THE LEADING UK CONSUMER ELECTRONICS TECHNOLOGY MAGAZINE

SERVICING-VIDEO-SATELLITE-DEVELOPMENTS

SEPTEMBER 1996 £2.35

150MHz generator:

over 15% discount

Capacitance bridge

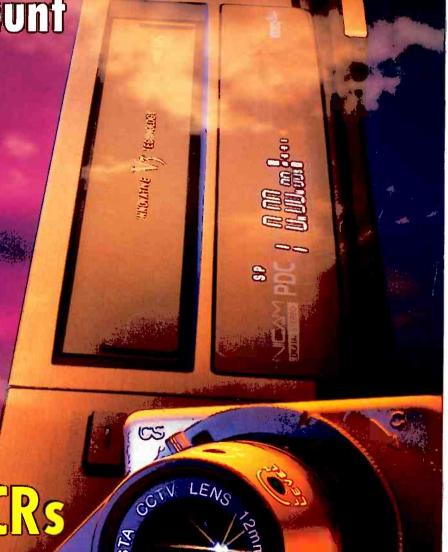
Intro into the Internet

Servicing the Samsung VI710

An RGB-to-VGA monitor conversion

Time-lapse VCRs





Fault Reports TVs, VCRs, Camcorders and Satellite





Caltek meters represent outstanding value & sophisticated design with many features which other manufacturers only incorporate in their more expensive top of the range meters

FEATURES INCLUDE:

CLEAR LCD DISPLAYS (UP TO 18mm CHARACTER HEIGHT (CM3920)

PRACTICAL ROBUST CASING DESIGNS

AUTO AC/DC SELECTOR (CM2700)

OVERLOAD PROTECTION*

AUTO POWER OFF

CE APPROVAL

TEMPERATURE MEASUREMENT (CM2400T/CM3920)

HV INDICATION FOR HIGH VOLTAGE*

AUTO POLARITY WITH BAR GRAPH DISPLAY (CM2700)

PROTECTIVE RUBBER HOLSTERS AVAILABLE

TEST PROBES AND BATTERIES SUPPLIED WITH METERS

For further details on Multimeters - Components/Accessories



PHILEX PLC . 110-124 THE BROADWAY . WEST HENDON LONDON NW9 7PP TEL: 0181 202 1919 FAX 0181 202 0015







CONTENTS

SEPTEMBER 1996

Test Case 405

Leader

VOL. 46, NO. 11

775

785

776 15, ters.
778
784

Servicing the Samsung VI710 786

John Coombes provides servicing know-how on the mechanical and electronic sections of this popular VCR.



Intro to the Internet

790

An explanation of the terms used, the development of the technology and what's involved in getting connected. Report from George Cole.

TV Fault Finding	794
Help Wanted	798
Satellite Notebook	800
VCR Clinic	802
Letters	806
A Look at the Panasonic Z5 Chassis	810

Ray Meadows describes the signal processing sections of the receiver, including the optional teletext module.

Get a Life!

Donald's daughter Rebecca tells us how kind,

SPECIAL OFFER

The Vann Draper SG4160B mains-powered RF signal generator is on special offer to readers at £129 inclusive – see page 827. It covers 100kHz to 150MHz in six ranges, each tunable, with a usable third harmonic output at up to 450MHz. Internal 1kHz AM at up to 30% is available, and external modulation from 50Hz to 20kHz can be applied.



courteous and ever patient he is with his many devoted customers. . .

Capacitance Tester/ Comparator

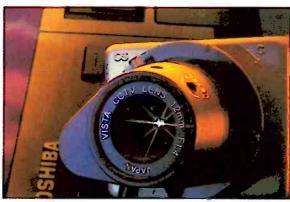
818

Ian Rees devised this bridge circuit to enable highvalue capacitors to be compared and leakage detected in one simple operation.

Time-lapse VCRs

822

Time-lapse VCRs are widely used in surveillance work to provide extended recording time. Joe Cieszynski



describes the ways in which time-lapse VCR operation differs from that of a standard model and the special servicing needs of these machines.

Long-distance TV

828

DX conditions and reception, the satellite scene and news from abroad. Roger Bunney reports.

An RGB-VGA Monitor Conversion

832

Ray Porter on how a Microvitec Series 7 RGB monitor can be modified to accept VGA drive signals.

Editor

John A. Reddihough
Production Editor

Tessa Winford

Consultant Editor
Martin Eccles

Publishing Director
Susan Downey

Advertisement Manager Carol Nobbs

0181 652 8330

Advertisement Sales Executive

Pat Bunce 0181 652 8339 Fax 0181 652 8931

Editorial Office 0181 652 8120 Fax 0181 652 8956

Note that we are unable to answer technical queries over the telephone and cannot provide information on spares other than given in our Spares Guide.

GRANDATA LTD

K.P. HOUSE, UNIT 15, POP IN COMMERCIAL CENTRE, SOUTHWAY, WEMBLEY, MIDDLESEX, ENGLAND HA9 0HB

Telephone: 0181-900 2329 Fax: 0181-903 6126

					TR	AN	SIS	STO	OR:	S /	LIN	JE/	۱R	ICs					
Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price
AAY32 AC107 AC125	9p 40p 30p	BD246A BD265 BD267	50p 45p 45p	BFY64 BFY90 BLY48	25p 45p 85p	MJ15004 MJ2501 MJ2955	300p 100p 55p	2N1613 2N1711 2N1893	24p 24p 30p	3.276 4.0 5.0	115p 110p 130p	BR84D 2A/400V BR86D	37p 43p	6502A 65C02 6522	360p 930p 280p	AN7156 AN7168 AN7178	240p 200p 180p	HA13108 HA13412 HA13432	350p 600p 400p
AC126 AC127 AC128K	30p 30p 40p	BD269 BD278 BD311	45p 50p 100p	BR100 BR103 BR303	14p 37p 85p	MJ3000 MJ3001 MJE29A	100p 100p 30p	2N2102 2N2218A 2N2219	50p 24p 24p	10.0 11.0 12.0	140p 250p 120p	2A/600V BR88D 2A/800V BR32	43p	6800 6802 680 36808	210p 220p 500p 500p	AN7222 AN7254 AN7256 AN7310	75p 150p 250p 60p	HA17524 ICL7106 ICL7660 KA2102	250p 650p 240p 150p
AC141K AC176 ACY18 ACY19	45p 22p 48p 48p	BD314 BD315 BD317 BD331	100p 150p 150p 40p	BSS74 BSX20 BT100A BT106	33p 15p 70p 180p	MJE30A MJE340 MJE350 MJE520	30p 25p 80p 30p	2N2221 2N2222 2N2369 2N2484	23p 23p 15p 15p	14.756 15.0 24.0	200p 160p 250p	2A/200V BR34 2A/400V	43p 43p	6809 6810 6818	500p 150p 380p	AN7311 AN7410 AY3-1015	90p 150p 290p	KA2130 KA2206 KA2209	150p 150p 125p
AD149 AF125 AF139	60p 50p 30p	BD332 BD361 BD362	40p 60p 60p	BT109 BT119 BT146	90p 100p 99p	MP8112 MPSA05 MPSA06	45p 15p 15p	2N2646 2N2904 2N2905	40p 20p 20p	VOLTAG REGULA	TORS	BR36 2A/600V BR62	44p 80p	6821 6840 6845	130p 290p 200p	AY3-1270 AY3-1350 AY3-8910	800p 450p 360p	KA2210 KA2212 KA2213	230p 80p 130p
AF239 BB105B BB205B	30p 18p 24p	BD370 BD371 BD410	30p 30p 50p	BTY79 BU105 BU108	140p 80p 100p	MPSA13 MPSA20 MPSA42	15p 15p 15p	2N2906 2N2907 2N3019	18p 18p 28p	7805 7806 7808	25p 25p 25p	6A/200V BR64 6A/400V	72p	6850 8085A 8086 8088	90p 300p 500p 480p	AY3-8912 BA301 BA311 BA313	400p 55p 80p 60p	KA2214 KA2261 KA2263 KA2264	150p 100p 100p 100p
BC107 BC108 BC109	8p 8p 8p	BD433 BD434 BD435 BD436	28p 30p 31p 30p	BU109 BU110 BU111 BU124	80p 90p 100p 60p	MPSA43 MPSA70 MPSA92 MPSA93	15p 15p 20p 20p	2N3053 2N3054 2N3055 2N3055H	18p 40p 38p 50p	7812 7815 7818 7824	25p 25p 25p 25p	BR251 25A/100V BR252 25A/200V	150p 165p	8156 8224 8226	300p 240p 240p	BA333 BA401 BA402	80p 60p 50p	KA2284 KA2401 KA2412	100p 150p 350p
BC109C BC140 BC141 BC142	10p 20p 20p 20p	BD437 BD438 BD439	28p 36p 40p	BU126 BU180 BU184	65p 100p 100p	MR510 MR856 OC28	35p 36p 350p	2N3442 2N3702 2N3703	85p 9p 9p	7905 7906 7908	25p 30p 30p	BR254 25A/400V BR256	185p 200p	8250 8251 8253	750p 200p 160p	BA511 BA514 BA516	145p 160p 150p	KA2912 KA2914A LA1130	125p 300p 240p
BC143 BC147 BC149	20p 8p 8p	BD440 BD441 BD533	40p 40p 50p	BU204 BU205 BU206	65p 70p 100p	OC29 OC35 OC36	250p 350p 250p	2N3704 2N3705 2N3706	9p 9p 9p	7912 7915 7918	30p 30p 30p	25A/600V BR258 25A/800V	240p	8257 8271 8279	220p 3400p 270p	BA521 BA524 BA526	100p 240p 180p	LA1150 LA1185 LA1201	150p 150p 75p
BC159 BC160 BC171	8p 30p 10p	BD534 BD535 BD536 8D537	38p 38p 38p	BU208 BU208A BU208AT BU208D	70p 75p 200p 130p	OC45 OC200 R2008B R2010B	180p 100p 100p	2N3707 2N3710 2N3711 2N3771	9p 12p 12p 85p	7924 78L05 78L08 78L12	30p 24p 24p 24p	BR351 35V/100V BR352 35V/200V	185p 200p	8283 8284 8287 8288	400p 440p 260p 650p	BA527 BA532 BA534 BA536	95p 100p 220p 150p	LA1210 LA1222 LA1230 LA1364	140p 80p 130p 200p
BC172 BC177 BC178 BC179	10p 14p 14p 14p	BD538 BD643 BD645	40p 40p 50p 50p	BU209 BU225 BU226	90p 120p 120p	S2000A3 S2000AF S2055A	175p 175p 175p	2N3772 2N3773 2N3799	90p 100p 18p	78L15 78L18 78L24	24p 24p 24p	BR354 35V/400V BR356	220p 230p	8748 8755 8T26	700p 800p 95p	BA546 BA612 BA656	160p 120p 110p	LA1365 LA1368 LA1385	120p 220p 170p
BC182 BC182L BC183	7p 7p 7p	BD647 BD649 BD675	50p 50p 40p	BU312 BU325 BU326A	90p 55p 75p	S2055AF S2530A S2800M	200p 100p 72p	2N3819 2N3903 2N3906	29p 11p 11p	79L05 79L08 79L12	35p 35p 35p	35V/600V BR358 35V/800V	260p	8T28	110p	BA658 BA684 BA685	350p 400p 400p	LA2000 LA2101 LA2200	150p 270p 190p
BC183L BC184 BC184L	7p 7p 7p	BD676 BD677 BD678	40p 38p 40p	BU406 BU406D BU407 BU407D	60p 85p 55p	TIP29 TIP29A TIP29C TIP29E	15p 22p 25p	2N4031 2N4401 2N4403 2N5061	25p 12p 12p 20p	79L15 LM309K LM317T LM323K	35p 100p 100p 350p	BY164 1.5 100V BY176 1.5 800V	40p	AN203 AN210 AN214Q	210p 165p 170p	BA1310 BA1320 BA1330 BA1360	160p 75p 120p 160p	LA3160 LA3210 LA3300 LA3301	120p 65p 140p 110p
BC212L BC212L BC213 BC213L	7p 7p 7p 7p	BD679 BD680 BD681 BD682	40p 40p 45p 45p	BU407D BU408 BU408D BU409	75p 60p 75p 85p	TIP30 TIP30C TIP31A	40p 25p 25p 22p	2N5088 2N5192 2N5241	20p 20p 50p 500p	78H08K0 79H12K0 79HGKC	800p	TRIACS	400	AN228 AN252 AN259	280p 150p 250p	BA4403 BA5101 BA5102	220p 350p 140p	LA3361 LA3375 LA4030	100p 300p 180p
BC214L BC214L BC237	7p 7p 7p	BD705 BD707 BD709	50p 50p 50p	BU426A BU500 BU505	70p 100p 90p	TIP31C TIP32 TIP32A	27p 24p 21p	2N5245 2N5294 2N5296	45p 30p 30p	VALVES	3	TIC206D 4AV400V TIC225D	60p 69p	AN262 AN271 AN274	140p 230p 250p	BA5204 BA5402 BA5406	200p 180p 180p	LA4031 LA4032 LA4051	140p 140p 160p
BC238 BC239 BC300	7p 7p 20p	BD711 BD736 BD826	50p 50p 50p 50p	BU505D BU505DF BU506 BU506D	90p 90p 100p 70p	TIP32C TIP33 TIP33C TIP34	28p 50p 60p 50p	2N5448 2N6107 2N6292 2N6385	12p 40p 40p 120p	DAF96 DY87 EBF80 ECC84	100p 80p 60p 80p	6AV400V TIC226D 8AV400V TIC236D	68p 85p	AN301 AN303 AN304 AN315	330p 250p 360p 210p	BA5408 BA6104 BA6208 BA6209	180p 250p 175p 85p	LA4100 LA4101 LA4102 LA4110	85p 80p 100p 120p
BC301 BC302 BC303 BC304	20p 20p 20p 25p	BD828 BD839 BD897 BD899	55p 50p 50p	BU506DF BU508A BU508AF	120p 70p 95p	TIP34C TIP35C TIP36C	60p 65p 65p	2N6403	160p	ECH84 ECL84 EF183	90p 100p 75p	12A/400V TIC246D 16A/400V	105p	AN316 AN360 AN362	350p 100p 140p	BA6304 BA6305 BA6410	120p 140p 220p	LA4120 LA4140 LA4160	270p 60p 100p
BC327 BC328 BC337	7p 7p 7p	BD977 BDX33 BDX65	50p 60p 80p	BU508D BU508DF BU508V	90p 115p 110p	TIP41A TIP41C TIP42A	20p 22p 20p	DIODES BY127	8p	EF184 EL500 EY86	85p 100p 70p	TIC253D 20A/400V TIC263D	190p 205p	AN366 AN610 AN3312	150p 160p 350p	BA6411 BA6993 BA7001	250p 150p 150p	LA4182 LA4190 LA4192	180p 300p 140p 130p
BC338 BC441 BC446 BC477	7p 28p 8p	BDW24 BDW93 BDW94 BDY92	55p 50p 50p 100p	BU508VF BU526 BU536 BU546	100p 75p 100p 125p	TIP42C TIP47 TIP48 TIP50	22p 40p 40p 60p	BY133 BY164 BY179 BY184	8p 40p 35p 32p	EY87 EY88 PC97 PCC85	70p 80p 100p 60p	25A/400V THYRIST	ORS	AN3821K AN3822K AN3990K AN3991K	600p 600p 300p 400p	BA7004 BA7007 BA7021 BA7022	200p 200p 180p 350p	LA4200 LA4201 LA4260 LA4261	120p 230p 300p
BC516 BC537 BC546	18p 22p 25p 8p	BF137 BF167 BF181	35p 30p 18p	BU608 BU626 BU705	120p 120p 120p 130p	TIP51 TIP52 TIP54	80p 80p 85p	BY206 BY207 BY227	11p 20p 19p	PCF80 PCF801 PCF806	100p 110p 115p	2N5061 0.8A/60V TIC116C	20p 59p	AN5025 AN5033 AN5132	250p 400p 250p	BA7751LS BA7752 BA7755	5 150p 250p 150p	LA4270 LA4420 LA4422	300p 140p 130p
BC547 BC548 BC549	8p 8p 8p	BF183 BF195 BF199	20p 7p 8p	BU706DF BU706F BU801	175p 150p 70p	TIP105 TIP106 TIP107	65p 65p 65p	BY228 BY298 BY299	28p 15p 18p	PCH200 PCL81 PCL82	100p 65p 80p	8A/300V TIC116D 8A/400V	70p	AN5150 AN5151 AN5215	400p 600p 100p	BA7767A CA3011 CA3048 CA3052	110p 190p	LA4430 LA4440 LA4445 LA4460	130p 200p 200p 120p
BC550 BC556 BC557	8p 7p	BF200 BF225 BF240 BF245	16p 30p 16p 25p	BU806 BU807 BU902 BU903	70p 60p 110p 110p	TIP110 TIP111 TIP112 TIP112H	40p 40p 35p 50p	BY448 BYX10 BYX55/60 BYX70/50		PCL84 PFL200 PL36 PL83	110p 120p 60p	TIC126D 12A/400V TIC126M 12A/600V	75p 90p	AN5256 AN5262 AN5265 AN5352	150p 175p 60p 600p	CA3052 CA3054 CA3085 CA3088E	190p 95p 135p 200p	LA4461 LA4500 LA4505	120p 120p 200p 220p
BC558 BC559 BC560 BC637	8p 8p 8p 20p	BF254 BF255 BF256	15p 12p 18p	BU920 BU922 BU930	100p 110p 130p	TIP115 TIP116 TIP117	30p 30p 30p	OA47 OA91 OA202	10p 10p 10p	PL84 PL95 PY81	80p 180p 100p	C106D 4A/400V BR103	28p 37p	AN5411 AN5421 AN5429	450p 150p 420p	CA3089E CA3090Q CA3130S	150p 250p 100p	LA4508 LA4510 LA4520	200p 100p 170p
BC639 BC640 BCY33	20p 20p 200p	BF257 BF259 BF262	18p 18p 25p	BU2508A BU2508A BU2508D	130p F 130p	TIP120 TIP121 TIP122	37p 35p 30p	IN4001 IN4002 IN4003	3p 3p 3p	PY500A	190p	BR303 BT106 BT119	180p 100p	AN5512 AN5515 AN5520	100p 160p 550p	CA3134E CA3140E CA3160	280p 38p 85p	LA4550 LA4555 LA4570 LA5112	200p 120p 130p 200p
BCY34 BCY70 BCY71 BCY72	200p 16p 16p	BF270 BF273 BF311 BF336	18p 15p 21p 20p	BU25080 BU2520A BU25200 BU2525A	F 225p	TIP125 TIP126 TIP127 TIP130	30p 40p 35p 30p	IN4004 IN4005 IN4006 IN4007	3p 3p 3p	3mm RED YELLOW	5p	17088 17089 17127 15/80H	200p 200p 200p 230p	AN5521 AN5612 AN5613 AN5615	100p 200p 200p 300p	CA3189E CA3193E CA3260E CA3290E	230p 230p 170p 150p	LA5523 LA5527 LA5700	150p 150p 300p
BD115 BD124P BD131	16p 30p 50p 25p	BF337 BF338 BF362	20p 20p 30p	BUH515 BUT11AF BUT12	200p 55p 80p	TIP131 TIP132 TIP141	30p 30p 65p	IN4148 IN5400 IN5401	4p 2p 9p 8p	GREEN 5mm RED	8p 5p	15/85R SG264 SG613	230p 800p 1600p	AN5620 AN5622 AN5625	250p 275p 400p	CX108 CX136 CX139A	950p 600p 750p	LA7011 LA7033 LA7042	220p 400p 280p
BD132 BD133 BD135	25p 50p 20p	BF367 BF371 BF421	13p 17p 18p	BUT56A BU18 BU18AF	100p 80p 80p	TIP142 TIP145 TIP146 TIP147	75p 50p 70p 80p	IN5402 IN5403 IN5404 IN5405	8p 8p 8p 11p	YELLOW GREEN	8p	COMPUT Z80ACPU		AN5712 AN5722 AN5730 AN5732	180p 140p 160p 120p	CX141 CX145 CX150B CX175	750p 725p 325p 325p	LA7046 LA7224 LA7505 LA7507	300p 150p 250p 250p
BD136 BD137 BD138 BD139	20p 20p 20p 20p	BF422 BF423 BF455 BF458	21p 25p 12p 19p	BUX10 BUX11 BUX12 BUX20	150p 200p 150p 350p	TIP150 TIP151 TIP2955	90p 60p 50p	IN5405 IN5406 IN5407 IN5408	12p 12p 12p	RECTAL LED®	VGULAR 2.5mm	Z80ADMA Z80ACTC Z80ASIO-	200p 140p 1 210p	AN5753 AN5763 AN5790	130p 250p 240p	CX187 CX804A CX867	825p 775p 575p	LA7520 LA7620 LA7800	200p 500p 90p
8D140 8D144 8D157	20p 90p 38p	BF462 BF471 8F472	50p 28p 28p	BUX21 BUX22 BUX37 BUX40	450p 450p 220p	TIP3055 TIPL763A TIPL791A	50p 200p 80p	RGP15 RGP30 SKE4F2/0	25p 16p 6 60p	RED YELLOW GREEN	5p	Z80ASIO- 75107 75110	2 210p 65p 75p	AN5791 AN5836 AN5900	225p 450p 130p	CX868 CX877 HA1125	525p 300p 120p	LA7801 LA7802 LA7806	100p 300p 260p
BD166 BD175 BD177	30p 30p 30p	BF479 BF494 BF495	30p 16p 16p	BUX41 BUX42	210p 200p 200p	TIS61 TIS90 TIS93	15p 15p 20p	SKE4F2/0 SKE4F2/1 SR2M		OPTO COUPL	ERS	75113 75122 75154 75162	100p 110p 100p 700p	AN6135 AN6247 AN6270 AN6300	120p 200p 400p 600p	HA1197 HA1199 HA1319 HA1338	130p 130p 200p 300p	LA7808 LA7820 LA7823 LA7910	250p 100p 200p 150p
BD179 BD181 BD182 BD184	32p 45p 60p 60p	BF595 BF596 BF615 BF617	16p 16p 30p 30p	BUX47A BUX48A BUX80 BUX84	220p 150p 180p 50p	VK1010 VN10KM ZTX107 ZTX108	88p 60p 11p 11p	1.C. SOC 8 PIN	KETS 5p	4N37 4N38 AN203	48p 68p 210p	75182 75183 75195	95p 95p 185p	AN6306 AN6320 AN6332	380p 180p 320p	HA1339A HA1377 HA1388	350p 120p 320p	LA7940 LC7131 LC7132	200p 260p 400p
BD187 BD201 BD202	30p 33p 38p	BF760 BF763 BF870	40p 40p 22p	BUX85 BUX86 BUX87	50p 30p 50p	ZTX109 ZTX212 ZTX300	12p 20p 10p	14PIN 16PIN 18PIN	6p 7p 10p	BRIDGE		2114 2532 2716	150p 200p 100p	AN6341 AN6344 AN6350	200p 440p 610p	HA1389 HA1392 HA1394	210p 120p 170p	LC7137 LF347 LF353	450p 110p 48p
BD203 BD204 BD222	42p 42p 31p	BF871 BF960 BF961	22p 38p 35p	BUX98A BU69A BUY71	350p 200p 250p	ZTX301 ZTX302 ZTX303	16p 10p 20p	20PIN 22PIN 24PIN	12p 13p 14p	W005 1A/50V W01	16p	2732 2732A 2764 27C64	200p 220p 150p 200p	AN6359 AN6360 AN6362 AN6371	500p 320p 400p 350p	HA1397 HA1398 HA11219 HA11221	200p 240p 280p 180p	LF355 LF357 LF398 LM301	70p 300p 26p
BD225 BD232 BD233 BD234	31p 31p 30p 32p	BF964 BFR90 BFR91 BFT43	38p 85p 99p 30p	BUZ11 BUZ71 BUZ80 BY448	200p 75p 200p 20p	ZTX304 ZTX320 ZTX501 ZTX502	10p 20p 13p 10p	28PIN 40PIN	16p 18p	1A/100V W02 1A/200V	19p	27128 27256-25 27512	150p 150p 300p	AN6387 AN6884 AN7105	480p 200p 170p	HA11225 HA11235 HA11251	130p 120p 190p	LM311 LM319 LM324	35p 165p
BD235 BD236 BD237	32p 28p 30p 21p	BFX29 BFX84 BFX85	20p 20p 20p	BYT11 C106D IRF630	25p 28p 150p	ZTX503 ZTX504 2N696	18p 25p 26p	2ENERS 400 mWa 2V7 to 39	itts V 5p	1A/400V W06	21p 23p	4116 4164-15 4164-12	40p 80p 90p	AN7110 AN7114 AN7115	75p 120p 110p	HA11423 HA11724 HA12002	140p 650p 220p	LM335Z LM339 LM348	30p 120p 35p 50p
BD238 BD239 BD240	24p 30p 40p	BFX87 BFX88 BFX89	15p 15p 60p	J174 J300 MJ900	38p 50p 200p	2N697 2N698 2N78	22p 40p 22p	1.3 Watts 2V7 to 39	V 9p	1A/600V W08 1A/800V BR81D	28p 33p	41256-15 41256-12 41256-10 41464-12	80p 100p 110p 150p	AN7116 AN7120 AN7130 AN7140	90p 100p 75p 170p	HA12003 HA12005 HA12017 HA13001		LM358 LM380 LM381 LM382	45p 80p 150p 130p
BD241A BD243A BD244 BD245	40p 50p 50p 50p	BFY52	14p 14p 14p 25p	MJ1000 MJ1001 MJ10012 MJ15003	200p 200p 300p 250p	2N914 2N930 2N1131 2N1132	28p 18p 28p 28p	Freq in M 2.4576		2A/100V BR82D 2A/200V	33p 33p	6116 6264-10 62256-12	80p 210p 300p	AN7145 AN7146 AN7154	195p 210p 180p	HA13002 HA13006 HA13007	200p	LM386 LM387 LM393	60p 100p 45p

PLEASE PHONE US FOR TYPE NOT LISTED HERE AS WE ARE HOLDING 10,000 ITEMS AND QUOTATIONS ARE GIVEN FOR LARGE QUANTITIES

Please send £1 P&P and VAT at 17½%. Govt, Colleges, etc. Orders accepted. Quotations given for large quantities.
Please allow 7 days for delivery. All brand-new Components. All valves are new and boxed.
Prices quoted are subject to stock availability and may be changed without notice.
TV & video parts sold are replacement parts.

_					_	-	_	Ų.			NS		_	_					6 .
Part	Price	Part 2SC1008	Price	Part 2SC1730	Price	Part 2SC2270	Price	Part 2SC2750	Price	Part 2SC3277	Price	Part 2SC3893	Price	Part 2SD836A	Price	Part 2SD1279	Price	Part 2SD1815	Pric
SA1380 SA1381	75p 100p	2SC1008 2SC1010 2SC1012	225p 75p	2SC1735 2SC1739	70p 800p	2SC2271 2SC2274	30p 15p	2SC2751 2SC2752	270p	2SC3280 2SC3281	200p 200p	2SC3895 2SC3897	400p 400p	2SD837 2SD838	55p 300p	2SD1288 2SD1289	175p 250p	2SD1825 2SD1843	1
SA1382	120p	2SC1013	170p	2SC1740	10p	2SC2275	50p	2SC2767	300p	2SC3284	600p	2SC3907	250p	2SD841	110p	2SD1291 2SD1292	400p	2SD1846	3
SA1385 SA1386	180p 400p	2SC1014 2SC1030	140p 150p	2SC1741 2SC1755	35p 90p	2SC2278 2SC2290	70p 1800p	2SC2769 2SC2773	400p 700p	2SC3293 2SC3298	85p 50p	2SC3927 2SC3950	250p 120p	2SD844 2SD845	200p 250p	2SD1292 2SD1297	60p 300p	2SD1849 2SD1850	3
SA1423 SA1489	30p 300p	2SC1047 2SC1050	20p 280p	2SC1756 2SC1758	35p 30p	2SC2291	40p	2SC2774	500p	2SC3299	120p	2SC3953	60p 210p	2SD850 2SD856	170p 48p	2SD1302 2SD1308	20p 80p	2SD1858 2SD1877	1
SA1491	300p	2SC1060	70p	2SC1775	10p	2SC2295 2SC2298	60p 35p	2SC2785 2SC2786	60p 20p	2SC3300 2SC3303	400p 100p	2SC3973 2SC3987	220p	2SD858	250p	2SD1309	140p	2SD1878	2
SA1493 SA1516	500p 280p	2SC1061 2SC1070	85p 65p	2SC1781 2SC1789	20p 100p	2SC2307 2SC2308	300p. 10p	2SC2787 2SC2791	10p 500p	2SC3306 2SC3307	130p 600p	2SC3996 2SC4006	1200p 100p	2SD863 2SD864	23p 200p	2SD1310 2SD1313	140p 1000p	2SD1879 2SD1884	3
SA1535 SB324	175p 40p	2SC1096 2SC1098	40p 120p	2SC1809 2SC1810	40p 250p	2SC2308	300p	2SC2792	220p	2SC3309	150p	2SC4020	280p	2SD866	120p	2SD1326	200p	2SD1886	4
SB546	45p	2SC1106	180p	2SC1815	10p	2SC2314 2SC2316	70p 150p	2SC2793 2SC2808	700p 40p	2SC3316 2SC3317	280p 350p	2SC4023 2SC4056	325p 350p	2SD866A 2SD868	140p 260p	2SD1328 2SD1347	60p 70p	2SD1887 2SD1910	3
SB560 SB561	25p 50p	2SC1114 2SC1115	415p 280p	2SC1819 2SC1826	70p 60p	2SC2320	10p	2SC2810	360p	2SC3323	480p	2SC4106	200p	2SD870	190p	2SD1348	65p	2SD1911	3
SB562	25p	2SC1116	290p	2SC1827	60p	2SC2324 2SC2329	120p 480p	2SC2812 2SC2814	40p 40p	2SC3327 2SC3331	60p 25p	2SC4123 2SC4124	450p 250p	2SD871 2SD879	300p 60p	2SD1350 2SD1376	150p 125p	2SD1913 2SD1929	
SB566 SB595	90p 55p	2SC1124 2SC1161	270p 110p	2SC1829 2SC1833	500p 40p	2SC2331	50p	2SC2824	75p	2SC3333	120p	2SC4169 2SC4236	60p 550p	2SO880 2SO882	40p 25p	2SD1379 2SD1380	100p 100p	2SD1939 2SD1941	,
SB596 SB598	50p 30p	2SC1162 2SC1164	30p 600p	2SC1834 2SC1844	50p	2SC2333 2SC2334	200p 80p	2SC2825 2SC2826	900p 200p	2SC3345 2SC3352	100p 200p	2SC4237	650p	2SD892A	75p	2SD1384	50p	2SD1959	3
B600	500p	2SC1165	750p	2SC1845	15p	2SC2335 2SC2344	75p 150p	2SC2827 2SC2832	200p 300p	2SC3353 2SC3355	280p 50p	2SC4242 2SC4301	170p 550p	2SD894 2SD895	35p 100p	2SD1390 2SD1391	350p 250p	2SD1961 2SD1978	
SB646 SB647	40p 20p	2SC1166 2SC1170	100p 180p	2SC1846 2SC1847	35p 45p	2SC2347	60p	2SC2834	400p	2SC3356	120p	2SC4742	275p	2SD896	200p	2SD1392	150p	2SD1984	4
B648 B649	45p 35p	2SC1172 2SC1173	150p 40p	2SC1855 2SC1856	85p 25p	2SC2353 2SC2360	120p 120p	2SC2837 2SC2839	250p 40p	2SC3358 2SC3361	50p 50p	2SC4769 2SD198	300p 140p	2SD900 2SD905	400p 450p	2SD1395 2SD1396	150p 120p	2SD2012 2SD2125	2
SB688	90p	2SC1195	210p	2SC1865	700p	2SC2361	150p	2SC2853	70p	2SC3376	300p	2SD199	195p	2SD916	130p	2SD1397	120p	2SD2333	2
SB703 SB705	90p 200p	2SC1212 2SC1213	35p 15p	2SC1870 2SC1875	700p 220p	2SC2362 2SC2365	50p 280p	2SC2877 2SC2878	120p 20p	2SC3377 2SC3378	50p 120p	2SD200 2SD201	180p 260p	2SD917 2SD921	300p 320p	2SD1398 2SD1399	120p 300p	2SJ48 2SJ49	- 4
SB707	200p	2SC1214	15p	2SC1881	70p	2SC2369	100p	2SC2879	3200p	2SC3383	80p	2SD257	195p	2SD923	360p	2SD1400	280p	2SJ50	4
SB716 SB718	20p 60p	2SC1215 2SC1216	25p 200p	2SC1890 2SC1904	15p 125p	2SC2371 2SC2373	25p 210p	2SC2883 2SC2898	60p 200p	2SC3387 2SC3393	550p 80p	2SD313 2SD315	25p 75p	2SD946 2SD947	120p 100p	2SD1402 2SD1406	150p 60p	2SJ56 2SJ74	7
SB727 SB754	200p 80p	2SC1222 2SC1226	15p 75p	2SC1906 2SC1907	15p 20p	2SC2383	50p	2SC2899	50p	2SC3399	50p	2SD325	30p	2SD950 2SD951	300p 290p	2SD1407 2SD1408	60p 125p	2SJ75 2SJ76	
SB755	310p	2SC1252	850p	2SC1909	250p	2SC2389 2SC2407	45p 110p	2SC2909 2SC2911	60p 80p	2SC3400 2SC3401	35p 50p	2SD330 2SD348	65p 300p	2SD957A	520p	2SD1409	170p	2SJ77	2
SB772 SB774	25p 50p	2SC1278 2SC1279	110p 30p	2SC1913 2SC1921	90p 15p	2SC2408 2SC2412K	120p 50p	2SC2912 2SC2921	120p 650p	2SC3402 2SC3409	40p 400p	2SD357 2SD358	40p 40p	2SD958 2SD965	60p 35p	2SD1412 2SD1413	75p 60p	2SJ79 2SJ103	;
SB775 SB791	100p 280p	2SC1306 2SC1308	90p	2SC1923 2SC1929	10p 180p	2SC2440	200p	2SC2922	480p	2SC3412	800p	2SD371	240p	2\$D970	170p	2SD1415	190p	2SJ108	
SB795	60p	2SC1312	40p	2SC1940	110p	2SC2458 2SC2459	10p	2SC2928 2SC2929	550p 280p	2SC3416 2SC3417	30p 90p	2SD380 2SD381	650p 50p	2SD973 2SD973A	60p 70p	2SD1417 2SD1425	125p 260p	2\$J115 2\$J117	
SB825 SB861	135p 110p	2SC1317 2SC1318	15p 10p	2SC1941 2SC1942	27p 350p	2SC2470	65p	2SC2934	75p	2SC3419	120p	2SD388	150p	2SD985	120p	2SD1426	160p	2SJ119	:
SB882 SB886	180p 90p	2SC1325 2SC1327	400p 20p	2SC1944 2SC1945	350p 350p	2SC2481 2SC2482	120p 20p	2SC2937 2SC2938	250p 235p	2SC3420 2SC3422	80p 75p	2SD389 2SD400	60p 14p	2SD986 2SD1012	120p 40p	2SD1427 2SD1428	180p 220p	2SJ161 2SJ162	- 6
SB950	180p	2SC1328	15p	2SC1946	1500p	2SC2483	120p	2SC2939	400p	2SC3423	60p	2SD401	50p	2SD1020	40p 120p	2SD1429 2SD1430	410p 280p	2SK19 2SK40	
SB951 SB1009	190p 110p	2SC1342 2SC1345	15p 15p	2SC1947 2SC1957	450p 70p	2SC2484 2SC2491	185p 200p	2SC2944 2SC2958	300p 50p	2SC3446 2SC3447	150p 200p	2SD402 2SD415	120p 55p	2SD1021 2SD1022	400p	2SD1431	250p	2SK49	
SB1077	180p	2SC1346	100p	2SC1959	10p	2SC2495	1900p	2SC2962 2SC2979	800p 160p	2SC3456 2SC3457	200p 125p	2SD424 2SD426	350p 150p	2SD1024 2SD1030	130p 75p	2SD1432 2SD1433	400p 750p	2SK55 2SK68	
SB1109 SC182	55p 75p	2SC1358 2SC1359	270p 15p	2SC1967 2SC1969	1300p 160p	2SC2498 2SC2500	50p 25p	2SC2987	250p	2SC3459	180p	2SD427	350p	2SD1031	70p	2SD1438	140p	2SK73	
SC372 SC380	25p 10p	2SC1360 2SC1364	70p 25p	2SC1970 2SC1971	100p 400p	2SC2502 2SC2519	200p 60p	2SC2988 2SC2995	150p 60p	2SC3460 2SC3461	130p 350p	2SD438 2SD467	35p 15p	2SD1046 2SD1047	200p 180p	2SD1439 2SD1441	165p 280p	2SK106 2SK107	
SC382	50p	2SC1383	25p	2SC1972	600p	2SC2527	300p	2SC2999	50p	2SC3466	225p	2SD468	15p	2SD1051	130p	2SD1445	200p	2SK118	
2SC388A 2SC394	60p 60p	2SC1384 2SC1393	20p 20p	2SC1973 2SC1983	150p 75p	2SC2534 2SC2535	150p 300p	2SC3001 2SC3012	1400p 300p	2SC3468 2SC3481	70p 300p	2SD471 2SD525	20p 50p	2SD1060 2SD1062	130p 150p	2SD1450 2SD1451	60p 260p	2SK125 2SK133	1
2SC403 2SC454	25p 15p	2SC1394 2SC1398	15p 55p	2SC1984 2SC1985	150p 100p	2SC2538	100p	2SC3019	320p	2SC3482	275p	2SD526 2SD545	70p 18p	2SD1063 2SD1064	200p 250p	2SD1452 2SD1453	350p 140p	2SK134 2SK135	4
SC458	10p	2SC1400	50p	2SC1986	100p	2SC2540 2SC2542	1900p 300p	2SC3025 2SC3026	500p 550p	2SC3486 2SC3502	275p 100p	2SD549	120p	2SD1065	160p	2SD1455	250p	2SK147	
2SC460 2SC461	10p 15p	2SC1403 2SC1407	500p 50p	2SC2001 2SC2002	15p 15p	2SC2545 2SC2546	55p 25p	2SC3030 2SC3037	300p 125p	2SC3503 2SC3504	50p 120p	2SD551 2SD555	300p 500p	2SD1069 2SD1071	150p 450p	2SD1457 2SD1459	165p 120p	2SK150 2SK163	
SC495	45p	2SC1413	150p	2SC2003 2SC2004	20p	2SC2547	65p	2SC3038	125p	2SC3505	240p	2SD560	50p	2SD1073	350p	2SD1468	60p	2SK168	
2SC496 2SC497	25p 85p	2SC1419 2SC1429	50p 50p	2SC2004 2SC2021	20p 10p	2SC2550 2SC2551	50p 70p	2SC3039 2SC3040	80p 260p	2SC3506 2SC3507	250p 650p	2SD571 2SD575	20p 530p	2SD1088 2SD1094	150p 520p	2SD1479 2SD1487	200p 225p	2SK176 2SK192	•
SC515 SC535	100p 30p	2SC1444 2SC1446	275p 55p	2SC2022 2SC2023	110p 180p	2SC2552	60p	2SC3042	300p	2SC3509	750p	2SD600	30p	2SD1110	225p	2SD1491 2SD1494	100p	2SK195 2SK197	
SC536	20p	2SC1447	70p	2SC2026	30p	2SC2553 2SC2555	200p 120p	2SC3057 2SC3058	150p 2500p	2SC3518 2SC3519	120p 250p	2SD601 2SD602	40p 60p	2SD1111 2SD1113	20p 225p	2SD1496	300p 350p	2SK214	1
SC558 SC563	275p 120p	2SC1448 2SC1449	100p 120p	2SC2027 2SC2028	200p 75p	2SC2562	90p	2SC3068 2SC3070	60p 35p	2SC3531 2SC3549	225p 200p	2SD612 2SD613	50p 70p	2SD1128 2SD1133	200p 100p	2SD1497 2SD1497-	230p 02 350p	2SK216 2SK218	:
SC605 SC619	100p 100p	2SC1450 2SC1454	200p 250p	2SC2029 2SC2037	120p 50p	2SC2563 2SC2564	200p 230p	2SC3074	200p	2SC3552	300p	2SD636	10p	2SD1135	75p	2SD1505	120p	2SK240	•
SC641	80p	2SC1470	120p	2SC2053	120p	2SC2565 2SC2568	260p 120p	2SC3075 2SC3077	150p 120p	2SC3568 2SC3584	200p 200p	2SD637 2SD638	15p 15p	2SD1138 2SD1140	50p 40p	2SD1507 2SD1509	60p 100p	2SK312 2SK315	
SC644 SC647	10p 300p	2SC1472 2SC1473	40p 15p	2SC2055 2SC2058	150p 20p	2SC2570	30p	2SC3086	150p	2SC3595	220p	2SD639	20p	2SD1142	350p	2SD1511	100p	2SK320	
SC681 SC683	250p 35p	2SC1474 2SC1475	45p	2SC2060 2SC2061	60p 75p	2SC2571 2SC2577	350p 110p	2SC3089 2SC3101	130p 750p	2SC3605 2SC3606	60p 100p	2SD640 2SD655	350p 18p	2SD1148 2SD1159	175p 90p	2SD1519 2SD1521	250p 70p	2SK323 2SK386	
SC708	100p	2SC1505	60p 80p	2SC2068	60p	2SC2578	170p	2SC3112	35p	2SC3607	150p	2SD661	60p	2SD1160 2SD1163A	150p	2SD1541	350p	2SK405 2SK413	
SC710 SC711	15p 15p	2SC1507 2SC1509	45p 35p	2SC2071 2SC2073	140p 40p	2SC2579 2SC2580	110p 175p	2SC3114 2SC3116	40p 75p	2SC3636 2SC3657	280p 400p	2SD666 2SD667	25p 20p	2SD1164	75p	2SD1548 2SD1554	450p 170p	2SK415	
SC730 SC732	350p 40p	2SC1514 2SC1515	35p 60p	2SC2075 2SC2078	60p 95p	2SC2581	175p	2SC3117 2SC3122	120p	2SC3659 2SC3668	600p 120p	2SD668 2SD669	120p 35p	2SD1168 2SD1169	270p 280p	2SD1555 2SD1556	170p 400p	2SK429 2SK511	
SC733	15p	2SC1520	45p	2SC2085	100p	2SC2588 2SC2590	600p 40p	2SC3148	50p 185p	2SC3675	100p	2SD673	350p	2SD1173	350p	2SD1564	100p	2SK513	:
SC735 SC738	40p 15p	2SC1541 2SC1545	110p 120p	2SC2086 2SC2092	60p 100p	2SC2591 2SC2592	50p 200p	2SC3149 2SC3150	180p 125p	2SC3678 2SC3679	280p 140p	2SD676 2SD716	250p 80p	2SD1185 2SD1186	400p 400p	2SD1565 2SD1571	75p 170p	2SK531 2SK534	:
SC739	150p 110p	2SC1567 2SC1568	40p 35p	2SC2094 2SC2097	1200p	2SC2603	10p	2SC3151	230p	2SC3680	380p	2SD717	180p	2SD1187	250p	2SD1572	100p	2SK537	9
SC761 SC762	150p	2SC1569	55p	2SC2099	2300p 2500p	2SC2610 2SC2611	60p 30p	2SC3152 2SC3153	130p 175p	2SC3685 2SC3687	450p 600p	2SD718 2SD722	85p 240p	2SD1189 2SD1190	55p 150p	2SD1576 2SD1577	250p 250p	2SK538 2SK539	1
SC783	85p 50p	2SC1570 2SC1571	40p 50p	2SC2118 2SC2120	1100p 10p	2SC2621	70p	2SC3156	350p	2SC3688 2SC3692	550p	2SD725	270p	2SD1191 2SD1192	120p 90p	2SD1579 2SD1589	120p 60p	2SK555	
SC792	380p	2SC1573	25p 600p	2SC2131 2SC2141	5 50 p	2SC2625 2SC2626	190p 600p	2SC3157 2SC3158	200p 260p	2SC3715	150p 480p	2SD734 2SD741	15p 120p	2SD1196	150p	2SD1590	100p	2SK556 2SK557	
2SC805 2SC828	225p 20p	2SC1580 2SC1583	25p	2SC2153	60p 40p	2SC2631	20p 10p	2SC3159 2SC3164	200p 350p	2SC3717 2SC3729	120p 450p	2SD743 2SD756	130p 100p	2SD1197 2SD1207	150p 40p	2SD1591 2SD1593	310p 125p	2SK566	
SC829 SC839	15p 20p	2SC1586 2SC1617	540p 340p	2SC2166 2SC2168	80p 120p	2SC2634 2SC2636	40p	2SC3169	150p	2SC3746	100p	2SD757	120p	2SD1210	280p	2SD1595	160p	2SK695 2SK719	:
2SC870	100p	2SC1623	50p	2SC2188	70p	2SC2637 2SC2640	120p 1800p	2SC3170 2SC3173	300p 180p	2SC3747 2SC3752	120p 250p	2SD758 2SD762	140p 100p	2SD1211 2SD1218	120p 75p	2SD1608 2SD1609	210p 70p	2SK724	-
SC898 SC930	275p 15p	2SC1624 2SC1626	60p 55p	2SC2200 2SC2221	250p 650p	2SC2653	100p	2SC3175	150p	2SC3781	150p	2SD763	140p	2SD1223	75p	2SD1632	500p	2SK725 2SK727	
SC941 SC943	15p 160p	2SC1627 2SC1628	15p 75p	2SC22284 2SC2229		2SC2654 2SC2655	180p 75p	2SC3178 2SC3179	175p 70p	2SC3783 2SC3787	300p 100p	2SD768 2SD772	180p 200p	2SD1225 2SD1227	120p 40p	2SD1637 2SD1647	50p 40p	2SK735	-
SC944	140p	2SC1634	50p	2SC2230	80p	2SC2656	550p	2SC3181	200p	2SC3789	75p	2SD773	20p	2SD1229 2SD1237	250p 300p	2SD1649 2SD1650	260p 180p	2SK758 2SK787	;
SC945 SC9 50	10p 40p	2SC1669 2SC1674	100p 15p	2SC2233 2SC2235	100p 60p	2SC2660 2SC2665	100p 200p	2SC3182 2SC3199	120p 40p	2SC3790 2SC3795	120p 175p	2SD774 2SD777	30p 400p	2SD1246	20p	2SD1651	150p	2SK794	!
SC959	225p	2SC1675	90p	2SC2236	20p	2SC2668	10p	2SC3209	120p	2SC3798	220p	2SD784 2SD786	650p 100p	2SD1247 2SD1248	40p 270p	2SD1663 2SD1666	450p 90p	2SK872 2SK903	
SC980 SC982	40p 20p	2SC1678 2SC1683	80p 100p	2SC2237 2SC2238	540p 45p	2SC2671 2SC2681	100p 170p	2SC3210 2SC3211	550p 220p	2SC3807 2SC3811	120p 80p	2SD787	20p	2SD1251	180p	2SD1667	120p	2SK1057	
2SC983 2SC1000	120p 20p	2SC1684 2SC1685	30p 30p	2SC2240 2SC2258	15p 30p	2SC2682	70p	2SC3212	260p	2SC3832 2SC3833	200p 250p	2SD788 2SD789	30p 20p	2SD1263 2SD1264	90p 55p	2SD1668 2SD1677	120p 300p	2SK1058 2SK1117	:
SC1000	950p	2SC1729	900p	2SC2259	60p	2SC2688 2SC2690	27p 60p	2SC3225 2SC3244	50p 45p	2SC3853	220p	2SD792	400p	2SD1265	75p	2SD1730	350p	2SK1118	
		ii.				2SC2705	50p	2SC3246 2SC3259	50p 350p	2SC3854 2SC3855	250p 220p	2SD794 2SD795A	33p 140p	2SD1266 2SD1267	180p 55p	2SD1732 2SD1739	400p 275p	3SK45 3SK51	
S	EE (ER P	AGE	S	2SC2710 2SC2712	50p 20p	2SC3260	350p 220p	2SC3857	500p	2SD811	450p	2SD1271	55p	2SD1740	125p	3SK59	
						2SC2716	50p	2SC3261	230p	2SC3858 2SC3870	550p 200p	2SD819 2SD820	200p 250p	2SD1271/ 2SD1272	225p 200p	2SD1748 2SD1760	90p 80p	3SK74 3SK77	
	ا کی	OR	MOR	-		2SC2719 2SC2721	25p 120p	2SC3262 2SC3263	280p 280p	2SC3883	280p	2SD821	550p	2SD1273	50p	2SD1762	50p	3SK81	
					NG	2SC2738	200p	2SC3264	390p	2SC3884		2SD822 2SD826	290p 30p	2SD1275 2SD1276	50p 60p	2SD1773 2SD1783	160p 100p	3SK85 3SK88	
	1 T . 1 I h	7 1 W 1 W 1	-41	RGA	17,17	2SC2740 2SC2749	450p 350p	2SC3269 2SC3270	50p 50p	2SC3886/ 2SC3890	150p	2SD826 2SD836	60p	2SD1276	190p	2SD1783	180p	3SK121	

