THE LEADING UK CONSUMER ELECTRONICS TECHNOLOGY MAGAZINE


SERVICING.VIDEO. SATELLITE, DEVELOPMENTS
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## Servicing Samsung

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Faulf Reports $T V_{s,}$ VCRs, Camcorders and Satellite

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All Those Channels.
Teletopics

| Camcorner |
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Test Case 410

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## REPLACEMENT VIDEO HEADS

Mold

# All those Channels 

The prospect of two hundred channels and more via satellite TV presents a number of problems. All being well, Mr Murdoch's two hundred digital TV channels should be available to us by next Christmas, if not before. The row over whether and how to make BSkyB's conditional access technology available on "fair, reasonable and nondiscriminatory terms" has been resolved, after a fashion. It has been left to the telecoms regulator Don
Cruikshank, director-general of Oftel, to "interpret" the regulations that have now become law. Strange that, introducing a law with the proviso that it requires interpretation! But then law making and fast-moving technology do not fit easily with one another. Mr Cruikshank has at any rate a clear strategy. He has issued a consultative document, and has set January 24th as a deadline for responses. The broadcasters will have to come to some sort of arrangement with one another, otherwise there could be no new digital TV services.

The interesting thing is how multi= channel TV will turn out. Will people make use of the two hundred plus channels on offer, or simply stick to the ones they are used to? Obviously some will wish to experiment, while others won't - and certainly won't wish to pay the extra cost involved. It's a great bonus that we have been freed from the restrictions of "balanced programming",
which were more relevant when spectrum space was limited. Those who want to watch old movies or sport all the time can do so, without being bothered by programming they don't want. Those who simply switch on and let TV do its stuff will continue as before. One can't help but feel that this will be the majority of viewers. If so, the new channels will find it difficult to raise the funds required to finance their operations. Meanwhile the existing channels will of course have fewer viewers, which implies less advertising revenue - and a bit of a conundrum for the BBC, which fits uneasily into this new multi-channel world.

The government has just announced a five-year deal which will increase the licence fee, and thus the BBC's income, in line with retail prices. To start with, anyway. From April, the colour TV licence will cost $£ 91.50$ and the monochrome TV licence $£ 30.50$. Next year's licence will be set at inflation plus three per cent. The following year there will be an increase of half a per cent in excess of retail prices, in the fourth year the figure will be inflation minus one per cent and in the final year inflation minus two and a half per cent. This is measly to say the least. The BBC's director-general John Birt has already commented that "we will have to go back to government and say we don't think this is realistic in later years". Without an adequate income, the

BBC will be unable to compete with those advertisement financed and pay TV channels to secure rights to the sports programming and good movies that viewers expect. Deprived of these, the BBC channels could become very much of minority interest.

One question is whether those who intend to get their sport, old movies, music programming, etc. elsewhere will be happy to go on paying for the BBC's position to be maintained? That depends to some extent on how well the BBC succeeds in maintaining viewer interest. Above and beyond this there is the old, still valid, argument about maintaining public broadcasting channels that are independent of particular interests, whether commercial or political. The BBC's position, and that of public broadcasting everywhere, is going to become more difficult. If you accept the case for public broadcasting, one that to us seems to be watertight, then adequate financing is essential. The present government seems to be in two minds about this. We shall have to see how the next government, of whatever colour, reacts to the problem. Quite apart from its role in providing an unbiased source of news and an open forum for views, public broadcasting can be a means of maintaining standards. But only if it is adequately funded. This will be a continuing problem, however many channels of various sorts become available.

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## INDEXES AND BINDERS

Indexes for Vols. 38 to 46 are available at $£ 3.50$ each from SoftCopy Ltd., who can also supply an eight-year consolidated index on computer disc ${ }_{n}$ For further details see page 291
Binders that hold twelve issues of Television are available for $£ 6.50$ each from Television Binders, 78 Whalley Road, Wilpshire, Blackburn BB1 9LF. Make cheques payable to "Television Binders".

## BACK NUMBERS

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# TELETOPICS 

## Digital Set-top Boxes

BSkyB is understood to be about to place an order for a million set-top decoder boxes for the start of its multi-channel digital TV service, which is on schedule for an autumn launch. The order is worth over $£ 200 \mathrm{~m}$ and will be spread amongst. up to six electronics groups, including Amstrad, Nokia, Pace, Panasonic and Sony. BSkyB hopes that the boxes will sell for about $£ 200-£ 300$ initially. This is likely to involve a subsidy of some sort, which BSkyB hopes to share with firms that will run interactive services.
The initial boxes will not incorporate facilities for interactive services such as home shopping and banking however. These will be catered for by a more sophisticated decoder design to follow later. The first decoders will enable the digital transmissions to be received, with provision for pay-

TV sport and film viewing. Hyundai Electronics America, one of the first manufacturers to deliver cable and satellite digital IRDs to the consumer market, has set up a joint venture with Scottish manufacturer Solectron to supply the European market. The company is the first manufacturer in Europe to incorporate OpenTV technology - in the set-top boxes it is manufacturing for distribution to NetHold digital TV networks worldwide. The boxes will enable cable and satellite TV viewers to use interactive TV services. Hyundai points out that current hardware is future-proofed with OpenTV, as the software can be downloaded to set-top boxes via the satellite or cable system. It can thus be upgraded without the need to purchase new hardware. First shipments have been to Italy and the Benelux and Nordic countries.

Users of OpenTV employ remote control and menu-based selection of the services and programmes required. The Hyundai digital settop boxes incorporate powerful 32bit Motorola processors and use a real-time operating system. They have a large selection of input/output connectors, including low- and high-speed data ports.
Pace has manufactured its 500,000 th digital IRD. The company has formed a joint venture in Italy to supply subscribers to the Telepiu service, has received a contract to deliver $£ 25 \mathrm{~m}$ worth of receivers to Canal Plus in France, and is supplying digital cable receivers to Stream of Italy.
PerfectTV, the first Japanese multi-channel digital TV service that started in October, signed up more than 100,000 subscribers during its first two months in operation.


## VIDEOcopy Printer

> Colorgraph has introduced the VIDEOcopy, a compact device that can be connected to a TV set, VCR or camcorder and a desktop colour printer to produce quality colour prints of pictures displayed on the screen. It can also show pictures on the screen, and has an optional output to a computer. The VIDEOCOPY enables video pictures to be captured and printed without the need of a computer. It comes as a stand alone unit at £199 plus VAT, or with a colour printer from around $£ 350$ plus VAT. It will work with PAL, NTSC or Secam signals and is simple to use - at the push of a button a single frame is taken and fed to the printer. For further details contact Colorgraph (UK) Ltd. on 01734819435.

## Business News

Sony has decided on South Wales as the site for production of its widescreen CRTs and TV sets for the European market. An investment of $£ 50 \mathrm{~m}$ over two-three years is involved, with the creation of some 1,000 jobs. A production unit for 28 and 32 in . widescreen tubes is being installed at the company's Bridgend plant, while sets will be assembled at its nearby Pencoed technology centre. The Welsh plants at present produce 2.4 m CRTs a year and 1.6 m TV sets. Monitors and decoders are also produced. About 85 per cent of the production is exported.
Philips Electronics is restructuring its TV operations in western Europe. Bruges is to become the global colour TV development and manufacturing centre. Dreux will be the final assembly centre for western Europe. Development and manufacture of TV sets at Monza is to stop in mid-1997

The restructuring is thought to involve a loss of around 1,400 jobs.
A price war in China is boosting the sale of colour TV sets and reducing the share of the market held by foreign brands. It has also resulted in a rationalisation of the Chinese industry, which has the capacity to produce nearly three times the number of sets currently being sold. The price cutting began last March, when market leader Sichuan Chang Hong Electric reduced prices by 8-18 per cent. Other major domestic producers followed suit. Since its price cuts were introduced, Chang Hong's share of the market has risen from 16 to 26 per cent (at end October). It has overtaken Matsushita Electric Industry as the top selling manufacturer. Total CTV set production by Chang Hong during 1996 is put at 4.5 m , out of a total national output of 58 m sets.

## New Technology from Canon

Some interesting technology, including a new type of flat-screen display, is being developed by Canon. The display is known as the Surfaceconduction Electron Emitter Device (SED). It consists of an array of electrodes on a quartz or soda-lime glass substrate. Advantages are the low drive voltage - less than 10 V - and a wider viewing angle than with an LCD screen. Canon is aiming to launch a 40 in . TV set using the display by the year 2000 . It will be 10 cm deep and weigh about 18 kg .
Canon is also developing a high-density memory that could store the equivalent of the contents of 200 CD -ROMS on a 2 cm square chip. It's expected to be at least five years before such chips become available

## The Thomson Sale

In the December issue we reported the French government's decision on the privatisation of the Thomson electronics and defence group. But of course you can never tell with the French. Although the decision was described as provisional, it looked pretty cut and dried at the time. Since then however the govemment has changed its mind, causing a furious reaction from Daewoo which was to have taken over Thomson's consumer electronics interests (Thomson Multimedia)
After an independent commission rejected the terms of the offer for Thomson made by its preferred bider Lagardère, the government decided to suspend the privatisation and could well now sell the profitable Thomson CSF defence division and the loss-making Thomson Multimedia separately, something it had previously ruled out.
The stumbling block seems to have been Lagardère's proposal to sell Thomson Multimedia to Daewoo: the commission pointed out that neither the government nor Lagardère could hold Daewoo legally to promises made to increasẽ jobs and investment in Thomson Multimedia. Privatisation of Thomson remains the government's intention, but we will have to wait to see how it's to be done.

## System Trials

Cable modems can provide interactive services and fast Internet access. Telewest Communications, the UK's second largest cable operator, plans to launch a cable modem trial at Basildon later this year. The trial will involve a hundred homes and small businesses, and will use Motorola's CyberSUFR cable modem. This can operate at data speeds up to $10 \mathrm{Mbits} / \mathrm{sec}$, with an upstream data rate of $768 \mathrm{kbits} / \mathrm{sec}$. Telewest has access to some 4.3 m homes in the UK.
The Philips CD-i system forms part of a major European home shopping trial, Homestead 2000, that's due to start in March. The project will cost around $£ 3 \mathrm{~m}$ and is part-funded by the European Commission. Some 5,000 people in the UK will take part, along with others in France, Italy and possibly Spain. They will use a CD-i deck or home PC to browse through multimedia CDs, then order goods. on line. The project will end in November.

## It's Official!

Channel 5 has announced that the revised date for the start of its service is March 30th, and that it is "on target to meet this scheduled date".


B-Tech has added two new TV wall mounts to its range of Hi-Style accessories. Models BT5 18 and BI521 are both designed for TV sets with screen sizes up to 21 in . $(53 \mathrm{~cm}$ ) - safe loading is 77 lb (35kg). The BT521 has a single straight arm while the BT5 18 (see photo) has an articulated twin-arm for maximum versatility. The arms swivel through $180^{\circ}$ while the TV support platform has provision for a $7^{\circ}$ tilt up or down. The wall mounts are available in black or white. For further information apply to B-Tech International Ltd., Vulcan House, Vulcan Way, New Addington, Croydon CRO 9UG (phone 01689848535 , fax 01689841087 ).

## JJ Components' Move

JJ Components is expanding and moving to new premises, with a trade counter, on January 16th. The new address is R/O 243-247 Edgware Road, The Hyde, Collingdale.
London NW9 6LU. Telephone no. is
01812059055 , fax 01812052053.

## Bull Electrical Catalogue

Bull Electrical has introduced a new full-colour mini catalogue that features some of the company's more popular lines. The wide range includes optical, electronics and other products. For a copy apply to Bull Electrical, 250 Portland Road, Hove, Sussex BN3 5QT (phone 01273203500 , fax 01273323077 ).


CPC of Preston has doubled the number of items available in its test equipment range. There are now over 300 product lines. New items being stocked include oscilloscopes from Kenwood, GoldStar, Fluke and Pico and both analogue and digital multimeters from Tenma.
The company has recently added the Commodore Multimedia Keyboard Plus to its range of computer accessories. It has a built-in 3W per channel amplifier with speakers and a microphone, and connects with the PC via one integral cable with four end connectors.
For further information apply to CPC PLC,
Component House, Faraday Drive, Fulwood,
Preston PR2 9PP (phone 01772654 455, fax 01772654466 ).


Reports from
David C. Woodnoth Simon Bodgett Brian Storm and Eugene Trundle

## Sanyo VMD90R

When the eject button was pressed the cassette housing would open then close automatically. It's not an unusual fault with models that use this deck. The trouble occurs when the mechanism, which is of very light construction and liable to bend under stress conditions, has been forced/dropped etc. The cassette latch and down switch are particularly vulnerable, but can normally be reset (bent!) to overcome the problem. A warning to the customer about the consequences of repeat damage, i.e. the cost of a new cassette housing, is not out of place and is generally heeded. D.C.W.

## Sharp VLV690H

The VTR functions were OK but there were no E-E pictures. Checks showed that the 15 V camera supply was low at 10 V . The guilty components were R116 $(2 \cdot 2 \mathrm{k} \Omega)$ which had gone high in value ( $3 \mathrm{k} \Omega$ ), $\mathrm{C} 138(10 \mu \mathrm{~F})$ and $\mathrm{Cl} 37(1 \mu \mathrm{~F})$. Normal service was resumed when they had been replaced. D.C.W.

## Panasonic NVG3B

The customer phoned to ask how much we would charge to replace the CCD imager. We asked why he thought this was necessary? Apparently he had been told that this was the only thing that could cause the symptom - vertical lines in the background of the picture. While agreeing that the imager could be the cause, we suggested that an inspection would probably be worthwhile before such an

## Camcorner

expensive item was replaced. The cause turned out to be a dry-joint at the CCD connector. Result - one happy customer! D.C.W.

## Sanyo VMRZIP

The customer complained about
"lines across the playback picture". In fact because of an ATF fault there was incorrect tracking and LP/SP switching. The cause of the trouble was failure of IC361 on the main PCB.
This was a common problem with an early batch of these camcorders. Hoperfully most of the faulty chips have now been replaced. D.C.W.

## JVC GRS707

"No camera power" was the complaint. On test we found that after a while the blank screen changed to a very discoloured picture, with red in the centre and a green line across the top. Then, as the camcorder warmed up, a good picture appeared. As freezer failed to reveal the culprit(s), patience was required. It paid off after several days. C37 and C38 on the imager PCB were both leaky - C37 was well out of specification. S.B.

## JVC GRSZ 1

The fault report said that this camcorder wouldn't record sound. When I checked it I found that there was no power. Previous repair attempts had resulted in the failure of several circuit protectors. The cause of the trouble was the audio/ control head cable. We had to replace the head assembly. S.B.

## JVC GRS707

This camcorder wouldn't record colour. We found that C445 was open-circuit. It's mounted on the edge of the PCB and can be damaged as a result of an impact you sometimes find that it's missing altogether. S.B.

## JVC GRAXIO

The fault report said that this unit recorded in monochrome for the first two minutes, then in colour. What it didn't say was that previous
repair attempts had left IC601 and its surrounding components in pretty poor condition. After a cleanup operation we found that the cause of the original fault was R605 and that the VCO (320fh) resistor R666 needed setting up. S.B.

## JVC GRS70/GRS77

Poor S-VHS playback, VHS OK, occurs when the THE 326A nonlinear de-emphasis module IC2 fails. Record as well as playback is affected. leaving the customer with defective recordings. The chip usually becomes intermittent in operation, and can reduce or limit its output without failing completely. S.B.

## JVC GFS 1000

This camcorder produced very poor playback pictures. It had been to another service organisation, which had replaced many components but not the defective one. The culprit turned out to be C47, in the comb filter return path. S.B.

## Panasonic NVM40

This full-sized machine behaved as if it had faulty video heads: when a known good tape was played back there was just a screenful of noise. Initial checks showed that there was no playback 5V supply at the head amplifier circuitry. As the correct switching sense was present at the systems control chip IC6004, we followed the switching lines through to the various buffer transistors. The switching terminated prematurely at the 2SB970X transistor Q3022. B.S.

## Sony CCDTR55

The E-E luminance signal would disappear a few minutes after this camcorder was switched on, leaving just the chroma and syncs. We found that there was no luminance output from the encoder chip IC301, though it was receiving a luminance feed, blanking and sync pulses and the correct control voltages from the EVR chip. IC301 itself, type CXA1072R, was faulty. E.T.

## PINCH ROLLERS/VCR BELT KITS

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## VCR BELT KITS/VIDEO LAMPS \& SWITCHES

| Model Price | Model Price | Model Price Model | rice Model Price |
| :---: | :---: | :---: | :---: |
| aranada <br> VHSDP1, VHSFV2 <br> VHSTJ1, VHSTJ2 <br> WHST 3 | 323, 535, VA200V1, 200V2. 20RW7, 21DV1, 210V2, 21D, V3, 25BO1. 25802, 11, 12, 302 , 303, 305. 310V1, 31DV2, 31D, V3, 3SBi1. | Models \& Description Order Price | ON/OFF MAIN SWITCHES |
|  | 35812, 35813. 72588. VR300V2, 35802, 35803.6358771584 .71555 .71588. |  | GRUNDIG |
|  |  | 80 mV ( 310 mm WIRES) | PART NO: 29703,29102 |
|  |  | 80 mV ( 310 mm WIRES) | USED ON: |
|  |  | PANASONIC VIDEO LAMPS VL02 30p | 8712,C8714,C8894,M68-190, |
| , |  | SHARP VIDEO LAMPS VL02 | 90/99,M70-195,P40-345, |
| MVS S 400. $440, \mathrm{VS} 400,410.415 .435 .400 .454$ 450.458 .480 |  |  | ST66-1602,T55-340,V7722 |
|  | VA3260.6344, 6488,6 | HITACHI 5381682 (VT63, VT64) VL04 135p | PRICE: 140p |
| 1600.2000. 2080. 2200. 2280, | 495B623, 6 6488895, 19586 | MPS | MATSUUSAISHO |
|  | VR501. 1100 |  |  |
|  |  | AIWA, AKAI, ALBA, AMSTRAD,VL05 100p BLAUPUNKT, FERGUSON. | , Matsul-2igo, Salsh |
| V5150 |  | BLAUPUNKT, FERGUSON, | PRICE: $\quad 140 \mathrm{p}$ |
| LC290N, LC295SN, SVS 780 , VS 170 70p VS 160, BARCELONA FLORENZ, GV 4000 . 4000.4001. |  | FUNAI, G.E.C., GOLDSTAR | PHILIPS |
|  |  |  |  |
|  | 4229,437.437, 442, 4299,432,437,442.44.4. | GRANADA, GRUNDIG, HINAR | USED ON: K30, K35, K40, KT3, KT4 |
|  | $512,522,5229,8379,842,647,722,7225$, 723, 7379. 747, 8389.948,9489 <br> $70 p$ |  | PRICE: $£ 0.95$ |
| 501, 5050. 5095. |  | TACHI, ITT, JVC IHRD | SONY |
|  | SAISHO <br> VR2000, VHL3 | SERIES), MATSUI, MITSUBISHI* | (POWER SWITCH + REMOTE SWITCH) |
| 5104, 5106. TVR37001 70 | VR3800, 3200, 3300, 3500, 3800, 3350 . <br> VRS 4400,5000 <br> VR3400 | NEC, ORION, NATIONAL, |  |
|  |  | PHILIPS, SAISHO, SALORA, | USED ON: KV1612, MK1, KV1612, MK2, |
|  | samsuna <br> SV716. 717. V1678. V-621, V1626. VX516. | SAMSUNG, SANYO, SHARP | USED ON: ${ }^{\text {KV }}$ KV1614, KV2052, KV2056, |
| $\underset{\substack{200 \\ V L 4, V \times L 355, ~ V T V 300 ~}}{18}$ |  | SIEMEN, SONY, TELEFUNKEN, |  |
|  |  | OMSON,TOSHIBA | $\begin{aligned} & \text { KV2062, KV2068, KV2212, } \\ & \text { KV2216, KV2252, KV2256, } \end{aligned}$ |
|  |  |  | KV2704 KV2705,KV2706, KV2752PE3. KX20PS1, KX20PS2, KX27PS1 |
|  | VBSOO, VB910, V1900, V1910 110 | AKAI, GRANADA (VHSTJ2). VL01 25p |  |
| VT5000, VIT500, VT18 | PX980, 981, 982, SE9001, sV9501, S1x307. | HITACHI (VT3000), ITT (VR3912, |  |
|  | 8220, 8226, VKB220, VPX3T, VX750, VX770. 790, 8220, 8225, SE9000, 9009 <br> 900 | VRP3833), JVC (HR2200, 3300, | 1.50 p |
| VT680, VT6500, VT 8800 , VT 9300 . VT9500. VT9700. 9900 <br> VT52 VT57 VT51, VT82 VTE3, $64,65,85 \mathrm{~F}$ |  | 3330, 3660), MITSU8ISHI | (POWER SWITCH + REMOTE |
|  | SVX301, 303, 305. SX77301, V8710, 971, V1710, 730, 750, 970, VX710. 712, 720, 730, | (HS200). TELEFUNKEN (VR510, | SWITCH |
| (63000 | 970.971,972 ${ }^{\text {900 }}$ |  | SWV2022, KV202 |
| V1700, 110, 111, 113, 115. 118, 120, 125, 128. |  | 519, 610).THOMSON (VK300, | 200p |
| VT145, 150, 188, 780, 175, 220. 225, 250, 255, | sanyo | 305, 306, 3301), FERGUSON | PART NO: (POWER SWITCH 26 mm ) |
| 258, 280. VTL30 |  |  | USED ON: <br> KV1400, KV1440, KV2040 |
|  |  | (3V00, 16, 22, 24, 3292, 8900,$8901,8902,8903,8909,5912$, | V1400, KV1440, KV2040, |
|  |  |  |  |
| HR7350, HR7800, HR7610. HR7850, HR7665 | VTC9100. VTC9300VTC $1100,1300,1500$. VHR1100, 1110. 1450, 1200. 1300. | 8901, 8902, 8903, 8909, 5912, | PRICE: |
|  |  |  | (POWER SWITCH 21 mm * REMOTE SWITCH) |
|  | VHP 15500.2370. M MF 220VHR2 200 VHR2300, WHR2500, | BLAUPUNKT,ORION IVH1, 2A),VL02 30pNATIONAL (NV200.2010, 3000, | USED ON: |
|  |  |  |  |
| HR0, |  | 7000, 8150, 8200. 8400.8600. | PRICE $£ 2.00$ |
|  | 3500, 3700, 3800, VHRD500, 700. TLS1000. <br> TLS1001 <br> 80p |  | 2 PIN (FUNCTION SWITCH) |
| 320, 321, 330. 337, HRD $350,370,400.430$, |  | 8610, 8620), SHARP (VC2300, | KV1612, MKK, V1612, MK2, |
|  | 154, 15, 15, 171, v111 145, 220, 23, 235, 240. | 0, 6300, 7300 | KV2052, KV2056, KV2212, |
|  | 2444, 250, 251, 274, 297, $21010,333.64 \mathrm{VHR3355}$ $350.4100,4105.4150 .4200,430.4300 .4550$. |  | KV2215, KV2216, KV2252, KV2256, KV2704, KV2705, |
| HRD227, 520. 52 1, 522, $527,600.610 .620$, 637, 641, 650. 830 . | 474, VHRA770, 5080, $5100, \$ 200,5300,5350$. 5700, 8850, 7100, VHR7200 7250. 7260. 7300, |  |  |
|  |  | Al IVS 101 ,GRANADA VL | KV2706, KV275PE3, <br> KV2756PE3 <br> 35p |
|  | 7400. 7500, 7520, 7530. 7530. V4R77560, | (VHSXJ3). TT (VR3993,3994), |  |
|  | $8250.8500, \mathrm{VHR} 8850$. 8801, VHRDL400, 4410 , 4500, 4500, VHRDA510. 4710, 4890, 570076p | JVC (HR2650, 7600, 7610, 7650, |  |
|  |  |  |  |
|  | vmib6. | 5), TELEFUNKEN (VR530, | REPLACEMENT IDLER TYRES AKAI M132773 M32773 |
| HRSA700, 5800, SR3200, SAS368E | VTC6010 | 535, 539, 550, 630, 650), | MZ366960J2 T02 |
| LOMk |  | THOMSON (V309, 316, 357, | GOLDSTAR VXP0521 |
|  |  |  | 6861471 |
| MATSUI <br> VX600, 730, 735, 750, 755, 765, 450. 6000, vS888 |  | VK309, 411,TX8000), |  |
|  | VC3500VC3300 |  | 6861482 |
| $V \times 1000 . V \times 2000, V \times 2500 . V \times 3000$.  <br> $V \times 6000$ 100 p <br> $V \times 800$ 70 p |  | FERGUSON (3V31, 8941, 8942) | 6886971 |
|  | VC350, 387, 471, 473, 481, 482. 483, 486, 458, 496, 8481 <br> $80 p$ | AUTHENTIC (N850), DECCA VL07 40p | JVCi PU 48967B IT06 |
|  |  | (VR8300),GRANADA (VHSTJ3, | PU 51380 |
| HS300, 301, 302, 307, 310, 337, 338, 347, 349 411, 412, 421, 480. HSB10. 2a, 30. HSE10, 20, | VC402, 500, 671, 573, 581, 582, 583, 586, 585, VCSF3, VC858: 80p <br> VCT08, 405. 408, 550, 600, 651, 674, 881,6e2 |  | PU 51402A |
|  | VC108, 405, 408, 550. 600, 651, 674, 681, 6e2, 682. 684. 685, 693 | WJ1, WJ3). ITT (VR3913, 3914, | PU 55373 |
| 411, 412, 421, 480. HSB10. 20, 30. HSE10, 20 , <br> 30,70 <br> 110p | VC700, 750, 783, VC6F3, VCEV3 700 VC206. 671, 772. 779, 780. 788, 782, 785, 786 | 3963) JVC (HT7200, 7300, 73507700) TELEFUNKEN (VR450. | PU 55374 IT10 |
| HS303, HS304, HS306. HS307, HS330. <br> HSS18, HS319.HS410 1100 <br> HSM1000. 18. HSM23. 25. 33. 34. 35, 37, 54. |  |  | NATIONAL PXP 0329 |
|  | 787. 793. 800.VC7810. 7822. VCA100, 102. |  | NATIONAL VXP 0329 IT1 |
|  | 501, 502, 602, 5011, VCB311, 361, VCD801. 802, VCH851, 852, 882. VCM73. VCT72 75p | 520, 529, 540, 549, 620, 640, 920. | PANASONIC VXP0343 IT12 |
| N.E.c. <br> N830, N831, N832. N833 N895 <br> PVC2300, PVC2400 <br> DX1000. 1600, 1800, 2000, 3000. N9012. <br> 180 p <br> 9013. 9014, 9016. N9033. 9034. 9053, 9054, <br> 9055, 9050, 9066, 9096, 9110,9120 <br> N9510, $9520,9530,9610$ |  | 1920), THOMSON (V4100, | VXP 0344 T13 |
|  | VCA10, 103. 105, 105, $113,11613,211.234$. 246, 254, 30, 33, 35, VCA $36,37,40,43,454$, |  | VXP 0401 IT14 |
|  |  | VK308, 309, 312, 410), | $V \times \mathrm{O} 0433$ T15 |
|  | 48, 50, 505, 51, 52, 53, 54, 55, 56, 57, 58 . VCABO, 805. 615. 67, 68, 1031, VCB320, VCB597, VCD805, VCDAOB, 810, 815. VCHBO, | FERGUSON (3V23, 29, 30, 8923. | VXP 0463 T16 |
|  | VCB597, VCD805, VCDOP6, 810, 815. VCHBO, 81, 85.865 .910 . VC5 1000 . | 8924, 8929, 8930, 8931, 8940) | VXP 0521 T1 |
| N9510, $5520,9530,9610$ 83 E <br> NATPOMAL PANASONMC  |  |  | VXP 0581 |
| NV300, NV | 313. ${ }^{\text {VC790ET }}$ ( VCC10 | GRANADA (VHSAY3),SHARP VL08 45p | SANYO 1430662T15620 |
| NVTIT, NVIB8 | sony | (VC200, 381, 384, 385, 386, 388, | SHARP NIDLOO5GEZZ IT20 |
|  |  | 390, 393, 9300, 9500, 9700) | NIDL0006GEZZ |
| NVVE00. NV2660, NV852 145 P |  |  |  |
|  | SL8800E, SLI8000\%, SL28200, SL8800 173p |  | NPLY0107GEZZ IT22 |
|  | SLV255. 125. 213, 225. 262. SLVx1. | PANASONIC | PRICE |
|  | $\frac{20.3}{\text { TositisA }}$ | MODE SWITCHES | 20p EACH |
|  | V55. V37 | MODE SWITCHES | 16P LACHI POR A PACK OF 5 FOR EACH MODE |
|  | V33. v31, V32, V61, V52, v53, v9600. | NV2000, 2010, 7000, 7200, 7800 (VS50048) |  |
| NVFV1, NVM 40 , 3000, 3300, 40. 7. 9000. ${ }^{\text {a }}$ | V68, V63. V65, V66. V67 | NV230, 260, 430, 810, 870, 2300, 4300 £3.50 |  |
|  |  |  |  |
| NVM 1. NVM3. NVM5 | 85,86 \% 8 , | (VSS0110) E2.25 |  |
| VRACSO. VRE920 | V198. $109,170.120 .133,140,1999.209 .2110$. | NV830 (VSS0091) E2.10 | GRANDATA LTD |
| VR6560 VR6442. VR65 20 | 660.711, 880 |  |  |
| VR2025. VR25800 | V91 G. V95G 115 p | NV300, 333, 340, 366, 688, 777, 778 | 1: 0181-900 2329 |
| OV188. 190, 286, 291, 292.488, 471, 582.551. |  | (VSS0060 £3.75 | Fax: 0181-9036126 |
|  | 703.813 CPS1E | NVG21, 25, NVH65, NVD80 (VSS0175A) £2.00 |  |

