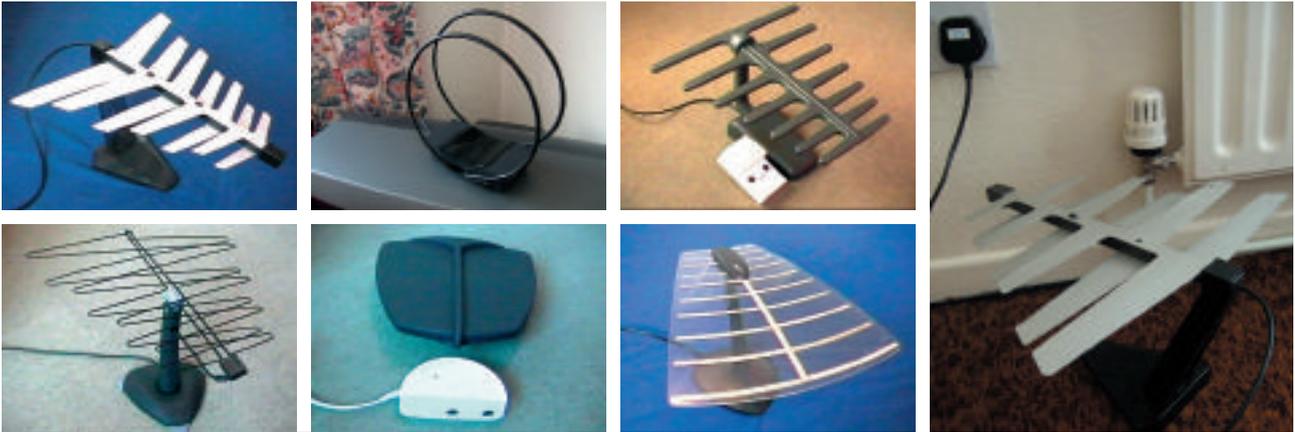
A low signal strength will mean that the picture and sound will be more susceptible to break-up caused by impulse interference from domestic gadgets such as thermostats. While an amplified aerial may reduce the incidence of pixilation caused by an inadequate signal level, it will still be susceptible to impulse noise interference which may cause the picture to pixilate. This, of course, will depend on whether the interference is being introduced via the aerial itself

or after amplification via the flylead outer braid or the power unit.

Before the ONdigital service was unveiled to the public in November 1998, some assessment work was carried out at the ONdigital headquarters at Battersea in London with a selection of set-top aerials which included amplified 'panel' aerials that could be hung on the wall. From purely a viewer's perspective, the digital pictures appeared far superior to the analogue ones when received through the same aerial but in all fairness, the analogue signals suffered serious ghosting from the gasholders and other nearby structures. Even when a London to Brighton express rumbled past every few minutes, the digital signals were still more favourably received.

One aspect of amplified aerials that needs to be addressed is their susceptibility to out-of-band interference from sources operating below Channel 21. This is more common among imported designs, some of which are designed to cover 40 to 860 MHz to cater for the FM band and TV reception in Bands I and III overseas.

Such designs mean that non-TV broadcasts are a potential threat particularly from taxi and other two-way communications, operating below the UHF band. In fact, this can be a problem with any amplified UHF installation or system where bipolar technology is used but an appropriate choice of device with additional input filtering where necessary should remedy this.



*Fig. 1: The Antiference 'Silver Sensor' log-periodic set-top aerial*

*Fig. 2: The Labgear 'SuperLoop' set-top aerial with an integral battery-powered amplifier*

*Fig. 3: The Maxview 'Horizon Plus' heavily encapsulated log-periodic set-top aerial with an amplifier which plugs directly into the mains socket*

*Fig. 4: The Labgear 'TriStar Supreme' log-periodic set-top aerial with a separate amplifier*

*Fig. 5: The Labgear 'TeleTop Delta' with a separate mains-powered amplifier*

*Fig. 6: The Telecam log-periodic set-top aerial*

*Fig. 7: Surprisingly, this is the optimum location for the aerial at 50 km from the Waltham transmitter!*

## Practical indoor aerial experiments

The proof of the pudding is in the eating, so to speak, when it comes to the use of set-top aerials. Experimentation is the key and some surprises can occur.

For nearly three years, tests conducted at 50km from the main Waltham transmitter using an Antiference 'Silver Sensor' log-periodic set-top aerial have proved very fruitful with results and signal reliability equating to those obtained from an external aerial. This is despite dubious signal-level and quality readings obtained.