		REPL/	ACE	MENT	VIDE	EO HE	ADS		
Model	Price	Model	Price	Model	Price	Model	Price	Model	Price
AIWA AV66/AV77 G700	1200p 1100p		2200p 1900p	VR3833, 3912, 3913, 3 4913, VRP3833 VR3986	650p	NVM1, NVM3, NVM5 AG2100, AG2200	4200p 700p	VHR1100, VHR1200 VHR1500, VHR2500	1500p 2100p
G900	1500p		5, 618, 620,	VP3826, 3906, 3916, 3 3948 VR3927	926, 3946, 1550p 1400p	NV430 NV730, NV770 4 HEAD NV366 NV180, NVD48	1850p	VHR2700 VHR7900	2450p 3000p
VS105, 112, 115, 116, 12 205, 220, 240, 244, 245, 303, 304, VSP8, VSP82	25, 126, 201, 202, 247, 248, 250, 301, 1000 p	905, 906, 908, 910, 911, 915	5, 916, 918, 75 1100 p	VR3976 VR3977	2300p 2700p	NV788 NV810, NV830	2300p 2600p 2400p	SHARP VC390, VC393, VC496 VC488	2750p 4200p
VP7100, VS9300, VS950 VP77, VP88, VP7100, VF VS9800	00, V\$9800 650p	VBR330 VBS7000, VBS7100, VBS90	1800p 2000p	VR3984, VR3994 VR3995, 3997 VR3917	2300p 1800p 1400p	NV850, NV950 NV870, NV890, NV970 NVG33, NVG46, NVL2	3, NVL25,	VC779 VC789, VC790	1800p 2900p
VS1, VS2, VS3, VS4, VS VSP1 VS33, VS35, VS37, VS3	5, VS10, 1350p	FVHP500, 711, 715, 721, 72 5100, FVHD720 FVHP725, 830, 980	1100p 2500p	VR3730, VR3731, VR3 VR3918, VR3919, VR3 VR3520, 3701, 3719, 3	938 1500p 720, 3721, 3759,	NVL28 NVG10, 11, 12, 14, 16, 450, 465	1500p	VC200, 220, 300, 381, 39, 387, 388, 471, 477, 481, 3300, 8381, 9100, 9300,	482, 483, 486,
VS66, VS765, VS767, VS VS512, VS515, VS516	S768 2100p 2800p	FVHP990 FVHP975 FVHD40, FVHD140, FVHP1	2700p 2400p , FVHP10,	9720 VR3907, VR3908 VR3968	2000p 1600p 700p	NVG18 NVG20, 21, 22, 25, 28, NVG50, NVG300	2650p	9700 VC582, 583, 651, 681, 75 684, 402, 500, 571, 573.	
VS465 VS11, VS12 VS6, VS8, VS9	2300p 1200p 2400p		1150р	J.V.C. & FERGUSON HR2200, 3300, 3320, 3	330, 3350, 3360,	NVG45 NVH70 NV688	1800p 3600p 2400p	693, 700, 772, 7810, 782 8481	2, 7822, 783, 1100p
VSX9 VSF600, VSF650 VS155, VS165	2250p 3600p 2300p	HQS200, VCR600, VCR6100 VR9100 VCR100	0, VR900, 1500p 1100p	3660, 3750, 3860, 4100 8902, 8903, 8906, 8922 3V22	0, 3292, 8900, 8901, 2, 8928, 3V01, 3V06, 600p	NV600 AG6800, AH6810 AG6100, AG6200, AG6	1150p 2600p 3300 2600p	VC6000, 6200, 6300, 730 8000, 8300 VC793	00, 7700, 7750, 1800p 3000p
VS20, 22, 24, 25, 26, 27, VSF10, VSP9 VSR9	1250p 1300p	VTR1000 GOLDSTAR	1100p	111, 120, 121, 220, 225 8923, 8924, 8925, 8925	5, HRS100, 8904, 9, 8935, 8941, 8943.	NVG7, NVG9, NV230 NV780 NVG15, NVG400	1050p 2400p 2600p	VC473, 785, 786 VC699, VCA501, VCA60 VC585, VC685	2200p 2 2800p 2000p
VS109, VS603, VS606, V VS75	/S607 2500p 2500p	8000 3HSSDB GVH51, GVH122, VCP4000 VCP4200	1900p , VCP4100, 1100p	8944, 3V16, 3V23, 3V2 3V36, 3V38, 3V39, 3V4 BR1600, HRD140, 141	4, 3V31, 3V35, 19 625p	NVM7, NVMC20 NVF70	3800p 5200p	VC90ET VFH815	3900p 2800p
ALBA VCR4000, VCR5000, VC	R6000 1650 p	GHV1232, 1233, 1241, 1242 1245, 1246, 1290, 1291, 129 8210, 8215, GVHP1240, 124	2, 1243, 1244, 95, 1296, 1891.	156, 157, 158, 160, 510 8948, 3V42, 3V44, 3V4 3V52, 3V54, 3V55, 3V5	01, HRS10, 8947, 5, 3V46, 3V47, 66, 3V57	N.E.C. N9011, 9012, 9013E, 90 9016, 901A, 902A, 903	014E, 9014G, 9015,	SIEMENS FM350, FM352, FM355,	
AMSTRAD VCR4500, VCR5200, VC TVR1	900p	VCP400, VCP4130, 4300, 43 4306, 4310, 4311, 4315, 431 4326	301, 4305,	HRD154, 170, 171, 210 350, 521, 522, 525, 526), 211, 217, 320, 321, 5, 527, 550, 8950,	9054, 9055, 9063, 9065 DX1000, 1600 N911A, 914C, 915A, 91	, 9066, 906, 1200p	FM363 FM364 FM391, FM392, FM461	1300p 1350p 1800p
VCR7000 VCR6000, 6100, 6200, 80 DD8900, 8904, TVR4	1100p	G.E.C. 4000H, 4001H, 4002H	1200p	FV21, FV26 HRD565, HRD566, 3V4 HRD725, HRD755, 3V4	1300p 8 2200p	9120 PVC600, 740, 744, 754,	2400p 763E, 764, PV2300,	FM394, FM464 FM462, FM561	2800p 1600p
TVR2, TVR3, VCR4600, VCR4700	VCR4600 MKII, 1100p	V4001H, V4004 V4005H	1200p 1200p 1500p	8930, 8931, 8933, 8940 8945), 3V29, 3V30 700p 2400p	2400, 760, 794, 770, 77 N380, N381, N830, N8 N834, N835, N836	31, N832, N833, 700 p	FM468 FM484, FM485, FM602, FM624	2450p FM604, FM622, 1800p
AUTHENTIC N850	800p	GRANADA CS1, DS2 VHSAH1	1600p	3V00, 8902, 8903, 8909 FV31 FV37, FV43H, HRD860	1500p 3500p	8261, AH1 (for model [N9610 N895	3000p 3150p	FM585 FM600	1425p 1900p
AWA ATVI BAIRD	800p	VHSAH3 VHSAN3 VHSAY3	1100p 2400p 800p	BR7000E, BR7000S HR7200, 7300, 7350, 2 HRD455	2000p	N9052, N9530, DX2000 VCP1 PVC2300, 2400, 740, 74	1700p 44, 760, 764 1400p	SONY DSR-19R (FOR SL-T 9MI DSR-21R (FOR SLC 8-C9	
8900, 8901, 8902, 8903, 8928	650p	VHSBH1, VHSCH1 VHSBP1	1200p 2100p 850p	HRD520 HRD300, 400, 580, 600 HR4100	1000p	NORDMENDE	3500p	DSR-35R (FOR C20, C30 SLF1UB, SLF1E) 2 PIN S), C40, SLC24PS,
8904, 8923, 8924, 8925, 8944 8909, 8912	650p 800p	VHSBY3 VHSD52 VHSEH2	2600p 1600p 1600p	HRD750, HRD830 HRD250, HRD257 3V32, 8942, HR7655	3300p 2500p 2200p	460, 9-460, V100, 140, 3 450, 550 V1001, 1005, 1015, 102	7 00p 25, 1035, 1041,	SLC33E, SLC44PS, SLF3 SLK85, SLT20ME, SLT3(DSR-43R (FOR SLC7 RA	OME 1500p NGE, SL5000,
8930, 8931, 8933, 8940 8942 8945	800p 2300p 2000p	VHSEY1, VHSEY2 VHSFG2, VHSFG4 VHFS1, VHSFS2	1400p 1300p 1300p	HRD180, 190, 230, 610 FV20B, 26, 30, 32, 33, \ HRD370, HRD430, HRD	/C141L 2250p	1055, 1065, 1105, 2005 V110, V333 V101, 102, 103, 112, 14	2000p 1, 142, 200, 300,	SL5100, SL3000) 1 PIN S SL36ES, SL37E SL3000, 8000, 8080, SL0	1300p
8947, 8948 8950 VC141L	1600p 1700p 3000p	VHSTJ1, VHSTJ2, VHSTJ3, VHSYJ2 VHSVH4, VHSWH1, VHSXF	700p	FV13H HRD530, HRD700, FV1 GRC1, GRC2, 3V41	2800p	301, 302, 350, 500, 300 V1205, V1215, V1235, V V1305	√1245 1400 p 2450 p	SLT7ME SLV201, 202	1600p 2000p
VH582 BLAUPUNKT	7000p	VHSYH2 VHSWJ1, VHSXJ3	1600p 700p	HRD330, 337, 440, 637 HRFC100, FV44L	, 641, 660, 2100 p	V380 V502, V503, V5005	2300p 3150p	SLK95, SLT50ME SLV373VB	2900p 2600p
RTV100, 200, 202, 211, 2 RTX100, 200 RTV301, RTX250, RTV33	800p 33 800p	GRAETZ 4312, 4605, 4905, 4912, 491 TR4605, TR4812, TR4905, T	R4912.	KENWOOD KV901, KV903, KV905 KV917	650p 2450p	ORION VH3, VH555, VH600, VI VH900, VH1000 (ALL N	10DELS) 1100p	V63 V9680	1500p 3400p
RTV306, 307, 309, 311, 3 707 RTV310, 311A, 312, 317,	319, 320 1100p	TR4913, TR4914, TR4943 4935, 4943, 4963, 4985, 499 TR4935, TR4985, TR4993	650p	LOGIK VR960	1500p	VH1, VH2A PHILIPS	700p	V8600, V8700 V21, V31, V33, V50, V51, V9600	3000p , V53, 1450p
RTV324, RTV325 RTV328 RTV424	1550p 1850p 3500p	4920, 4927, 4930 4946, TR4906, TR4916 TR4994	1700p 1600p 2300p	VR950	1400p	VR6460, VR6520, 64VR VR6711 4 HEAD 6920, VR6440	1800p 2500p	V55, V57 V71, V73, V74, V75, V77,	700p , V80, V81, V82,
RTV434, RTV444 RTX260, RTX720, RTV33 RTV454, RTV740	5000p	TR4995 GRUNDIG	3300p	OC410, OC420, OC440 OC50, OC55, OC60, OC	2400p 265 1500p	VR6441, VR6540, VR65 VR6642	41, VR6640, 1300p	V83, V84, V85, V86, V87 V80, V93 V5470, V5480	1450p 1300p
RTV478 RTV520, RTV530 RTV535, RTV560, RTV57	3700p 1800p 0 2000p	VS410, 450, 460, 500, 505, 5 530, 546 BARCELONA, MVS400, 440	1600p , 500, 600,	LUXOR 9225, 9256 9245, 9251, 9254	1800p 1225p	BV6900AS N830EA, RV300, RV310		V600 V880MS V700G	2350p 2600p 3700p
RTV635, RTV660, RTV67 CR1000, CR1200, CR150 CR1800	0 4650p 4100p	SE5100, 6100, 6110, 9100, T 5510, VS400, 440, 500, 505, 610, 5180, VS6190, 700, 900	510, 518, 600, 1400p	9270, 9271, 9273 9272, 928217 9252	1800p 2700p 2500p	RV340, RV350, RV380 REDSON MR100	700p 1700p	V500G, V509G V9680 V300G, V301, V305, V309	2500p 2900p
RTV321, RTV322 RTV338 RTV348	1700p 2800p 2700p	MADRID, SE5140, VS540, V MVS550, 620, VS550, 620, 6 930, 940	30, 640, 790, 2400p	928017, 928077, 92809 928117 9253	1700p 2500p	SABA 2A10, 2A70, 2B20	1400p	V61, V63 V110, V120, V130, V140,	1700p , V210,
RTV404, RTV414 RTV640 RTV750, RTV800, RTV90	3000p 3000p 0 3500p	VS120 VS680 VS160, VS740	2300p 4600p 4400p	9281 9284, 9295, VR3701, VI VR3761	2700p R3721, VR3731, 2100p	4A10, 4B20 6A10, 6A70 8A10, VR6038	2450p 2300p 3150p	TRIUMPH	1500p
RTV810 RTV910 BOSCH BAUER	4400p 4500p	VS170 MVS660, SE6160, VERONA VS6690	3500p	MATSUI VX500E, 800A, 810A, 8	20, 80A, 770B,	CVR6083, VR600, 6600 7006, 7007 PVR6068, 6070, 8070, V	7, 6008, 6009, 1 250 p	VR9500, VR9501, VR9529	
VRH50 VRP20	1000p 1000p	MVS710, 720, 910, SE7120, 720, 800, 810, 910, 920	9120, VS710, 1700p	773B VCRL3, VX730, VX750 VX735, VX755, VX990	1200p 1450p 1500p	6012, 7000, 9010 VHR7000, VR5005 VR6004, 6005, 6011, 60	600р 1500р	A890 A920, VR1970, 2920, 292 7921, 7926, 7931, 7970, 9	
VRP25 VRP30	1000p 3350p	HINARI VXL2, 3, 4, 20, 35 VXL5, V20H	1000p 1050p	VX735A, VX765, VX85 VX600	0 1750p 1100p	6022, 6023, 6024, 7004, 7730, 8011, 8014 VR6018, VR7018		VR400, 410, 450, 510, 513 610, 620, 640, 920, 1920 A930, 932, 935, VR2931,	9, 520, 529, 540, 700 p
VR10 VR30A, VR30B, VR30E, V	/R40A 3350p	VXL6 VXL7 VXL8, 9, 10, 11, 90, VCR34H	1200p 1300p	MITSUBISHI HS303, HS304, HS320, HS306, HS318, HS710	1500p	VR6028 VR7016	2300p 2000p	4935, 4940, 4942, 4945, 5 A935, VR3945, VR3950, V	5935, 7932 1400p VR7959 2450p
DAEWOOD 912, VCR12, VCR30, VCR VCR52	132, VCR50,	HITACHI	1100р	HS307 HS319 HS330	2300p 2300p 2400p	SAISHO VR100, 605, 705, 805, 9 1200, 1600	05, 1000, 1100, 1200 p	A940, VR1925, 1930, 194 440, 449, 530, 535, 539, 5 925, 930, 940, 950	549, 550, 630, 650, 7 00 p
VCP11 RAF	1800p	VT11, 14, 15, 16, 30, 33, 34, 3640, 5030, VTP10, 30 VT7, VT17, VT18, VT19	1000p 2200p	HS400 HS349, HSE31, HSE32, HS411	2900p	VR3300X, VR3600X, VF VR3800 VR3200, VR3500	13650, 1400p 1400p	VR1980, VR7980, VR980 VR2915 VR2970, VR7971, VR975	1100p
8300 8400, 8500	1000p 650p	VT35, VT38, VT39 VT100, 110, 111, 112, 113, 1 125, 128, 220, 225, 400, 405,	410, 413, 414,	HSE30, HSB30 HS338 HSE10, HSE11, HSE20,	2100p 2200p HSE21, HSE41,	VR2000, VR3300, VR36	00 , 1400 p	VR7979 THOMSON	2300p
DUAL EVR101 VR70, VR71, VR74, VR81	2300р , VR90,	415, 418, 510, 518, 520, 525, 626, 725, 726, 728 VT3000	1400p 650p	HSB10, HSB20 HS300, HS301, HS302, HS273	1450p	6500, 6600 SV7300, SV8200, SV83 SV7400, 8400	1600p 00, SV9200 1500p 1600p	TX8000, V309, 316, 320, 34100, 4200, 4300, VX305	T, 306T, 309BL,
VR91 VR85, VR96 VR97	650p 2300p 3300p	VT4000, 4200, 5000, 5500, 5 VT77, 680, 6500, 6700, 6800 8030, 8040, 8100, 8300, 8500	, 7000, 8000,), 8700, 9000.	HS200 HS337, HS347 HSE12, HSE22, MX1	650p 1400p 2100p	SV8100 SAMSUNG	1200p	3301, 312T, 410T, 411T TX8500, V318, 342, 343, 3 4210, 4230, 4260	650p 351, 352, 353, 1250p
VR80, VR92 VR93	650p 2450p	9300, 9500, 9700, 9900 VT8, 9, 56, 57, 570, 575, 576, 588	1000p 580, 585, 3200p	HS411EZ, HS411GZ HSB11, HSB21 HSE50	2900p 2100p 3300p	SVX301, VB900, 910, V 5600, VX510, 511, 520, 614, 619, 629, 710, 712,	616, 626, 627, 717,	V333 V340 V357, VK309LP	1100p 1100p 2300p
EDISON VC2130, 2133, 2135, 2140 2932, 2934, 3122	650p	VT65 VT130, 135, 138, 145, 250, 2 425, 426, 428, 430, 431, 435,	2400p 55, 258, 420, 438, 535, 536.	NATIONAL PANASO NV300, 322, 333, 390, 2	NIC 000, 2010, 3000,	972, SV716, 717, SVX30 520, 610, 616, 617, 619, 710, 971, V1520, 616, 62	03, 305, VB510, 620, 626, 627, 629.	V360, V5500 V364, V4400	2450p 2000p
VK2132, VK2512 VK2436, VK2340 VK2530, VK2532, VK263	2300p 650p 1, VK2541 1600p	VTL30, 301, VTM630, 635, 6 VT52, VT60, VT61E, VT62E, VT640	36 1900p VT63, VT64, 1200 p	7000, 7500, 7800, 7850, 8600, 8610, 8620 NV777, NV330	8170, 8200, 8400, 625p 1150p	910 VB770, V1730, V1770, V VK770, VK8225	/K8220, VX750, 1900p	V368, V6000, V8540 V410, 510, 610, 630, 715, V430, 530, 4340	2450p
VK2632 VK2637 VKH2545	1700p 3050p 2450p	VT168, VT150, VT260, VT49 HEAD) VT530	8 (4 2300p 2050p	NV8050, NV8051 AG1000, AG1050, NV2 NV470, NV480	2800p	VM1560, VN1561 SANYO	2200p	V450 VK300T, VK301T, VK302 VK308P	2300p
VKH2639, VKH2439 FUNAI	3300p	VT522, VTM620, VTM622, V VTM722, VTM822 VT660E	TM720, 1650p	AG6010, AG6015 AG6840 NV100, NV200, NV370,	2500p 2400p NV380,	VTC5000, 5400, 6000, 60 VTC1500, VTCM10, 11, VTC2000, 5100, 5150, 5	500, VPR5000, 20, 21, 25, 300, 5400, 5350,	VM10, VM20	2700p
E11, 1100, VIP1000, 1400 VCR4000, 4500, 4800, 52 6400, 6600, V1, V25	00, VCR5600, 1100p	H.M.V. HV1000, HV2000, HV3000		NV630 NVD80, NVH65 NVF65, NVH75	725p 3400p 3200p	5370, VTCNX10, VTCN) VPR5800 VTC5500, 5550, 9100, 9	K15, 20, 30, 1800p	GRANDAT	TA LTD
VCR4600, VCR5400, VCR VCR5480, 5843, 8007, VIR 6000, 150	5800 1200 p P2500A, 3000A, 2000 p	HV4000, HV7000, HV8000p		NVF51 NVG19 NVJ30, NVHJ33, NVL2	4200p 2300p	9455, 9500 VHR1110, VHR1150, VH VHR2300	1900p	Tel: 0181-9	00 2329
VCR4530, VCR6000, VCR VCR6803	6100, VCR6800, 1300p	VR3605, 3905, 3935, 3943, 3 3985, 3993, 4993	954, 3958, 650 p	31, 40, 130 NVJ35, NVG46	1450p 2100p	VHR3200, 3270, 3100, 3 3310, VHRD500	150, 3300, 3400, 1500p	Fax: 0181-9	03 6126

	PINCH RO	DL	LERS /	VCR	BELT	KITS	5	
Model Price	Model Pri		Model	Price	Model	Price	Model	Price
AKAI VS10, VS9300, VS9500, VS9700, VS9800, VP1100, VP77 VS1, VS2, VS3, VS4, VS5, VS6, VS8, VS9 VS105, 112, 115, 116, 126, 205, 220, 240, 244, 245, 247, 248, 250, 512, 515, 516, VSX9 VS201, VS301, VS303, VS304, VS603,	VHSTJ1, VHSTJ2, VHSTJ3 VHSWJ1, VHSWJ3, VHSXJ3 VBXYB3 VHSEH3, VHSES2 VHSF94 VHSFP2 GRUNDIG BARCELONA, MADRID, MVS500, E	165p 165p 165p 165p 165p 165p	N.E.C. N830, 831, 832, 833, 895 PVC2300, 2400, 740, 744 766 DX1000, 1600, 2000, 300 9014, 9016, 9033, 9034, 1 9055, 9066, 9110, 9120, 9	, 746, 760, 764, 165p 10, N9012, 9013, N9053, 9054,	FM566, FM558, FM560, FM FM574, FM578 FM601, 603, 605, 607, 608, 621, 623, 625, 626, 628, 630 638, 639 SOLAVOX NCVR1000, NCVR5000	165p 617, 619, 620,	FERGUSON 3292, 3V00, 3V01, 3V16, 3V2 8904, 8906 3V23, 8923, 8924, 8932 3V29, 3V30, 8930, 8931, 8933 3V31, 3V32, 8941, 8942 3V35, 3V36, 3V38, 3V39, 3V4 3V42, 3V43, 3V44, 3V45, 3V4 3V54, 3V55, 3V57, 8946, 894	120p 65p 75p 75p 9, 8943, 75p 8, 3V53,
VS606, VS607, VPS8-P82 165p VS125, VS155, VS165, VS220, VS240, VS250, VS512 165p VS22, 23, 25, 35, 37, 38, 53, 66, 75, 422, 425, 426, 427, 462, 465, 467, 465, 965, 967, VSA77 165p VSF260, 261, 262, 265, 270, 274, 280, 290, 410, 440, 400, 455, 480, 490, 497, 560, 599	600, 620, 660, 710, 720, 910, 9105, SE5110, 5140, 6100, 6110, 7120, 91 9120, TVR4000, 4510, 5510, VERON VS500, 505, 510, 520, 530, 540, 550 610, 620, 630, 640, VS650, 660, 680 710, 720, 740, 790, 800, 810, 900, 91 930, VS940, 5180, 5480, 6190, 6690 MVS400, 440, 440, 441, 44 460, 441, 440, 440	00, NA, , 600, , 700, 10, 920, 165p 165p	ORION VH1, VH2 VC150, 180, VH3, 33, 20, 250, 254, 288, 300, 303, 53, 700, 704, 712, 770, 780, 6 2948, 3030, 3312, VHF22 COMB115000, 16000, HV NEVH, NEVHM, NEVHM, VCP, VH04, 30, 103, 300, 400, 416, 512, VH530, 53	312, VH404, 555, 344, 900, 1000, 3, VP2948 165p 703, LVH50, 11, TVP230RC, 358, 360, 362, 2, 535, 536, 600,	SONY SLC5, 6, 7, SL3000, 8000, 80 SLJ10, SLT6ME, SLT7ME SLC9, 20, 24, 30, 33, 44, SLI 11, 20, 25, 30, 60, 100, 20, SLF90E, SLHF150, 850, SLR SLT20ME, SLT30ME, SLT5 BMC100, BMC200, BMC500 SLV201, 202, 301, 302, 401, 802	165p HF100, SLF1, SLF60PS, (88, 95, 0ME 165p 0 165p	3V43, 3V44, 3V58, 3V65, 895 FV11, FV12, FV13, FV14, FV2 FV22, FV32, CV141L FV31B FDELITY HOS200, VCR600, VCR100 VCR100 VTR1000	0.8951.FV10.
AMSTRAD VCR4000, 4500, 4700, 5200, 6000, 6100, 8500, 8602, 8603, 8604, 8700, 8704, 8714, 8800, 8804, 9000, 9340, DD8904, TVR1, 2, 3, 4 VCR7000 AIWA AV66, AV77 165p G700, G900 165p	VS150, 200, 220, 226, 262, 265, 267 310, 315, 320, 326, 345, 380 GOLDSTAR GHV51, 1221, 1232, 1240, 1241, 124 1243, 1244, 1245, 1246, 8000, 8200, 8215, GHVP1240, 1241, 1247, 1248, 1291, 1295, 1295, V296, VQP4000, 4100,	165p 42, , 8210, , 1290,	630, 635, 640, 666, 730, 780, 800, 820, 850, 888, 839, 839, 44, 1012, 1040, 1050, 11120, 1204, 1440, 1500, 1251, 2308, 2204, 2400, 2960, 2970, 3050, 3060, 4012, 4015, 4020, 4300, 4202, 4015, 4015, 4020, 4300, 420, 259, 257, 2586, 2979, 257, 257, 257, 300, 257, 257, 300, 257, 257, 300, 257, 300, 257, 300, 257, 300, 257, 300, 257, 300, 257, 300, 257, 300, 257, 300, 257, 300, 257, 300, 200, 200, 257, 300, 2570, 257, 300, 2570	900, 930, 940, 942, 060, 1070, 1100, 1660, 1800, 2004, 2500, 2600, 2700, 4000, 4008, 4010, 5020, VP10, 200, 5, 1032, 2949,	SLV210, 270, 273, 275, 300, 415, 474, 656, 715, SLV757, SLV255 TELEFUNKEN A920, 930, 932, 935, 940, 96, 1200, VR925, 930, 940, 950, 1920, 1925, 1930, 1940, 195 2930, 2931, 2935, 2941, 296	353, 373, 410, 777 165p 165p 30, 980, 990, 971, 975, 980, 60, 2920, 2925, 30, 2970, 2671,	FINLUX VR2005, VR2010, VR2020, VR2025, VR2040 VR2008 VR3009 FISHER VB57000	105p 160p 140p 245p
ALBA VCR3000, VCR4000 VCR5000, VCR6000 165p AUTHENTIC NB50 BLAUPUNKT RVT100, 200, 202, 222, 224, 301, 306, 307,	4200, 4300, 4301, 4305, 4306, 4310, 4315, 4316, 4320, 4321, 4325, 4326 HINARI V20H, VXL5, VXL6, VXL7, VXL8, VX VXL10, VXL11, VXL19 VXL2, VXL2, VXL2, VXL25	180p	PHILIPS VR6460, VR6920 VR2020, VR2021, VR202 VR6711 VR6540 DV856, 586, VR702, 703, 6880, 6948	165 p 2, VR2023, 165 p 165 p 165 p 6485, 6589, 6785, 165 b	3936, 3945, 3950, 3965, 397 4942, 4945, 4970, 6000, 792 7931, 7932, 7970, 7971, 797 VR1935, VR2915 VR1970, VR1980 VR400, 410, 440, 449, 400, 5 549, 610, 640 VR520, 529, 530, 535, 539, 5	21, 7926, 7929, 29, 7980 165p 165p 165p 510, 519, 540, 165p	VBS3000 FVHP520, FVHP530, FVHP42 FVHP615, 618, 620, 622, 710 721, 722, 725, 730, 840 FVHP905, 906, 908, 910, 911 918 VBR330, VBS7500, VBS7600 VBS9900 VBS3500	, 711, 720, 80p , 915, 916,
309, 311, 312, 315, 316, 317, 319, 320, 326, 404, 414, 434, 444, 478, 707, RTX100 169, RTV211, 214, 321, 322, 348, RTX250, 207, 207, 207, 207, 207, 207, 207, 20	HITACHI VT7, 11, 14, 16, 17, 19, 33, 34, 35, 31 88, 330, 680, 6500, 6800, 5000, 5500 8000, 6300, 8500, 9300, 9500, 9700, 9800 VT8, 52, 57, 61, 62, 63, 64, 65, 85, 81 100, 110, 111, 113, 115, 118, 120, 12 130, 135, 138, 145, 150, 168, 175, 22 250, 255, 258, 260, 400, 405, 410, 41 415, 418, 420, 425, 426, 428, 430, 45	0, 7000, 165p 6, 88, 22, 125, 20, 225, 13, 414,	VR445, VR6442, VR6542 VR6943 DV464, VR2220, 2300, 2: 2340, 2350, 2414, 2480, 4 2489, 2490, 2498, 2840, 6560, 6660, 6860, 6861, 4 N-1700, VR2870 VR2025, VR6580 VR6548, VR6580 VR6548, VR6580	165p 324, 2330, 2334, VR2485, 2486, 6462, 6463, 6464, 6862, 6863 165p 165p 165p	THOMSON SV1000, TX8500, V320, 321 343, 351, 352, 353, 360, 364 400, 510, 520, 530, 540, 620 4200, 4210, 4230, 4240, 426 4400, 5500, 5540, 6000, 854 TX8000, V309, 316, 357, 30 3801, 4100 V333, V340	1, 368, 410, 430, 1, 630, 640, 50, 4300, 4340, 10 165p	FUJITSU HS760, HS750, VGX715, VG FUNAI V1, V25, VCR4600, 4800, 520 6400, 6600, VIP3000, VIP500 VCR4530, 5840, 5843, 6800, 8103, VIP150, 6000 G.E.C.	00, 5400, 5600, 0 160p 6803, 8007, 160p
VCR12, VCR32, VCR52 165p VCR30, VCR500 165p DECCA VR8300 165p VRH8495DK (Pressure Roller Assembly) PS403-40205 350p FERGUSON 300, 3V01, 3V16, 3V22, 3V23, 3V24,	438, 400, 498, 510, 518, 520, 525, 52 580, 585, 588, 640, VT0660, 665, V 775, VTL30, VTLC50, VTM620V, TM 626, 630, 635, 636, 640, 645, 646, 72 725, 726, 728, VTM730, 731, 735, 73 745, 746, VTS80, 85	26, 576, TF770, M625, 20, 722,	40205, DV186, 190, 286, 471, 562, 582, 571, 761, 1 302, 303, 305, 6180, 618, 6290, 6291, 6293, 6362, 6393, 6467, 6468, 6470, 6670, 6676, 6760, 6761, 6975, 86B1, 63SB7, 68SI	291, 292, 486, VR201, 202, 203, 2, 6185, 6285, 6367, 6390, 6391, 6561, 6570, 6581, 6762, 6870, 6970,	VX300, 301, 302, 305, 306, 305, 306, 307, 301, 302, 305, 306, 306, 307, 307, 307, 307, 307, 307, 307, 307	312, 3301 165p , 71, 73, 74, 75, , 90, 96, 97, 0, 500, 509, 165p 165p	4005 V4004 GOLDSTAR GHV1221, 1232, 1241, 1242, 1245, 1246, 1247, 1248, 8210 VCP4100, VCP4130 GHV1290, 1291, 1295, 1296, 4200, 4300, 4301, 4305, 4306 4315, 4320, 4321, 4325, 4326	0, 8215, 80p VCP4000, 5, 4310, 4311,
3292, 8900, 8901, 8902, 8903, 8904, 8906, 8909, 8912, 8922, 8923, 8924, 8925, 165p 3729, 3700, 3791, 3732, 3752, 8930, 8931, 8933, 8940, 8941, 8942, 3742, 3743, 3744, 3745, 3748, 3	I.T.T. VR3605, 3626, 3905, 3906, 3916, 39 3935, 3946, 3948, 3976, 3985, 3986, 3997, 6348 VR3913, 3914, 3943, 3954, 3984, 39 3994 VR3907 VR3907 VR3912, VR3963, VRP3833 VR3912, VR3963, VRP3833	, 3995, 180p	SANYO VHR1100, 1150, 1200, 13 2300, 2500, 2700 VTC5000, 5150, 5300, 53 6000, 6500, 9100, 9300, 72 1, 31, 50, VPR5800 VHR3100, 3300, 3310, 34 VHRD500, 700 VTC3000	165p 150, 5400, 5500, VTCM10, 20, 11, 165p	PRESSURE ROLLER ASSEI 40205, V91, V95 VCR BELT KIT AKAI VP7100, VS9300, VS9500, V97 VS9800	MBLY - PS403- 350p TS 700, 120p	GRANADA VHSAH1, VHSAH3 VHSVH4, VHSWH1, VHSXH VHSYH2 VHSBH1, VHSCH1 VHSBP1 VHSAN3 VHSDS2	100p 1 60p 50p 150p 135p 110p 125p
8947, 8948 165p 3V52 1850, 8951, FV10B, 11R, 13H, 14T, 20B, 21R, 26D, 31R, 32L, 41R, FV42L, 50B, 51R, 52L, VC14H, FV46T, FV43H 165p FISHER FVHP420, 520, 530 165p	VR3927, 3929, 3968 (PRESSURE RI ASSEMBLY) PS403-40205 SVR3799, VR3520, 3701, 3719, 372 3721, 3730, 3731, 3749, 3759, VR37 3781 VR3918, 3919, 3958, 3998 VR670, VR680, VR681 VR3927, VR3977 VR482, VR580, VR681, VR682	0LLER 400p 0, 761, 165p 165p 165p	VHR4100, 4150, 4200, 43 5100, 5200, 5300, 5350, 7500, 7530, 7540, 7800, 8500, VHRD4400, 4410, 4710, 4890, 6700, VHRS VCR100	300, 4350, 4770, 5700, 7100, 7200, 8100, 8200, 8250, 4000, 4600, 4610, 700 165p	VS1, VS2, VS4, VS5 VS10 VSX9, VS105, 112, 115, 116, 20 244, 245, 247, 248, VS250, 512 516 VS22, VS23, VS25, VS35, VS3 VS53, VS55, VS66 VS4, VS6 VSA77	2,515, 300p	VHSAY3 VHSBY3 VHSEY1, VHSEY2 VHSCC1 VHSDP1, VHSFV2 VHFTJ1, VHSTJ2 VHSTJ3 VHSWJ1, VHSWJ2 VHSWJ3 VHSWJ2	125p 100p 70p 100p 80p 150p 65p 120p 85p
EVHP615, 618, 620, 622, 710, 711, 715, 716, 720, 716, 720, 721, 722, 725, 730, 830, 840, 165p, FVHP905, 906, 908, 910, 911, 915, 916, 918, 970, 975, 980, 990, 5000, 5005, 5050, 50575, 5100, 5050, 7500, 7500, 7500, 7500, 7500, 7500, 7500, 7500, 7500, 7500, 9000, 99	VR9720 J.V.C. HR2200, 3300, 3330, 3360, 3660, 41 7700 HR2650, 7200, 7300, 7350, 7600, 76 7650, 7655 HRD110, 111, 120, 121, 140, 150, 18	165p 510, 165p 57, 158,	VC200, 381, 384, 395, 38 800, 2300, 3300, 6000, 6 7750, 8300, 9100, 9300, VC300, 387, 402, 471, 47 483, 486, 488, 496, 500, 583, 584, 585, 8481, VC5 VCA1031 VC600, 651, 681, 682, 68 700, 772, 750, 779, 780,	200, 7300, 7700, 9500 180p 571, 573, 581, 582, F3, VC5W20E, 165p 14, 685, 693, 699, 781, 782,	AIWA AV66 AV77 G700 G900	125p 140p 160p 180p	VHSF51, VHSF52 VHSFG1, VHSF64, VHSF63 GRUNDIG MVS400, MVS440, VS400, 4 400, 456, 450 VS180, 200, 220, 226, 262, 2! 2X40800, 0850, 0880, 1600, 2200, 2280, MVS20001	130p 180p 10, 440, 441, 55p 65, 267, 2000, 2080,
FIDELITY HQS200, VCR100, 600, 6100 165p VTR100 165p FUJITSU HS760, VX715, VX720D 165p	160, 225, 257, 455, 565, 566, 725, 7: HRP50 HRD520, 540, 550, 580, 600, 620, 6: 650, 660, 830, 860, 960, HRS5800 HRD170, 180, 210, 230, 300, 320, 32 337, 350, 370, 400, 430, 440, 441, 4: 530, 700, 750, 950, HRS5000, 5500,	165p 37, 641, 165p 21, 330, 70, 500,	VC782MK2, 783, 785, 78 7810, 7822, VCT72, VC6 VCA100, 102, 104, 131, 211, 234, VCA303, 501, 6 VCD801, 802, 851, 852, 8 VCT73 VC220 VCA10, 30G, 60, 103, 10 505, 605, 615, 1031, VC	F3, VC6V3, 140, 170, 202, 203, 502, 5011, 381, 882, VCM73, 165p 165p 5, 106, 211, 244, 3806, 810, 815,	VCR40000 VCR5000, VCR6000 AMSTRAD TVR123, VCR4600, VCR4700, VCR5200 VCR7000 VCR7000, 6100, 8600, 8602, 86 8700, 8704, 8714, 8800, 8804, 9	9000, 9340,	VS150 VS310, VS315, VS320, VS32 VS345, VS380 HINARI VXL2 VXL7, VXL8, VXL9, VXL10 VXL4, VXL35 VXL5, VXL6 VXL3, VXL20	6, VS340, 85p 80p 180p 70p 160p 90p
V1, V2, VCR4000, 4000, 4530, 4540, 4600, 4800, 5200, 5400, 5800, 5840, 5843, 6000, 6400, 6600, 6800, 6803, 8007, 8103, VIP150, 3000, 5000, 6000 165p VIP1000, VIP1400 165p	LOGIK VR956 LUXOR 9245, 9251 8252, 8253, 8256, 8286	180p 165p 165p	VCH80, 865, 910, VCS10 610, VCT1314, 5313 SAISHO VHL3, VR1000, VR2000, VR3800	165p	AUTHENTIC N850 BLAUPUNKT RTV100	120p 120p	HITACHI VT11, 14, 17, 19, 33, 34, 35, 3 330 VT5000, VT5500 VT7000, VT8000, VT8300, V VT6800, VT6500, VT6800, VT	88, 39, 88, 165, 90p 120p 18500 60p 9300, VT9500.
V4004 165p GRANADA VHSAH1, 3, VHSVH4, VHSWH1, VHSXH1, VHSYH2 VHSAN3, VHSBP1, VHSVN1, VHSVN2 VHSAY3, VHSX42 VHSBH1, VHSCH1, VHSFS1, VHSFS2, VHSEH2, VHSEH3 165p	9254 9255 9270, 9271, 9273, 9274 9272, 928017, 928077, 928097, 928 929017, 929117, 929317 9281, 9283, 9284, 9292, 9295, VR37 3721, 3731, 3761, 3781 MATSUI VX850	165p	SALORA SV6500, SC6600 SV7300, SV8200, SV830 SC9300 SV7400, 8400, 8420, 850 8600, 8620, 8700, 8710, 9500, 9600, 9810 SV8000, SV8100 SV601, SV800, SV900, S	165p 00, 8520, 8550, 8720, 8800, 8830, 165p 165p 6V901, SV6910,	RTV200, RTV224 RTV202, RTV200 RTV322, RTV248 RTV306, 307, 309, 310, 311, 31 434, 444, 707 RTV211, RTV214 RTV324, RTV325 RTV315, RTV316, RTV319, RT RTV317 RTV317, RTV333, RTV338, RT	135p 140p 65p V320, 50p	VT52, VT57, VT61, VT62, VT VT65, VT85, VT86, VT640 VT8000 VT100, 110, 111, 113, 115, 1 128, 130, 135, 138, 145, 150, 225, 250, 255, 258, 260, VTU I.T.T. VR3605, VR3905, VR3935, V	105p 120p 18, 120, 125, 168, 175, 220, 30 110p
\text{VHSSY3, VHSCC1} \text{1565} \text{1565} \text{1565} \text{VHSDS2, VHSNY2} VHSDP1, VHSFP2 (Pressure Roller Assembly) F9403-40205 \text{VHSFQ2, VHSFY2, VHSFG3, VHSFG4, VHSFG4, VHSFG4, VHSFG4, VHSFG4, VHSFG5, VHSFG4, VHSFG5, VHSF	MITSUBISHI HS200, HS300, HS301, HS302, HS3 HS304, HS310, HS320, HS300, HS700 HS306, HS307, HS318, HS319, HS3 HS338, HS347, HS349, HS400, HS4 HS411, HS412, HS421, HS710, HS1 30, HSE10, 20, 30, 70	303, 165p 337, 410, B10, 20, 165p	SV6700, SV8710, SV875 SV6800, 6900, 8820, 885 8920, 8970 SAMSUNG SV716, 717, V8510, 520 619, 620, 626, 627, 629, 520, 616, 617, 619, 626, SVX301, 303, 305, 307.	60, 8870, 8910, 165p . 610, 616, 617, 900, SV910, VI510, 900, 910, VX510, 627, 629 165p 319, 322, VB710,	BONDSTEC BT100 BT300, BT310 BT350 BT50 BOSCH-BAUER VRH50	110p 170p 140p 150p	VR3913, VR3914 VP3926, VR3906, VR3916, V VR3946, VR3948, VR3976, V VR3995, VR3997, VR6948 VR3927, VR3977 VR3993, VR3994 VR3963 VR3912 VR3917 VR3928, VR3968	70p R3926, R3986, 65p 65p 75p 65p 130p 150p
SEE PAGE 703	HSE11, HSE22, HSE21, HSE22, HS HSE32, HSE41, HSE51, HSE52 NATIONAL PANASONIC NV100, 180, 300, 332, 333, 340, 366 688, 777, 788, 3321, AG6010, 6015, 6200, 6400, 6800 NV230, 250, 260, 280, 370, 380, 430 433, 400, 460, 465, 470, 480, 630, 61	165p 6, 600, , 6100, 180p 0, 431,	770, 971, 8220, 8225, V1 18225, VX710, 712, 720, 790, 825, 970, 971, 972, SANSUI SVR5030 SVR7010	730, 750, 770,	VRH60 VRP20 DAEWOOD VCR12, VCR32, VCR52 VCR30DAP VCR30DBD, VCR500BD, VCR5 VCR50DFP	140p 180p 110p 150p	3721, 3730, 3731, 3749, 3751 3721, 3730, 3731, 3749, 3751 3781 VR3908 VR3918, VR3919, VR3958, V J.V.C. JR3300, HR3330 HR3360, H	9, 3761, 90p 180p 115p R3660,
FOR MORE GRANDATA	770, 780, 810, 830, 850, 870, 890, 2010, 3000, 7000, 7200, 7200, 8000, 8000, 8200, 8300, 8400, 8600, 8610, 8620, NVG14, NVG7, 10, 12, 15, 18, 30, 1; AG1000, 1050, 1200, 1500, 2100, 2: 6810, NVH70, NVG120	000, , 8150, , 30, 400, 200, 165p	FM350, FM352, FM355 FM361, FM362, FM363, FM391, FM392, FM394, FM464, FM468, FM561 FM484, FM485 FM585, FM602, FM604, FM627	FM461, FM462, 165p 165p FM622, FM624, 165p	DECCA VR8300 VRH8945DK DUAL VR4430	90p 80p 90p 75p	HR4100 HR7200, HR7300 HR7350, HR7600, HR7610, H HR7665 HR7700 HRD110, HRD111, HRD120, HRD225 HRD225	130p 70p 1R7650, 75p 75p HRD121, 90p 250, 257, 455,
BARGAINS	AG840, NVH65, 75, NVJ30, NVL2 25, 28, NVG300, NVF65, NVF70, NV NVFS100, NVG19, 20, 25, 33, 40, 5 NVD48, NVD80, NVG21, NVG45	VFS1,	FM600 FM204, 303, 304, 314, 33 376, 384, 386, 388, 404, 489		VR91, VR93, VR97 VR70, VR71, VR74, VR81, VR9 VR80 VR96		565, 566, 725, 755, HRP50 HRD170, 180, 210, 230, 300, 337, 350, 370, 400, 430, 440,	320, 321, 330, 441, 530, 700,

Not much cheer

ews in the brown goods field has been pretty dismal of late. Take Philips, which seems to be a perennial walking wounded case. The company had appeared to be on the mend after a worldwide costcutting programme which was started five years ago when Jan Timmer took over as chairman. But, following a sharp profits fall, with the company's first quarterly loss since 1992, a further shake up is being undertaken. The difficulty is that the company operates in a mature market, in which prices are falling at an annual rate of six per cent. Manufacturers are competing by cutting costs to gain a larger share of static demand. It's not a situation in which any firm that does its own manufacturing can achieve much.

Philips' latest plan involves an overall loss of 6,000 jobs in its consumer electronics business, with far greater reliance placed on a group of external suppliers which are referred to as "a cluster of dedicated subcontractors". This is an approach that was pioneered many years ago by major Japanese manufacturers. Rather than make everything yourself, you rely on subcontractors who, in return, rely on you for their main source of work. It is hardly a cosy arrangement: the whole point seems to be that the major firm can exert pressure on its subcontractors, thereby - in theory – achieving optimum efficiency and cost-effectiveness. What happens when lower and lower prices are demanded for subcontracted work is not made clear. The whole edifice could collapse. However that might be, this is the course on which Philips has now embarked. The company is also to carry out distribution, sales and marketing on a regional rather than a national basis, and has said that it will not support Grundig's losses after this year. But Philips' chief financial officer Dudley Eustace has said that it has "no intention of abandoning the television and audio business".

One has to assume that the subcontracting will also be done on an international basis, as major Japanese firms have had to do. There is a sense of déjà vu about this, though one wishes Philips well—it is still one of the major contributors to research and development in our industry.

Toshiba, which has also just appointed a new top man, Taizo Nishimoro, provides an interesting contrast. Mr Nishimoro thinks that the western emphasis on sales and marketing rather than engineering is the way to go. So the whole industry seems to be moving full circle. Taizo Nishimoro has become the first non-engineering president of Toshiba. Where the company cannot compete effectively on its own, he intends to seek international alliances or go for closures. He put it as follows. "The technology and the businesses we are engaged in are getting more complex. In these circumstances, if we try to do everything ourselves we are making a mistake." Here's how Minoru Makihara, became head of Mitsubishi Corporation four years ago, sees it. "Technologies are now moving so fast that it is impossible for the top manager to know all the details. Companies are now looking for generalists who can understand broad changes, delegate and provide leadership." Corporate change indeed amongst our oriental colleagues.

Major firms the world over are facing similar problems and having to adopt similar policies. In a mature market such as consumer electronics, you have to rely on marketing to squeeze the last little bit of advantage from such developments as Dolby sound and other added value features.

The consumer electronics industry has been hoping that the digital video disc would come to its aid and get sales and profits moving ahead. The DVD was due to be released this month, but we are unlikely to hear much more about it yet awhile. There's no problem with the technology: the difficulty is with licensing and software. There is obviously no point in launching it without adequate software support. But the movie companies, which control most of the required supply of software, are concerned that a recordable version of the disc, due in a couple of years' time, would be a gift to pirates worldwide. Concessions have been made by the electronics industry, in particular that different disc formats should be used in different parts of the world. But a curious problem has arisen. The other main use of the DVD is as a ROM in computer systems. For this application flexible copying facilities are a major requirement. But the movie companies are unwilling to agree to this. At present the situation is deadlocked and the great hope of an autumn launch, all important for sales, has had to be postponed. Next year maybe? It's a great pity, since the DVD has much to offer.

There's a lot of sad news on the retail side as well. Colorvision has been placed in administrative receivership, with a threat to 800 jobs at its 76 stores, while the Rumbelows shops that were taken over by computer retailer Escom have suffered a similar fate. The receivers have closed down the UK chain with the loss of 850 jobs at some 150 stores.

Nothing seems to be going right just now.

COPYRIGHT

© Reed Business Publishing Ltd., 1996. All rights reserved. No part of this publication may be reproduced, stored or transmitted in any form or by any means without the written permission of the publishers.

All reasonable precautions are taken by *Television* to ensure that the advice and data published are reliable. We cannot however guarantee it and we cannot accept legal responsibility for it.

CORRESPONDENCE

All correspondence regarding advertisements should be addressed to the Advertisement Manager, "Television", Reed Business Publishing, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. Editorial correspondence should be addressed to "Television", Editorial Department, Reed Business Publishing, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

INDEXES AND BINDERS

Indexes for Vols. 38 to 45 are available at £3.50 each from SoftCopy Ltd., who can also supply an eight-year consolidated index on computer disc. For further details see page 830.

Binders that hold twelve issues of *Television* are available for £5.50 each from Television Binders, 78 Whalley Road, Wilpshire, Blackburn BB1 9LF. Make cheques payable to "Television Binders".

BACK NUMBERS

Some back issues are available at £2.75 each. For further details see box on page 798.

SUBSCRIBER SERVICES

For any enquiries about subscription or newsagent copies, please contact the relevant numbers below:

Subscriber Enquiries

Telephone: 01444 445 566 Fax: 01444 445 447 Credit card orders: 01622 778 000

Address: Television, Subscriptions Dept, PO Box 302, Haywards Heath, West Sussex RH16 3YY, UK.

Cheques made payable to: Television

Subscription rates:

UK £28.00 per year

Overseas£40.00 (Airmail – Europe)Overseas£52.00 (Airmail – Rest of

World)

NEWSAGENT ENQUIRIES

Retail distribution is handled by MarkerForce (UK) Ltd. Telephone: 0181 652 8171

Fax 0180 652 8997

ISSN 0032-647X



TELETOPICS

Digital set-top box technology

The BBC has asked the government to license digital settop box technology to ensure that universal decoders become available for digital TV services from satellite, cable and terrestrial sources. It wants digital operators to declare in advance the conditional access system they propose to use, and legislation to guarantee that the industrial property rights for the manufacture of a decoder box and encryption system are offered under licence to all manufacturers and broadcasters on fair, non-discriminatory terms. The legislation should, the BBC adds, be enforced by Oftel, with the ITC given extra powers to ensure digital standardisation.

In a move endorsed by the BBC and the ITC, the Voice of the Listener, the National Consumers Council and the Consumers' Association have written to Ian Lang, the President of the Board of Trade, asking for standardisation of digital TV equipment. Major

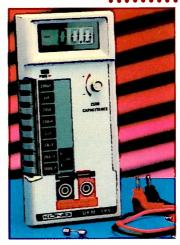
European pay-TV companies have met the European industry commissioner Martin Bangemann to discuss the prospects of a single digital decoder. The meeting included Bertlesmann, BSkyB, Canal Plus, CLT, Deutsche Telekom and Vebacom.

Meanwhile BSkyB has sent a confidential digital decoder specification to manufacturers and has said that it expects decoders to be available in quantity by September 1997, when it proposes to launch a 200-channel UK satellite TV service. The company is considering expansion to 500 channels in the longer term, giving near video-on-demand in addition to a large number of different channels. BSkyB's decoder specification includes forecasts on decoder demand in each year following the start of its service. There are no plans to appoint exclusive manufacturing rights. BSkyB is particularly interested in the prices that

manufacturers can suggest. It hopes that the decoder boxes can be made available for around £200. The specification is understood to include compatibility with terrestrial TV services.

BSkyB has been in touch with various groups, including British Telecommunications and Barclays Bank, to establish whether they would be prepared to subsidise the initial retail cost of the decoder boxes in return for an involvement in developing interactive services such as home shopping and banking.

It seems that the two leading digital satellite TV groups in Germany, Kirch and Bertlesmann, have reached agreement on a standard digital TV decoder. The two groups had previously been working on the technology separately. Kirch's service, DF1, in which BSkyB has a 49 per cent stake, is already in operation. Bertlesman plans to start its digital TV service this autumn.



The Konig DKM190 digital capacitance meter, which is available from SEME Ltd., Unit 2, Saxby Road Industrial Estate, Melton Mowbray, Leicestershire LE13 1BS (phone 0166 465 392, fax 0166 463 976). The newly-developed meter can check capacitance values from 1pF to 20,000µF with an accuracy of 5 per cent. It comes complete with carry bag, test leads, 9V battery, fuse and instruction manual for £73.

Latest news on Channel 5

Channel 5 Broadcasting is to employ some 7,000 engineers to carry out retuning in areas where the service will use ch. 37. Retuning has already started and is expected cost rather more than C5B originally estimated – the figure is now put at around £70m. Following the trial run covering an area of 10,000 houses in Wallington, Surrey, C5B has conceded that its original plan required amendment.

The retuning exercise will be backed by an extensive advertising campaign which will include 3,000 "Give Me 5" posters and promotions in Blockbuster Video and Thorn and Granada rental outlets. Retuners will wear a branded uniform and carry a special identity card. C5B has reached an agreement with the Association of Chiefs of Police to vet all retuners to ensure that none have a criminal record.

A seminar on C5 was held at the Confederation of Aerial Industries' recent trade fair. The CAI has a video of the seminar available at £15 plus

VAT. The CAI can be contacted at Fulton House Business Centre, Fulton Road, Wembley Park, Middx HA9 0TF (phone 0181 902 8998, fax 0181 903 8719).

Multiview (UK) Ltd.,12 Thorkhill Road, Thames Ditton, Surrey KT7 0UE (phone 0181 398 6663, fax 0181 398 0177) has launched two products to help with Channel 5 retuning problems, a signal generator and a "tune in module". The signal generator, which has a trade price of about £150, generates a test pattern and has one button preset to ch. 37. The tune in module is an external modulator for use where existing equipment has a limited tuning capability. It has a tuning range of ch. 32-49 and is preset to channel 44. There are two versions, for use with satellite IRDs and VCRs. The former has a trade price of about £11 and uses the LNB supply. The latter, with a trade price of about £13, uses an external power supply.

Terrestrial digital TV trial

The BBC, BT and Pace Micro Technology are conducting live trials of a terrestrial digital multiplex TV system, claimed to be the first working system of its type in the world, using the Crystal Palace and Pontope Pike transmitters. BBC-1, BBC-2 and BBC World are being transmitted as a multiplexed digital signal that includes data for an electronic programme guide. The signals

conform with the relevant
European standard and are being
received using prototype receivers
developed by Pace in conjunction
with BBC Research and Development – the trial service will not
be made available to the public. BT
is using the transmissions to test
interactive services.

The test transmissions started with widescreen coverage of Trooping the Colour.

Business news

Philips is to reorganise its consumer audio and video businesses with a loss of some 6,000 jobs. The idea will be to employ a group of external specialist producers for capital-intensive parts of its manufacturing operations.

Distribution, sales and marketing will also be affected – they will be run on a regional basis. As an example of what will be involved on the manufacturing side, there's a plan to reduce the number of current TV chassis from twenty five to just six.

The company has emphasised that it has no intention of abandoning the television and audio fields – an interactive TV set that gives access to the Internet is to be launched in

the USA this October.

Talks that were to lead to a takeover of Amstrad's digital telephone business by Psion, the hand-held computer manufacturer, have been called off following consideration of a report from the company's financial advisers.

The Lit-On Technology
Corporation of Taiwan, which is the world's fifth largest computer monitor manufacturer, is to build its first European plant in Lanarkshire, creating over 1,000 jobs in the next two years. Planned output is a million units a year. The recent decision by fellow Taiwanese company Chunghwa Picture Tubes to establish a plant in Lanarkshire contributed to Lit-On's decision.

Magneto-optical discs

Fujitsu plans to start production of a new generation of computer memory discs with increased storage capacity next year. The magneto-optical discs will mainly challenge the DVD-ROM disc, which is due to become available next year. Fujitsu's discs will be able to store between 6-7Gbytes of data,

which can include video, in comparison with the DVD-ROM's 2.6Gbytes. The company hopes that the discs will be used for multimedia services such as video-on-demand and interactive TV. Seven other electronics companies, including Hitachi, Philips, Sharp and Sony, are to manufacture the discs.



Teletest for PC Monitors

The newly-released Teletest PC monitor test pattern generator (right), which is available from Ozan at £149.95 plus VAT. This makes it cheaper and more convenient than carrying a second-hand computer around! Hand-held and battery powered, the Teletest PC generates six different test patterns and plugs into the monitor directly.

Ozan has also relaunched the Teletest 2 test pattern generator (left) for TV sets and VCRs. It now provides six test patterns with S video as well as composite video, RF and line AV outputs.

For a free information pack, Freecall Ozan on 0500 009 070 – or check out the new web page at ozan.co.uk.

Sharp's Surround Sound

In addition to models that feature Dolby Pro-Logic Surround sound, Sharp is about to launch several models that use a surround sound system called SRS (Sound Retrieval System). This was developed by the Californian company SRS Labs. The system works by combining the left and right channels of a stereo signal to produce a sum signal (L + R) and also subtracts one signal from the other to create two difference signals (L - R) and (L - R) and control such as dialogue) and provides spatial information while the difference signals provide directional cues. The result is surround sound from a two-speaker system, with a wide listening area.

Sets using the system will be labelled "3-D Surround Sound". Models will include the 21in. 51CS05H at £430, the 25in. 59CS05H at £530 and the 28in. 66CS05H at £630 (suggested retail prices).

New Type Service Manual

The significant feature of the first of a new type of service manual just released by Grove Farm Publications is the fact that it has been prepared for the service industry by a service engineer (Steve Beeching). It covers most of the Grundig satellite receivers that were made in the company's UK factory between 1994 and 1996, including models in the Grundig, JVC, Matsui and Philips

ranges, and was produced with the co-operation of Grundig International – for those who do not have a Grundig account.

The aim is to present the technical information in a way that will be of greatest help to service engineers, with technical specifications, circuit descriptions and block, circuit and layout diagrams. The circuit and layout diagrams are clear and are

gridded so that the engineer can find what he wants with the minimum distraction while working on the equipment.

The manual costs £15 plus post and packing and represents good value. Enquiries to Grove Farm Publications, Grove Farm, Long Lane, Barnby In The Willows, Newark, Notts NG24 2SG (phone 01636 626 829, fax 01636 626 767).



Reports from David C. Woodnott and Eugene Trundle

Sanyo VMD3P

There was no viewfinder picture though the machine was otherwise OK. We traced the cause of the fault to leakage in the line drive coupling capacitor C9911. This was a very misleading fault, because the waveform at the base of the line output transistor seemed to be good while the waveform at its collector was ragged. This could lead one to suspect the line output transformer and its periperal components. E.T.

Canon E200E

This one came in because there was playback picture mistracking. The cause was a loose slant pole, something that's not uncommon with this model. It was easy enough to put right: we reset the pole's position, then secured it with a Loctite product. After this the machine seemed to work fine.

When we tested it however there was a problem at tape end. The machine entered the caution mode, with a flashing symbol in the viewfinder. No functions were available until the tape had been ejected and reinserted. At the end of rewind the same fault recurred.

This prompted a suspicion that the cassette LED had failed – rare perhaps, but not impossible. The lamp and the connecting ribbon cable were both OK however. Use of another camcorder to view the LED confirmed that it was working. What next? – there were still no outputs from the tape-end sensors. The only other item in the chain, the gooseneck baseplate which carries a clear plastic lens assembly to direct

Camcorner

the light from the LED into the cassette, turned out to be the cause of the trouble. The plastic light-bending unit was deformed, probably because of heat during a previous soldering operation. Beware! D.C.W.

JVC GRM3F

There was no camera operation. This was simply because the camera head section had become detached from the deck section, no doubt as a result of an impact. Refitting the connector restored all functions. **D.C.W.**

Canon UC10E

Playback was OK with this 'upright' model, but there was no camera E-E picture. The cause of the fault lay with the sensor PCB assembly which, having a ceramic-based substrate, is unfortunately not repairable. Capacitor failure had caused print damage. The problem is becoming a serious one with models that use this form of construction. We've had similar faults with Model E6E and others. A new board is required, at around £120 trade! D.C.W.