VIDEO SERVICE KITS
AMSTRAD
VCRTOO
COMTOATS
BELT SET. PINCH ROUER. REEL IDLER. VIDED LAMP Order Code: SK41

## V42/43

HRD 455 HRO725
Cantonts
BELT SET, PINCH ROUER.
BAND
Order Code: SK37 ELT SET, PINCH ROLER SUPPLY CLIJTCH, TAKE UP CLUTCH

3V58/59/64,65
HRD $170188 / 210 / 230 / 300 / 320 / 37 / 400 / 430 / 530700 / 50$
HRS5000
BELT SET, PINCH ROLER, IDLER ARM, TENSION BAND Order Cade: SK44

## 3V29/3V30

HR720007300/7350
Contents
BELT SET, PINCH ROLLER, TENSION BAND, IDLER TYRES,
Ortar Cade SKOS
3V35/36, 38,39/49
HRD11Q111/120/225
Content
GELT SET, PINCH ROLLER, TENSION BAND, IOLER TYRES
Order Code Ska
$3 \mathrm{~V} 31 / 3 \mathrm{~V} 42$
HR750076107650,7655
Conterns Econorry Kit Contents BELT SET, TU REEL TABLE SELT SET, TNU REEL TABLE IDLER. T/U CLUTCH TNIDIER. IDLER TYRE T/U IDLER TYRE TENSIDN BAND VIDEO LAMP T/U CLUTCH

## $3 V 35 / 36 / 38 / 39 / 49$

HRDIIC/111/120/121/225
COIT SE
BELT SET. TU REEL TABLE TYRE PINCH ROLLER TIU CUTCH TN IOLER PEL IDIER TENSION BAND Order Codi: SK3s
1.00 O2DER CODE SK34

Econony Kir Contart
EELT SET. TU REEL TABLE YRE. SUPPLY REEL TABLE TYRE. PINCH ROLLER. TJ LUTCH. T/U IDLER TVBE REE IDLER TYRE E10.00 ORDER COOE: SK 35 Economy Kit Comtants HROT200/730077350 Contant
BELT SEI. TV REEL TABLE TYRE SUPPLY REEL TABLE
IOLER. TU CLUTCH TMEIDIER.
IOLER. TU CLUICH. TNU IDLER.
IDETVRE TN IDLER REE
Order Code: SK31 Fiom TN CLUTCH
3V4/4/4/48/53/54/55/57
HRPSOMRDD140/150 K158/160
HRD250/257/565/566/755
CEIT SET. PINCH ROLLER.
CLUTCH MECHANISM. TENSION

FISHER
FVHPSO5/906/907/S08/910/911/91G/918

BEIT SET. PINCH ROLLER.
IDLER. GEAA IDLER UNIT.
TENSION BAND
Order Code: SKS7 $\quad$ E13.00 ORDER CODE: SKS8
FVHP655/618/620/622/710/71/715/715/720/721/722/25/ 73018301840
Contopts
BEIT SEL PINCH ROLIER
IDLER GEAR IDLER UNIT.
TENSION BAND
Order Code: SKss

## HITACHI

VT11NT33
Coments
BELT SET. PINCH ROLLER. TENSION BAND. IOLER TYRES
Order Code: SK08

EOnOMy Kir Conterts
BELT SET. PINCH ROUER. IDLER TYRE
E11.00 ORDER CODE: SKG9
Ecomony Kit Contonts BELT SET. PINCH ROUER. IDLER TYRE
85.00

## VIDEO SERVICE KITS (Cont.)

## VT11/VT3

Contents Ecomonay Kit Conterts
BELT SET. TMP REEL TABLE BELT SET. PINCH ROULER
TYRE SUPPLY REEL TABLE
55.50 TYRE. PINCH ROLER. FF/REW

IOLER CLUTCH PLATE.
TENS!ON BAND
Order Code: SK45 E1300 ORDER CODE: SK45 E3.J
VT52/61/62/63/64/65/85/86/640
Comennis
CIT SET PINCH ROUEP
BELT SET, PINCH ROLIER,
FF/REW ARM. CLUTCH PLATE Econay kroman
Econamy Kit Comtencs ECONOTTY KI COMtOnLS FTREW IOLER
TENSION BANO
Order Coda: SK49 $\quad$ E14.00 ORDER CODE: SKSO
VT $400 / 405 / 410 / 13 / 74 / 15 / 18 / 420 / 25 / 25 / 28 / 430 / 31 / 35 / 48 / 450 / 488$ $510720125 / 28 / 530 / 35 / 36 / 540 / 545 / 46 / 43 / 570 / 75 / 576,580 / 85 / 88$
Contents
TMING BELT. PINCH ROUER. FIREW ARM. CLUTCH BASE
NSION BAND
Order Code: SK52 C9.T5

VT100/11ゆ111/113/115/118/20/125/128/130/135/138/145/150 175/220/225/250:255/258/250 NTL30
Contonts. PINCH ROUER. FFFREW ARM. CLUTCH PLATE
55.00 TENSION BAND

Ordse Code: SK51
f14.00

## PANASONIC

NV2C00/NV2010
55.00 Contonts

BEIT SET. PINCH ROUER. TENSION BAND. IDLER TYRES

NV7000/NV7200/NV7800 COITOAS SET. PINCH RDUER TENSION BAND. IOLER TYRES NV300/NV330/NV333/NV340/NV366
Contents
BELT SET. PINCH ROUER. TENSION BAND. IDLER TYRE Drder Code: SKOI
E2.00 NV2000~NV20:10
COAt日fts EINCH ROLER FF Econony Kit COntants
BELT SET. PINCH ROLLER FF BELT SET. PINCH ROLER
IDLER. PLAY IOLEA TENSION IOLER TYRE PULLEY TYRE
BAND. VIDEO LAMP
Order Coda: SK13 E3.50
NV7000NV720NNV7800
Contents
Economy Kit Contents
BELT SET. PINCH ROLIER BELLT SET, PINCH ROLLER
IDLER UNIL PLAYIDLER IDLER TYRE CUUTCH TYRE
TENSION BAND
NV300~NV330/NV333NV34QNV366
Comfonts BEIT SET, PINCH ROUER,
BEIT SET, PINCH ROUER,
IDLER UNT. PLAY IDLER.
TENSION BAND
NVG7/NVGgNVG1LNVG11/AVG12/NVG14/NVG:5/NVGT6/ NVG18NVG32NVG120NNVG130/NVGACO/NVY 65 (PX/ACV AG1870 (P/K)
Contents Ecomony Kit Contents LOADING BELT. CAPSTAN BELT. PINCH ROLLER IDLER BELT. PINCH ROLLER. IDLER. ON BAND

## UNIVERSAL TRIPLER Price: $\mathbf{5} 5.00$ each

AMSTRAD MODE KIT Price: $\mathbf{£ 2 . 7 5}$ each

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NV332

## BELT SET. PINCH ROLIER

 PLAYIDIER BELT SEI, PINCH ROUER LAY IOLION BAND FREW TYRE PLAY IOLER TYRE FF/RE ENSION BAND. FHREW TYRE IDLER TYRENV230/250/250/28Q/435/450/450/470/650/810/890/

## AGiz00PK

BEIT SET, PINCH ROLLER.
OLER. TENSION BANI
Order Code: SKzz
NVEOCMNVE
Comtoats
EEIT SET, PINCH RDUER.
PLAY IDLER FF/REW IDLER.
TENSION BAND
MV730NVTTO
SLOT IN BELT LOADING BEIT Eeoromry Kit Cortonts
PINCH ROLIER. IDLER UNIT. SLDT IN BELT. LOADING BELT.
TENSION BAND PINCH ROLLER IDIER TVRE

Order Code: SK19
NV37QNV380/480/630780/830/850/AG2IEOPK/AG2200PK
Contents Econony Kit Contsats
BELT SET, PINCH ROLLER, BELT SET, PINCH ROUER
IDLER. TENSION BAND IDLER TYRE
Ordar Codo: SKZ1 SíM ORDER COOE SKZZ

## 2275

NV77/NV788
Contants
EI, PINCH ROLIER
DLER UNIT. TENSION BAND
OLER UNIT. TENS

Econonry Kit Coutants
BELT SEI, PINCH ROLLER
10LER TME
ORDER CDIE SK18

## VIDEO SERVICE KITS (Cont.)

## SHARP <br> VC381

Comonts Eeonomy Kit Contonts
BELT SET. PINCH ROLLER. BELT SET. PINCH ROUER
REEL IOLER. TENSION BAND. REEL IDLER TYRE
Order COde: SK47 E8.00 ORDER CODE SK48 E3.25
VC500VC511NC581NC582VC583VC584/VC5F3
Coments Econonry Kit Contonts
BEIT SET. PINCH ROLLER BELT SET. PINCH ROLLER
REEL IOLEA. TENSION BAND REEL IDLEA
Order Cods: SK60 E950 ORDER CODE: SKG1 E5.00
VC781NC7810VC7822NC785NC788/NC793NC800
VCAIOONCA1O2NCAIOANCA202
Contents Econosry Kin Cortonto
BEIT SET. PINCH ROLIER. BELT SET. PINCH ROLIER REEI DRIVE UNIT. TENSIDN REEL DRIVE UNIT TYRE
BAND
Dider Coda: SKEA E13.50 ORDER CODE: SK65 E3.75
VC581~NC582NC6B4, $\mathrm{VC685}$ /VC693 NCE99 NC6F3 VC700

REEL DRIVE UNIT. TENSIDN BELT SEI. PINCH ROLLER
BAND
Order Code: SK62 E13.50 ORDER COOE: SKGZ ESOM

## FOR MORE DETAILS OF OVER 500 TVPES OF SERVICE KITS . PLEASE RING US!

## BACKUP BATTERIES

REPLACEMENT PHILIPS NI-CAD BACKUP BATTERIES
Replaces Ferguson Part No:
00E6-067-001, used on TX10, L2V
Replaces Philips Part Nos:
130-10138, $138-10313.1 .2 \mathrm{~V}-90 \mathrm{mAh}$
Replaces Philips Part Nos:
138-1229, 2.4V - 90 mAh
REPLACEMENT FEROUSON NICAD BACKUP BATTE Replaces ferguson Part Now No-cai backup batteries Replaces Ferguson Part Nos:00E6-066-001, 2.4V Used on: 3V35, 3V56, 3V58, 3V65

## REPLACEMENT

LINE OUTPUT TRANSFORMERS

| Description | Price | Order Code |
| :---: | :---: | :---: |
| HITACHI 2433752 | 1500p | LOTOT |
| ORION 3714002 | 1500p | LOT02 |
| FIDELITY ZX300 | 1500p | LOTO3 |
| FE TX100 90 DEG | 1500p | LOT04 |
| SABA 490007182 | 1500p | LOT05 |
| FE TX90 WHITE | 1650p | LOT06 |
| ITT O307/37 EQ | 1600 p | 10707 |
| BLAUPUNKT 210 | 1600p | LOT08 |
| GRUNDIG 2922010 | 1600p | LOTO9 |
| IT CVC800/1/3 | 1500p | LOT10 |
| ITTO218/37 EQ | 3600p | LOT11 |
| NORMENDE 5255 | 1600p | LOT12 |
| SABA 81000200 | 1600p | LOT13 |
| SALORA T236 EQ | 1650p | LOTi4 |
| SABA 811-50-24 | 1600p | LOT15 |
| SABA 770223500 | 1600p | LOT36 |
| TELEFUNKEN AT1 | 1450p | LOT17 |
| TELEFUNKEN EQ | 1400p | LOT18 |
| SALORA FM0218B | 1600p | LOT19 |
| NORMENDE 5255 | 1600p | LOT20 |
| ITT CVC 1150/\% | 1500p | LOT21 |
| ITT COMPACT 80 | 1500p | LOT22 |
| FE TX100 GREEN | 1400p | 1 OT23 |
| HINARI CTA/5 5113 | 1500p | 10 T 24 |
| SELECO 6320410 | 1600p | LOT25 |
| BLAUPUNKT 8667 | 1600p | LOT26 |
| ITT COMPACT B1 | 1450p | LOT27 |
| ITT CT3326 MUL | 1500p | LOT28 |
| ITT D066/37 EQ | 1600p | 10729 |
| $1 T \mathrm{3546}$ EQ | 1500p | 10730 |
| LUXOR 5810110 | 1600p | LOT31 |
| SABA 849380920 | 8600p | 10732 |
| HITACHI 2434141 CP | 1200p | 10733 |
| FE TX100 110 D | 1500p | 10734 |
| HANTAREX 28021 | 1600 p | $10 T 35$ |
| SHARP C3700 EL | 1600p | 10736 |
| HITACH1 2432981 CP | 1300 p | LOT37 |
| FERGUSON OOD3-508-002 | 1650p | LOT38 |
| Firs Chassis TX99 $41 \mathrm{~cm}+51 \mathrm{~cm}$ |  |  |
| Used On: 51K2, 51J8, 51J7, 41H3, |  |  |
| 41H3, 41H2, 51 K 3 |  |  |
| PANASONIC TLF 14567 F | 1850p | LOT39 |
| Used On: TC2043, TC2243, TX300 |  |  |
| PANASONIC TLF14568F | £15.00 | LOT40 |
| Used On: TX2231, TX2244 |  |  |
| PANASONIC TLF14584 | 2000p | LOT41 |
| Used On: TC2210, TC2160, |  |  |
| TX1752. TX2112 |  |  |
| TX2112. TX2162, TXC22 |  |  |
| PANASONIC TLF14586F | £18.00 | LOT42 |
| TC1651, TC2051, TC2061, |  |  |
| TC2253, TC2263, TX5500 |  |  |
| Hinari | 1600p | LOT43 |
| Used On: CT15 |  |  |
| HITACHI 2434274 | 1250p | LOT44 |
| CPT2174. CPT2176, CPT2 178, 2434274 |  |  |
| We etock lline output traneformers for over 100 different models. Please ring 0181-900 2329 for more information. |  |  |

Satellite PSU Repair Kits
Experience shows that $50 \%$ of all receiver power supplies 'bounce' unless the correct precautionary measures are taken when being serviced. A kit of all recommended parts is supplied for the most popular models, which when fitted should overcome this.

| MAKE \& MODEL | ORDER CODE | PRICE |
| :---: | :---: | :---: |
| PACE PRD880, PRO900 | SATP SU1 | ${ }_{0} \mathrm{CSO}_{0}$ |
| PACE SS5000. $9200.5010,9210,5220$ | SATPSU2 | ${ }_{6550}$ |
| AMSTRAD SRD510. SRD520 | SATPSU3 | 6509 |
| AMSTRAD SRO500 | SATPSU4 | ${ }_{\text {BSOPO}}$ |
| AMSTRAD SRX340, SRX345, SPX350 | SATSPU5 | ${ }_{65000}$ |
| PACE D1W\%150 | SATPSU6 | ${ }_{6500}$ |
| CHURCHILI OZMAC | SATPSU7 | ${ }^{850 p}$ |
| PACE MSS 100 | SATPSU8 | 7300 |
| PACE MS 5200300 APPOLL | SATPSU9 | ${ }_{650}$ |
| PACE MSSSOO/1080 | SATPSUIO | 12300 |
| FERGUSON SRDA | SATPSUII | 885 p |
| ECHOSTAR SRSSOC | SATPSU12 | 1735p |
| ECHOSTAR ESSOMTT0err700 | SATPSU13 | 3125p |
| AMSTRAD SADEOO | SATPSU14. | 31250 |
| MIMTEC (Suransan) | SATPSU15 | 7750 |
| AMSTRAD SRDTOO/SRESO/SRX100/301 SPXS01/1002/2001/SRD2000 SAT250 | SATPSU18 | 7300 |

## PACE 9000 SWITCH MODE TRANSFORMER ORDER CODE: PACESOOO PRICE 800p

SATELITE TUNERS
PACE PRD800/MSS200 2Ghz
Order Code: TUNER 01 Price: $1650 \mathrm{p}+$ VAT
PACE PRDSOO/MSS 10002 hzz
Order Code: TUNER 02 Price: 1650 p + VAT


POWER SUPPLY REGULATOR

ALBA CTV10 TRAVELLER NIKKAI BABY 10

ORDER CODE: BABY 10 PRICE: 1200p + VAT

Audio Control Head

## AMSTRAD ORIGNALL NO: 15075

Used on: AMSTRAD TVF1, 2, 3, VCR4600, $4800 \mathrm{MKII}, 4700$ FUNA VS2, VCR4600, 4800, 5200, 5600, 3600, VIP3000, 5000 Also fits: FIDELITY, FUNA, HINARI, PROLINE. SCHNEIDER. TOWADA, UNIVERSUM ORDER CODE: AH01 PRICE: 13500

NMSTRAD ONIGNAL NO: 153134
Used on: AMSTRAD DD8900, 8904, VCR2000, 6000, 5100,8800 . 8802, 8803. VCR8804, $8700,8704,8714,8900,9005,8244$ Also fits: ANTECH, BONDSTEC. CASIO, CROWN, FIDELITY, GOLDHAND, GRANADA HINARI, MARQUANT, OMEGE, PROFEX, SCHNEIDER. SEG, SENTRA, SHINTOM, TASHIKO, TATUNG, TOWADA UNIVERSUM ORDER CODE: AHO2 PRICE: 1450p

Replacement Audio Control Video Sound Head for National Panasonic

| PAFT NUMBER | MODEES | PRICE |
| :---: | :---: | :---: |
| VBR0081 | NVG7 stc | 8750 |
| VBRCOSO | NV300, NV360 ats | 8750 |
| Varcios 1 | NVIT7 ete | 8759 |
| VBROIO3A | NVISO, NV450 etc | 6259 |
| VBROILS |  | 8259 |

8 way Preprogrammed Universal Remote Control A single remote control to operate Teiovisions, Videos and Satellite Recsivers. Plus Auxiliary Optional
Replaces up to 8 remotes with one. Simple 4 digit setup routine Controls 1000s of models - Tetetext functions with Fastext Clear (large key) layour - Code Search Facilly
Sydish and easy to operate - Replece broken or lost remotes Original romote not required

Cassette DC Motors


Replacement Video Cassette Housings

| NAME | MODELS | COOE | PRICE |
| :---: | :---: | :---: | :---: |
| AXA | $\begin{aligned} & \text { VS35, VS53. VSSS. } \\ & \text { VS56. VSTS } \end{aligned}$ | CH18. | 33000 |
| GRANADA | VHSDP1 | CH05 | 11000 |
|  | VHSYJ2 | CHOI | 20000 |
| GOLDSTAR | GHVII290P, 1291P, 12 OSP, 9100. THOO1, GSE12SSP, GSE1ESTP. $200010,200510$. VCP4200, 4300 . 4301,4305, VCP4306, 4311, 4315. 4318, $4320,4227,4325$ | CH25 | 20009 |
|  | GHY51, 1221, $1232,1240,1241$. 1242. 1244, 1248, 1248. GHV8900, 8800 | CH 26 | 2500 p |
| FERGUSON\& J.V.C. | 3V39, 3V39. 8943, 8944, 8951. 3V35. 3V36. 3V49. HRD 110. 111, 120, 121,25 | CHO1 | 2800 p |
|  | 3V42. 3V43,3V4. 3V45, 3V48. $3 \sqrt{53}, 3 \sqrt{54}, 3 \sqrt{55}, 3 \sqrt{57}, 8965$, 294, 2948, HRD 140 . <br> 141, 150, 157, 158, 160, 250 . HRD257, 455, 565, 566.725, 755 | CHO2 | $2800{ }_{p}$ |
|  | 8988, 8850, P108, 124. 13H, 141, 208. 2:R, 271, 28, 305. HRO230. <br> 430.530 | CHOS | ${ }^{2900}{ }_{p}$ |
|  | 3Y58, NKEN, 3VEA, SVE5. RVIIR, 8950. 8951 . HRO170. MROIEO. M H O3\% | CHO4 | 2800 p |
|  | FY3IR | CH19 | 43000 |
|  | HRD515, $520,57,540,500,580$. $600,810,200,850,870$, HRD830. $840,150,850,4050,6500, \mathrm{~F} 337 \mathrm{H}$ | CH 2 O | 22000 |
|  | YRDS $40.580,850,650,910.950$. HRDSTO, HRDX20, EERGUSON FV57H | $\mathrm{CH}_{2} 7$ | 24000 |
| ET.T. | VR3505. VR3905 | CHol | 28000 |
|  | VR 3816.3978 .3566 .3848 .3976 . $3366,3895.397,6948$ | $\mathrm{CH} / 2$ | 29009 |
|  |  3985, 3958 , 3997,6448 |  | 28000 |
| NATIONAL PAMASONIC. | Nu730 | CHO6 | 15000 |
| N.EC. | NR3OEG, N831EG. N83TEG, N832 NES3EG | CHO1 | 28000 |
|  | Nass | Cave | 28000 |
| PFILIPS | CASSETTE UFT ASSEMBLY 16912 DVI86. 190, 286، 471. 562. 781. VA6180. $5182,8185,6285$, VR8290. 5231, 6253, $6352,6387,5233,6467$. 6468,6770 , VR6561, $8870,6700$. 5761. 5870,6970 | CH05 | 11000 |
|  | vabilu | CH2 | $2500 \cdot \mathrm{p}$ |
|  | $\sqrt{6548}$ | CH23 | 2500 p |
|  | 4SEB6 | $\mathrm{CH}_{2} 4$ | 25000 |
| SHARP | VCA100, VCH851, VCH8S2 | CH22 | 29000 |
|  | VCa $103,103 \mathrm{GV}, 106,108 \mathrm{GVM}$. 2546 VM | CH23 | $2500 p$ |
|  | VCS211,24, 5055, 805, VC8230, VC0006G, B10G. VCT212, 310. \$10G. 510 | CH24 | 25800 p |
| TELEFUNKEN | Vi2970 | CHO2 | 28000 |
| THOMSON | V520, 321, 323.326, 4200,4300 | CHOI | 28800 |
|  | V312,343, 352,353.300, 364, 368. $4210,4230,4250,400$, 55500 . 6000, 8540 | CHO | 280009 |
| TOSHIBA | V3, V57 | CHO1 | 28000 |
|  | VES. V88 | CYO2 | 28000 |

Service Aids

| DESCRIPTION | VOLuME | CODE | PRICE |
| :---: | :---: | :---: | :---: |
| VIDED HEAD CLEANER | 7MML | Sph | 1860 |
| SWITCHCLEANER | 176 ML | SPCO2 | 1700 |
| SILCCOME GREASE | 200831 | SPM | 200 |
| FREL7E If | 170 HL | SPOT | 31000 |
| PreEIETH | 400\% HL | Spl 1 | 0000 |
| FOAM CIEANE | 4 mam | SPO5 | 1800 |
| ANT-STATIC | 15046 | SPOS | 1909 |
| AEROKLEANE | 1351M | SPOT | 2200 |
| AERD DUSTER | 15091 | SPC8 | 310 p |
| AERODUSTER | 400914 | SP17 | 580p |
| PLASTIC SEAL | $2006+1$ | SPC9 | 2500 |
| GLASS CLEANEH | 250 ML | SP10 | 1800 |
| COCDKLENE | 2501 ML | SP13 | 2300 |
| EXCEI POUSH 80 | $250 \times 1$ | SP18 | 150 p |
| ADHESIVE 120 | 400 AL | SP19 | 190 p |
| LABEL REMOVER $3^{30}$ | 200012 | SP20 | 2400 |
| REFURB 140 | 400 ML | SP21 | 2400 |
| TUBE SILCON EREASE | 50 GRAMMES | SP11 | 2100 |
| TUBE SILCON SEALANT WHITE | 75M1 | SP22 | 2809 |
| TUBE SILICON SEALANT CIEAR | 75 ML | SP23 | 2309 |
| TUBE HEAT SINK CDMPOUND | 25 GRAMMMES | SP12 | 150 p |
| DRIVE CLEANER | 200 ML | SP24 | 150\% |
| SCREEN CLEANER | 200121 | SP25 | 150\% |
| COMPUTER CARE KTT | - | SP26 | 21000 |

> All the above terme are manufaotured by Servisol i you purchase more than one Servisol Product, postage peckage will be charged as follows: 300 por 5 cans- $\quad 460 \mathrm{p}$ for more than 5 cans

## CD Pick Ups

## SONY OPTICAL PICK UP

PART NO: KSS210A SONY CDPC 301M, CDPC 305 M
Ftas most Sony, Akel a J.V.C. Portable HiFi and Midi Systems

## PART NO: XSS210B

USED ON MODELS
CFD 100 , $105 \mathrm{~L}, 120,300,440,454,455,50,500,55,58,60$
CFD68. $750,765,760,765,770,775,440 \mathrm{~S}, \mathrm{~W} 100,700 \mathrm{~S}$

## Cassette Tape Heads

| HEAD TYPE |  | PRICE |
| :---: | :---: | :---: |
| MONO HEAD |  | 90p |
| STERED HEAD |  | 110 p |
| MINIHEAD |  | 150p |
| AUTO REVERSE HEAD |  | $200 p$ |
| Soldering Accessories |  |  |
| DESCRIPION | CODE | PRICE |
| ANTEX SOLDERING IROMS |  |  |
| 25 WATT 240 VAC $X$ XS25W 240 V$)$ | S101 | 9000 |
| 15 WATT 260 VAC (XS15W 240V) | S102 | 9000 |
| 25 WATT SPARE ELEMENT | S103 | 450p |
| 15 WATT SPARE ELEMENT | S104 | 450p |
| SOLEERTE STAND \& SPOMEES |  |  |
| SOLDERING STAND (MADE BY ANTEX) | S108 | 350 p |
| SPARE SPONGE | S109 | \$50 |
| SOLDER |  |  |
| 14 SWG 500 GRAMMES | St10 | 5000 |
| 20 SWG 500 GRAMMES | S111 | 650p |
| 22 WWG 500 GRAMMES | S112 | 700p |
| DESOLDERENG AJDS |  |  |
| SOLDER MOP STANDARD GAUGE 1.2MM X 1.5 M | \$107 | ${ }^{80}$ p |
| SOLOER MOP T.2MM X 10 M | S113 | 4000 |
| DESOLDERING PUMP | SIOS | 3200 |
| SPARE NOEZLE | S108 | 80, |

## FAULT FINDING GUIDE BOOKS

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

Order Code: BOOK05.
Price $\mathbf{\varepsilon 8 . 5 0}$ - No VAT.