For convenience, the coaxial feed from the aerial has been extended using a basic-quality video recorder RF lead. Analogue levels in Group C/D via the Silver Sensor range between 50 and 54dB $\mu$ V while the digital levels on Channels 23, 26, 33, 42, 45 and 49 range between 34 and 43dB $\mu$ V. These levels fall short of the recommended 50dB $\mu$ V, a figure to aim at in order to compensate for signal variations throughout the day. The signal-quality readings are not exactly encouraging either with only three of the multiplexes (those in Group A) showing a 'pass'.

Analogue pictures are grainy with slight multi-path distortion on ITV but in fairness, these occupy C/D Channels 54, 58, 61 and 64 and suffer the most attenuation. In this instance, the digital pictures appear far superior to their analogue counterparts due to the inferior analogue signal.

Despite the poor readings, the

incidence of picture and sound 'hiccups', due to impulse interference, has been astonishingly infrequent. The results are so impressive that the main distribution feed from the outdoor aerial has confidently been dispensed with. The only inconvenience is that the set-top aerial works best at floor-level with the aerial pointing straight into a brick wall!

Random pixilation and sound drop-out is always going to be one of the annoying side-effects of digital reception and it all depends on whether the viewer is prepared to accept this when changeover comes. In many respects, snowy and 'ghostly' analogue images may be replaced by comparatively superior digital images but at the expense of viewers suffering picture disruption and sound break-up. It remains to be seen whether or not viewers will find this objectionable when using a set-top aerial or if they will realise that an outdoor aerial (where they are allowed) will provide improved performance. As for the unfortunate ones who have no option other than to use an indoor aerial, they may have to wait until the transmitter powers are eventually ramped up before they can enjoy the delights which the broadcasters promise digital terrestrial television has to offer. So far, these promises have yet to materialise!

Full digital power is not feasible until all the analogue transmitters are decommissioned, so the full potential of using indoor aerials may not be realised until after 2012.

## Set-top aerial evaluation

Prior to the UK's first digital trial in 2002, a random selection of set-top aerials were tested and the performance between designs was staggering.

Amplified versions usually consisted of a basic aerial plus a separate amplifier. The aerials pictured here show the different types of set-top aerials which may be found in the home.

As anticipated, the log-periodic design came out on top. The most impressive passive set-top aerial evaluated by the authors was the Antiference 'Silver Sensor' log-periodic which out-performed its rivals by an average of 3dB. Its chief drawback is its lightweight base which means it can easily topple over and disappear down the back of the TV set.

Having always been impressed by its technical performance, it is an aerial which we have recommended time and time again, ever since we were asked to review it in a technical magazine in the early Eighties.

# The TV Man

by Arthur Jackson

I must mention a big fellow who was one of our aerial riggers for quite a few years, he was a very kind-hearted soul and undoubtedly a gentleman but was quite simply hopeless at working on his own and his van to say the least was never organised, i.e. he would have a load of group C/D aerials on board but only group A amplifiers or vice versa or a selection of chimney brackets and no lashing kits to secure them around the chimneys. But worse than that he had the sense of direction of an average supermarket trolley and would often lose hours looking for an address which he had been to just a couple of days earlier.

In a bid to help him out (or point him in the right direction so to speak) we would all meet at the workshop in the morning when we got our job sheets and amongst a few of us we would number his calls in a sensible direction and do a quick checklist of possible equipment he might need.

This was a great idea and worked quite well for a few months until one day he arrived to repair an aerial on a house which was one of a row up on a steep bank, the closest parking was a good fifty meters away so the heavy wooden ladders and roof ladder had to be carried a long way and then put in place, no mean feat on a wet and blustery day.

Thirty minutes later the aerial job was completed and our man struggled with his big ladders and tools etc. back down the hill where he secured everything back onto the roof rack and inside his van.

He then made his way back up to the house to tidy things up and collect the payment necessary for his work, the offer of a welcome cuppa and home made scones was gratefully accepted and some brief pleasantries and thank-you's were exchanged, after which he returned to his van to read through his call sheets and see where his next job was.

Well, his reaction must have been a sight to see when he realised that his next call was to replace a faulty masthead amplifier for the next door neighbour of the peoples house he had just been to and that ten or fifteen minutes earlier his backside had been against the very amplifier he had to replace as the houses shared a common chimney stack.

When he relayed this story to us the next day he said he felt sure it was the silliest mistake he had ever made! uh- uh, I think the silliest mistake he ever made was telling us lot as he never lived it down till the day he left.

While most of the field repairs we did were to rental sets we also carried out a few 'in house' chargeable repairs but these almost always were difficult to get payment for, for the simple reason which is still the case today, people tend to base the charge on the size of the component fitted and never gave any thought to the fact that engineers need wages and cars don't run for free.

Can you just imagine the reaction you would get after showing a customer a Philips painter chip and quoting them about £150?? I know what they

would tell me and their second word would definitely be OFF! Nowadays the only (where possible) 'in house' repairs we do are to rental or 'in warranty' sets.