Panasonic NVS500

All functions except for zoom and autofocus worked correctly. The cause of the fault was a damaged ribbon cable at the connection to the zoom motor, possibly the result of impact damage. A new cable put matters right. **D.C.W.**

Sanyo VEMS1P

As with several models these days, electrolyte leakage can cause various fault symptoms, necessitating replacement of all the surfacemounted can electrolytics on the main PCB. A quick check on the situation, without need to remove the case, is to examine the video signal waveform while playing back a previously recorded tape: note especially any rounding off or crushing in the sync pulse area – this is a sure sign that all is not well.

It's easy to get confused when replacing the capacitors in this model as there is an extra, marked space for a capacitor that's not

fitted. Note this position before you start removing the old capacitors – the layout detail in the manual is not too clear (both sides of the PCB are shown as seen from the same side, requiring some mental agility in getting things right when you turn the board over). **D.C.W.**

Sanyo VMD90P

The reported fault was that the camera E-E picture flashed on and off erratically, and that an E-E picture was seen dimly even in the playback 'stop' mode, which is normally blank. Tape playback was OK. Internal inspection showed that the iris motor had moved from its normal position, doubtless because of an impact – it sits only a few millimetres behind the front of the case. We had to fit a new lens assembly, as the motor is not available separately. The result was a fairly expensive repair.

Note that the lens assembly for Model VMD90R has a different iris motor. A few days after this repair another Sanyo came in with an E-E picture showing in the VTR mode! Another lens unit was required. D.C.W.

Chinnon VC1500

Mechanical failures are common with this mechanism, which is very similar to the Amstrad VMC100 and various JVC decks. One we had in recently had failed during eject, and as a result had damaged the intermediate gear. The cause of the failure had been the spring plate beneath the take-up guide becoming loose. The mechanism had then jammed, causing the fault and the damage to the intermediate gear. Although the gear costs only a few pounds, you have to dismantle most of the loading ring gear and head drum assembly to fit it. Retiming is straightforward - in comparison with some later mechanisms! D.C.W.

Sony FX Series

For no power up, check the connections between the DC-DC converter and the main PCB. Impact damage can detach the socket pins from the PCB. **D.C.W.**

VC	RBE	LT KIT	S/R	EPLACEM	EN.	ΤV	IDEO	LAMP	S
Model	Price	Model	Price	Model	Price			del Pri	
HRD520, 600, 620, 637, HRD540, 550, 580, 660, HRS5800	641, 650, 830 95p 860, 960, 130p	VR6010, VR9010 VR6020, VR6022, VR602 VR7730 VR6024	70p 3, VR6028, 75p 75p	Models & Description	Order Code	Price	0	N/OFF MAIN SWITCHES	I
KENWOOD KV901 KV903	70p 90p	VR6520, VR6540, VR656 VR6710, VR6720, VR673 VR6720, VR6730, VR676 VR6780	0 90p 5, VR8720 130p	UNIVERSAL VIDEO LAMP 9V 80mV (310mm WIRES)	VL01	25p	GRUNDIG PART NO: USED ON:	29703, 29102 C7500, C7500TT, C	
LOEWE OC11, OC40 OC410, OC420, OC440, OC50, OC55, OC60, OC	95p OC460 130p 65, OC70,	SAISHO VR2000, VHL3 VR3800	90p 75p	PANASONIC VIDEO LAMPS	VL02	35p	PRICE: £2.25	C8712, C8714, C885 M68-190/99, M70-1 ST66-1602, T55-34	95, P40-345,
OC75 LOGIK VR955	120p	SALORA SV6500 SV6600 SV8000	100p 150p 120p	SHARP VIDEO LAMPS	VL02	35p	ITT PART NO:	13/1074	
LUXOR 9245, 9251 9252 9253	130p 140p 140p	SV8100 SV8500, SV8520, SV950 SV7400, SV8400, SV842 SV6700, SV8710, SV875 SV6800, 6900, 8810, 882	0, SV8550 120p 0, SV9700 120p	HITACHI 5381682 (VT63, VT64) VIDEO LAMPS	VL04	13 <mark>5</mark> p	USED ON:	CP0200, 0211F, 032 0341/14, 0345F, 035 0361/1, 9350, CT05 0500T	51/1, 0361,
9254 9255 9256 9270, 9271, 9273, 9274 9272, 9280	100p 130p 130p 130p 115p 140p	8920, 8970 SV8600, 8620, 8700, 872 9810 SAMSUNG	95p 0, 8830, 9600, 130p	AIWA, AKAI, ALBA, AMSTRAD, BLAUPUNKT, FERGUSON,	VL05	150p	PRICE: £3.00 PART NO: USED ON: PRICE: £2.00	LFC 005 CVC40	
9281, 9284, 9285, 9292, 3731, 3761, 3781	VR3701, 3721, 95p	SV716, 717, V1616, V162 VX617, VX619, VX626, V VB520, 510, 610, 616, 61 627, 629, V1510, 520, 611	X627, VX629 85p 7, 619, 620, 626,	FIDELITY, FISHER, FUJITSU, FUNAI, G.E.C., GOLDSTAR, GRANADA, GRUNDIG, HINARI,			MATSUI/SAIS USED ON:	MATSUI-2190, SAI	SHO-
WX850 MITSUBISHI HS200 HS300, 301, 302, 307, 3	75p	VX510, 520 VB900, VB910, V1900, V PX980, 981, 982, SE9001 SVX307, 319, 322, VB77 V1770, 790, 8220, 8225,	1910 110 , SV9001, 0, 8220, 8225, VK8220, VPX31,	HITACHI, ITT, JVC (HRD SERIES), MATSUI, MITSUBISHI			PRICE: £2,00 PHILIPS		
349, 411, 412, 421, HSB 20, 30, 70 HS303, HS304, HS306, HS400, HS700	10, 20, 30, HSE 10, 150p HS307, HS330, 150p	VX750, VX790, 8220, 822 SVX301, 303, 305, SX73 V1730, 710, VX712, VX7 972 VX9880	01, VB710, 971,	NEC, ORION, NATIONAL, PHILIPS, SAISHO, SALORA, SAMSUNG, SANYO, SHARP,			USED ON: PRICE: £0.95	K30, K35, K40, KT3	KT4
N.E.C. N830, N831, N832, N83 N895	130p 3 100p 80p	SANYO VTC5000, 5150, 6000, 65 20, 21, 30, 31, 50	75p	SIEMEN, SONY, TELEFUNKEN, THOMSON, TOSHIBA	·		PART NO: USED ON:	(POWER SWITCH - SWITCH) KV1612 MK1, KV16 KV1614, KV2052, K	12 MK2,
PVC2300, PVC2400 DX1000, 1600, 2000, 30 9014, 9016, 9033, 9034, 9066, 9110, 9120, 9510, 9610	180p 00, N9012, 9013, 9053, 9054, 9055,	VTC5300, VTC5350, VTC VPR5800 VTC5500 VTC9100, VTC9300 VTC1100, 1300, 1500, 11	100p 95p 220p 00, 1150, 1200,	AKAI, GRANADA (VHSTJ2), HITACHI (VT3000), ITT (VR3912,	VL01	2 <mark>5</mark> p		KV2062, KV2068, K KV2216, KV2252, K KV2704, KV2705, K	V2212, V2256, V2706,
NATIONAL PANASO NV300, NV332, NV333, NV366	NIC NV340,	1300, 1500 VHR2100, VHR2300, VHF VHR2700 VHR3100, 3300, 3310, 34 VHRD500, 790	150p 00, 3700, 3800, 110p	VRP3833), JVC (HR2200, 3300, 3330, 3660), MITSUBISHI (HS200), TELEFUNKEN (VR510,			PRICE: £2.25 PART NO:	KV2752PE3, KX20F KX20PS2, KX27PS (POWER SWITCH -	1
NV777, NV788 NV2000, NV2010, NV30 NV7000, NV7200, NV78 NV8600, NV8610, NV86 NV230, 250, 280, 430, 4	100 95p 120 145p	VHR4100, 4150, 4200, 43 5100, 5200, 5300, 5350, 5 7500, 7530, 7540, 7800, 7 8250, 8500, VHRO4400, 4 4610, 4710, 4890, 6700	5700, 7100, 7200, 7810, 8100, 8200,	519, 610), THOMSON (VK300, 305, 306, 3301), FERGUSON (3V00, 16, 22, 24, 3292, 8900,			USED ON: PRICE: £3.00 PART NO:	SWITCH) KV2022, KV2024 (POWER SWITCH)	
465, 470, 730, 770, 810, 1050 NV370, NV380, NV480, NV830, NV850 NV600, NV688, AG6010	125p NV630, NV780, 100p	SHARP VC200, 384, 385, 386, 389 9500, 9700 VC7300, VC7700, VC7750	100p	8901, 8902, 8903, 8909, 8912, 8922, 8925)			USED ON: PRICE: £8.00 PART NO:	KV1810 MK1, KV18 KV1820, KV1822, K (POWER SWITCH 2	V2000 MK1
NVG7, 10, 12, 14, 15, 18 NVH70 NORDMENDE	, 30, 130, 400, 70p	VC8000 VC8300 VC300, 387, 471, 473, 48 488, 496, 8481	150p 150p 1, 482, 483, 486, 80p	BLAUPUNKT, ORION (VH1, 2A), NATIONAL (NV200, 2010, 3000,	, VL02	40p	USED ON: PRICE: £2.00	KV1400, KV1440, K KV2060	V2040,
V100, V140 V1000M, 1005M, 1205, 1305, 1403, 1405, V1500 1805K, 2000D, 2405, 25 V3405H, 3105, 4405H, 5	DP, 1503, 1505K, 00H, 3000H, 000, 8005, 900,	VC402, 500, 571, 573, 58 585, VCSF3 VC600, 651, 682, 684, 68 VC6F3, VC6V3 VC772, 779, 781, 782, 781	5, 693, 783, 70 5, 786, 793, 800,	7000, 8150, 8200, 8400, 8600, 8610, 8620), SHARP (VC2300, 6000, 6200, 6300, 7300, 7700,			PART NO: USED ON: PRICE: £2.00	(POWER SWITCH 2 REMOTE SWITCH) KV2020	
905 V1001, 1005, 1015, 1029 1055, 1065, 1105, 3005, 503 V101, V102, V103, V112	304, 5005, 502, 80p	7810, 7822, VCA100, VC, 140, 170, 202, 203, 234, 5 VCD806, 810, 815, VCH8 VC51000, VCT310, 410, V VCTS312	01, 602, 5011, 0, 865, 910,	8000, 8300)			PART NO: USED ON:	2 PIN (FUNCTION S KV1612 MK1, KV16 KV2052, KV2056, K KV2215, KV2216, K	12 MK2, V2212,
V301, V302 V110, V333 V1500T, V2000B, V2000 V250, V460, V9460, V20 V20035543	90p 110p P, V400H 95p	SIEMENS FM350, FM352, FM355 FM484, FM485 FM391, FM392, FM394, F	60p 55p	AKAI (VS10), GRANADA (VHSXJ3), ITT (VR3993, 3994), JVC (HR2650, 7600, 7610, 7650,	VL06	40p	PRICE: £0.35	KV2256, KV2704, K KV2706, KV275PE3 (4 PIN FUNCTION S	V2705, , KV2756PE3
V300, V303, V380 V500	75p 75p	FM391, FM392, FM394, F FM461, FM464, FM468, F FM361, FM362, FM363, F	M561 150p	7655), TELEFUNKEN (VR530, 535, 539, 550, 630, 650), THOMSON (V309, 316, 357,			PART NO: USED ON: PRICE: £0.50	VARIOUS	
COMBI15000, 16000, N 900MVH1012, VH1030, 1100, 1120, 1440, 1500, 2308, 2400, 2500, 2600, 358, 360, 362, 4010, 401	1040, 1060, 1070, 1660, 1800, 2150, 2700, 2960, 300, 5, 4016, 4020,	SLC6, SLJ10, SLT6ME SLC5, SLC7, SLJ7, SLJ9 SLC9, SL8000, SL8080, S SL8000E, SL8080E, SL82 SLV255	140p 140p 145p 165p 100, SL8600 175p 95p	VK309, 411, TX8000), FERGUSON (3V31, 8941, 8942)			AKAI GOLDSTAR	ACEMENT IDLER TYP M132773 MZ366960J2 VXP0521	IES IT01 IT02 IT17
4300, 5010, 5015, 530, 5 640, 730, 735, VP220, 22 2966, 2980, 821, 925, V) NEVHL, VCP, VH1204, 2 3060, 4008, 400, 4012, 4	25, 245, VR1032, CL25 30p 2004, 2204, 3050, 12, 512, 600, 666,	TELEFUNKEN VR400, VR410, VR440, VI VR450, VR540, VR549, VI	R449 130p R640 70p	AUTHENTIC (N850), DECCA (VR8300), GRANADA (VHSTJ3,	VL07	40p	HITACHI	6861471 6861482 6886971	IT03 IT04 IT05
744, 774, 7905, 800, 820 VR2949, 2956, 2957, VX VC150, 180, VH1000, 20 250, 254, 288, 300, 303, 3312, 404, 555, 700, 704	L20 90p 0, 201, 205, 212, 3030, 312, 33, , 708, 712, 770,	VR520, VR529, VR620, VI VR530, VR535, VR539, VI VR650 A940, VR1925, 1930, 194 925, 930, 940, 950 A920, VR1970, 1980, 292	R550, VR630, 75p 0, 1950, 2960, 90p	WJ1, WJ3), ITT (VR3913, 3914, 3963), JVC (HT7200, 7300, 7350, 7700), TELEFUNKEN (VR450,			JVC/ FERGUSON	PU 48967B PU 51380 PU 51402A PU 55373	IT06 IT07 IT08 IT09
780, 844, 900, VHF2, VH VH1, VH2A PHILIPS VR6460, VR6920	3 80p 150p	2970, 7921, 7926, 7931, 7 970, 7981, 975, 980 A1200, 930, 932, 935, 960 VR2931, 2935, 2941, 297	970, 7971, 7980, 65p 0, 980, 990, 1, 3935, 3945,	520, 529, 540, 549, 620, 640, 920, 1920), THOMSON (V4100, VK308, 309, 312, 410),	•		NATIONAL PANASONIC	PU 55374 VXP 0329 VXP 0343	IT10 IT11 IT12
VR6540 VR6540 DV186, 286, 291, 292, 44 761, VR201, 202, VR200 20RW7, 25BO1, 25BO2, VR30DV2, 35BO2, 35BO	58, 471, 562, 571, V1, 20DV2, 302, 303, 305,	3950, 3965, 3975, 4935, 4 496, 5VR4970, 6000, 793 VR1935 VR2915	940, 4942, 4945, 2, 7959, 7979 65p 100p 90p	FERGUSON (3V23, 29, 30, 8923, 8924, 8929, 8930, 8931, 8940)				VXP 0344 VXP 0401 VXP 0433 VXP 0463	T13 T14 T15 T16
715B5, 715B8, VR865B2 VR6180, 6185, 6285, 628 6367, 6390, 6391, 6393, 6561, 6570, 6581, 6670,	90, 6291, 6293, 6467, 6468, 6470, 6676, 6760,	THOMSON SV1000, V410, 430, 450, 4540, 620, 630, 640, 4240, TX8000, V309, V357, VK4 TX8500, V342, 343, 351, 3	SV5540 65p	GRANADA (VHSAY3), SHARP (VC200, 381, 384, 385, 386, 388,	VL08	60p	SANYO	VXP 0521 VXP 0581 1430662T15620	IT17 IT18 IT19
VR68SB4, 86SB1, 92SB VR6442, VR6542 VR2025, VR2580 VR445B9, BR445B920, VB66843 VR6649, VR6649, VR6649	70p 100p /R445B922,	364, 368, 4210, 4230, 426 6000, 8564 V320, V321, V323, V326, V4300 V333	0, 4400, 5500, 90p	390, 393, 9300, 9500, 9700)		<u> </u>	SHARP PRICE	NIDL005GEZZ NIDL0006GEZZ NPLY0107GEZZ	IT20 IT21 IT22
VR6548, VR6648, VR495 VR644869S SABA VR6420, 6435, 6440, 646	110p	V340 V4100, VK308, VK309, VF VK300, VK301, VK302, VF VK3301	90p (410 120p (303, VK305, 135p	PANASON MODE SWITC NV2000, 2010, 7000, 7200, 7800	HES	£3 E0	20p EACH 16p EACH FOR	A PACK OF 5 FOR EA A PACK OF 10 FOR EA	
6770, 7200, 8420, 2A10, 4A10, 4B20, 6A10, 6A70 VR6004, 6005, 6011, 60 7014, 8011, 8014, BERLI VR2000, VR6000, VR601	70, 2B20, 3B20, 1, 6B20, 8B20 65p 14, 7004, 7011, N 90 p	VK312 TOSHIBA V55, V57 V33, V31, V51, V53, V960	65p 85p 0, V9680 85p	NV2000, 2010, 7000, 7200, 7800 NV230, 260, 430, 810, 870, 2300, (VSS0110) NV830 (VSS0091)		£2.25 £2.10	GR/	ANDATA L	TD
VR7720, PVR6068 VR5005, VHR7000 VR6006, 6007, 6008, 600 9018, 6038, 7006, 7007, 9006	130p 135p 9, 6015, 9016, 7016, 7018,	V61, V63, V65, V66, V67 DV80B, DV80D, V71, 73, 86 V108, V109, V199, V209,	74, 75, 81, 83, 85, 120p V609 120p	NV830 (VSS0091) NV300, 333, 340, 366, 688, 777, 7 (VSS0060) NVG21, 25, NVH65, NVD80 (VSS		£3.75 £2.00	Tel: (0181-900 2 0181-903 (329
	65p	V91G, V95G	115p	14 OZ 1, 20, 144 1100, 144 DOU (4 22	JII JA	00	Tax	9101-303 (

VIDEO SERVICE KITS		VIDEO SERVIC	E KITS (Cont.)		VIDEO SERVICE I	KITS (Cont.	.)
AMSTRAD VCR700 Contents BELT SET, PINCH ROLLER, REEL IDLER, VIDEO LAMP Order Code: SK41 FERGUSON & JVC	£5.50	VT11/VT33 Contents BELT SET. T/UP REEL TABLE TYRE. SUPPLY REEL TABLE TYRE. PINCH ROLLER. FF/REW IDLER. CLUTCH PLATE. TENSION BAND	Economy Kit Contents BELT SET. PINCH ROLLE FF/REW IDLER TYRE. T/UF TABLE TYRE: SUPPLY RE TABLE TYRE	P REEL EEL	BELT SET. PINCH ROLLER. BEL REEL IDLER. TENSION BAND. REE VIDEO LAMP	onomy Kit Contents LT SET. PINCH ROLL EL IDLER TYRE Ier Code: SK48	ER. £3.25
3V42/43 HRD455/HRD725 Contents BELT SET. PINCH ROLLER CLUTCH MECHANISM. TENSION BAND Order Code: SK37 £16.00 Order Code: SK38		Order Code: SK45 £13.00 VT52/61/62/63/64/65/85/86/640 Contents BELT SET. PINCH ROLLER. FF/REW ARM. CLUTCH PLATE. TENSION BAND	Order Code: SK46 Economy Kit Contents BELT SET. PINCH ROLLE FF/REW IDLER		BELT SET PINCH ROLLER. REEL IDLER. TENSION BAND Order Code: SK60 £9.50 Ord	onomy Kit Contents LT SET PINCH ROLL EL IDLER Jer Code: SK61	.ER. £5.00
3V58/59/64/65 HRD170/180/210/230/300/320/370/400/430/530/700/750 HRS5000 Contents BELT SET. PINCH ROLLER. IDELR ARM. TENSION BAND		Order Code: SK49 £14.00 VT400/405/410/13/14/15/18/420/25 510/520/25/26/530/35/36/540/545/4 Contents TIMING BELT. PINCH ROLLER. F	6/48/570/75/576/580/85/88		BELT SET. PINCH ROLLER. BEL REEL DRIVE UNIT TENSION REE BAND	C/93/VC800/ Innomy Kit Contents LT SET. PINCH ROLL EL DRIVE UNIT TYRE	
Order Code: SR44 3V29/3V30 H7/200/7300/7350 Contents BELT SET. PINCH ROLLER. TENSION BAND, IDLER TYRES	£7.00	TENSION BAND Order Code: SK52 VT100/110/111/113/115/118/120/12 175/220/225/250/255/258/260/VTL3 Contents	30	£9.75	VC681/VC682/VC684/VC685/VC693/VC6 Contents Eco BELT SET. PINCH ROLLER. BEL REEL DRIVE UNIT. TENSION REE	er Code: SK65 599/VC6F3/VC700 Inomy Kit Contents LT SET. PINCH ROLL EL DRIVE UNIT TYRE	
Order Code: SK05 3V35/36.38/39/49 HRD110/11/120/225 Contents BELT SET. PINCH ROLLER, TENSION BAND, IDLER TYRES	£5.00	BELT SET. PINCH ROLLER. FF/R TENSION BAND Order Code: SK51 PANASONIC		£14.00	FOR MORE DETAILS		£5.00
Order Code: SK04 3V31/3V42 HR7600/7610/7650/7655 Contents BELT SET. T/U REEL TABLE BELT SET. T/U REEL TABLE	£5.00	NV2000/NV2010 Contents BELT SET. PINCH ROLLER. TENSION BAND. IDLER TYRES Order Code: SK03 £5.00	NV7000/NV7200/NV7800 Contents BELT SET. PINCH ROLLE TENSION BAND. IDLER T Order Code: SK02		TYPES OF SERVI PLEASE RIN BACKUP BA	IG US!	<u> </u>
TYRE. PINCH ROLLER. REEL IDERL. T/U CLUTCH. T/U IDLER. TENSION BAND. VIDEO LAMP Order Code: SK33 3V35/36/38/39/49 TYRE. PINCH ROLLER. RE ITYRE. PINCH ROLLER. RE IDLER TYRE. TYRI. PINCH ROLLER. RE IDLER TYRE. TYRI. PINCH ROLLER. RE IDLER TYRE. TYRE. TYRE. TYRE. PINCH ROLLER. RE IDLER TYRE.	EL .	NV300/NV330/NV333/NV340/NV360 Contents BELT SET. PINCH ROLLER. TENS Order Code: SK01		£5.00	REPLACEMENT PHILIPS NI-CAL Replaces Ferguson Part No: 00E6-067-001, used on TX10, L2V Replaces Philips Part No's: 138-10138, 138-10313. 1.2V – 90n	D BACKUP BAT	
HRD110/11/1/20/12/225 Contents BELT SET. T/U REEL TABLE TYRE. SUPPLY REEL TABLE TYRE. SUPPLY REEL TABLE TYRE. PINCH ROLLER. T/U TYRE. PINCH ROLLER. T/U	.E	NV2000/NV2010 Contents BELT SET. PINCH ROLLER. FF IDLER. PLAY IDLER. TENSION BAND. VIDEO LAMP Order Code: SK13 \$6.00	Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE. PULLEY TYR Order Code: SK14		Replaces Philips Part No's: 138-10229. 2.4V – 90mAh REPLACEMENT FERGUSOI BATTERIES Replaces Ferguson Part Nos:		£1.35
CLUTCH. T/J IDLER. REEL IDLER. TYRE IDLER. TYRE IDLER. TYRE IDLER. TYRE IDLER. TYRE 3V29/3V30 HR7200/7300/7350	£5.50	NV7000/NV7200/NV7800 Contents BELT SET. PINCH ROLLER. IDLER UNIT. PLAY IDLER.	Economy Kit Contents BELT SET PINCH ROLLE IDLER TYRE CLUTCH TY	R.	00E6-066-001, 2:4V Used on: 3V35, 3V56, 3V58, 3V65 REPLACE LINE OUT	MENT	150p
Contents BELT SET. T/U REEL TABLE TYRE. SUPPLY REEL TABLE TYRE. SUPPLY REEL TABLE BELT SET. T/U REEL TABLE TYRE. SUPPLY REEL TABLE		TENSION BAND Order Code: SK11 £8.50	Order Code: SK12	£3.25	TRANSFOR		
TYRE. PINCH ROLLER. REEL IDLER. T/U CLUTCH. T/U IDLER. IDLE TYRE. T/U IDLER TYRE. T/U IDLER TYRE. T/U IDLER TYRE. TENSION BAND. WICEOLAMB.	EL	NV300/NV330/NV333/NV340/NV366 Contents BELT SET. PINCH ROLLER.	Economy Kit Contents BELT SET, PINCH ROLLE		Description	Price	Order Code
IDLER. T/U CLUTCH. T/U IDLER. TENSION BAND. VIDEO LAMP Order Code: SK31 £10.00 Under Code: SK32 3V44/45/48/53/54/55/57 HRP50/HRD140/150/158/160 HR D250/257/565/566755	EL	Contents BELT SET. PINCH ROLLER. IOLER UNIT PLAY IDLER. TENSION BAND Order Code: SK15 £7.00 NVG7/NVG9/VNG10/NVG11/NVG11/NVG12	Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE. PLAY IDLEF TYRE Order Code: SK16 2/NVG14/NVG15/NVG16/		Description HITACHI 2433752 ORION 3714002 FIDELITY ZX300 FE TX100 90 DEG SABA 490007182 FE TX90 WHITE	Price 1500p 1500p 1500p 1500p 1500p 1500p	Code LOT01 LOT02 LOT03 LOT04 LOT05 LOT06
IDLER. TAU CLUTCH. T/U IDLER. IDLE TYRE. T/U IDLER TYF TAU CLUTCH T/U CLUTCH Order Code: SK32 3V44/45/48/53/54/55/57 HRP50/HRD140/150/158/160 HRP50/HRD140/H	EEL RE. £ <mark>5.00</mark>	Contents BELT SET. PINCH ROLLER. IDLER UNIT PLAY IDLER. TENSION BAND Order Code: SK15 £7.00 NVG7/NVG9/VNG10/NVG11/NVG12 NVG18NVG30/NVG120/NVG130/N AG1810 (P/K) Contents LOADING BELT. CAPSTAN BELT. PINCH ROLLER. IDLER TENSION BAND	Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE. PLAY IDLEF TYRE Order Code: SK16 2/NVG14/NVG15/NVG16/ VG400/NVH65 (PX/AC)/ Economy Kit Contents LOADING BELT. CAPSTAI BELT. PINCH ROLLER. IC TYRE	£3.25 N DLER	Description HITACHI 2433752 ORION 3714002 FIDELITY ZX300 FE TX100 90 DEG SABA 490007182 FE TX90 WHITE ITT D307/37 EQ BLAUPUNKT 210 GRUNDIG 2922010 ITT CVC800/1/3 ITTD218/37 EQ NORMENDE 5255	1500p 1500p 1500p 1500p 1500p 1500p 1650p 1600p 1600p 1600p 1600p	Code LOT01 LOT02 LOT03 LOT04 LOT05 LOT06 LOT07 LOT08 LOT09 LOT10 LOT11 LOT12
IDLER. TAU CLUTCH. TAU IDLER. TENSION BAND. VIDEO LAMP Order Code: SK31 3V44/45/48/53/54/55/57 HRP50/HRD140/150/158/160 HR D250/257/565/566/755 Contents BELT SET. PINCH ROLLER. CLUTCH MECHANISM. TENSION BAND Order Code: SK39 £ conomy Kit Contents BELT SET. PINCH ROLLER CLUTCH MECHANISM. TENSION BAND Order Code: SK40 FISHER FYHP905/906/907/908/910/911/916/918 Contents BELT SET. PINCH ROLLER. IDLER GEAR IDLER LINIT. IDLER TYRE. T/U IDLER TYRE T/U CLUTCH Order Code: SK32	£5.00 £5.00	Contents BELT SET. PINCH ROLLER. IDLER UNIT PLAY IDLER. TENSION BAND Order Code: SK15 £7.00 NVG7/NVG9/NNG10/NVG11/NVG11/NVG18/NVG30/NVG120/NVG130/N AG1810 (P/K) Contents LOADING BELT. CAPSTAN BELT. PINCH ROLLER. IDLER TENSION BAND Order Code: SK27 £6.00 NV332 Contents BELT SET. PINCH ROLLER.	Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE. PLAY IDLEP TYRE Order Code: SK16 2/NVG14/NVG15/NVG16/ VG400/NVH65 (PX/AC)/ Economy Kit Contents LOADING BELT. CAPSTAI BELT. PINCH ROLLER. ID TYRE Order Code: SK28 Economy Kit Contents BELT SECONOMY Kit Contents BELT. PINCH ROLLER. ID TYRE Order Code: SK28	23.25 N DLER £3.00	Description HITACHI 2433752 ORION 3714002 FIDELITY ZX300 FE TX100 90 DEG SABA 490007182 FE TX90 WHITE ITT D307/37 EQ BLAUPUNKT 210 GRUNDIG 2922010 ITT CVC800/1/3 ITTO218/37 EQ	Price 1500p 1500p 1500p 1500p 1500p 1600p 1600p 1600p 1600p 1600p 1600p	Code LOT01 LOT02 LOT03 LOT04 LOT05 LOT06 LOT07 LOT08 LOT09 LOT10 LOT11
IDLER TAU CLUTCH. TAU IDLER. TENSION BAND. VIDEO LAMP Order Code: SK31 \$10.00	EEL	Contents BELT SET. PINCH ROLLER. IDLER UNIT. PLAY IDLER. TENSION BAND Order Code: SK15 NVG7/NVG9/VNG10/NVG11/NVG12 NVG18/NVG30/NVG120/NVG130/N AG1810 (P/K) Contents LOADING BELT. CAPSTAN BELT. PINCH ROLLER. IDLER TENSION BAND Order Code: SK27 NV332 Contents BELT SET. PINCH ROLLER. PLAY IDLER. FF/REW IDLER. TENSION BAND. FF/REW ITRE Order Code: SK29 SELT SET. PINCH ROLLER. PLAY IDLER. FF/REW IDLER. TENSION BAND. FF/REW ITRE Order Code: SK29 NV230/250/260/280/430/450/460/47 AG1200PK/AG1500PK	Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYPE. PLAY IDLEF TYRE Order Code: SK16 VG400/NV465 (PX/AC)/ Economy Kit Contents LOADING BELT. CAPSTAI BELT. PINCH ROLLER. ID TYRE Order Code: SK28 Economy Kit Contents BELT SET. PINCH ROLLER. ID TYRE UTder Code: SK28 Economy Kit Contents BELT SET. PINCH ROLLER IDLER TYRE IDLER TYRE Order Code: SK30 V0/650/810/890/	23.25 N DLER £3.00	Description HITACHI 2433752 ORION 3714002 FIDELITY ZX300 FE TX100 90 DEG SABA 490007182 FE TX90 WHITE ITT D307/37 EQ BLAUPUNKT 210 GRUNDIG 2922010 ITT CVC800/1/3 ITTD218/37 EQ NORMENDE 5255 SABA 81000 200 SALORA T236 EQ SABA 811-50-24 SABA 811-50-24 SABA 811-50-24 SABA 8770223500 TELEFUNKEN AT1 TELEFUNKEN AT1 TELEFUNKEN EQ SALORA FM0218B NORMENDE 5255 ITT CVC 1150/1 ITT COMPACT 80 FE TX100 GREEN HINARI CT4/5 5113 SELECO 6320410	1500p 1500p 1500p 1500p 1500p 1500p 1650p 1650p 1600p 1500p 1500p 1450p 1500p 1500p 1500p	Code LOT101 LOT02 LOT03 LOT04 LOT05 LOT06 LOT07 LOT08 LOT09 LOT110 LOT111 LOT12 LOT13 LOT14 LOT15 LOT16 LOT17 LOT18 LOT19 LOT21 LOT23 LOT23 LOT24 LOT25
IDLER TAU CLUTCH. TAU IDLER. TENSION BAND. VIDEO LAMP Order Code: SK31 \$10.00	EEL	Contents BELT SET. PINCH ROLLER. IDLER UNIT. PLAY IDLER. TENSION BAND Order Code: SK15 NVG7/NVG9/NVG10/NVG11/NVG12 NVG18/NVG30/NVG120/NVG130/N AG1810 (P/K) Contents LOADING BELT. CAPSTAN BELT. PINCH ROLLER. IDLER TENSION BAND Order Code: SK27 \$6.00 NV332 Contents BELT SET. PINCH ROLLER. PLAY IDLER. FF/REW IDLER. TENSION BAND. FF/REW TYPE Order Code: SK29 NV230/250/260/280/430/450/460/47 AG1200PK/AG1500PK Contents BELT SET. PINCH ROLLER. IDLER. TENSION BAND Order Code: SK29 \$6.00 NV230/250/260/280/430/450/460/47 AG1200PK/AG1500PK Contents BELT SET. PINCH ROLLER. IDLER. TENSION BAND Order Code: SK23 £6.00	Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE. PLAY IDLER TYRE Order Code: SK16 2/NVG14/NVG15/NVG16/ VG400/NVH65 (PX/AC)/ ECONOMY Kit Contents LOADING BELT. CAPSTAI BELT. PINCH ROLLER. IC TYRE Order Code: SK28 Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE. FF/RE IDLER TYRE Order Code: SK30	£3.25 N DLER £3.00 R. W	Description HITACHI 2433752 ORION 3714002 FIDELITY 2X300 FE TX100 90 DEG SABA 490007182 FE TX90 WHITE ITT D307/37 EQ BLAUPUNKT 210 GRUNDIG 2922010 ITT CVC800/1/3 ITTD218/37 EQ NORMENDE 5255 SABA 81000 200 SALORA T236 EQ SALORA T236 EQ SABA 811-50-24 SABA 811-50-24 SABA 770223500 TELEFUNKEN AT1 TELEFUNKEN EQ SABA FM0218B NORMENDE 5255 ITT CVC 1150/1 ITT CVMPACT 80 FE TX100 GREEN HINARI CT4/5 5113 SELECO 6320410 BLAUPUNKT 8667 ITT COMPACT B1 ITT COMPACT B1 ITT CT3326 MUL ITT D666/37 EQ ITT 3546 EQ LUXOR \$810110	Price 1500p 1500p 1500p 1500p 1500p 1500p 1650p 1600p 1600p 1600p 1600p 1600p 1600p 1650p 1650p 1650p 1650p 1650p 1650p 1450p 1500p 1500p 1500p 1500p 1500p 1500p 1500p	Code LOTT01 LOTT02 LOTT03 LOTT04 LOTT05 LOTT06 LOTT07 LOTT08 LOTT09 LOTT10 LOTT11 LOTT12 LOTT13 LOTT14 LOTT15 LOTT16 LOTT19 LOTT20 LOTT21 LOTT22 LOTT21 LOTT22 LOTT23 LOTT24 LOTT25 LOTT25 LOTT26 LOTT27 LOTT29 LOTT27 LOTT29 LOTT29 LOTT29 LOTT20 LOTT21 LOTT27 LOTT28 LOTT29 LOTT20 LOTT27 LOTT28 LOTT29 LOTT20 LOTT27 LOTT28 LOTT29 LOTT20 LOTT21 LOTT29 LOTT20 LOTT31
IDLER. TAU CLUTCH. TAU IDLER. TENSION BAND. VIDEO LAMP Order Code: SK31 \$10.00	EEL	Contents BELT SET. PINCH ROLLER. IDLER UNIT. PLAY IDLER. TENSION BAND Order Code: SK15 VG18hNVG30/NVG11/NVG11/NVG130/N AG1810 (P/K) Contents LOADING BELT. CAPSTAN BELT. PINCH ROLLER. IDLER TENSION BAND Order Code: SK27 \$6.00 NV332 Contents BELT SET. PINCH ROLLER. PLAY IDLER. FF/REW IDLER. TENSION BAND. FF/REW TYPE Order Code: SK29 V230/250/260/280/430/450/460/47 AG1200PK/AG1500PK Contents BELT SET. PINCH ROLLER. BELT SET. PINCH ROLLER. BELT SET. PINCH ROLLER. TENSION BAND. FF/REW TYPE Order Code: SK29 V230/250/260/280/430/450/460/47 AG1200PK/AG1500PK Contents BELT SET. PINCH ROLLER. IDLER. TENSION BAND	Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYPE. PLAY IDLEF TYRE Order Code: SK16 2/NVG14/NVG15/NVG16/ VG400/NVH65 (PX/AC)/ Economy Kit Contents LOADING BELT. CAPSTAI BELT. PINCH ROLLER. ID TYRE Order Code: SK28 Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE Order Code: SK30 VG650/810/890/ Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE Order Code: SK30 VG650/810/890/ Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE IDLER TYRE ORDER TYRE ORDER TYRE IDLER TYRE	R £3.25 N N DLER £3.00 R. W £5.10	Description HITACHI 2433752 ORION 3714002 FIDELITY ZX300 FE TX100 90 DEG SABA 490007182 FE TX90 WHITE ITT D307/37 EQ BLAUPUNKT 210 GRUNDIG 2922010 ITT CVC8007/3 ITTD218/37 EQ NORMENDE 5255 SABA 81000 200 SALORA T236 EQ SABA 811-50-24 SABA 770223500 TELEFUNKEN AT1 TELEFUNKEN EQ SALORA T236 EQ SALORA T236 EQ SALORA T236 EQ SABA 770223500 TELEFUNKEN EQ SALORA FM0218B NORMENDE 5255 ITT CVC 1150/1 ITT COMPACT 80 FE TX100 GREEN HINARI CT4/5 5113 SELECO 6320410 BLAUPUNKT 8667 ITT COMPACT B1 ITT CASSA EQ LUXOR 5810110 SABA 849380920 HITACHI 2434141 CP FE TX100 110 D HANTAREX 28021 SHARP C3700 EQ HITACHI 2432981 CP	Price 1500p 1500p 1500p 1500p 1500p 1500p 1650p 1600p 1500p 1600p 1600p 1600p 1600p 1600p 1600p 1600p	Code LOT01 LOT02 LOT03 LOT04 LOT05 LOT06 LOT06 LOT07 LOT08 LOT09 LOT11 LOT12 LOT13 LOT14 LOT15 LOT16 LOT17 LOT18 LOT19 LOT21 LOT21 LOT22 LOT23 LOT24 LOT28 LOT28 LOT28 LOT28 LOT29 LOT30 LOT31 LOT30 LOT31 LOT35 LOT35 LOT36
IDLER TAU CLUTCH. TAU IDLER. TENSION BAND. VIDEO LAMP Order Code: SK31 £10.00 3V44/45/48/53/54/55/57 HRP50/HRD140/150/158/160 HR D250/257/565/566/755 Contents BELT SET. PINCH ROLLER. CLUTCH MECHANISM. TENSION BAND Order Code: SK39 £15.00 Order Code: SK40 FISHER PVHP905/906/907/908/910/911/916/918 Contents BELT SET. PINCH ROLLER. BELT S	£5.00 £5.00 £5.00	Contents BELT SET. PINCH ROLLER. IDLER UNIT. PLAY IDLER. TENSION BAND Order Code: SK15 NVG7/NVG9/NVG10/NVG11/NVG12 NVG18/NVG30/NVG120/NVG130/N AG1810 (P/K) Contents LOADING BELT. CAPSTAN BELT. PINCH ROLLER. IDLER TENSION BAND Order Code: SK27 \$6.00 NV332 Contents BELT SET. PINCH ROLLER. PLAY IDLER. FF/REW IDLER TENSION BAND. FF/REW IDLER. IDLER. TENSION BAND Order Code: SK23 \$6.00 NV230/250/260/280/430/450/460/47 AG1200PK/AG1500PK Contents BELT SET. PINCH ROLLER. IDLER. TENSION BAND Order Code: SK23 \$6.00 NV600/NV688 Contents BELT SET. PINCH ROLLER. PLAY IDLER. FF/REW IDLER. TENSION BAND	Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE. PLAY IDLEF TYRE Order Code: SK16 2/NVG14/NVG15/NVG16/ VG400/NVH65 (PX/AC)/ Economy Kit Contents LOADING BELT. CAPSTAI BELT. PINCH ROLLER. IC TYRE Order Code: SK28 Economy Kit Contents BELT SET. PINCH ROLLE PLAY IDLER TYRE. FF/RE IDLER TYRE Order Code: SK30 (70/650/810/890/ Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE Order Code: SK24 Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE Order Code: SK24 Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE Order Code: SK26 Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE Order Code: SK26 Economy Kit Contents SLOT IN BELT. LOADING PINCH ROLLER T	£3.25 N DLER £3.00 R. W £5.10 R. £3.25 R. W £6.00 BELT. YRE	Description HITACHI 2433752 ORION 3714002 FIDELITY 2X300 FE TX10 90 DEG SABA 490007182 FE TX90 WHITE ITT D307/37 EQ BILAUPUNKT 210 GRUNDIG 2922010 ITT CVC8007//3 ITTD218/37 EQ NORMENDE 5255 SABA 81000 200 SALORA T236 EQ SABA 81-50-24 SABA 770223500 TELEFUNKEN AT1 TELEFUNKEN EQ SALORA T236 EQ SALORA T236 EQ SABA 770223500 TELEFUNKEN EQ SABA 770223500 TELEFUNKEN EQ SALORA FM0218B NORMENDE 5255 ITT CVC 1150/1 ITT CVC 1150/1 ITT COMPACT 80 FE TX100 GREEN HINARI CT4/5 5113 SELECO 6320410 BLAUPUNKT 8667 ITT COMPACT B1 ITT CT326 MUL ITT D066/37 EQ ITT 3546 EQ LUXOR 5810110 SABA 849380920 HITACHI 2434141 CP FE TX100 110 D HANTAREX 28021 SHARP C3700 EQ HITACHI 2432981 CP FERGUSON 00D3-508-002 Fits Chassis TX99 41cm + 51ct Used On: 51K2, 51J8, 51J7, 41 41H3, 41H2, 51K3 PANASONIC TLF14568F	Price 1500p 1500p 1500p 1500p 1500p 1500p 1650p 1650p 1600p 1600p 1600p 1600p 1600p 1600p 1650p 1600p 1500p 1450p 1450p 1500p 1500p 1500p 1500p 1500p 1600p	Code LOT101 LOT102 LOT0103 LOT04 LOT05 LOT06 LOT07 LOT08 LOT09 LOT101 LOT112 LOT113 LOT114 LOT15 LOT16 LOT17 LOT18 LOT19 LOT21 LOT22 LOT23 LOT25 LOT25 LOT26 LOT27 LOT28 LOT25 LOT26 LOT27 LOT28 LOT27 LOT28 LOT29 LOT30 LOT31 LOT32 LOT31 LOT32 LOT34 LOT35 LOT34 LOT35 LOT36 LOT37 LOT38 LOT36 LOT37 LOT38 LOT37 LOT38 LOT36 LOT37 LOT38 LOT37
IDLER TAU CLUTCH. TAU IDLER. TENSION BAND. VIDEO LAMP Order Code: SK31 £10.00 0rder Code: SK32 3V44/45/48/53/54/55/57 HRP50/HRD140/150/158/160 HRD250/257/565/568/755 Contents BELT SET. PINCH ROLLER. CLUTCH MECHANISM. TENSION BAND 0rder Code: SK39 £15.00 0rder Code: SK40 FISHER PHP905/908/907/908/910/911/918/918 Contents BELT SET. PINCH ROLLER. BELT SET. PINCH ROLLER. IDLER. GEAR IDLER UNIT. IDLER GEAR IDLER UNIT. TENSION BAND 0rder Code: SK57 £13.00 0rder Code: SK58 PHP615/618/620/622/710/711/715/716/720/721/722/725/730/830/840 Contents BELT SET. PINCH ROLLER. BELT SET. PINCH ROLLER IDLER. GEAR IDLER UNIT. IDLER TYRE Economy Kit Contents BELT SET. PINCH ROLLER IDLER GEAR IDLER UNIT. IDLER TYRE IDLER GEAR IDLER UNIT. IDLER TYRE BELT SET. PINCH ROLLER IDLER TYRE BELT SET. PINCH ROLLER BELT SET. PINCH ROLLER BELT SET. PINCH ROLLER IDLER TYRE TENSION BAND 0rder Code: SK69 UNIVERSAL TRIPLER Price: £4.50 each AMSTRAD MODE KIT Price: £2.75 each	£5.00 £5.00 £5.00	Contents BELT SET. PINCH ROLLER. IDLER UNIT. PLAY IDLER. TENSION BAND Order Code: SK15 \$7.00 NVG7/NVG9/NVG10/NVG11/NVG12 NVG18/NVG30/NVG120/NVG130/N AG1810 (P/K) Contents LOADING BELT. CAPSTAN BELT. PINCH ROLLER. IDLER TENSION BAND Order Code: SK27 \$6.00 NV332 Contents BELT SET. PINCH ROLLER. PLAY IDLER. FF/REW IDLER. TENSION BAND. FF/REW TYPE Order Code: SK29 \$12.00 NV230/250/260/280/430/450/460/47 AG1200PK/AG1500PK Contents BELT SET. PINCH ROLLER. DLER. TENSION BAND Order Code: SK23 \$6.00 NV600/NV688 Contents BELT SET. PINCH ROLLER. PLAY IDLER. FF/REW IDLER. TENSION BAND Order Code: SK25 \$12.00 NV730/NV770 Contents SLOT IN BELT. LOADING BELT. PINCH ROLLER. IDLER UNIT. TENSION BAND Order Code: SK19 \$5.00 NV370/NV380/480/630/780/830/850 Contents BELT SET. PINCH ROLLER.	Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYPE. PLAY IDLEF TYRE Order Code: SK16 2/NVG14/NVG15/NVG16/ VG400/NVH65 (PX/AC)/ Economy Kit Contents LOADING BELT. CAPSTAI BELT. PINCH ROLLER. ID TYRE Order Code: SK28 Economy Kit Contents BELT SET. PINCH ROLLE PLAY IDLER TYRE, FF/RE IDLER TYRE Order Code: SK30 (0/650/810/890/ Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE Order Code: SK24 Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE Order Code: SK24 Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE Order Code: SK26 Economy Kit Contents SLOT IN BELT. LOADING PINCH ROLLER. IDLER T Order Code: SK20 VAG2100PK/AG2200PK Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE Order Code: SK20 VAG2100PK/AG2200PK Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE Order Code: SK20 VAG2100PK/AG2200PK Economy Kit Contents BELT SET. PINCH ROLLE BELT SET. PINCH ROLLE	£3.25 N	Description HITACHI 2433752 ORION 3714002 FIDELITY ZX300 FE TX100 90 DEG SABA 490007182 FE TX300 WHITE ITT D307/37 EQ BLAUPUNKT 210 GRUNDIG 2922010 ITT CVC8007/3 ITTD218/37 EQ NORMENDE 5255 SABA 81000 200 SALORA T236 EQ SABA 811-50-24 SABA 811-50-24 SABA 770223500 TELEFUNKEN EQ SALORA T236 EQ SALORA T236 EQ SALORA T236 EQ SABA 770223500 TELEFUNKEN EQ SALORA FM0218B NORMENDE 5255 ITT CVC 1150/1 ITT COMPACT 80 FE TX100 GREEN HINARI CT4/5 5113 SELECO 6320410 BLAUPUNKT 8667 ITT COMPACT B1 ITT CT326 MUL ITT D066/37 EQ LUXOR 5810110 SABA 849380920 HITACHI 2434141 CP FE TX100 110 D HANTAREX 28021 SHARP C3700 EQ HITACHI 2432981 CP FERGUSON 0003-508-002 FIS CHASSIS TX99 41cm + 51ct Used On: 51K2, 51J8, 51J7, 41 41H3, 41H2, 51K3 PANASONIC TLF14568F Used On: TC2210, TX2124 PANASONIC TLF14584F Used On: TX2231, TX2244 PANASONIC TLF14584F USed On: TX2210, TX2124 PANASONIC TLF14586F	Price 1500p 1500p 1500p 1500p 1500p 1500p 1650p 1650p 1600p	Code LOT101 LOT102 LOT102 LOT103 LOT104 LOT105 LOT106 LOT107 LOT108 LOT107 LOT108 LOT101 LOT112 LOT113 LOT114 LOT115 LOT116 LOT17 LOT118 LOT119 LOT20 LOT21 LOT22 LOT23 LOT24 LOT25 LOT26 LOT27 LOT28 LOT29 LOT30 LOT31 LOT32 LOT31 LOT32 LOT33 LOT34 LOT35 LOT36 LOT37 LOT38
IDLER TAU CLUTCH. TAU IDLER. TENSION BAND. VIDEO LAMP Order Code: SK31 3V44/45/48/53/54/55/57 HRP50/HRD140/150/158/160 HRD250/257/5655/568/755 Contents BELT SET. PINCH ROLLER. CLUTCH MECHANISM. TENSION BAND Order Code: SK39 FISHER PHP905/906/907/908/910/911/916/918 Economy Kit Contents BELT SET. PINCH ROLLER. CONTENTS BELT SET. PINCH ROLLER. IDLER. GEAR IDLER LIDLER. IDLER. GEAR IDLER LIDLER. IDLER. GEAR IDLER LIDLER. IDLER CONTENTS BELT SET. PINCH ROLLER. IDLER GEAR IDLER LIDLER. IDLER TYRE ECONOMY KIT CONTENTS BELT SET. PINCH ROLLER. IDLER TYRE CONTENTS BELT SET. PINCH ROLLER. IDLER TYRE ECONOMY KIT CONTENTS BELT SET. PINCH ROLLER. IDLER TYRE CONTENTS BELT SET. PINCH ROLLER. CONTENTS BELT SET. PINCH ROLLER. BELT SET. PINCH ROLLER. CONTENTS BELT SET. PINCH ROLLER. BELT SET. PINCH ROLLER. BELT SET. PINCH ROLLER. BELT SET. PINCH ROLLER. CONTENTS BELT SET. PINCH ROLLER. BELT SET. PINCH ROLLE	£5.00	Contents BELT SET. PINCH ROLLER. IDLER UNIT. PLAY IDLER. TENSION BAND Order Code: SK15 \$7.00 NVG7/NVG9/NNG10/NVG11/NVG12 NVG18/NVG30/NVG120/NVG130/N AG1810 (P/K) Contents LOADING BELT. CAPSTAN BELT. PINCH ROLLER. IDLER TENSION BAND Order Code: SK27 \$6.00 NV332 Contents BELT SET. PINCH ROLLER. PLAY IDLER. FF/REW IDLER. TENSION BAND. FF/REW TYPE Order Code: SK29 \$12.00 NV230/250/260/280/430/450/460/47 AG1200PK/AG1500PK Contents BELT SET. PINCH ROLLER. IDLER. TENSION BAND Order Code: SK23 \$6.00 NV30/NV688 Contents BELT SET. PINCH ROLLER. PLAY IDLER. FF/REW IDLER. TENSION BAND Order Code: SK23 \$6.00 NV600/NV688 Contents SELT SET. PINCH ROLLER. PLAY IDLER. FF/REW IDLER. TENSION BAND Order Code: SK25 \$12.00 NV730/NV770 Contents SLOT IN BELT. LOADING BELT. PINCH ROLLER. IDLER UNIT. TENSION BAND Order Code: SK15 \$5.00 NV370/NV370/NV380/480/630/780/830/850 Contents SLOT IN BELT. LOADING BELT. PINCH ROLLER. IDLER UNIT. TENSION BAND Order Code: SK15 \$5.00 NV370/NV380/480/630/780/830/850 Contents	Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE. PLAY IDLEF TYRE Order Code: SK16 2/NVG14/NVG15/NVG16/ 2/NVG14/NVG15/NVG16/ 2/NVG14/NVG15/NVG16/ 2/NVG14/NVG15/NVG16/ 2/NVG10/NVH65 (PX/AC)/ Economy Kit Contents BELT. PINCH ROLLER. ID TYRE Order Code: SK28 Economy Kit Contents BELT SET. PINCH ROLLE PLAY IDLER TYRE Order Code: SK30 Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE Order Code: SK24 Economy Kit Contents BELT SET. PINCH ROLLE IDLER TYRE Order Code: SK24 Economy Kit Contents BELT SET. PINCH ROLLE PLAY IDLER TYRE. Order Code: SK26 Economy Kit Contents SLOT IN BELT. LOADING PINCH ROLLER. IDLER T Order Code: SK20 V/AG2100PK/AG2200PK Economy Kit Contents	R £3.25 N DLER £3.00 R. W £5.10 R. £3.25 R. W £6.00 BELT. YRE £3.00 R. £2.75	Description HITACHI 2433752 ORION 3714002 FIDELITY 2X300 FE TX100 90 DEG SABA 490007182 FE TX90 WHITE ITT D307/37 EQ BILAUPUNKT 210 GRUNDIG 2922010 ITT CVC800/1/3 ITTD218/37 EQ NORMENDE 5255 SABA 81000 200 SALORA T236 EQ SABA 81-50-24 SABA 81-50-24 SABA 770223500 TELEFUNKEN AT1 TELEFUNKEN EQ SALORA FM0218B NORMENDE 5255 ITT CVC 1150/1 ITT CVMPACT 80 FE TX100 GREEN HINARI CT4/5 5113 SELECO 6320410 BILAUPUNKT 8667 ITT COMPACT B1 ITT COMPACT B1 ITT CT3326 MUL ITT D066/37 EQ ITT 3546 EQ LUXOR 5810110 SABA 849380920 HITACHI 2434141 CP FE TX100 110 D HANTAREX 28021 SHARP C3700 EQ HITACHI 2432141 CP FERGUSON 00D3-508-002 Fits Chassis TX99 41cm + 51ct USed On: 51K2, 51J8, 51J7, 41 41H3, 41H2, 51K3 PANASONIC TLF14568F USed On: TC2204, TX2244 PANASONIC TLF14568F USed On: TC2210, TC2160, TX1752, TX2112	Price 1500p 1500p 1500p 1650p 1600p 1650p 1600p 1500p 1500p 1650p 1600p 1600	Code LOTIO1 LOTIO2 LOTIO2 LOTIO3 LOTIO4 LOTIO5 LOTIO6 LOTIO6 LOTIO7 LOTIO8 LOTIO9 LOTIO1 LOTI