## Video Recorders Edition 4

Lists more than 4500 faults for 43 different brands
Price $\mathbf{2 1 . 7 5}$ - No VAT. Order Code: BOOK01

## TELEVISION

Edition 5
Lists more than 6,000 faults with 306
pages covering 58 different brands
Price: 1450 p only - no VAT. Order Code: BOOK02

## Satellite Repair Manual Edition 3

A comprehensive guide to receiver reviewing, featuring stock faults and installation tips.
Price 1400p Only No VAT Postage 100p Order Code: BOOK03

## SEMICONDUCTOR COMPARISONS 1996

Listing more than 29,000 Semiconductors with suitable alternative complete with descriptions and base information.
Price: $\mathbf{£ 1 4 . 5 0}$ - No VAT. Order Code: B00K04

## VIDEO CLEANING STICKS

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

## VIDEO MAINTENANCE TOOLS

Set of 8 Allen keys packed in a plastic wallet
Order Code: TOOL9 Price 125p
Specifically designed for video maintenance
UNIVERSAL HEAD EXTRACTOR TOOL
Hand tool designed for extracting hard to remove heads without damage to either the head or the mounting assembly. Adjustable so as to suit various brand heads. PRICE - 600p

GRANDATA LTD Tel: 0181-900 2329 fax: 0181-903 6126

| Description | Order Code | Price | Description | Order Code | Price |
| :---: | :---: | :---: | :---: | :---: | :---: |
| GRUNDIG |  |  | PHILIPS ( continuled) ${ }^{\text {d }}$ |  |  |
| TP160E | RC 107 | 900 p | RC38 | RC 301 | 750 p |
| TP200, TP300 | RC 380 | 750p | KT3 TEXT | RC 5301 | 750p |
| TP400 | RC 401 | $675 p$ | RC5352 | RC 5352 | 750 p |
| TP590-600 | RC 600 | 750p | RC5375 | RC 5375 | 750 p |
| TP390, TP610 | RC 610 | 750 p | RCS STANDARD | RC 5534 | 850p |
| TP621 | RC 621 | 800p | RC5901 | RC 5901 | 850 p |
| TP630, TP650 | RC 650 | 750p | RC5903 | RC 5903 | 700 p |
| TP660 | RC 660 | 750 p | SABA |  |  |
| TP661 | RC 661 | 750 p | T6772 | RC149 | 900p |
| HITACHI |  |  | TC319-320 | RC 328 | 800 p |
| CLE800-CLE830 | RC 140M | 700p | TC356 | RC 356 | 800 p |
| A617402/655602 | RC 192 | 800 p | TC358 | RC358 | 800p |
| A512120/230 | RC 900 | 750 p | TC360 | RC 360 | 750 p |
| A514790 | RC 901 | 750 p | TC365 | RC 365 | 750p |
| A5088470 | RC 902 | 800 p |  |  |  |
| A518612 | RC 903 | 750 p | SALORA |  |  |
| SCL002 | RC 904 | 750 p | SERIES L | RC 190 | 750 p |
| C2096 | RC 905 | 800 p | 86173 | RC 882 | 750p |
| A511940 | RC 906 | 750p | SANYO |  |  |
| 655602H | RC 907 | 800p | RC218, RC222, RC228, RC238 | RC 140M | 700p |
| 17 |  |  | JXGE | RC 878 | 800 p |
| \|FB13, 14, 15 | RC 143 | 800 p | JXDE | RC 884 | 750p |
| FS4 | RC 148 | 750p | VHR2300 | RC 890 | 750p |
| RG305 | RC 305 | 675 p | RC628 | RC 865 | 900p |
| RG306 | RC 306 | 750p |  |  |  |
| FS9/1-10/1 | RC 307 | 750p | SHARP |  |  |
| VS5 RUK | RC 308 | 750 p | G0121CESA, 123CESA, 204, 251 | RC 140M | 850p |
| VS4-1 | RC 310 | 750p | SIEMENS |  |  |
| MULTICONTROL (17C20) | RC 311 | 750 p | FC616 | RC 130 | 850 p |
| KORTING |  |  | FC631 | RC 132 | 750p |
| 18279, 18396, 18460, 18521 SE | RC 108 | 750 p | FC742 | RC 164 | 750 p |
| 40540 VTS | RC 108 | 750p | SONY |  |  |
| LOEWE DC11 |  |  | RM604, RM605, RM606 | RC 140 | 700 p |
| DC11 | RC 146 | 800 p | 32 CHANNEL | RC 140M | 700 p |
| MATSUI |  |  | 8M613 | RC 141 | 750p |
| 010270601 | RC 889 | 750 p | RM632, RM636 | RC 160 | $675 p$ |
| VX770 | RC 892 | 750p |  |  |  |
| METZ |  |  | TATUNG FXA | RC 877 | 750p |
| JAVA COLOR (6890) | RC 166 RC 183 | 800 p 800 p | RC70 | RC 883 | 750 p |
| COLOR (7156) | RC 183 | 800 p 800 p | FX70 FASTIEXT | RC 894 | 750 p |
| JAVA (7180) | RC 184 | 800p |  |  |  |
| MITSUBISHI |  |  | TELFFUNKEN |  |  |
| 939P/03607,939P/03609 | RC 140M | 850 p | FBE32 | $\text { RC } 632 \text { ST }$ $\text { RC } 639 \text { ST }$ | 750 p 750 p |
| NOKIA |  |  | FB 339 |  | 750 p |
| SATELIITE | RC 550 | 750\% | THORNFERGUSON |  |  |
| NORDMENDE |  |  | 3V35-42 | RC 342 | 650 p |
| TC2336 | RC 351 N | 750p | 3V31-32 | RC 344 | 750 p |
| CMC1, TC3519 | RC 356 | 800p | 3V57-58 | RC 628 | 750 p |
| OCEANIC |  |  | TX10 TEXT | RC 732 | 575 p |
| 390C9500 | RC 339 | 750 p | TX10 STEREO TEXT | RC 738 | 575 p |
| ORION |  |  | TX9-90-100 | RC 740 | $675 p$ |
| RC53 | RC] 892 | 750p | TX100 FASTTEXT | RC 785 | 750p |
| PANASONIC |  |  | TX100 STEREO FASTTEXT | RC 789 | 650 p |
| EUR51200 | RC 200 | 800p | PROFESSIONAL | RC 790 | 650p |
| TC2200 | RC 201 | 850 p |  |  |  |
| VSN0357/NV730 | RC 202 | 750 p | CT937 |  |  |
| TNQ1621 | RC 203 | 750p | CT937 CT9117 | RC 951 | $750 \bar{p}$ |
| PHILCO |  |  | 201848 | RC 952 | 750 p |
| CARVEL, CONCORDE, | RC 108 | 750p |  |  |  |
| TELESTAR |  |  | We stock Remote Controls for |  |  |
| TC10 | RC 152 | 900p |  |  |  |
| PHILIPS |  |  |  |  |  |
| RC5002,5154 | RC 134 | 750p |  |  |  |
| KT3 NON TEXT | RC 135 | 750p | Ring for further details on |  |  |
| 69117032 | RC 178 | 800 p |  |  |  |
| 69117194 | RC 180 | 750 p | 0181-900 2329. |  |  |
| RC5991-UNIV | RC 300 | 580p |  | -8. |  |


| VCR ALIGNMENT KIT <br> CONTANS: <br> SET OF 7 HEAD \& TAPE PATH ALIGNEAS <br> - RCA TYPE AUOIO \& CONTROL HEAD POSTTONJNG TOOL <br> - RCA AOUUSTMENT TOOL FOR TAPE GUIDE POSTS <br> - RCA TYPE gACK TENSION TOOL <br> - TENSION AOUUSTMAENT TOOL FOR VARIOUS USES - VCR AOUUSTMENT TOOL |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| FUSES |  |  |  |  |
|  | TIME LAG [ 20 mm ) |  | QUick BLOW ( 20 mm ) |  |
| Value | Order Code | Price | Order Code | Price |
| 160 mA | FUSE 01 | 75p | FUSE 17 | 60p |
| 250 mA | FUSE 02 | 75p | FUSE 18 | 60p |
| 315 mA | FUSE 03 | 75p | FUSE 19 | 60p |
| 400 mA | FUSE 04 | 75p | FUSE 20 | 60p |
| 500 mA | FUSE 05 | 75p | FUSE 21 | 60p |
| 630 mA | FUSE 06 | 75p | FUSE 22 | 60p |
| 800 mA | FUSE 07 | 60p | FUSE 23 | 60p |
| 1A | FUSE 08 | 60p | FUSE 24 | 60p |
| 1.25A | FUSE 09 | 60p | FUSE 25 | 60p |
| 1.6A | fuSE 10 | 60p | FUSE 26 | 60p |
| 2A | FUSE 11 | 50p | FUSE 27 | 60p |
| 2.5A | FUSE 12 | 50p | FUSE 28 | 60p |
| 3.15A | FUSE 13 | 55p | FUSE 29 | 50p |
| 4A | FUSE 14 | 55p | FUSE 30 | 50p |
| 5A | FUSE 15 | 60p | FUSE 31 | 50p |
| 6.3A | FUSE 16 | 60p | FUSE 32 | 50p. |
| FUSES |  |  |  |  |
| CURRENT RATING |  | ORDER CODE |  | PRICE |
| CERAMIC PLUG TOP |  |  |  |  |
| 3A |  |  | USE 33 | 100p |
| 5A |  |  | USE 34 | 100p |
| 13A |  |  | USE 35 | 100 p |
| 20 mm CERAMIC TIME LAG |  |  |  |  |
| 3.15A |  |  | USE 41 | 100p |
| 4A |  |  | USE 42 | 100p |
| 5A |  |  | USE 43 | 100p |
| 6.3A |  |  | USE 38 | 100 p |
| 8A |  |  | USE 39 | 100p |
| 10A |  |  | USE 40 | 1000 |
| - 32 mm CERAAAIC SLOW BLOW |  |  |  |  |
| 8A |  |  | USE 44 | 210p |
| 10A |  |  | USE 45 | 210p |
| 15A |  |  | USE 46 | 210p |
| 20 A |  |  | USE 47 | 210 p |
| 38 mm CERAMIC SLOW BLOW |  |  |  |  |
| 10A |  |  | USE 48 | $875 p$ |
| ALL THE ABOVE PRICES ARE FOR PACKS OF 10 FUSES |  |  |  |  |
| ICPF10 ICPF38 |  | ICPN10 ICPN38 |  |  |
| ICPF15 ICPF50 |  | ICPN15 ICPN50 |  |  |
| ICPF20 ICPF75 |  | ICPN20 ICPN75 |  |  |
| ICPF25 ICPN5 |  | 1CPN25 |  |  |
| Price: Only 30p each |  |  |  |  |



NEC 3022
Have you noticed that it's always the very last component you replace that cures the fault? So it turned out with my wife's sister's daughter's receiver. What made the situation even worse was that the cause of the fault should have been blindingly obvious to someone who has replaced the tiny $2.2 \mu \mathrm{~F}$ electrolytic capacitor in thousands of Hitachi tuners used in Pace receivers.
The symptom had been a screenful of horizontal lines that gradually resolved themselves into a very poor quality picture as the unit warmed up. It was only after I'd replaced every electrolytic on the main board that I thought about the tuner. 1 replaced the $10 \mu \mathrm{~F}$ and $3 \cdot 3 \mu \mathrm{~F}$ electrolytics there, but the cause was the $100 \mu \mathrm{~F}$ one of course. Next time I'll replace the last one first!

## The Horrortron Decoder

The Oritron D2MAC Eurocrypt decoder has been sold under several other names, such as Dixi, Aegir and Lenco. It has, on the right-hand side, a heatsink that becomes

# WORKSHOP 

incredibly hot. The unit is not easy to work on, which is why I always think of it as the Horrortron.
The one that arrived by post from the Midlands was no exception. It was sent to me because it refused to respond to remote control commands. All Oritrons suffer from this to some extent: you usually have to stand at least two metres away to get reliable handset operation. But this one wouldn't respond at all. It remained on, but stubbornly refused to produce anything apart from a blank raster.
A phone call to my friend at Satfix produced the suggestion that the DMA2286 chip might be faulty. It's soldered directly to the board of course, and is square with at least 64 J -shaped legs. These curl beneath the chip, and there is almost no possibility of removing it with a soldering iron - though one enterprising dealer told me that he uses a pin to lift each leg in turn!
Deciding that I had nothing to lose, I placed a sheet of aluminium foil over the board, pressed it down firmly, cut a square hole in it to expose the suspect chip and applied heat from my trusty paint-stripper. A quick flick with my penknife and, in three seconds, the chip was off the board. I was also left hoping around the workshop, sucking my burnt fingers!
Fortunately the board had survived the treatment and the copper tracks were intact. I positioned the new - and expensive - chip and soldered each leg in turn, using 0.4 mm solder and my finest Weller tip. Amazingly, the decoder worked! But I definitely don't recommend that you try this yourself. I've practiced on dozens of scrap boards, and my success rate is still depressingly low. There is also the safety aspect to consider.

## Signal Meters

It occurs to me that I've never mentioned satellite signal-strength meters in this column. Since they cost more than the average receiver,
you can charge a goodly sum for their repair. So here's what 1 know!
The Altai SM01 turns up under various brand names including Manhattan. There are several faults that can occur, the most common being:
(1) The meter reads backwards when it is switched on. Simply replace the $1 \mathrm{k} \Omega$ trimmer potentiometer SFR1 and adjust it for a zero meter reading. The trimmer fitted as standard seems to be underrated - it melts!
(2) No LNB power output. Check the $4.7 \mu \mathrm{H}$ inductor L 5 which tends to go open-circuit.

The low-cost Satfinder meters seem to suffer from some sort of burn-out if they are left switched on until the batteries are almost discharged. I've never bothered to look inside to find the source of the smoke, since Satfinder UK offers such a quick, low-cost repair service. For further information phone the company on 01491573 390.

The now obsolete Maspro LC2E meter has always been the favourite of experienced installers. Its main problem is that you find copper wire strands in the nut at the rear of the threaded input connector. The result is an intermittent short-circuit that makes the front-panel LED go out. Simply unscrew the connector behind the panel and blow out the offending strands. I've found that Ali and Ishar at Satellite Services (0181 961 4662) provide a good repair service should you have any other problems.
For Promax meter repairs, phone 01727832266.

## Plastic Tabs

The clips used to secure Pace front panels consists of plastic tabs that can become brittle when exposed to heat over the years. I've seen all sorts of bodged repairs done when they snap off, ranging from watch=
maker's screws to hold a bridging piece to a strip cut from a leather belt Superglued in place!
For some time now I've replaced broken plastic tabs by using a soldering iron to melt a paper clip into the remaining plastic. Tape the base and front panel together securely, then gently screw the paper clip into place. Press the tip of a hot soldering iron down on the paper clip, where the clip rests on the remaining section of the plastic tab. The end result is shown in the accompanying picture.
I've never had one break after carrying out this repair.

## More e-mail Blues

People still write me the most curt messages! Here's a typical one the complete message, as it arrived, apart from the sender's name:
"PRD900. Problem is as follows Sound okay but after 10 minutes Picture flashes on and off intermmitently (sic) leaving black raster. Thanks in anticipation."
"What's wrong with that?" I hear you ask. What's wrong is this. Imagine that you are writing to your
bank manager for an interest-free loan. Do you think you would get one with such a letter? There's no "Dear Sir", no introduction, no mention of technical ability, soldering skills or equipment available. How do I know what is wanted? The receiver's serial number isn't mentioned, nor the age of the equipment, the history of the fault, the method of connection to the TV/VCR or the tests already carried out. Worst of all, there's no reference to Television magazine. So there's no way he's getting free advice from me! (The cause of the fault is probably transistor Q105, but don't tell him!) In fact I was unable to reply because no return address was provided!
So when you send me an e-mail, tell me who you are, your abilities, where you found my address and provide a complete description of the equipment, the symptoms and the fault history. It's also fun to learn about your interests and hobbies, and have a general chifchat! Maybe it's because I am a Yorkshireman, but 1 simply don't like replying to messages that look like telegrams.
Finally, do type your return

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

## jackarm@netcentral.co.uk

One model per message - state make/model and fault symptoms. If you have no e-mail facilities you can write to him c/o Television, Room L302, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. Please enclose two stamped envelopes.
address. I reply to all messages. If you don't get a reply. it's always
because you provided an incorrect address or none at all.


A paper clip used to repair one of the plastic tabs thot secure Pace front panels.

## Test Case 410

Impatiently waiting for its heater to warm up, and with de-icer fluid dripping from the windscreen, Doc Colin swung the big van out into the main road. His nose glowed red as he drove to his first field call. It was to Mr Hay, who had recently bought from us a new Canon UC9Hi camcorder - after due study of Camcorder User magazine. Colin's task was to check it out on site, the complaint being no colour. The camera had already been returned to the workshop because of this, but had been tested and found to be OK.
Mr Hay was awaiting the call, and had the gear all hooked up ready. He'd bought the camcorder for its high definition, superior to his previous low-band Sanyo model. To take full advantage of this he had purchased a special lead by mail order. It had a scart connector at one end and two phono plugs plus an Splug at the other. But all that came through was an excellent monochrome picture plus sound - and that's all his VCR, a Panasonic HiFi VHS Model NVF65, would record from the camcorder.
Further proof of the camcorder's failure to produce colour was provided when Mr Hay disconnected the scart plug from his VCR and connected it to his TV set, a posh new largescreen model with two scart sockets. Again the sound was fine but the picture was in black-and-white, whatever the camcorder's mode of operation - record, playback or E-E. The camcorder itself provided no clues - it had a monochrome viewfinder. Colin soon had the situation sussed out. What was the cause and cure? Not a difficult one ...

Colin then went on his way, with the heater now working at full blast, to sec Miss Jones, who also had some new
merchandise from our shop - an Hitachi Model C2546TN TV set. It worked well enough until she switched it to the VCR channel to watch her keep-fit tapes and the programmes she had time-shifted during the day while she was out at work. The off-tape picture and sound came up beautifully, but the image was marred by a nasty little caption, full of nonsensical and garbled letters, numbers and symbols, that wiggled and juddered sideways at the bottom, centre of the screen. It would go away after a few seconds, but would occasionally reappear at odd times.
The caption put in an appearance only when the TV set was switched to its AV channel. Selection of any broadcast channel brought up a perfectly good, steady caption at the bottom centre of the picture to say which channel had been selected - BBC-1, Ch. 4 etc. And the lady's neighbour had gone to so much trouble to get the TV set tuned in for her to the VCR's output on channel 36 !
After a visit to the accessories box in the van Colin once again triumphed - and Miss Jones found her equipment even simpler to operate than before. What magic had Doc worked this time?
These two very different problems had some interesting parallels. The solutions were almost identical, and none of the equipment was actually faulty. Neither call would have been necessary had everyone (the shop staff, workshop people and the customers) been fully clued up or communicated well. Don't furn to page 291 until you have given some thought to this! In real life you cannot get off the hook by turning over a few pages, can you?!


## Are you thinking of investing in a new pattern generator? Eugene Trundle tries out some suitable equipment from the Promax range

Test gear generally has a longer life than that of consumer electronics equipment. As a result, a lot of what is at present in use in workshops is relatively old. It is not until you look at today's test instruments that you realise the extent to which things have progressed in this field: frequency-synthesis carrier generation for example; microcomputer and bus control; provision of Nicam and teletext signals; and complete 'test cards' that come out of relatively inexpensive boxes. All with an accuracy undreampt of (outside the broadcast industry) a few years ago.
Promax is a well-established Spanish manufacturer of test equipment. From its huge range, l've selected for review two TV pattern generators that reflect current techniques.

## The GV698

The Promax GV698 is a very sophisticated bench generator of every TV signal currently required for alignment and servicing. It provides 32 different patterns that range from a complete, full-feature general-purpose test card (reminiscent of the broadcast-type Philips PM5544) to colour bars, W/R/G/B screens, chroma demodulator patterns, a multiburst (definition gratings) and crosshatch and dot displays.
These patterns are available as $1 \mathrm{~V} / 75 \Omega$ baseband video (CVBS) at a front-mounted BNC socket and a rear-panel scart port, as $S$ video at a Y/C socket at the back, and in RGB form at BNC and scart sockets. They can be modulated on to an RF carrier, along with an audio signal.
The RF department is glorious indeed. A doublesideband carrier is provided at a front-panel BNC socket at a level of $80 \mathrm{~dB} \mu \mathrm{~V}$ (about 10 mV ), with $0-50 \mathrm{~dB}$ attenuation available in 10 dB steps. The carrier 'clock' consists of a high-stability, close-tolerance crystal that operates with a frequency-synthesis system to provide carrier frequencies in the range $37-865 \mathrm{MHz}$, selectable by frequency (in 50 kHz steps, which in effect amounts to continuous coverage) or by channels to CCIR specification, including all the broadcast and cable channels throughout the VHF and UHF bands. Channels and frequencies are shown on a front-panel alphanumeric readout display.

The instrument includes an audio test facility, with tones available at the scart socket and modulated on to the RF carrier in accordance with systems $\mathrm{B} / \mathrm{G} / \mathrm{H}(5 \cdot 5 \mathrm{MHz})$, $\mathrm{D} / \mathrm{K} / \mathrm{K}^{\prime} / \mathrm{L}(6 \cdot 5 \mathrm{MHz})$, I $(6 \mathrm{MHz})$ and $\mathrm{M}(4 \cdot 5 \mathrm{MHz})$. The scan rates, colour encoding and modulation are changed as appropriate between PAL, Secam and NTSC, so that any terrestrial broadcast in the world can be matched. Also available on the version (/11) I had for test are stereo/dual sound in the German Zweiton form and Nicam, both with individually-switchable $R$ and $L$ channel tones at 1 kHz and 3 kHz . When the system is changed from I (UK) to B/G (W. Europe) the Nicam carrier automatically shifts from 6.552 MHz to 5.850 MHz to suit.
The review version also had a teletext facility. The text appears in Spanish and English, with eight pages that include an index, a clock-cracker, a full character/function screen and a graphic 'picture'. The real-time clock display alternates between zero and one on each page. Five lines per field are used for teletext data.

## Operation

Since the instrument is microcomputer controlled, operation is very simple. A single rotary knob selects channels. frequencies, patterns and standards, enabling each function and range to be stepped through sequentially. You don't have to do this each time the instrument is used, because 32 complete settings can be stored in an EEPROM and called up at will. Each setting consists of a channel and system, for example ch. 21 , PAL-I, on to which any required pattern can be modulated. An illuminated 16 -character LC display provides a readout of all parameters.
There are eleven push keys on the front panel to control or modify the video and audio modulation. The first group of four keys governs the video image, by switching off the burst, the chroma or the interlace, and by superimposing a circle on any of the patterns. The circle comes from an EPROM which is scanned at 20 MHz . giving a very smooth outline with no sign of jagged steps. Interlace switch-off makes convergence adjustment easier, by removing interlace flicker at close viewing distances. The second group of four keys controls the audio signal -
on/off, dual, L off, R off. Finally come three keys for teletext function control.

## Further Features

Three of the test patterns contain black-and-white captions. In standard form these are the manufacturer's name and trade mark and the instrument's type number (GV-698 is displayed). The captions can be customised, for example your trading name can be displayed, by replacing an EPROM with an appropriately programmed one - the manufacturer offers this service via its distributors.
In addition to the rear-panel sockets already mentioned there are a 5 -pin DIN audio input port with an internal/external modulation switch, BNC sync and scope trigger outputs, and a sync-with-G switch for use with RGB monitors.
It's quite a box! I have not included a full specification, since it runs to five A4 sheets. We simply don't have room. Supply voltage can be $110,125,220,230,240 \mathrm{~V}$ at 20 W . Weight is 3 kg , dimensions $288 \times 102 \times 247 \mathrm{~mm}$ ( w $\mathrm{xh} \times \mathrm{d}$ ). For further details apply to the distributors, see the end of this review.

## On Test

After learning how to drive the machine 1 used it for all bench and field work for a couple of weeks, then spent some hours playing with it and checking its functions.
The wide range of test pattems it provides satisfied my every need - and many more that I don't have at present! My favourite one is the composite test card. Having it continually on tap, with a test tone, was reminiscent of the good old days of BBC-2 in the Seventies.
The chroma demodulator test patterns (axis and antiPAL) worked well. Though few modern TV sets or monitors have adjustments in the decoder department, they are useful for checks and fault diagnosis.
Two of the patterns are intended specifically for VCR work. The black block that hops along a white slot at a rate of one space per field enables things like freeze frame, stepped image, position of heads etc. to be checked.
The black-and-white patterns include some excellent ones for checking video bandwidth, LF response and ringing/echoes. They are useful for checking cable systems as well as receivers and monitors.
The RF generator section is excellent. I put all four local TV channels into the memory, along with channels 36 (VCR), 37 (Channel 5) and 38 (satellite TV). Further slots can be used to store other local channel groups, for pretuning and testing TV sets and VCRs, and for simulating any world standard (for checks on multistandard gear and outward-bound sound- and systemconversion jobs).
The ability to tune down to the TV IF of 39.5 MHz is another useful feature - it facilitates tuner checks by direct carrier injection into the IF amplifier.
RF gain checks are also easy. Switch 30 dB of attenuation in for about $300 \mu \mathrm{~V}$ of RF and look for slight noise in the pattern. At 50 dB attenuation the snowy picture should still be locked and discernible. The full output (about 10 mV ) should instigate tuner AGC action.
The teletext and Nicam facilities were put to good use, especially the latter since the BBC hasn't got around to Nicam in this neck of the woods! It was easy to test and align Nicam decoders by attenuating the RF signal, and one soon learns how decoders should behave as the noise level increases.
I checked the parameters, levels and tolerances of the signals produced by the generator, but gave up after a


The Promax GV298 pattern generator-a 'little brother' to the GV698.
while. All were bang on specification and up to broadcast standard, the result of using precision ICs and crystals. In the days of discrete component circuitry, banks of presets and lots of $L C$ components, a reviewer could have a field day carrying out such checks. The likelihood now is that the generator will be more accurate than the gear with which you try to test it.
The GV698 has many applications beyond TV receiver testing and adjustment. It can be used to analyse the performance of cable and distribution systems; to check RGB monitors that use broadcast-type scanning standards; to test VCRs. including high-band types; to make video test tapes that provide high-quality video and audio content; to check, align and preset equipment that uses any terrestrial analogue TV standard in the world; and as a high-quality precision modulator for externally derived signals.

## Inside

The instrument is surprisingly tightly packed inside. A large fibreglass motherboard supports eight plug-in daughter boards. This amounts to about 1.5 sq . fi of double-sided PCB that carries upwards of fifty ICs. The power supply is based on a toroidal mains transformer and four heatsinked three-leg regulator chips. The whole thing looks set to last for many years, with robust, strongly-mounted connectors and controls and a build quality appropriate to industrial as opposed to domestic equipment. If it were to last as long as my old and trusty - but very dated - Philips PM5509 pattern generator it would do very well.

## Summary

You get a reasonably comprehensive instruction book but no service manual. Service, spares and repair back-up are available from the UK distributors Alban Electronic

The test card produced by Model GV698.

during and beyond the one year guarantee period. I would not buy test equipment without an assurance of this kind from a reputable and established company. There should be no problems here.
The GV698 is an excellent instrument, and I was sorry to see it go. It comes in several versions with several options at prices appropriate to the features incorporated. All have the wonderful RF modulator and 32 test patterns. The / 11 version I tried out has all the available bells and whistles.
Two minor criticisms occurred to me. It would have been nice to have had a tilt-stand/handle of the sort often provided with oscilloscopes. And if possible I would have liked a simpler and cheaper method of customising the logos, either similar to that used in camcorder and satellite receiver caption generators or by setting them up on a PC and downloading them. If the instrument was mine and, knowing that it would sometimes stray into the field, my first action would be to buy it a foam-lined aluminium carry box.
The various versions of the GV698 cost from £969 to $£ 1,428$ excluding VAT. That's a lot of money, but it's good value - similarly specified instruments from other makers cost a good deal more. Your reputation and standard of work will both benefit from it.

## The GV298

Little brother GV298 has a more modest specification and is certainly easier on the investment budget. Priced at $£ 433$ plus VAT, it's smaller and lighter and provides eight essential patterns - colour bars, W/R/G/B rasters, crosshatch with circle, dot matrix and chequerboard. It has
switches to control interlacing, PAL commutation, subcarrier on/off and audio on/off. Up-down keys select the patterns, channels and frequencies. The RF modulator is similar to that in the GV698, with synthesis coverage of $37-865 \mathrm{MHz}$ and pushbutton channel selection. All are shown in a 16 -character LC display. This instrument caters for only one standard, PAL-I in the UK.
The GV298 provides an RF output with $0-60 \mathrm{~dB}$ attenuation in 20 dB steps, composite video from a frontmounted BNC socket and a rear-mounted scart socket, RGB video from the scart socket, and a scope trigger output. External signals cannot be modulated on to the carrier.
This generator worked well for me on test. with everything spot-on as before: precise frequency and channel settings, a smooth circle and close-tolerance patterns. The build quality and intemal workings are similar to those of the GV698. In fact it's a high-quality, precise instrument.
Its greatest virtue is the wonderful synthesis RF modulator, and much of the cost pays for that. If you want just the pattems rather than the channels and frequency coverage, you would be better off with something like the Promax mini-generators VG90 or GC981B at about half the price.

## Availability

Promax instruments are marketed in the UK by Alban Electronic Ltd., 6 Caxton Centre, Porters Wood, St Albans, Herts AL3 6XT - phone no. 01727832 266, fax 01727810 546. Details of the huge range of Promax test and measuring equipment are available free on request.

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Reports from
Nick Beer
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Robert Marshall
Graham Thomson
John Edwards and
Steven Leatherbarrow

## Beogram CD5500

This player, part of the Beosystem 5500 , wouldn't play discs. As soon as play was selected the radial arm moved to the outside edge of the disc. Checks around the radial error/ tracking error amplifier showed that the supply voltages were incorrect. Pins 2 and 4 , which should have been at 9.5 V and -9.5 V respectively, were actually at -0.65 V and -5.6 V . As so often, a fault in one half of the split supply was upsetting both halves. The 9.5V regulator transistor TR 10 had never had its base connection soldered. Remarkably, the player had worked for several years without giving any trouble, going wrong only when its owner moved house.
N.B.

## Pioneer PD-Z91

This player was dead. When we removed the main PCB we quickly saw the cause of the trouble: voltage regulator IC12 was badly dryjointed. N.B.

## Pioneer XR-P250M

This system tumed out to be faulty when we installed it. Discs were not read and were immediately ejected there's no drawer as this is an edge loading model. We found that there was no laser output or focus bob. As is so often the case, the cause of the problem was a break in the flexiprint link (PNP1343) to the optical unit. There are connectors at both ends, making it easy to replace. It's folded under the traverse deck at $45^{\circ}$ : many attempts had obviously been made during production to get the angle correct! N.B.