The following are a few of the humorous views and statements from customers on regular occasions; all have been said to me many times when I arrived to repair their set;

"I don't know much about TVs, but I'm sure it's the picture valve"

"It can't be anything serious as it just went off very quick"

"It's exactly the same fault again except this time the sound is still on"

"You're not going to work at that with the back off are you son?"

"We were eating our supper and the picture went off just as Bobby put the sausage in his mouth!" and of course,

"The man next door gets a great picture on every channel with just a coat hanger!"

The opinion of many customers to this very day is; 'No picture?' it must be the picture valve!

'No sound?' it must be the sound valve!

'No sound or picture?' it's probably just a wee fuse!

Imagine all those wasted years at the tech studying the theory and principles of the various stages in a TV receiver when all we need carry to repair any fault is two valves and a fuse.

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

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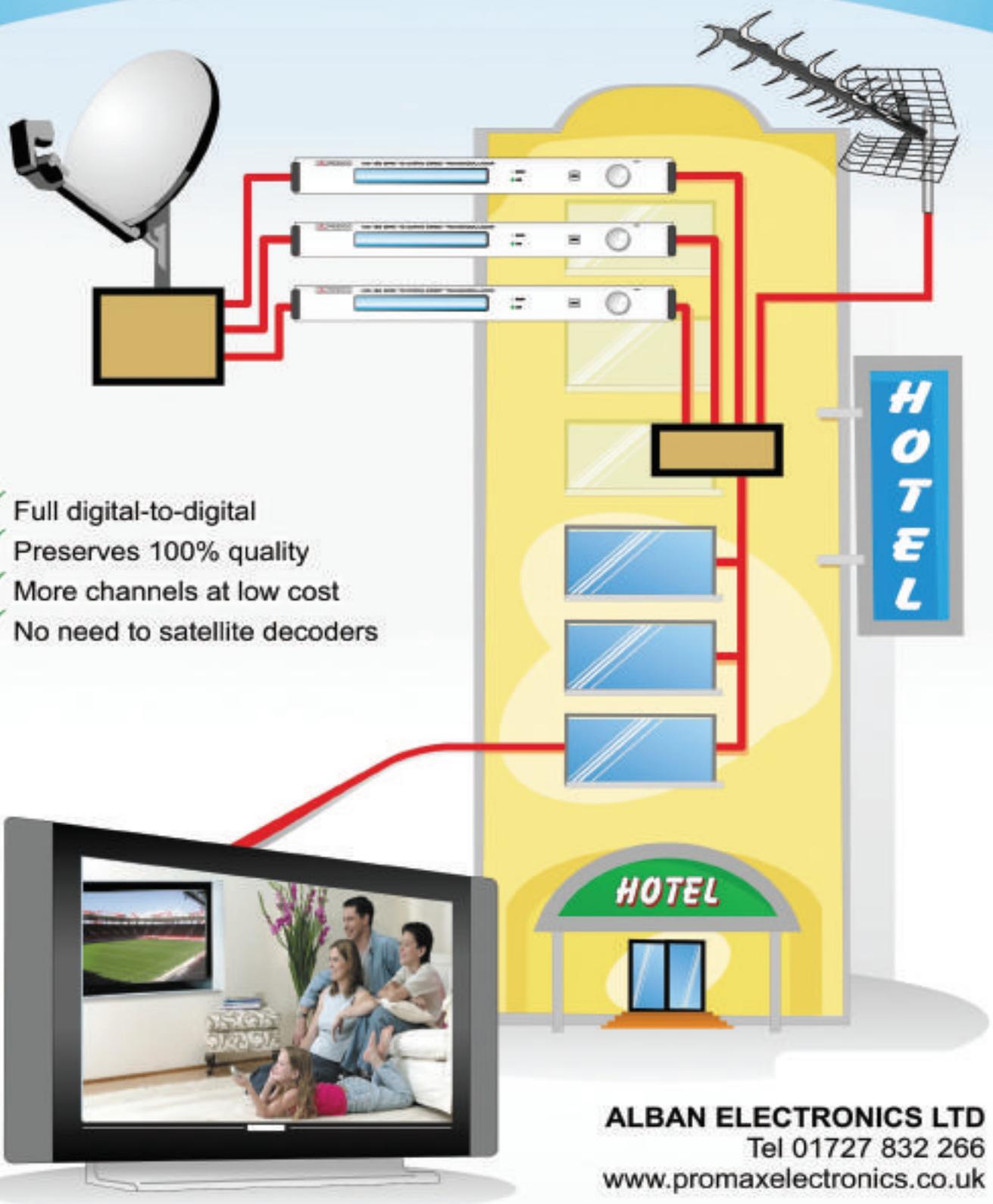
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