IDLERS &	PULLEYS REPL	ACEMENT	1	VT680, 6500, 6800 FS-BRAKE 6861505	230p
AKAJ VS1-2, VS4-5, VS15	FF-REW IDLER	M1327773	400p	VT9700, 9900	25.50
VS3, 6, 12, 56, 58, 59 VS1-2, VS4-5, VS15	T-UP IDLER	BV327815	500p	OUTPUT MODULE HM 6232	£8
VS3, 6, 12, 59, 59 V9700	IDLER	BV321979 MZ366960J2	600p 900p	JVC HR330, 3660, 4100 T-UP IDLER SML PU49280 HR7200, 7600, 7650 T-UP CLUTCH PU53462A	£5.50 220p
VS125, 126, 155, VS165, 240, 244, 245, 247, VS22, 38, 105, 112, 115, 1				HR7655, 7300, 7350, 7610 HR7200, 7300, 7350 REEL IDLER PU48967	175p
VP7100, VS9300 VS9500, VS9800	T-UP IDLER	PU47752	£4.50	HR7600, 7610, 7650, 7655, 7700 HR7600, 7610, 7650. ROLLER ASSY PU49042A	350p
VP7100, VS9300 VS9500, VS9800 VP7100, VS9300	UNLOADING IDLER REW IDLER	PU46381 PU46380	£4.00 500p	HR7555, 7700 HR3300, 3660, 4100 T-UP IDLER LRG PU47752 HR7200, 7600, 7650 T-UP IDLER PU51402A	£4.50 100p
VS9500, VS9800 VP88	IDLER	BV336067	£5.00	HR7655, HRD110, HRD111, HR7300, 7350, 7610, HRD120-121, 225 HRD110, HRD120-121, T-UP CLUTCH PU55373	150p
VS1, 3, 4, 9, 12 VS15, 58	REEL TABLE	BR347731	450p	HRD225, HRD111, HRD110, HRD120-121, IDLER ARM PU55374-3-8	200p
VS23, 35, 37, 53, 55 VS66, 75, VSA77 VS9700	CLUTCH FF IDLER	ML373043 BV321761	1100p £3.20	HRD225, HRD111 HRD170, 180, 210, 230 IDLER ARM PU58465 HRD320, 370, 400, 430, 470, 530, 700, 750, 950, 3000	£2.25
VS9700 AMSTRAD	REWIDLER	W321762	£4.25	HRS5000, HRS5500 HRD455, HRD725 CLUTCH MECH PU558822	1200p
VCR7000 TVR1, VCR4500	IDLER CLUTCH	150280 150873	£1.50 £3.75	HRD140, 150, 157, 158 CLÚTCH MECH PU57658 HRD160, 250, 257, 565, 566, 755, HRP50 HR3300, HR3330 REW IDLER PU46380	1050p 500p
VCR4600, VC5200, VCR90 TVR1, VCR4500 VCR4600, VCR5200, VCR5	GEAR HOLDER	151284	£3.50	HR3660, HR4100 HRD140, 150, 157, 158 TAKE UP CLUTCH PU56043-1-4	240p
TVR1, VCR4600 VCR5200	REF CLUTCH		£3.50	HRD160, 250, 257, 455, 565, 566, 725, 755, HRP50 HRD140, 150, 157, 158 TAKE UP CLUTCH PU56044-1-5	160p
VCR6000, VCR6100 VCR4500, VCR9000	CLUTCH	153202	£3.80 £4.00	HRD160, 250, 257, 455, 565, 566, 725, 755, HPR50 MATSUI	
VCR4500, VCR4600 VCR4700 MOD KIT TAPE CREASIN	MOD KIT G FOR AMSTRAD	(TAPE CREASING)	300p	VX730, 735, 750, 755, CLUTCH 850A00005 VX810, 820, 850, 880, 990	420p
VCR4500, 4600, 4700 FERGUSON	OTOTIANOTIPE		£3.00	VX730, 735, 750, 755 LIMITED POST LEVER VX770, 800, 810, 880 ASSY VX990	£1.30
3V00, 3V01, 3V16 3V22, 3292, 8900, 8901, 85	T-UP IDLER 904, 9806	PU47752	£4.50	VX800A, VX900 IDLER REEL VX800A, VX820 REEL UNIT CLUTCH	£1.50 280p
3V16, 3V22 8903, 8909, 8912, 8922	T-UP IDLER	PU49280	£5.50	MITSUBISHI HS306, 307, 318, 319, GEAR ASSY 522B00201	£6.25
3V23, 3V31	REEL IDLER 924, 8929, 8930, 8931, 8940, I ROLLER ASSY	PU49042A	175p 350p	HS400, 410, 710 HS337, 338, 347, 349 IDLER 552B01701	325p
3V29, 3V30, 3V31 3V32, 3V35, 3V36, 3V38, 3	T-UP IDLER V39, 3V49, 8930, 8931, 8940,	51402 8941, 8942	100p	HS411, 412, 421, HSB10, HSB20, HSB30, HSE10, HSE20, HSE20, HSE30, HSE70	£2.00
3V29, 3V30, 3V31 3V32, 8930, 8931, 8940, 89 3V35, 3V36, 3V38	T-UP CLUTCH 941, 8942 REEL IDLER	PU51380 PU55374	200p 200p	HS400, 410, 710 HS347, 349, 412 IDLEB 522902002	£3.00
3V39, 3V49, 8943, 8944 3V35, 3V36, 3V38	T-UP CLUTCH	PU55373	150p	HSB10, HSB20, HSB30, HSE10, HSE20, HSE30, HSE70 HS337, 338, 411, 421 IDLER 552B01801	320p
3V39, 3V49, 8943, 8944 3V58, 3V59, 3V64	IDLER ARM	PU58645	£2.25	HS200 TAKE UP IDLER (LARGE) HS200 UNLOADING IDLER	£4.50 £4.00 £6.00
3V65, FV10, FV11, FV12 F FV30, FV32, FV33, 8950, V 3V42, 3V43	V13, FV14, FV20, FV21, FV22, C141L CLUTCH ASSY	. FV26 PU55822	1200p	HS306, 307, 318, 319 SUPPLY REEL 522A00101 HS400, 410, 710 DISK	£3.20
3V43, 3V44, 3V45 3V48, 3V53, 3V54, 3V56, 3	CLUTCH ASSY N57, 8947, 8948	PU57658	1050p	HS306, 307, 318, 319 TAKE UP REEL 522A00102 HS400, 410, 710 DISK	£3.20
3V42, 3V43, 3V44 3V45, 3V48, 3V53, 3V54, 3 3V42, 3V43, 3V44	T-UP CLUTCH V55, 3V56, 3V57, 8947, 8948 SUPPORT CLUTCH	PU56043-1-4 PU56044-1-5	240p 160p	H\$320 REEL DISK 522C06301 H\$337, 338, 411, 421 REEL DISK 522P00601 H\$300, 301, 302, 310 PULLEY 522C05201	£3.00 £5.00 £2.25
3V45, 3V48, 3V53, 3V54, 3 3V00, 3V01, 3V16	V55, 3V56, 3V57, 8947, 8948 LOADING IDLER	PU43681	£4.00	HS306, 307, 318, 319 GEAR WHEEL 641D71101 HS400, 410, 710	£1.50
3V22, 3292, 8900, 8901, 89 8912, 8922	902, 8903, 8904, 8906, 8909			HS306, 307, 318, 319 GEAR WHEEL 641D71001 HS400, 410, 710	£1.50
3V00, 3V01, 3V16 3292, 8900, 8901, 8904, 89 3V16, 3V22, 8902	REWIDLER 106 IDLER	PU46380 PU49281	500 p £1.70	NEC NB30, N831, N832, N833 TAKE UP CLUTCH	150p
8909, 8912, 8922 FISHER	iou.	10-0201	20	N830, N831, N832, N833 TAKE UP IDLER N830, N831, N832, N833 REEL IDLER	100p 200p 550p
FVHP420, 520, 530 EVHP615, 618, 620	FF-REW PULLEY COMP, IDLER ASSY	HI638531 F11430420400300	80p £2220p	N895 TAKE UP IDLER SMALL N911, N915, N916, N917 REEL DRIVE PULLEY N9012, 9013, 9014, 9016, 9033, 9034, 9054, 9055, 9066, 9110	350p
FVHP622, 710, 711, FVHP FVHP840,905, 906, FVHP9	720, 721, 722, FVHP725, 730, 108, 910, 911, FVHP915, 916,	830 918 F11430490400900	200-	N9510, 9520, 9530, 9610	
FVHP615, 618, 620 FVHP622, 710, 711, FVHP FVHP725, 730, 830, FVHP	340	H1430490400900	380p	NATIONAL NV322, NV600, NV688, IDLER UNIT VXP0463 NV777, NV788, NV332, AG6100, 6200, 6800, 6810	£2.75
FVHP615, 618, 620 FVHP662, 710, 711, FVHP	REEL T-UP ASSY 720, 721, 722	F1430410400900	£5.50	NV300, NV333, NV340 IDLER ARM VXL0997 NV366	£3.60
FVHP725, 730, 830, FVHP FVHP905, 906, 908, FVHP910, 911, 915, FVHP	GEAR IDLER ASSY	F11430490402400	275p	NV300, NV330, NV333 IDLER UNIT VXP0401 NV340, NV366 NV300, NV330, NV333 PLAY IDLER VXP0433	60p £2.75
FVHP975, 980, 990, FVHP999, 5000, 5005	IDLER	F1430420400700	300p	NV340, NV366, NV8620 NV300, NV332, NV333 ACTION GEAR VDG0016	£0.60
FVHP5050, 5075, 5100 FVHD40, 55, 140 FVHP1, 10, 20	REEL DRIVE ROLLER		£6.00	NV340, NV366, NV600, NV777, NV788, NV2000, NV2010, 3000, 7000 AG6010, AG6015 NV333, NV688, NV2000 LOADING GEAR VXP0325	€2.00
FVHP975, 980, 990 FVHP420, 520, 530	CLUTCH (DLER	F12430510404200	£9.50 £2.80	NV3000, NV7800 NV300, NV332, NV333 NTERMEDIATE GEAR VXG0017	£0.65
FVHP420, 520, 530 FVHP990 VBS3500	TAKE UP IDLER LOADING GEAR REEL DRIVE PULLEY		290p 90p £3.20	NV340, NV366, NV600, NV777, NV788, NV2000, NV2010, 3000, 7000 AG6010, AG6015 NV330, NV333, NV340 CAM GEAR VXG0158	£1,00
VBS3500 VBS7000	IDLER REW IDLER		250p 95p	NV366, NV777, NV788	110p
GOLDSTAR GHV1221, 1232, 1240	CLUTCH GEAR	435038A	£2.50	NV230, NV250, NV260 LIDER ARIM NV280, NV370, NV380, NV430, NV450, NV460, NV465, NV470, NV480 NV630, NV650, NV730, NV780, NV810, NV830, NV850, NV870 NVG7, NVG9, NVG10, NVG11, NVG12, NVG 14, NVG15, NVG16, VG18	
GHV1241, 1242, 1243, GH GHV8200, 8210, 8215, GH	V1244, 1245, 1246, GHV1247 VP51, VCP4100, 4130 IDLER	7, 1248, 8000,	110	NVG7, NVG9, NVG10, NVG11, NVG12, NVG 14, NVG15, NVG16, VG18 NVG30, NVG400, AG1000, AG1200, 1500, 1810, 2100, AG2200, NVH65, NVH70	
GHV1221, 1232, 1240 GHV1241, 1242, 1243, GH GHV8200, 8210, 8215, GH	V1244, 1245, 1246, GHV1247	7, 1248, 8000,	110p	NV370, NV430, NV870, CAM GEAR VDG0200 NV730, NV830, NV850, NVG10, NVG12, NVG18	£1.20
HINARS VXL3, VXL20	REEL IDLER	40000009	110p	NV730, NV770 IDLER UNIT VXP0581 NV2000, 2010 3000 IDLER UNIT VXP0331 NV2000, 2010, 3000 IDLER UNIT VXP0329	£2.50 80p 80p
VXL2 VXL4, VXL35	IDLER IDLER	-000000	110p £2.75	NV2000, NV3000 CAM GEAR VDG0069 NV7000, 7200, 7800 IDLER UNIT VXP0344	£1.00 75p
VXL4, VXL35 VXL4, VXL12, VXL25	CLUTCH LIMITER POST		£6.50 £1.30	NV7000, 7200, 7800 CLUTCH VXP0343 NV8150, 8200, 8300, IDLER UNIT VXP0245	300p 80p
VXL30, VXL35, VTV300 VXL5, VXL6 VXL5, VXL6	CLUTCH GEAR HOLDER		£3.75 £3.50	NV8400, 8600, 8610, 8620 NV8200, 8400, 8600 PLAYIDLER VXP0243 NV8610, 8620	80p
VXL7, VXL8, VXL9	CLUTCH		£3.80	NV8620 CLUTCH VXP0343 NV332, NV600, NV688 IDLER VXPO488	250p 300p 400p
HITACHI VT11-33, VT63-64 VT14, 17, 19, 38, 57, 86, 80	CLUTCH ASSY 3, 34, 35, 39, 52, 61	6879515	£7.50	NVG20, NVG21, NGV25 PULLEY UNIT VXP0767 NVG40, NVG45 NV230, NV250, NV280 WORM WHEEL VXP0604	400p 160p
62, 65, 85, 330, 640, VT163 VT120-220, 100, 110	CLUTCH ASSY	6886824	£7.50	NV430, NV450, NV460, NV465, NV650, NV730, NV770, NV810 NV870, NV890, AG1000	300p
111, 113, 115, 118, 200 125, 128, 130, 135, 138, 14 255, 258, 260, VTL30	15, 150, 175, 225, 250,	6886972		NV370, NV380, NV630 IDLER VXP0523 NV780, NV830 VXP0595 VXP0595	300p £1.00
VT8000-8300, 7000 VT8500-8700	FF-REW IDLER	6413663	£2.80	NVG7, NVG11, NVG12 WORM WHEEL VXP0691 NVG14, NVG15, NVG18, NVG30, NVG120, NVG130, NVG400, NVH70	£1.50
VT8000-8300, 7000 VT8500-8700 VT8000-8300, 7000	PLAYIDLER FF-REW PULLEY	6414221 6383531	290p 80p	NV2000, 2010, 3000 LOADING GEAR VDG0035 NV7000, 7200, 7800, 8050 NV230, NV250, NV370 LOADING GEAR VXP0520	£0.60 £1.50
VT8500-8700 VT9300-9500, 6500	FF-REW IDLER	8681471	250p	NV430, NV450, NV460, NV630, NV730, NV770, NV780, NV810 NV830, NV890, NVG7, NVG10, NVG12, NVG15, NVG30, NVG120	2.30
VT680, 6800, 9700, 9900 VT9300-9500, 6500	PLAYIDLER	6861482	230p	NGV130, NVG400, NVH70, AG1000 NV230, NV250, NV260 CLUTCH GEAR	£2.50
VT680, 6800, 9700 VT 9900 VT9300-9500, 9700	IDLER	6861481 681505	230p	NY280, NY430, NY450, NY730, NY770, NY810, NY870, NY880 NYG7, NYG10, NYG11, NYG14, NYG14, NYG15, NYG18, NYG30 NYG120, NYG130, NYG400, NYH70, AG1000	
VT9900, 6500, 680, 6800 VT11-33, VT63-64	IDLER FF-REW IDLER	687043 6886971	£3.80 125p	NV230, NV250, NV260 LIMITER ROLLER NV280, NV300, NV333, NV340, NV366, NV370, NV430, NV450, NV460 NV465, NV630, NV650, NV777, NV780, NV788, NV810, NV830, NV850,	£1.50
VT14, 16S, 17, 19, 34, VT3 VT65, 85, 86, 88, 330, 640		6996702	240p	NV870, NV890, NV2000, NV2010, 7200, 7800, NVG7, NVG10, NVG12,	
VT175, 220, 225, 250, 255,	FF-REW ARM 128, 130, 135, 138, 145, 150 258, 260, VTL30	6886792		NVG14, NVG15, NVG18, NVG30, NVG120, NVG130, NVG400, NVH70, AG1000	
VT400, 405, 410, 413 VT414, 415, 418, 420, 425,	FF-REW ARM , 426, 428, 430, 431, 435	6897094	£1.30	SAISHO VR605, VR800, VR900 CLUTCH 850A20000 VR110, 1200, 1500, 2500, 2200	420p
VT438, 450, 498, 510, 518, VT536, 540, 545, 546, 548	. 520, 525, 526, 530, 535	80.85		VR1100, 1200, 1600, 2500, 3200, 3300 VR3500, 3600, 3800 UMITER POST VR1100, 1200, 1600, 2500, 2300, 3300, 3500, 3600, 3700	£1.30
I VT400, 405, 410, 413	CLUTCH BASE	6896951	£5.00	VR605, VR900, VR900 IDLER VR2500, 3200, 3300, 3500, 3600, 3800	280p
VT414, 415, 418, 420, 425, VT438, 450, 498, 510, 518, VT536, 540, 545, 546, 546, VT589, VT589, VT589	570, 575, 576, 580, 585	90 0E		VR705, VR805, VR905 IDLER SANYO	110p
VT3000 VT3000	, 635, 636, 640, 645, 646, VTS T-UPIDLER (LARGE) REWIDLER	~~, 00	£4.50 £6.00	VHR1110, 1150, 1200 IDLER 143-0-662T-14730 VHR1300, 1500	£5.00
-					

	VTC5000, 5150, 6000	FF-REW IDLER	143-0-741T-20001	250p
ł		M20, M21, M30, M31, M50	143-0-551T-01400	95p
ļ	VTC9100, VTC9300	FF ROLLER ASSY	143-0-557T-01400	200p
ı	VTC9300		143-0-662T-10350	£5.00
i	VTCM10, M11, M20, M21	REEL DRIVE PULLEY	143-0-0021-10350	25.00
į	VTCM30, M31, M50	101 50	6130374899	300p
•	VHR2100, 2300, 2500	IDLÉR	61303/4899	Juup
į	VHR2700			
1	VTC5000, 5150, 6000	PULLEY	143-0-662T-01201	£5.20
i	VTC6500			
	VTCM10, M11, M20, M21	PULLEY	143-0-662T-10350	£5.50
	VTCM30, M31, M50			-
	VHR3100, 3300, 3310	REEL DRIVE	143-0-662T-15621	350p
	VHR3400, 3700, 3800	ROLLER		
	VHRD500, VHRD700			**
	VPR5800, VTC5300	LOADING ROLLER	143-0-661T-03800	80p
	VTC5400			
	VTC3000	FWD LIMITER		£3.50
	VTC3000	IDLER		750p
	SHARP			
		IDLER ASSY	NIDL0005GEZZ	110p
		IDLER	NIDL0006GEZZ	110p
	VC600, 651, 681, 682	IDLER ASSY	NPLYV0107GEZZ	£6.15
	VC684, 685, 693, 699, 700,	783, VC6FR, VC6V3		
	VC7300, VC7700, 7750	PLAY IDLER KIT	NPLYV0041+	
	10,000,10,,100,		NDA1V1007	£7.50

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 £8.50 – No VAT.

Video Recorders Edition 4 List more than 4500 faults for 43 different brands

Price £12.75p Only. No VAT. Order Code: BOOK01

TELEVISION Edition 5

Lists more than 6,000 faults with 306 pages covering 58 different brands Price: 1450p 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: £14.50 – No VAT. Order Code: BOOK04

VIDEO HEAD CLEANING STICKS



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

Solder Mop 1.2mm×10metres 400P
Tubed Silicon Grease 50 gram 200P
Tubed Heat Sink Compound 25 gram 150P

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 – £6.50

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

JUST ARRIVED!!! NEW ITEMS.

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 the recommended parts is supplied for the 4 most popular models, which when fitted should overcome this.

MAKE & MODEL	ORDER CODE	PRICE
PACE PRD800, PRD900	SATPSU1	650p
PACE SS9000, 9200, 9010, 9020, 9220	SATPSU2	650p
AMSTRAD SRD510, SRD520	SATPSU3	650p
AMSTRAD SRD500	SATPSU4	650p

Replacement Video Heads

MAKE	MODELS	PRICE	
HITACHI	VT570, VT575, VT576, VT580, VT585 VT588, VTF70	3100	
I.T.T.	VR3761	3100p	
JVC & FERGUSSON	HRD950, HRD960, HRD980, FV46	5000p	
LUXDR	VR3761	3100	
MITSUBISH	HSE51	3000p	
NATIONAL	NVFS200, NVFS90, NVV8000	4600;	
PANASONIC	NVHD100, NVHD101, NVHF100	3100p	
	NVSD	1400p	
	AG7330, AG7350, AG7355, AG7450	5000p	
	NVFS100	5000p	
N.E.C.	D5600	3500p	
SANYO	TLS1000P, TLS1001P, TLS1100	3100p	
	VHR7800, VHR7810, VHR8000SP, VHR8801SP, VHRD4800	3100p	
SHARP	VCH80, VCH81, VFH815	2800p	
	VCA33, VCA36, VCA43, VCA44, VCA46, VCA49	1500p	
	VCA55, VCA63	2200p	
SONY	SLV656, SLV715, SLV757, SLV777, SLV815, SLV825	4600p	
	SLV353UB	3200p	
	CCDF340E, CCDF500E, CCDV90E, CCDV95E, CCDSP5E	4800p	

Original Video Heads

MAKE	MODELS	PRICE
NATIONAL PANASONIC	NVG20, NVG21, NVG22, NVG25 NVG25, NVG28, NVG200, NVD48 PART NO: VEH 0343	3000p
	NVG33, NVG45, NVG46, NVL23 NVL25, NVL28 PART ND: VEH 0417	2900p
	NVJ30, NVHJ33, NVL20, NVL21, NVG30, NVG31, NVG40, NVG130 PART NO: VEH 0416	2700p

Audio Control Head

AMSTRAD ORIGINAL NO: 150751

Need on: AMSTRAD TVR1, 2, 3, VCR4600, 4600MKII, 4700, FUNAI VS2, VCR4600, 4800, 5200, 5600, 6600, VIP3000, 5000 Also fits: FIDELITY, FUNAI, HINARI, PROLINE, SCHNEIDER, TOWADA, UNIVERSUM ORDER CODE: AH01 PRICE: 1350p

ONDER CODE: AHOT PRICE: 135Up

AMSTRAD ORIGINAL NO: 153134

Used on: AMSTRAD DB390, 8904, VCR2000, 6000, 6100, 8600, 8602,
8603, VCR8604, 8700, 8704, 8714, 8800, 9005, 6244
Also fits: ANITECH, BONDSTEC, CASID, CRDWN, FIDELITY,
GOLDHAND, GRANADA, HINARI, MARQUANT, OMEGE, PROFEX, SCHNEDIER, SEG, SENTRA, SHINTOM, TASHIKO, TATUNG, TOWADA, UNIVERSUM ORDER CODE: AH02 PRIO PRICE: 1450p

Replacement Audio Control Video Sound **Head for National Panasonic**

PART NUMBER	MODELS	PRICE
VBR 0091	NVG7 etc	875p
VBR 0050	NV300, NV340 etc	875p
VBR 0061	NV777 etc	875p
VBR 0103A	NV250, NV450 etc	625p
VBR 0125		625p

8 way Preprogrammed Universal Remote Control

A single remote control to operate Televisions, Videos and Satellite

A single remote control to operate lelevisions, videos and satellite Receivers. Plus Auxilliary Options!

* Replaces up to 8 remotes with one * Simple 4 digit setup routine * Controls 1000s of models * Teletext functions with Fastext * Clear llerge key) layout * Code Search Facility * Stylish and easy to operate * Replace broken or lost remotes * Original Remote not required

Order Code: 8 WAY Price 1450p + VAT

Replacement	Video Cassette Housings	

MAKE	MODELS	CODE	PRICE
AKAI	VS35, VS53, VS55, VS56, VS75	CH18	2600p
GRANADA	VHSDP1	CH05	1100p
	VHSYJ2	CH01	2800p
GDLDSTAR	GHV1290P, 1291P, 1295P, 9400, 73401, GSE1295P, GSE1891P, 20001Q, 20051Q, VCP4200, 4300, 4301, 4305, VCP4306, 4311, 4315, 4316, 4320, 4321, 4325	CH25	2000p
	GHV51, 1221, 1232, 1240, 1241, 1242, 1244, 1246, 1248, GHV8000, 8200	CH26	2900;
FERGUSDN & J.V.C.	3V38, 3V39, 8943, 8944, 8951, 3V35, 3V36, 3V49, HRD 110, 111, 120, 121, 225	CH01	2800p
	3V42, 3V43, 3V44, 3V45, 3V48, 3V53, 3V54, 3V55, 3V57, 8945, 8947, 8948, HRD140, 141, 150, 157, 158, 160, 250, HRD257, 455, 565, 566, 725, 755	CH02	2800p
	8948, 8950, FV10B, 12L, 13H, 14T, 20B, 21R, 22L, 26, 395, HRD230, 430, 530	CH03	2600
•	3V58, 3V59, 3V64, 3V65, FV11R, 8950, 8951, HRD170, HRD180, HRD370	CH04	26001
	FV31R	CH19	4300
	HRD515, 520, 527, 540, 550, 580, 600, 610, 620, 660, 670, HRD830, 840, 850, 860, 4050, 6600, FV37H	CH20	24001
	HRD540, 580, 830, 860, 910, 960, HRD970, HRDX20, FERGUSDN FV57H	CH27	2400
.T.T.	VR3605, VR3905	CH01	2800
	VR3916, 3926, 3946, 3948, 3976, 3986, 3995, 3997, 6948	CH02	2800
	VR3916, 3926, 3946, 3948, 3976, 3986, 3995, 3997, 6948	CH02	2800
NATIONAL PANASONIC	NV730	CH06	4300
N.E.C.	N830EG, N831EG, N832, N833EG	CH01	2800
	N895	CH02	2800
PHILIPS	CASSETTE LIFT ASSEMBLY (69120366) DV186, 190, 286, 471, 562, 761, VR6180, 6182, 6185, 6285, VR6290, 6291, 6293, 6362, 6367, 6393, 6467, 6468, 6470, VR6561, 6670, 6760, 6761, 6870, 6970	CH05	1100
	VR6443	CH22	2900
	VR6448	CH23	2500
	49SB6	CH24	2500
SHARP	VCA100, VCH851, VCH852	CH22	2900
	VCA103, 103GV, 106, 106GVM, 254GVM	CH23	2500
	VCS211, 244, 5055, 605, VCB230, VCD806G, 810G, VCT212, 310, 410G, 610	CH24	2500
TELEFUNKEN	VR2970	CH02	2800
THDMSON	V320, 321, 323, 326, 4200, 4300	CH01	2800
	V342, 343, 352, 353, 360, 364, 368, 4210, 4230, 4260, 4400, V5500, 6000, 8540	CH02	2800
TOSHIBA	V55, V57	CH01	2800
•	V65, V66	CH02	2800

Service Aids

DESCRIPTION	VOLUME	CODE	PRICE
VIDEO HEAD CLEANER	75ML	SP01	140
SWITCH CLEANER	176ML	SP02	150p
SILICONE GREASE	200ML	SP03	170p
FREEZEIT	170ML	SP04	220p
FREEZEIT	400ML	SP16	550p
FOAM CLEANER	400ML	SP05	170p
ANTI STATIC	150ML	SP06	170p
AEROKLEANE	135ML	SP07	200p
AERO DUSTER	150ML	SP08	220p
AERO DUSTER	400ML	SP17	550p
PLASTIC SEAL	200ML	SP09	200p
GLASS CLEANER	250ML	SP10	160p
CDLDKLENE	250ML	SP13	200p
EXCEL POLISH 80	250ML	SP18	150p
ADHESIVE 120	400ML	SP19	190 _F
LABEL REMOVER 130	200ML	SP20	240p
REFURB 140	400ML	SP21	240p
TUBE SILICON GREASE	50 GRAMMES	SP11	200p
TUBE SILICON SEALANT WHITE	75ML	SP22	280p
TUBE SILICON SEALANT CLEAR	75ML	SP23	280p
TUBE HEAT SINK COMPOUND	25 GRAMMES	SP12	150p
DRIVE CLEANER	200ML	SP24	150p
SCREEN CLEANER	200ML	SP25	150p
COMPUTER CARE KIT	_	SP26	2100p

All the above items are manufactured by Servisol

If you purchase more than one Servisol Product, postage & package will be charged as follows:

300p for 5 cans

450p for more than 5 cans

CD Pick Ups

SONY OPTICAL PICK UP

PART ND: KSS210A SONY CDPC 301M, CDPC 305M 2200p Fits most Sony, Akei & J.V.C. Portable HI-Fi and Midi Systems

PART NO: KSS210B

CFD100, 105L, 120, 300, 440, 454, 455, 50, 500, 55, 58, 60 CFD68, 750, 755, 760, 765, 770, 775, 440S, W100, 100S

2200p

Cassette DC Motors

MOTOR TYPE	PRICE
6V MOTOR	170p
9V MOTOR	170p
12V CW MOTOR	170p
12V CCW MOTOR	170p
13.2 CCW MOTOR	290p

Cassette Tape Heads

HEAD TYPE	PRICE
MDNO HEAD	90p
STEREO-HEAD	110p
MINI HEAD	150p
AUTO REVERSE HEAD	200p

Soldering Accessories

DESCRIPTION	CODE	PRICE
ANTEX SOLDERING IRONS		
25 WATT 240 VAC (XS25W 240V)	S101	900p
15 WATT 240 VAC (XS15W 240V)	S102	900p
25 WATT SPARE ELEMENT	S103	450p
15 WATT SPARE ELEMENT	S104	450p
SOLDERING STAND & SPONGES		
SOLDERING STAND (MADE BY ANTEX)	S108	350p
SPARE SPDNGE	S109	55p
SOLDER		
18 SWG 500 GRAMMES	S110	500p
20 SWG 500 GRAMMES	S111	650p
22 SWG 500 GRAMMES	S112	700p
DESOLDERING AIDS		
SOLDER MOP STANDARD GAUGE 1.2mm x 1.5M	S107	80p
SOLDER MDP 1.2mm x 10M	S113	400p
DESOLDERING PUMP	S105	320p
SPARE NOZZLE	S106	60p

Transistors & ICS

A I WILDIDE	15.0	· ICO	100	W.	
BU 508A (PHIL)	80p	MJE 13009	100p	2SC 3885A	350p
BU 810	110p	MJE 18004	125p	2SD 633	70p
BUZ 90A	180p	STK 6982H	600p	2SD 1680	225p
CXA 1044P	550p	STK 7253	450p	2SK 793	400p
HA 13408	350p	TDA 2030H	100p	2SK 956	1400p
IRFBC40	400p	TEA 2019	200p	2SK 1023	550p
L272	200p	TMP 47C434N	1250p	2SK 1342	750p
L6210	250p	SAA 1300	200p	2SK 1358	600p
MC 3423P	100p	2SA 1540	55p	68000	500p
MJ 15015	250p	2SC 3788	60p	82S147	450p
MJ 15016	350p	2SC 3885	350p		

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

DEMATE CANTDAL

	REN		E C	CONTROLS		
	Description	Order	Price		Order	Pric
	GRUNDIG	Code		PHILIPS (continued)	Code	
	TP160E	RC 107	900p		RC 301	750
	TP200, TP300	RC 380	800p		RC 5301	750
	TP400	RC 401	675p		RC 5352	800
1	TP590-600	RC 600	850p		RC 5375	850
	TP390,TP610	RC 610	850p	RC5 STANDARD	RC 5534	850
	TD004	RC 621	850p		RC 5901	850
	TP630, TP650	RC 650			RC 5903	700
	TP660	RC 660	850p 850p		NC 3303	/00
	TP661			SABA		
		RC 661	850p	T6772	RC 149	900
	HITACHI			TC319-320	RC 328	875
	CLE800-CLE830	RC 140M	700p	TC356	RC 356	875
	A617402/655602	RC 192	875p	TC358	RC 358	850
	A512120/230	RC 900	800p	TC360	RC 360	800
	A514790	RC 901	800p	TC365	RC 365	800
	A5088470	RC 902	800p	SALORA		
ď	A518612	RC903	900p	SERIES L	RC 190	875
	SCL002	RC904	850p	86173	RC 882	850
	.C2096	RC 905	850p		NC 002	000
	A511940	RC 906	750p			
	655602H	RC 907	800p	RC218, RC222, RC228, RC238	RC 140M	700
	ſΠ			JXGE	RC 878	850
	IFB13, 14, 15	RC 143	875p	JXDE	RC 884	850
d	FS4	RC 148	850p	VHR2300	RC 890	850
	RG305	RC 305	675p	RC628	RC 865	900
ı	RG306	RC 306	825p			
ı	FS9/1-10/1	RC 307	850p	SHARP	5044014	
ı	VS5 RUK	RC 308	825p	G0121CESA, 123CESA, 204, 251	RC 140M	850
	VS4-1	RC 310	850p	SIEMENS		
1	MULTICONTROL (17C20)	RC 311	800p	FC616	RC 130	850
	KORTING		3006	FC631	RC 132	850
	18279, 18396, 18460, 18521 SE	RC 108	850p	FC742	RC 164	900
ı	40540 VTS	RC 108				•••
Ì	/	NC 100	900p	SONY		
	LOEWE			RM604, RM605, RM606 32 CHANNEL	RC 140	700
	DC11	RC 146	850p	32 CHANNEL	RC 140M	700
	MATSUI			KM613	KC 141	750
	010270601	RC 889	850p	RM632, RM636	RC 160	675
	VX770	RC 892	850p	TATUNG		
i	METZ			FXA	RC 877	850
	JAVA COLOR (6890)	RC 166	850p	RC70	RC 883	750
1	COLOR (7156)	RC 183	850p	FX70 FASTTEXT	RC 894	850
١	JAVA (7180)	RC 184	850p		NC 034	000
ı		1.0 104	ОООР	TELEFUNKEN		
ı	MITSUBISHI	5044014		FB632	RC 632 ST	850 _l
ı	939P/03607, 939P/03609	RC 140M	850p	FB639	RC 639 ST	850
ı	NOKIA			THORN/FERGUSON		
ı	SATELLITE	RC 550	850p		DC 242	CEO.
	NORDMENDE		-,	3V35-42	RC 342	650j
ı	TC2336	RC 351N	850p	3V31-32	RC 344	800
ı	CMC1, TC3519	RC 356	875p	3V57-58	RC 628	800
١	OCEANIC		۱ ' ا	TX10 TEXT TX10 STEREO TEXT	RC 732	575 ₁ 575 ₁
Į	390C9500	RC 339	900p		RC 738	
İ	ORION	000	ooop	TX9-90-100	RC 740	675p
ı	RC53	RC 892	850p	3V55, FV11	RC 783	800p
ı		NC 032	ooup	TX100 FASTTEXT	RC 785	650p
ı	PANASONIC ELIPE 1200	DC 200		TX100 STEREO FASTTEXT	RC 789	650p
ı	EUR51200	RC 200	800p	PROFESSIONAL	RC 790	650p
1	TC2200	RC 201	850p	TOSHIBA		
I	VSQ0357/NV730	RC 202	875p	CT937	RC 950	850p
ı	TNQ1621	RC 203	900p	CT9117	RC 951	800r
1	PHILCO	80		201R4B	RC 952	800p
1	CARVEL, CONCORDE,	RC 108	850p			
ı	MERCURY, TELESTAR		, I	UNIVERSAL PROGRAMMABLE R	EMOTE CONTI	ROL
١	TC10	RC 152	900p	Controls up to 4 different devices		
I	PHILIPS		ľ	remote controls including TV, audio		
١	RC5002,5154	RC 134	850p	(need original remote control		
1	KT3 NON TEXT	RC 135	825p	Order code: IR100R	Price: 1	950n
I	69117032	RC 178	875p	We stock Remote Controls for or		
I	69117194	RC 180	875p	models. Ring for further details		
I	RC5991-UNIV	RC 300	580p	models, mily for further details	VII OU 1-300-232	.J.

VCR	AL	.IGN	IMEI	NT	KIT

Price

750p 750p 800p 850p 850p 850p 700p

900p

875p

875p 850p 800p 800p 875p 850p

700p 850p 850p 850p 900p

850p

850p 850p 900p

700p 700p 750p 675p

850p 750p 850p

850p 850p

650p 800p 800p 575p 575p

675p 800p 650p 650p 650p

850p

800p 800p

CONTAINS:	SET OF 8	
SET OF 7 HEAD & TAPE PATH AUGNERS	ALLEN KEYS	
 RCA TYPE AUDIO & CONTROL HEAD POSITION TOOL 	* 0.90mm	
• RCA ADJUSTMENT TOOL FOR TAPE GUIDE PO	OSTS 1,27mm	
* RCA TYPE BACK TENSION TOOL	* 1.60mm	
* TENSION ADJUSTMENT TOOL FOR VARIOUS	USES 2.00mm	
VCR ADJUSTMENT TOOL	* 3.00mm	
3 Reversible Screwdrivers	Circlip Pliers	
Spring Hook Micro Screwdriver		
VCR Head Extractor		

Order Code: TOOL10 Price: 2900p **FUSES**

	TIME LAG (20mm)		QUICK BI (20mm	
Value	Order Code	Price	Order Code	Price
160mA	FUSE01	75P	FUSE17	60P
250mA	FUSE02	75P	FUSE18	60P
315mA	FUSE03	75P	FUSE19	60P
400mA	FUSE04	75P	FUSE20	60P
500mA	FUSE05	75P	FUSE21	60P
630mA	FUSE06	75P	FUSE22	60P
800mA	FUSE07	60P	FUSE23	60P
1A	FUSE08	60P	FUSE24	60P
1.25A	FUSE09	60P	FUSE25	60P
1.6A	FUSE10	60P	FUSE26	60P
2A	FUSE11	50P	FUSE27	60P
2.5A	FUSE12	50P	FUSE28	60P
3.15A	FUSE13	55P	FUSE29	50P
4A	FUSE14	55P	FUSE30	50P
5A	FUSE15	60P	FUSE31	50P
6.3A	FUSE16	60P	FUSE32	50P

FUSES		
CURRENT RATING	ORDER CODE	PRICE
CERAM	IC PLUG TOP	
3A	FUSE33	100P
5A	FUSE34	100P
13A	FUSE35	100P
20MM CER	AMIC TIME LAG	
3.15A	FUSE41	100P
4A	FUSE42	100P
5A .	FUSE43	100P
6.3A	FUSE38	100P
8A	FUSE39	100P
10A	FUSE40	100P
32MM CERA	MIC SLOW BLOW	1
8A	FUSE44	210P
10A	FUSE45	210P
15A	FUSE46	210P
20A	FUSE47	210P
38MM CERAMIC SLOW BLOW		
10A	FUSE48	875P

ALL THE ABOVE PRICES ARE FOR PACKS OF 10 FUSES

I.	C. PKU	IECIU	K
ICPF10	ICPF38	ICPN10	ICPN38
ICPF15	ICPF50	ICPN15	ICPN50
ICPF20	ICPF75	ICPN20	ICPN75
ICPF25	ICPN5	ICPN25	
	Price: Onl	y 30p each	
	ALIDIO CON	TOOL HEAD	

AUDIO CONTROL HEAD
Amstrad Original No: 150751
Used on Amstrad TVR1.2.3, VCR4600, 4600Mil, 4700
Funai V2S, VCR4600, 4800, 5200, 5600, 6600, VIP3000, 5000
Also fits: Fidelity, Funai, Hinari, Proline, Schneider, Towada,
Ultravox
Order Code: AH01 Price: £13.50

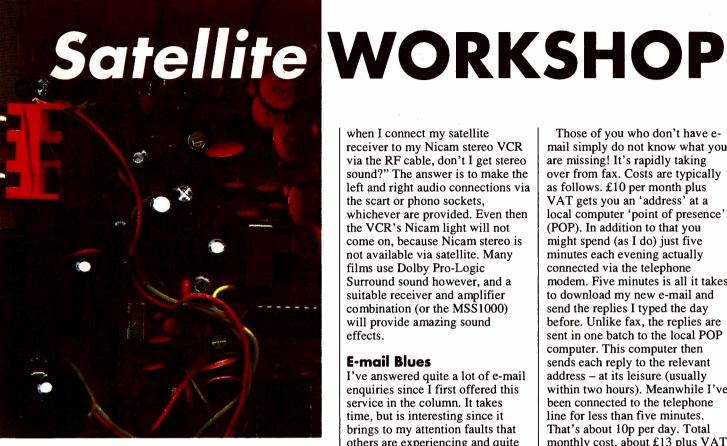
Order Code: AH01 Price: £13.50

Amstrad Original No: 153154
Used on Amstrad 008900, 8904, VCR2000, 6000, 8600, 8602, 8603, VCR8604, 8700, 8704, 8714, 8800, 9005, 9244
Also fits: Antitech, Boadstec, Casio, Crown, Fidelity, Goldhead, Granada, Hinari, Marguant, Omega, Protex, Schneider, SEG, Sentra, Shiptom, Tashiko, Tatung, Towada, Universum
Order Code: AH02 Price: £14.50

K.P. HOUSE, UNIT 15, POP IN COMMERCIAL CENTRE, SOUTHWAY, WEMBLEY, MIDDLESEX, ENGLAND HA9 0HB

Telephone: 0181-900 2329 Fax: 0181-903 6126

OPEN Monday to Saturday. Times: Mon-Fri 9.00-5.30 Sat 9.00-2.00



Jack Armstrong

aving just attended the dealer training course on the MSS200 at Pace's factory in Shipley I should be an expert on it. I haven't had many in for repair however. Early problems seem to have been solved during the warranty period: the receivers I see are those that have suffered from contamination or a mains surge caused by lightning.

These surges seem to destroy the chopper transistor without doing much other damage. I recommend that you always replace the 47uF, 400V mains bridge rectifier's reservoir capacitor however - I've seen a few that have failed.

Pace's training courses really are excellent. In the past, other manufacturers have charged £99 and thrown in a buffet lunch. Pace do the course and provide a full works restaurant meal plus service manual with updates free of charge. As spaces are limited, the training is for dealers' staff only. So book early. I don't have a list of future courses, but details can be obtained from Tricia Payter on 01274 532

Stereo Sound

Some questions come up time and time again. A favourite is "why,

when I connect my satellite receiver to my Nicam stereo VCR via the RF cable, don't I get stereo sound?" The answer is to make the left and right audio connections via the scart or phono sockets, whichever are provided. Even then the VCR's Nicam light will not come on, because Nicam stereo is not available via satellite. Many films use Dolby Pro-Logic

Surround sound however, and a

suitable receiver and amplifier

combination (or the MS\$1000)

will provide amazing sound

E-mail Blues

effects.

I've answered quite a lot of e-mail enquiries since I first offered this service in the column. It takes time, but is interesting since it brings to my attention faults that others are experiencing and quite often I can help. The only real problem is that I have a shocking memory. If someone sends me a question one day then refers to my answer a couple of days later I can't remember the original question!

A typical e-mail follow-up might go along these lines: "Dear Jack, thank you very much for your reply. Now I have another problem. Can you tell me why it causes wavy lines on the other three channels? Kind regards. . . When this first happened I spent a fruitless hour searching through previous replies to find the original question and answer. Now I don't bother. So if you get no reply, or a very curt "huh?", you know why!

I answer between five and twenty

messages a day. They come from all over Europe, and are not just in English. It all takes time. If you want to tell me about new faults and solutions, I'm very interested to know about them. If you have a problem, I am only too pleased to help: but please list all relevant details and use a separate message for each model. If you list several models and faults in one message it becomes confusing. Please don't use abbreviations: I don't always understand them. E-mail is not like Telex or Morse Code. Type full words - it doesn't cost.

Those of you who don't have email simply do not know what you are missing! It's rapidly taking over from fax. Costs are typically as follows. £10 per month plus VAT gets you an 'address' at a local computer 'point of presence' (POP). In addition to that you might spend (as I do) just five minutes each evening actually connected via the telephone modem. Five minutes is all it takes to download my new e-mail and send the replies I typed the day before. Unlike fax, the replies are sent in one batch to the local POP computer. This computer then sends each reply to the relevant address - at its leisure (usually within two hours). Meanwhile I've been connected to the telephone line for less than five minutes. That's about 10p per day. Total monthly cost, about £13 plus VAT.

The Cambridge RD480

A customer brought in one of these receivers with the complaint that some of the channels were missing. Suspecting a polarisation voltage problem, I checked this out on the bench but could find nothing amiss. So I gave it back to him. The following day he returned, complaining that he could receive only two programmes above a certain channel number. This was so - the receiver wouldn't tune higher than Sky Sports.

Closer inspection showed that the top of C172 (2,200uF, 35V) was bulging. The cause of this was not hard to find since the diodes that feed it also looked the worse for wear. In fact one of them was open-circuit.

For good measure I replaced all fourteen diodes in the power supply. As they are difficult to desolder without peeling tracks off the board, my usual approach is to snip the diodes flush with the top surface of the board then desolder the remaining leg sections from

beneath.

For reference, the tuning voltage supply across C172 should be in excess of 32V.

I had another RD480 in during the same week with the same fault, though this time the symptom was

that the screen would suddenly go blank five minutes before the end of a film. After cooling down, the set would work fine until five minutes before the end of the next movie – or so the customer said! It looked like a tuner fault but wasn't.

An Amstrad SRD545

This model is based on the SRD510, with a few circuit design improvements. The one that was brought in showed "your card is invalid" when a valid card was inserted.

Fitting known good decoder and card reader boards failed to cure the fault, which I eventually found was caused by R205 (10Ω) being open-circuit. This resistor is not present in the SRD510 – it's one of the improvements for better reliability. Oh dear! You'll find it near the front left-hand corner of the main PCB.

Another problem I've been seeing with these 'improved reliability' receivers is failure of C622 (2,200µF, 10V) in the 5V supply. When it goes open-circuit the feedback regulation system

raises all the secondary voltages. The result is usually a line of exploded electrolytics across the main board and the power supply. You can easily be fooled, because the only one that doesn't explode is C622 itself. Unfortunately the fault usually destroys the decoder module. If you have one of these receivers on the bench, monitor the LNB supply: the first sign of the fault condition is 60V going to the LNB which, believe me, smokes!

Manuals

I've received a copy of a service manual, produced by Grove Farm Publications, that covers the Grundig GRD100/150/200 /250/280/300, JVC TU-C200, Matsui RD600 and Philips STU3301/3501/3601 satellite receivers. It's excellent: comprehensive, with circuits, circuit descriptions and parts lists. Price is £14.95 plus £1 postage, from Grove Farm Publications, Grove Farm, Long Lane, Barnby In The Willows, Newark, Notts NG24 2SG.

The Discus Ellipse receiver forms the basis of a budget

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, fault symptom and history. Please mention Television magazine and your level of technical competence. 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.

motorised system. There are plenty of them in use and they are generally quite reliable. When a fault does occur however, life becomes difficult without service information. A manual (£10) and spare parts are now available from Satellite Surplus (Telford). Give Frank Martin a call on 01952 598 173 for further details. Frank is well known on the Radio Rally circuit, and has all sorts of satellite bargains.

Test Case 405

The evolution of satellite TV receivers and broadcast services has been very rapid. While a four- or five-year old TV set or VCR is regarded (around here, anyway!) as relatively new, a satellite box of the same vintage seems to have come out of the stone age. The need to update satellite receivers has been forced on users by the introduction of more channels, extra transmission frequencies, stereo sound, VideoCrypt encoding and other features to which older sets cannot be adapted. In contrast, TV sets and VCRs continue to receive, record and display all that's required.

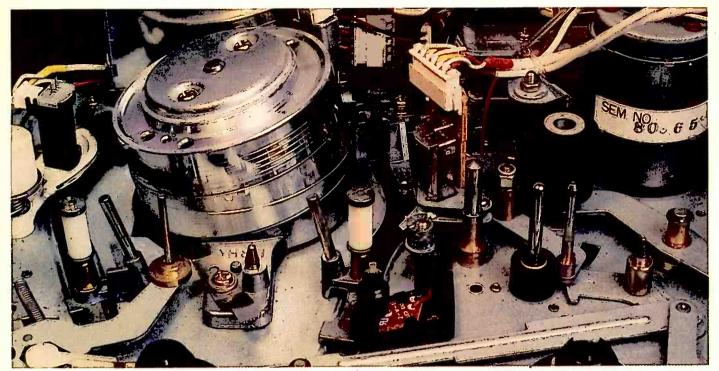
Despite this there is still some old satellite hardware about, mainly in the possession of those users who don't rent their gear. One such is Mr Todd, whose installation dates from the earliest days of Sky broadcasting. As things have progressed, Mr T has added a separate VideoCrypt decoder and has retuned his sat-box to obtain his favourite programmes within its limited channel capacity. Another problem had now emerged however, one that required our help. While most of the channels he wants were being received reasonably well some of them, particularly the premium movie channels and Sky News, had gradually deteriorated to the point where the pictures were suffused with grain and sparklies. The other channels were also affected when it rained, and retuning hadn't helped. That's what he told our Pam, who sent Doc Colin along in his big van to check things

Colin's intention had been to carry out a quick visual check on the installation and bring the receiver back to the workshop for attention. Everything appeared to be OK – except for the pictures on the afflicted channels of course – so the loan receiver was connected up. It was pretuned for use with a standard LNB, so there was no twiddling to be done. But the

pictures it produced were no better than those of the original set! Plainly the cause of the trouble was external to the sat-box itself: life is seldom easy these days, even for a delivery/installation technician. Colin departed, promising that another man would come. This turned out to be none other than Colin himself (staff holidays, you know). He brought with him ladders, a field-strength meter and other items. The day was bright, and Mr Todd wondered what it would all cost as he watched our man climb the ladder.

Colin unwound the tape and disconnected the feeder cable. It seemed to be in good condition, unsullied by water ingress. He then plugged in his field strength meter, carefully loosened the dish fixings and checked its alignment. No improvement in the signal level could be achieved. So the dish was once more clamped in position and the reception tried. There was no difference. Back down the ladder then, and back up with another LNB of the same type as the original: we are awash with these, removed from installations that have been updated. The pictures on the afflicted channels were now, if anything, a little worse than before! The polarisation and position of the substitute LNB had of course been carefully checked, and it was known to be in working order.

Perhaps something was wrong with the dish, though it didn't appear to be bent, damaged or distorted. Could there be a fault with the DC supply to the LNB? A meter check atop the ladder showed that the voltage was correct and didn't vary between good and bad channel reception. None of the other faults that occurred to Colin would discriminate between channels, duffing out the Movie Channel while leaving UK Living, Family Channel and others unscathed. So where did the cause of the trouble lie? For the solution, turn to page 819.



Servicing the Samsung VI710

John Coombes on what to check when electronic or mechanical problems are encountered with these popular VCRs

The Samsung VI710 is a basic model, with HQ, that was on sale during the 1988-90 period. A badged version was sold as the Logik VR955.

Power Failure Faults

If the clock display is lit up, the power switch is on but the power indicator light is not illuminated, check that the always 6V supply is present at pin 32 of the UPD75104CW-087 microcontroller chip IC601. If this supply is missing, check whether D601 and/or D602 is open-circuit. Both diodes are type 1N4148. If the voltage at pin 32 is present and correct, check at the power control output pin (56) of IC601 where the reading should be 0V. If this voltage is incorrect, check IC601 by replacement.

If there is no clock display, check whether the always 6V supply is present at pin 5 of connector CN101 on the power supply/regulator panel. Check the following items should this voltage be missing: the mains transformer PT101, the RBV-402 mains bridge rectifier D101 and fuses F101 (500mA) and F102 (2·5A). If F101 has blown, check the mains filter capacitor C101 which is probably short-circuit.

Should the always 6V supply be present and correct, check for 30V at pin 10 of CN101. When this voltage is missing, the following items should be checked: the 1N4002 rectifier diode D104, the KSC945 30V regulator transistor Q102, its 2-7k Ω collector feed resistor R108 and zener diodes ZD101 (24V) and ZD102 (6-8V).

The next thing to check is that the display device is receiving its 5·1V AC supply. Check back to source (at PT101) if this is missing.

There must be a 50 Hz signal at pin 8 of connector CN101. If this is missing, Q101 (KSC945) could be open-circuit, D103 (1N4148) could be short-circuit or leaky or R101 ($10 k\Omega$) open-circuit.

The STK5333 regulator chip IC101 could be faulty – check it by replacement. If necessary check the fusible resistors FR101 (1.2 Ω) and FR102 (2 Ω) which could be open-circuit.

Fig. 1 shows the circuitry on the power supply/regulator panel.

No Play

Incorrect or no tape loading is the first possibility here. Check for a high state voltage (4.8V) at pin 53 of the microcontroller chip IC601 and a low-state voltage at pin 52. If these conditions are not present, check IC601 by replacement. If they are correct, check the BA6209 loading motor drive chip IC205 by replacement and then if necessary the loading motor itself, again by replacement.

If tape loading is OK, check the operation of the tapeend sensor. Its output is fed to pin 18 of IC601, where the reading should be 0V. If the voltage is high, suspect the tape. If it is correct, check that the drum is rotating. The first things to check when the drum fails to rotate are that the 15V supply is present at pin 1 of connector CN101 and the 5V supply at pin 4. If these voltages are

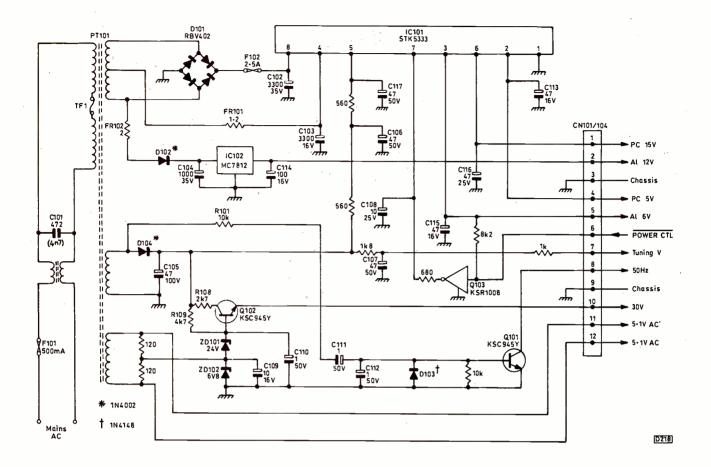


Fig. 1: The power supply/regulator circuitry used in the Samsung Model VI710. Supply line switching is carried out on the main PCB.

present and correct, suspect the microcontroller chip IC601, the BA718 chip IC202 or the drum motor assembly. Check these items by replacement.

If drum rotation is normal but the machine cuts out quickly, check for the presence of the 25Hz switching pulse waveform at pin 1 of IC601. It comes from pin 9 of the SD3624A servo chip IC201. If the 25Hz waveform is not present here, check that the drum PG signal is present at pin 17. Check it back to source if missing (via C211, CN201, CN204, CN214).

If the 25Hz waveform is OK, does the capstan motor rotate? If not and the 15V and 5V supplies are correct, IC601, IC201 and/or IC202 (BA718) and the capstan motor are suspect.

Another check to make if necessary is that turntable reel pulses are present at pin 2 of IC601. If these are missing, Q209 (KSC945) or R251 (470k Ω) could be open-circuit or the reel sensor Q005 (NJL5141EA) faulty – check it by replacement. If the pulses are present at pin 2, check IC601 by replacement.

Failure to Record

If the complaint is failure to record, first check that the machine will play – see previous section.

Insert a tape and press record. Does the record mode symbol appear in the display? If not, check whether the record safety input at pin 9 of IC601 is correct (5V). If this is incorrect, check IC601 and/or the safety tab switch by replacement.