## Sony CDP101

This early model had been well and truly butchered. I had to replace both

## CD Player casebook

servo chips and repair quite a lot of print. I then found that the focus gain control had been turned right up. The cause of the trouble was a faulty inverter in IC105. Because of this the laser wasn't being turned on. R.B.

## Saisho CDX200

Failure of the open/close button is a fault I've had with a number of these players. They often come to us with a disc trapped inside. More often than not the drawer mechanism will function correctly when you short out the switch momentarily (a quarterinch screwdriver is ideal for this). The cause of the problem is nearly always that the small PCB which carries the single switch is mislocated.
Note that in these machines the open/close button is hinged at the top, i.e. it isn't a true button, being attached to the front panel. What seems to happen is that the front panel gets knocked, pushing the little PCB out of its two locating lugs so that the push button at the front can no longer reach it. Push the PCB back home, then use a dab of glue to hold it in position. H.A.

## Matsui CDS1000

The sound was fine at first. but after playing one disc there would be a strong hum as the next disc was loading, with a background hum that became worse as the disc was played. The sound output chip is an NJM4060D, which is supposed to operate with $\pm 10 \mathrm{~V}$ supplies. They read $\pm 15 \mathrm{~V}$ however. The transformer was not the wrong one, but a replacement cured the problem - even though the supplies were still not within specification. The Matsui CDM30 uses the same PCB, which is a Philips design. R.M.

## Sanyo DC-D12U

The display lit up, the CD section produced an error indication and there was no audio output. The N20 1CP4I was open-circuit - it's near socket CN705. I then found that safety resistor R4903 was open-circuit, while the audio output chip had a hole in it and had burnt the PCB. Repairing the
bumt area of the PCB and replacing the failed components put matters right. G.T.

## Cheap CD Players

This is something of a problem area. Access is often limited. and servicing is at times virtually impossible. The only spares available seem to be complete mechanisms, inclusive of the laser unit, and replacement PCBs. This is not good when the unit is out of warranty, as the cost makes repair uneconomic.
The good news is that the laser unit is normally a KSS210, which is readily obtainable, while in many cases all that's required is to clean the laser unit and the sled and apply a spot of light grease to the latter.
The PCBs seem to come from China. It is worth keeping old ones if you are given a unit that has been written off. G.T.

## Goodmans SS5200

This is a component system with a tuner and a cassette player connected via a ribbon cable to a CD player and amplifier. The customer complained that nothing happened when he tried to activate the tuner preset scan function using the remote control unit. A check showed that the remote control unit was in order, the cause of the fault being traced to the ribbon cable socket on the tuner/cassette player - it was dry-jointed. G.T.

## Alba CD1010

This machine wouldn't play discs. All three plugs to the CD mechanism had dry-jointed sockets. In addition there was intermittently no display and no operation. The plugs to the front PCB were not pushed fully home. G.T.

## Bush MS352

The mains transformer was opencircuit, the cause being shorted protection capacitors across the bridge rectifier diodes. This is quite a common fault. G.T.

## Daewoo AMI310

The CD player section of this tuner/ tape/CD system did strange things
intermittently: the drawer would sometimes refuse to open or close while on other occasions the machine would refuse to play a disc. The cause was a dry-jointed socket - CN704. G.T.

## Proline/Alba SYS150CD

The CD lid catch on this Proline midi systemı had failed. We were able to cross-reference and obtain a replacement from Alba - the part no. is 700016846000 . G.T.

## Sharp WQ-CD220L

The main fuse F651 in this portable radio/tape/CD player unit had blown. After replacing it everything worked until the tape deck was put into play. The fuse then went again. On investigation I found that the leaf switch in the supply to the motor was bent and shorting to chassis. A new switch cured the problem. All right, not a CD fault but the sort of thing you have to watch out for with such units. G.T.

## Aiwa CXN340X

This midi system holds three discs, using a turntable. The drawer would go in and out, but the mechanical timing was incorrect because of grease that had become like tar - the large amount of nicotine inside the unit was probably
not unconnected with this. A clean, regrease and realignment cured this initial problem.
I next found that the spindle motor didn't rotate, then that the sled motor didn't move. The cause was an opencircuit N10 ICP - it's behind connector CN 30 on the CD PCB. While I had the equipment apart I cleaned and lubricated the sled.
The disc would now spin and the sled moved, but the player skipped. I'd given the optical unit a clean while I had the machine apart to replace the ICP. So I checked the eye pattem, whose amplitude was low at 700 mV . Not surprising in view of all the nicotine. A new optical unit cured this final problem. G.T.

## Hitachi DA7000

We fitted a new loading belt to get the drawer to open and close when told, then found that the inserted disc wouldn't spin. Cleaning the lens restored normal operation. J.E.

## Alba CX740

When a disc was inserted this top loader did nothing apart from flash two zeros in the display. After switching it off 1 examined the objective lens carefully with a magnifying glass. Its

## Panasonic RX-DT401

Apart from the CD section everything in this radio/tape/CD player worked correctly. But after inserting a disc and closing the lid the LC display remained unimpressed and did nothing. A few seconds later it would say "no disc". I noticed that the lens was bobbing up and down frantically in an attempt to focus, but the disc wasn't spinning. In fact the spindle motor's turntable had been pushed down the spindle shaft and was jammed against the cabinet moulding.
I released the turntable by prizing it gently upwards. It was then able to spin freely. After a few experiments to get the turntable height correct the player was back to normal. J.E.
milky white colour meant that there was no chance of it focusing on the disc. A phone call to the customer revealed that after cleaning the tape heads with methylated spirit he had decided to clean the "laser thingy" as well. The estimate for a new optical unit was refused. Oh well! J.E.

## Pioneer PD 103

Severe sound distortion was the complaint with this CD player. We've had the fault before with this and some Philips models. The symptom is often caused by a faulty AD converter. Sure enough IC401 (type PD2026B) was defective - a blast of freezer proved the point. S.L.

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 characteristics and how to get the best from them}

The nickel-cadmium cell is well-established as a source of power for portable electronic equipment. But care is required with its charging and use if it is to fulfill the promise of a thousand charge-discharge cycles. Many potential users are discouraged from using NiCad cells because of reports of their short life and high cost. These two factors go hand-in-hand: although the NiCad cell costs very little to recharge, the cost of the cell itself is high.

## Construction

Fig. 1 shows the construction of a NiCad cell. The electrolyte is sandwiched between a sintered positive electrode strip of nickel hydroxide and a pressed powdered cadmium negative electrode strip. This sandwich is rolled up and placed in a cylindrical container, with tabs inserted to enable external connections to be made.
The rolled-up sandwich construction provides a very large surface area for the chemical reaction. The container is generally the negative terminal and the end
stud, which is vented to allow the safe release of gas if overcharging occurs, the positive one. An aqueous solution of potassium hydroxide is used for the electrolyte.

## Characteristics

NiCad cells are very rugged and have ideal characteristics for many forms of electronic equipment. They can nevertheless be abused, and certain rules have to be observed if the maximum number of chargedischarge cycles is to be obtained. The discharge characteristic is very nearly flat - see Fig. 2.
A freshly charged cell has a terminal voltage of abou 1.3 V . This falls quickly to a very stable 1.2 V until the end of the charge is reached. At this point the voltage falls very rapidly.
Ideally, a cell should not be discharged below 0.9 V . It is easy to detect this point in electronic equipment, but with a torch or hand tool it's not quite so simple. When the bulb goes dim however, or the motor rapidly loses speed, it's time to recharge.

Where a number of cells are used in series to form a battery, there can be a problem should one of them have a slightly lower output voltage than the others. When the battery is almost totally discharged, the low-voltage cell will be discharged first and, as there is still some output from the others, the current will charge the low cell in reverse! If a battery consistently produces a lower voltage after being recharged than when new, a low cell in the chain is the probable cause. If you have access to the cells individually, remedial action can be applied to the defective one using a small bench power supply.
The disadvantage of the NiCad cell is its terminal voltage. NiCad cells are manufactured in the same physical sizes as zinc-carbon and alkaline cells, but these both have a terminal voltage of 1.5 V . Using four NiCad cells in say a radio will not produce the best results because the set will be supplied at only 4.8 V instead of 6 V . A six-cell radio will normally operate with a 9 V supply from alkaline or zinc-carbon cells: it will receive only 7.2 V from NiCad cells. Thus equipment designed for use with zinc-carbon or alkaline cells will not be 100 per cent happy with NiCad cclls. Although it will work for a long time before the cells are discharged, performance will not be at optimum. Bear in mind the lower terminal voltage before converting to NiCad cells at considerable cost.

## Charging

The main damage is done when a NiCad cell is charged. There are fast chargers that will refresh a camcorder battery in under an hour. Others will charge standard-size cells in five hours. These fast chargers are fine, but the rules for long life with a NiCad cell are that it must be discharged to 0.9 V or less before it is recharged, and that the correct charging time must be observed. To 'top up' a partially discharged battery is asking for trouble. So discharge it first, either with a special discharger designed for the purpose or a bulb on clip-leads. Then charge it from the flat state, adhering to the recommended charging time if the charger is a fast one.
Fast camcorder battery chargers have a sensing circuit that detects the sudden temperature rise as a cell reaches full charge, but they are not foolproof. Using onc to top up a cell's charge will result in over charging. The cell may reach its fully-charged state quickly, but the time will be too short to allow the internal temperature and the temperature of the cell's case to equalise and the sensing system to operate effectively.
A safe rate at which to charge a NiCad cell is at or below a current equal to one tenth of the cell's amperehour capacity for ten or more hours. Thus a 1.2Ah cell can be trickle charged at 120 mA for ten hours or at 100 mA for twelve hours and so on. Divide the Ah capacity by the charging current to obtain the total charging time. At the end of the charging period the current is sufficiently low to enable the gases produced by over charging to recombine, so nothing is lost from the cell via the safety vent and the electrolyte remains at 100 per cent volume.
Small radio batteries such as the PP3 require a slightly longer time to charge: 16 hours at 11 mA is the recommended rate.
Failure to charge a NiCad cell fully lowers its apparent capacity: these cells have a 'memory' effect, and take to a short charge-discharge time as 'normal', thus exhibiting an apparent loss of capacity. The capacity can usually be restored by putting the cell or battery through several full-term charge-discharge cycles. Unfortunately this treatment does not work with over charged cells!


Fig. 2:
Discharge
characteristic of a NiCad cell, in this case a I.2Ah cell at a discharge current of 100 mA .


## Storage

When a NiCad cell is not in use it should ideally be stored in a discharged state. Storage at high temperatures should be avoided - so don't keep them in the airing cupboard. A dry spot on a shelf in the garage is preferable

## Performance and Safety

A NiCad cell will deliver its full capacity at low temperatures. At high temperatures the internal leakage increases and the apparent capacity is less.
As the internal resistance is very low, a cell will deliver a very high current for a short period something like 1A per square inch of electrode area! This can result in fire in an external circuit and will also damage the cell. With some types of battery an internal fuse is incorporated to protect the cells and the circuitry in the event of a short-circuit.
With care NiCad cells and batteries will last for the 1,000 charge-discharge cycles claimed for them, and will at the same time provide a very low-cost source of electric power.

## Disposal

Finally a word about the disposal of defective NiCad cells. Cadmium is a toxic substance, so dud cells should be well wrapped in platic bags and handed to the dustman.
Cells should not be burnt: they are likely to burst and could injure someone.

## Servicing the

# Samsung VIK310/320/350 

## Mike Leach on how to tackle the various faults you could encounter with these popular VCRs

TThese VCRs are good from both the user's and the technician's point of view, though there are a few common fault conditions that we will look at in this article. They are reasonably easy to operate, and can be quickly dismantled for servicing as and when required. The VIK310/320/350 have been around for two to three years now, and a definite fault pattern seems to have emerged. Those who are familiar with them will be fully aware of the faults and remedies described in this article. It should however be of benefit to the technician who sees one for the first time. The range is as follows:

Model VIK310: This is a simple two-head machine with standard play only.

Model VIK320: This is a two-head machine with standard and long-play modes.

Model VIK350: This is a four-head machine with standard and long-play modes.

The most common failure occurs in the power supply. It can often lead to faults developing in other areas of the machine. I'll start off with the 'regulator' section of the power supply (the chopper circuit), as faults here must be cleared before any other checks can be made.

## The Power Supply

The power supply can be divided into two sections. First the chopper circuit (see Fig. 1), which is housed inside the large metal can towards the right-hand side of the machine. This produces permanent outputs for the power switching/distribution section on the main mother board. We'll concentrate on the chopper circuit, since nearly all the power supply faults occur here.
The most common symptom is a completcly dead machine. The customer will often say that the machine had been disconnected and moved, but wouldn't come back on when connected to the mains supply some time later. This is very common and brings us straight to the crux of most of the problems from which these machines suffer. The reason that they may fail to come on again after a rest is capacitor C 110 , a $100 \mu \mathrm{~F}, 25 \mathrm{~V}, 105^{\circ} \mathrm{C}$ electrolytic. You may find it difficult to find: it's protected by a plastic shroud, which is brown in colour. Look between the STR11006 chopper chip 1C101 and the chopper transformer T101. C109 is protected by a similar plastic
shroud, but this capacitor should not require replacement.
My rule these days is to replace C 110 before I even plug the machine in on the bench. Even when the VCR has come in for only a minor fault such as a head clean, I always replace C 110 first. C1 10 dries up because of excessive heat. It can destroy 1 C 101 and the $2 \cdot 7 \Omega$. 2 W surge limiter resistor R101, thus producing the dead machine condition. The first time I came across this situation 1 replaced only R101 and the chip. I did that only once!

## Dead Machine

Thus when faced with a dead machine the first thing to do is to replace C110. You'll find that in nine cases out of ten the surge limiter R101 will also have failed, which means that the STR 11006 chip will require replacement as well. This chip doesn't always fail, but as there's no way of checking it the best course is to replace it to be surc.
When these three items have been replaced there arc several other things to check in the power supply before trying the machine. Check F102 (2A) in the 6.5 V supply. It may have blown. Another item that causes problems is the 22 V zener diode ZD101, which is buried amongst other components. It protects the 16.5 V supply. Well, sometimes it provides protection and sometimes it doesn't. I've known it to go short-circuit or open-circuit, so it must be checked and replaced as necessary. Then take a look at R113 ( $1.5 \mathrm{k} \Omega, 0.25 \mathrm{~W}$ ), which may be a little charred. If so, replace it.
To summarise: always replace C 110 ; replace IC 101 if the machine is dead; check and replace as necessary R101, ZD101, R113 and F102.
This covers most of the common power supply ailments. I've known very bad cases where a complete new power supply has had to be ordered, but this is a rare occurrence and the above checks will in most cases provide a complete cure. If there are no other burn ups in the power supply, you can assume that the unit is now OK and that it's safe to power the rest of the machine.
In my experience the power supply will run on its own and doesn't have to be plugged into the main PCB. It's best to plug it in however. as the voltages on the supply lines can be rather high off load. It is obviously not a good idea to run the power supply in this way if you are not sure whether everything is OK. So the rule is to plug it in.
All things being equal, the machine should now work. But the chances are that it won't. Let's look at some of the other faults you may encounter.


Fig. 1: Circuit diagram of the chopper power supply used in the Samsung Models VIK310, VIK320 and VIK350. Model VIK375 uses an almost identical circuit, the difference being that a single $68 \mathrm{k} \Omega, 5 \mathrm{~W}$ resistor is used in the R104/R114 position.

## Clock/display Problems

After a major power supply repair you will often find that the clock is either dimly lit or there's no display at all. The fault is easy to rectify, but it's a good idea to know a bit about the source of the digitron display's power supply and also to able to identify which type of main panel is fitted to the machine.
A good working power supply provides -30 V at pin 6 of plug CN151 on the main panel. This voltage is fed to the two $100 \Omega$ chip resistors R638 and R664, which are mounted on the underside of the main panel. They are connected in parallel, presenting an cffective resistance of $50 \Omega$. After the resistors, a chunky 27 V zener diode stabilises the supply. It's then applied to the digitron (DT701) and the microcontroller chip. The zener diode and the two resistors are the main cause of display problems. The diode may be in one of two places, depending on which type of main panel was fitted during manufacture of the machine.
If you've got a problem the chances are that the zener diode is D606, which is mounted just to the left of the power supply plug/socket CN151. You may find that the board is a little charred in this area. If you can't find a D606 in this area the diode will be ZD702 instead. It's mounted on the front panel, just to the right of the digitron.
In either case a quick check should be made on the value of the two resistors. If the zener diode has gone shortcircuit or leaky, one or both of the resistors will probably have failed. If only one of them has gone open-circuit the effective resistance will have risen to $100 \Omega$. So the clock display will be dim.
It's easy to check the resistors. Remove the power supply can and find CN151 on the main panel. Switch your bench meter to the $200 \Omega$ range and connect one
probe to pin 6 of CN 151 , the other probe to jumper wire W691. This jumper wire is immediately to the right of the larger of the two ribbon cables that connect the main and the front panel. It's a good idea to disconnect this ribbon cable whilst carrying out the resistance check. The reading obtained should be $50 \Omega$. If you get a higher or an opencircuit reading, you will have to remove the main panel and replace the resistors.
Access to the PCB is simple. Remove the complete deck assembly (see mechanical section later) and the front timer board, also the power supply if you haven't already done so. Then remove the two screws at the back end of the machine, above the scart socket. The main PCB will now come out of the cabinet freely. Turn it over and look for CN151's soldered connections. R638 and R664 are just above it.
Always replace them both, even if only one of them is faulty. You must use chip components in these positions. It may be tempting to use a couple of 0.25 W resistors if the original type is not to hand. They will work of course, but if the 27 V zener diode were to go short-circuit at a later date the 0.25 W resistors would fire up big time and produce much smoke and burning. Two chip resistors will just give off a minor 'phut' and go open-circuit. I would regard them as safety components, so the original type must be used.
This brings us to the heat generated by the 27 V zener diode. When the diode is D606 on the main PCB you are likely to find that the board is somewhat charred or even burnt through. If the board is in a bad way, it could well be that damage to the very fine print that runs in this area has occurred. This means replacing the whole board. Samsung can supply one, minus the tuner etc., for a reasonable price.
If the board around D606 is just slightly darkened and
the print hasn't been damaged you can prevent further damage by replacing the diode, not necessarily in its original position. As a better alternative you can mount a new 27 V zener diode in the ZD702 position on the front pancl. Fortunately where the diode is D606 on the main PCB there is also a vacant position marked ZD702 on the front pancl, just to the right of the digitron display. A new diode can be mounted here - on the component side of course - without fear of any further heat damage occurring. There are no extra leads to run, just fit the new diode in this pusition. Make sure that you solder it well as it will still get rather warm
Be careful when removing the old D606 diode. Waggling it about while trying to remove it can cause print damage - be very careful when working in this area, and always use a new diode. I've known of cases where excessive heat from a soldering iron has damaged the old diode, with the result that R638 and R664 were knocked out when the machine was switched on again.
Where the diode was mounted on the front panel during manufacture, just check it for dry-joints. It's likely that the solder will have dried up a little.
If the display is still dim after carrying out these checks and any necessary replacements, you'll have to replace the digitron. I've had to replace several of them over the past year or so. The symptoms are the usual ones: some segments brighter than others rather than the whole display being uniformly dim.

## Loading Motor Drive

Another problem you may get after a major power supply failure is a blown loading motor drive chip (IC602, type KA8301). The damage can vary from a disintegrated chip that has blown itself in half and burnt its feed resistors (R630 and R631) to a chip that has simply packed up. The chip is mounted betwcen the two ribbon cables on the main panel, to the left of the power supply.
Problems with this chip are becoming quite common. After a power supply repair a machine will often power up then either refuse to load a tape or, if the tape is already in the machine, it will remain in the fully-loaded position and refuse to eject the cassettc. Don't despair. When you remove the bottom cover you will find that the loading motor drive chip and its two feed resistors are accessible from beneath. This is one of the few things you can get at without having to remove the deck assembly. The $7.5 \Omega$ fced resistors R630 and R631 are of the safety type, rated at 1W. I always replace them both as they are connected in parallel. Once again the original type must be used.

## Less Common Problems

If the machine keeps trying to front load of its own accord, without a tape being inserted, strip it down and check for dry-joints at the lighthouse (LD601) and the two end sensors. Also check the two plugs and sockets that connect the deck assembly to the main panel. They are usually OK, but bear in mind that one of these plugs is connected directly to the mode-select switch - you obviously don't want any intermittent connections here.
The cause of intermittent patterning, poor E-E and record pictures etc. is usually the tuner. The IF and mixer/booster assemblies are reliable.
A few weeks ago I repaired a machine that had died after a power cut. Apart from power supply failure, the capstan motor drive chip, which is mounted on the capstan motor, had blown itself apart and the servo and main microcontroller chips had failed. This was interesting. After replacing the 27 V zener diode the machine continued to destroy the previously mentioned resistors R638/R664 in the -27 V supply. It did so because of the
shorted microcontroller chip. Definitely one to watch out for in future.

## Summary - Electronics

Apart from the 'one off' failures we all get, that's about it with regard to electrical problems with these machines. If you are now in the fortunate position of being able to box up the machine and return it to the customer, there are just two small things that are worth attention.
First, when you replace the power supply in the machine for the last time check the condition of the small insulating pad between the power supply and the main board. The space between the power supply and the main panel is only a couple of millimetres: the white and green looking pad provides insulation between the two. It can deteriorate over a period of time because of heat, and obviously needs to be checked. I've found that the double-sided sticky Pritt Pads make an ideal replacement should the original pad be too far gone.
Secondly, makc sure that the ribbon cables between the front panel and the main board are dressed clear of the loading motor drive chip. We have noted that this chip can be distressed, so don't ask for trouble!

## Deck Basics

The deck used in these machines is very similar to that used in the earlier SI3260 and subsequent models. But it's more reliable. Two motors are used for tape transport. The loading motor drives the cassette housing and tape guides, while the capstan motor also provides wind/rewind drive. As with most modern machines, a pinch roller cam drives the pinch roller assembly up and down and a review arm guides the tape up to the capstan motor spindle. A sliding rack driven by the main cam provides tape guide operation.

## Removing a Tape

Removing a tape from a dead machine looks difficult at first because in the loaded position one of the main deckretaining screws is obscured by the cassette housing. OK, you can remove the cassette housing by taking off the front panel to gain access to the two screws that hold it at the front, then remove the screws that hold it at the top. But if you do this you will still have difficulty if the tape is in the fully-loaded position, because the pinch roller will prevent the tape from coming out easily.
The best way to remove a tape is to take off the bottom metal cover to gain access to the previously mentioned loading motor drive chip. Then unsolder the chip and apply a few volts from the bench power supply to the loading motor via the print. Apply about $5-7 \mathrm{~V}$, positive to pin 10 and negative to pin 2 . with the chip removed. This will unload the tape. Do it slowly, stopping every second or so. You will have to turn the capstan motor spindle from the top of the machine to wind in the loop of tape caused by this unloading.
You probably won't have to do this very often because, as we all know, the customer usually finds a far better way of removing a tape!

## Cassette Housing and Eject Gear

The cassette housing is driven by the white or black eject gear that protrudes slightly above the metal chassis at the right-hand side of the deck. If a white one is fitted, you will probably find that the teeth which drive the cassette housing have wom away. Obviously the eject gear must be replaced. It's a good idea to replace the right-hand plate of the cassette housing at the same time, as the problem might otherwise recur.
To replace the eject gear, proceed as follows. Remove
the six screws that hold the cassette housing in place. Remove the housing, then undo from underneath the three screws that hold the main deck. There are three more larger screws that have to come out from the top of the deck, after which it should be free. Don't forget to unplug the connecting leads from above. One of them is the flexy print to the lower drum. It can easily be damaged. You can now lift out the deck and turn it over to replace the eject gear. The loading motor and cam should be on the lefthand side as you look at the deck. Remove the three screws that hold them in position. From now on we will refer to this as the loading block.
Fig. 2 shows the loading block and eject gear in the cject position, correctly timed. If the mechanism has gone out of sync because of a wom eject gear, you will usually find that turning the loading motor a few times will resync the mechanism to the correct position. If the loading motor is stiff, it's likely that the nylon worm wheel will need to be replaced along with the eject gear. This worm wheel's teeth can be distressed if the loading assembly seizes. I've never known the main cam to suffer. The mode select switch, which is beneath the main cam, is also usually reliable.
The arrow on the relay pinch gear can be difficult to see. Make sure, by looking from the top of the deck, that the review arm is in the unloaded position (in line with the tape guides). It should now be easier to see the arrow for retiming. With the new eject gear in position, its arrow aligned with the main cam as shown in Fig. 2, double check the alignment of the relay pinch gear then screw the loading block firmly back into position. Also ensure that the sliding rack which loads the tape guides is pushed firmly to the right before tightening the loading block.
All that now remains is to reseat the cassette housing in line with the eject gear from above. Fig. 3 shows the riming of the eject gear and the cassette housing in the eject mode. Notice that the first tooth of the cassette housing rack goes into the first slot of the eject gear. As with most machines, if the timing is only one tooth out there will be problems.
The deck can now be replaced in the cabinet, with the cassette housing in place. The deck retaining screws are all accessible without a tape in.

## Tape Damage

No take-up is a common symptom with these machines. The usual cause is a faulty clutch unit, which has to be replaced. I've known several cases however where the cause was the small idler, which can be seen immediately below the cassette housing. It swings to and fro, and often becomes stiff on its pivot. I have had to replace it, but sometimes a small drop of light oil on the pivot is all that's required to get it swinging again.
In fact with the cassette housing removed you can see a whole series of small gears that drive the two reel umtables in the various modes. Each one can be removed and cleaned, which is a good idea when carrying out a service. If some of these gears seize up the result can be a severe tape loop on eject, though take-up in the play mode may be OK.
Tape wrinkling can also be a problem. As with:any machine, a good test for tape wrinkling is to put it into fast-forward search then review search then back into play. The obvious cause is the pinch roller. When replacing this item, be sure to use the complete unit available from Samsung. I've tried using a plain pattern roller and have sill had problems because the shaft on which the roller sits was slightly out of true (bent!). This will wrinkle the tape.
The revicw arm is critical. If in doubt, replace it. At least gou know that a new one will be right. I say this because

there's no review arm height adjustment, and if the old one is only slightly bent there will be tape wrinkling problems.
If the pinch roller and review arm are OK but the machine still wrinkles tape, it's possible that the audio/control head requires fine adjustment. This is also


Fig. 2: The loading block assembly, shown in the correct position for the eject mode. Broken lines indicare the cam and worm wheel hidden beneath the metal chassis plate. $A$ and $B$ : the timing arrows on the eject gear, relay pinch gear and main cam, also the hole in the latter, should line up as shown for correct mechanical synchronisation. critical. If the head is only marginally out of alignment it will cause tape wrinkling, but check the other items first.

## Summary - Mechanical

So much for the general run of mechanical problems I've had with these machines. There is one other problem. I've spoken to Samsung about it on a couple of occasions and have also discussed it with other engineers, but no one has come up with the answer. On possibly seven or eight occasions now a machine has come into the workshop with a tape wrapped perfectly around the back of the drum. with no apparent tape damage. After removing the tape the machines have worked perfectly, showing no signs of any mechanical fault.
Now it's worth noting that as these machines load the tape to the drum they produce a little kick just at the time when the guides reach the fully-loaded position. This kick leaves, briefly, a very small loop of tape around the head and then tightens up again. It's very small and isn't really a problem. But suppose that a contaminated tape is inserted and the contaminated part reaches the head at the time when the kick occurs: it might be just enough to throw the tape over the drum to cause the problem. This is only a theory however. as I've never seen it happen. Has anyone else seen it? It's probably just one of those inexplicable quirks we encounter every day in this trade.

## Useful part numbers

| Power supply |  |
| :--- | :--- |
| C110 | A1104-0364 |
| IC101 | B4010-0015 |
| R101 | A1014-0011 |
| ZD101 | $62169-423-096$ |

Main panel D606 or ZD702 IC602 R630/R631 R638/R664

Front panel DT701 (digitron) A4153-0018
Mechanical parts
Cassette housing complete
62052-0004-00
Cassette housing RH plate
62203-0025-01
Eject gear
61473-0051-01
Review arm
Pinch roller complete 61544-0032-00
61523-0021-01
61453-0001-01

The help wanted column is intended to assist readers who require a part, circuit etc. that's not generally available.

## Requests are

published at the discretion of the editor. Send them to the editorial department do not write to or phone the advertisement department about this feature.

# HELP WANTED 

Wanted: Deflection yoke for the Matsui Model 1440A (narrow-neck $90^{\circ}$ tube type 3702B22). Willing to try anything with a field coil DC resistance of $15 \Omega$. L. Watkinson. Regent House, Week St. Mary, Devon EX22 6UJ. 01288341254. For disposal: Three Sony SLC6, four Philips N1700, five Philips VR2020 and five Philips VR6462 VCRs, with full service manuals for thc Philips models. They all need attention but as I need the space and haven't the time to repair them I will accept $£ 50$ for the lot - if they are taken away as one lot. They are all complete and haven't been cannibalised, but many have worn video heads. MoorView Television, 13 The Arcade, Okehampton, Devon EX20 lQZ. 0183754044 (day). 01837840184 (evenings). Wanted: Sony RMT-V270 remote control unit for VCR Model
SLV210. Robert McGrath, 41 Belvedere Place, Dublin 1. Ireland. Wanted: Scan coils for the Philips Model 14CT3605/05 (KT3 chassis). Tube is type A37-554X. Ron Bloy, 63 James Street, Stenhousemuir, Stirlingshire FK5 3HR. 01324552 241.