If the record mode symbol is present, check pin 51

(rec) of IC601 where the voltage should be 5V. If it's low, replace IC601.

If these control arrangements are OK, check the video and audio circuitry as necessary.

No E-E Video

Check with the VCR in the stop mode. If the video signal is missing, check the following items: IC0303 (TA8605), C0353 (4·7µF), IC0302 (TA8606), Q0304 (KSA733) and low-pass filter FL0302. C0353, Q034 and FL0302 can go open-circuit. Make sure that the DC conditions around IC0303 and IC0302 are correct. C0366 (100pF) and R0359 (82k Ω), which are connected to pin 28 of IC0303, are possible suspects.

Loss of Playback Video

For playback, the PB5V supply must be present at pin 10 of IC0301, pin 4 of IC0302, pin 13 of IC0303 and pin 7 of IC0307. If this supply is missing, check Q112 (KSA928), Q113 and/or Q114 (both type KSR1004), by replacement if necessary.

If still in trouble use a scope to trace the signal path through IC0303, IC0302 and IC0301. By a process of elimination you'll locate the faulty chip or associated component.

Other possibilites are the TA7772 video preamplifier chip IC0307 and the heads.

Tuning Faults

First check that all channels can be selected. If not,

check that the strobe, clock and data pulses are present at pins 11, 12 and 13 of IC601. Suspect IC601 if they are missing – check by replacement.

Ensure that the data track between IC601 and the tuner is intact. If so, suspect the tuner.

In general, if the IF section is at fault there will be a blank screen, whereas if the tuner is faulty there will be either no picture or a snowstorm.

Deck Faults

The most common deck fault is tape chewing or creasing because the pinch roller is worn or faulty.

If there's no picture, just snow or bent verticals, or hooking over the top third of the screen, check the tension band assembly for wear or damage.

If playback of prerecorded tapes is marred by lines, check that the guide poles are correctly set up, using the FM waveform as a guide.

Tape slowing down or not being taken up by the spools is very often caused by lack of lubrication on the take-up and/or supply spool spindles. Only a spot of oil is required to give freedom of movement.

Wear on the lower drum assembly, though not common with this machine, can be responsible for a rolling picture, picture jitter, intermittent loss of the picture and poor or jerky visual search (usually only in the reverse direction). A scope check will generally show this: loss of contact between the tape and the heads will leave gaps between the sections of the FM waveform

If there is no play, rewind or fast forward, check the

idler clutch assembly for wear. Also the idler belt for wear or stretching.

Check the capstan belt if the picture quality varies. To prevent noisy play or record, ensure that the capstan flywheel spindle is lubricated. Sound variation can be caused by a faulty capstan motor.

If there is a loading fault that's purely mechanical, replace the loading motor assembly, which comes complete.

A worn audio/control head will cause poor/no/low amplitude sound.

Check the front-loading cassette unit if there is no fast forward and/or rewind.

Phototransistors Q003 and/or Q004 (both type PN202S) should be checked if the tape will not start or stop after fast forward or rewind.

Should the VCR fail to function when record is pressed, ensure that the record safety switch is OK.

If the machine won't accept a cassette, check the cassette switch. Failure to accept a tape, with possible grinding of the mechanics, should lead to a check on the side arm gears, the timing gear and the arm gear. Any one of these items may have stripped teeth or broken or cracked cogs. Another cause of failure to accept a tape is a bent or misaligned lid opener. If the loading operates correctly in the manual mode, check IC601 and the loading motor drive chip IC205 – by replacement. If the cassette doesn't drop down straight, or jams, check the cassette holder assembly. It may be bent, or the guide pins may be broken or out of position.

INCREASE YOUR PROFIT BY OFFERING YOUR CUSTOMERS A RADIO DECODING SERVICE

HUNDREDS OF MODELS COVERED.

EASY TO USE COMPUTER BASED SYSTEM.

TELEPHONE HELPLINE

REGULAR SOFTWARE UPDATES

USING THE PROVEN JOULE A-400

Works on any I.B.M. or compatible computer from an Amstrad 1512 to a Pentium.

PURCHASE OPTIONS

[1] STARTER KIT COVERING OVER 100 MODELS: £375.00 + VAT.

[2] INDEX SYSTEM COVERS ALL AVAILABLE MODELS: £275.00 + VAT.

PHONE NOW FOR MORE INFORMATION AND FREE DEMONSTRATION DISK

ELECTRONIC SOUND SYSTEMS

Hilton Road, Aycliffe Industriál Estate, Co. Durham DL5 6EN Tel: 01325 301007 or 307442. Fax: 01325 300189

SERVICING THE FUTURE

AUTHORISED SPARES AND ACCESSORIES DISTRIBUTORS FOR:

- SHARP
- PHILIPS
- JVC
- GRUNDIG
- TATUNG
- PACE
- NOKIA
- FERGUSON

SOUND & COMMUNICATIONS DIVISION

- BOSE
- TOA

*Genuine Manufacturers' Parts available for other Premium Brands

CD-ROM REVOLUTION

400,000 - Descriptions

340,000 - Part Numbers

280,000 - Products

3,500 - Pictures in colour

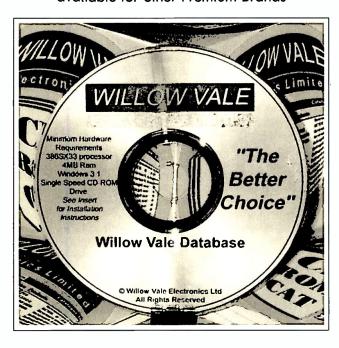
Now with interactive **COPLINK** giving up to the minute information and availability.

TECHLINE is always available. Should you require any technical help or advice on **0891 615915.**

(*all calls charged at premium rate).

DE-ZINE-LINE, Willow Vale's FREE planning service designing your professional sound and communication system. Phone or Fax Gerry Bevan on **01635 254218**.

C.O.P.S. computer ordering parts system via our 'viewdata' based order/enquiry system.





'The Better Choice'

Reading Head Office

Telephone: 0118 987 6444 Fax: 0118 986 7188

Manchester Office

Telephone: 0161 682 1415 Fax: 0161 682 9031



The Internet

he Internet is one of the most remarkable developments of modern times. No one knows how many people have access to it, but estimates suggest that the present number is in the region of 35-50 million. More and more people are coming into contact with the Internet, and a growing number of consumer electronics companies are developing Internet products. They include Philips, Sony, Akai and Mitsubishi.

What is it?

Basically the Internet is a worldwide link between computer networks. In practice however it's much more than this. The Internet is one of the largest sources of information in the world, much of it free. Almost anyone with a personal computer (PC), a telephone line and a modem to link the two together has access to the Internet. There is no controlling organisation, though there is an Internet Society. This consists of computer companies, academic bodies and others. It co-ordinates technical developments related to the Internet.

The Internet grew from an unlikely source, the US

George Cole reports on how it came into existence, how to get connected and the present state of the technology

Department of Defence (DOD). In the Sixties, during the height of the cold war, the DOD drew up a plan to create a network of computers, linking military and academic sites. The network, called ARPAnet, was designed so that if a connection was destroyed by enemy action data could be re-routed via another pathway, i.e. the system itself would survive. To enable different types of computer to 'talk' to each other, a common set of communication codes (a 'protocol') was developed. This is known as the Transmission Control Protocol/Internet Protocol or TCP/IP. It's stored in every computer that's linked to the Internet.

There was spontaneous growth of the Internet during the Seventies and Eighties as more and more government departments, research centres and academic bodies linked themselves to it. During this period the Internet was essentially a communications tool for researchers and academics – users had to operate rather unfriendly Unix computers. If, in those days, you had predicted that people of all ages wound one day be using the Internet you would have been regarded as a good candidate for the men in white coats!

A development by an Englishman, Tim Berners-Lee, in 1989 opened the Internet to the public. He was at that time working at the European particle physics research centre (CERN) in Switzerland. What he came up with was a system that made it easier and more efficient to share information with other computer networks. The World Wide Web, now simply known as the Web, was born.

The Web

The Web is based on a concept, called hypertext, which was created by computer scientist Alan Kay in the Sixties. A hypertext page on a computer screen looks like an ordinary text page, but some of the words are highlighted. This enables pages to be linked. Imagine for example that you are using your PC to read about VCR systems and come to the highlighted phrase 'audio systems'. Click on it with your mouse and you are taken to another page which explains the basic sound systems used in VCRs. While reading this page, click on the words 'depth multplex recording'. You are taken to another page which is devoted to the VHS hi-fi system. The technique gives you easy access to a great deal of related information.

The Web uses a system known as client-server. Some of the computers connected to the internet simply store information. They are called servers. Computers that request information from a server are clients. The Web makes the process of moving between servers much quicker and easier. Go back to your VCR page. The information you called up on VCR audio systems might be stored on a server in the USA while the depth multiplex recording information might be stored in Japan. Other information you might want to call up might be stored in computers in other parts of the world. The Web lets you hop from one server to another at the click of a button. It also creates 'hypermedia links', which means that while some information will consist of text there may also be sound, graphics – even video.

System development

Web servers communicate via a system called 'hypertext transmission protocol (http). Pages are created using an ASCII-based system called 'hypertext markup language (HTML). This explains why Web sites have strangelooking addresses such as

http://www.video.co

Many companies have Web sites nowadays, and addresses are precious things. Microsoft paid around \$10,000 for the site address "Slade", which is the name of its electronic magazine. Some people tried to make money by registering the names of large companies, but this practice has been outlawed.

The next step was the creation of a graphical Web interface, or 'browser'. The first popular browser, Mosaic, was created by the National Center for Supercomputing Applications. Other browsers have since come along, the most popular today being Netscape's Navigator. In less than two years this has acquired over 38 million users. A Microsoft browser, called Explorer, is to be built into future Windows operating systems. Browsers are popular because they are free and can be downloaded from the Internet. Browser developers make money by charging companies for the right to create Web pages that their browsers can read.

Another development that helped make the Web popular is the 'search engine', such as those offered by Yahoo and Infoseek. To use them, you type in a few words to describe what you are looking for, such as "television systems": the search engine then looks for all Web sites that are relevant. Some search engines are better than others. You very often get the names of dozens of sites, many of which have little or no connection with what you want.

The Web is only part of the Internet. There is also the Usenet, which consists of thousands of discussion groups concerned with virtually every subject under the sun! Many people use the Internet to send electronic mail. This



also involves odd addresses (e.g. joe@netco.com.uk).

Getting connected

For most people, access to the Internet involves the use of an Internet Service Provider (ISP) such as Pipex or Demon, or going via an online service such as CompuServe or AOL. ISPs tend to charge a flat rate (around £10-15 a month) and give unlimited access to the Internet. Online services generally give you several hours of free access to the Internet per month, then charge by the hour. Most people use a local telephone number to get on to the Internet. Despite this, the phone bills can soon mount up!

Using the Internet

You'll find almost anything on the Internet. Libraries, government agencies, commercial companies, advertising agencies, newspapers, television programmes and NASA are just some of the organisations with Web sites. The Internet reflects life, so you'll find good and bad things on it. Some governments, including the Chinese, are trying to restrict the public's access to the Internet in order to control free speech and political debate. This has proved to be difficult, as there are so many pathways into and out of the Internet.

The main concern of many parents is pornography sites. They exist, but you have to look hard for them and there are software programs that can help prevent children gaining access to unsavoury material. These packages, which have names like Net Nanny and Cyberpatrol, work by either blocking particular sites (which parents can designate) or looking for particular names. The latter can cause problems. For example Scunthorpe had to change its Internet name to Sconthorpe – I'll leave you to work out why!

The 'Platform for Internet Content Selection' (PICS) was formed by the Massachusetts Institute of Technology's World Wide Web Consortium. It has over forty members, including AOL, AT&T, CompuServe, IBM, Microsoft, Netscape, Time-Warner and Viacom. PICS is a technical standard for labelling Internet sites with respect to violence, sex and language. The idea is to create a universal labelling system that will be recognised by different hardware system and software packages. Labels can be created when a site is being put together, or added by a third party at a later stage. Computers can be set up so that they have access only to sites that are rated say zero for sex and violence.

There are also shopping sites on the Internet, but as things stand few people are making much money out of them. The reason for this is partly the culture of the Sofa surfing – access to the Internet using the Philips CD-Online system. Mitsubishi's Net TV, which incorporates a Web browser and modem.



Internet – freedom, universal access and paying nothing for the information! Most Internet transactions tend to be between commercial companies rather than members of the public. For example, company X sells company Y content to be displayed on the latter's Web site. Advertising and marketing companies are looking at ways of using the Internet, and a number of brands have Web sites. But the amount of advertising is so far very small – in May 1996, less than £13 million was made from Internet advertising.

Part of the reason for this is the profile of the typical Internet user – male aged 16-25, though the 30-50 age group is growing as more and more parents decide that the Internet can help with their children's education. Stories about hackers stealing credit card numbers have put many people off buying via the Internet. Visa and MasterCard are developing SET (Secure Electronic Transactions), a system that encrypts data to make bank card transactions over the Internet secure. The Dutch company DigiCash has produced an electronic cash system for Internet payments, and Olivetti has developed an Internet home banking system.

Hardware

Most people use a PC for Internet access, but a number of companies are developing products that use a television set for the display. Database giant Oracle has developed the 'Network Computer' (NC). This is a box that can be linked to a TV set or monitor and uses the Internet for access to and storing data. It has a RISC (Reduced Instruction Set Computer) microprocessor, a few megabytes of RAM but no hard disc – all the software is downloaded from Internet servers. Any documents created by an NC are also stored on the Internet. An NC could be used for wordprocessing, sending e-mail and for access to databases. Its advocates say that it should be much cheaper than a PC, since it uses fewer components – the first NCs will probably cost around £300-500.

Apple, IBM, Netscape, Oracle and Sun were to introduce a Network Computer reference profile this summer, to ensure that different makes of NCs provide a common set of features and facilities. VGA resolution or better was expected to be included, a pointing device, text input capability, audio and various telecoms and Net protocols. A security feature would make it safe to use credit cards and electronic cash with the Internet.

Those working on NCs include BT, Fujitsu, Hitachi, GoldStar, Lotus and Master Card. The UK company Acorn Networks (a spin-off from Acorn Computers) plans to be one of the first to manufacture and distribute NCs, which could be on the market this month (September). Akai has announced an NC called the Internet Connection. It will use a RISC processor from ARM, 4-6 Mbytes of RAM, a 28-8 modem – faster ISDN and cable modems will be used when these become available – and will link up with a TV set, being operated by a remote control handset or an infra-

red keyboard. Akai plans to launch it in the USA by the end of the year and says that the cost will be less than \$300 (£200).

The computer industry is divided over the prospects of the NC – some wonder whether consumers will want a cutdown version of a PC. But many believe there is a considerable market for products that enable consumers to gain access to the Internet via their TV sets.

Philips was one of the first companies to enter this market, with CD-Online, which was launched about a year ago. The system uses a CD-i player and a connection kit that consists of a modem, a software disc and connecting cables. The disc contains browser software which has been specially developed to improve the presentation of text and graphics on a TV screen. It also caters for music, animations and video clips – media that are slow to download from the Internet. The limitations of the system are that users cannot download and store data from the Internet, while sending e-mail is a slow and tedious business without a keyboard (Philips demonstrated a plugin keyboard earlier this year however). Unfortunately CD-Online has not been very successful: Philips has closed down its UK operation, though the service is still in operation from the Netherlands.

The lack of commercial success for CD-Online may be more to do with CD-i's failure to sell in quantity than the idea of viewing Web pages on the TV screen. Philips certainly thinks so, and with Sony has licensed technology from the US company WebTV Networks. This will lead to the development of set-top boxes giving TV viewers access to the Internet.

Microsoft and NBC have joined forces to develop a news system that combines TV pictures with Web pages. Earlier this year Mitsubishi demonstrated the Net TV, a set that includes a built-in Web browser and a modem. Companies such as Philips, Nokia and Hitachi have also developed TV sets that can display VGA or SVGA computer graphics.

The future

One thing is certain: the Internet will continue to grow and develop. Web pages will become more sophisticated and interactive, largely because a new programming language developed by Sun Microsystems, called Java, allows developers to create applets – miniature programs that run inside a Web page. As a result, it will be easier to add to Web pages features such as video clips and animations.

HTML was designed for static text and pictures. To view animation or video clips today, you have to download extra programs called plug-ins. Java will enable this to be done seamlessly. If you call up a Web page with a video clip, the applet for tuning it will be downloaded to your PC automatically. When you've finished looking at the page, the applet will be automatically removed from your computer.

One thing on which everyone agrees is that the Internet's data speed is at present far too slow. Even with the fastest telephone modem (28,800 bits/second), it can take many minutes to download pictures, sound or video. Compression systems like JPEG have helped, but use of the Internet will improve when more of us have access to ISDN or fibre-optic telephone links. Some cable TV companies are already installing cable modems that run at rates of tens of Mbits/sec. Some of us might even link up with the Internet via satellite: companies such as Eutelsat, Pace and SES (owner of Astra) are developing satellite data systems.

Even today there are some people who believe that the Internet will prove to be a short-liven phenomenon, like CB radio. But the wealth of material on the Internet, and the relatively low cost of gaining access to it, make this unlikely.

COMPATIBLE VIDEO HEADS **Highest Quality Components**

IMPORTED AND DISTRIBUTED BY:

Electronics



AIWA
AMSTRAD TVR2, TVR3,
TVR2, TVR3,
6000, 8600, 9000 £8.67 VT130, 138, 420 £21.94 NV250, NVG10 £13.36 BAIRD from £7.86 VT150, 260, 498 £26.82 NV3000, 340, 7000 £7.86 BLAUPUNKT from £7.86 VT550, VT990D £11.64 NVG30, 42 £14. ITT from £7.86 PROLINE from £8.67 VT770, VR90 £7.86 HRD2200, 7350 £7.86 PROLINE from £8.87 VY600, 3V39, 3222 £7.86 HRD231EM, 700 £9.67 SAISHO from £11.64 S25.49 HRD330, 440 £25.49 FIDELITY from £8.67 KENWOOD from £13.27 SAMSUNG FU44L £25.49 HRD330, 440 £25.49 SAISHO from £11.64 FUMAI VCR5600, 6600 £10.98 LOGIK VR955 £10.98 SANSUI from £7.65 CRS00, 6600 £10.98 GOLDSTAR GHYD21, 1891P £9.45 MARCONI from £7.86 TASHIKO from £8.67 KENWOOD from £7.86 SONY VR960 £11.64 SLC20E, 40 £14.50 CRS00, 6600 £10.98 MARCONI from £7.86 TASHIKO from £8.67 KENWOOD from £7.86 SANSUI from £7.65 CRS00, 6600 £10.98 CRS00 £11.64 SLC20E, 40 £14.50 CRS00, 6600 £10.98 CRS00 £11.64 SLC20E, 40 £14.50 CRS00, 6600 £10.98 CRS00 £11.64 SLC20E, 40 £14.50 CRS00 £14.50
BAIRD
BAIND
BLAUPUNKT from £7.86 Trop
DECCA
DUAL VR97 £28.87 ITT from £7.86 PROLINE from £8.6 VR70, VR90 £7.86 JVC SABA SABA FERGUSON (THORN) HRD2200, 7350 £7.86 PVR6068, VR7720 £7.86 3V00, 3V39, 3222 £7.86 HRD141, 160 £9.97 VR6038 £28.8 3V64, FV308 £9.67 HRD330, 440 £25.49 SAMSUNG FV44L £25.49 HRD755 £28.87 VB510, VX972 £10.9 FIDELITY from £8.67 KENWOOD from £7.86 SANSUI from £7.86 FUNAI LOEWE from £13.72 SHARP VC110, 481, 581 £11.6 VCR5600, 6600 £10.98 VR955 £10.98 SONY GOLDSTAR VR960 £11.64 SLC20E, 40 £14.3 GOLDSTAR ARRONI from £7.86 TASHIKO from £8.6
VR70, VR90 £7.86 HR2200, 7350 £7.86 £7.86 HRD141, 160 £9.97 £9.97 \$VR6038 £28.8 £28.8 £28.8 3V00, 3V39, 3222 £7.86 HRD321EM, 700 £9.67 £5.49 \$AISHO from £11.6 \$AISHO \$AISHO from £7.6 \$AISHO \$AISHO \$AISHO from £7.6 \$AISHO \$AISHO from £7.6 \$AISHO \$AISHO from £7.6 \$AISHO \$AISHO \$AISHO from £7.6 \$AISHO \$AISHO from £7.6 \$AISHO \$AISHO from £7.6 \$AISHO \$AISHO \$AISHO from £7.6 \$AISHO \$AISHO from £7.6 \$AISHO \$AISHO from £7.6 \$AISHO \$AISHO \$AISHO from £7.6 \$AISHO \$AISHO from £7.6 \$AISHO \$AISHO from £7.6 \$AISHO \$AISHO from £8.6 \$AISHO \$AISHO from £7.6 \$AISHO \$AISHO from £7.6 \$AISHO <td< td=""></td<>
FERGUSON (THORN)
3V00, 3V39, 3222 £7.86 HRD321EM, 700 £9.67 \$AISHO from £11.8 3V64, FV30B £9.67 HRD330, 440 £25.49 \$AMSUNG FV44L £25.49 HRD755 £28.87 VB510, VX972 £10.8 FIDELITY from £8.67 KENWOOD from £7.86 \$ANSUI from £7.8 FUNAI LOEWE from £13.72 \$SHARP VCR5600, 6600 £10.98 \$VR955 £10.98 \$ONY GOLDSTAR VR960 £11.64 \$SLC20E, 40 £14.8 GHV1221, 1891P £9.45 MARCONI from £7.86 TASHIKO from £8.8
3764, FV30B
FV44L £25.49
FIDELITY
FUNAI VCR5800, 7000 £8.58 LOEWE from £13.72 SHARP VC110, 481, 581 £11.8 VCR5600, 6600 £10.98 VR955 £10.98 SONY GOLDSTAR VR960 £11.64 SLC20E, 40 £14.8 GHV1221, 1891P £9.45 MARCONI from £7.86 TASHIKO from £8.6
VCR5800, 7000 £8.58 LOGIK VC110, 481, 581 £11.6 VCR5600, 6600 £10.98 VR955 £10.98 SONY GOLDSTAR VR960 £11.64 SLC20E, 40 £14.9 GHV1221, 1891P £9.45 MARCONI from £7.86 TASHIKO from £8.6
VCR5600, 6600 £10.98 VR955 £10.98 SONY GOLDSTAR VR960 £11.64 SLC20E, 40 £14.9 GHV1221, 1891P £9.45 MARCONI from £7.86 TASHIKO from £8.8
GOLDSTAR VR960 £11.64 SLC20E, 40 £14.5 GHV1221, 1891P £9.45 MARCONI from £7.86 TASHIKO from £8.6
GHV1221, 1891P £9.45 MARCONI from £7.86 TASHIKO from £8.6
LODAGO ACCUM CO AC
VCD4000 4350W C0 45
VCP4000, 4350W £9.45 MATSUI TATUNG from £7.8
GRANADA from £7.86 VX3000, VX8800 £11.64 TELEFUNKEN
GRUNDIG NEC VR2920, 7921 £9.5
GV210, GV220 £14.18 N9012, N9120 £11.64 TENSAI from £11.6
MVS400, 610 £9.31 N830EG £7.86 THOMPSON from £7.8
VS520E, 530E £13.29 NORDMENDE TOSHIBA
HINARI V100, 142, V9460 £7.86 V71, V88 £9.8
VXL10, VXL8 £8.67 V1010 £9.67 TRIUMPH from £11.6

Add £1.00 Handling charge and then add 17.5% VAT to total order

CENTURY WAY, MARCH, CAMBS PE15 8QW

FAX: 01354 51416 TEL: 01354 51289

SERVICE MANUALS

VARIOUS MAKES

AIWA, AKAI, AMSTRAD, BUSH, FERGUSON, GRUNDIG, HITACHI, JVC, PANASONIC, PHILIPS, SANYO, SHARP, SONY, TOSHIBA

VIDEOS from £4.00, TV'S from £3.00, AUDIO from £1.50

WRITE OR PHONE FOR FULL LIST

AMSTRAD SPARES AT LOW PRICES

HANDSETS		OPERATOR MA	NUALS
VCR4600	£6.00	PC1640	£10.00
VCR4700	£9.00	PC2286	£10.00
TVR2	£7.50	PC3086	£10.00
SERVICE MANUALS		MOTORS	
VCR6000/6100	£11.50	LLN4B21	£8.50
VCR9000	£9.00	LLA4B02	£8.50
SRD510/520	£4.50	MCB9B02	£3.00

WRITE OR PHONE FOR FULL LIST **CENTURY WAY, MARCH, CAMBS PE15 8QW**

HARRISON ELECTRONICS FAX: 01354 51416 TEL: 01354 51289

4 ABBEY STREET, ACCRINGTON. LANCS BB5 2FF

Tel: 01254 236521/390935 Fax: 01254 395361

TUBES SEND LARGE S A E. FOR TRADE CATALOGUE

CALLERS WELCOME **BUT TRADE COUNTER** CLOSED ALL DAY WED OPEN MON-FRI 9-5pm SAT 9.30-12 noon

> NEW R.F. MODULATOR Allows any device with AV outputs to be linked to aerial input of a standard TV

> > £23.95

REDUCED

Periswitch

superior Scart

switch unit with

full stereo sound

£29.95

SATELLITE NEWS!! WHAT DO YOU NEED? EUTELSAT 13°E, TV100 1° W, ASTRA ID???

Multi LNB Holder £ Astra ID Converter £ D2 MAC Decoder £1 Pace HSS 100 Rec. only £15	21.95 39.95 24.95 24.95 29.95 49.95 45.95 15.95 19.95 30.00 20.00 70.00
--	--

SPECIAL PURCHASE. Only £199.00 GOODMANS 6350 HI-FI SYSTEM

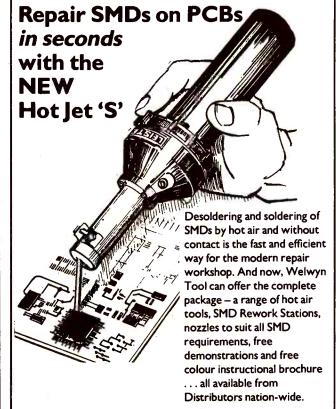
RK Stereo with Turntable, CD, Twin Cass., Radio - PLL Tuning

WE CAN'T LIST EVERYTHING THAT WE STOCK, OUR RANGE IS SO EXTENSIVE. WE HAVE A TRADE CATALOGUE. WE SELL—AERIALS, BRACKETS, BATTERIES, TUBES CABLE CONNECTORS, CMOS CAPACITORS, DISCOS, DIODES, ELECTRICAL ACCESS, FUSES, ICS, LOPIX, LEADS, MANIJALS, PUSH BUTTON LIGHTS, PHONES, PHONE ACCESS, POTENTIOMETERS, RELAYS, SEMICONDUCTORS, STRIPBOARD, SWITCHES, TUNERS, IV BATTERY LEADS, TV WALL BRACKETS, TOOLS, TEST EQUIPMENT, VALVES AND EVERYTHING YOU NEED FOR VIDEO REPAIRS – HEADS, IDLERS, TYPES, PINCH ROLLERS, CLEANERS, TEST CASSETTES, VIDEO TAPE.

HOW TO ORDER: Up to 1k ADD £2.00 per order P&P (U.K.). Heavier parcels, e.g. cables, service alds, degausing coils, please allow \$4.00 P&P (U.K.). Export orders charged at cost. First Class Mall is used whenever possible. Add 17.5% VAT to total except where it states zero rate. Over 3k will be sent by carrier - \$12.00 + VAT up to 15k (except tubes). We do not despatch on Saturdays.

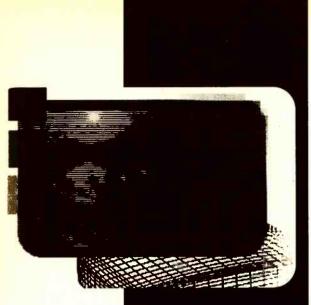
Goods will be despatched on the day we receive your order. If for any reason we are adouts will be desplaced in the day we clearly your deat. In or any lease, we do not of stock we will try to inform you as quickly as possible. We try our best to give a speedy, fast and efficient service. VAT invoice on request. Give us a ring — we'll give you service. Please ask if what you need is not listed — we will try to help. Prices are subject to change without notice. In some cases we may have to supply an equiva-lent. We need expiry dates for credit card orders. MIN. ORDER £1.





For further information, please ask for Reference No. TSM WELWYN TOOL COMPANY LIMITED 4 SOUTH MUNDELLS, WELWYN GARDEN CITY, HERTS AL7 1EH

TEL: WELWYN GARDEN (01707) 331111. FAX: (01707) 372175. PUT HOT AIR TO WORK FOR YOU



Reports from
Keith Evans,
John Edwards,
Glyn Dickinson,
Christopher Nunn,
Michael Dranfield,
Paul Hardy,
Graham Colebourn
and Richard Newman

Amstrad CTV1000

When the customer complains about a thin white line across the screen we usually assume that there's a field timebase fault. This time the line was vertical, which is much less common. Line collapse is usually confined to faulty scan coil connections or a faulty component in the feed to the coils. In this case the dry-joints were at the connections to the line linearity coil L7702, which is in series with the coils and does not have any damping components in parallel with it. **K.E.**

Sharp CV2123H

When power was applied to this set the red LED came on and the standby relay operated when asked, but the set remained dead. The chopper power supply was inoperative because the STR41090 chip had failed. **K.E.**

Sony KVX2532U (AE1B Chassis)

Two of these sets appeared in the workshop within hours of each other. The symptoms with the first one were intermittent loss of video, preceded by a broken up negative picture. Once again there were dryjoints in those IF transformers (T1 and T2). In this second-generation version of the AE1 chassis however

TV Fault Finding

the transformers are burried in the IF module, adjacent to the tuner.

The second set had a different intermittent fault, loss of right-hand channel sound. Dry-joints at the audio chip IC261 were the cause. **K.E.**

Tatung 140 Chassis

This tired looking set came in with no picture and uncontrollable motorboating and screeching from its loudspeaker. The power supply seemed a good place to start, and replacing the electrolytics around the TDA4600 chip is always a good idea. We found that the value of C808 ($100\mu F$) had dropped dramatically. A replacement restored the picture and sound. **K.E.**

Toshiba 2812DBT

This set was tripping because the line output transformer was faulty. A replacement produced sound and a picture, but there was lack of width and the set wouldn't go to standby. My thanks to Toshiba's technical department, which enabled me to solve the problem in minutes although I'm not an account holder. Correct standby operation was restored by replacing the 2SC2023 transistor O845 in the power supply: it's in series with the HT feed to the LOPT. The width problem was resolved by adjusting the factory set parameters, using the handset. It would take rather a lot of space to describe this here, but Toshiba technical will explain if you give them a call. Well done Toshiba! J.E.

Ferguson TX9 Chassis

When I switched this set on I thought it was suffering from a luminance fault. Blotches of colour relevant to the scene were present, but the raster was very dark, i.e. there was no picture detail. All was clear when I turned up the tube's first anode voltage control – it had no effect.

Although these sets use a diodesplit LOPT, the first anode voltage is obtained from a separate rectifier fed from the transformer. R232 (1k Ω), which is in series with this rectifier, was open-circuit. **J.E.**

Toshiba 285T8BZ

Field collapse was the complaint with this set. I found that the TDA8170 field output chip IC303 had a diagonal crack across its body. As the 27V supply was present at pin 2, a new chip was fitted. About two hours later, while the set was being soak tested, it returned to the field collapse condition. This time the $2 \cdot 7\Omega$ feed resistor R327 had burnt out.

I decided to refer to my trusty but tattered 'rotten faults' notebook. Sure enough there was a note about a modification. I removed D305 and fitted a 47Ω , 1W resistor in its place, then refitted the diode on the copper side of the board. I also replaced the 6-8V zener diode D303, and of course R327. There were no more problems after this. **J.E.**

Sharp C1430H

This set would shut down suddenly four minutes after being switched on. You could almost set your watch by it! Increasing the tube's first anode voltage slightly would immediately instigate the fault. This suggested that there was an excess beam current protection circuit fault. Investigation here showed that R623 $(1\cdot 2M\Omega)$ was open-circuit. J.E.

Ferguson TX10 Chassis

The customer said that this set "went bang then dead". The bang had been caused by C732 (10μ F, 63V) exploding. It's the reservoir capacitor for the -40V supply, which is derived from the line output transformer (T721). When a replacement capacitor had been fitted the set worked but tripped intermittently. On investigation I

found that T721's chassis connection pin was dry-jointed. It seemed best to resolder all the pins. After this the set was OK. J.E.

Philips 2A Chassis (110°)

"Line on screen" was the complaint with this set, meaning slight top foldover. We had replaced the field output chip IC7570 some months previously, also the associated electrolytics C2571 and C2575. The new parts were checked just in case but were blameless. We eventually found that R3573 in the linearity feedback network had fallen in value. It should be $51k\Omega$ in 110° sets. G.D.

Matsui 1455

The cause of a dead set is usually R603/4 or C613. Not this time! There was 300V across C604, and no distress in the power supply. We decided to check the transistors in the discrete-component chopper power supply and discovered that Q602 was leaky. As a precaution, the chopper transistor's base drive coupling capacitor C607 was replaced with a high-temperature component. G.D.

Orion W310

This old set displayed a good picture but there was field cramping and reduced height. Although we had no service information I decided to take a quick look and found that a small 4.7µF, 50V capacitor behind the field output transistors looked a bit poorly. A replacement restored the full field scan. **G.D.**

Philips CP90 Chassis

A dead set with the 95V HT supply present was the unusual fault with this remote control model. The start-up 22V supply was found to be very low because C2691 (330µF, 25V) was open-circuit. **G.D.**

Solavox 141

This set produced a snowy black and white picture with lack of height. It seemed reasonable to suspect problems with the multifunction TDA4505 chip IC101, so we started off by checking its supply which was low at 9V. The 12V supply was OK however. The cause of the problem was R104 in the feed to IC101. This 3.3Ω , fusible resistor had gone high in value. **G.D.**

Philips CP110 Chassis (early version)

The owner described all the symptoms of a very poor tube: the

picture took several minutes to appear, and when it did it was very dull – even with teletext. Our tube tester disagreed however. We soon found that the contrast control had very little effect on the voltage at pin 6 of the TDA3562A colour decoder chip, but disconnecting the beam limiter made no difference.

A transistor (T7672) that's not shown in the manual is connected to pin 6. It's fed from the 143V rail via a pair of resistors that are also not shown. Ripple on the HT line was switching this transistor on, and hence the beam limiter. Replacing the 22µF HT reservoir and smoothing capacitors C2670 and C2621 cured the trouble.

We've since had the fault with another of these sets. Later versions appear to have this circuit deleted. **G.D.**

Samsung CI5061

"Black band on the left" said the customer. Sure enough, the picture was shifted a couple of inches to the right. There's a phase preset control which is linked to the TDA8361 chip via R420 (820k Ω), with C404 (2·7nF) for decoupling. These two components tested OK, but replacing the capacitor restored the correct picture position. **G.D.**

Toshiba 285T8B

This set was stuck in standby but would apparently come on after several hours. It has two switchmode power supplies. The main one wasn't starting up despite being asked to do so. There was a supply at pin 9 of the TDA4601 chopper control chip but no output at pin 6. When a replacement was fitted the power supply merely chirruped. It seems that the chip has to be of a certain standard. When a Siemens one obtained from Toshiba was fitted the set worked normally. G.D.

Alba CTV3400

Intermittent audio was the problem with this set. Naturally as soon as I went anywhere near it with a scope or meter the fault disappeared. After some careful flexing, heating and freezing I discovered that the cause of the fault was the loudspeaker. The last thing you would expect with a fairly new set. C.N.

Ferguson D59F (ICC9 Chassis)

A blank raster with no sound was the complaint, though the on-screen graphics were present and pictures were obtained when a video signal was injected at the scart socket. I didn't have a manual, and horrible thoughts of expensive ICs ran through my mind. I decided to try scope checks, starting at pin 6 of the IF unit. The signal was present up to transistor TX07, which is a chip device, but it produced no output. A replacement cured the fault. C.N.

Sharp DV5103H

The chrominance information was displayed about one and a half inches to the right of the luminance information – just as if there was a luminance delay-line fault. The cause of the problem was the small plug-in non-volatile memory chip on the digital PCB. C.N.

Sanyo CBP2148

No power up was the complaint. The set came on in standby but refused to come out. A check on the mains switch's momentary contacts suggested that they were OK, so attention was turned to the standby circuit. As I had no luck here I changed the mains on/off switch, though the old one measured correctly. The replacement brought the set back to life! In this set the momentary contacts have to make before power is applied, not after as with many sets. Don't get caught out like me. C.N.

NEI 1451TX (Indiana 100 Chassis

This set powered up but there was no line drive. R605 ($5.6k\Omega$, 3W) in the HT feed to the line driver transformer was open-circuit. C.N.

Grundig CUC220 Chassis

If the tuning voltage is at 30V and the set won't tune in, the usual cause of the trouble is the U264B prescaler chip in the tuner/IF block. It's now no longer available, but a U644B can be used as a replacement.

To find this item, look under the small screening can. Pin 9 is the output at the edge connector. M.Dr.

Hinari TVA1

Intermittent loss of sound was the complaint with this TV/clock/alarm. The set is very similar to the Hinari CT4, but as the TVA1 has a headphone socket a 1:1 isolating transformer is required. This item was the cause of the fault. One of the transformer's pins had been wrapped but never soldered. **M.Dr.**

Grundig CUC2800 Chassis

This set produced low, distorted sound. We traced the cause to the U2829B dual sound intercarrier

chip. It's available from Willow Vale. M.Dr.

Sharp DV5150H

If the set trips back to standby after two seconds, replace the 3.3Ω safety resistor R612 right behind plug H, which is connected to the tube base PCB. R612 supplies 28V to the field output stage and seems to go opencircuit for no reason. M.Dr.

Bush 3114

There was some sort of field blanking fault with this set: the top part of the picture would be blanked out intermittently, and in addition black lines would run across the picture. A slight tap on the PCB would cure the fault.

A long time was required to sort this one out. It transpired that the field output chip's heatsink earth connection was dry-jointed. Problems of this sort are quite common with the Luxor SX9 chassis, in which use is made of heatsinks to link PCB lands. M.Dr.

NEI 1601R

The chopper transistor had blown, also the fuse. As I couldn't find any other obvious fault I replaced these items and sent the set on its way. About a month later it came back with the same fault. A very helpful NEI technical department suggested that I check RP36 (33Ω safety) in the snubber network associated with the rectifier diode that produces the 26V supply. When it fails the result can be excess current in the chopper transformer. Sure enough it was open-circuit, though it showed no physical signs of distress. A replacement restored reliable operation. P.H.

Osaki P141

The customer complained about very poor, distorted sound. I replaced the 6MHz ceramic filter and the TDA4505E chip without improving matters, then found that the sound coil T101 could be adjusted over the whole of its range with virtually no effect. I reckoned that it must be faulty, but spares for these sets are like hens' teeth. A check on several circuit diagrams suggested that a coil from the Nikkai TLG100T would be a suitable replacement. This proved to be the case. After fitting one I was rewarded with the sort of audio you expect from a small portable. P.H.

Proline 360TT (Tatung 170 Chassis)

The complaint with this set was

"loss of colour and going to lines". It was an extremely intermittent fault but did respond to tapping. Lots of bad joints were made good and the tuner was checked as the cause of the trouble seemed to lie in this area. With the scope in action and further tapping I found that the video was being lost after the teletext board. When this board was removed some of the edge connectors were seen to be badly soldered. Reflowing all suspect joints and refitting the board cured the problem. The fault was miles away from the tuner! P.H.

Huanyu 37C-3R

The set would intermittently go off, with the mains switch release solenoid operating. I checked the solenoid circuit but it seemed to be OK. What was actually happening was that the power supply was intermittently failing to provide any output. A new STR4011 chip put that right. The mains switch popping out is a characteristic of the circuit. The 40V supply to the solenoid circuit decays more slowly than the 5V logic supply: if the power supply cycles up before the 40V has disappeared, the micro reset caused by the arrival of the 5V supply trips the solenoid. **P.H.**

Philips G110 Chassis

This set was totally dead with the 148V HT supply low at only 20V. A replacement line output transformer restored the set to life, but the picture was far too wide. In addition the width varied with the brightness of the scene – this turned out to be a vital clue.

Disconnecting or shorting out the EW modulator driver transistor Tr7533 proved that the EW modulator was working. The culprit turned out to be the 6-8nF chip capacitor C2526 in the EW antibreathing bias circuit. It was leaky. We fitted a 100V polyester replacement – the original capacitor was rated at 50V. G.C.

Philips CP90 Chassis

This set would sometimes fail to turn on. In the fault condition a whistle was just about audible from the chopper circuit and the voltage on the 95V HT line was only 1.5V. These symptoms arose because the crowbar thyristor Thy6696 was conducting. A check on the three zener diodes in its gate circuit showed that they were all OK, and a new thyristor made no difference. Replacing the electrolytic capacitor C2700 ($4.7\mu F$), which decouples its

gate, put matters right – even though the capacitor's value measured correctly when checked. **G.C.**

B and O 7423

Every few minutes the picture would gradually lose its colour, fading out to black and white. Then full colour would suddenly be restored. Saturation is controlled by the DC voltage at pin 5 of the TDA3300 colour decoder chip. We found that the voltage at this point fell from the normal 3.1V to only 1V when the fault was present. The cause of the trouble was intermittent contact in the 100kΩ saturation preset potentiometer R42. Incidentally some B and O manuals show the customer brightness and colour controls interchanged. G.C.

Matsui 1440A/Saisho CT142RX

The picture suffered from flickery horizontal banding and patterning. This was being caused by HF oscillation in the UPC1378 field output chip. C417, a 15nF capacitor which is connected between pin 4 of the chip and chassis, was found to be open-circuit.

Other models in these ranges use the same circuit and chip, but the component reference and capacitor values differ. G.C.

Sony KVM14U

The customer complained about a burning smell and said that the picture had become dim and blurred. Once the back had been removed we saw that R852 ($1k\Omega$) in the first anode (G2) supply had fried to a crisp. The cause was D852, which was leaky. As diode types seem to be very critical with Sony sets, we obtained the correct type from CPC. This and a new $1k\Omega$ resistor restored a really excellent picture. **R.N**.

Philips 2B Chassis

No matter how familiar you are with some chassis you can still come across faults that lead you a merry dance. "Fizzing and smoke" was the complaint with this set. Its cause was the 1.5nF, 2kV (110° version) capacitor across the line output transistor – it had split. A replacement restored life to the set, but there was field collapse.

As I could find nothing amiss initially I replaced the field output chip. This made no difference. I then did what I should have done in the first place and carried out some meter checks around the TDA8370 timebase generator chip IC7550. It

soon became apparent that there was no 12V supply at pin 22, which meant that the chip was running on its start-up supply. R3535 (10Ω) was open-circuit because C2536 ($100\mu F$, 25V) was short-circuit. Replacing these two items brought everything back to normal. **R.N**.

GoldStar CIT2190

This set was brought in because it was dead. All that was wrong was a very bad dry-joint at D803 in the mains bridge rectifier circuit. **R.N.**

Philips CP90 Chassis

There was no picture at all, because the tube's first anode voltage was missing. The line output transformer was faulty. It's the first time I have had one fail in this way. R.N.

Goodmans 2180

Sound but no picture was the complaint with this set. The HT voltage was correct, but further checks showed that there was no voltage at the collector of the line driver transistor – the primary winding of the transformer was open-circuit. A replacement cured the problem. Spares for this set seem to be available only from Comet. When I asked about the

transformer I was told that I was the third person to enquire that day. So maybe this is a stock fault. R.N.

Hitachi G8Q Chassis

I've not had much experience with these sets. This one had a dead power supply. Q901 (BUZ71A), Q902 (SGSIF344) and a couple of diodes were short-circuit while R910 (0·5 Ω) was open-circuit. A colleague showed me an Hitachi service bulletin that recommends replacement of TH902, Q901, D905, D907, IC901, ZD902, Q902 and R910. Whenever the power supply fails it's essential to replace TH902.

CHS supply a repair kit (KIT HIT 1) that contains all the components required. It's not cheap, so make sure that you allow for this in your estimate. **R.N.**

Ferguson TX99 Chassis

The cause of this set's failure was traced to a short-circuit line output transistor. When a new R4050 had been fitted it worked perfectly. Ever mindful of intermittent drive faults however, I left the set on soak test. After about an hour the width would jump in and out intermittently. The eventual cure

was to resolder all the legs of the TDA4505 chip. **R.N.**

Telefunken 617 Chassis

This set had been to another dealer who had quoted a ridiculous figure to repair it. I hadn't seen one before, but found a Ferguson/Thomson ICC5 chassis inside. The set thumped three times before it shut down. After checking the usual items in the EW correction circuit I began to suspect the line output transformer. As there appear to be several different types, I decided to order one from a specialist.

With the new transformer fitted, I was rewarded with line collapse and realised that I had accidentally left the scan coil plug disconnected. After refitting this I expected the set to work, but it screamed in a most alarming way. I hastily switched off. A check across the scan coils revealed a dead short. On examining the coils more closely I found that a piece of fuse wire had been very neatly soldered across the tags, thus shorting them out. When this had been removed the set produced an excellent picture. Why this act of deliberate sabotage had been carried out remains a mystery. R.N.



HELP WANTED

The help wanted column is intended to assist readers who require a part, circuit etc. that's not generally available. Requests are published at the discretion of the editor. Send them to the editorial department - do not write to or phone the advertisement department about this feature.

Wanted: Emiscope 5in. 3/1 CRT for pre-war TV set. At worst a dud one will do — mine is missing. Also information on the Defiant Model TR947's EHT transformer and a black 9in. CRT mask for this set. Robin Howells, 40 Minster Road, Stourport, Worcs DY13 8AR or leave message with Clive on 01384 872 744 after 6pm.

Wanted: Circuit diagram for the monochrome CCTV camera supplied by Bull Electrical – in particular details of the pin connections (16) to the CCD image sensor. A. Turner, 25 Partridge Green, Pitsea, Basildon, Essex SS13 3EF.

Wanted: Complete, working field output/line oscillator panel for the Philips G9 chassis. Paul Proctor, 22 Toll Bar Road, Christleton, Chester, Cheshire CH3 5QX.

Wanted: Power transformer or panel for the Matsui Model MB10. W. Simmons, 2 Marston Crescent, New Lodge, Barnsley S71 1SY. 01226 732 404.

Wanted: Leader LCT910A CRT tester/rejuvenator for parts, a LOPT

for the Ferguson 350000 and a Data Precision 1350 digital multimeter for spares. Pat Foran, Crag, Castleisland, County Kerry, Ireland.

Wanted: IC701 (SC111281) or scrap board, also circuit diagram (photocopy OK), for the Sony D131 personal CD player. Also a capstan PCB for the Hitachi VT410. J. Thomas, 113A Parkgate, Darlington, Co. Durham DL1 1RZ. 01325 487 628 after 6pm.

Wanted: Panel M and LOPT for the Panasonic TC2051 (U5 chassis). Also front display panel for the Matsui 1422 and remote control units for both these sets. R. Kusz, 130 McCracken Drive, Viewpark, Uddingston, Glasgow G71 5ND. 01698 321 037.

Wanted: Flyback transformer type DCF1551 for the Bell and Howell VP1400 and any service information. B. Senior, 1 Bedale Close, Coalville, Leicester LE67 3BA. 01530 832 088. Wanted: FLH145 IC made by Siemens or information on it. It's a digital chip used in speed counting. Roy Brown, 44a Middle Road, Shoreham by Sea, West Sussex.

Wanted: Circuit diagram or manual for the Scopex 4D10 dual-trace scope. E.A. Coleman, 13 Hazelmere, Bedfont Close TW14 9PX. 0181 890 6796

Wanted: Circuit diagram/manual for the Pye VK4900 observation camera. Bob Green, Green Electronics, 6 Short Street, Lowestoft, Suffolk NR33 0JJ. 01502 513 960.

Wanted: Service manual for the ITT 3907 VCR. Dennis Leefarrs, Wigmore Cottage, Thruxton, Allensmore, Hereford HR2 9BD. 01981 570 409.

Wanted: Service sheet (photocopy OK) for the Memorex Model 1432R 14in. TV receiver. R.L. Pearson, 6 Eversley, Skelmersdale, Lancs WN8 6DP. 01695 721 957.

Wanted: LOPT (part no. M37 421 M6-318SP) for the Matsui Model MB10, new or second hand. Or details of a possible source. Bernard Sharp, 128a Desborough Avenue, High Wycombe, Bucks HP11 2SQ. 01494 465 899 (home), 01844 342 720 (work).

Wanted: Remote control units for the Selco 21SM.427 CTV with text and the Panasonic NVJ30HQ VCR. R. Flitcroft, 69 Cartmel Court, Blackley, Manchester M9 7HT.

Wanted: Epson PCE and PCAX2

operating and service information. A. Livesley, Beckgatehead, Barbon, Via Carnforth, Lancs LA6 2LJ. 01524 276 276.

Wanted: Program flap and remote control unit for the Akai VS-A77EK. M.A. Foster, 43 St Paul's Close, Aveley, South Ockenden, Essex RM15 4SH. 01708 860 265.

Wanted: An instrument for measuring the strength of magnets and magnetic fields. Have for disposal a pile of pre-1985 TV/VCR manuals. John, TV Hire, 10 Clapham Park Road, London SW4 7BB. 0171 622 7762.

Wanted: Control unit and remote control for a Finlux 562 obc. A. Freeman, 414 Canterbury Road, Densole, Folkstone, Kent CT18 7BH. 01303 892 812.

Wanted: Circuit diagram (photocopy OK) for the Philips CTX-E chassis. S.A. Varden, 18 Drayton Way, Nuneaton, Warwickshire CV10 9ER. 01203 393 010.

Wanted: Circuit diagram (photocopy OK) and parts list for the Panasonic VW-AM10 camcorder AC adaptor/charger unit, also a circuit diagram for the Hinari Model CT5. R.W. Goad, G4EFA, 7 Chipstead House, Chipstead Road, Cosham, Hants PO6 3JJ.

Wanted: Source for a TEA1064A chip for a BT answerphone and an IF panel for the Pye 725 chassis (or can anyone align the one I have?). S. Furley, 3 Ivy Place, Tantobie, Stanley, Co. Durham DH9 9PT. 01207 282 988.

Wanted: I have an ITT Cine Vision TV Projector with no model number. Can anyone identify it? Ron Cavalla, 74 Wendling, Southampton Road, London NW5 4QU. 0171 813 0060.

Wanted: Service manual or circuit diagram for a Western Systems monitor, which was made in Korea. Identifying marks are KEC Model CAE14RG or WS14RGVL. John S. Prescott, 30 Bangor Avenue, Bispham, Blackpool FY2 0HB. 01253 352 429 (after 6pm).

Wanted: Details of the teletext power lead assembly PL615 for use with the Ferguson TX100B chassis and the PC1637-022A remote control PCB. I have a problem linking them to make a retrofit teletext kit work. Jim Doherty, 14 Lovedean Lane, Horndean, Waterlooville, Hants PO8 8HH. 01705 593 463.

BACK COPIES

We have available a limited stock of the following back issues of *Television*:

1992 February, April, May, July, August, September, October, November and December

1993 January, May, June, July, August, September, October and <u>December</u>

1994 January, February, March, April, May, June, July, August, September, October, November and December

1995 January, February, April, May, June, July, August, September, and December

and December

January to date

1996

Copies are available at £2.75 each including postage. Send orders to:

Reed Business Publishing, Television Back Issues, Room L302, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

Make cheques/postal orders payable to Reed Business Publishing Ltd.

ELC EAST LONDON COMPONENTS AUDIO TELEVISION VIDEO COMPONENTS AT VERY KEEN PRICES TEL: 0181-472 4871 FAX: 0181-503 5926

REMOTE CONTROLS FROM £7.99 ASTRAD Converter IDLER TYRES 50p 1+, 25p 10+ VIDEO HEADS FROM £6.99

Over 200 models at very attractive prices AKAI, AMSTRAD, FERGUSON, FISHER GOLDSTAR, HINARI, HITACHI, LOGI, MATSUI, ORION, PANASONIC, SAISHO, SHARP AND MANY MORE VIDEO SPARES.

VIDED IDLERS, CLUTCHES BELT KITS, PINCH ROLLERS BACK UP BATTERIES, TV SWITCHES, CD SPIN MOTORS **FAULT FINDING BOOKS FOLIVALENT BODKS** JAPANESE TRANSISTORS RESONATORS, THERMISTORS HITACHI TH902 £1.30 TRIPLERS UNIVERSAL £4.99 WITH FOCUS £7.99 CHC2410 £16.99 POWER SUPPLY MOD KITS **FUNCTION SWITCH** 85P

ELC EAST LONDON COMPONENTS 63 PLASHET GROVE, EAST HAM, LONDON E6 1AD. TEL: 0181-472 4871 two minutes walk from Upton Park Tube Station

VISIT OUR SHOP OPEN MON-SAT 9AM-7PM 100's OF TOOLS, COMPONENTS, INSTRUMENTS, REPAIR KITS, BOOKS & CABLES TO CHOOSE FROM ADD £1.50 P/P + 17.5% VAT ALL GOODS DESPATCHED SAME DAY PRICE SUBJECT TO CHANGE WITHOUT NOTICE VISA ACCESS ACCEPTED. MIN ORDER £5.00









SOCKET

CTV2200 CTV2210 TVR1/2/4 14.99 14.99 16.99 16.99

16.99 X E/S

24.99 24.99 24.99 24.99 24.99 24.99 16.99

19.99 A 16.99 16.99 16.99 16.99 16.99 16.99

19.99 19.99

TA7205 TA7222 TA7240 TA7241 TA7264 TA7269 TA7271 TA7273 TA7283 TA7283 TA7283 TA7288 TA7283 TA7288 TA7289 TA7680 TA7680 TA7680 TA7680 TA7680 TA7680 TA7680 TA7680 TA7680 TA8210
DEGUSSING ROD £29.99 VHS ALIGNMENT TAPE

BAND TRACKING, TAPE TRANSPORT EMPICTU CURVE, AUDIO SYNC HEAD AZIMUTH TRACKING PLAYBACK SWITCHING POINT £39.99

PATTERN GENERATOR

Colour bar, Cross hatch, Staircase. COMPACT PORTABLE £84.99 only

Capacitance Meters
Capacitance Meter PG015



An accurate, capacitance meter providing measurements over a very wide range.

0 TO 2000UF **ACURACY 0.5%** £29.99

Transparent Service/Cassette



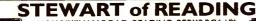


WE HAVE THE WIDEST CHOICE OF USED OSCILLOSCOPES IN THE COUNTRY	
Philips PM3295 Dual Trace 350MHz Delay, Cursors etc. 4 H.P. 54200A Digitating Oxcilloscope 50MHz. Tektronix TAS465 Dual Trace 100MHz Delay Cursors. A Tektronix 2445 4 Ch. 100MHz Delay Cursors. Tektronix 465 Dual Trace 100MHz Delay Sweep. Tektronix 465 Dual Trace 100MHz Delay Sweep.	2000
H P 54200A Digitizing Oscilloscope 50MHz	1000
Tektronix TAS465 Dual Trace 100MHz Delay Cursors4	1100
Tektronix 2445 4 Ch. 100MHz Deby Cursors	1500
Tektronix 465 Dual Trace 100MHz Delay Sweep	£400
Tektronix SC504 Dual Trace 80MHz in TM503 Philips 3065 2+1 Channel 100MHz Dual TB/Delay	.400
Philips 3065 2+1 Channel 100MHz Dual TB/Delay	₹700
Tektronix 22 3 Dual Trace 60MHz Harneg 705 Dual Trace 70MHz Delay Sweep Hameg 605 Dual Trace 60MHz Delay Sweep Component	.2350
Hameg 705 Dual Trace 70MHz Delay Sweep	.63/5
Tester	4450
Tester	400
Philips PM3217 Dual Trace 50MHz Delay Sweep	(240
hanter SSS702 Dual Trace 20MHz	€200
hvatsu 555702 Dual Trace 20MHz.	.£200
Hirschi V209 Dual Trace 20MHz Mains Rattery	. €400
Philips PM97 Dual Trace 50MHz SCOPEMETER Dig Stora	ge
25M/Samples	.2800
Leader LCD100 DMM/SCOPE 200KHz Digital Storage LC	CD.
25H/Samples Leader LCD100 DMM/SCOPE 200KHz Digital Storage LC Display Tektronix 468 Dual Trace 100MHz Delay Sweep Digital	.£300
Tektronix 468 Dual Trace 100MHz Delay Sweep Digital	****
Storage Hitachi VC6041 Dual Trace 40MHz Dig Storage 40 Mega	.£750
Hitachi VC6041 Duai Trace 4011112 Dig Storage 4011ega	6450
Sample	6400
Tektronix 434 Dual Trace 25MHz Analogue Storage	€250
THIS IS II IST A SAMPLE - MANY OTHERS AVAILAR	u e
H.P. 8620C Sweep Oze with 86220B 2-18.6GHz. H.P. 8620C Sweep Doz with 86220B 0-10-24GHz. H.P. 8620C Sweep Doz with 86222D 0-10-24GHz. H.P. 8620C Sweep Doz Mith Wall Frame only H.P. 8626 Sweep Doz Mith Wall Frame only H.P. 8656A Synthesised Sig Gen 0.1-990MHz. Wiltron 6410A Programmable Sweep Gen 1-2GHz. Marcon 2022 ANVFM Sig Gen 10KHz-1GHz. Harcon 2022 ANVFM Sig Gen 10KHz-1GHz.	
H.P. 8620C Sweep Osc with 862908 2-18.6GHz	LZUUU
H.P. 8620C Sweep Osc with 86222D 0.01-2.4GHz	12000
H.P. 8620C Sweep Oscillator Main Frame only	(1750
M/P. 8656A Synthesised Sig Gen U.1-77011712	1500
Marroni 2022 AM/FM Sig Gen LOK Hz-LGHz	61600
Marconi 2019 Syn AM/FM Sig Gen 80KHz-1040MHz	£1750
Marroni 2018A Syn AM/FM Sig Gen 80KHz-520MHz	61000
H.P. 8640B PhaseLock/Syn Sig Gen 500KHz-512MHz	.£800
Marconi 2012 APPIPT 3IG GEN TOKTYZ-IGHTZ Marconi 2019 Syn AMFEM Sig GEN 80KHz-1040MHz Marconi 2018A Syn AMFEM Sig GEN 80KHz-520MHz H.P. 8640B PhaseLock/Syn Sig GEN 500KHz-512MHz H.P. 8640A AMFEM Sig GEN 500KHz-1024MHz MEM	.£750
Farnell PSG520 Syn AM/FM Sig Gen 10MHz-520MHz Farnell SSG520 Synthesized AM/FM Sig Gen 10-520MHz	. £600
Farnell SSGS20 Synthesized AM/FM Sig Gen 10-520MHz	2400
H.P. 8160A Programmable Precision Pulse Gen SOMHz H.P. 435A Power Meter with 8481A 0.1-18GHz	. 4400
H.P. 8160A Programmable Precision Pulse Gen 30MHz	(1250
H.P. 435A Power Meter with 8481A U.1-18GHZ	. LOUU
H.P. 4277A LCZ Meter with Test Fixture	4450
Wayne Kerr 4225 LCR Meter R & S Video Noise Meter UPSF2 with UPSF2E2 40Hz-	
IOME	£1500
HP 3335A Synetheized Level Generator.	POA
H.P. 3335A Synethsized Level Generator H.P. 3336B Synthesized Level Generator 10Hz-21MHz	£800
H.P. 3581 A Wave Analyser 5Hz-50KHz LED Readout	£600
	\neg
BRUEL & KJOER EQUIPMENT AVAILABLE	
DI FACE ENIONINE	

=	PLEASE ENQUIRE
	SPECTRUM ANALYSERS
THEFT 2 1	LP 865.6 0.01-27G/Hz

Marconi 2305	Modulation Meter SOOKHz-2GHz£2250
Paral 9008 A	Modulation Meter 500KHz-2GHz
Cacal 20000 Au	tomatic Modulation Meter 30MHz-1.5GHz £250
Racal 9009 Au	TOMATIC Production Preter Serving-1.30mz 6234
I H.P. 331A Dis	stortion Meter 5Hz-600KHz Manual 0,1%£100
Manner TEXX	31A Distortion Factor Meter 20Hz-20KHz
Plarcom FF23	31A Distortion ractor rieter zonz-zond iz
I 0.05% Un-use	d£150
Schlumber Sta	bilock 4021 Radio Test Set 6800
LUD CAAR C	17E0
H.P. 5342A C	ounter 24GHZ HPIB
I H.P. 5340A C	dd (150 bilock 402 Radio Test Set (880 ounter 24GHz HPIB (1750 ounter 10Hz-18GHz (750
Marroni 2435	Freq Meter 10Hz-2GHz 1500 equency Counter I. 3GHz (Options GPIB & High 1750 equency Counter I. 3GHz (Options GPIB & High 1750 equency Counter/Tener 160MHz 9 dign 1500
12 0011 2455	C 13CH (O COID & Har
Kacal 1998 Fro	equency Counter 1.3GHz (Options GPIB & High
Stab)	
Dami/Dam 100	I I Injured Counter/Timer IA/Mily 9 digit (500
Racas Dana 177	TO CHIVETSAL COURSE THREE TOOL II 12 7 GIG C 4300
Racal 1990 Ur	universal Counter 120MHz 7 digit
Marroni 2437	Universal Counter/Timer DC-100MHz 8
diale	£175
digit	
Raca 99 6 Fr	equency Counter 10Hz-520MHz
Raral 9906A	Iniversal Counter Timber 10Hz-200MHz. £250
14	T BMC V-la
1 Plancon Zbiu	If de N. D. volumeter with GFID
Solartron 7 5	61/2 digit Computing Multimeter IEEE/RS232 £450
1 Solarsoon 715	0.61/2 High DMM with IEEE True RMS AC £350
C. L 704	C 4 (0 45-14 Marter Material Marter M
Solartron /04	equency Counter 10Hz-520MHz
Fluke 8842A	Digital Multimeter
Fhike 8050A	Bench/Portable DMM 4 1/2 digit True RMS £225
Elute OOLOA	Bandy (Barrable DMM 1 /2 digit True BMC /IEA
FIUKE BUTUA	Denovronable Dinin 372 digit True Kins £130
I Fluke 77 Hand	\$ 4/2 digit Multimeter Volts/Amps/Ohms. 680 Digital Puldumeter Digital
Thorday 1503	43/4 digit Multimeter with Adaptor
Transpired Transpired	10 11 . O O
Marconi IFZ/	UO Universal Bridge, Batt Op from 173
Wayne Kerr E	3424 Dig. Component Meter LCR£150
Bahin OM65	Handbald Die Morer Inwed 175
KOOIII OI 103	CTI C T T T T T T T T T T T T T T T T T
Telequipment	CI/I Curve Traces with Adaptor
H.P. 5006 Sign	nature Analyser£150
LID SOMA S	ionarius Analyses (100
Dt.III - Dt4FC3	N TO C 1 A 1
Philips PM333	JY IV Colour Analyser
Philips PM556	5 Waveform Monitor£300
Philips PM991	7 Video Line Selector £200
Campa i i io	7 video Line Selector
remographic	132 NELOTUET TEST SEL.
Unaohm EPS	Ol Audio Analyser£350
Philips PMSSC	19 Colour Pattern Generator £250
Plant Franco	ina Calaus Bas Canamatas (160
DIALK STATE OF	IOI COIOU DAI GENE AUT
Leader LSG2	16 Generator430
I Kemo Dual V	ion Colour Bar Generator £160 16 Generator £450 (ariable Filter VBF/3 0.1 Hz-10KHz £200
Racal/Dam 01	104 RF Power Meter MHz-I GHz; 10mW-
200044	C400
300W	400
Racal 9100 At	bsorption Wattmeter IMHz-IGHz 0.01-3W £100
Di-Log (Seam	and) RC-24 RCCB Test Unit Unused £100
Di Los Scan	I Tablica Combilers Tester I lowed 4100
DI-FOS (265M	rard) RC-24 RCCB Test Unit Unused
Thandar TG1	02 Func. Gen 0.2Hz-2MHz Sine/Sq/Tri/TTL (80
F	Cian Carres One 10He IMH-
rameli LFMZ	Sine/square Osc. 10/12-11/172
I Farnell AP60	-50 0-60 Volts 0-50 Amps Autoranging£ 1000
Farnell H40/2	ine Square Osc. 10Hz: 17HHz. 253 Sine Square Osc. 10Hz: 11HHz. 250 50 0-60 Volts 0-50 Amps Autoranging. 21000 0 Mk2 70 Volts 5 Amps/35 Volts 10 Amps. 2400
Ca TC\/76	O MILO 70 Vales E Amer/36 Vales I O Amer
rarmen (5V/L	TIRE TO YOUR S AMPS 33 YOUR TO AMPS.
Metered	£200
Farnell 30.5	0-30 Volts: 0-5 Amps. 2 Meters
Farmell LT20	0-30 Volts; 0-5 Amps. 2 Meters
rarmen c 130-	2 0-30 TOIG, U-2 Miles. 1 Wice
Farnell L30-2	. 0-30 Volts; 0-2 Amps. Metered
Thurlby-Ther	ndar TSP3222 Programmable 32V; 2 Amos Twice.
STID. DISIGN	20040 0 2014 to 0.2 Acres Today District (225)
I hurlby PL32	TUCHTO U-SU YORS; U-Z AMPS. TWICE DIGITAL 1223
I Thurlby PL31	OOMD 0-30 Volts: 0-1 Amp. Twice Digital £175
Heme 100 A	200MD 0-30 Volts; 0-2 Amps. Twice Digital 225 100MD 0-30 Volts; 0-1 Amp. Twice Digital 6175 C/DC Clip-on Ammeter Digital 6175 109M EHT Meter 0-40KV
I Pondest	TOOM ELIT Masses O JONY
i brandenburg	
	TUTTI ETT I TRUET U-TUKYETT3
	TOTT EN THECE OFFICE TO THE ENTER TH
	WEOLUDMENT

NEW EQUIPMENT





110 WYKEHAM ROAD, READING, BERKS RG6 1PL Telephone: 01734 268041 Fax: (01734) 351696 Callers Welcome 9am-5.30pm Mon-Fri



TRANSWORLD SATELLITE SYSTEMS

THE EUROCRYPT SPECIALISTS

THE RIDINGS, NORMANBY, WHITBY, NORTH YORKSHIRE Y022 4PS Telephone / Fax: 01947 880016

THE TRANSWORLD EUROCRYPT UPGRADE AS Reviewed in The March Issue Of 'WHAT SATELLITE TV' D/D2 MAC EUROCRYPT M/S/S+, TELETEXT, WIDE SCREEN OPTION, SUB TITLE REMOVAL FROM £149.00 NEW: SVHS NOW AVAILABLE Kit - £20.00 installed - £26.00 EUROCRYPT MAC RECEIVER DECODER, 100 CHANNEL D/D2 MAC, M/S/S+, FULL MENUS £169.00

SPECIAL OFFER! WE WILL CONVERT YOUR FERGUSON SRB1 OR PHILIPS STU902 BSB RECEIVER TO A D/D2 MAC DECODER FOR ONLY £109.00

PACE 508IP £275.00 PACE D155 £229.00 NOKIA 5918 £263.00 PHILIPS BDE353 £217.00

PACE 290 : £175.00 Secam to Pal transcoder £89.50 Videocrypt 1/2 decoder £139.00 Videocrypt II kit £62.60 card £69.00 Two View - enables the viewing of two scrambled channels from one Sky card £99.00. Auto scart switch for up to 4 decoders £89.00 Satalitia Bacaluars, Amstrad 700ird £115 00 Page MSS300 £179.00 Page MSS100 E139 88 Page MSS200 E149 88 Amstrad 650 E299 Bish nesitioners Pace MSP200R £110.00 Nokia positioner £119 Amstrad positioner with remote control £96.00 Mini-Mac 1000 £54.08 MANY SUPERIACK POSITIONER ONLY CLARKS Meterised Dish Systems mount & actuator £70.00 Mount/actuator/R0cm dish and LNR - £125.00 Mount/actuator/R0cm Lenson Heath dish and LNR - £135 00 Mount/actuator/1mtr dish and LNB - £145.08 or upgrade the LNB to a universal LNB for only £18.00 extra. T/K wall bracket £12.50 Lenson Health bracket £12.50 wall polar mount for above - £15.00 PIC RESTER as seen in MAY "What Satellite TV" kit £40.00 Blank PCB - £2.50 PIC 16C84 - £5.00 pre assembled cards £3.00

LHB's Grundig universal £38.00 Cambridge Universal £46.00

Cambridge gold 0.6 enh £38.00 Blue cap £12.00 Marconi bullet circular polarisation £20.00 Twin enhanced or twin non enhanced - £47.00 Enhanced/non enhanced 1.1db LNB £28.00 Dishes 30cm Lenson Heath type £20.00 63cm Lenson Heath type dish £18.00 80cm dish £29.50 80cm Lenson Heath £38.00 1 meter solid dish £54.80 all dishes include brackets 1.2 meter Channel Master dish £199.00 Accessories Eutelsat Little Cannon £8.50 Twin Sat LNB holder £6.50 Sat finder kit £38.80 Lenson Twin Sat (19 & 13 degrees) £12.50 Lenson bracket for 3 Sat's 13, 16, 19 deg £15.00 Cable kit - 20 meters cable, 50 clips, compass 2 f connectors, bolts - £10.00, f connectors 35p Scart leads from £2.99, Sat A/B switches £8.50 Passive splitter - 2 way £6.50 4 way £9.00 Tone switch £17.50 Tone inserter £12.00



Motorise your system - Mount/actuator/superjack positioner only £99.99 MODIFY YOUR SYSTEM TO RECEIVE 1° WEST FROM ONLY £15.00 + LNB





Special package deals available on motorised systems All prices include VAT, P&P extra, next day delivery available, prices correct at time of printing, however we reserve the right to change

Satellite notebook

Hugh Cocks on various satellite receiver and reception problems

Corrosion

The owner of a Palcom SL5000 receiver-positioner called the other day with the complaint that it "didn't receive all channels". On investigation I found that the magnetic polariser had gone opencircuit, leaving only the vertically-polarised channels. Straightforward enough it seemed. As the receiver incorporates voltage-operated polarisation switching I fitted an LNB of this type and assumed that everything would be OK. Things are sometimes not that simple however.

While I was tuning through the channels the receiver suddenly stopped at around 1,540MHz, though the on-screen display carried on merrily. Below 1,540MHz, to the bottom of the band, tuning was normal. My first thoughts were that something was wrong with the LNB's oscillator frequency or the receiver's LNB setting. But this couldn't be so, because the frequency display was correct. Time to inspect the innards.

When I opened up this unfamiliar receiver I found that it was sturdily built, with the tuner PCB at the extreme right-hand side. Some corrosion was present at resistors on this board. The owner admitted that a glass of water had gone flying near the receiver a couple of weeks previously, but he thought that the receiver had escaped. There was no sign of any water having fallen on the main PCB, but when the tuner's covers were removed a nasty white corrosion patch was seen near the prescaler chip - on both sides of the board. Cleaning had to be done carefully, as the corrosion was quite bad. But, to cut a long story short, once cleaning had been completed the tuner refused to tune at all!

The simplest solution seemed to be to keep the tunerless Palcom unit as a dish positioner and install a new receiver. The owner readily agreed to this. Since reception from only

19.2°E and 13°E was required, these positions were programmed into 'channels' 1 and 2 of the Palcom unit's memory. The required Astra and Eutelsat channels were then stored in blocks in the memory of a new Pace MSS138 receiver (non-IRD MSS100).

A Modulated MTI LNB

A recent job consisted of adding Eutelsat reception to an existing Astra installation, the owner being primarily interested in the BBC World Service. To avoid sparklies with the weaker Astra channels and the non-Hot Bird Eutelsat channels (including BBC World Service) it's best to use two dishes here. The receiver was a Pace PRD800, with a Global 22kHz tone inserter which was connected to the existing dish IF cable. Both LNBs were linked to the cable via a tone switch.

The problem was that the Eutelsat channels all suffered from good, old-fashioned co-channel type interference, the Astra channels being fine. This ruled out a modulator or terrestrial frequency clash, and was fairly easily diagnosed as 22kHz interference.

I'd seen this before with a tone switch of Far Eastern manufacture. It had been very effective at injecting tone back into the receiver via the flying lead going to pin 8 of the receiver's TV scart socket. Indeed the tone amplitude here had been higher than that going up the cable! The unit proudly displayed a CE sticker of course. Fitting a Global switch had cured that.

But this time I was using a Global unit, which I was reluctant to condemn on site without test gear. As a check I swapped over the LNB inputs to the tone switch and returned downstairs to view the results. There was now no patterning on any of the pictures.

The cause of the problem was that the old MTI LNB, repositioned for

Eutelsat reception, couldn't filter out the 22kHz in its DC supply. As a result, its output was modulated at 22kHz. The new Cambridge LNB had improved filtering.

Unfortunately I couldn't leave the LNBs connected this way round, as the Cambridge LNB produced the Astra 1D frequencies while the MTI LNB didn't, and the customer specifically wanted reception of the Dutch 1D channels as part of the refit.

So I had to think of an easy modification to the MTI's power supply! I had PRD800 power supply components with me but little else by way of electronic bits and pieces.

After opening the MTI LNB I disconnected the voltage regulator's input, inserted a 1Ω series resistor and added a $22\mu F$ electrolytic decoupler from the input to chassis. For good measure, as space was available, I also added a $22\mu F$ electrolytic at the input to the resistor.

When the LNB had been reassembled I tested the installation and found that the additional filtering had completely removed the patterning when the tone was active. Panic over!

More LNB Trouble

We seemed to have more LNB trouble last winter than during the previous ten years put together. Excessive rain and lightning didn't contribute to reliable operation of course, but new LNBs seem to be much less reliable than older ones. Does anyone still remember the Japanese DX DSA508 of 1984/5? It was built like a battleship, had a 3dB noise figure, and cost in the region of £500. But it never went wrong. A fairly large dish was required to compensate for its high noise figure – but I digress . . .

A system that's been giving us a lot of trouble recently consists of an 85cm offset dish with a Cassegrain type feed assembly. These dishes were installed a few years ago, and the original suppliers are no longer around. The LNB is mounted on the feed arm, pointing at the Cassegrain subreflector. In time the feed cover deteriorates and, because the LNB angle is quite high, water gets in when there's a heavy rainstorm. This produces the no picture complaint.

LNB replacement works, but the same problem will inevitably return (whether before or after LNB failure as a result of lightning is another matter).

If you explain the problem to the customer, he usually agrees to having a standard offset dish installed along with the new LNB.

A Silent Pace SS9000

The owner of this receiver complained that the sound had disappeared the previous evening. Operation had been OK prior to this.

With the unit on test in the workshop I found that sound was present at the output from the demodulator chip U1. I then traced the signal through U11, U12, U13 and U14. Though both left and right channel sound was present at the input to the LM324 operational amplifier U15, almost no output

could be seen on the scope's display. A new chip restored the volume.

The receiver's power supply seemed to be perfectly OK-it obviously lived in a fairly cool environment. I changed C9 ($1\mu F$) in the power supply as a precaution, also C29 which was the cause of faint diagonal lines on VideoCrypt channels. C416 (in the tuner), which is the major cause of "lines on the picture" in this model, had already been replaced.

Lucky Connexions CX95A

This receiver was used in a holiday rental home where it lived on top of the TV set in a rather precarious manner. Its owner hadn't taken into account small children. As a result it ended up falling on to a hard floor while switched on. Naturally enough it refused to work after this.

Being fairly robust, the cabinet had survived well. The main mechanical problem was that the VideoCrypt decoder had become detached from the plastic spacers which secure it to a metal plate on top of the main PCB. I replaced the 1.6A fuse F2, which had blown, and switched on. Fortunately everything worked. The plastic spacers for the VideoCrypt

decoder were then glued on to the metal plate.

I returned the receiver and installed it on the floor beneath the TV set. At least gravity wouldn't cause any damage! When I plugged it back in however there were virtually no signals from the dish. In all likelihood this was the original reason for the kids pushing the front panel buttons so hard that it fell down.

The 1-2m fixed Astra dish was suffering from the aftermath of near hurricane-force winds the month before. It had blown off course, while in addition spiders had taken up residence in the prime-focus feed, helping to attenuate what little signal was present there. After repeaking the dish and clearing out the spiders I sealed the feed with a thin piece of polystyrene, to stop them entering again.

The Connexions remote control unit has too many tempting buttons for holiday rental use, and no tuning lock facilities. I solved this problem by dismantling the unit and sticking insulating tape on all the PCB areas concerned with tuning. This provided normal use but with the tuning buttons inactive.

CENTRAX DIRECT SALES HAVE ON OFFER A HUGE RANGE OF TOP BRAND TVs & VIDEOS

Plus Hundreds of other lines

14" Teletext£115

21" Remote Control Text£150

21" Nicam**£220** 25" Nicam**£270**

28" Nicam ...**£300** 29" Pro-Logic**£550**

Video Mono with VideoPlus – start at £150 up to £220 for Nicam

Camcorders available ring for quotes

Midi systems available – 3 and 10 Disc systems – all working at clearance prices – from £110

Vacuum cleaners available from £25
- cylinders

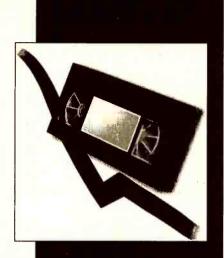
ALL STOCK GUARANTEED

CENTRAX DIRECT SALES LTD

UNIT 17, 193 GARTH ROAD, MORDEN, SURREY SM4 4LZ TEL: 0181 330 7766 (10 Lines) FAX: 0181 330 7726

OPENING TIMES:

MONDAY-SATURDAY 9.00am-5.00pm - SUNDAY 10.00am-4.00pm



Reports from
Philip Blundell, AMIEEIE,
Edward Branch,
David Corcoran,
Chris Hawkins,
Michael Maurice,
Michael Dranfield,
Chris Watton,
Adrian Farnborough
and Nick Beer

Toshiba V254

This machine produced some odd symptoms. There was no E-E sound, and with its own recordings the head switching line floated up and down the screen. The playback picture and sound with a known good tape were OK.

A check at the audio mute test point BS004 showed that the mute line was active (the reading was 5V). So attention was directed to the main microcontroller chip IT001. As expected, the voltage at the audio mute pin 16 was high. Checks on the video inputs to the chip showed that there was no signal at pin 70, the composite sync detect pin. This input comes from pin 42 of IV001 on the other side of the board, where the signal was present. When we traced along the track we found that the signal was lost after the wire jumper above RV139 (by the cut out in the PCB for the drum motor). Bridging the break with fine wire restored normal operation. P.B.

JVC HRD540

This VCR was apparently dead with no clock display. Checks

VCR Clinic

showed that the unswitched 12V and 5V supplies were present but not the switched 12V and 5V supplies, and there was no poweron signal to the main micro IC601. If the power-on line was taken low manually, the switched supplies appeared but there was still no go. The microcontroller chips seemed to be getting all their supplies, but there were no strobe pulses from micro IC1 to the clock display. I took a chance and ordered a UPD725216ACW-A35 from JVC. Fitting it restored normal operation. E.B.

Panasonic NVJ30

If the problem is dark/pulling E-E and playback pictures, check for dry-joints at the RF converter. **E.B.**

Samsung VI711

There was no sign of life – no display or operate light. All the power supply output voltages were present, but the /power control signal at pin 5 of CN101 was, at 2.4V, in neither the high nor the low state. I tried replacing the STK5333 power chip and digital transistor Q103 before delving into the microcontroller circuitry.

IC601's supply was present, but there was no oscillation at pins 46 and 47. It was possible to instigate oscillation, sometimes briefly and sometimes for a longer period, by holding crystal X601 with one's fingers. When oscillation was present the machine worked normally.

I assumed that the crystal was faulty and fitted a replacement. A soak test suggested that everything was now OK, but a few days later the machine was back with the same symptom – dead. It could still be coaxed back to life by touching the crystal, or by briefly shorting

the 5V supply (Vdd) to chassis.

This led me to suspect that the cause of the trouble was in the reset switch stage. Transistor Q601 wasn't faulty, but C612 (22µF, 35V) certainly was! A further soak test proved that this time my diagnosis was correct. E.B.

JVC HRD540

This VCR was completely dead: no LED display, no clock, nothing! Full HT was present at C12, but there were no outputs on the secondary side of the chopper transformer. Q1 (2SC4517) was open-circuit. Replacing this item restored the machine to life. D.C.

Akai VS248, 249, 250

If the complaint is poor quality recording and playback, before you change the drum check that the small earthing screw in the middle of the PCB, under the metal screen that covers the video preamplifier, is fully tightened. C.H.

Samsung VB920

This machine would sometimes cut out after a couple of minutes for no apparent reason. On other occasions it would run perfectly for hours. Replacing the 12V and 5V regulator chips, IC1 (S3122) and IC2 (AN7805) respectively, put an end to the trouble. C.H.

Akai VS18, 19, 22, 23, 24, 34, 35

If the drum motor takes off at high speed, or play stops after a few seconds, suspect the BU2375 digital servo chip IC503. It tends to be damaged when the voltage at pin 28 (5V) goes high because of a power supply fault. As this chip is expensive, it's a sensible precaution to add a $6\cdot 2V$, $1\cdot 3W$ zener diode across C9 ($100\mu F$, $6\cdot 3V$) in the

supply to pin 28. There's room on the reverse side of the power supply PCB, near connector P1. C.H.

JVC HRD600, 620, 650/ Ferguson FV37H, FV43H

There was no problem about getting the tape around the heads, but the machine refused to give the tape back unless it was disconnected from the mains supply. It seemed that either the mode switch or the servo chip was the cause of the trouble, but before we dived in at the deep end we sent a search party to look at the lower deck during tape loading. The cause of the problem became apparent after several attempts at loading. Because the toothed part of the plastic sliding bar (item 39) didn't engage correctly at the end of its run, the full loading sequence could not be completed. Plastic circlip item 40 was the cause of the trouble: it had gone on holiday. C.H.

Matsui VX1000

The customer complained that "half the old programme showed". We found that the tape failed to make proper contact with the full erase head because the back-tension arm didn't move to its correct position. The cure was to grease the operating lever that contacts the back-tension arm and check the back tension. M.M.

Panasonic NVJ35

There was a display problem with this machine. Several segments were permanently lit up. Our experience has been that this fault is usually caused by the display itself or one of the diodes connected to it. Not on this occasion however: the microcontroler chip IC7501 was faulty. M.M.

Sanyo VHR350E

This unit was dead. We found that the two $560k\Omega$ start-up resistors R5005 and R5006 were both open-circuit. Replacements restored the machine to life. **M.M.**

Akai VSG64

The customer's complaint was that most tapes wouldn't play properly—the off-tape pictures rolled. Her husband, who is a computer engineer, mentioned that if he twiddled the left-hand guide this would sometimes temporarily stop the rolling. My rule is that if the guides are tight, why should they have moved from the manufacturer's settings? In fact the cause of the fault was poor head-to-tape

contact. The user confessed that the machine led a hard life, being constantly in use. A new upper drum, together with slight realignment of the entry guide, restored normal working. M.M.

Mitsubishi HSB20

This machine had been to another dealer who, despite replacing the loading belts, had failed to cure the fault – intermittent failure to accept a tape. The cause of the trouble was the cassette-in switches on the front of the loading unit. A replacement, part no. 439C021010, cured the fault. M.M.

Osaki VCR33

The following note illustrates what can happen when incorrect parts are fitted. Intermittent tape chewing and going into the fault mode was the complaint. Now this model is a GoldStar clone and uses a deck that bears an uncanny resemblance to the Panasonic D mechanism. On inspection we found that the gear which is part of the plate assembly A10 had split. So we ordered one and fitted it. The machine then appeared to work correctly – until the bottom cover was fitted, when the fault returned.

To cut a long story short, we discovered that the loading motor from a Panasonic deck had been fitted. Its pulley fouled the bottom cover, which was minus some of its screws, thereby stalling the motor. All was well when the correct GoldStar loading motor was obtained and fitted. M.M.

JVC HRD230/Ferguson FV12L

Intermittent failure to play or record was the complaint with this machine: the tape would lace up, but the drum wouldn't rotate. Voltage checks showed that the Motor 12V supply and the motor drive and motor run voltages were all present. When I removed and dismantled the lower drum I found that the ICP on the drum motor's PCB was dry-jointed. Resoldering provided a complete cure. M.M.

Hitachi VTF770

This machine wouldn't eject tapes. Fortunately the cause was simply a slipping belt. **M.M.**

JVC HRD230/Ferguson FV12L

This machine would intermittently stop while in the play or record mode. On test it appeared that the capstan motor was stalling. As there was no stiffness in the motor I came to the conclusion that it had a dead spot. A new motor cured the trouble. M.M.

Samsung \$13560

This machine's carriage didn't sit properly when a cassette was loaded and ejected the tape with the force of a bullet! When faced with this problem the usual procedure is to replace the eject gear and the right-hand side carriage bracket, which has been modified. All was revealed when we stripped the machine down. Another 'engineer' had tried to repair the bracket by using a large self-tapping bolt to mount the side plate's drive gear! A new eject gear and bracket restored normal operation. M.M.

JVC HRD150/Ferguson 3V45

This machine would sometimes fail to go into the record or playback mode, switching itself off in the loaded state. The cause of this is usually hardened grease and a worn belt on the loading block, but a replacement block failed to cure the fault. An optosensor that's fitted to the underside of the deck was the cause of the trouble. **M.M.**

Samsung VI730

Dropouts were the problem with this machine - the symptom was long, black streaks that ran across the picture. As a start we decided to set up the CCD level control as laid down in the manual. Connect a scope to TP3303 and adjust VR3301 for a video level of 0.6V peak-topeak it said. In fact the video signal was missing at TP3303, though it was present at pin 4 of the 1H delay chip IC3302. The only item in between is a 3MHz low-pass filter, FL3303, which was open-circuit. We took one from a scrap machine and after setting up the dropout compensation operation was back to normal. M.Dr.

Sharp VCA33

If tape spills out during play, i.e. there's no take up, try a spot of fine oil on the idler shaft, where the idler gear slides up and down. It tends to become a bit sticky and fails to reach the bottom. This note applies to all machines that use this deck. M.Dr.

Akai VS77

This machine stopped after five seconds, indicating a take-up rotation fault. We cleaned the underside of the reel disc, but the fault remained. A scope check at the

take-up sensor showed that the amplitude of the pulses was only 3V peak-to-peak – it should be 5V p-p. Presumably the LED part of the sensor had lost emission. A new sensor restored the amplitude and correct operation. M.Dr.

Samsung VIK310, 320, 350, 375

Further to my note on power supply failure with these machines (see page 658, July), a 100µF, 25V capacitor rated at 125° can be obtained from Farnell Electronic Components of Leeds (01132 636 311) for use in position C110. It's made by Philips and the part no. is 286-709. M.Dr.

Saisho VRS5000

This machine appeared to be dead, as there was no clock display. But if a tape was inserted it would half load then stop. Still no display however, and eject didn't work – the tape had to be wound out. The drum would sometimes rotate when a tape was inserted, and would continue for four-five minutes. The power supply seemed to be OK, though the switched outputs couldn't be checked.

Checks at the tuner/timer chip IC601 showed that the 5V supply was present. All the display drives were at -28V. No key scan pulses could be found. We then discovered that there was no activity at crystal oscillator X601. A new crystal restored normal operation. C.W.

Amstrad DD8900

Various display segments flickered and the control keys were either very slow to act or produced the wrong function. The stop-eject key initiated forward wind for example. A look at the circuit diagram showed that the display drivers operate with a –27V supply. The display outputs are also connected to the key lines. So a supply problem was suspected. A check showed that the voltage was low at only –15V. Replacing C27 (47µF, 50V, 105°C) cured both problems. C.W.

Bush VCR190

This double-deck machine came to us with a list of intermittent faults. They included won't accept a tape, won't eject, won't play, sometimes stops during rewind and sometimes switches off – all with the bottom deck, as is usual with twin decks. I pounced on the mode switch like wildfire, but this was a waste of

time. By watching what happened when a fault symptom occurred I saw that the capstan motor seized. Stripping it down then cleaning the bushes and oiling them cured the fault. I then lubricated all the moving bits on the bottom deck and, to be on the safe side, did the same with the top one. C.W.

Mitsubishi HSM50

Rows of white spots marred the playback picture. We removed the deck and checked the static discharge arrangement, which appeared to be OK. The large screened PCB along the back of the deck was loose however. Three screws secure it and provide earthing. Tightening the screws solved this one. C.W.

Samsung VI611

In any mode the tape would run for only about a second. The machine would then go into the 'emergency state', with the standby LED flashing. The cause of the fault was in the rotation sensor section. As cleaning made no difference, we checked at pin 3 of the sensor – you can see it when the bottom cover is removed. A squarewave was present when the disc was rotated, but its amplitude was only 2V. A new sensor (part no. 62309110243) produced pulses of greater than 4V amplitude, the signal now reaching pin 55 of the syscon chip. This restored normal operation. C.W.

Mitsubishi H\$551B

This machine would run for only a few seconds in any mode then stop. A check showed that the take-up reel pulses were missing at pin 92 of the microcontroller chip. When we examined the connections to the reel sensor (Q5E4) we saw that three of its legs were broken. A.F.

Mitsubishi HSM20V (J Deck)

We've had two of these machines, both rental models, with broken loading gears. Although the fault is reasonably easy to put right, provided you are not interrupted, be careful that item C 053 plate cam B has its full complement of teeth. Is it the machines, or are the customers too rough? Time will tell. A.F.

Ferguson FV30B

This was another machine that would run for only a few seconds in any mode. A check at test point BT15 showed that the supply reel pulses were of low amplitude and

tended to be erratic. A complete clean of the clutch assembly and the sensor cleared the fault. A.F.

Panasonic NVSD200

Very low E-E audio was the complaint with this machine. I found that one end of C0729 in the VIF pack was dry-jointed – it's the detector audio output coupling capacitor. Interesting that the other end had clearly been soldered manually! N.B.

GoldStar GSI1290I

The E-E sound and vision were affected by severe hum. There was slightly less hum in the playback mode. The culprit turned out to be C118 (470 μ F, 25V). It took a while to find, as I didn't have a circuit diagram. **N.B.**

Panasonic NVJ30

As the combined remote control/bar scanner handset (part no. VEQ1107) for these machines is an expensive item, repair is usually economic. This one seemed to be dead, though the chips were being supplied. There was no clock signal at pins 15 and 16 of the microcontroller chip IC1 however. Crystal X1 (3·52MHz) was faulty. N.B.

Fisher FVHP445VK

This non-UK machine is similar to the Sanyo VHR5200E. The one brought in by a customer wouldn't come out of standby. Checks revealed that the switched 5V supply was missing. Q5402 (2SC3070) turned out to be short-circuit base-to-emitter. N.B.

Panasonic NVFS90

The complaint was no S-VHS playback or record – standard VHS was fine. When I traced the luminance path through I found that the signal entered the hybrid chip IC303 (VEFH05BT) at pin 2 but nothing came out at pins 7 and 8. The cause of the trouble appeared to be that one of the aluminium can, surface-mount electrolytics in the module had leaked. A replacement IC cured the problem. **N.B.**

Panasonic NVL25

When this machine was put into the standby mode the vision remained and the red LED stayed alight! The cause of these interesting symptoms was a splash of solder that shorted the cathode of D1002 to an adjacent wire link. As a result the switch line to the power supply didn't change state. N.B.

MANOR SUPPLIES

QUALITY TV & VIDEO SPARES SUPPLIED FOR ENGINEERS BY ENGINEERS

MKV PAL COLOUR TEST GENERATOR FOR DOMESTIC TV & VCR p.p. £5.00

TEST **DEMONSTRATIONS** AT 172 **WEST END LANE**





- ★ 40 different patterns and variations.
- ★ Fully interlaced syne pulses with correct picture blanking.
- ★ EBU colour bars, BBC colour bars, whole rasters & split bars (specially useful for VCR service), white, yellow, cyan, green, magenta, red, blue and black.
- Chequerboard.
- ★ Mono outputs with border castellations, cross hatch, grey scale, vertical lines, horizontal lines and dots. UHF modulator output plugs straight into receiver aerial socket.
- ★ Additional video output for CCTV & VCR.
- ★ Facilities for sound output.
- ★ Easy to build kit, standard parts. Only 2 adjustments. No special test equipment required.
- ★ Mains operated with stabilised power supply.
- ★ All kits fully guaranteed with back-up service.
- ★ Also available with VHF Modulator.

Price of Kit	£79.00
Case $(10'' \times 6'' \times 2^{1/4}'')$ app	£19.00
Optional Sound Module (6MHz or 5.5MHz)	£5.90
Built & Tested in Case including Sound Module	£139.00
Post/Packing £4.50	
Add VAT 17.5% TO ALL PRICES	

PAL COLOUR BAR GENERATOR (Mk4)

- ★ Output at UHF, applied to receiver aerial socket.
- ★ In addition to colour bars R-Y, B-Y etc.
- ★ Cross-hatch, grey scale, peak white and black level.
- ★ Push button controls, battery or mains operated.
- ★ Simple design, only five i.c.s on colour bar P.C.B.
- ★ Backup service available.

PRICE OF Mk4 COLOUR BAR GENERATOR KIT £39.00. CASE £6.90. BATT HOLDERS £4.20

MAINS SUPPLY KIT £5.80 (Combined P&P £5.00)

VHF MODULATOR (CH 1 to 4) FOR OVERSEAS £6.80 EASILY ADAPTED FOR VIDEO OUTPUT & C.C.R.V

ADD

LINE OUTPUT TRANSFORMER TESTER



- ★ Service Aid. Saves time and Money.
- Checks short turns.
- Simple to use
- ★ Reliable
- ★ Battery operated.
- ★ Pocket size

PRICE £24.00 POST/PACKING £2.50

VIDEO (PAL) TO R.G.B. CONVERTER

- ★ Ready built & tested ★ R.G.B. + Sync Out Scart
- ★ Incl. Power Supply ★ Colour/Brightness/
- ★ Video In Phono
- Contrast Controls
- ★ 5-VHS Adaptable
- ★ Size 5" x 5" x 2"

PRICE £99.00 POST/PACKING £3.50

CRT TESTER & REACTIVATOR KIT

★ For Colour & Mono complete with Case. Panel Meter Indicator – can be £55.00 P.P. £4.50 adapted for latest CRTs

KITS AND PROJECTS

SAW IF AND TURNER UNIT complete and tested for video & audio outputs £28.50 p.p. £1.80

PAL DECODER KIT (Video to RGB) for Monitors £27.00 p.p. £1.80. PAL ENCODER KIT (RGB to Video) £20.00 p.p. £1.80.
INFRA RED REMOTE CONTROL TESTER Infra Red Remote Control Tester £10.00 P.P. £2.50.

TV & VIDEO SPARES

REMOTE CONTROLS

Replacement for: Ferguson, Hitachi, Philips, Panasonic, Grundig, ITT, Sony, Saisho, Granada, Saisho + many others Phone for make and model no.

IC SELECTION p.p. 90p									
14DN487	£15.80	SAB3037	£8.80	TA7681P	£7.80	TDA2594	£3.80	TDA6200	£22.50
AN5521	£3.80	SAF1039	£2.20	TA7698P	£6.80	TDA2595	£4.80	TDA7052	£2.50
AN5900	£2.20	SDA2516	£9.90	TA7699	£13.50	TDA2600	£6.80	TDA8138	£2.20
BA6209	£6.80	SDA2546	£9.00	TA8690	£22,50	TDA2611A	£1.90	TDA8140	£2.20
BA6219	£3.80	SL470/471	£4.00	TA8691N	£6.80	TDA2653A	£2.90	TDA8153	£13.80
BA6229	£3.80	SL486	£3.20	TA8739P	£4.50	TDA2654	£5.70	TDA8170	£3.00
BA6238A	£6.80	SL490	£3.80	TBA121	£5.80	TDA2670	£3.20	TDA8172	£3.00
BA6239	£3.80	SL1430	£2.40	TBA120S	60p	TDA2680	£3.80	TDA8175	£3.50
BA6435	£9.80	SL1432	£6.80	TBA750	£2.20	TDA2690	£3.80	TD A8180 Kit	£7.50
CCUFRG07		SN76226DN		TBA950	£2.20	TDA3301	£6.80	TDA8190	£3.80
CNR50	£6.00	SN76705	£9.80	TBA2800	£1.80	TDA3303	£19.80	TDA8305	£12.90
CNX50	£6.00	STA441	£2.80	TCA270	£1.80	TDA3330	£12.50	TDA8341	£6.20 £8.40
CNX62	£4.00	STK5322	£21.80	TD6316AP	£4.80	TDA3504	£6.80	TDA8372A	
CNX83A	£4.80	STK5325	£6.80	TDA1011	£2.20	TDA3505	£15.80	TDA8380	£3.20 £2.50
HA11211	£2.80	STK 5326	£6.80	TDA 1013	£2.20	TDA3506	£4.80	TD A8442	£3.80
HA11423	£3.80	STK5331	£3.80	TDA 1015	£2.20	TDA3540	£2.50 £3.50	TD A9403 TD A9503	£3.80
HA51338SE		STK5332	£4.80	TDA1035T	£2.80	TDA3541	£5.80	TDA9513	£4.80
LA4270	£4.95	STK5333	£13.80	TDA1044	£2,90 £3,80	TDA3561A TDA3562A	£4.00	TEA1009	£2.20
LA4445	£3,00	STK5337	£4.80	TDA1060	£4.00	TDA3562A		TEA1014	£3.50
LA4520	£3.80	STK5338	£6.80	TDA1082	£1.80	1 DA3302A	£5.80	TEA1039	£1.90
LA7520	£2.80	STK 5339	£6.80	TDA1170S	£2.20	TDA3561A	£2.50	TEA2014	£3.80
LA7530	£8.50	STK5342 STK5372H	£4.80 £8.80	TDA1180 TDA1185A	£3.20	TDA3565	£3.80	TEA2018A	£2.20
LA7800	£1.80	S1K33/2H	£6.80	TDAI190Z	£2.20	TDA3566	£5.80	TEA2026	£5.80
LA7801	£3.50	STK5392 STK5421	£6.80	TDA11902	£5.70	TDA3571B	£9.50	TEA2029	£5.80
LA7820 LA7830	£3.80 £2.80	STK 5421	£5.30	TDA1512	£3,20	TDA3576B		TEA2031	£1.80
LA7835	£2.20	STK5471	£4.50	TDA1515	£4.50	TDA3640	£5.20	TEA2164	£3.95
M104B1	£6.80	STK5481	£8.80	TDA1521	£2.50	TDA3650	€8.50	TEA2165A	£6.80
M293B1	£21.80	STK5482	£4.90	TDA1524	£6.80	TDA3651	£3.20	TEA5101	£2.80
M490BB1	£18.80	STK5487	€6.80	TDA1670A	£3.20	TDA3653A	£3.20	TEA5115	£6.80
M491BB1	£9.80	STK5490	£7.80	TDA1701	£3.80	TDA3653B	£3.20	TMS1000N2	21.1
M494	£9.80	STK6962	£3.80	TDA1870	£6.80	TDA3654	£1.80		£6.80
MDA2062	£3.80	STK7253	£5.80	TDA1872	69.80	TDA3810	£5.50	TMP47C432	
ML926	£4.80	STK7308	£4.80	TDA1904	£1.80	TDA4420	£2.20	8188	£21.95
MN1220	£6.80	STK7348	£5.40	TDA1908	£2.80	TDA4426	£3.20	TMP47C432	
MN15425	£15.80	STR3125	£4.80	TDA1940	£3.20	TDA4427	£3.20	8189	£15.50
PCD8572P	£9.00	STR4090	£13.50	TDA1950	£3.50	TDA4442	£2.80	TMP47C434	E14.90
SAA1024	£5.80	STR4211	£7.80	TDA2004	£2.80	TDA4443	£7.80	3415 TMP47C434	
\$AA1061	£5.80	STR5412	£4.95	TDA2006	£2:80	TDA4500	£4.00	3555	£15.50
\$AA1124	£3.50	STR6020	£7.80	TDA2009A		TDA4501	£5.00	TMP47C434	
SAA1250	£3.80	STR10006	£5.80	TDA2030	£2.80	TDA4502A TDA4503	£7.80	3559	£14.90
SAA1251	£8.40	STR40090	£6.80	TDA2030A	£3.80 £7.80	TDA4505E	£5.00	TUA2000	£8.50
SAA1293.0	2 17.50	STR44115	£9.80 £6.80	TDA2040 TDA2050	£4.80	TDA4510	£3.80	U2829B	£6.50
SAA1293.0 SAA1294.2		STR50020 STR50103	£4.80	TDA2270	£3.90	TDA4555	£9.80	U4606	£14.80
SAA1294.2 SAA1296	£12.00	STR50103	£14.50	TDA2540	£2,20	TDA4565	£3.80	UC3842	£2.20
SAA5000	£6.80	STR54041	£6.80	TDA2548	£5.80	TDA4600	£2.85	UC3844 UPC1363C	£1.50 £5.80
SAA5010	£5.80	STR55041	£10.50	TDA2576A	£5.80	TDA4601	£2.80	UPC1363C	4 65 80
SAA5012	£5.80	STR58041	£5.80	TDA2577A	£3.20	TDA4601D	£2.80	UPC1363C/ UPC1378	£1.00
SAA5020	£5.80	STR59041	£6.80	TDA2578A	£2.70	TDA4605	£2.20	UPC1394	£3.80
SAA5050	£11.80	STRD1806E		TDA2579A	£3.60	TDA4610	£6.80	UPC1420CA	£12.20
SAA5231	£7.80	STRD4420	£12.80	TDA2581	£3.80	TDA4950	£1.60	LIPC1488	£3.20
SAA5243	£17.80	STRD6108E		TDA2582	£2.50	TDA5510	£12.50	UPC1498	£3.20
SAB3035	£9.80	TA7680AP	£5.80	TDA2593	£1.50	TDA5850	£2.80	UPD1397C	£4.80

LINE OUTPUT TRAI	NSFORMERS p.p. £1.80
ALBA CTV14RS£23.80 B&O LX2500, 2800 AT2077/81£23.50	PHILIPS K30 £22.80 PHILIPS CTX-E/S £23.80
P.O. I V2500 2000 A T2077/91 623 50	PHILIPS CTX.F/S £23.80
B&O MX2000£15.00	PHILIPS KT4£22.50
BUSH 2914T£15.50	PHILIPS 2A£16.90
BUSH AT2079/10£34.80	PHILIPS K40 £27.50
DECCA/TATUNG 145,146,147 P/N853786 £21.80	PHILIPS 3A £16.90
FIDELITY ZX2000£15.50	PHILIPS 2B£16.90
FIDELITY ZX3000. £14.50	PHILIPS CF1 £23.80
FIDELITY ZX3000 22"£21.80	PHILIPS CP90 £15.50
FIDELITY CTV140	PHILIPS (P110 £32.00
GOLDSTAR 154-132 £16.95	PHILIPS GRIAX£15.50
GOLDSTAR 154-194 £10.93	PHILIPS NC3
GOLDSTAR 134-134 GOLDSTAR CTT9325 154-125 A£16.95	SAISHO CT14R, CT141, 3714002£15.00
GOODMANS TV20£15.50	SAISHO CT141B, CT142B, 3214009£16.80
CDINDIC CUCTO FIRST	SAMSING FCM 20A021 625 00
GRUNDIG CUC70	SANYO CBP2144, 2145
HINARI CT4, CT5	SANVO CTP7132 7135 £39.80
HITACHI CPT1455, 1456, 1476, 243414/1 £14.50	SANYO CTP7132, 7135 £39.80 SELECO 145E 121 UK £24.00
HITACHI CPT 2158	SELECT 143E 121 OK
HITACHI CPT1446, 1626 2432981£15.90	SOLAVOX 14R19 £16.50 SOLAVOX 16R19 £16.50
HITACHI CPT 1446, 1626 2432981	SOLAVOX 20T19£21.80
HITACHI CP121/4, 21/6, 21/8 24342/4 £14.00	SOLAVOX 22R19 £15.00
HITACHI CPT2476, 2478 2434002 £16.50	SOLAVOX 22S19 £15.00
HITACHI CPT2074, 2274 2433752£15.50	SOLAVOX 22519 £15.00
HITACHI/SALORA FM503A£49.80	SOLAVOX 22T19 £15.00
HITACHI/SALORA FM0513£55.00	SONY KV1612UB2 £21.80
ITT/NOKIA Compact B.110° £17.80 ITT/NOKIA Compact 80, 110° £14.80 ITT/NOKIA Compact 80, 90° £14.70 ITT/NOKIA COMPACT ENGINE ENGIN	SONY KV1612UB2
ITT/NOKIA Compact 80, 110°£14.80	
ITT/NOKIA Compact 80, 90°£14.70	SONY KV2020 £18.50 SONY KV2052/56, 2060/62 £21.80
ITT/NOKIA Compact 80, 110° FST	SONY KV2052/56, 2060/62£21.80
ITT/NOKIA Monoprint A£15.80	SONY KV2090/92/96 £24.80
ITT/NOKIA Monoprint B £14.70 ITT/NOKIA CVC 25, 30, 32 £10.00	SONY 21XMTU 1-439-416-11
ITT/NOKIA CVC 25, 30, 32£10.00	SONY KV21XR10
ITT/NOKIA CVC 800, 801, 803£14.95	SONY KV2212/15/17£24.80
ITT/NOKIA CVC1100. Picos£16.50	SONY KV2652/56RX£24.80
ITT/NOKIA CVC1150, 1175	SONY KV27XRTU£16.50
ITT/NOKIA CVC1200, 1201, Mini 2£16.80	SONY KV2704 £29.00
ITT/NOKIA CVC1204£11.50	SONY KV2752/56RX£21.80
ITT/NOKIA CVC1210/12/15/17£15.80	SONY KV2752/56PE3£29.00
ITT/NOKIA Digi 3, 110° £18.45 ITT/NOKIA Core 90° 4515-03-46 £19.80	SONY KX27PS1£22.80
ITT/NOKIA Core 90° 4515-03-46£19.80	THORN/FERG TX85, 86
ITT/NOKIA Core 110°, 4515-03-48£15.50	THORN/FERG TX89 £23.50 THORN/FERG TX90 14", T9031, Red Spot £16.90
ITT/NOKIA Core 110° FST£15.80 LOEWE C9000, Art1, Art T21, Art T28, Contur	THORN/FERG 1X90 14", 19031, Red Spot £16.90
LOEWE C9000, Art1, Art T21, Art T28, Contur	THORN/FERG TX90 20", T9044, White Spot £14.80 THORN/FERG TX100/110° T6033L,
T24, T28, Profi T28£18.50	THORN/FERG TX100/110" 16033L.
LOEWE C8001, Classic M24, S127, S28, Contur	Green Spot £13.50 THORN/FERG TX100/90° 243892, Yellow Spot £16.90
\$124, \$127, \$128, \$24, \$28, Profi \$28£22.50 LOEWE Classic M124, M27, Contur M27£18.50	THORN/FERG TX100/90" 243892,
LOEWE Classic M124, M27, Contur M27 £18.50	Yellow Spot
I OF WE Prof. M21 £34.40	THORN/FERG TX100/110° FST, T6045L £16.80 THORN/FERG TX100/90°, T6031, Blue Spot £15.00
LUXOR 5810110.01 £27.60	THURN/FERG 1 X100/90°, 16031, Blue Spot £15.00
MATSUI 1440A, 1480A, 3714002£15.00	THORNGERG CIVE CIVE COPT 47710700 C10 50
MATSUI 1420B, 1440B, 3214009 £16.80	THORN/FERG SIRS, SIR/, SYF/, 4/319/00 \$19.50
MATSUI 1422, 1450, 1455£16.80	THORN/FERG 51F/
MA 13U1 1403	THORN/FEDC 50M5 68M5 617 50
MATSUI 1400A, 1480A, 3/14002 116, 80 MATSUI 140B, 140B, 3/14009 116, 80 MATSUI 1422, 1450, 1455 116, 80 MATSUI 1422, 1450, 1455 121, 80 PANASONIC TLF1420F, TLF14568F 223, 80 PANASONIC TLF1423F, TLF14576F 223, 80 PANASONIC TLF1423F, TLF14576F 223, 80 PANASONIC TLF1423F, TLF14576F 223, 80 PANASONIC TLF1428F, 121, 80 PANASONIC TLF1438F, 12	HORN/FERG ASIF. THORN/FERG ASIF. 13.50 THORN/FERG SSIF. 15.50 THORN/FERG SPS. 16.50 16.50
PANASONIC TLE 14506E 523 80	TOSHIRA 1400RB A72079/23 £15.00
PANASONIC ILF 143001	TOSHIBA 1400RB, AT2079/23 £15.00 TOSHIBA 150R6B, AT2079/09 £15.00
PHILIPS K13	TOSHIBA ISONOD, ATLOVIO

MANY OTHER LOPTS IN STOCK, PLEASE PHONE WITH MAKE AND MODEL NUMBER TRIPLERS EHT MULTIPLIERS p.p. £1.80

CONTINENTAL UNIVERSAL TVK & BG RANGE (Quote exact no.) £13.80 TVK 96-1 £13.80 TVK 96-3 £18.00 U.K. UNIVERSAL (best quality) £7.80

DECCATATUNG BG 200/44 TYPE £9.80 GRUNDIG BG 2077-442-1003/1004 £14.80 GRUNDIG BG 2087-642-1001/1002/1006 £14.80 GRUNDIG BG 20807-641 £13.80 THORN 9000 £9.80

MISCELLANEOUS p.p. £1.80

VHF/UHF upconnvertor £40.00 p.p. £3.50
Mains Isolating 500VA £51.25 p.p. £5.25
ASS CRYSTALS for handsets. 4 for £2.00 p.p. 80p
DEGAUSSING ROD £33.75 p.p. £4.70
TRANSPARENT VIDEO SERVICE CASSETTE
£6.80 p.p. £1.80 £6.80 p.p. £1.80 TV FAULT FINDING GUIDE £18.50

VCR FAULT FINDING GUIDE £18.50 HITACHI FRAME MODULE HM 6251 £9.80, HM6232 £12.80 p.p.£1.80 HTTACHI THERMISTOR TH902 £2.85 FERGUSON TX10 FOCUS UNIT £8.50 p.p.£1.80 PHILIPS BACK UP BATTERY: 2.4V £3.00, 1.2V £2.00 p.p. 90p

HOW TO ORDER: ADD p&p TO ORDER + VAT 17.5% TO THE TOTAL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

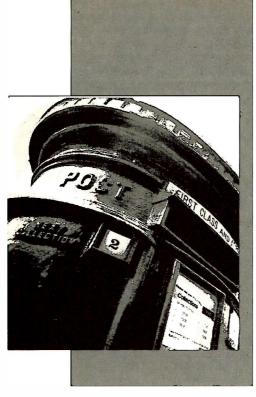
Telephone 0171-794 8751/794 7346 Fax 0171-431 5778 172 WEST END LANE, LONDON NW6 1SD



CALLERS WELCOME AT SHOP Mon-Fri 9.30-6pm - Thurs 9.30-1pm - Sat 9.30-5pm







Installing Aerials

John Pitt-Francis (July issue) is probably a well-qualified and respected TV repair man, but I wonder whether he would appreciate an "aerial riggers' guide to branching out into TV, VCR and satellite repairs" along the lines that all you need are a set of screwdrivers and a soldering iron?