Wanted: PWB-DEFL-SUB panel type CP210A132-10 for the Dell Ultra scan SVGA 17FS-EN monitor, Model VC7EN (Mitsubishi), or a circuit diagram for this panel. Chris Laudan, 235 Holt Road, Horsford, Norwich NR10 3EB. 01603897638. Wanted: Tripler for the Grundig 900 GB GSC 900 camera. or possibly a camera for spare parts. R.M. Brannigan. Old Omnibus, 59 St. Oswald's Street, Old Swan, Liverpool 13.01512520514. Wanted: Service manual for the Philips CD104 and a handbook for the Philips VR6870, to buy or borrow. Have for disposal about 150 used TV valves, free if collected. S.J. Sheppard, 12 Bedford Road, Harrow, Middx HAl 4LZ. 01818635150.
Wanted: Parts list for the Perdio
CTV Model 3002 - same as OSD 521/S. Paul Lee, 6 Woolton Close, Moston, Manchester M40 0HQ.
Wanted: The following items for the Sanyo VTC5000 VCR. (1) The PCBs associated with the front panel, which contains the fluorescent
display and power switch. (2) The associated syscon panel, containing IC3301. (3) A reel drive motor, preferably new. (4) A pinch roller/idler asscmbly. F.C. Bailey, 2 Elmridge. Leigh, Lancashire WN7 1HN. 01942675299.
Wanted: Cassette mechanism for the Sharp TV/radio/cassette recorder Model $10 \mathrm{P}-18 \mathrm{H}$, or a complete model - working or not. F. Hendry, 183 Boreland Drive, Knightswood, Glasgow G13 3TP.
Wanted: Scan transformer for the Philips PM3211 oscilloscope. A service manual (photocopy OK) for the Pioneer PDM550 CD player. A service manual (photocopy OK) for the Aiwa AA8500H stereo amplifier, or information on where this can be obtained. J. Rivas, 11 Palaipaphou Street, Kato Paphos, Cyprus. 06-249 446.

Wanted: An EVF for the Philips VKR6820 camcorder (or the JVC, Ferguson etc. equivalent) including lead and plug. A battery pack for the Philips VKR6810 (or equivalent) camcorder. A Panasonic Zl chassis main PCB - preferably working. A Ferguson ICC5 chassis Nicam sound PCB. An Advent/Barco 750E 6 ft projection TV screen. I have many PCBs from scrap sets free apart from postage costs. Malcolm Lambert. 20b Palmer Lodge, Old Kent Road. Paddock Wood. Tonbridge. Kent TN12 6JD. 01892837566.
Wanted: A front control panel and a handset for the Mitsubishi Model HS-M55 VCR and a handset for the Mimtec Premier 2IRD satellite tuner. E.J. Edwards, 43 Hoose Court, Market Street, Hoylake, Wirral LA7 5AB. 01516320614.
Wanted: New or good second-hand LOPT, type MSU1RGV07. for the Samsung CSA7571 17in. monitor. Dave Chaplin. 470 Derby Road. Chesterfield, Derbyshire S40 2EX. 01246273048.

Wanted: UCL82 valve and circuit diagram (photocopy OK) for the AP100 amplifier produced by CSR Ltd. of Poole, Dorset. P. McKeever, 4 Castleview Park, Derry, N. Ireland BT48 8DL. 01504353613.
Wanted: Would Nick, who called me in connection with my request for a TCM1705A and a TCM1512P
chip and information on them, please give me a call - l've lost your telephone no. Peter Ward, 01425475 445.

Wanted: Sony CCD element type ICX027BKA-6 or details of a source of supply or alternatively a complete drive PCB type 63005-701-461 with CCD for the Samsung VC-E805P camera. D. Pack, 10 Manus Place, Glenfield 2167, NSW, Australia.
Wanted: Circuit diagram and operating/tuning instructions for the Thomson TF2502 colour portable and a circuit diagram for the Microvitec 653 Cub colour monitor. Photocopies will do. S.C. Stacey, 54 Swinston Hill Road, Dinnington,
Sheffield S31 7SA. 019() 9566457.
Wanted: TDA2270 field deflection chip for an Hitachi/Solaro TV set and a remote control unit for the Hitachi VT9700E VCR. Ted Yates, 79A Ash Road, Sutton, Surrey SM3 9LA. 01816440710.
Wanted: Mains transformer for the Solartron CD1400 scope, new or second-hand. M. Henry, 42 Chapel Road. Dungiven, Co. Derry. N. Ireland BT47 4RT. 01504741558. Wanted: Manual, circuit, control panel data or a working panel for the Electrolux 4076 microwave. Also a manual or parts list with ICs etc. for the Saft automatic 12 V fast charger Mk. 2. Michacl J. Levy, 19 Totternhoc Close, Harrow, Middx HA3 OHS. 01819073620.
Wanted: Programmable remote control unit for the Goodmans TX3650 VCR. S. Partin, Ilversden Cottage, Withy Road, West Hunspill, Somerset TA9 3NN. 01278794101.

Wanted: Any technical information, circuit diagrams or service shects for the Bell and Howell Hi-Bcam 550 video projector, manufactured by Videpro, Dublin. J. Foster, 117 Cotes Road, Barrow-upon-Soar. Loughborough, Leics LE12 8JP. 01509413145.

Wanted: LOPT for the Bush Model TV161. A Bush Model TV148 complete, also a colour set fitted with the BRC 2000 chassis and any dual-standard Bush-Murphy colour sets. S. Pendlebury, 218 Belmont Road, Sharples, Bolton, Lancs BL1 7AZ. 01204305781.

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## Ferguson 59P7A (ICC5 Chassis)

This set was dead. Another shortcircuit S2000 line output transistor (TL31)? Sure enough a reading of $40 \Omega$ was obtained between its collector and emitter. but when it was removed it was found to be OK. The reading was caused by a faulty EW coil, LG11, which was short-circuit between its primary and secondary windings. Resistor RL44, which consists of $56 \Omega$ and $120 \Omega$ in series. was open-circuit, and with the TDA4950 EW drive chip IG01 short-circuit from pin 5 to chassis this completed the path across TL31. With a new LG11, TDA4950 and RL44, also CL48 ( 10.5 nF ) and CL44 ( 300 nF ) for good measure. we tried the set. No other damage had been done. P.B.

## Philips CTX-E Chassis

This set had been arcing from its first anode connector and was now dead. A check on the 125 V HT supply showed that it was low at 70 V . The voltage at the collector of transistor T7330 in the trip circuil was correct at 6.8 V , so this eliminated possible problems in the excess current protection system. We removed for testing transistors T7322 and T7323 in the chopper pre-driver circuit. T7322 (BC548) was open-circuit. A new EHT lead

## TV

 Fault Findingand cap were required of course. P.B.

## Grundig P37-2226 (CUC2201 Chassis)

This set was tripping. The front display was off. and there was no sound or vision - just a thumping noise from the speaker. The tripping noise stopped when the tripler's input lead was disconnected from the combi transformer, but the tripler was OK. Resistance checks showed that the transformer was open-circuit between secondary windings N and L . A new transformer restored normal operation. P.B.

## Fidelity AVS1600

There was no sound and the set was stuck on ch. 8. Sound was restored by replacing a faulty TDA 1908A chip and fuse. But the set was still stuck on ch. 8 with the balance control and remote control unit having no effect. Checks around the M104B1 chip IC1 showed that its 5 V supply at pin 14 was missing. The cause was the 5.1 V zener diode 5D1 which was short-circuit. Then we just had to reassemble it al!! G.R.

## Sanyo CBP2145 (E2 Chassis)

The two faults mentioned on the report card, patterning and lack of height, showed up only after about an hour. When freezer was sprayed near the 12 V and 5 V regulators IC361 and IC365 the faults cleared. Both regulators have $100 \mu \mathrm{~F}, 25 \mathrm{~V}$ dccoupling electrolytics - C364 and C398. Replacing them cleared the two faults. G.R.

## Salora L Chassis

This set was actually a Tashiko Model 51E941. The fault was no sound. We soon discovered that there was no audio output from the TDA4505 chip. where voltage checks showed that pin 14 was at
0.2 V instead of 1.5 V . The 22 nF decoupling capacitor CB119 was faulty, a replacement restoring perfect sound. G.R.

## Cascade TV510

If one of these sets destroys either the line output transistor or the field output chip intermittently, disconnect the HT supply to the line output stage and connect a 60 W bulb as a dummy load. The HT should read 112 V . If it's high or goes high when the power supply warms up, replace the $47 \mathrm{uF}, 63 \mathrm{~V}$ electrolytic C909.
Note that small variations in the HT voltage may cause volume variations or tuning drift. Again C909 is probably the cause. G.R.

## Tatung 190/195 Chassis

This set was actually a Matsui 1424. Its linc frequency was wrong, and adjustment of the control would produce only a very unstable lock. The cause of the trouble was R109 ( $30 \mathrm{k} \Omega$ ) in the line oscillator circuit. It had increased in value to about $31 \mathrm{k} \Omega$. G.P.

## Sanyo CBP2 180

This set couldn't be tuned because its tuning voltage was missing. R714 ( $10 \mathrm{k} \Omega$ ) on the front control PCB had gone open-circuit. G.P.

## GoldStar CIT2175 (PC07X2 Chassis)

It would take several minutcs for this set to come on from cold. We found that C811 $(47 \mu \mathrm{~F}, 25 \mathrm{~V})$ in the power supply had dried up. It's the reservoir capacitor for the supply to pin 9 of the TDA4601 chopper control chip IC801. As a precaution we also replaced C812 $(100 \mathrm{\mu F}$,
16 V , C808 ( $1 \mathrm{\mu F}, 50 \mathrm{~V}$ ) and C813 ( $100 \mu \mathrm{~F}, 16 \mathrm{~V}$ ). G.P.

## Toshiba 145R7BZ

This set wouldn't go into the standby mode. Checks in the on/off
control section of the power supply brought us to R833 ( $120 \mathrm{k} \Omega$ ) which had gone open-circuit. G.P.

## Matsui 6091

The ficld hold would lock at only one end of the control's range and would be lost completely once the set had warmed up. R412 ( $220 \mathrm{k} \Omega$ ) had increased in value. G.P.

## Sony AE2 Chassis

On very intermittent occasions this set would cut out and go to standby. The cause was rather roundabout. There was a dry-joint at R854, depriving the field chip of its supply from time to time. As a result, the protection circuit would come into operation. G.P.

## Matsui 14R1 (Grundig G1000 Chassis)

There was no sound output from one of these receivers. On investigation we found that the $4.7 \Omega$ safety resistor $R 550$ had gone open-circuit. G.P.

## Mitsubishi Euro 4 Chassis

One of these sets had no tuning memory. The tuning memory chip IC702 requires a -30 V supply. which was missing, at pin 2 . This supply is derived from the standby transformer T951, one of whose secondary windings was opencircuit. When we removed T951 we found that some of the pins were covered with a hardened brown glue. This had corroded the fine secondary-winding leadout wires. G.P.

## Ferguson TX86 Chassis

The cause of failure of the power supply to start up was traced to the TEA2018A chopper control chip IC4, which was faulty. It's always worth checking the soldering of R61 in the power supply in these sets, as a dry-joint here can destroy the line output transistor. G.P.

## Ponasonic Alpha 3 Chassis

One of these sets had no tuning memory because the chip select signal to the memory chip from pin 53 of the microcontroller chip was missing. We found that L1209 had gone open-circuit. Its part no. is ELEXT100KA. G.P.

## Philips G110 Chassis

Two weeks after rebuilding the power supply in one of these sets we were called back because the set had again gone dead. When we switched it on there was silence for
a fcw seconds then a purring noise came from the power supply. The cause of the trouble this time was the line output transformer, a replacement restoring normal operation. M.M.

## Hitachi C2574TN

The owner had beentold by the shop at which he had bought this set that he could connect the external speakers to it and to the external amplifier at the same time. But when a loud piece of music came on the set tripped out and went dead. We soon found that the main audio output chip IC4451 (type
TDA7263M) was short-circuit, so a replacement was fitted. The set then started but couldn't be tuned in.
Checks showed that the correct voltages were reaching the tuner and the IF strip, but there was still only noise. I then checked the supply to IC4451 and found that it was missing. It comes via Q956, which is used for on/off switching and was open-circuit. A new BD438 restored the supply and brought the set into full operation. A look at the circuit diagram showed that the switched 25 V supply also feeds a voltage regulator. M.M.

## Texet CTV10

Id never come across one of these budget 10 in . portables before. The problem was that it wouldn t come out of standby. Power switching is controlled by a 2SA1012 transistor, which was open-circuit. A replacement cured the fault. M.M.

## Philips K30 Chassis

A common problem with these sets is intermittent tripping because the little bush at the end of the EHT cable is dry-jointed. As a result, when you remove the cable the bush stays in the transformer. The way I deal with this problem is first to ensure that the EHT is fully discharged, then put a long screwdriver with a little bit of Araldite at its end down into the LOPT. Allow the Araldite to set then, when you remove the screwdriver, the bush will come with it. You can separate the bush from the screwdriver, remove the adhesive (by heating) and resolder it to the EHT lead. This is far cheaper than fitting a new transformer and EHT cable. M.M.

## Texet CT 141

There were two faults with this set. First. it went into standby after a few minutes. This was cured by
replacing the capacitor in the chopper transistor's base circuit and resoldering the dry-joints in the power supply. The second fault was field bounce or, to be more precise, the field scan was trying to collapse. Scope checks were inconclusive and, after replacing several components in the field output stage, we eventually replaced the height control. This cured the problem. M.M.

## Grundig CUC2800 Chassis

The usual cause of no sound with these sets is failure of the TDA6200 sound processing chip. On this occasion however the U2829B sound demodulator chip was responsible.
The construction of this chassis does not make servicing easy. There is some access to the print side of the IF board however. A scope check in the coupling circuit between the two chips will show which one is the culprit. M.M.

## Matsui 1480A

This set displayed a dark picture. If the first anode preset was turned up there was a good bright picture. but the brightness control didn't work. As we didn't have the right manual we wasted a lot of time before we discovered that C483 (4.7 $\mu \mathrm{F} .50 \mathrm{~V}$ ) in the beam limiter circuit was the cause of the trouble: It had dried up, which is not surprising as it is mounted right next to the field output chip's heatsink.
In the model whose manual we were using the beam limiter acts on the contrast. In this model it acts on the brightness. M.Dr.

## Philips GRI-AX Chassis

If the set won't stop searching even when a good strong signal is found. replace C2031 (22nF) even if it reads OK when checked. M.Dr.

## Matsui 1482

If the set is dead with the standby light on, check R605 $(680 \mathrm{k} \Omega)$ in the power supply. You will usually find that it's open-circuit. M.Dr.

## Bush 2059NTX

Reduced, fluctuating height, with the Nicam sound dropping in and out, led us to carry out voltage checks in the power supply. We found that the 18 V supply was low at only 11V. R919 (1S2) had risen in value to $13 \Omega$. M.Dr.

## Nokia 6365

The sound was OK but the picture took up to twenty minutes to appear.

Timebase and EHT operation were normal. I initially suspected that something was amiss in the tube's heater supply, but it was OK. The first anode (G2) control had no effect however. The tube's first anode and focus supplies come from a module which is mounted on the chassis, near the line output transformer. I connected a scope, set to DC, to the module's first anode supply output and found that the display varied erratically and wild?y bctween 100 V and 250 V . With time it gradually settled down and a picture appeared. A replacement module restored normal operation. It's quite cheap, and can be obtained from Willow Vale - the part no. is 57109W). J.E.

## GEC C1402

There was HT at the collector of the line output transistor, but the line output stage was dead. When the dry-joint at the transistor's cmitter had been resoldered the set came to life. J.E.

## Nikkai NT1416

The only sign of life was a loud whine from the power supply. We found that C444 ( $370 \mathrm{pF}, 2 \mathrm{kV}$ ) in the line output stage was shortcircuit. When this capacitor was removed a split could be seen around its outer cdge. J.E.

## Goodmans 5150RC

According to the jot card this set was dead. A faint whine could be heard from the power supply however, while a regular 'ticking' noise at about one second intervals came from the line output transformer area. With the bench lamp switched off, a blue spark could be seen jumping the short distance between the transformer's base and one leg of the $33 \mu \mathrm{H}$ coil L652 in the HT feed. A closer look showed that the coil's legs were both dry-jointed. After a quick solder up the set worked normally. J.E.

## ITT CVC801 Chassis

The owner of this ageing portable complained that it took over thirty seconds to come to life when switched on. It had obviously been well cared for, being in immaculate condition both inside and out. I didn't have the circuit to hand. but my attention was drawn to a sad looking electrolytic capacitor,
C757, whose sleeving had shrunk untidily around its body and was discoloured. With the aid of a magnifying glass I found that its
value should have been $10 \mu \mathrm{~F}$ (350V). The capacitance meter produced a reading of only $0.5 \mu \mathrm{~F}$ however. When a replacement had been fitted the set started up normally every time. J.E.

## Lloytron T142C

This portable suffered from intermittent line hold drift. Slight movement of the cabinet would result in line collapse. We found that the pins of the line driver transformer T201 were dry-jointed. Resoldering them cured the problem. J.E.

## Sony KVX2532

No sound from one of this set's speakers was the result of dry-joints at all five pins of the TDA2050 audio output chip IC261. J.E.

## Hitachi CPT 1474

 (NP84CQ4 Chassis)The cause of vertical rolling was traced to $\mathrm{C} 906(0.2 \mu \mathrm{~F})$ in the field oscillator circuit. It measured OK when checked with a capacitance meter, but a replacement cured the fault. J.E.

## Sony KVE2532

This rather bulky Nicam set came to me with a well over-modulated picture and field cramp. I was scratching my head over what could be the cause when the customer mentioned that the set "went funny during a thunder storm". This could have been a real nasty, or maybe an 'electronic screwdriver' reset was all that was required. When the test mode was entered all the settings were seen to be at their extremes. Resetting them produced a lovely square picture and a sigh of relicf. T.L.

## Ferguson TX80 Chassis

This set was stuck in standby. In the on condition the voltage at the junction of RP37 and DP45 should be 3 V . It was very low. Cold checks revealed that RP36 $(75 \mathrm{k} \Omega, 2 \mathrm{~W})$ was open-circuit. T.L.

## Hitochi CPT2598 (G8Q Chassis)

The customer said that there was no picture, but on investigation we found that field collapse was the cause of the problem. A check at the field output chip IC601 showed that its LT supply was missing. Further checks showed that R715 ( $1 \Omega$ fusible) had gone open-circuit. Its replacement burnt out immediately however. You d expect to have found a short-circuit
here, but there wasn't one. Nevertheless a new IC601 and R715 restored normal operation. T.L.

## Matsui 1436XA

This portable had no picture. The line output stage was getting its HT supply, but the line driver stage wasn't. The line driver transformer T751 was open-circuit. T.L.

## Grundig GT2003

This set had a bright raster with flyback lines. A quick check at the CRT base panel showed that the HT supply to the RGB output stages was missing. R918 ( $10 \Omega$ safety type) was open-circuit. T.L.

## Matsui 2180TT

Field jitter was the problem with this set. We found that there was a dry-joint at the scan plug P570. Resoldering its connections cleared the fault. T.L.

## Hitachi CPT2250

This set is fitted with the Salora J chassis. Its picture would gradually brighten, until there was a very bright raster with no picture content. The sound was not affected. The tube's cathode and first anode voltages remained stable, but the voltage at its control grid drifted upwards. This was caused by dry-joints at the metal screening shield on the PCB, directly above the tube's neck - it's used as an earth return. E.T.

## Ferguson ICC9 Chassis

This set would come on for a second, with the rustle of EHT, then dic. Time for psychic fault finding! There were no shorts, so I decided to disconnect the TDA8172 field output chip IF01. The result was field collapse with no tripping. A replacement TDA8172 chip restored the picture. G.D.

## Orion 14ARX

These sets, which use a simple resistive dropper to power the standby circuit. tend to come to us stuck in the standby mode. To prove where the fault lies, disconnect Q117. If the set docsn't come on, the cause is probably the STR 50103 chip or the series-connected 330 kS 2 resistors. If the set now works except for standby - the cause of the fault is usually in the standby 5 V feed. If this falls below 4 V . the LED still lights but the set doesn't respond. C530 $(3.3 \mu \mathrm{~F}, 250 \mathrm{~V})$ is the usual cause of this problem. It's mounted by the mains switch, in a hot comer. A high-temperature
component is a good idea here. This chassis is used in Matsui, Bush etc. sets. G.D.

## Philips GRI-AX Chassis

This set, with remote control, was dead with very low outputs from the power supply. It was stuck in standby, though the microcontroller chip sent the on/off signal to transistor T7631. Replacing R3610 and R3613 restored the set to life, but the fault recurred. The cause of the trouble was eventually traced to the 10 V zener diode D6610. It's in the chopper FET's gate circuit. G.D.

## Matsui 2092

After fitting a new dcgaussing thermistor and fuse we were greated with - nothing! Although the power supply was working, there was no line drive. D411, a 9.1V zener diode in the start-up supply, had gone short-circuit. G.D.

## Ferguson TX85 Chassis

Sets fitted with this chassis have a habit of going bang. Replacing the obviously damaged components will often get the set going again, but with an unhappy power supply
that goes bang soon after. For a reliable repair, replace TR6 (TIPL791A), IC4 (TEA2018A), R102 ( $1 \cdot 2$ 2S, 3W) and FS1. This fuse must be a 1.25 A anti-surge, not a slow-blow, type - you may find that an 800 mA fuse is fitted. Solder the chopper transformer and mains switch tags - replace the latter if in doubt. Then check the following : R101 ( $1 \cdot 2 \mathrm{k} \Omega, 5 \mathrm{~W}$ ) - this is vital!; D8. D10 and D23 (all type 1N4002); D3-6 (all type BY133); R95 (100 ) and R97 (10 2). Power the set via a variac, with the degaussing coils disconnected. It should now work. If the picture is blotchy, replace the degaussing thermistor. G.D.

## Matsui 209T

All sorts of odd intermittent faults can be caused by R630 which, despite its designation, is in fact a 1.25 A fuse. The holder is usually to blame. I find it best to replace both the fuse and its holder. G.D.

## Amstrad CTV1410

These sets have proved to be quite reliable. This one had very intermittent field collapse,
especially when cold. Out with the polar hear! Replacing IC402 didn't help, but freezing C404 ( $0.022 \mu \mathrm{~F}$ ) produced the fault symptom and a replacement cured it.
Another of these sets produced a picture that had all the hallmarks of a low-emission tube. In fact R650 and R651 (both $4.7 \mathrm{k} \Omega$ ) in the onscreen display circuit had gone high in value. G.D.

## NordMende F10 Chassis

The set that came in, with the complaint of poor field centring, was a 14 in . Model T3434. It has a 10 -pin diode-split line output transformer. The thing to check is the 21 V supply, at CL28. Even if the supply is only marginally low, CL28 (1,000) F ) and RL52 (15 2 ) should be tested. Either can cause very strange effects on the field scanning. B.McC.

## Hitachi NP84CQ4 Chassis

The problem with this 14 in . colour portable (Model CPT1474) was HT instability - the voltage was also low. Replacing C910 and C919 (both $10 \mu \mathrm{~F}$ ) cured the trouble. B.McC.

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## WORKSHOP

## TV Tuning <br> Aid

## Ian Rees describes a simple unit to enable the video and satellite channels of TV receivers to be set up accurately

Fig. 1: Circuit diagram of the IV tuning aid.

Asignal source for setting up the video and satellite channels of TV sets is a useful item for both workshop and field use. The advent of Channel 5 in some areas has brought into focus the need for the outputs from VCRs and satellite receivers to be set accurately.
The unit described in this article provides two UHF outputs that can be tuned across the range from channel 30 to channel 40. A four-position switch enables blank or modulated rasters to be produced, either separately for manual tuning or simultaneously for sets with selfprogramming. The blank raster is also useful for carrying out grey-scale adjustment.

## Circuit Details

Fig. 1 shows the circuit. The UHF carriers are produced by a pair of Astec UM1 233 modulators, M1 and M2. whose outputs can be modulated by the CD4001 quad two-input nor gate chip IC2. This is arranged as an astable multivibrator with buffered complementary outputs. The multivibrator's frequency is set by RV1 to provide a suitable bar pattern.
The outputs from the two modulators are combined by the three $47 \Omega$ resistors R4-6 and are terminated at the RF output socket by the isolation components C5-6 and R7.


The three-pole, four-way selector switch $\$ 1$ can be set to give:
(1) Outputs 1 and 2 without modulation.
(2) Output 1 only, modulated.
(3) Output 2 only, modulated.
(4) Outputs 1 and 2, modulated.

A stabilised mains power supply is incorporated, with ICl to provide regulation. This is required to maintain the stability of the oscillator's output.

## Construction

It would be best to enclose the unit in a metal box. As radiation from the Astec modules was found to be negligible however a plastic case was used for the prototype. The layout shown in Fig. 2 is not critical provided the following points are observed.
By mounting the modulators as shown there's no need to use phono plugs for their outputs: the two resistors R4 and R5 can be soldered directly to the inside of their phono sockets, leaving just the ends of these resistors showing to link together with R6. A right-angled PCBmounting phono socket terminates the UHF output, enabling a coaxial flylead to be connected.
The small, compact Astec modulators were obtained from a couple of defunct Spectrum computers. Other computers and video games of that era use these modulators. I understand that both Sendz and Bull Electrical, who advertise regularly in Television, may be able to supply them or an equivalent. Modulators removed from VCRs or satellite receivers could also be used. If their physical size is different, the layout would have to be altered from that shown, but an advantage would be that their in-built test signals could be used.
I mounted all the components on a piece of standard Veroboard measuring $80 \times 100 \mathrm{~mm}$. The strips beneath the modulators etc. were soldered together to form an RF screen.
With care, you can use a drill to open up the holes a few millimeters to enable the selector switch to be tagmounted through the panel. The tags can then be connected via links or. to avoid lots of flying leads, soldered directly to the print. A single hole in the lid of the case is required for the switch shaft.
RV1 is mounted on the underside of the board.

A small mains transformer supplies rectifiers D1 and D2, whose output is fed to the 5 V regulator IC 1 . This doesn't require a heatsink. To prevent instability the two small $0 \cdot 1 \mu \mathrm{~F}$ capacitors ( C 2 and C 4 ) associated with the regulator should be mounted as close to its input and output as possible.
R1 is included to ensure that IC2 doesn't oscillate in the no modulation position.
C5 and C6 should be high-quality isolation capacitors to prevent any danger of shock with older TV sets that have live or half mains potential chassis.

## Setting Up

If you don't have a UHF frequency counter the simplest way of setting up the unit is with a TV set whose channel frequencies can be switch selected. Allow a few minutes for the modulators to stabilise after switching on, then proceed as follows - the example assumes that the standard channel 36 for video and channel 38 for satellite TV are to be used.
(1) Connect the unit to the mains supply and link its output to the TV set's UHF input socket. Set RV1 to mid-position.
(2) Switch the TV set to ch. 36 .
(3) Set switch S1 to position 2. Carefully tune the core in modulator 1 until a strong, steady pattern is seen.
(4) Switch the TV set to ch. 38.
(5) Set S1 to position 3 and repeat the tuning, this time with modulator 2 .
(6) Seal both modulator tuning cores with wax.
(7) Adjust RV1 until a suitable number of bars are obtained on both channels.

## Use

The unit can be used by plugging its output into a TV set's UHF input socket directly. For a better indication of how the set will perform, use a passive Y splitter to


Fig. 2: Layout on a piece of $80 \times 100 \mathrm{~mm}$ Veroboard.
mix the output from the unit with the signal from the aerial. Picture/sound performance can be directly examined on each channel used.
Some TV sets won't lock to the unit in the automatic scan mode and will have to be tuned manually.