I like his rule about aerial installation being "good weather activity". In my sixteen years' experience, this would add up to about six weeks a year in which to make a living! A part-timer would have just long enough to recoup his stock investment. If you decide to align satellite TV dishes correctly – to avoid calls about "sparklies whenever it rains" – a frequency-specific meter is required. It will mean that you can forget about any profit unless the rain holds off for a complete year!

The use of ladders is not a matter to be taken lightly. It requires consideration of Health and Safety issues and minimum insurance needs. John Breeds devotes a complete chapter to the subject in his latest book, while the Confederation of Aerial Industries has spent seventeen years evolving Codes of Practice relating to the whole business of quality aerial installations.

On January 1st 1997 Channel 5 should be available to around 74 per cent of the population of the UK. Without going into detail, a wideband masthead amplifier providing a gain of 24dB will, in the hands of the uninitiated, provide a lot of people with a lot of entertainment – but not the public!

Letters

We welcome letters from our readers and try to publish as many as we can. You can send them typed, hand written, or on disc – addressed to the Letters Editor, Room L302, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

The stock list suggested by John is going to look a bit sick in many areas of the UK, not to mention the disasters that can occur with his list of splitters.

John's article has made some of us who have devoted a lot of time and effort into raising the standards and respectability of the aerial industry a touch cross. The CAI spends a great deal of time meeting broadcasters, regulators and now MPs to discuss how new technologies will affect our industry. A TV set is only as good as the signal it receives. The public is being educated by the media on how to complain – so don't set yourself up as a target. Leave our profession to the true professionals. Tim Jenks, CAI Inspector,

Tim Jenks, CAI Inspector, Wolverhampton, W. Midlands.

I feel that John Pitt-Francis's article on aerial rigging may have created the wrong impression, suggesting to readers that it's a simple, mechanical business that requires little scientific understanding. Aerial installation without a signal strength meter for example is highly dubious - how would you check all channel levels, to ensure a reasonable balance, or the sound-vision ratios? There are many things that the TV set won't tell you. Because signal conditions can vary, you may get a call back when, for example, the pressure changes. A correctly sited and aligned aerial will minimise such possibilities. When it comes to a satellite dish, how on earth can this be set up accurately without a meter?

Reception in poor-signal areas in particular requires skill. In a recent case I was asked for advice where reception in a valley location had not been improved despite fitting a larger aerial atop the nearby hill and a higher-gain masthead amplifier. I discovered that a local relay was being received from the back of the aerial, despite the polarisation being incorrect! Because the masthead amplifier was a wideband type, these four extra channels made the amplifier work flat out. The solution was to fit a channelised amplifier.

An omni-FM aerial sounds a good idea – but only where you have very good signals.

In my opinion set-back amplifiers are a bit like head-cleaning tapes: a great seller as a consumer item, but of little or no use to the professional aerial installer. The amplifier should be close to the signal source, i.e. at the aerial. One use for a set-back amplifier is to drive a splitter, or overcome cable loss with a long feed used to pipe say a VCR's or a satellite receiver's output around a property.

Insurance and regulations are important matters that were not covered in John's article. Ladders must meet the regulations for industrial rather than domestic use, and must be of a type approved by your insurance company, which will need to be informed should you decide to take on extra types of work, especially anything as hazardous as aerial rigging. The insurance company will place restrictions on maximum working height and the types of weather in which you can work (wind speed etc.). This will apply to your public liability insurance, which may well need to be extended, and your personal accident insurance.

There are now also regulations relating to vehicle ladder racks — their strength and mounting. Police have in this area been stopping drivers and checking racks. Some vehicles that are popular in this industry do not, in standard form, meet the mounting requirements for the ladders we typically use.

In omitting so many things, John's article could be very misleading. The true professionals in this field deserve every respect. There is no short cut to becoming a competent aerial installer.

Nick Beer,

Nick Beer, Bideford, N. Devon.

Going It Alone

It was good to see both positive and negative reactions to my two articles. I agree that an inspection fee is the right approach, which I adopted

from the start. New customers have to pay this up-front. I didn't mention insurance but did, in my first article, strongly recommend getting the free business advice offered by the Training and Enterprise Council, as explained at all jobcentres. This covers the legal aspects of running your own business as well as many other topics. Public liability insurance and carriage of goods are legal requirements. Planning consent is a greyer area: it applies to an exclusive change of use, which is another reason for my suggestion of shared use.

On the subject of aerial rigging, I cannot go along with the suggestion that a meter is essential for alignment. Easier perhaps, but it's unlikely that the dozen or so nearby aerials are all pointing the wrong way! This, along with a geographical knowledge of where the transmitter masts are, has never yet failed me.

Excessive signal strength is the most misleading situation I encounter. In my locality, Stockland Hill has in recent months been pumping out Ch. 23 (ITV) at about 9dB higher than the weakest channel in the group, BBC-1 on Ch. 33. This can cause overloading, particularly with the low-power relays such as Honiton and Beer, which do not appear to equalise the error.

Newcomers to the trade will find it helpful to rig up a system to demonstrate the effects of overloading, so that they can spot it. See Fig. 1. BSS 1984 recommends input signals between 1mV and 10mV (peak), which is a swing of roughly 20dB. Your test TV set will be taken well above this limit as you remove the attenuators from right to left, one by one, though some sets will handle it quite well. So you may need an extra cascade! Space all amplifiers well apart.

On one occasion I received a call to a very prestigious house in Sidmouth, where this problem was present. A professional rigging company had gone overboard in providing a cascade amplifier and top-of-the-range distributor to many rooms. The result was messy pictures, because of co-channel and coastal radar interference. Removal of the head-end amplifier was all that was required to obtain excellent results. Knowing this earned me a customer for life. Do I make my point?

John Pitt-Francis, Honiton, Devon.

I read with interest John Pitt-Francis's article (June) on starting your own repair business. Having run my own business for some years now, I consider that the advice given was very helpful and informative. There are however a couple of suggestions I would like to add to help the new-comer.

First, 'street cred' is all important these days. Creating a good image from initial contact with the customer right through to his paying the bill will mean that he is likely to spread the word, bringing in more customers. I've found that referrals from satisfied customers are by far the most common way in which my customer base has been built up. In this respect I've also found that being able to offer payment by Credit Card is a facility that many customers look and go for, especially with the more expensive repairs. It adds a bit to the overheads, but is well worthwhile. I've also been told that being VAT registered, even though you might not need to be because you do not meet the turnover requirement, adds to credibility. This is a big step to take however and shouldn't be done lightly.

Secondly, John mentions various options for obtaining service information. I had the same bad experience with a manuals library some years ago but, recognising the value of such a facility to repairers, I decided to start my own manuals library. This has been running successfully for some three years, with hundreds of members to date. Joining a library is probably the most cost-effective way of gaining access to thousands of manuals, many of which may not be available elsewhere, especially for equipment that's getting on a bit.

Another benefit is that it can help to have a 'sparring partner' when the fault is an elusive one. Being in the trade myself, I can offer such a service to members and can obtain help from other members, particularly dealers for specific manufacturers.

manufacturers.
More and more manufacturers are closing their doors on technical support (and, in some cases, even spares supply) to anyone who is not an authorised dealer, making it even harder for the independent repairer to run a successful business. But there remain many of us willing to help in whatever way we can.

Keith Harvey,
Harvey Electronics,
43 Loop Road, Beachley,
Chepstow, Gwent NP6 7HE.

Phone 01291 623 086

fax 01291 628 786.

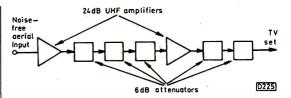


Fig. 1: Amplifier/attenuator arrangement to demonstrate the effects of overloading. The aerial input is assumed to be noise-free and at least 6dB up from threshold.

Monitor LOPT Query

In his note on the Philips CM11342 monitor (August, page 754) Edward Branch asked why the LOPT with which he was supplied was wired differently from the original. I'm tempted to say "because it's a Philips", but I suspect that he may have used the CPC TF027. I did this and was presented with the same symptoms for the same reason - pin 7 being connected to chassis. My solution was to fit the HR replacement, HR7533, which although apparently delisted from the CPC catalogue was still available at the time of writing. This has pin 7 wired correctly for beam limiting.

Incidentally I'm told that CPC intends to stock the entire range of HR transformers in the near future. Now there's a bit of good news. Adrian Spriddell, Micomicon Electronic Services, Diss, Norfolk.

NEXT MONTH IN TELEVISION

Test Equipment Supplement

The test equipment required for today's TV/video servicing – a guide to what you need for efficient work as we approach the twenty first century.

Multi-satellite Reception

There comes a time when reception from one satellite leaves something to be desired. After all, there are many alternative sources of satellite signals. So dish positioners and actuators have to be considered. Next month J. LeJeune describes what this involves, the technology and how it operates. Our new series deals with practical installation and maintenance.

VCR Take-up Problems

The tape take-up mechanism in a VCR gives rise to many different problems, some obvious others less so. Nick Beer considers take-up configurations and failures, also the principles involved.

Toshiba Service Up-date

Latest service know-how from Toshiba Technical.

PLUS ALL THE REGULAR FEATURES

got HASSLE .



* Economic supply TV & Video parts very very Fast

- One of the contract self with the contract of the property of the contract of
- Colliveres of fine of impreciately exercited and the property of the supplier
We do it willingly and for the YOU NEED ECONOMIC!!

THE RESERVE SERVED OF	**********	MANAKANAKANA	*********	CANCHE SALARAGE	E-KREEKKKKKKK	RESERVE VARIABLE	HENNYMENEN KNUCK	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	CERRITARIAN	HENNIGHT VICENTIA	RANGERSKA	KHRKKKKKKKKKKK	XXXXXXXXXXX	EXAMERATE SANTAL	CLFKXENSKKKHAR:	KFRZNAFSSPXN×XXXXXPSSKEP)	CHERT PROPERTY
1N4001	0.04	2SC2570A	0.38	AN5265	1.76	BC558C	0.18	BRX44	1.02	CD4016	0.14	RB156	2.40	TDA1013A	1.56	TDA46002D	4.27
1N4002	0.07	2SC2655	0.31	AN5435	1.46	BC558C	0.06	BRX49	0.43	CD4017	0.47	RC4558	0.55	TDA1015	1.37	TDA4601	1.46
1N4004	0.04	2SC3153	2.65	AN5512	1.76	BC636	0.14	BRY55	0.28	CD4049	0.35	REGBABY10	15.90	TDA1035T	4.27	TDA4601D	4.02
1N4005	0.07	2SC3182	1.20	AN5515	2.79	BC637	0.11	BSX20	0.35	CD4053	0.54	RGP10G	0.26	TDA1044	1.43	TDA4605	4.10
1N4006	0.04	2SC3225	0.60	AN5521	1.66	BC639	0.21	BT139600	1.29	CD4093	0.32	RGP15J	0.17	TDA1060	1.08	TDA4950	1.76
1N4007	0.06	2SC3330	0.52	AN6610	0.94	BC640	0.11	BT151500R	1.12	CNX62A	1.29	RGP15M	0.44	TDA1085C	2.74	TDA7052	1.70
1N4148	0.06	2SC3502	0.45	AN7171K	5.56	BC848B	0.28	BT151800R	1.15	CNX82A	2.10	RGP30M	0.30	TDA1170	1.82	TDA7240A	2.57
1N5062	0.26	2SC3795	2.69	BA157	0.09	BC848C	0.18	BU208A	1.46	CNX83A	2.55	S2000A3	1.54	TDA1170N	2.57		
1N5400	0.11							BU208D	1.61							TDA8138	1.97
		2SC3795B	2.21	BA158	0.07	BC858B	0.24			CNY75B	0.52	S2000AF	1.71	TDA1170S	2.05	TDA8140	4.62
1N5401	0.14	2SC3807	0.91	BA159	0.11	BC858C	0.19	BU326A	1.36	DTA114ES	0.31	S2055AF	3.74	TDA1180P	1.69	TDA8145	1.97
1N5402	0.12	2SC3885A	6.82	BA3910B	6.99	BC875	0.33	BU406	0.69	DTA124ES	0.19	SAA129302	10.37	TDA1515A	3.16	TDA8153	16.24
1N5408	0.14	2SC3892A	6.82	BA5406	2.14	BD131	0.26	BU426A	1.29	DTC124E	0.19	SAA5012	3.34	TDA1516Q	3.59	TDA8170	4.70
1N6263	8.20	2SC4204	0.60	BA5412	2.48	BD132	0.26	BU500	1.41	DTC124ES	0.77	SAB3035	1.71	TDA1518Q	4.27	TDA8172	2.65
1N914	0.04	2SC4242	2.31	BA6109	1.85	BD135	0.33	BU500S	0.35	DTC144ES	0.19	SDA2516	2.89	TDA1519	4.27	TDA8175	6.41
181555	0.07	2SC4517	4.70	BA6209	1.46	BD136	0.20	BU508A	1.29	FXT749	0.43	SGSIF344	10.70	TDA1520B	2.48	TDA8178FS	3.98
2N2222A	0.23	2SC4517A	2.52	BA6209N	1.27	BD137	0.48	BU508AF	. 1.32	HA13001	3.85	SL1430	1.92	TDA1524A	2.99	TDA8180	4.87
2N2369A	0.19	2SC458	0.12	BA6219B	1.76	BD138	0.29	BU508D	1.56	HA13108	2.57	SL1431	2.82	TDA1553Q	4.79	TDA8190	3.59
2N3055	0.50	2SC4742	5,11	BA6222	1.70	BD139	0.31	BU508DF	1.88	HA13117	2.05	SL1432	10.17	TDA1554Q	8.12	TDA8380	2.53
2N3773	1.52	2SC536	0.30	BA6238A	2.91	BD140	0.24	BU508V	2.40	HA13118	1.88	STA441C	3.86	TDA1557Q	4.23	TDA9503	2.13
2N3904	0.32	2SC8050	0.52	BA6247	1.95	BD233	0.23	BU806	1.03	HA13119	2.05	STK4132II	10.00	TDA1558Q	7.69	TEA1039	
2N4123	0.32	2SC945	0.32					BU807	0.51								2.11
				BA718	1.08	BD234	0.24	BU908	1.68	HA13151	13.20	STK414111	10.23	TDA1670A	2.98	TEA2018A	2.29
2SA1013	0.35	2SD1207	0.57	BAT85	0.96	BD237	0.31	BUK444500B	2.57	HA51338SP3	7.69	STK4142II	9.40	TDA1675A	3.85	TEA2029C	7.04
2\$A1015	0.11	2SD1266	0.82	BAV21	0.21	BD238	0.24			HM6251	14.32	STK4152II	10.68	TDA1904	1.63	TEA2031A	4.26
2SA1015GR	0.11	2SD1275	1.41	BAW76	0.03	BD239 ·	0.33	BUK454600C	2.99	KA2263	0.55	STK463	11.49	TDA1908A	2.14	TEA2164	3.40
2SA1020	0.44	2SD1292	0.64	BAX14	0.17	BD243C	0.44	BUK454800A	4.99	KBL08	1.42	STK5331	2.87	TDA2004	2.57	TEA2165A	9,58
2SA1175	0.26	2SD1397	2.31	BC107B	0.20	BD244A	0.34	BUK455600B	2.54	KIA6210AH	6.15	STK5332	2.82	TDA2005	1.83	TEA2260	2.48
2SA1286	0.60	2SD1398	2.14	BC108	0.24	BD244C	0.42	BUT11	0.65	LA1230	1.95	STK5333	15.00	TDA2006	1.06	TEA2261	3.68
2SA1370	0.43	2SD1426	3.51	BC108C	0.15	BD433	0.29	BUT11A	0.95	LA4282	4.93	STK5342	4.07	TDA2030H	0.86	TEA5101A	6.48
2SA1706	0.50	2SD1439	5.88	BC109A	0.28	BD434	0.31	BUTLLAF	1.18	LA4440 -	3.45	STK5372H	6.84	TDA2030V	1.48	TEA5115	2.91
2SA608	0.24	2SD1441	5.98	BC141	0.36	BD437	0.28	BUT12A	0.91	LA4445	3.45	STK5421	9,52	TDA2040H	4.34	TIC106D	0.82
2SA673	0.18	2SD1453	3.85	BC147A	0.24	BD438	0.28	BUT12AF	1.87	LA4700	4.27	STK5471	4.87	TDA2050	4.56		1.02
2SA733	0.18	2SD1433						BUT18AF	1.37							TIC225M	
2SA733 2SA769			4.74	BC148A	0.35	BD826	0.35	BUT56A	1.19	LA6358S	0.60	STK5481	8.12	TDA2170	0.00	TICP106D	0.60
	1.29	2SD1541	4.98	BC157	0.13	BD839	0.57	BUT56AT	3.48	LA6510	2.94	STK5482	5.52	TDA2270	9.60	TIP102	0.86
2SA872A	0.35	2SD1546	7.69	BC158B	0.12	BD901	0.52	BUV46A	0.84	LA7520	4.60	STK7253	5.90	TDA2540	1.29	TIP107	1.12
2SA933	0.36	2SD1548	5.95	BC182L	0.14	BD902	0.60	BUV48A	1.52	LA7800	1.61	STK7348	5.74	TDA2541	1.12	TIP110	0.36
2SA966	0.41	2SD1554	3.25	BC184A	0.12	BD939F	1.61	BUW11A	1.63	LA7830	1,88	STR11006	7.37	TDA2576A	5.95	TIP112H	0.95
2SA970	0.19	2SD1555	2.65	BC184L	0.06	BDT65C	1.68			LA7835	2.99	STR4211	9.40	TDA2577A	2.99	TIP121	0.50
2SA984	0.38	2SD1556	5.11	BC184LC	0.10	BF180	0.38	BUW418	1.39	LA7837	2.40	STR451	23.41	TDA2578A	2.91	TIP122	0.48
2SB1010	0.35	2501651	2.38	BC212	0.08	BF194	0.22	BUW81A	3.11	LC7132	4.70	STR50020	9.38	TDA2579A	4.91	TIP127	0.47
2SB1143	0.77	2SD1710	2.52	BC212B	0.19	BF199	0.04	BUW84	1.03	LED3G	0.10	STR50103	4.48	TDA2581	4.27	TIP137	0.48
2SB1243	0.60	2SD1877	2.14	8C212L	0.18	BF224	0.21	BUX84	0.60	LED3R	0.10	STR50103A	5.56	TDA2581Q	1.99	TIP29E	0.62
258641	0.21	2SD1878	2.63	BC213L	0.10	BF240	. 0.11	BUZ71A	1.03	LED3Y	0.10	STR54041	10.52	TDA2582	3.85	TIP3055	0.02
2SB649A	0.77							BUZ80A	1.97								
2SB686		2SD1884 2SD1887	3.35	BC237B	0.19	BF244	0.43	BUZ90A	2.55	LM317T	1.29	STR5412	3.68	TDA2594	2.21	TIP30C	0.17
	2.05		3.56	BC238	0.11	BF245A	0.19	BY127	0.18	LM324N	1.48	STR58041	3.42	TDA2595	3.19	TIP31C	0.00
258698	0.35	2SD1911	5.98	BC238C	0.07	BF245B	0.41	8Y133	80.0	LM339N	0.50	STR59041	8,11	TDA2600	7.69	TIP32A	0.45
258716	0.43	2SD350A	1.97	BC307	0.06	BF256A	0.23	BY179	0.77	LM358N	0.52	STR6020	6.07	TDA2611A	0.64	TIP32C	0.40
258764	0.30	2SD400	0.34	BC307B	0.15	BF258	0.04	BY227	0.13	M494B1	11.85	STR61001	10.86	TDA2611AQ	1.32	TIP35C	1.82
258772	0.50	2SD401A	0.77	BC308	0.09	BF324	0.18	BY228	0.26	M5218L	0.69	STRD1816	7.69	TDA2653A	4.70	TIP36C	2,14
2SB774	1.61	2SD468	0.28	BC308B	0.19	BF391	0.16	BY2291000	1.31	M54544L	2.84	STRD4420	11.49	TDA33018	6.75	TIP41C	8.65
258891	0.60	2SD669A	0.64	BC309C	0.14	BF420	0.21	BY229800	1.08	M58655P	4.98	T9053V	1.35	TDA3505	2.40	TIP42C	0.50
258892	0.35	2SD716	1.63	BC327	0.10	BF421	0.24	BY255	0.14	MC13002P	7.69	T9064V	1.87	TDA3560	3.86	TIPL760A	2.57
2SC1213	0.14	2SD756	0.47	BC328	0.14	BF422	0.19			MC14066B	0.21	TA7205AP	2.87	TDA3561A	5.30	TIPL761A	1.85
2SC124	0.48	2SD837B	1,12	BC337	0.14	BF423	0.14	BY299	0.18	MC14426P	1.29	TA7227P	2.29	TDA3562A	3.90	TIPL791A	1.25
2SC1318	0.19	2SD856	8.79	BC338	0.06	BF458	0.31	BY398	0.18	MDA2062	13.74	TA7270P	2.72	TDA3562ATF	8.97	TL072	0.00
2SC1573	0.35	2SD8988	6.41	BC368	0.18	BF459	0.43	BY399	0.12	MJ2955	0.98	TA7271P	2.70	TDA3565	2.74		
2SC1740								BY448	0.30							TL082CP	0.21
2301740	0.16	250965	0.67	BC369	0.18	BF460	4.82	BYD14J	0.35	MJ4052	3.34	TA7274P	4.93	TDA3566	6.41	TMP47C432AP8189	15.19
2SC1815	0.17	2SK1118	3.40	BC372	0.48	BF469	0.34	BYD33D	0.12	MJ802	2.91	TA7280P	2.74	TDA3576B	10.31	TMP47C434N3555	16.63
2SC1827	9.58	7406	0.69	BC517	0.16	BF470	0.38	BYD33J	0.16	MUE13005	0.86	TA7281P	3.20	TDA3592A	4.27	TPU2732	10.05
2SC1959	0.18	7407	0.69	BC546A	0.11	BF471	0.37	BYD33M	0.26	MUE18004	2.05	TA7698AP	5.97	TDA3640	5.98	U2829B	2.40
2SC2001	0.23	74HC04	0.34	BC546B	0.12	BF487	0.57	BYV10-40	2.55	MUE3055T	0.74	TA8201	3.93	TDA3650	12.02	UC3842	1.46
2SC2023	3.18	7805	0.78	BC547	0.11	BF759	0.38	BYV95B	0.21	MJE340	0.45	TA8205AH	4.50	TDA3653B	1.54	UC3844	1.20
2SC2060	0.30	7808	0.72	BC547A	0.04	BF763	0.23	BYV95C	0.21	MJF18004	2.05	TA8207	2.74	TDA3653C	2.55	UC3844N	1.91
2SC2078	1.00	7809	0.69	BC547B	0.11	BF788	0.52	BYV96D	0.27	MN650	3.30	TA8210AH	4.10	TDA3653CQ	2.57	UPC1230H	3.40
2SC2120	0.23	7812	0.52	BC548	0.06	BF869	0.25	BYV96E	0.53	MPSA06	0.35	TA8210H	4.79	TDA3654	1.88	UPC1318AV	3.85
2SC2230	0.55	7815	0.82	BC548A	0.11	BF869S	0.48	BYW56	0.33	MPSA42	0.23	TA8215H	4.96	TDA3654Q	2.82	UPC1365C	1.70
2SC2235	0.36	78L05	0.35	BC548B	0.06	BF871	0.41			MPSA56	0.23	TA8220H	9.82	TDA3634Q TDA4500	4.66	UPC1378H	1.68
2SC2236	0.36	7912						BYW95C	0.21								
			0.35	BC548C	0.89	BF959	0.16	BYW96E	0.46	MPSA92	0.18	TA8221H	7.26	TDA4501H	5.95	UPC1394C	1.92
2SC2240	0.21	7915	0.82	BC5498	0.11	8F960	8.30	BYX10	0.38	NESSS	1.03	TA8403K	2.31	TDA4502A	5.47	UPC1488H	2.99
2SC2271	0.67	AC127	0.52	BC550C	0.09	BF961	0.26	BYX55600	0.23	NE592N	1.91	TAA550B	0.26	TDA4503	4.00	UPC574J	98.0
2SC2274	0.35	AC187K	0.59	BC556A	0.11	BFR90A	0.68	BZV1D	1.34	P6KE130A	2.55	TBA120S	0.89	TDA4505E	7.35	UPD1937C	3.85
2SC2314	0.38	AC188K	0.71	BC557	0.09	BFR91	8.60	CA3189E	3.12	P6KE180A	4.65	TBA120T	0.51	TDA4505M	8.97	VID1054	0.60
2SC2335	1.12	AD149	0.52	BC557B	9.06	BR100	0.16	CD4001	0.24	R2M	0.84	TBA810S	88.0	TDA4600	2.14	X2402P	3.75
2SC2482	0.35	AF127	1,51	BC557C	0.14	BR103	0.62	CD4011	0.38	R4050	3.04	TBA820M	0.24	TDA4600/2/3	2.82	ZTK33B	0.12
IE VALLDA																-	

IF YOU DONT SEE IT LISTED ASK FOR QUOTE, GIVE MAKE, MODEL, LOCATION, REMEMBER TO ADD \$1.00 POST & HANDLING U.K. MAINLAND ONLY, EXPORT AT COST, ADD 17.5% YAT TO TOTAL

housands of semiconductors I.C's etc. of vides parts, heads, belt kits etc. of remote controls. etc. etc.

over 100,000 database records to help find the difficult video parts quickly. Stock availability & price in seconds

We compete on **QUALITY** - We compete on **SERVICE** We will not compromise and yet our prices are often less.

2 11172				
sowine litik	an The St	ecial	offers	(Singly while slocks last)
REGBABY 0 each \$13.00	事15.500 15. 集集 140 集	\$7.50	STK5481 STR50103	X2=\$10.00
01208A X 5 \$5.00 BIS08A X 5 \$4.74	BUTI IAP X5 BUTI IA X5	\$3.75 \$2.50	S2000AF	X2 £7.00 X5 £6.00
BU508AF X 5 \$5.00 BU508D - X 5 \$5.50	CNX62A X 5 LA7830 X 2	£3 75 £7 00	10 K(658)	X 5 &8.75 X 2 \$2.50
Philips type 1.2 volt Back up batte Philips type 2.4 volt Back up batte	ry X5 \$450	Satell	ite division s	Satellite divisior
Scare scarr each earn muly wife	1 72 2 90			
Standard video sensor lamp Sta video sensor lamp : :: plug		visi		ANNELS
Sid video sensor lamp ∓ phug 3/72) etc Belt kit 3/35/36 etc Belt kit	X5 \$4.50 X5 \$4.25			diameter of 50mm. It is recommended that
Vi Eeic Belikit Positor P737, T198009 (White)	X5 25.50 X5 24.75		er 200 Channels available on	the dish should be a minimum of 80cms and not more than 1 metre. This may involve upgrading the size of the dish, in
Thorn: 14:100 Green spot LOPIX (please add \$1:00 handling	each \$12.95	E YOU	ır satellite TV	which case an 80 cms or 95 cm dish can be provided. This 3 part story
wood bar	ask .	you can	ve a fixed dish system, it means that	is no fairy tale. Three parts are required to create a
		Astra po	sition. The ideal way of upgrading	motorised system the first of which is the mini poler mount as already described. The

Satellite division Satellite division Satellite o

SPEC.

ETTI 86.86 Pace - PRD800,PRD900,PSR800,PSR900, Rerguson SRDS,SRD16,Grundig STR1 SRE250S/1,250S/1, Philips STU802/05M, Manhattan 850,950 Goodmans ST700, Toelsba TU-SD200,SAT99 ETT2 86.95 Ametred - SIS10,520,540,SRDR45,SRDS50

ETT3 86.95 Ametred - SIS510,520,540,SRDR45,SRDS50

ETT3 86.95 Ametred - SIS510,520,540,SRDR45,SRDS50

ETT4 86.95 Ametred SRD 500 ETT4 #6.95 Amstrad SRD 500 ETT6 #6.95 Pace D100,120

ETTS 86.95 Amstrad SR0320,340 etc (export models) ETT7 86.95 Churchill D2MAC decoder

KITY 86.95 Pace MSS200,300,Apollo ETT11 85.95 Perguson SRD4

ETT13 229.71 Echoster SR6500,7700,8700 ETT15 27.96 Minutes (Soremon PSU type only) ETT16 25.96 Ametred SRD700,5R950,SRX100,90

ETT12 &16.45 Echostar SR5500(early PSU with adjuster) SIT14 623.86 Ametrad SRD600

strad SRD700,SR950,SRX100,301,501,1002,200 ,SRD2000

LE PATE IN THE

ETTS 85,95 Pace MSS100 ETT10 813,11 Pace MSS500,1000

you can only receive programmes from one was a way a special position and in most cases this will be three parts are required. Astra position. The ideal way of upgeding motorised system the fit from a fixed dish to a system which is mini polar mount as altre capable of viewing all the satellites and second part required it the position. The ideal way of upgrading motorised system the first of which is min polar mount as already described bable of viewing all the satellites and second part required is the actuative number of hundreds of programmes available mini-jack and it is this part that mechan myour location is to go motorised with a pushes or pulls the dish in a part hundred to the course in the positioner. This is the only way part required is the mini positioner to cause in every case the dish is pointing early at the back reception from your dish sends the voltage to the actuator to cause in every case the dish is pointing early at the individual satellite.

Common fixed dish system now óbsolete.

horizon-to-horizon mini poler mount evallable now at a price that most families can afford. It is a do-it-youself add on unit which are catainal note is vertical and has an outside Starter kits available from

It is only by litting a polar mount th nos its abilities. Add a D2MAC decoder to le many more channels or add its, therity to the invention of a new on many French and Russian autolites. Take the

2 Temple Street, Wolverhampton, WV2 4AN, UK Tele ++ 44 (0)1902 773122 Fax ++ 44 (0)1902 29052

A look at the Panasonic Z5

In the second article in his latest series Ray Meadows describes the signal processing arrangements used in this small-screen chassis

his month we will deal with the signals circuitry used in the Z5 chassis and the optional teletext module. The obvious place to start is with the tuner unit and the IF section.

Tuner and IF

Unlike its predecessor, the Z5 chassis uses frequency-synthesised tuning. This is normally a more costly option than the alternative, voltage-synthesised tuning, but it does provide more accurate tuning, particularly where many broadcasts are packed into adjacent channels. On a recent trip to Belgium I found that some block-converted UHF channels shrink when down-converted for cable system use at VHF, with the result that they become less than the standard 8MHz bandwidth. This means that it is possible to squeeze more channels into the same space. In this particular case there were actually two channels

corresponding to channel E12, one at the low end and the other at the high end. The latter was found only whilst search tuning. But I digress.

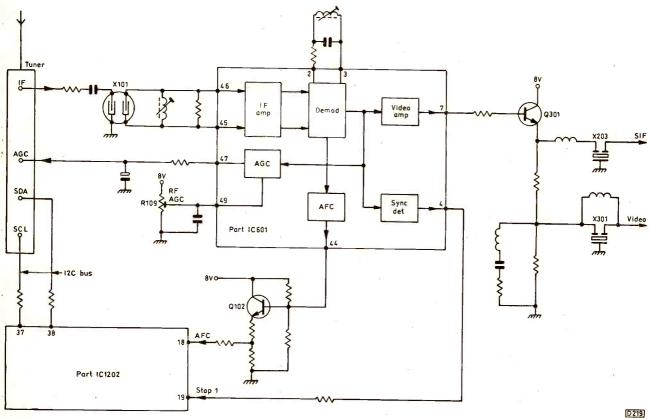
The tuner fitted in UK Z5 models is an Ecom type ENV87877G3, which is connected to the 30V tuning supply as well as the 12V and 5V lines and is thus powered down during standby. Tuning is controlled by the main micro chip IC1202, via an I2C bus – see Fig. 1. The tuner provides an unbalanced IF output which is passed to the SAW filter X101. Continental models that have a balanced-output tuner incorporate an additional buffer circuit, formed around Q101, to drive the SAW filter. The signal then passes to a Philips TDA8361 chip, IC601, which handles all the vision and sound IF, the sync, the colour decoder and timebase generator functions.

As far as the vision signal is concerned, IC601 contains an IF amplifier and demodulator, with full AFC and AGC



Fig. 1:

Simplified block



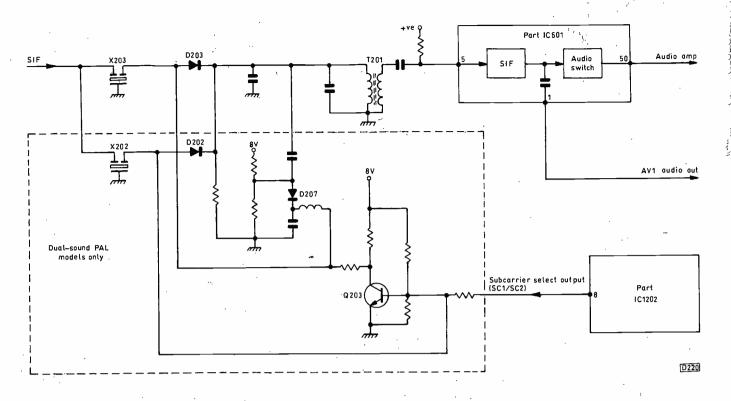


Fig. 2: The SIF system, including the modified arrangement for dual-sound PAL operation. For PAL I X203 has a centre frequency of 6MHz; for PAL B/G and D/K X203 has a centre frequency of 5.5MHz and X202 a centre frequency of 6.5MHz.

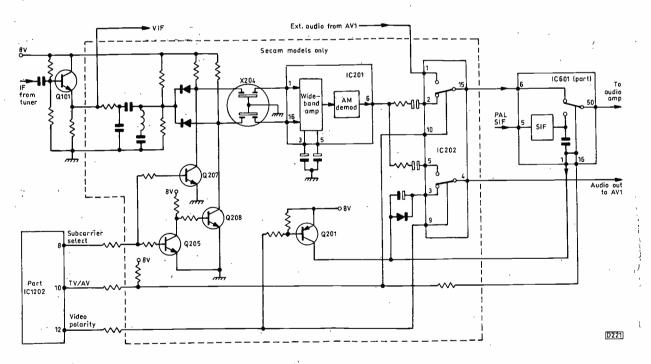


Fig. 3: The Secam sound IF/audio arrangement.

functions. The RF AGC output is fed direct to the tuner, while the AFC output is fed via buffer transistor Q102 to pin 18 of the microcontroller chip where it is interpreted, coded and sent to the tuner via the I2C bus to adjust the tuning. IC601 is not itself connected to the I2C bus.

The output from the demodulator within IC601 is fed to a video amplifier, to the AGC circuit and to a sync detector circuit. The latter provides an output at pin 4, which is connected to pin 19 of the microcontroller chip. When this

pin is low, the micro knows that there is no IF signal present. It therefore mutes the sound via the PWM volume control output. The input at pin 19 of IC1202 is also used in the search tuning mode: the search continues until pin 19 goes high.

IC601's video output (with sound) leaves at pin 7, passing to the emitter-follower transistor Q301. From this point the signal is split. Ceramic filter X301 in the composite video signal path removes the sound signal. The

MOONSHINE BIBLE 270 page book covering the production of alchohol from potatoes, rice, grains etc Drawings of simple home made stills right through to commercial systems. £15 ref MS1

NEW HIGH POWER MINI BUG With a range of 800 metres or more and up to 100 hours use from a PP3 this will be popular! Bug measures less than 1' square! £28 Ref LOT102.

SINCLAIR C5 MOTORS We have a new ones available without gearboxes at £50 ref LOT25

BUILD YOU OWN WINDFARM FROM SCRAP New publication gives step by step guide to building wind generators. Armed with this publication and a good local scrap yard could make ou self sufficient in electricity! £12 ref LOT81

PC KEYBOARDS PS2 connector, top quality suitable for all 286/ 3864486 etc £10 ref PCKB 10 for £65

TRACKING TRANSMITTER range 1.5-5 miles, 5,000 hours on AA batteries, also transmits info on car direction and motion!Works with any FM radio 1.5" square, £65 ref I OT101

ELECTRIC DOOR LOCKS Complete lock with both Yale lock and 12v operated deadlock (keys included) £10 ref LOT99
GALLIUM ARSENIDE FISHEYE PHOTO DIODES Complete

th suggested circuits for long range cor

SURVEILLANCE TELESCOPE Superb Russian zoom telescope adjustable from 15x to 60xl complete with metal tripod (imposible to use without this on the higher settings) 66mm lense, leather carrying case £149 ref BAR69

WIRELESS VIDEO BUG KIT Transmits video and audio signals from a minature CCTV camera (included) to any standard television! All the components including a PP3 battery will fit into a cigarette packet with the lens requiring a hole about 3mm diameter. Supplied with telescopic aerial but a piece of wire about 4" long will still give a range of up to 100 metres. A single PP3 will probably give less than 1 hours use. £99 REF EP79. (probably not licensable!)

CCTV CAMERA MODULES 46X70X29mm, 30 grams, 12v 100mA, auto electronic shutter, 3.6mm F2 lens, CCIR, 512x492 pixels, video output is 1v p-p (75 ohm). Works directly into a scart or video input on a tv or video. IR sensitive. £79.95 rel EF137.

IR LAMP KIT Suitable for the above camera, enables the camera to be used in total darkness! £5.99 ref EF138.

REMOTE CONTROLTANDATA TD1400 MODEM/ VIEW DATA Complete system comprising 1200/75 modern, auto dialler infra red remote keyboard. (could be adapted for PC use?) osu, UHF and RGB output, phone lead, RS232 output, composite

output. Absolute bargain for parts alone! £9.95 ref BAR33

9 WATT CHIEFTAN TANK LASERS

Double beam units designed to fit in the gun barrel of a tank, each unit has two semi conductor lasers and motor drive units for alignement. 7 mile range, full circuit diagrams, new price £50,000? us? £349. Each unit has two gallium Arsenide injection lasers, 1 x 9 watt, 1 x 3 watt, 900nm wavelength, 28vdc, 600hz pulsefrequency. The units also contain an electronic receiver to detect reflected signals from targets, five or more units £299 ea. £349 for one. Ref LOT4.

TWO WAY MIRROR KIT Includes special adhesive film tomake two way mirror(s) up to 60°x20°. (glass not included) includes full instructions £12 ref TW1

NEW LOW PRICED COMPUTER/WORKSHOP/HIFIRCB UNITS Complete protection from faulty equipment for everybodyl Inline unit fits in standard IEC lead (extends it by 750mm), fitted in le than 10 seconds, reset/test button, 10A rating £6.99 each ref LOT5.
Or a pack of 10 at £49.90 ref LOT6, if you want a box of 100 you can

RADIO CONTROLLED CARS FROM £6 EACH!!!! All returns from famous manufacturer. types available, single channel (left,right,forwards,backwards)£6 refLOT1. Two channel with more features £12 ref LOT2.

THOUSANDS AVAILABLE RING/FAX FOR DETAILS! MAGNETIC CARD READERS (Swipes) £9.95 Cased with fivleads, designed to read standard credit cards! they have 3 wires coming out of the head so they may write as well? complete with control elctronics PCB. just £9.95 ref BAR31

WANT TO MAKE SOME MONEY? STUCK FOR AN IDEA? We have collated 140 business manuals that give you information on setting up different businesses, you peruse these at your leisure using the text editor on your PC. Also included is the certificate enabling you to reproduce (and self) the manuals as much as you like! £14 ref FP74

PANORAMIC CAMERA OFFER Takes double width photographs using standard 35mm film. Use in horizontal or vertical mode. Complete with strap £7.99 ref BAR1

COIN OPERATED TIMER KIT Complete with coinslot mechanism, adjustable time delay, relay output, put a coinsiot on anything you like! TV,s, videos, fridges, drinks cupboards, HIFI. takes 50p's and £1 coins. DC operated, price just£7.99 ref BAR27. ZENITH 900 X MAGNIFICATION MICROSCOPE Zoom metal construction, built in light, shrimp farm, group viewing screen, lots of accessories, £29 ref ANAYLT.

AA NICAD PACK Pack of 4 tagged AA nicads £2.99 ref BAR34 PLASMA SCREENS 222x310mm, no data hence £4.99 ref BAR67

NIGHTSIGHTS Model TZS4 with infra red illuminator, views up to 75 metres in full darkness in infrared mode, 150m range, 45mm lens, 13 deg angle of view, focussing range 1.5m to infinity. 2 AA required. 950g weight. £199 ref BAR61. 1 years warranty

LIQUID CRYSTAL DISPLAYS Bargain prices, 16 character 2 line, 99x24mm £2.99 ref SM1623A 20 character 2 line, 83x19mm £3.99 ref SM2020A 16 character 4 line, 62x25mm £5.99 ref SMC1640A

TAL-1 110MM NEWTONIAN REFLECTOR TELESCOPE Russian. Superbastronomic 1'scope, everything you need for some

erious stangazing! up to 169x magnification. Send or fax for further

WOLVERHAMPTON BRANCH NOW OPEN AT WORCESTER ST W2HAMPTON TEL 01902 22039

CENTRAL POINT PC TOOLS Award winning software, 1,300 virus checker, memory optimiser, disc optimiser, file compression, low level formatting, backup scheduler, disk defragmenter, undelete, A calculators, D base, disc editor, over 40 viewers, remote computing, password protection, encryption, comprehensive manual supplied etc £25 ref lot 97 3.5° disks.

GOT AN EXPENSIVE BIKE? You need one of our bottle alarms, they look like a standard water bottle, but open the top, insert a key to activate a motion sensor alarm built inside. Fits all standard bo amiers, supplied with two keys. SALE PRICE £7.99 REF SA32.

GOT AN EXPENSIVE ANYTHING? You need one of our cased vibration alarms, keyswitch operated, fully cased just fit it to anything from videos to caravans, provides a years protection from 1 PP3 battery, UK made. SALE PRICE £4.99 REF SA33.

DAMAGED ANSWER PHONES These are probably repair so just £4.99 each. BT response 200 machines. REF SA30. COMPUTER DISC CLEAROUT We are left with a lot of software packs that need clearing so we are selling at disc value only! 50 discs for £4, thats just 8p each!!(our choice of discs) £4 ref EP66
IBM PS2 MODEL 150Z CASE AND POWER SUPPLY

h fan etc and 200 watt power supply. £9.95 ref EP67 DELL PC POWER SUPPLIES 145 watt +5-5+12-12 150x150x85mm complete with switch, flyleads and IEC socket. SALE PRICE 69.99 ref EP55

1.44 DISC DRIVES Standard PC 3.5" drives but returns so they will need attention SALE PRICE £4.99 ref EP68

1.2 DISC DRIVES Standard 5.25" drives but returns so they will attention SALE PRICE NOW ONLY £3.50 ref EP69

PP3 NICADS Unused but some storage marks. £4,99 ref EP52 DELLPC POWER SUPPLIES (Customer returns) Standard PC osu's complete with fly leads, case and fan. +12v,-12v,+5v,-5v SALE PRICE£1.89 EACH worth it for the bits alone! refDL1. TRADE PACK OF 20 629 95 Ref DL 2

GAS HOBS ANDOVENS Brand new gas appliances, perfect for small flats etc. Basic 3 burner hob SALE PRICE £24.99 ref EP72. Basic small built in oven SALE PRICE £79 ref EP73

RED EYE SECURITY PROTECTOR 1,000 watt outdoor PIR witch SALE PRICE £6.99 ref EP57

ENERGY BANK KIT 100 6'x6' 6v 100mA panels, 100 diodes, connection details etc. £69.95 ref EF 112

PASTEL ACCOUNTS SOFTWARE, does everything for all sizes of businesses, includes wordprocessor, report writer, windowing, networkable up to 10 stations, multiple cash books etc. 200 page comprehensive manual. 90 days free technical support (01342-326009 try before you buy!) Current retail price is £129, SALE PRICE £9.95 ref SA12. SAVE £120!!!

COMPLETE PC 200 WATT UPS SYSTEM Top of the range UPS system providing protection for your computer system and valuable software against mains power fluctuations and cuts. New and boxed, UK made Provides up to 5 mins running time in the event of complete power failure to allow you to run your system down correctly. LAST FEW TO CLEAR AT £49 SAVE £30 ref LOT61

BIG BROTHER PSU Cased PSU, 6v 2A output, 2m o/p lead, 1.5m input lead, UK made, 220v. SALE PRICE £4.99 REF EP7



Check out our **WEB SITE**

http://www.pavilion.co.uk/bull-electrical

RACAL MODEM BONANZA! 1 Racal MPS 1223 1200/75 mode telephone lead, mains lead, manual and comms software, the cheapest way onto the net! all this for just £13 ref DEC13.

4.6mw LASER POINTER, BRAND NEW MODEL NOW IN STOCK!, supplied in fully built form (looks like a nice pen) complete with handy pocket clip (which also acts as the on/off switch.) About 50 metres range! Runs on 2 AAA batteries. Produces thin red beam ideal for levels, gun sights, experiments etc. just £39.96 ref DEC49 TRADE PRICE £28 MIN 10 PIECES

BULL TENS UNIT Fully built and tested TENS (Transcutaneous Electrical Nerve Stimulation) unit, complete with electrodes and full instructions. TEMS is used for the relief of pain etc in up to 70% of sufferers. Drug free pain relief, safe and easy to use, can be used in conjunction with analgesics etc. £49 Ref TEIV/1

PC PAL VGA TO TV CONVERTER Converts a colour TV into abasic VGA screen. Complete with built Inpsu, lead and s/ware.. Ideal for laptops or a cheap upgrade. Supplied in kit form for home assembly. SALE PRICE £25 REF SA34

EMERGENCY LIGHTING UNIT Complete unit with 2 double

SOME OF OUR PRODUCTS MAY BE UNLICENSABLE IN THE UK

BULL BULKCIRICAI

250 PORTLAND ROAD, HOVE, SUSSEX. BN3 5QT. (ESTABLISHED 50 YEARS) MAIL ORDER TERMS: CASH, PO OR CHEQUE

WITH ORDER PLUS 43 P&P PLUS VAT. WELCOME ACCESS VIBAS SWITCH, AMERICAN EXPRESS)
TEL: 01273 203500
FAX 01273 323077

E-mail bulk@pavilion.co.uk

bulb floodlights, built in charger and auto switch. Fully cased. 6v 8AH lead acid reg'd. (secondhand) £4 ref MAG4P11

YUASHA SEALED LEAD ACID BATTERIES Two sizes currently available this month. 12v 15AH at£18 refLOT8 and 6v 10AH (suitable for emergency lights above) at just £6 refLOT7.

ELECTRIC CAR WINDOW DE-ICERS Complete with cable. g etc SALE PRICE JUST £4.99 REF SA28

AUTO SUNCHARGER 155x300mm solar panel with diode and 3 etre lead fitted with a cloar plug, 12v 2watt, £8.99 RFF SA25

MICRODRIVE STRIPPERS Small cased tape drives ideal for stripping, lots of useful goodies including a smart case, and lots of components. SALE PRICE JUST £4.99 FOR FIVE REF SA26

SOLAR POWER LABSPECIAL You get TWO 6"x6" 6v 130mA solar cells, 4 LED's, wire, buzzer, switch plus 1 relay or motor. Superb value kit SALE PRICE JUST £4.99 REF SA27

RGB/CGA/EGA/TTL COLOUR MONITORS 12" in good on. Back anodised metal case. SALE PRICE £49 REF SA 16B PLUG IN ACORN PSU 19v AC 14w , £2.99 REF MAG3P10

13.8V 1.9A PSU cased with leads. Just £9.99 REF MAG10P3 UNIVERSAL SPEED CONTROLLER KIT Designed by us for the C5 motor but ok for any 12v motor up to 30A. Completc. A heat sink may be required. £17,00 REF: MAG17

PHONE CABLE AND COMPUTER COMMUNICATIONS PACK Kit contains 100m of 6 core cable, 100 cable clips, 2 line drivers with RS232 interfaces and all connectors etc. Ideal low cost method of communicating between PC's over a long distance utilizing the serial ports. Complete kit £8.99. Ref comp1.

VIEWDATA SYSTEMS made by Phillips, complete with internal 1200/75 modern, keyboard, psu etc RGB and composite outputs, menu driven, autodialler etc. SALE PRICE £12.99 REF SA18

AIR RIFLES.22 As used by the Chinese army for training puposes, so there is a lot about! £39.95 Ref EF78. 500 pellets £4.50 ref EF80. PLUG IN POWER SUPPLY SALE FROM £1.50 Plugs in to 13A socket with output lead, three types available, 9vdc 150m A£1.50 ref SA19, 9vdc 200mA £2.00 ref SA20, 6.5vdc 500mA £2 ref SA21. VIDEO SENDER UNIT. Transmits both audio and video signals viDEO SENDER ONTI - Haissinis both adult and more signals from either a video camera, video recorder, TV or Computer etc to any standard TV set in a 100 rangel (tune TV to a spare channel) 12v DC op. Price is £25 REF: MAG15 12v psu is £5 extra REF: MAG5P2

*MINATURE RADIO TRANSCEIVERS A pair of walkie talkies with a range up to 2 kmin open country. Units measure 22x52x155mm. Including cases and earp'ces. 2xPP3 reg'd. £30.00 pr.REF: MAG30 FM TRANSMITTER KIT housed in a standard working 13A adapter!! the bug runs directly off the mains so lasts forever! why pay £700? or price is £15 REF: EF62 (kit) Transmits to any FM radio.

*FM BUG BUILT AND TESTED superior design to kit. Supplied to detective agencies. 9v battery req'd. £14 REF: MAG14 TALKING COINBOX STRIPPER COMPLETE WITH

COINSLOT MECHANISMS originally made to retail at £79 each, these units are designed to convert an ordinary phone into a payphone. The units have the locks missing and sometimes broken hinges. However they can be adapted for their original use or used for something else?? SALE PRICE JUST £2.50 REF SA23 GAT AIR PISTOL PACK Complete with pistol, darts and pellets

£12.95 Ref EF82B extra pellets (500) £4.50

6"X12" AMORPHOUS SOLAR PANEL 12v 155x310mm 130mA. SALE PRICE £4.99 REF SA24.
FIBRE OPTIC CABLE BUMPER PACK 10 metres for £4.99

ref MAG5P13 ideal for experimenters! 30 m for £12.99 ref MAG13P1

MIXED GOODIES BOX OF MIXED COMPONENTS WEIGHING 2 KILOS YOURS FOR JUST £6.99

4X28 TELESCOPIC SIGHTS Suitable for all air rifles, ground lenses, good light gathering properties. £19.95 ref R/7.

GYROSCOPES Rememberthese? well we have found a company that still manufactures these popular scientific toys, perfect gift or for educational use etc. £6 ref EP70

HYPOTHERMIA SPACE BLANKET 215x150cm aluminised foil blanket, reflects more than 90% of body heat. Also suitable for the construction of two way mirrors! £3.99 each ref 0/L041.

LENSTATIC RANGER COMPASS Oil filled capsule, strong metal case, large luminous points. Sight line with magnifying viewer. 50mm dia. 86cm. £10.99 ref O/K604.

RECHARGE ORDINARY BATTERIES UP TO 10 TIMES! With the Battery Wizard Uses the latest pulse wave charge system to charge all popular brands of ordinary batteries AAA, AA, C, D, four at a time! Led system shows when batteries are charged, automatically rejects unsuitable cells, complete with mains adaptor. BS approved.

TALKING WATCH Yes, it actually tells you the time at the press of a button. Also features a voice alarm that wakes you up and tells you what the time is! Lithium cell included. £7.99 ref EP26.

PHOTOGRAPHIC RADAR TRAPS CAN COST YOU YOUR LICENCE! The new multiband 2000 radar detector can prevent even the most responsible of drivers from losing their licence! Adjustable audible alarm with 8 flashing leds gives instant warning of radar zones. Detects X, K, and Ka bands, 3 mile range, 'over the hill' radar zones. Detects X, K, and Ka bands, 3 mile range, 'over the hill' around bends' and 'rear trap facilities. micro size just 4.25"x2.5"x.75", Can pay for itself in just one day! £79.95 ref EP3.