## Component details

| C1 | $0.01 \mu \mathrm{~F}, 100 \mathrm{~V}$ Mylar | $\mathrm{R} 1-\mathrm{R} 3$ | $2.2 \mathrm{k} \Omega$ |
| :--- | :--- | :--- | :--- |
| $\mathrm{C} 2,4$ | $0.1 \mu \mathrm{~F}, 30 \mathrm{~V}$ ceramic | $\mathrm{R} 4-6$ | $47 \Omega$ |
| C3 | $470 \mu \mathrm{~F}, 16 \mathrm{~V}$ electrolytic | $\mathrm{R7}$ | $2.2 \mathrm{M} \Omega$ |
| C5 | $180 \mathrm{pF}, 600 \mathrm{~V}$ ceramic | RV 1 | $1 \mathrm{M} \Omega$ |
| C6 | $470 \mathrm{pF}, 600 \mathrm{~V}$ ceramic |  |  |
|  |  |  |  |

Fixed resistors $0.25 \mathrm{~W}, 5 \%$ carbon. RV1 is a linear skeleton preset rated at 0.25 W

T1 Mains transformer with $6-0-6 \mathrm{~V}, 150 \mathrm{~mA}$ secondary winding
D1-2 BY127
IC1 $78055 \mathrm{~V}, 1 \mathrm{~A}$ regulator
IC2 CD4001 quad two-input nor gate
M1-2 Astec UM1233 modulators

## NEW FROM HAMEG

Two scopes and a spectrum analyser have been added to the Hameg Instruments range.
Model HM305 is a dual-trace, analogue/digital scope that replaces the HM205. It has a 30 MHz analogue bandwidth and a $40 \mathrm{MS} / \mathrm{sec}$ digital sampling rate. Sensitivity is $1 \mathrm{mV} /$ div, timebase ranges are 0.2 s to $10 \mathrm{~ns} / \mathrm{div}$, and there's an integral component tester. Digital functions include $40 \mathrm{MS} / \mathrm{sec}$ sampling in both channels, two $2 \mathrm{~K} \times 8$-bit memories. 50 s to $0.5 \mu \mathrm{~s} /$ div timebase operation and pre-trigger, singleshot and roll modes. An HO79-5 interface can be used to feed waveforms to a matrix printer or, via RS232 or IEEE lines, to a PC. Waveforms can also be fed back from the PC to the HM305's memories and displayed on its screen. The HM305 is available at $£ 724$ plus VAT, the price including two probes, a mains lead, a manual and a two-year warranty.
Model HM304 is a microprocessor-controlled analogue scope with an auto-set system that has six set-up memories to save and recall complete front-panel configurations. This can be achieved by frontpanel operation. or remotely using the standard RS232 interface. Basic specification includes 35 MHz analogue bandwidth. $1 \mathrm{mV} / \mathrm{div}$ sensitivity and 0.5 s to $10 \mathrm{~ms} /$ div timebase ranges. A delay timebase, variable hold-off and a built-in component tester are provided. The HM304 is available at $£ 552$ plus VAT, the price including two probes,


The Hameg HM305 analogue/digital scope.
a mains lead, manual and a two-year warranty.
Model HM5010 is a stand-alone spectrum analyser with a 5 in . CRT and a frequency range of $150 \mathrm{kHz}-1.05 \mathrm{GHz}$. An on-screen frequency marker cursor utilises the numeric digital display, which also indicates the centre frequency, with 100 kHz resolution. Input range is -100 to +13 dBm . This lightweight portable analyser is ideal for EMC precompliance testing. The price is $£ 1,198$ plus VAT.
These instruments are available from Hameg Instruments, 70-78 Collingdon Street, Luton, Beds LU1 IRX (01582 413 174, fax 01582 456416 ). A catalogue is available from the company.



| NEW \& HARDLY USED TEST EQUIPMENT |  |  |  |
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| 1M4002 | 0.07 | $25 C 2655$ | 0.31 | N05135 | 1.45 | BC558C | B．86 | $88 \times 49$ | 8.43 | CO4017 | 0.47 | RC1558 | 0.55 | TAP1015 | 1.37 | TMus01 | 1.45 |
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| 1 N 4005 | 0.07 | $2 \mathrm{SC3182}$ | 1.20 | AN5515 | 2.75 | 8C637 | 211 | BSx20 | 0.35 | CD4053 | 0.54 | RGP10G | 8.25 | TDAIOM | 1.43 | TOA4605 | 4.10 |
| 1 N 4006 | 18 | $25 C 3225$ | 8.60 | N55521 | 1.66 | BC639 | 0.21 | 87139600 | 1.29 | CD4093 | 0.32 | RGP15 | 9.17 | Ta1060 | 1.08 | TMM950 | 1.76 |
| 1\＄4007 | 8.06 | $25 C 3330$ | 0.52 | AN5610 | 0.94 | BC640 | 8.11 | 87151500 R | 1.12 | CNX62A | 1.29 | RGPISM | 1.4 | TDA1085C | 2.74 | T0．7052 | 1.70 |
| 104148 | 0.66 | $2 \mathrm{SC3502}$ | 0.45 | AN7171K | 5.56 | ${ }^{\text {BC8488 }}$ | 0.21 | ET151800R | 1.15 | CNX82A | 2.18 | RGP30M | 0.30 | TDA1170 | 1.82 | TPa7240A | 2.57 |
| IN5062 | 0.26 | 2 SC 3795 | 289 | 84157 | 0.09 | BC84SC | 0.18 | BU208A | 1.45 | chas3a | 255 | S2000A3 | 1.54 | DA117ON | 2.57 | T018138 | 1.97 |
| IN5400 | 1.11 | $25 ¢ 37958$ | 2.21 | BA158 | 0.07 | BC8588 | 0.24 | 842080 | 1.51 | CNY758 | 0.52 | S20004F | 1.71 | Dallios | 2.05 | TAB140 | 4.52 |
| $1 \mathrm{NS401}$ | 214 | $25 C 3807$ | 2.81 | BA159 | 1.11 | BC858C | 0.15 | 8U326\％ | 1.36 | DTAIIESS | 0.31 | S2055AF | 3.74 | Dall80p | 1.69 | TA8145 | 1.37 |
| 1M5402 | 0.12 | 2SC3885A | 8.82 | BA39108 | 6.89 | BC875 | 0.33 | Bu406 | 0.63 | DTA！24ES | 0.19 | S4129302 | 10.37 | PaAISISA | 3.16 | DAR153 | 16.24 |
| iN5408 | 0.14 | 2SC38924 | 6.82 | 8， 5406 | 2.14 | B0131 | 2.26 | BU426A | 1.29 | DTC124E | 0.15 | Sus012 | 3.34 | Dal516a | 3.59 | TAS170 | 4.70 |
| IN6263 | 0.20 | $2 \mathrm{SC4204}$ | 0.50 | BA5412 | 2.48 | B0132 | 0.26 | BU500 | 1.41 | OTC124ES | 0.71 | SA83035 | 1，11 | TDA5180 | 4.27 | T． 48172 | 2.5 |
| 1 N 914 | 0.4 | $2 \mathrm{SC4} 242$ | 2.31 | BAC109 | 1.85 | B0135 | 0.33 | 8u500s | 0.35 | DTCIMES | 0.19 | S042516 | 2.89 | TA1519 | 4.27 | T128175 | 8.41 |
| 151555 | 0.87 | $2 \mathrm{CCH517}$ | 4.78 | B46209 | 1.46 | 30136 | 0.20 | Bu508A | 1.29 | ¢ $\times 1749$ | 0.43 | SGSIF34 | 1.78 | DA1520B | 2.48 | TDE3178FS | 3.88 |
| 2N2222A | 0.3 | 2 2SA5i7A | 2.52 | BA6209N | 1.27 | 80137 | 0.48 | Bu5084F | 1.32 | H413001 | 3.85 | \＄ 11430 | 1.92 | Dal524a | 2.99 | T0A8180 | 4.87 |
| 2N2369A | 8.9 | $2 \mathrm{SCH58}$ | 0.12 | B162198 | 1.76 | 80138 | 8.29 | 805080 | 1.58 | HA13108 | 2.57 | St1431 | 2.82 | DA15530 | 4.75 | TDAS190 | 3.59 |
| 2N3055 | 2.50 | 2SC4742 | 5.11 | B46222 | 1.70 | BDI39 | 0.11 | BU508DF | 1.88 | HA13117 | 2.05 | SL1432 | 18.17 | DAL5SA0 | 2.12 | TDA8380 | 2.53 |
| 2 N 3773 | 1.52 | ${ }^{2 S C 5} 36$ | － 3.30 | B462384 | 2.91 | BD140 | 0.24 | 84508 V | 240 | HA13118 | 1.88 | STA4SIC | 3.85 | TDA15570 | 4.23 | TDA503 | 2.13 |
| 2 3 3904 | 0.32 | $2 \mathrm{SC8050}$ | 0.52 | 846247 | 1.95 | BD233 | 0.23 | 84806 | 1.83 | HA13119 | 2.85 | STK413211 | 11.80 | TAA15580 | 7.69 | IEAO39 | 2.11 |
| 2N4123 | 0.30 | $25 C 985$ | 3.12 | 84718 | 1.88 | 80234 | 0.24 | 30887 | 0.51 | HA13151 | 13.20 | STK41411 | 10.23 | TDA1670a | 2 298 | T12018 | 2.29 |
| 25 A 1013 | 0.35 | 2501207 | 1.57 | 84785 | 0.96 | B0237 | 6.31 | 80908 | 1.68 | H251338583 | 769 | STKA142II | 9.40 | TDA1675A | 3.85 | Teaz20sc | 7.04 |
| $2 \mathrm{SN1015}$ | 0.11 | 2501266 | 0.82 | Sav21 | 0.21 | 80238 | 0.24 | Qux4445008 | 2.57 | HM6251 | 14.32 | Smuls21 | 10.68 | TDA1904 | 1.63 | TEA2031A | 4.35 |
| 2SA10156R | 211 | 2501275 | 1.41 | BAW76 | 0.03 | 80239 | 0.33 | BUK454600C | 2.99 | K 22263 | 0.55 | STM 433 | 11.4 | Dal908A | 2.14 | EFE264 | 3.48 |
| $2 \mathrm{SH1020}$ | 0.44 | 2501292 | 184 | $8 \times 14$ | 1.17 | 80243C | 0.44 | BUK454800A | 4.99 | XBLP8 | 1.42 | STK5331 | 2.87 | TDA2004 | 2.57 | TEA2165A | 9.58 |
| 2 SA1175 | 88 | 2501397 | 231 | BC1078 | 2.28 | 802441 | 0.34 | BUKA556008 | 2.54 | X14621004 | 6.15 | STK5332 | 2.82 | TDAZ005 | 1.45 | TEA2260 | 2.48 |
| $2 \mathrm{SN1} 285$ | 0.68 | 2501398 | 2.14 | 8 Cl 108 | 0.24 | BD2S4C | 0.42 | BUT11 | 0.65 | 141230 | 1.95 | STK5333 | 15.60 | TDR2006 | 1.08 | TEA2261 | 3.68 |
| 2SA1370 | 0.43 | 2501426 | 3.51 | BCIOBC | 0.15 | ${ }^{\text {B04 }} 33$ | 0.29 | BUTilia | 0.95 | 144282 | 4.53 | 5715342 | 4.07 | TDA2030H | 0.85 | TESLIO1A | 6.41 |
| 2SA1706 | 0.50 | 2501439 | 5.85 | BCIOSA | 0.28 | B0434 | 0.31 | BUTIINF | 1.18 | U4440 | 3.45 | STK5372 | 6.84 | TOA2030N | 1.45 | TEGS115 | 2.91 |
| 2S4608 | 0.24 | 2SD1441 | 5.98 | BC141 | 0.36 | B0437 | 8.28 | 8UTI2A | 0.91 | $\underline{44445}$ | 3.45 | STK5421 | 9.52 | TDA2040H | 4.34 | TC106D | 0.82 |
| 254673 | 0.18 | 2501453 | 3.85 | BC147A | 8.24 | 80438 | 0.38 | 8UT12AF | 1.87 | 4／700 | 4.27 | STKS671 | 4.87 | TD2050 | 4.58 | TCO25M | 1.82 |
| 251733 | 0.18 | 2 SO 1497 | 4.74 | ${ }^{8 C 148 A}$ | 0.35 | 30826 | 0.35 | 801184F | 1.37 | 4653585 | 0.60 | STK548！ | 8.12 | TOA2170 | C．00 | 7CP1060 | 1.10 |
| 2SA769 | 1.29 | 2501541 | 4.95 | BC157 | 0.13 | 80839 | 1.57 | 80136 | 1.19 | L46510 | 24 | STK5482 | 5.52 | T02270 | 9.50 | TP102 | 0.85 |
| 2S48724 | 0.35 | 2501546 | 7.59 | BC1588 | 0.12 | 30901 | C5 | 日UT56AT | 3.48 | LT520 | 4.80 | 577253 | 5.50 | DA2540 | 1.29 | 7P107 | 1.12 |
| 2 SA 933 | 0.38 | 2501548 | 5.95 | BC182 | 0.14 | B0902 | 0.60 | BUNEAA | 0.44 | L7800 | 1.15 | STK7348 | 5.74 | TMA2541 | 1.12 | 7P110 | 0．36 |
| 2SA966 | 8.11 | 2501554 | 3.25 | BC184A | 0.12 | B0939F | 1.61 | BLNssa | 1.52 | U7830 | 1． 10 | STR11006 | 7.31 | Dazs76a | 5.95 | TPPI2 ${ }^{\text {H }}$ | 0.95 |
| 2S1970 | 215 | 2501555 | 285 | 8 Cl 184 | 0.85 | B0T65C | 1.68 | BLWILA | 1.63 | LT835 | 2.99 | STR 4211 | 9.41 | TOA2577a | 2.99 | Pppl21 | 0.50 |
| 2SA984 | 0.38 | 2501556 | 5.11 | BCIsalc | 0.11 | Br 180 | 0.38 | BIN418 | 1.39 | 107837 | 2.40 | STR 451 | 23.41 | T1a2578 | 2.1 | TP122 | 0.48 |
| 2581010 | 0.35 | 2501651 | 2.38 | BC212 | 0.08 | BF194 | 0.22 | Bungia | 1.11 1.83 | 1C7132 | 4.70 | STR50020 | 2.38 | T0125794 | 4.91 | nP127 | 0.47 |
| $2 \mathrm{SB1143}$ | 0.77 | 2501710 | 2.52 | 8C2128 | 0.19 | 8F199 | Q． .4 | 8UN84 | 1.03 | LED3G | 0.10 | STR50103 | 4.48 | T0A2581 | 4.27 | TP137 | 8.48 |
| $2 \mathrm{SB1243}$ | 0.60 | 2501877 | 2.14 | BC2121 | 0.18 | BF224 | 0.21 | $80 \times 34$ | 0.60 | LED3R | 0.10 | STR50103A | 5.56 | T0a25810 | 1.59 | HiP29E | 0.52 |
| 258641 | 0.21 | 2501878 | 2.63 | BCCi3L | B． 19 | 85240 | 0.11 | Buz71a | 1.03 | LED3Y | 0.10 | STR 4041 | 1.52 | TA2582 | 3.85 | TP3055 | 4.83 |
| 2SB6494 | 0.77 | 2501884 | 3.35 | вС2378 | 4.19 | 85244 | 0.43 | Bu289a | 1．97 | $1 \begin{aligned} & 1417\end{aligned}$ | 1.29 | STR5412 | 3.58 | TDA2594 | 2.21 | ПP30C | 0.17 |
| $2 S 8686$ | 2.85 | 2501887 | 3.56 | ${ }_{8 C 238}$ | 2.11 | 85245A | 0.15 | BU2904 | 25 | LM324N | 1.48 | STR5804］ | 3.42 | T0／2595 | 3.19 | \＃P3IC | 0.00 |
| 258698 | 0.35 | $2 \mathrm{SO1911}$ | 5.98 | 8С238C | 0.17 | BF245B | 8.41 | BY127 BY133 | ［18 | 4 H 339 N | 8． 50 | STR 59041 | 8.11 | TOAFS00 | 7.69 | TiP32A | 0.45 |
| 258716 | 0.43 | 2503504 | 1.97 | 8 C 307 | 0.56 | 85256A | 8.23 | BY179 | 0.71 | L4358\％ | 0.52 | STR6020 | 6.07 | TAZEILA | 0.84 | TTP32C | 0.40 |
| 258764 | 0.30 | 250400 | 134 | 6C3078 | 0.15 | BF258 | 0.04 | $8 \mathrm{BY27}$ | 0.13 | M49481 | 11.85 | STR61001 | 10.68 | T2061ina | 1.32 | TP35C | 1.12 |
| 258777 | 0.50 | $250401 / 4$ | 4.77 | ${ }_{\text {BC3 }} 308$ | 0.6 | BF324 | 0.18 | 8 BY 28 | 0.13 | MS5218L | 0.59 | STR01816 | 7.69 | TH2653 | 4.70 | \＃P36C | 2.14 |
| 258774 | 1.61 | 253688 | 0．28 | ${ }_{\text {В }} \mathbf{3} 3688$ | 0.19 | BF391 | 4.18 | 8 Br 2291000 | 1.31 | M 545441 | 2.4 | STRD 4120 | 11.49 | TLA33013 | 6.75 | TPalc | 0.65 |
| 258891 | 0.50 | 2506698 | 184 | BC3098． | 0.14 | B6420 | 0.21 | BY229800 | 1.08 | M58655P | 4.56 | T9053V | 1.35 | T0A3505 | 2.40 | 7 P 42 C | 0.50 |
| 258892 | 8.35 | 250716 | 1.63 | BC327 | 0.10 | 85421 | 0.24 | Br25s | 0.14 | MC13002P | 7.69 | T9064V | 1.87 | TA3550 | 3.15 | TIPL760 | 2.57 |
| $2 \mathrm{SCl213}$ | 0.14 | 250756 | 1.47 | BC328 | 0.14 | B5422 | 0.19 | Br299 | 8.18 | MC140668 | 0.21 | TA72054P | 2.87 | TRA351A | 539 | TPLJSIA | 1.85 |
| 2 SCl 24 | 8.48 | 2508378 | 1.12 | BC337 | 0.14 | BF 523 | 0.14 | 日Y398 | 0.18 | MC14426P | 123 | T17227P | 229 | T23562A | 3.50 | TIPLT91A | 1.25 |
| ${ }_{2 S C 1318}$ | 8.15 | 250856 | 0.79 | BC338 | 0.96 | BF458 | 0.31 | 8 Y 399 | 0.12 | MD2062 | 13.74 | TA72709 | 2.72 | 1703562017 | 8.97 | 12072 | 0.00 |
| $2 \mathrm{SC1573}$ | 0.35 | 2578988 | 6.41 | BC368 | 118 | 8F559 | 0.43 | $8 \times 448$ | 0.30 | W2955 | 0.98 | Th7271P | 2.70 | 1013565 | 2.74 | T082CP | 0.21 |
| $2 \mathrm{SC1740}$ | 0.15 | 250965 | 4.87 | BC369 | 0.18 | E8460 | 4.82 | 8YD14 | 0.35 | Mu4052 | 3.34 | TA7273P | 4.93 | TDA3566 | 5.41 | TKP47C432AP8189 | 15.19 |
| $2 \mathrm{SC1815}$ | 0.17 | 2 SK1118 | 3.41 | BC372 | 0.48 | Br 469 | 0.34 | BY0330 | 0.12 | 10882 | 281 | 717280？ | 2.74 | T0A35768 | 10.31 | TMP47C434N355j | 16.63 |
| $2 \mathrm{SC1827}$ | 0.98 | 7405 | 0.65 | BC517 | 0.16 | BF470 | 0.38 | 8ro33J | 0.18 | WIE13005 | 0.55 | TA7281P | 3.28 | T－35924 | 4.27 | TPN2732 | 10.05 |
| 2SC1959 | 018 | 7407 | 0.69 | ECS46A | 日． 11 | B5471 | 2.37 | в 10334 | 0.28 | ME18004 | 245 | TA76989 | 5.97 | TDA3640． | 5.88 | 172899 | 24 |
| $2 \mathrm{SC2001}$ | 0.23 | 74HCO4 | 0.34 | BC5468 | 212 | B5487 | 4.57 | BWle－40 | 2.55 | ME3055T | 0.74 | 188201 | 3.93 | TOA3650 | 12.02 | UC3842 | 1.46 |
| 2 SC 2023 | 3.11 | 7805 | 078 | BC547 | 0.11 | 8759 | Q． 38 | B7958 | 0.21 | MUE340 | 0.45 | TA8205AH | 4.50 | т1236538 | 1.54 | UC3844 | 120 |
| $2 \mathrm{SC2060}$ | 0.30 | 7808 | 0.72 | BC547A | 818 | B763 | 0.23 | BYMgS | 0.21 | M．jF18004 | 2.55 | i P 8207 | 274 | T－23653C | 2.55 | UC3344N | 1.91 |
| 2 SC 2078 | 1.00 | 7809 | 0.69 | BC5478 | 0.11 | B788 | 1.52 | BW960 | 0.21 | M 6650 | 3.30 | TAB2IAAH | 4.10 | T013653C0 | 25 | UPC1230H | 3.41 |
| 2SC2120 | 0.23 | 7812 | 0.52 | BC548 | 8．5 5 | 87869 | 1.25 | BYYGE | 0.53 | MPSADG | 0.35 | TA8210 | 4.79 | 10A3654 | 1.88 | UPCI318KV | 3.85 |
| 2SC2230 | 8． 55 | 7815 | 0.82 | BC548A | 0.11 | BF869S | 1.48 | BYW56 | 0.31 | MPSM42 | 0.23 | TAB215 | 4.96 | TPA36540 | 2.82 | UPC1365C | 1.70 |
| $25 C 2235$ | 0.36 | 7805 | 1.35 | $3 \mathrm{C5488}$ | 0.65 | B8871 | 0.41 | BYW9SC | 0.21 | MPSAS5 | 0.23 | TR8220H | 9.82 | TDA590 | 488 | UPC1378H | 1.68 |
| $25 C 2236$ | 0.36 | 7912 | 0.35 | BC543C | 0.09 | Bf95s | 0.18 | BWW96E | 0.49 | MPSA92 | 0.18 | IN8221H | 7.26 | TMA501H | 5.95 | UPC1394C | 1.92 |
| $2 \mathrm{SC2240}$ | 1.21 | 7915 | 182 | ${ }_{8 C 5493}$ | 0.11 | 85960 | 0.30 | BXX10 | 0.30 | ME555 | 1.83 | TA8403K | 2.31 | TDM502A | 5.47 | UPC1488H | 299 |
| $2 \mathrm{SC2271}$ | 4.17 | 4.127 | 458 | BCS50C | 0.09 | BF961 | 2.26 | BY $\times 55600$ | 1.23 | NE592\％ | 1.91 |  | 0.26 | TRe503 | 4.00 | UPC5741 | 0.85 |
| $25 C 2274$ | 1.35 | AC187K | 0.59 | BC5S5A | 0.1 | BFRga | 0.6 | B2V10 | 1.34 | PSTKE130A | 2.55 | TBAI20S | 0.85 | TMM505E | 7.35 | UPD1937C | 3.85 |
| $25 C 2314$ | 1.38 | AC1883 | 1．11 | BC557 | 0.9 | BFR91 | 0.68 | CA3189E | 3.12 | PSKE180A | 4.85 | TBA120T | 0.51 | TDAS505M | 2.97 | ทD1054 | Q． 68 |
| $25 C 2335$ | 1.12 | A0149 | 458 | 8C5578 | 0.96 | BR100 | 0.11 | CO4001 | 0.24 | R2M | 0.4 | TBA810S | 0.66 | TMM600 | 2.14 | $\times 2402{ }^{\text {P }}$ | 3.75 |
| $2 \mathrm{SC2} 482$ | 0.35 | AF127 | 1.51 | BC557C | 0.14 | BR103 | 0.52 | C04011 | 0.38 | 84050 | 3.44 | TBA820M | 8.24 | T $\mathrm{A}_{4} 4600 / 2 / 3$ | 2.82 | 27K33 | 0.12 |




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## Samsung VI375

This machine was dead. There's a repair kit for the power supply, called the 6 WINNER1 kit - it's available from Samsung or CPC. When we fitted one the machine worked but the brightness of the clock display varicd. In fact it sometimes almost went out. Replacing D109 and C118 in the power supply cured this problem. C.W.

## Akai VS425

This machine was brought in because the display was dim. As usual, the cause was the $56 \mu \mathrm{~F}$ capacitors C446 and C447. Once these had been replaced however the machine was dead. Great! The power supply connector 201 had correct voltages, but the powerdown detector was operating because the $15 \Omega 23 \mathrm{~V}$ feed resistor R221 was open-circuit. It supplies TR205. C.W.

## Ferguson FV61B

This machine was dead. A check at pin 1 of connector BW06, where -25 V should be present, produced a reading of only about -2 V . As this

## VCR Clinic

is an unswitched rail, this suggested that there was a fault in the power supply. Checks at the output rectifiers showed that there was a short-circuit across the 14 V line. Transistor TP91 (BCP53-16 or 2SA2010) was found to be shortcircuit and RP91 ( $1.5 \Omega$ safety) open-circuit. Once these two items had been replaced the machine powered up normally. C.W.

## Sony SLV270

This machine was dead with no display. Checks in the power supply showed that C1325 ( $1 \mu \mathrm{~F}, 100 \mathrm{~V}$ ) measured only $0.7 \mu \mathrm{~F}$ while C 1326 $(47 \mu \mathrm{~F}, 63 \mathrm{~V})$ measured $19 \mu \mathrm{~F}$ and was very leaky. J.E.

## Sharp VC9300

This machine refused to accept a tape because the 'tape-in detect' leaf switch, which is mounted on top of the carriage, was buckled. A new switch restored normal operation. It's available from Willow Vale under part no. 27354BT. J.E.

## Samsung VI710

There were no functions and no display because the STK5333 regulator chip didn't provide any switched voltages. The 25 V input from the bridge rectifier was correct at pin 8 , but there was no 30 V input at pin 5. This comes from a separate winding on the mains transformer, via a rectifier diode and $560 \Omega$ resistor (R104). The resistor had gone open-circuit. J.E.

## Amstrad UF30

This machine produced no channels or E-E signals - not even a test signal. When the standby switch was operated, the switched 5 V supply at pin 2 of the tuner/ modulator/IF modulc TU01 rose to
only 0.4 V . The cause was traced to Q7005, which provides the switched 10 V supply. It was shortcircuit base-to-emitter. A BD131 was well able to carry out the task of the original 2SC3246 - and fitted nicely as well! J.P-F.

## Sharp VC8300

The cassette lift would jam because the lift arms were out of sync, i.e. the left side was higher than the right. On investigation we discovered that the reciprocating collar (item 23) within the worm wheel had fractured. The part no. is LANGJ0009GEZZ - it's still available from Sharp! J:P-F.

## JVC HRD230/Ferguson FV22L

The channels were slightly off tune: But when fine tuning was carried out and the channel was stored in memory it reverted to the original mistuned condition. The culprit was the MN1220 EPROM chip IC101, which is conveniently plugged in piggyback fashion at the rear of the front control panel. J.P-F.

## Amstrad VCR9000

"Won't play tapes" is a common enough complaint from our customers. On this occasion the cause wasn't a mechanism fault. When we inserted our trusty blank cassette we saw that the drum wasn't rotating. Checks on the various voltage rails showed that there was no 5 V supply. The 78M05 regulator chip ICl on the main panel had failed. K.E.

## Matsui VX2700

The customer complained about "tracking problems". In fact the playback picture was badly broken up. When we examined the operation of the mechanism in the
playback mode it was apparent that someone had been fiddling with the back-tension arm. As a result, it jammed. After readjusting it and checking for correct tension we were able to see the original fault symptom - the capstan was running at the wrong speed. If the back tension, and hence the load on the capstan motor, was reduced manually the tape speed altered noticeably. A new DD motor assembly was required. K.E.

## Panasonic NVJ35

This machine would go into the tuning search mode but wouldn't stop when a channel was reached. The cause of the fault was cracked print leading to pin 2 of the tuner/demodulator pack. A link across the crack solved the problem. M.M.

## JVC HRD700/Ferguson FV26D

The reported fault was field roll in the playback mode. It's bccoming quite common to find that the entry and exit guides in these machines are starting to work loose. so I set up the tape path. Then, while playing back a tape, I noticed a severe hum bar on the picture. It sccmed to be intermittent. Checks showed that there was ripple on the switched 5 V supply when the fault was present. A replacement STK5481 power regulator chip restored normal operation. M.M.

## Toshiba V813B

This machine's capstan motor was running slow. All that was required was to dismantle the motor and slightly lubricate its bearings. After that the machine worked correctly. M.M.

## Matsui VX2500

The playback and E-E pictures were very poor. As this is one of the later versions with a scart socket, I tried a scart connection to the TV set. The picture was then OK. A replacement RF converter cured the fault. M.M.

## Osaki VR300

Tape chewing was the complaint with this machine, which had come via another dealer. As the bottom edge of the tape was being crinkled, the dealer had replaced the pinch roller. This appeared to stop the creasing, but the sound was muffled and there was a lack of control pulses. On inspection I found that when the tape was loaded it was at the correct height with respect to
the audio/control head, but when the pinch roller moved into position the tape rode up the AC head by about 1 mm . The dealer had fitted a pattern pinch roller. Fitting the original type and arm assembly cured the fault, a new clutch completing the rcpair. M.M.

## JVC HRD540

The clutch wouldn't engage correctly in the fast-forward mode. Instead, there was a grinding noise and virtually no torque at the tape spool. I found that the plate assembly was worn, a replacement restoring correct operation. M.M.

## Panasonic NVHD90

This machine recorded the head switching point two thirds of the way up the screen. Suspicion naturally fell on the integrity of the field sync signal that's used to lock the phase of the head drum in the record mode. It was completely missing, the cause being a defective video processor chip (IC301, part no. VEFH29H). B.S.

## Panasonic NVSD40

This machine rejected any vidco cassette it was offered. When it took the cassette in it would pause briefly then throw the cassettc back out. This is a classic result of no capstan motor operation. But in this case the capstan motor was going too fast, as there was no 12 V supply to the capstan motor's stator. The 2SD601 voltage regulator transistor Q2505 was found to be opencircuit. B.S.

## Panasonic NVSD200

If one of these machines intermittently shows F04 or F05 or sometimes F06, check for dry-joints on the loading motor. In this particular case however the causc of the problem was a deformed contact on the mode switch plug-in connector, which stands up off the main board. B.S.

## Panasonic NVHD650

This is the third of these machines we ve had in with the remote control unit apparently failing to operate it. The reason is that the owner has selected the VTR2 mode from the on-screen graphics menu. When this is done, the VCR ignores all further commands from the remote control unit unless this is also changed to the VTR2 mode Open the remote control unit's flap and press 'TV select' whilc also pressing 'cursor up' or 'cursor down'. This changes the data to
match the VCR, and all in the garden is then rosy again. B.S.

## Samsung SI3260

As the capstan didn't turn, this machine was damaging tapes. We found that D108 was going opencircuit under load. As a precaution we also replaced D109 and D110. G.S.

## Nokia VR3722

Therc was no channel display and the machine wouldn't tune in. A quick check showed that the 33 V supply was missing. The 33V regulator was OK, but C6010 nearby was going short-circuit. A replacement capacitor restored normal operation. G.S.

## Samsung VIK320

Dead, no power and no clock display - an all 100 common set of symptoms with these machines. After filting the power supply repair kit the power came up but the scrvo was drifting in both playback and record, as though there were no control pulses. A new servo chip (IC201) cured the problem. G.S.

## Sharp VCM20

There was no clock display and no functions. When you encounter these symptoms in this model you will probably find that Q901 is short-circuit and R904 open-circuit. To prevent a recurrence of the fault Sharp has introduced a heatsink for Q901. The part no. for this is PRDAF1065UMFW. G.S.

## JVC HRD830

This machine's power supply was buzzing badly. The cure was to replace C 12 and remove the darkened glue from the Q1 heatsink area. G.S.

## Nokia VR37 16

After a while the sound produced by this machine was marred by wow. The cause was a faulty main clutch. G.S.

## Panasonic NVJ40

The deck was jammed, with the tape wrapped around the head. There was nothing unusual about this, so the upper and lower deck service kits were fitted and aligned. I find the $G$ deck alignment instruction video that's available from Charles Hyde and Son very helpful: it takes you through the procedure step-by-stcp - you simply use playback pause while carrying out the task described, then continuc. When the service kits had been
fitted everything worked normally apart from the fact that there was no auto stop at the end of rewind, play and fast forward. The microcontroller chip was calculating the speeds of the spool carriers accurately, because the tape speed was being reduced as the tape neared its end. But when the tape ran out the mechanism struggled to keep it going for a few seconds then the VCR entered the stop mode. This would not do the mechanism any good, and was probably the cause of the misalignment in the first place.
A scope check across the infrared "lighthouse" transmitter produced a 2.5 V peak-to-peak pulse at 25 msecs . When we fitted a replacement the reading was 0.8 V peak-to-peak and the auto stop worked correctly. J.E.

## JVC HRD660

There was no play: the tape would be pulled out of the cassette in the normal way, but would not be positioned between the capstan and the pinch roller. As a result there was no forward tape motion. The pin that was responsible for this problem had parted from its plastic holder and was nowhere to be seen (the deck reference number is 47). It's reminiscent of the infamous limiter post used in some Matsui machines, and could also become a stock fault. J.E.

## Panasonic NVSD40

This VCR was brought in because the tuner/booster pack produced a low-gain E-E output. This is not unusual. After fitting a replacement however the machine wouldn't tune in any stations. A check on the tuning voltage showed that the sweep was normal, so we assumed that the new tuner was faulty. It wasn't.
This model has a band-switching circuit, which is controlled by IC6710 on the syscon board. lt should supply a low output to the band-switching chip, but the output was high. Replacing IC6710 restored correct operation.
A quick check for this is to short the relevant pin of IC6710 to chassis and see whether you can then tune in stations. M.O.

## JVC HRD580

The customer complained about a rattling noise in the fast forward and rewind modes. I replaced the idler gear unit and clutch, but this didn't fix the problem. When I examined the small toothed gear at
the rear of the capstan motor closely I noticed a small, hair-line crack in it. As this gear is not shown as a separate part in the manual I considered a replacement capstan motor assembly. But the cost is quite high. So I spoke to a very helpful person at JVC Technical and was advised to order part no. PTU96031-678C - it's a gear kit. Installing this cured the fault. M.B.

## Ferguson 3V54

The customer complained that this machine damaged tapes when it ejected them. It seemed that the slant poles didn't fully retract.
Replacement of the loading sensor assembly, part no. PU35632A3 fixed the problem. I've also had this failure with Model 3V55, which uses the same part. M.B.

## Hitachi VT65

Intermittent failure to record in colour was the complaint with this machine. Initial tests showed that the tape-in light was permanently illuminated. Further tests revealed a bad tape-end sensor. The cause of the "intermittent colour" was an extremely dirty video head drum. This was cleaned - the customer declined the quote for a replacement. M.B.

## Amstrad VCR3000

Intermittent loss of stations and failure to store channels was the complaint with this machine. After exhaustive tests we condemned the X24C01P memory chip IC05. A replacement confirmed the diagnosis.
If you have a non-mechanical fault with one of these machines, linking pins 10 and 13 of CN601 will enable the entire mechanism to be removed so that checks can be carried out on the PCB. G.R.

## Sharp VCH81H/ VCAIIBHM

Failure of the capstan motor is a common fault with these models and those from other manufacturers that use the same deck. So I asked myself why? If you have a dead capstan motor, look carefully at C6 ( $10 \mu \mathrm{~F}, 25 \mathrm{~V}$ ). Early motors were not fitted with a leakproof capacitor. As a result, electrolyte gets on to the print between pin 12 of the motor IC (usually an M52440ASP) and the motor's input socket (where the ribbon is inserted). The print goes opencircuit, removing the chip's 12 V supply.

With a good hot soldering iron and calm nerves the track can be linked and C6 replaced. But first remove any gunge. I've repaired several of these motors in this way.
One motor ran slow after the repair - it still did after cleaning and greasing the shaft and capstan. I found that R3, an $0.47 \Omega$ surfacemounted resistor, had gone high in value. Its replacement cured the fault. These motors are very similar to those used in Matsui and other machines.
Proper cleaning and lubrication of the capstan and shaft is very important. G.R.

## Sharp VC9300

This old timer had been in for replacement of the reel motor and idler. It bounced, with the same fault description - intermittently shredding tapes. I soon found that when the fault occurred the supply to the reel motor went missing. But the machine would then run correctly for days! Fortunately I was able to spot the microscopic dry-joints at a couple of the pins of the reel drive chip IC7751. G.R.

## Mitsubishi HSM40V

If the machine doesn't accept tapes, check the front-loading cassettc housing. The item called JUT J (L031, part no. 622D231010) can break or become disconnected because of excessive force when inserting a tape. If JUT J has broken, make sure that spring JUT is also fitted. When JUT J is faulty the tape flap won't open. Hence no loading and the tape being ejected. J.C.

## Aiwa HVGX150

Failure to accept or eject a tape is generally caused by a faulty loading belt. In this case however the loading motor had seized. J.C.

## Panasonic NVG7

Check the drum servo chip IC6387 if the drum motor hunts or runs fast in the forward direction.
If the tape laces up but the capstan motor doesn't rotate, just vibrating, check the AN 3821 K chip IC2001 by replacement. J.C.

## JVC HRD530

You sometimes find that the halfloading arm is not able to extract tape from the cassette. The problem is caused by static. As a result of this, the tape sticks to the lid of the cassette. The cure is to replace the housing lid guide, part no.
PRD43315. J.C.

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# What 

## It would be a lot simpler if TV sets didn't have owners. That would halve the problems. But we have to put up with both sorts, as Donald Bullock reports

Every time I sce a chap who is going grey the wrong way round - from the crown of his head downwards - I know I'm in the company of a classic worrier. There are quite a few of them about. Eddie is one - forty five, emaciated and a complete stranger to self-esteem. He brought in a Samsung CI6229T colour TV set and stood there, looking downwards.
"It's only an inch tall" he said. I looked at him intently. " 'Er said it's no good to anybody, only an inch tall."
"Let's take this one step at a time" I replied, noting down his name and telcphone number. "What's only an inch tall?"
"The picture" he said. "It's my sister's set. 'Er wants me out o' the 'ouse. Says I'm crazy."
"How many beans make five?" I asked. He looked up.
"Beans?" he asked.
"Just leave it herc" I said.
I pulled the set on to the bench and sought the ficld output chip, which tumed out to be a TDA3654 on a pretty large heatsink. It was very hot indeed. A replacement restored the field scanning, but it still seemed hot to me. Before returning the set to Eddie l ran it for a couple of days and fitted an extension to the already huge heatsink.
When he came back to collect it he pulled out a purse and began poking about in it with his long fingers. They always do, these chaps who go grey the wrong way round.
" 'Er said to get outa her house" he announced. "Said I'm crazy, keepin' fish in the bath."
"Do you keep fish in the bath?" I asked.
" 'Course I do" he said. " 'Ere, don't you start causin' trouble." And with that he strode out.

## Salora J Chassis

Our next caller was Hank. He does a bit of servicing in a nearby village.
"Hey, you two are smart, aren't you?" he called out,
"Sure are" I said, "and if we get any smarter we're going to give this trade the slip."
"This Hitachi CPT2060 is fitted with the Salora J chassis" he said.
"Christ" we said in unison.
"As it wouldn't tune I took out the little tuning board with the picture controls and the tuning circuit on it and soldered some very dry-joints. That brought back the search tuning, and the set will tune and store channel 10 . But not the rest. Why's that?"
"Dunno" we said, and off he loped.
We could have been more helpful if the set had been dead. In this event we make sure that the set is switched off at the front button and plug it into the mains supply. If the little red dash in the display lights up, this tells us that the power supply is OK. So we move over to the line output side of the Ipsalo (integrated power supply and line output) circuit. If it docsn't light up we go first to the two $4.7 \Omega, 5 \mathrm{~W}$ surge limiter resistors RB711 and RB713, then to the MJE13005/ BUW41B chopper transistors TB700 and TB 701 which often go short-circuit. A clue that this fault is about to occur is provided by the fact that the set takes an increasingly long time to start up.

These sets can fail repeatedly if the repair is not done properly. It's
essential to replace the two $4.7 \mu \mathrm{~F}$, 63 V electrolytics CB712 and CB726 that couple the base drives to the chopper transistors. We use the type from Willow Vale. Make sure that you apply heatsink compound to the chopper transistors, and that all three solder tags on the heatsinks are well soldered to the panel - they are used as circuit links. Then check the whole power section for dry-joints.
When we think we ve repaired the set and it seems to be working, we switch it off then plug it back into the mains supply. If the dash comes on we know we've succeeded and that the set will spring to life at switch on.
If we suspect the line output side of the Ipsalo circuit we go to the $0.33 \mu \mathrm{~F}$ scan coupling capacitor CB532 first. Its left-hand pin becomes dry-jointed. This capacitor is to the right of the square control cutout on the main panel, four inches from the top of the chassis.
All sorts of faults occur when one or more of the legs of the huge heatsink/partition screen bccome dry-jointed. The screen is silver coloured and wraps around the bottom left-hand comer of the chassis. This item is also used as a conductive link for the print on the panel.

## Norman's Mitsubishi

Our next customer was Quiet Norman Glutton. Short and squat, he likes to eat. And eat. He brought in this Mitsubishi CT2124BM colour set.
"He don't switch on like 'e used to" he said.
I leant forward. "So how does it switch on now?" l asked.
"Different" he said.

I filled my lungs. "Right" I said.
"An' the colours be wishy-washy" he added. Then he looked about and fished his penknife from his pocket.
"What's the pasties like from over the road?" he asked. And with that he waddled off.
By the time he came back, carving into a pie, we had his set on the bench. Sussing out the 'wishywashy picture' didn't take long. His kids had fully upped every control on the remote handset. But he was right: the set didn't switch on as these sets should. Instead of coming to life when the on-off switch was pressed it went into standby. To make it come on we had to press the standby button.
1 dived into the power supply panel, which is to the right of the main chassis. A $100 \mu \mathrm{~F}, 50 \mathrm{~V}$ electrolytic (C964) had leaked so much that its legs had rotted away. A replacement cleared the fault, and by the time the job was ready to go Quiet Norman had finished his fourth pie.
Another fault we've found to be quite common with this model is loss of tuning memory. To deal with this look for IC702 and check for 5 V at pin I and -30 V at pin 2 . If either voltage is missing, check back to the power supply and then, if necessary, replace the chip.

## Cassandra Grant

It was stark and awful yesterday morning. Then Cassandra Grant glided in. The sun shone, the breeze dropped, blossoms burst from their buds, songbirds sang and the world fell into soft focus.
"I need your help, Mr Bullock" she purred.
"I know" I said, understandingly. "And what would you like me to do?"
"Repair my Grundig TV" she breathed, in her husky voice. I need it as soon as possible."
The set was a TSS 340 , which is fitted with the CUC 3400 chassis. It was dead, with the 800 mAT fuse SI624 in the feed to the chopper transformer open-circuit. We declared the BUTIIA chopper transistor T661 guilty without trial, and sure enough it was short-circuit So wc fitted a replacement, which blew up as soon as we switched the set on again. Time to look farther in the chopper circuit. In this version of the chassis C667 in the snubber network consists of two $2 \cdot 2 \mu \mathrm{~F}$, 385 V capacitors that are connected in series. One of them had dried up completely, while the other had fallen to $0.5 \mu \mathrm{~F}$ in value. Replacing
them both cleared the fault. So we phoned the lovely Cassandra to tell her the good news.
Half an hour later a gangling, white-faced piece of string appeared at the door.
"I've called for Cassandra's set" he whined. "Carry it to the car. will you? I've got a bad back."
I did his lackeying and watched them depart. In my day a prat like that wouldn't have aspired to even a Pansy Potter or Keyhole Kate.

## A Matsui Portable

Terry Tic came in carrying a Matsui 1455 14in. colour portable. "Like a bladdy bomb" he announced, "just like a bladdy bomb". Then he departed.
Steven tried the set and found that it was dead: inside there was a Snoddy's job card. "Blew up in standby" it said. C301, a small $47 \mu \mathrm{~F}, 63 \mathrm{~V}$ electrolytic that lives by the line output transformer. had disintegrated - it's the reservoir capacitor for the supply to the field output stage. Its innards were everywhcre. And C310, an $0.0022 \mu \mathrm{~F}, 600 \mathrm{~V}$ damping capacitor that sits by the line driver transformer, had melted. We replaced them and started the set up using the variac. There was a rustle of EHT but nothing else.
When we checked the voltage across C301 it was negative to chassis! Further checks in this supply showed that the surge limiter resistor R310 (10S2 fusible) was open-circuit. After replacing it we had a 50 V supply but the set was still dead.
It seemed logical to check the two field output transistors, Q302 (2SC2073) and Q303 (2SA940). They were both short-circuit. After replacing them and carrying out a few more checks we dared to switch on again. There was still field collapse.
I left it to Steven. After spending about four hours on it he stood up and shook his head. He looked shattered. "Can't understand it" he said "I've replaced or checked just about everything". Then he mused: "wonder if the field scan coils have gone as well?"
There was a similar set under the bench. He borrowed the scan coils and fitted them to the 1455. Up came the field scan, and after some adjustment we had an excellent picture.
"You've got to give Snoddy's one thing" Steven said, "they know which jobs to grab and which ones to turn down".

"Said I'm crazy, keepin' fish in the bath."
"And that's everything" I said.
Then Terry returned. Steven pulled up the 1455 for him and noticed that he was carrying another identical set.
"I won't go on having that set done, Mr Bullfrog"' he bawled. "It was only my son's computer monitor. I've found another one for him at the car boot sale. Cost next to nothing. Just put 'im back together and I'll take it out of your way."

## A Call to the Bar

The phone rang. It was the
Horseflies, who run our local pub. Their lad had managed to yank the coaxial plug off the aerial lead. As Greeneyes had come in to tidy up, Steven and I decided to go off together.
Having fixed the lead we were about to depart when we saw Pervy Fletcher, a right shallow, extrovert showman.
"Ah, Donld" he rasped, "let me get you a drink!" He guzzled the last of his and ordered a round.
"These two look singularly dry to me" he commented.
Then a one-eyed fellow lurched in, looking the worst for drink.
"Hm. . . inebriated" observed Pervy. "If he's any trouble, leave him to me."
We made a hurricd departure. I keep telling Horsefly he should put more water in the beer if he wants to avoid trouble.


## Pace MSS200

We've had very few problems with this model so far. This one was brought in by its owner who complained that it was "dead". It seems that the trouble had arisen because the mains socket made intermittent contact with the plug. A new socket had been installed, but the receiver then refused to play ball. The mains fuse was intact, and nothing looked the worse for wear. When I connected the receiver to the mains supply I heard a 'chirp' every second or so from its power supply, also a distinct 50 Hz hum. This led me straight to the mains bridge rectifier's reservoir capacitor C54 ( $47 \mu \mathrm{~F}, 400 \mathrm{~V}$ ), which was as open-circuit as they come. A new one restored normal operation.
One thing I don't have here is a variac, which could be considered essential to minimise semiconductor device turnover when mending Pace power supplies! To get round this problem I carry out basic checks before applying power, then connect the receiver to the mains supply for only a second. If all is well, a 'beep' should come from the power supply (plus, normally, a slight indication from the front display). If nothing happens, a fault must be present and the circuit must be rechecked. Don't be tempted to leave the power on any longer, or disaster may strike! H.C.

## Only One Polarity

## Regular readers may recall

Professor Magrew who lives farther down the coast and, amongst other things, installs dishes and does general electronic repairs. I recently sold him a Cambridge LNB with a C120 circular flange to fit to a prime-focus dish. A couple of days later he rang up to say that "the LNB you sold me picks up only the
vertical channels". He later brought in the Cambridge LNB complete with the feedhorn used on the dish. The cause of the problem was immediately obvious. The LNB was attached to an old magnetic polariser which had a rectangular flange. This effectively knocked out the second polarisation.
I removed the flange and the polariser's works (they normally push out of the tube fairly easily with a few sharp taps). The LNB had to be set back from the fcedhorn a little way because of mechanical difficulties - the original polariser body was the ideal length for the job. This produced good results on all channels.
There's a small hole in the polariser's body, where the original wires entered. This small diameter hole doesn't seem to degrade reception, but seal it up with some glue. H.C.

## Pace PRD800

The label attached to a Pace PRD800 (branded Thorn Sat 120) simply said "power supply problems, doesn't respond to repair". I could see that C5, C7 and C8 had been replaced, along with the chopper control chip U1 and the BUT11A chopper transistor Q1. The fuse was intact, and Q1 wasn't short-circuit. The other components that often die with Q1 and U1 (D11, R8 and R14) were all OK and appeared to be the original ones. For good measure I changed C5, C7 and C8 again, also U1, and checked for track continuity around U1. To be fair, a good job had been made of the previous replacements and there were no damaged tracks. When I powered the receiver I heard a rapid "ping, ping, ping", indicating the probability of a short-circuit. But none could be found, and the
receiver worked normally when the 5 V and 12 V lines were powered from an external source.
Time to return to the power supply. While chccking the chip components on the copper side of the PCB I noticed that.R129 (220 2 ) was cracked. It's connected between the base and emitter of Q1. A replacement restored normal operation. H.C.

## Pace VC100 VideoCrypt <br> Decoder

This is the first Pace stand-alone VideoCrypt decoder, which was later superseded by the VC200. The power supply, on a small PCB, is identical to that in the SS9200 receiver, with the same infamous pink mains transformer - though it seems to be much more reliable in this less power-consuming application. The decoder PCB, which is not unlike the SS9000/9200 one, sits atop the video in/out PCB on plastic spacers. I've had a few problems with the VCl 100 .
This particular one lived on top of a D2 MAC IRD. The complaint was of "poor pictures that had gradually become worse". By some miracle the D2 MAC unit was still functioning, and the quality of its baseband video output to the decoder was OK. Time to take the lid off the VC100.
The Sky News video quality was dreadful. Fortunately the decoder comes to life on this channel, seeing Sky's VideoCrypt data though not having to decode the picture. With non-VideoCrypt channels the baseband video is simply passed in and out via the scart socket - unlike the ond Thomson sloping-front decoder, which helpfully provided a clamped video output signal whatever was fed into it.

A scope check on the quality of the video signal that arrived at the VideoCrypt PCB from Q8, the last stage on the video processing board, showed that it was bad. It was also bad at the first stage. The culprit was C2 $(100 \mu \mathrm{~F}, 16 \mathrm{~V})$, which couples the baseband video from the scart socket to the base of Q1.
For good measure I also replaced the $1 \mu \mathrm{~F}$ electrolytic in the power supply - the one that gives problems with SS9000/9200 scries receivers. Its reference number is C520 in the VCl00.
I sited the decoder well away from the MAC IRD when I reinstalled it and expect the latter to come in for attention any day now. H.C.

## Things People Say . . .

A customer asked whether the number of channels her Pace receiver was able to receive could be reduced "as we only watch seven programmmes at most". She figured that a lot less clectricity would be required to power a seven-channel rather than a 250 -channel receiver, leading to a big saving on her electricity bill. . . H.C.

## Eclipse Season

We've recently been through the few days in October when the sun passes bchind the geostationary satellite arc (this also happens in March). When this occurs the signals become much weaker for some minutes, as the sun is a much stronger source of radio energy. It's really extra-terrestrial jamming! I always mean to mark the dates in the workshop diary, but it never gets donc. We usually receive calls over several days, at around 11.15 am ., complaining about "snowy pictures". This can lead to wasted service calls - it's amazing how many people seem to watch TV at that time of the day!
The other rude reminder occurs during an installation, when trying to find Astra at around 11 a.m. This can lead to abortive LNB changes. The first entry in the 1997 diary will be the 'solar outrage' dates, next due in early March. H.C.

## Amstrad SRD5 10

For once a dead unit that wasn't a C612 (220) F) or R602/3 (both $47 \mathrm{k} \Omega$ ) job! The cause of no outputs from the power supply was traced to the CNY17F optocoupler IC601. When a replacement had been fitted all outputs except the 12 V supply were present. The dead short across this line was caused by failure of C283, an $0.1 \mu \mathrm{~F}$ disc ceramic
capacitor that decouples the supply to IC6. Since C283 is rated at 25 V , it was either a one-off failure or possibly the optocoupler's demise resulted in a considerable rise in the 12V supply. S.L.

## Amstrad 1000 Satcorder

Crushed video with rolling pictures during satellite reception was the complaint with this combined VCR/satellite receiver. As we had no circuit diagram we had to rely on a freezer and heat foray. This led us to CA05 $(100 \mu \mathrm{~F}, 25 \mathrm{~V})$ which was open-circuit.
A few days later another of these units came in with the same complaint. Several other electrolytics had to be replaced this time to restore the unit to full working order. They were all mounted on the decoder board at the rear of the machine, and all were partially or completely open-circuit. This was in no small part because of the heat that collects in this area and the poor ventilation. We used $105^{\circ} \mathrm{C}$ capacitors. S.L.

## Pace PRD800

For failure to decode the pay channels with no decoder messages, replace the SP973T8C chip U20. It's an ADC chip that can also bc responsible for picture distortion/ low contrast - as if the gain of the LNB is low. S.L.

## PRD800/900 Tuning Problems

We've becn contacted recently by scveral people about inability to tune in all the new Granada channels via Astra 1D. While Talk TV at 10.861 GHz can be received, Good Life at 10.844 GHz won't appear. The Sky Movies tuning in operation last ycar, at 10.877 GHz , didn't give any problems however.
All the installations involved date from early 1994. The cause of the problem is a combination of receiver and LNB. Later PRD receivers and their clones have selection of the old 10 GHz or new 9.75 GHz LNB local oscillator frequency in the installation menu. The on-screen graphics indicate tuning down to 10.7 GHz with both types of LNB, but the tuner fitted in production runs at this time won't tune down to 700 MHz . Very late PRD receivers have a ' 700 MHz ' tuner, enabling a 10) GHz LNB to cover the Astra 1D band. Astra 1D LNBs were beginning to be installed at this time, but older 10 GHz . units were being offloaded at low prices. Hence the combination.

The effect when a 10 GHz LNB and an earlier tuner is used is that tuning ceases at around 10.860 GHz , though the tuning graphics carry on down to 10.7 GHz , at first sight suggesting a fault. The easiest solution is to fit a new LNB or an Astra 1D converter. Installation of a new 700 MHz tuner would be a more clegant solution, but its cost would without doubt exceed that of a new LNB.
The exact low point of the tuner's range varies. Some go as low as an IF of 800 MHz (receiving down to 10.8 GHz ). Others get down to 10.877GHz, the Sky Movies

Gold/Weather channel. H.C.

## Pace DVR500

This digital receiver had been brought over from Holland for reception of the Dutch channels. Within two weeks of installation it failed in this task, when the electrical power supply to the house had suffered a repeated series of on-off, on-off cuts. Everything else connected to the supply withstood the onslaught. The owner was keen to avoid sending his receiver back to Holland for repair if possible, so I agreed to have a look. Unfortunately I had no service information, as the receiver is so new.
The primary side of the power supply was familiar however. So was the violently blown fuse! The chopper device is the TOP202 used in MSS 100 series receivers, though in this case it's clipped to a heatsink and is referred to as U700 on the PCB. Plastic rivets to hold the PCB to the chassis have gone, being replaced by stout screws. The transformer is quite large, no doubt to be able to handle the increased current demand, and an optocoupler is used in the regulation circuit.

It was no great surprise to find that the TOP202 was dead short. I removed it and checked the HT electrolytic and rectifier diodes, which were all OK, also a $47 \Omega$ surface-mounted resistor that's linked to the TOP device. It presumably serves the same purpose as R2 in the MSS 100 , determining with C 4 in this model the loop response and power-up delay. On one occasion with an MSS 100 I found that this resistor had been damaged when the TOP202 had failed.
Since everything else appeared to be OK, I replaced the TOP202 and the fuse and gingerly applied power. Fortunately all was well - and the customer was greatly relieved. The receiver is now left disconnected from the mains supply except when in use. This means that you have to search for its 'default frequency' every time power is applied (see article on the DVR500 in the January issue), which can take a few seconds, but the inconvenience is worthwhile.
The TOP device seems to be susceptible to failure under thesc conditions - I had the same problem with an MSS 100 a few months ago (see Television, October 1996, page 895). One can't help wondering how it will fare in remote areas where the power supply may be variable. Where the mains supply is very rough, it might be an idca to use an uninterruptible power supply (UPS) consisting of a 12 V DC to 230 V AC inverter, a 12 V battery and a charger fed from the incoming mains supply. H.C.

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

## Safety Checks

This letter is a warning to those who service and repair electrical products. The need to carry out proper Class 1 and Class 2 safety checks where appropriate is probably overlooked by many engineers and service departments. A check on fuse ratings, for correctly wired plug tops, and a glance at the condition of the mains lead is just not good enough, as I discovered recently.
Having completed a repair on a JVC VCR, I checked for insulation safety between its mains plug and cxternal metal parts. I was surprised to hear loud beeps from my tester, warning me of a potential hazard. Under test conditions a complete breakdown between the primary and secondary sides of the chopper power supply circuit existed. On investigating the cause of the problem, I found that adhesive used during component assembly had hardened and crusted into a conductive compound. The components concerned had to be removed and the black, hardened gunge stripped from the PCB. When all traces of the adhesive had been removed, a retest showed that all was well.
It's not uncommon for adhesives used on PCBs to turn black with age and become conductive, causing all sorts of circuit faults. I strongly recommend the purchase of a good PAT tester for the workshop. Most

Letters
component suppliers stock them, and it must work out cheaper than a hefty fine!
The correct use of these testers must be understood when dealing with sensitive electronic equipment. In the case quoted above we are not talking about flash tests to show the potential hazard.
Menvyn Deeley,
Wolverhampton.

## Sharp VC-MH60HM

In the November VCR Clinic, page 44, Michael Dranfield suggested fitting the heatsink from a Ferguson 9000 chassis sound output transistor to Q901 in the Sharp Model VCMH60HM. I must point out that great care is required with any alteration here. Because the VCR is a Class 2 product, the heatsink must have a minimum gap of 3 mm between itself and any conductive part that the user can touch, for example the top cabinet or mechanism. This distance also applies to primary/secondary isolation, though this is not particularly relevant here.

To improve long-term reliability, a heatsink for Q901 is available from Willow Vale ctc. under part number PRDAF1065UMFW.
This heatsink modification can also be carried out with the following models in the range: $\mathrm{VC}_{\dot{B}}$ M20HM, VC-M 201 HM , VCM202HM, VC-M21HM, VCM41HM, VC-M401HM, VCM20LM, VC-M21LM and VCM41LM, plus the Granada V/WHSNYI/A and V/WHSNY6/F. Marcus Jones,
VCR Production Engineering Dept., Sharp Manufacturing Company UK $L d$.

## Customer Satisfaction

I would like to compliment Farnell Electronic Components of Leeds (telephone number 0113263 6311) whose level of service is outstanding. Although the company does not deal specifically with TV components, its two inch thick colour catalogue lists a wealth of components, tools, test equipment etc.

They are all of the highest quality, from major manufacturers.
Here are a few examples. Safety resistors from Philips are listed at less than 6p each, while the little blue ceramic disc capacitors used in many TV sets are 16 p each. Compare that with your regular suppliers. Prices are fixed for the duration (six months) of the catalogue.
There is no minimum order value for an account holder - if you want to order just a 60p transistor, Farnell will oblige. You can phone 24 hours a day, seven days a week and speak to a real person. If you order a capacitor that's out of stock, the technical department will select an equivalent with the required specification and phone back to check whether it's suitable. Some items can be ordered on a 14-day sale-or-return basis, which is handy if you want to try out test equipment before ordering it.
Most orders arrive next day, but special delivery is available at extra cost. I phoned Farnell recently, after blowing up a piece of equipment on a saturday afternoon, to order one IC and one transistor. I told the sales assistant that the order was yery urgent, and was told that the $£ 2.30$ worth of components could be delivered by courier within two hours.
My account with Farnell was opened by fax within ten minutes. If you are not dealing with the company, you don't know what you are missing!
Michael Dranfield,
Buxton, Derbyshire.

## RGB-VGA Conversion

Chris Laudan has raised an interesting point in connection with my article in the September issue on an RGB-VGA conversion for the Microvitec/Reuters CMV125MV monitor. He mentions that some computers with VGA cards may not always use VGA syncs when running DOS rather than Windows programs. As a result, his monitor conversion had a field sync problem with some programs. My own
computer did not present this problem, perhaps because I don't use any DOS programs that are more than about four years old.
Chris points out that PC hardware information is available on the Internet at
http://www.comp.sys.ibm.pc.hardw are.video

Readers may find some useful tips there. Many thanks to Chris for drawing this to our attention. Ray Porter, M.Sc., C.Eng., MIEE, Stourbridge, W. Midlands.

## What's New?

We are constantly hearing about the tough time the brown goods manufacturers are having. I put the blame squarely on them however. Over the past few years they have bombarded us with the latest technology, whether we want it or not. We are told that we all need high-definition TV sets in our homes. Do we? Is Mr Average, when he gets home from work, really going to appreciate the slightly higher definition while watching his favourite soap? I think not. Some of the homes I visit have viewers who are quite content to watch programmes all night on a set with a soft tube, the picture being so bad that its content is quite hard to make out.
Our present system, when viewed with a modern flat-screen receiver, is quite adequate. And do we really need widescreen? Again I think not. Those who manufacture these sets are likely to end up with very modest sales figures, the sets being bought mainly by those who want to keep up with the Joneses or have more money than they know what to spend it on.
Look at all the video formats on discs we've seen launched over the past fifteen years. How many have survived long enough to produce a healthy profit? None!
The situation has been as bad with audio formats. The Sony Mini Disc is an excellent product, but is too expensive for the average music lover. Only the broadcasting industry has adopted it - for jingles, short recorded works etc. The Philips Ditigal Audio Cassette system failed to get anywhere. It was another excellent product looking for a market that simply didn't exist. The last I heard, these products were being cleared out at 199. DAT is still around in small quantities, being used mainly by industry and remaining too expensive for the general public.

Most good-quality standard cassette recorders in Hi-Fi stacks can produce music to suit the quality required by all but the fussiest music lovers. Why change for the sake of change?
The CD format reproduces music faithfully, with any distortion at such a low level that it is totally imperceptible to the listener. We are now to be presented with the Digital Video Disc, which will contain the video of your favourite recorded album as well as the music itself. Do you really want to watch as well as listen? Most CD buyers will probably play their discs a dozen or more times. They are unlikely to want to watch the same information more than a couple of times. This is borne out by the number of secondhand VHS Music Videos found on market stalls and at car boot sales. Most people tire of them quickly.
DVD players are unlikely to be cheap, while the discs will probably be more expensive than the average $C D$. So why change from the excellent CD format? It's as good as anyone needs for music reproduction - up to 77 minutes of it on one handy-sized piece of plastic.
And what about all those CDs that music lovers have amassed over the past ten or so years? Are we expected to throw them away and replace them with the same data in another format? Look how long vinyl lasted after the introduction of the CD. They still make Hi-Fi units with record decks!
What are manufacturers to do, I hear you ask, if they can't introduce new products to keep their workforces employed? Well, the policy of introducing new formats where existing ones are perfectly adcquate has certainly not worked over the past five years. Perhaps the industry should try to come up with an entirely new product that we really do need in our lives, something we don't yet know about. Over the past century, manufacturers that have managed to do this have been the successful ones. Has anyone any ideas about what we won't be able to live without during the next decade? And does it have to be to do with computers?!
Mike Goodall,
Ely, Cambridgeshire.

## Cassette Extraction

In his article on Customer
Reliability in the October 1996 issue Brian Storm asks for suggestions as to why his customer had removed a VHS cassette with a
kitchen knife. Along with the rest of the trade, we often find cassette trays that have suffered at the hands of customers - probably for no better reason than that they don't wish to pay the 50 p fine for late return of a hired film. The short answer to most of these occurrences is "because some customers are complete idiots".
I recently had a far more worrying example of the tape extraction syndrome with a dead Sharp camcorder - see photograph. It still contained most of the cassette, but before sending the unit in for repair the customer had torn away the top of the housing and wrecked the mechanism in order to destroy the actual tape.
Now this had just got to be something far more serious than footage of his girlfriend with no knickers on. Can anyone out there advise me where we stand as repairers if we fail to report any suspicions we may have to the police? And what would happen if my suspicions turn out to be unfounded? Would the customer's lawyers come down on me like a ton of bricks?
Recent news of the Belgian child pornography ring, and the continuing Fred West saga, make me more than a touch uneasy. Cornered of Norfolk.

The damagè done to a Sharp camcorder when its owner wanted to remove a tope.


# Refurbishing RC Handsets 


#### Abstract

Handsets come in for a lot of misuse and can end up in poor condition. This detracts from the value of the equipment they control. Thus handset refurbishment makes economic sense. Malcolm Burrell provides some suggestions on how to go about it




Presentation is all important if you want to obtain a good price for second-hand equipment. It can make the difference between $£ 15$ at a car boot sale and $£ 50$ through a shop display. 'Clean, gleaming and free from damage ${ }^{3}$ is the key to making the right first impression even before a set is switched on. I recently acquired an attractive Samsung 14in. colour portable. It operated perfectly apart from a singing transductor. This was easily dealt with. I removed the transductor, coated it with resin then refitted it. No more singing. But the set was obviously intended for remote control use, and the handset had been badly neglected see photograph above.

## The Damage

Inspection showed that the latched battery compartiment cover had long since been replaced with a scrap of metal that was held in place with adhesive tape. This item forms

A section of plain PCB was used to repair the battery compartment.
the bridge to link the two AAA-size batteries. In addition the face of the handset had been left close to a heat source, creating some distortion, while one of the keypad buttons had been worn to half its normal height. Finally, the sprayed grey surface had become badly scratched and worn, exposing the black plastic base.
As it wasn't worth buying a programmable replacement handset, thought was given to restoring the appearance and operation of the existing handset to a reasonable condition, using items available in my workshop.

## Polyester Filler

DIY stores and motor accessory shops stock many types of polyester filler. It's intended for the repair of ornaments, gutters etc. and for minor car body repairs. With care the filler can be applied and carefully honed to achieve a virtually invisible repair to even a very small item, or moulded to create a new surface.

## Battery Compartment Repair

When I fitted new batteries I found that the unit worked electrically. So far so good. The main problem was to repair the battery compartment. As the case consisted of two shells that were held together with a couple of screws, it seemed sensible to fill the space vacated by the missing cover and rely on screw removal for the occasional battery replacement.
The unit was dismantled into its main component parts: the shells, the PCB, the infra-red window and the key pad. A small section of Plasticard, which can be obtained from hobby shops, was inserted in the wall of the battery section of each shell, then covered with polyester filler. A bridge to link both batteries was then devised, using $a^{3}$ small section of copper-coated PCB. This was inserted in
one shell, after which I checked that the batteries could be inserted and worked reliably. A further application of polyester filler was used to secure it.

## The Key Pad

The key pad had been moulded from rubber. It had carbon contacts beneath each button, positioned to cover the required PCB tracks. All was in order apart from the defective button. This was built up, using several small layers of polyester filler to increase its height gradually. When dry the button was smoothed to shape using an emery manicure board. The only problem was that the repaired button's grey tone was lighter than that of the other buttons. A coat of grey Humbrol modelling enamel put that right - I made sure that the flexible rubber base of the pad remained untouched.

## The Handset Face

More subtle treatment was required to correct the warp of the handset top. The facia with its lettering was masked with adhesive tape (removal is better if this can be accomplished without damage). Further applications of polyester filler were then used to fill the concave surface produced by exposure to excessive heat.

## Finishing

Fine wet and dry paper was used to smooth the polyester filler to shape when it had hardened. With the selfadhesive tape still masking the facia, I then applied a thin layer of primer. Once this had dried silver paint was sprayed on to produce a satisfactory overall finish. Minor defects in the surface became apparent at this point. Further filling, smoothing and painting put this right.
When the casing was dry I reassembled the key pad,

infra-red window and PCB into the unit. The batteries were next inserted, after application of a little petroleum jelly (or silicone grease) to their contacts to inhibit

The handsef after repair. oxidation and possible intermittent operation in the future. Both shells of the handset were then screwed together. Finally, the unit was thoroughly tested.

## In Conclusion

Today's viewers expect to be able to operate equipment by remote control. Quite apart from this, it's now cheaper to manufacture receivers with infra-red remote control than to incorporate dedicated rotary controls. But remote control units are subject to considerable abuse and suffer from neglect. This can put someone off the purchase of a secondhand receiver that is in every other respect acceptable.
Handset restoration to a reasonable, though probably not as-new, standard will increase the potential resale value of any equipment.

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# Long-distance Television 

# DX conditions and reception. Satellite sightings and news. Equipment notes and other matters. Roger Bunney reports 

November brought us fog, frost, rain, high winds and, for some, snow. The chilly month was matched by an equally chilly period of reception. Even the Leonids meteor show failed to provide the usual welcome boost, at least during the periods when I was monitoring the bands - and the clear nights in mid-November produced few meteor trail sightings. I received Lopik ch. E4 daily via tropospheric scatter, which at least confirms that this Dutch transmitter is still in operation. The poor Sporadic E log is as follows:

11/11/96 MTV (Hungary) ch. R1; RTS (Serbia) E3; RAI (Italy) IA; YT (Ukraine) R2.
14/11/96 YT R2.
19/11/96
RAI IA; an umidentified programme on ch. R1.

## Aerials above a Beirut rooftop, courtesy Middle East Satellite Today.

Tropospheric and meteor scatter activity were both very quiet.

## Satellite Sightings

A new satellite, Eutelsat's Hot Bird 2, appeared in our eastern skies on December 3rd, when John Locker (Wirral) received test transmissions. The Eutelsat test film was being transmitted at 11.797 GHz
horizontal and 11.845 GHz vertical, with audio at 6.6 MHz . The transmissions came to an end at around 2300 hours. A politically significant point perhaps is that the test slot was at $29^{\circ} \mathrm{E}$, which Eutelsat claimed some years ago via the ITU. Astra is now seeking a $28.5^{\circ} \mathrm{E}$ slot for its Astra 2 satellites. Eutelsat will obviously defend its claim strongly. Hot Bird 2 has now joined Hot Bird 1 and Eutelsat II FI at $13^{\circ} \mathrm{E}$.
Though there are encouraging prospects in the equipment field for future sat-zapping in the digital era, the change to digital technology is not helping in the short term, with a noticeable fall in the number of news feeds compared to say a year ago. Fortunately many of our old favourite hunting grounds are still active. Eutelsat IF4 at $25.5^{\circ} \mathrm{E}$ still provides analogue programme feeds for example. I logged the "Children in Need" night on the 22nd, when the SIS 03 and SIS05 trucks were active in Melrose and Stornaway respectively from 2100 hours onwards. The next day Miss World hit Bangalore: the whole event was distributed across Europe via Eutelsat II F2 at $10^{\circ} \mathrm{E}$, using the $11 \cdot 165 \mathrm{GHz}$ horizontal transponder, from 1500 GMT on. The technical quality wasn't always too hot.
Poor picture quality, at times
resembling a worn VHS tape, can be seen via the new APNA TV feed from Orion Atlantic ( $37.5^{\circ} \mathrm{W}$ ) at 12.670 GHz vertical. This downlink first appeared in early November and was well established with programme offerings by the end of the month. A caption seen on the 29th mentioned loss of the analogue carrier that night for some hours with a digital feed continuing. Late in November the ident changed to APNA TV/FMS INTL. A mystery sighting via Orion on the 27th consisted of a colour-bar pattern with "Media Casting" and Frenchlanguage captions inlaid.
John Locker comments on the German D-box (digital decoder) which is now becoming available outside Germany. The latest software provides a greater range of FEC and bit rates, enabling various news feeds from Eutelsat, Intelsat etc. to be received. One problem that has come to light is lack of compatibility between digital equipment and triple/quad band LNBs. Several types of LNB seem unable to lock to digital signals could this be a stability problem?
John has seen the new Fox News with various feeds via Intelsat K ( $21.5^{\circ} \mathrm{W}$, in the FSS band). The BBC still appears via Orion 1 $\left(37.5^{\circ} \mathrm{W}\right.$ ), using BBC SIS (sound in syncs) which will not lock using a standard EBU SIS decoder. Noel Edmonds inserts for his Houseparty programme are often carried via Orion 1. In late October the same programme featured a game from the Wessex Super Bowl,
Basingstoke. It was relayed by the BBC UKI 121 SNG unit mid-
afternoon (at $12 \cdot 669 \mathrm{GHz}$ vertical).
Roy Carmen (Sandown) watched
an Italian OB feed via Intelsat 705 at $18.5^{\circ}$ ( $11 \cdot 133 \mathrm{GHz}$ horizontal). It featured an unusual game that was played by hand using a half-sized snooker table. Roy thinks it's called Stravechio - does anyone have any details of this game? He has also seen a European distribution feed from the MIR space station, via Eutelsat II F4 at $7^{\circ} \mathrm{E}$. The frequency was 11.091 GHz and the transmission was in clear PAL with clear audio. A rare mid-aftemoon catch he had on the afternoon of the 26th was "Goonhilly 1cc Uplink to PanAmSat 3 Trans 7EK Downlink 12731 H PAL VBW 18MHz Audio $6.6+7.2 \mathrm{~J} 17^{\prime \prime}$. There is still much to be seen despite the arrival of digital transmission.

## Terrestrial News

UK: Two companies are now using MMDS (microwave terrestrial transmission of cable programming) in the southern UK, the Convergence Group around Burgess Hill and Eurobell Holdings in West Kent. The material transmitted includes analogue and digital TV, the Internet and phone services. The exact frequencies used are not known, but MMDS generally uses the 2.5 GHz band. A small dish or long Yagi aerial with head downconverter would be required for reception. This method of distribution is useful in country areas where cabling is too expensive. Palestine: The ch. E30 Ramallah transmitter is at present carrying test programming from 0500-0800 GMT: from midday to closedown at 2300 hours it takes the main Gaza TV feed.
Portugal: There are now two versions of the RTP-1 service, the main nationwide one from Lisbon and a regional one from Oporto. The latter carries the national version from mid afternoon. Both produce regional opt-out news. Separate programme feeds are available for Madeira and the Azores, which both generate some of their own programming. USA: The first terrestrial digital HDTV transmissions are due to start in early 1997 from the Washington WETA-TV site. The transmitting equipment is being installed by Harris Corporation. The call sign will be WETA-HD. Czech Republic: The Premiera commercial TV service, which has been on air since 1993, closed down at the end of December. It will be replaced by a new network in early 1997.

Germany: During the next
tropospheric opening watch out for the 24-hour local TV station Dresden Fernsehen on ch. E59. It opened in mid-1996 and runs at 10kW ERP.
Amateur Radio: More 50 MHz amateur radio activity in Iceland is expected soon now that the lowband VHF TV links have moved to cable. Ireland has lifted many restrictions on 50 MHz operation, on a trial basis. In Italy, the power limit in the $50-51 \mathrm{MHz}$ band has been lifted from 10 W to 300 W .

## Satellite TV News

Eutelsat's Hot Bird 2 is now in position at $13^{\circ} \mathrm{E}$, with twenty 120 W Ku band transponders that can handle analogue or digital signals. There are two service zones, Widebeam which covers all Europe, North Africa and the Middle East as far as the Gulf States, and Superbeam which is aimed at westem and central Europe. The transponders can be switched from one beam to the other. More than half are expected to be used for digital TV broadcasts to small receiving dishes.
A new MTV Europe channel should be available throughout the continent by January 1997, similar in content to the US M2 channel. It's expected to join the Murdoch package later in the year. The German SAT-1 channel intends to launch SAT-2 as mainly a repeat free channel.
GE Americom is discussing with the Gibraltar govermment a proposal to base a new worldwide twelvesatellite network there. It has requested from the ITU allocations at 23,15 and $10^{\circ} \mathrm{W}$, and at $3,37 \cdot 5$, 47,51, 97, 100.7, 105.3 and $108 \cdot 2^{\circ} \mathrm{E}$, for Ku band operation. GE hopes to build a large satellite Earth station and production centre in Gibraltar.
Hughes Space has won the contract to build and launch AsiaSat-3 during the winter of 1997 , slotting in at $122^{\circ} \mathrm{E}$ with 28 C band and sixteen $K u$ band transponders. A contract will shortly be on offer to build ArabSaj 2 C , to orbit at $26^{\circ} \mathrm{E}$ with 20 Ku band transponders exclusively for TV use. ArabSat 2B was launched in November and is in position at $30 \cdot 5^{\circ} \mathrm{E}$, mainly for TV use, with 34 C and Ku band transponders. It covers the Middle East, India and other parts of Asia.
Orbital allocations are being sought from the ITU for Ka band $(17.7-20 \cdot 2 \mathrm{GHz})$ operation. The band is expected to be used for regional TV/radio transmissions and

two-way interactive services. The high frequencies would mean a greater tendency to rain fade and signal drop-out in moist conditions. Intelsat, Eutelsat and Luxembourg have filed for numerous slots. Other applicants include Spain, Cyprus, Italy and Turkey.

An offset dish in Bandula Gunasekera's garden (Sri Lanka). Note the elevation, to look for Ku band signals from the PAS4 satellite at $68.5^{\circ} \mathrm{E}$.


> 11 Kent Road. Parkstone, Poole, Dorset BH12 2EII Tel: 01202-738232 Fax: 01202-716951


An APNA TV test transmission nice to have an analogue signal from Orion 1
Atlantic of $37.5^{\circ} \mathrm{W}$.
encouraging, but the recently introduced Thomson SK888 seems to be capable of receiving all types of MPEG transmissions there and will adjust to the non-DVB US DirecTV programmes and news feeds. It has third generation MPEG chips and built-in search facilities for FEC and bit rates. According to Bob Cooper (SatFACTS) the receiver has been built for ease of use - point and zap with your remote control unit - while providing the multi-satellite enthusiast with flexible coverage of many types of digital signals.

## Equipment Notes

Some issues ago I mentioned a digital threshold extender for satellite use, with a claimed threshold of 0.5 dB . It has apparently enabled Hot Bird and Astra to be received in Africa and East Brazil, and $S$ band Insat programming to be received in Germany, lifting a watchable colour signal from virtually noise level. 1 didn't give an address, as it's an expensive unit, but several enquiries have been received. Anyone interested should contact NKM, PO Box 1705, 79507 LORRACH, Germany - telephone 07621 18571, fax 0762118840.
The Triax BB Grid/Wolscy Colour King are well proved favourites amongst UHF TVDXers. They consist of a wideband four-bay stack that covers the entire UHF TV band including the amateur 435 MHz allocation. Gain of a single bay is typically some 10 11 dB , with a shallow peak perhaps 2 dB higher mid-band. HS Publications has now introduced a DX Grid that features an added half-wave dircctor in front of each dipole, increasing the gain by an additional $1-1 \cdot 5 \mathrm{~dB}$. For further information contact HS Publications at 7 Epping Close, Derby DE22 4HR (phone 01332381 699).

Those who want to use a ferrite polariser with a non-variable polarisation recciver can obtain from Alban Electronic Ltd. the inline polariser controller type PC108. This is inserted in series with the coaxial LNB feed. There's a +/switch and a variable skew control, with twin terminals for the two-wire polariser connections at the LNB head assembly. An insertion loss of less than 2 dB is quoted over the $950-2,050 \mathrm{MHz}$ IF band. The controller operates in the $12-18 \mathrm{~V}$ range at $\pm 140 \mathrm{~mA}$. Price is $£ 59$ plus postage and VAT. Oddly, the unit uses BNC instead of the standard F
sockets - F to BNC adaptors can be obtained from Maplin however. For further details contact Alban Electric Ltd. at 6 Caxton Centre, Porters Wood, St. Albans, Herts AL3 6XT (phone 01727832 266).

## Computer Interference

Computer interference has been a major problem for TV-DXers, particularly in Band 1. It was worse a few years ago. Dave Lauder runs the RSGB's EMC committee, a hard-working group that looks into and wherever possible solves interference problems. Computers in the amateur radio shack nowadays work alongside receivers that are often sceking ultra-weak radio signals. lt's been found possible to tame the interference from a computer to allow such weak-signal working.
1 would recommend readers to seek out the EMC columns in Radio Communications December 1996 and February 1997. They describe how to make you or your neighbour's computer quiet. Radio Cominunications is published by the RSGB, Lambda House, Cranbournc Road, Potters Bar, Herts EN6 3JE (phone 01707659015 ).

## TEP

Six News, the 6 m radio amateur bulletin, recently reported that the first 50 MHz TEP (transequatorial propagation) for some time was received in the UK on September 24th. from the V51VHF beacon in SW Africa at 50.018 MHz . TEP occurs as evening approaches and the sun sinks slowly towards the west. Solar radiation decreases, and the daytime F1 and F2 layers merge to form a single layer. As the layers merge, the MUF (maximum usable frequency) rises considerably and can reach the lower VHF spectrum. Incident signals, such as low-band TV, hit the now diffused F layer and are reflected, often via several paths. If the signal is a TV transmission, the result is reception of, a rather smeary/multiple image picture.
TEP is a north-south phenomenon, signals from the south of the equator being reflected to Europe and vice versa. As radiation increases with the start of the new solar cycle, MUFs and TEP will increase. TEP occurs mainly in winter. For UK DXers, the time when it is likely to be present is around 1700-2100 hours. The Zimbabwe ch. E2 Gwelo transmitter has been a TEP visitor to the UK at this stage in past solar cycles.


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Reports from
B.D. Andrew

Philip Blundell
Graham Thompson
and John Pit-Francis

Fig. 1: Typical pin voltages for the LM1203N video controller chip.

## Screens

Be careful when cleaning monitor screens. Some require special treatment - look out for a slightly blue screen, the same as a camera lens.
Some screens have a plastic sheet stretched across them. This can give the appearance of a dirty screen or a worn out tube. Try running a scalpel around the edge of the CRT to see if the sheet can be peeled off. You will be surprised! B.D.A.

## Epson Colour Printer

If the colours don't change, check the small plastic peg under the print ribbon holder. The cheapest repair, better than the original, is to replace the plastic peg with a domed copper rivet. Drill a hole the same size as the rivet, where the peg broke off, and glue the rivet in position in the ribbon holder-adjust for depth under the holder. B.D.A.

## Monitor Chips

Many standard TV integrated circuits that will be well known to readers are used in monitors. There are however several widely used monitor chips that are not found in TV sets. Since monitor circuit diagrams are often difficult to obtain and service manuals can be expensive, readers might find pin voltage details for some of these ICs helpful. We start off with the LM1203N video
controller chip, see Fig. 1. Pin functions are as follows:
12V supply
Decoupling
Decoupling
B input
B clamp capacitor
R input
Chassis
R clamp capacitor
G input
G clamp capacitor
Bias voltage output
Contrast control
12V supply
Clamp pulse input
G clamp bias input
G output
G clamp feedback
G gain
R clamp bias input
R output
R clamp feedback
R gain
12V supply
B clamp bias input
B output
B clamp feedback
B gain
12V supply

## AOC 4VIR

Field collapse was the problem with this monitor. Checks around the TDA8172 field output chip showed that its supplies were present but its drive was missing when I injected a signal the field scan opened up. The drive comes from a TDA9102C chip. As my Mauritron monitor book contains a circuit diagram for the GoldStar 1715 that uses this chip, I was able to find out which pin does what. Field sync was entering at pin 14 , and there was a field ramp at pin 13, but there was no field drive output at pin 15. A new TDA9102C chip (it must be a $C$ version) from Grandata restored the field scan. P.B.

## AOC MM413S

This dead monochrome monitor was making strange noises. On investigation I found that C708 $(47 \mu \mathrm{~F}, 400 \mathrm{~V})$ had leaked over the board. C314 ( $2.2 \mu \mathrm{~F}, 50 \mathrm{~V}$ non-
polarised) had done the same. This was not quite the end of the story, as R702 was open-circuit. After replacing these items I had a working monitor. G.T.

## Apple M9102Z/D

This monitor would intermittently die. The cause of the trouble was dry-joints at the regulator attached to the rear chassis, near the mains input socket. The circuit reference number is 7108 . G.T.

## RIF ON1782G

This fault could apply with any monitor. There was intermittent loss of sync because some of the pins in the D socket had been pushed in. RIF stands for Royal Information Electronics. G.T.

## Eizo T662 NA2080

There was evidently some problem in the power supply section of this 21 in . monitor, as the standby LED was winking and there were no voltages at the outputs from the HT chopper circuit. There are actually two chopper circuits. A fault in the LT one was traced to D64, a 4.8 V zener diode which had gone shortcircuit. A replacement restored life to all departments. J.P-F.

## Dell Ultrascan D1428HS

There was no width or pincushion correction control - over scanning in fact. The cause was traced to IC302 (LM358N) and Q353 (2SD669A). When these two items had been replaced all the controls worked correctly. J.P-F.

## Compaq 444

There was no green content in the display. We found that the BF423 transistor Q764 in the green drive stage was short-circuit collector-toemitter. A replacement restored the full range of colours. J.P-F.

## Mitsubishi SDC322C

There was a degaussing buzz but no display. R909 in the start-up feed had gone open-circuit. We replaced R908 and R909, which äre connected in series, with a single $470 \mathrm{k} \Omega$, 1 W resistor. J.P-F.

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## Answer to Test Case 410

\author{

- See page 245 -
}

Well done Doc Colin! The Canon UC9Hi camcorder has two vidco output modes, YC via the S connector and composite video via the yellow-coded phono socket. The connecting lead in usc was a special one. wired for scart-S operation with the luminance signal at pin 20 and the chroma signal at pin 15 . This is fine with a suitably configured high-band VCR, but no good at all with a standard VHS machine such as the NVF65. The latter is designed to rcceive composite video at scart pin 20, and sorely missed the chroma signal here. A scart to three phonos lead was prescribed: this enabled colour VHS copies to be madc by the VCR. The special lcad worked well when connected to the TV set, once the latter's software had been set to $\mathrm{S} / \mathrm{scart}$ mode for the AV2 input.
Miss Jones's problem was also solved with a scart lead, an ordinary one this time from the VCR to the TV set. At programme change the Hitachi C2546 interrogates the incoming teletext signal and composes from it a station ident caption. The off-tape playback text pulses are too corrupt, because of limited bandwidth and timing jitter, to decode into a meaningful caption. The timing jitter was also responsible for the faulty message box's lateral twitch. The Hitachi set doesn't attempt to caption pictures it receives via a scart lead, and by way of a bonus switches automatically to the AV mode when playback starts.

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This budget-price modcl from Pace is nevertheless a sophisticated receiver. It uses some interesting new chips to get almost everything on to one compact main PCB. The chopper chip has just three pins and incorporates a power MOSFET. Most video and audio processing is carried out by a Thomson STV0056 LSI chip that also provides supervisory functions. J. LeJeune takes a look at the technology used.

## SERVICING THE MITSUBISHI CT2964/2965STX

John Coombes provides a step-by-step fault diagnostic guide for these interesting sets. They usc different power supplics, the 2965's being based on a master-slave chopper control chip arrangement.

## FORUM: TECHNICAL TRAINING

Steve Beeching argues that the introduction of the new NVQ system could have an adverse effect on the technical competence of those employed in the brown goods servicing industry.

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