3" DISCS As used on older Amstrad machines, Spectrum plus3's etc £3 each ref BARAM

STEREO MICROSOPES BACK IN STOCK Russian, 200x complete with lenses, lights, filters etc etc very comprehensive microscope that would normally be around the £700 mark, our price

ust £299 (full money back guarantee) full details in catalogue. WE BUY SURPLUS STOCK

FOR CASH

BUYERS DIRECT LINE 0802 660377

FREECATALOGUE

100 PAGE CATALOGUE NOW AVAILABLE, 50P STAMP OR FREE ON REQUEST WITH ORDER.

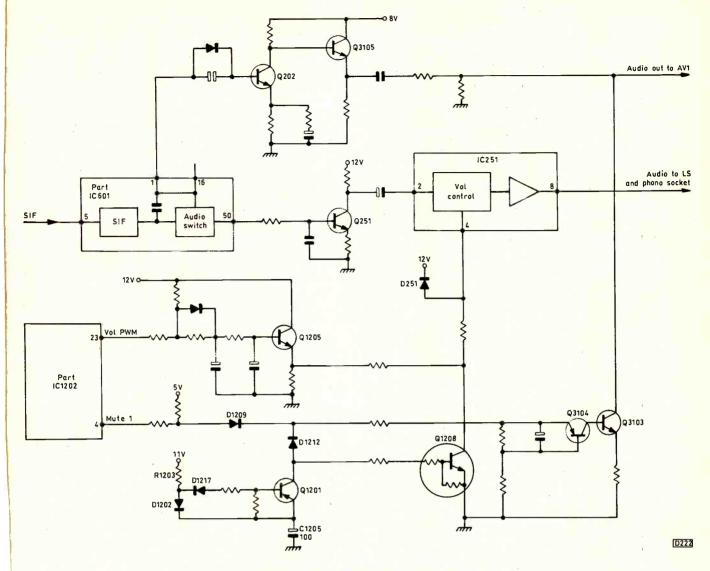


Fig. 4: The audio amplifier and mute system.

video is then passed back to IC601 (non-text models) or to panel T (text models – see Fig. 6 last month). There is also a recording output to the scart socket.

Sound IF

The path to the sound IF circuit, which is also in IC601, starts with the bandpass filter X203 (see Fig. 2). This passes the 6MHz signal to coil T201, which in turn feeds pin 5 of IC601. In countries where both PAL B/G and PAL D/K signals can be received there are two bandpass filters in parallel, X202 and X203, to cater for the 5.5MHz and 6.5MHz sound carriers. The output from the appropriate filter is selected via a pin diode system which is controlled by the SC1/SC2 output from the micro chip (pin 8). IC601 produces an audio output at pin 50.

Secam Sound

Secam L/L' models incorporate an additional SIF circuit to handle the AM sound, see Fig. 3. This is built on a small subpanel which is referred to as board A. There are two chips here, IC201 and IC202. The AM demodulator chip IC201 is a Philips TDA3843. A 'quasi-parallel' sound demodulation system is used, the output from the emitter of Q101 being taken to a dual-frequency SAWF, X204, which can pass the 32-4MHz and 40-7MHz Secam L and L' carriers. Note that with Secam L (Band III) the sound

carrier is below the vision carrier whereas with Secam L' (Band I) it is above the vision carrier.

Once again pin diodes are used for signal selection, under the control of transistors Q205/7/8. As the sound mode depends on the Band, the VHF low/other switch signal at pin 8 of IC1202 is used to control these transistors. After demodulation the audio signal is passed to the CMOS chip IC202 which contains two switches. The first selects an input from either the AV1 connector or IC201 to pass to IC601. The second selects either demodulated PAL or Secam sound to pass to the AV output. Fortunately this complication does not apply to sets from Panasonic UK.

Audio Circuitry

The selected audio from IC601 is amplified by Q251 (see Fig. 4) and is then fed to the Matsushita AN5265 audio amplifier chip IC251. This is the same device that was used in the Z4 chassis. Thanks to the simpler speaker cabinet design, it produces a cleaner, resonance-free sound with the Z5.

There are no tone controls. Volume is controlled via pin 4, using the PWM output at pin 23 of IC1202 after filtering, with Q1205 acting as a buffer.

The power-off mute circuit is also connected to this pin. The circuit uses transistors Q1201 and Q1208 and diodes D1202, D1212 and D1217. With the set in normal

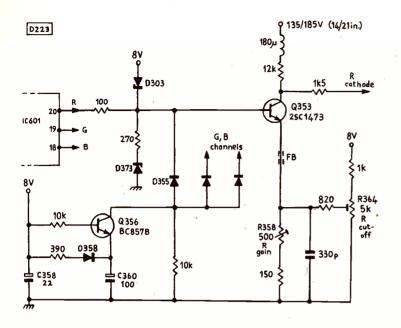


Fig. 5: One of the RGB output stage circuits (red).

operation, C1205 is charged via R1203 and D1202 from the 11V +B4 supply. At switch off, because of the charge stored by C1205 (D1202 will now be reverse biased) the

voltage at the emitter of Q1201 will be higher than the voltage at its base. Thus Q1201 and Q1208 conduct, linking the volume control line to chassis. D1217 provides a path through which C1205 can discharge, so that the mute is removed should the set be switched on again quickly.

D1212 connects the power-off mute to the AV output mute circuit formed by Q3104 and Q3103. Thus the scart audio output is linked to chassis at power off. This circuit also receives a mute output from pin 4 of IC1202 to mute the scart audio during channel change.

The audio output from IC251 is at pin 8, where it goes to the headphone socket and loudspeaker. IC251 provides a 5W music power output.

Video Processing

Apart from the chroma delay line, which is a TDA4661V2 CCD chip (IC602), the colour decoder circuitry is all within IC601. Colour decoding follows standard practice, but there are several points of interest. The luminance delay line is built into IC601. It's followed by a peaking circuit, which provides – under the control of the main micro (at pin 14 of IC601) – sharpness adjustment. The resultant processed luminance signal is then fed to the RGB matrix.

The colour-difference signal outputs from the chroma delay line are fed to the matrix at pins 28 (B-Y) and 29 (R-Y). To cater for Secam signals, some models incorporate a Philips TDA8395 Secam decoder chip (IC603). This takes a filtered chroma output from pin 27

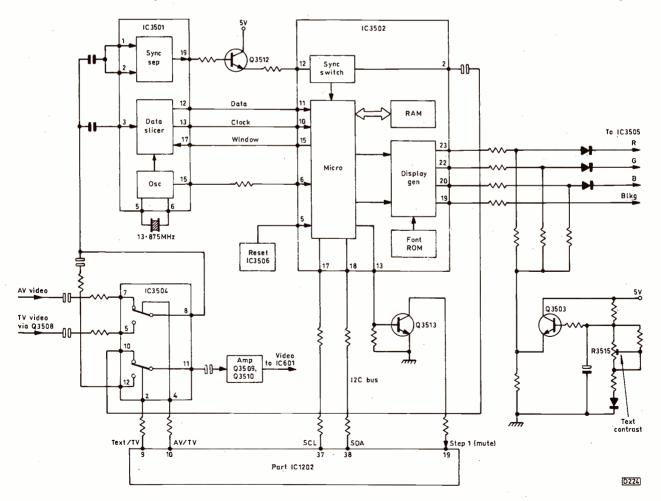


Fig. 6: Block diagram showing the arrangement of the Unitext circuit on panel T.

C601 and produces its own colour-difference signal puts which, as with the demodulated PAL signals, are to the chroma delay line chip. In both the PAL and am modes the chroma reference oscillator is in 501: there are separate crystals, connected to pins 34 cam) and 35 (PAL).

n RGB switch within IC601 selects the outputs from matrix or external RGB inputs from either the scart

ket or the teletext circuit.

he RGB outputs from IC601 leave at pins 20, 19 and respectively. They are fed to the CRT base panel Y which the output stages are mounted.

3B Output Stages

in previous Panasonic chassis, simple class A video plifier design is used in the RGB output stages. Fig. 5 pws the red channel circuit. The RGB drive signals are 1 to three voltage amplifier transistors, Q351, Q352 d Q353 (red). A potentiometer in the emitter circuit of ch of these transistors is connected between the 8V e and chassis to adjust the bias: these are the cut-off ntrols. The red and green channels also include a gain justment potentiometer.

The collector of each output transistor is connected via $12k\Omega$ load resistor and a peaking coil to the 135V 4in. models) or 185V (21in. models) line. Cut-off and hite balance adjustment are as described for the Alpha chassis in the May 1994 issue of *Television* (see page

2).

witch-off Spot Suppression

vitch-off spot suppression is provided by Q356 and its sociated components. While the set is running C360 is arged from the 8V supply with the result that the base d emitter of Q356 are at the same potential. At switch f the 8V supply falls rapidly and the voltage at the hitter of Q356 becomes greater than that at its base. As result it conducts, removing the drive to the RGB ltput transistors.

letext

mpared to previous Panasonic chassis, the Texas struments' Unitext system. This has the advantage of oviding most European language character sets via a agle processor chip. Other languages, including nonabic fonts, are available with alternative versions of chip. In addition, on-board memory means that four ges of text can be stored by the chip without the need an external static RAM. The system also provides I level one features (FLOP) and TOP text, which is in in the UK via German satellite TV channels, and a st' (no magazine) mode.

The main items in the circuit (see Fig. 6) are the 72306 data slicer IC3501 and the Unitext processor 3502, which is type CF70204ANW for UK models. Ley are on panel T, along with the video switch 3504 and the RGB switch IC3505 (see Figs. 5 and 6

t month).

The video signal from the tuner or the AV connector is lected by IC3504 and fed to the data slicer chip 3501, which strips off the text data and clock signals d also produces a composite sync signal. An on-board 875MHz oscillator produces a x2 data clock signal lich is used to synchronise the outputs to the Unitext bocessor IC3502. The micro in IC3502 then decodes text data stream, producing the required text pages in AM. The page numbers are selected by remote control a the main microcontroller IC1202 and the I2C bus. To sist with text data acquisition, the Unitext chip counts

the video lines from the sync signal and generates a 'window' gating pulse during video lines 2-22 for use by the data slicer.

When IC1202 selects the text mode, IC3504 is set to select the text-originated sync pulses instead of video. If the video signal should be lost or the text data level falls below a certain threshold, the Unitext chip decides that the video signal is poor and produces a mute signal output at pin 13. This, via Q3513, is connected to the Stop 1 pin of IC1202, which then produces a mute signal. It also means that the text display remains stable until a good video signal arrives.

The RGB outputs leave IC3502 at pins 23, 22 and 20 respectively, passing to the RGB switch described last month (see Fig. 5, page 739). The text blanking signal is used to control the switching action, mixing the textoriginated RGB with any external RGB from connector

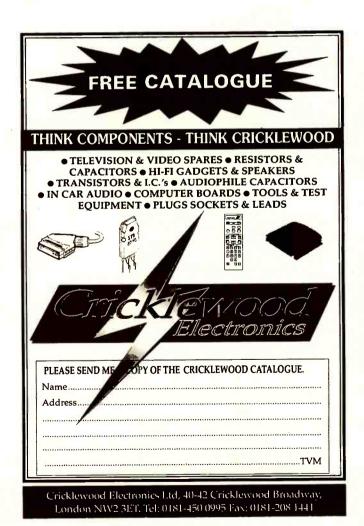
AV1.

Other items in the text module include an MN1280R reset generator (IC3506), which is connected to the 5V line and IC3502, and an LM78M05 regulator (IC3503) which receives its input from the 16V line.

Text contrast control is via Q3503, whose conduction is controlled by the text contrast potentiometer R3515. This circuit is connected to each RGB channel via separate diodes.

Next Month

In the concluding instalment next month we'll look at the timebase circuits, including the 'hot' line scan circuit.



Get a Life!

We all know what our Donald is really like – kind, patient, courteous etc., etc. Daughter Rebecca Bullock has hijacked his wordprocessor to fill us in on the etcetras.

Hello! I'm Rebecca Bullock. My dad repairs TV sets and things and writes about some of them. He's a good dad, but when customers annoy him he kicks at our dogs and cat and walks over them saying "out of my way". He also gets nasty with my mum, and she says things to him that make him even more annoyed. Right now he's very annoyed, and my mum said I should write an article telling you what he's really like. I slipped into his hut to write this one.

Likes

I like my dad, even when he's annoyed, but he doesn't seem to like people. Well, he likes some. He likes my Aunt Lillie, but not my Uncle Tom, who works at the Weights and Measures and says he's important. My dad says he's unemployed and a prat and ought to be hung.

He doesn't like Mrs Brown. She brought along a plug and asked dad to fit it to her video lead. Then she came back and said he'd blown up her video. He told her to go to a place I mustn't say, and my mum told him to stop causing trouble.

Sundays

My dad likes to read the Sunday Telegraph. But when he opened it this morning the telephone kept ringing and apologetic people asked my mum which set is the best, and did my dad have a fuse, and was their set ready, and that their husbands thought it was a valve. My dad refused to speak to them and my mum put the phone on the table and hissed at him to grow up fast.

He always does what she says, because she's always right. So he talked to some of them. But meanwhile more apologetic people knocked on the door and came round the back, and crouched and smiled and waved at him through the window when we were having our dinner. They told him their set still wasn't quite right, and could he sell them a plug, and tune in their new video from Crubbs Foodstore, and stop their's rolling because they were expecting visitors. He got annoyed and told them to go to the place I mustn't say.

Then he caused trouble with my mum and said she was like my gran, only worse. He asked my mum to buy him a spade and some cheap crocodiles, but I don't know why.

It takes all sorts

Garth Palmer's mother is nice.
Garth takes her radios and hairdryers to pieces, then she brings them here and my dad throws them away for her and she gives him money. My dad likes Mrs Palmer and my mum thinks he's good at being funny.

My brother Jamie asked dad why his hair is going rotten and my mum said it's because he's old. But my dad said it's because my mum nags him. He said his hair was all right before he met her, and that he was four inches taller. The chemist down the road thinks he's old too. He thinks dad is my grampie. My dad said that the chemist is a prat and can go to that certain place as well if he likes.

Herbie Millar knocked his mother's radio over at Easter and my dad had to send off for a new cabinet. Mrs Millar and Herbie came to collect it yesterday. She said a new radio would have been cheaper, but my dad said she asked for a cabinet not a new radio and he wished he lived on the moon. Mrs Millar smiled and asked him to knock up a rocket. Then her Herbie

started jumping about, making noises and saying he was a rocket. When she asked him to stop he screamed at his mother and knocked the radio on to the floor and the cabinet broke again.

Mrs Millar told Herbie he'd been very naughty and started to cry. But Herbie stamped his feet and screamed and wouldn't be quiet. Then my dad came over from the bench and smiled at him and whispered in his ear. He shut up at once. I heard what my dad said, but I don't think his soldering iron would have fitted and anyway it was very hot. Mrs Millar dried her eyes and said how good my dad is with children, and how lucky my mum is.

Outside calls

My dad doesn't like calling at people's houses, but a man who wore a round hat and a frock sat in the workshop and talked quietly to him for two hours and said his set hadn't been right since dad had done it. In the end my dad agreed to go and took me along.

The man ran along the pavement behind our van and was puffing when he caught us up at his house. He unlocked the door and my dad went in and walked quickly round the table and out again. The man watched us drive away. When I asked my dad why he came out so fast he just said "stunk". He told my mum that the set had a Snoddies sticker and that the man could go to the place I mustn't say.

Holidays

When we go on holiday my dad is really happy and my mum likes him a lot. We don't tell anyone that my dad mends sets because if we do they all tell him what sort of set they've got and what was on when it went wrong and how the man

they called was a crook and it was only a loose wire. This sort of thing makes my dad nasty and he rows with my mum. She tells him to get that look off his face and he tells her she should have had a husband who clouted her. She jabs him and says nobody would clout her and his side of the family are all mental.

My dad likes listening to BBC radio programmes. When we go to Spain he picks them up on our satellite dish and transmits them around our house and garden using a little home-made transmitter. My mum can hear them on her VHF radio while she's ironing on our sun roof or in the garden.

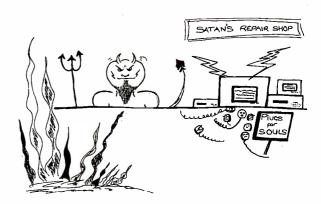
Not long ago dad mended our neighbour's radio. The neighbour called him over the garden wall, gave him two bottles of wine and said he was the best engineer there ever was, because his set now even picks up Radio 2 "all the way from Britain"

Last night we went to Paco's to have a meal. The TV set there kept going to a line. Paco started looking at my dad so we left and went to Manuel's. Half way through our dinner a bullfight came on and the set banged and smoked and my dad said "bloody good job". He said he hoped the bullfighter had blown up too. He wished every set in Spain would blow up and that all the so-called engineers would go to the special place and stay there for keeps. He said next time we go to Spain he's going to take with him a special remote control to switch off all the sets everywhere he goes.

At home

Our telly isn't on much when dad is at home, because the people on it annoy him and make him call my mum names. He says when he was a boy he never saw anyone like the people he sees every day on television - they were all in asylums or hung. He wants them hung now.

My dad wears sandals. He says it isn't because he cares about the world and that those who do are prats. He likes a laugh though. Once when I was with him at Mrs Blair's house he purposely told her a lie. When she made a joke about his toe poking through his sock he said "I know, but it's the only pair



"I wonder if this is going to be a god day for Donald, or am I going to be rushed off my feet"...

I've got". She took two pairs of socks off her clotheshorse and tossed them over to him. Her husband looked up from his paper and said "hey, hey there." But my dad kept the socks. They were good

When my dad is out my mum says she doesn't know what she'd do without him. I like my dad. Even though he keeps telling people to go to the place I mustn't

THE MMDS (WIRELESS CABLE) **INSTALLATION MANUAL**

- Direct from the USA, one of the most thorough installation manuals about MMDS available.
- ✓ An overview of MMDS history and technology.
- ✓ Company policies and operational practices that lead to success.
- ✓ Operational practices of an efficient installation dispatch and control system
- The details of technical basics such as cutting fittings, weatherproofing and grounding.
- √ The latest OSHA safety regulations
- ✓ Customer relations and creating goodwill.
- ✓ Detailed receive-site installation practices exterior and interior.
- Quality control and safety procedures.
- ✓ Service and troubleshooting procedures.
- Headend installation details.





SATELLITE TELEVISION **Installation Guide John Breeds**

- Step by step guide on how to set up a motorised dish in less than five minutes!
- Written in clear non-mathematical terms on large A4 format, plus lavish use of diagrams throughout. Tips on how to quickly carry out a site survey for fixed and motorised systems. Shows how to ascertain the correct polar and apex angles on motorised offset angles.
- Fully illustrated, concise learning program covering the theory and practice of satellite technology. Includes 500 dish angle settings across Europe.
- Includes diagrams and dish size tables for your site, and EIRP footprints for most popular satellites. Covers fault-finding and how to avoid intermodulation patterning (be ready for Channel 5!). ISBN 1 872567 09 6 Postag UK: £2
- Adopted by the Confederation of Aerial Industries as the study manual for approved City & Guilds courses. Acclaimed by the Press and Trade as easily the best work of its kind.



R of W: £9

THE DIGITAL REVOLUTION Satellite Television Manual

by Dr Frank Baylin

- ✓ An invaluable sourcebook for professional installers and enthusiasts that outlines the transition from analogue to digital broadcasting occuring in Africa.
- With emphasis on PAS-4 Multichoice with emphasis on PAS-4 multichoice broadcasts this manual explains; fundamentals of satellite communications, MPEG2 compressed digital video broadcast, uplink site and satellite operation, TVRO components, designing analogue and digital systems, rebroadcast method including MMDS.
- Also included are details about: headends and distribution systems, how to properly install a system, upgrading a system from analogue to digital, reception problems including TI, sun outages and adjacent satellite interference, troubleshooting for any satellite TV system.
- A thorough reference and excellent working tool that presents all the details to install, operate and maintain a satellite receive system





UK: £3.00

MPEG - Digital Television for All

NTL's authoratitive guide on leading edge techniques for future television. Squeeze 30 channels into an existing single channel! Descriptions of Transform Coding, I, B and P Frames, analyses Quantisation techniques; compressed audio in MPEG2; descriptions of Transform Coding, bit rate reduction. Highly recommended!

Send stamped, addressed envelope for complete list of satellite books, videos and software

17 Pittsfield, Cricklade, Wilts, SN6 6AN, England



Capacitance Tester/Comparator

This bridge circuit, devised by Ian Rees, provides a quick go/no-go check on high-value capacitors. It enables capacitor values to be compared and leakage detected

ith the increased reliability of electronic equipment, it's becoming less and less possible to carry out servicing on a stock-fault basis. Nevertheless certain types of components, especially when used in particular ways, are responsible for a far greater percentage of faults than others. Of these, electrolytic capacitors are amongst the least reliable items used in electronic equipment. When mounted in a position where they are subjected to heat they tend to dry out and fall in value, or develop electrical leakage. When faulty they are often responsible for the failure of other components, which they can take out domino style.

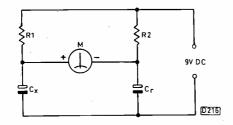
Preventive maintenance carried out by blanket component replacement can be cost effective in the short term, but won't tell you much about the true situation in a particular piece of equipment. A little more time spent checking each component as it is removed will reveal the actual condition of an ageing chassis. As experience is gained in this way, so time can be saved and the cost of replacement components reduced.

My all-singing digital multimeter will check capacitors with values up to $20\mu F$. So anything above $20\mu F$ had either to be replaced without question or checked using the swing time of the needle of my analogue ohmmeter. Comparing this with the result obtained with a new capacitor produced a ball-park charge estimate, which is by no means an accurate method. The capacitance comparator described in this article was devised to overcome this problem. It's very useful for quick go/no-go checks on high-value capacitors to establish their condition.

Circuit Description

Fig. 1 shows the basic circuit, simplified to make its operation clear. The two electrolytic capacitors Cx and Cr are connected as two elements in a DC bridge circuit. At the

Fig. 1: Basic principle of the capacitance comparator bridge.



moment when voltage is applied to them, they charge exponentially via the equal-value resistors R1 and R2. When the value of the two capacitors is the same, they will charge together at the same rate and the centre-zero meter's pointer will not be deflected.

If Cx is of lower value than Cr, Cr will take longer to charge and a lower voltage will be present across it than across Cx during the latter part of the charging cycle. As a result the meter's pointer will be deflected. If Cx is of larger value than Cr the meter deflection will be reversed. When the two capacitors have both charged fully the meter reading will return to zero. If the meter shows a standing deflection after this, it will be caused by leakage in one of the capacitors.

This is the basic principle of the comparator. Fig. 2 shows the circuit of the working prototype.

It is important that both capacitors are fully discharged before the test is started. The three-position function switch S1A/B enables the capacitors to be discharged, via R5, when in position D (discharge). Do this before and after the test. Comparison for value, as just described, is carried out with the switch in position C (compare). Leakage is indicated with the switch in position L – in this position the reference capacitor is open-circuited.

The centre-zero meter M, used to provide the indication, is protected by the back-to-back zener diodes D1 and D2 and resistors R3 and R4. This is essential to prevent it being damaged by a short-circuit capacitor or test leads.

Construction

There are so few components that the prototype doesn't even have a PCB. Point-to-point wiring is suitable and, with a little thought, the unused tags of the function switch S1 can be used as anchor points.

A plastic box from CPC was used to house the unit, padded inside to hold the PP3 battery in place. The function switch, a three-pole, four-way type, was also obtained from CPC. Its stop was altered to give just three ways.

To keep it simple, I rely on my supply of spares instead of using switched capacitors as a reference. Two pairs of crocodile clips, correctly colour-coded for the +/-connections, are connected to leads that exit from the top and bottom of the box. These pairs are labelled test and reference to ensure that I have the correct capacitor connected to the relevant leads.

In practice I use the component I'm about to fit as the

reference. But the shelf life of electrolytic capacitors is often unstated. So even a new component could be of uncertain condition. Doing things this way means that the replacement capacitor can also be checked before it's fitted. On several occasions I've found that the replacement has been faulty. This could have caused a lot of grief had it been fitted.

For logical reasons it's sensible to ensure that the meter's pointer swings right (+ve indication) when the reference capacitor has a larger value than the one being tested. This can easily be checked by shorting together the reference terminals with the function switch set to position C.

The value of R1 and R2 was chosen to provide the greatest range from $1\mu F$ upwards. If you want to speed up the test with capacitors of $1,000\mu F$ and above, the value of R1 and R2 can be reduced to $1k\Omega$ or less. Unfortunately with this resistance value smaller value capacitors will not be able to produce a visible meter kick.

Use

The tester draws only a small current from the 9V PP3 battery during a test. Provided the unit is left switched to position D (discharge), it is effectively off. This is the start position for all tests, and ensures that both capacitors are discharged.

The comparator will work with capacitors of lµF value upwards. Do not use it with capacitors whose working voltage rating is less than 9V. Bear in mind that high working voltage capacitors will have higher leakage currents than will be shown by a 9V instrument.

Smaller-value capacitors give a 20-30µA kick that's instantly seen. With large values of 1,000µF and above a few seconds are required for the charge to start to bottom out before the meter deflects to show the comparative charge rates of the capacitors.

Non-electrolytic capacitors charge very rapidly and decay to zero with no leakage.

Electrolytics can be seen to form as they charge. For this reason, compare like with like when testing. Avoid mixing types, otherwise confusing results will be obtained.

The test procedure is as follows:

- (1) Set the function switch to position D.
- (2) Connect the new capacitor to the reference terminals, with correct polarity.
- (3) Connect the capacitor being checked to the test terminals.

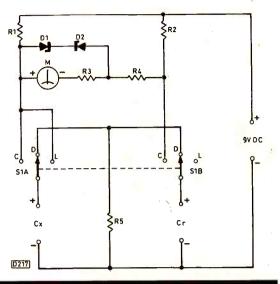


Fig. 2: Circuit of the prototype capacitance tester/comparator. Meter polarity shown for connections, not panel indication.

Component details

R1, R2	4·7kΩ, 0·25W 5% carbon					
R3	33kΩ, 0·25W 5% carbon					
R4	2·2kΩ, 0·25W 5% carbon					
R5	100Ω, 0⋅25W 5% carbon					
D1, D2	BZY88C 3V6 zener diodes					
M	100-0-100µA moving-coil meter					
	MPS/Maplin RW98G)					
S1	3-pole, 4-way rotary switch (CPC					
	ALF441C)					
PP3 bat	tery, battery connector, box, knob, four					
crocodile clips						

- (4) Set the function switch to position C. Watch whether the meter's pointer moves in either the +ve or the -ve direction, indicating that the test capacitor Cx is of smaller or larger value respectively than the reference capacitor Cr.
- (5) Set the function switch to D then to L. The meter will deflect then fall back to zero. Any subsequent deviation is caused by leakage. Most capacitors show little or no leakage when fully charged.
- (6) Always return the function switch to position D when the test has been completed. ■

Answer to Test Case 405

– See page 785 –

Well, what can be wrong with a satellite installation when the dish is correctly aligned, the LNB is a known good one and the receeiver has been found to be OK by substitution? The feeder cable of course! It's a misleading situation, especially when, as here, only one channel or a group of channels is affected. You expect a cable either to work or not work. And if it has become lossy for any reason you might (naively!) expect that the loss would increase with frequency. Not necessarily, in the realm of domestic satellite reception. Damage, joints, tight bends, physical constriction of the cable, bad termination and water can all cause strange symptoms.

In this particular case it seemed that cable ageing was the sole cause of the trouble – it wasn't very good quality cable anyway, from the look of it. Certainly a new run of good-quality, double-screened satellite cable cured the problem, restoring interference-free reception of all the available channels.

Meanwhile Mr Todd, impressed by the loan receiver in spite of the short time it had been there, bought a posh new Grundig IRD and consigned the old one, complete with its descrambler box, to the dustbin where the lossy cable had gone. All that remains of the original installation is the dish, which is gently rusting in the summer sunshine.



RENTAL FINANCE

Expand your CTV and VCR rental business with no capital outlay and increase your profitability.

Broughfame has the solution and their rental finance plan will provide facilities from £2,500 upwards.

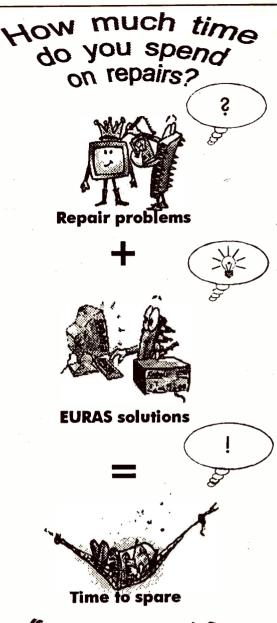
Block Discounting also available.

For further details ring or write to Bob Wickham at the address below:

BROUGHFAME LIMITED

115A ST JOHN'S HILL SEVENOAKS KENT TN13 3PE

Telephone: (01732) 743400 Fax: (01732) 743335



If a repair takes minutes
rather than hours You reap the benefits

SAVE TIME - SAVE MONEY with the EURAS Repair Tip database for Consumer electronics

With more than:

260,000 tips20,000 modelsincluding selected circuit diagrams

CALL **EURAS** NOW for details about our demo CD and 30-Day Trial (0117) 9860900



vista electronics LTD

Manufacturers of television tubes and video heads

COMPONENTS CATALOGUE

(FREE TO TRADE ONLY)



1000's

OF TV AND VCR SERVICE SPARES AND ACCESSORIES IN STOCK





£1.50 for orders less than £10 (Ex VAT)

RING 01429 838057 FOR OUR FRIENDLY, HELPFUL SERVICE

SPECIALISTS IN VIDEO HEAD TECHNOLOGY



OVER 200 MODELS IN STOCK COMPREHENSIVE CATALOGUE AVAILABLE

MANUFACTURERS OF RE-GUN CRT'S

HUNDREDS OF NEW, B GRADE AND RE-GUNS IN STOCK



SPECIAL OFFER

NEW A59 EAK

£79.00

PLUS CARRIAGE

NEW A66 EAK

£89.00

TELEPHONE COMPONENTS
TUBES

01429 838057

FAX

01429 837100

01429 837101

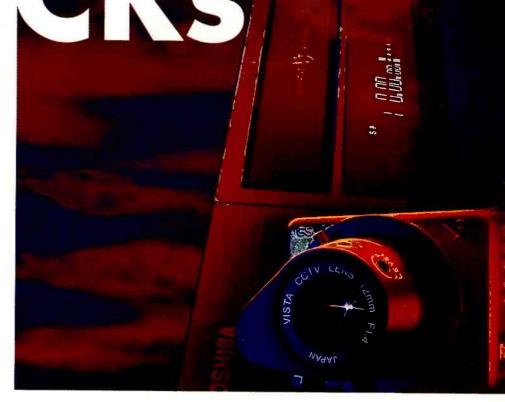
VISTA ELECTRONICS LTD, UNIT 1B, WINGATE GRANGE IND EST WINGATE, CO DURHAM TS28 5AH





Time-lapse VCRS

How time-lapse VCRs differ from conventional ones. Features of time-lapse machines. Servicing aspects. Joe Cieszynski on a good prospect for increasing the scope of your servicing activites



n recent years there has been a steady increase in the number of time-lapse VCRs used in the video surveillance industry. This growth is expected to continue, as the cost of video surveillance equipment falls and the police, insurance companies and private security firms demand video surveillance to complement intruder alarm systems.

Not surprisingly the VHS format dominates the field, mainly because of its low cost. In earlier years manufacturers simply adapted their consumer designs to meet the requirements of surveillance work. This is less often the case today, as the average domestic VCR would not withstand the punishment a time-lapse machine receives. The time-lapse VCR must be capable of providing peak performance over a prolonged period.

S-VHS quickly found a role in this market. Its higher performance was immediately appreciated by the industry, while the higher cost didn't prove to be the drawback it has been in the consumer market.

A point that should be of interest to readers is that these machines represent a new source of servicing work – along with the monitors, cameras and controllers that go with them. Most engineers who install and maintain

surveillance equipment do not have an electronics background, and are not expected to open up any of the equipment when it fails. Faulty equipment is replaced and taken back to base, where it is frequently sent out for servicing. The average workshop that's equipped for VCR and camcorder repairs is in an ideal position to be able to take on surveillance equipment servicing.

What then is a time-lapse VCR, and how does it differ from a domestic machine?

Time-lapse Operation

The need for time-lapse operation in the surveillance field is pretty obvious. No matter to what extent any of the current VCR formats are modified, they will never provide more than a few hours of continuous recording. This is totally inadequate where the requirement may be to record events for twenty-four hours a day, seven days a week. With time-lapse operation, large quantites of still pictures are recorded at short time intervals, thus making it possible to record sufficient information to provide a continuous 24-hour record service. A full E180 cassette recorded in the time-lapse mode can be likened to a photograph album that contains 270,000 pictures!

A number of developments in recent years have improved the performance of time-lapse VCRs way beyond what was earlier expected of them. But before we look at more modern format machines, we should consider the basic principle of time-lapse operation.

The time-lapse VCR makes maximum use of the still-frame feature and the precision of a Hall-effect motor. For time-lapse operation the basic sequence is to lace up, run the drum up to speed, start the tape transport, record one frame (two fields), stop the tape transport, pause for a given length of time and so on.

While the tape is running, it moves at the normal speed of 24mm/sec. It's the pause intervals between recorded frames that provide the extended recording time. The need for a very high-precision servo control system and capstan motor is clear when you consider that the tape speed has to accelerate to 24mm/sec and subsequently decelerate to

stop almost instantaneously.

Fig. 1 illustrates the time-lapse track format. The numbers at the top represent TV frames. In this example I've assumed that the machine is operating in the twelve-hour time-lapse mode. The machine records one complete two-field frame while the tape is being driven at 24mm/sec, then the drive is halted for nine frames, after which the tenth frame along is recorded. Thus one frame in every ten is recorded, the cycle taking 0-2sec (ten 20msec frames = 0-2sec). The drum continues to rotate while the tape is stopped, but the output from the heads is switched off so that it doesn't override the tracks just recorded.

The recording time in the twelve-hour mode requires a bit of explanation, because it is not actually twelve hours. An E180 cassette provides a basic recording time of 180 x 60 = 10,800 seconds. The number TV frames recorded during this time is $10,800 \times 25 = 270,000$. With time-lapse operation this works out at $0.2 \text{sec} \times 270,000 = 54,000 \text{ secs}$, which is fifteen hours.

Similar calculations in the other time-lapse modes prove that the recording time available is always three hours more than the time suggested. If we consider the twelve-hour mode again, when the 0-2sec cycle is reduced by one 40msec frame period the recording time becomes twelve hours. But, as we shall see later, to maintain the VHS specification one frame more than the time-lapse period has to be recorded.

When the recording depicted in Fig. 1 is played back in the twelve-hour mode the machine operates in a continuous play, pause, play, pause fashion. As a result you can view the pictures in a real-time form with a duration of fifteen hours, though they are just a series of still frames. Alternatively the machine can be set to the three-hour mode, i.e. standard VHS operation, which enables the recording to be seen in fast motion. When a slower time-lapse is selected, the operator can examine each frame in greater detail.

The main drawback with time-lapse recording is that activity which occurs between the recorded fields is missed: the longer the time-lapse, the greater the amount of information lost.

Improved Technique

The time-lapse system just outlined was used with earlier machines. A number of manufacturers have introduced a refinement that goes some way towards reducing the information loss.

In the arrangement shown in Fig. 1, both fields of each selected frame are recorded. Although this gives good quality when the recording is played back at normal speed, when the tape is played back in the time-lapse mode the machine is effectively in perpetual still and the second field is not used – the two heads scan the same

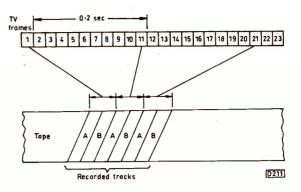


Fig. 1: Track arrangement with a frameadvance machine in the 'twelve-hour' time-lapse mode: every tenth frame is recorded.

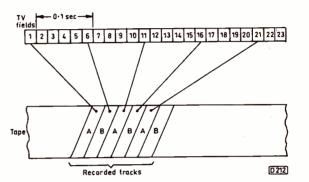


Fig. 2: Twelvehour mode recording with a time-lapse cycle half that in Fig. 1: every fifth field is recorded.

section of the video track. This being so, why not record one field per frame and use the second field for another recording later on? The principle is outlined in Fig. 2.

Note that the figures at the top this time represent fields rather than frames. Although the machine still operates in the twelve-hour mode, the time lapse cycle has been reduced from 0.2sec to 0.1sec. During each pull however the tape moves for 20msec instead of 40msec (one frame). The tape will still run for fifteen hours, but will have recorded twice as much information $-2 \times 270,000 = 540,000$ still fields.

Fig. 3 demonstrates the advantage of recording in this manner. Consider the sequence of events being recorded by a time-lapse machine recording complete frames in a 360-hour mode with delay cycles of 4.8sec. If the machine recorded picture one, the next to be recorded would be picture six. The action has not been caught. Now consider the same sequence with a machine that records fields. In the 360-hour mode the delay cycle is now only 2.42sec. So if picture one is the first to be recorded, the next to be recorded will be pictures four then seven. Much more has been caught!

Delay Period

The delay period cannot be selected at random. It has to take two important factors into account.

First, because of the slant-azimuth technique used with VHS machines, the tracks must be laid down in the order ch. 1, ch. 2, ch. 1, ch. 2 etc. (or A B A B as some texts call

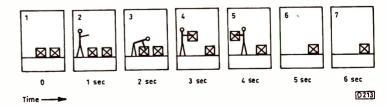
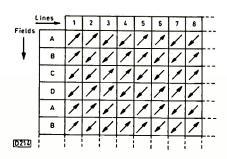


Fig. 3: Vital information can be lost when the time between recordings is lengthy.

Fig. 4: Phasor representation of the recorded ch. 2 VHS chroma signal that would produce a pure magenta raster.



it). The delay time has to ensure that when an odd field, which is recorded as a ch. 1 track, has been laid down the next field will be an even (ch. 2) field, and vice versa.

Secondly, the delay period has to take into account the chroma signal phase rotation used in the VHS system to cancel crosstalk. The ch. 2 chroma is phase retarded by 90° on each line prior to being recorded: subsequent phase shifting and comb filtering during playback result in chroma crosstalk cancellation.

The phase shifting follows a set sequence over four TV fields. This is illustrated in Fig. 4, where the arrows represent the ch. 2 chroma signal's phase on each line after the 90° phase retard. The diagram assumes that a pure magenta raster is being recorded.

Those wishing to look into this subject in greater detail should refer to my articles in the February-April 1996 issues of *Television* (in the VCR Signal Processing series).

For the crosstalk cancellation system to work with a time-lapse VCR, the recorded pattern must follow the basic four-field sequence. This means that in the twelve-hour mode each fifth field has to be recorded. If, for example, the first field A in Fig. 4 has just been laid down on the tape, the next field that can be recorded is the next-but-one B field. This will be followed by the next-but-one C field etc.

This might be more clearly explained as follows. Take the following series of fields in the twelve-hour mode:

A B C D A B C D A B C D A B C D A B C D A B C D

Recording each fifth field, shown in bold, maintains the format. The delay cycle is 100msec (five fields). In the 24-hour the situation is as follows:

A B C D A B C D A B C D A B C D A B C D A B C D

This time every nineth field must be recorded, the delay cycle being 180msec. This is why the actual recording time is always three hours longer than that implied by the mode selected. The delay cycles for all other time-lapse modes must also ensure that the four-field chroma signal phase is maintained.

Any attempt to play this tape back at normal speed (three-hours) will result not only in a very fast motion

Mode	Running time	Delay Frame rec.	Delay Field rec.
12h	15h	0-2sec	0-1 sec
24h	27h	0-36sec	0.18sec
48h	51h	0-68sec	0.34sec
72h	75h	1 sec	0.5sec
120h	123h	1-64sec	0-82sec
240h	243h	3-24sec	1.62sec
480h	483h	6-44sec	3-22sec
720h	723h	9-64sec	4-82sec
960h	963h	12-84sec	6-42sec

effect but also in picture distortion, because each interlaced field is from a different frame.

Remember also that when frame advance is selected the tape is moved by one instead of two tracks.

The accompanying table (below left) lists time-lapse modes and the associated delay cycles commonly used. It is not exhaustive.

A problem that manufacturers have to deal with is accelerating the tape speed to 24mm/sec in a very short time. In practice this cannot be achieved, the record speed being slightly less than 24mm/sec. Without compensation, the change would result in a shift in the angle at which the signal is laid down on the tape. The angle is very precisely set at 5.9° in the VHS system, and is determined by several factors that include the tape speed – a slight reducation in speed reduces the track angle slightly.

The problem is overcome by altering the drum speed while recording. The principle is simple: if a slower tape speed reduces the angle, a corresponding reduction in the drum speed will provide correction.

Linear Slow Speed

A drawback we have not so far considered is loss of the sound recording facility: any attempt to record a linear sound track while the tape is moving in these short, intermittent bursts would produce unintelligible results.

Some machines offer time-lapse recording for up to twenty four hours with a continuous sound track. The tape is driven at a very slow speed, making it possible to lay down a sound track. But the slow speed means that the HF response is poor. Remember also that the extinction frequecy falls as the tape speed is reduced. There is also considerable wow and flutter.

There are different linear slow-speed modes, for example twelve and 24 hours, but the delay period is the same as for intermittent time-lapse operation. When the first field has been recorded, the video heads are switched off for the duration of the delay period. When the time comes to record the next field the tape, which has been running continuously, will be in the correct position in relation to the heads.

In the twelve-hour continuous mode the tape speed is 4.678mm/sec; in the 24-hour mode it's 2.599mm/sec (the standard speed is 23.39mm/sec).

The track format in the slow-speed mode is the same as that in the intermittent time-lapse mode, i.e. one field is recorded each time-lapse interval. The only benefit this mode provides is the facility for recording sound.

When sound is not required in the 12/24-hour modes it's best to select intermittent operation – the picture quality is better. In the linear slow-speed mode the video heads play back the same scan several times as the tape passes slowly. The result is a constantly varying signal-to-noise performance, as the head moves from the centre to one side of the track and back again. Some manufacturers attempt to overcome this problem by using all four video heads during playback. A sensing circuit in the FM stage detects which head is producing the highest FM output at any time, this output being selected as the playback signal.

Shot Mode

This is another feature offered by some manufacturers, provision being provided for an external trigger input. When the 'shot' mode is selected, the machine waits for a trigger pulse and then records a small number of frames or fields (depending on the recording format). Once about half a dozen frames/fields have been recorded the machine returns to the pause mode.

Because the machine cannot remain in the pause mode indefinitely – the tape would be worn out by the

continuous video head scanning – it records a few frames/fields every three or four minutes in the shot mode. This enables the tape to move slowly past the heads.

The shot input is usually a normally-open (N/O) one that's taken to ground for activation. The trigger switch may be a manually-activated N/O non-latching push switch, a pressure mat or even the bell output terminals of an alarm control panel with a negative applied bell trigger.

There are also passive infra-red detectors that are designed specifically to trigger a time-lapse VCR. To provide compatibility they offer selectable-polarity switch outputs.

Alarm Inputs

Like the shot feature, alarm recording is activated by an external trigger input. The alarm input enables more information to be recorded at the time of a possible intrusion by immediately placing the machine in the three-hour mode. If, for example, we look again at the theft in Fig. 3, if the intruder activated an alarm on penetrating the area the machine would go from the time-lapse mode to which it was set to the three-hour mode.

After a preset period, which may be selectable, the machine reverts to its previous mode. The running time of an alarm recording is usually at least one minute. It may be several minutes.

Some machines have a reset input that enables normal operation to be restored manually before the internal alarm timer has cut out. This is usually a N/O non-latching switch.

Alarm Input Markers

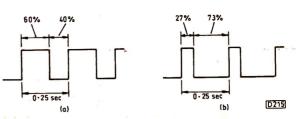
Many machines have an index search facility to provide quick access to alarm events during playback. A marker signal is recorded on the control track each time an alarm input is received. During fast wind or visual search, the machine can be programmed to stop at a particular alarm event and enter the play mode.

Many manufacturers make use of the VISS (Video Index Search System) which is widely used in consumer machines. The idea is to alter, for a period of four seconds, the mark-space ratio of the control pulses at the start of each alarm recording (see Fig. 5).

The control pulse mark-space ratio is normally 60:40. To generate the VISS signal, it's changed to about 27:73 for the four-second period. The tape will be unlaced from the video heads during rewind or fast wind: it will still be partially laced however, passing the audio/control head which can thus read the control track. The signal is passed to the microcontroller chip, which analyses its mark-space ratio. On detecting the 27:73 ratio the chip initiates the stop and, possibly, the play mode. The altered mark-space ratio does not affect the operation of the phase control servo, since this relies on the timing of the pulses rather than their duration.

Some manufacturers have introduced variations to the standard VIS system to improve the search capabilities of their time-lapse machines. The machine may be programmed to record a digital signal, containing a time code, in addition to the control pulses. The operator can key in a specific day and time: the machine will then fast wind until the required time is read off, using the control head for detection. When the required time is reached, the machine laces up fully and goes into the play mode.

The number of alarm events may be displayed on the monitor screen, along with a reference number. In addition the machine may have some form of indication on the front panel, or it may include an alarm output terminal to which a warning device such as a 12V buzzer or lamp can be attached. This output is usually a



dry relay contact, so an external 12V supply needs to be used.

Auto Re-record

The operation of this feature is very simple. When it's selected, the machine automatically rewinds at the end of the tape and starts to make a new recording.

Clock Output

The clock output is a very important signal. Up to now we've considered the time-lapse feature only in the context of a single camera input. What happens if there are a number of cameras, controlled by a separate switcher unit whose output is fed to the VCR? Unless the time-lapse and camera switching are synchronised, cameras may be missed out or may be switched in half way through a recorded field.

To overcome this problem, the time-lapse delay signal generated by the VCR is made available to serve as a camera controller sync output. This is fed to the controller's external sync input to override the switching signal generated by the controller.

Some machines have a built-in camera controller. The one disadvantage of this is that the built-in controller may not have the range of features required for a particular installation.

Servicing

It's very easy for those familiar with servicing domestic VCRs to become accustomed to time-lapse machines, since in most respects they are the same. The nature of the complaints you get may vary a little however. The customer is obviously going to be more particular about the performance of the still and frame advance functions, which are essential instead of being novelty features. In addition, main microcontroller problems often produce different symptoms because of their different programming. Although basic mechanism control is the same, domestic control systems relate mainly to timing and tuning. With a time-lapse machine the programming naturally relates more to the time-lapse modes, alarm inputs and outputs and, in more modern models, clear warning to the operator of any system faults.

The thing to bear in mind is that when a machine lands on your bench for repair it could well have been operating for twenty four hours a day for the last twelve months. So don't waste time looking for individual tape path faults. Every machine that comes in must be given a full mechanical overhaul before anything else is done. Then deal with any faults that remain.

Pay particular attention to the control head. Replace it if there are any signs of wear – on most machines it does far more than simply record and play back the control pulses. As we have seen, the control head often plays an important role in various search modes. And of course frame advance will suffer if the pulses are attenuated.

One of the more common symptoms is poor tracking in the time-lapse mode. This is simply because the frame (or field) advance isn't working as it should. In most cases cleaning and servicing the mechanism solves the problem. Pay particular attention to the brake pads or braking Fig. 5: Basic VHS control track pulses (a). Modification for VISS purposes (b). mechanisms on the capstan flywheel, as these are vital to the frame advance operation. Since a time-lapse machine usually spends most of its working life stopping and starting, these items can wear.

If the machine still suffers from poor time-lapse mode tracking after a clean and service, check the condition of the capstan motor. Time-lapse operation has serious implications for this item. The constant kicking action to provide the precise tape movement places an immense strain on the motor, which requires high currents to provide the acceleration and braking action. The capstan motor will be a brushless Hall-effect type, which is far more robust than a simple brush/commutator type. Any mechanical wear will impede its operation however.

The test equipment required for time-lapse VCR servicing is basically the same as for any other machine, but you should have a pattern generator with S-VHS outputs.

There is a real bonus if you are tooled up for camcorder servicing, because you can offer a surveillance camera repair service. Many of the smaller cameras are considered to be throw-away devices however. There is a drawback in offering to service the full range of equipment: you may find that motorised camera housings are delivered to your workshop. These don't seem too large when you drive past them on the motorway. They take on an altogether different appearance when seen close up on the bench!

Test Tapes

Your alignment tapes or home-made colour-bar test tapes can be used for time-lapse servicing. You will find it helpful to make yourself a time-lapse test recording however. In particular you should have available a recording made on a field advance (rather than a frame advance) machine. Remember that in this mode each helical track on the tape is from a different frame, so a colour-bar recording made by a standard machine won't tell you whether the time-lapse machine is advancing just one field at a time or is slipping.

A collection of tapes with recordings made in different time-lapse modes is a very useful addition to your workshop, especially if they have been made using a camera trained on an area of activity, so that movement is clearly visible (this probably rules out the manager's office!).

Spares

As the majority of time-lapse machines are manufactured by companies that have been well known in the brown goods industry for years, spares are usually not too difficult to obtain. In fact in some cases the chassis will be shared with a domestic model.

But some companies that are very big in surveillance are not known in the consumer electronics field. You would have to approach them directly to become a service agent. With the current rapid expansion in the surveillance industry however, manufacturers are looking for competent service agents.

Acknowledgements

My thanks to Jim Medley of the Mitsubishi Security Equipment Group and Martin Hanson of Panasonic Service UK for their valued help in providing background information for use in this article.

AN 3320K = 750 STK 0049 = 500 TBA 1205 = 030 2SC 901A = 350**NEW - NEW** AN 5135 = 585 STK 0050/2 = 899 TBA 120T = 030 2SC 1577 = 600 AN 5790 = 240 STK 436 = 399 TBA 1013A = 299 2SC 2200 = 250 IC - DATABASE/ON FLOPPY DISK AN 7320 = 100STK 463 = 850 TDA 1022 = 530 2SC 3427 = 340 BA514 = 150STK 1050/2 = 800 TDA 1060 = 325 2SD 1391 = 300 THE MOST IMPORTANT TECHNICAL DATA AND BA 4232AL = 190 STK 2048/2 = 1299 TDA 11705 = 135 2SD 1577 = 480 **FUNCTIONS OF 48,000 SEMI-CONDUCTORS** BA 7767 = 180 STK 2155 = 895 TDA 1520B = 330 2SD 1887 = 435 (20,000 IC's AND 28,000 TRANSISTOR, TRIACS, CXA 1044P = 1485 STK 2240 = 650 TDA 1540 = 420 2SD 2125 = 415 ETC) OF THE CONSUMER ELECTRONIC ON HA 11381 = 250STK 3042/3 = 500 TDA 1600 = 360 B4500 = 265FLOPPY DISC HA 11714 = 380STK 3082/2 = 725 TDA 2009 = 250 B4 508A-PHIL = 80 YOU CAN FIND REPLACEMENT TYPES, PIN HA 13119 = 315STK 4038/2 = 695 TDA 2170 = 1999 B4 508AF-PHIL = 125 LAYOUTS AND TECHNICAL SPECIFICATIONS) KIA 8210 = 425STK 4131/2 = 650 TDA 2506 = 500 B4 5080D-PHIL = 110 ONLY £14.99 FACH + STK 4141/V = 750 $1 \pm 3210 = 060$ TDA 2545 = 130 B4 2508AF = 250 STK 4162/2 = 515 LA 3350 = 199TDA 2577 = 1299 B4 2525AF = 410 STK 4211/V = 1200 TDA 2577A = 200 1 A 4282 = 350(ONCE PURCHASED WILL NOT BE ACCEPTED BACK) B4T 11A-PHIL = 070 STK 4362 = 450 LA 4500 = 200TDA 2579A = 250 B4T 18AF = 120 STK 4773 = 820 TDA 2600 = 425 LA7294 = 150B4T 56A = 080 STR 4853 = 699 TDA 3300B = 2475 LM 317T = 150S 2000AF-TOSH = 175 SPECIAL - OFFERS STK 5322H = 450 TDA 3561A = 410 LM 1203 = 499 S 2055A = 165VALID UP TO: 15/9/96 STK 5331 = 300 TDA 3576B = 915 M710B1 = 610STK 5337 = 485 TDA 3654 = 090 M 190B1 = 495 TDA 3562A-ST = 499 STK 5467 = 650TDA 4500 = 310REMEMBER -M51393 = 595TDA 3562A-PHIL = 599 STK 5490 = 450 TDA 4504B = 790 M54519 = 499B4 208A-TOSH = 199 VIDEO IDLERS. STK 7348 = 400 TDA 5850 = 375 M 54564 = 115 SOLDER REEL - 100GRM = 110 HEADS, PINCH STK 8050 = 750 TDA 7050T = 170MC 1377P = 425 VIDEO HEAD PULLER = 399 ROLLERS, BELT STK 736051 = 300 TDA 8153 = 1599 MC 3357P = 095 VT11 ORIGINAL IDLER = 199 STR 441 = 1899 TDA 81795 = 999 KITS, TYRES. MDA 2062 = 450 STK 5481 = 425 STR 451 = 2999 TDA 8180 = 1815 MEA 2901 = 300 MODE SWITCHES, STR 454 = 1499 TDA 8390 = 850 TV ON/OFF SAA 1026 = 450 STR 5412 = 400 TEA 1039 = 175 SAA 1061 = 375 Please phone us for the types not SWITCHES, LINE STR 50092 = 550 TEA 2018A = 150 listed. Please add 60p post & packing SAA 1294 = 850 OUTPUT STR 50103A = 385 TEA 2164 = 325S SAA 3004P = 315 and then add 17 5% VAT to the total. TRANSFORMERS, STR 54041 = 350 TEA 6300 = 685 Callers by appointment only SAA 3028 = 845 STR 58041 = 300 UC 3842 = 150 TRIPLERS, AERIAL SAA 5231 = 895 UC 3844 = 150 STRD 1816 = 399 ASS, COMPUTER SAA 5241P/A = 1000 J.J. COMPONENTS STRD 6008 = 680 **UPC 1168 = 360** LEADS, MOUSE, SAA 7000 = 899 TA 8210 = 300UPC 1216V2 = 110 GLASS FILTERS. SAA 7274 = 650 63 THE CHASE, EDGWARE TA 8205 = 300UPC 4558C = 050 SAB 3021 = 399 AUDIO-VIDEO TA 8200 = 3502SA 839 = 140 MIDDX: HA8 5DN, ENGLAND SAB 3035P = 545 LEADS, ETC, ETC.. TA 8207 = 1652SA 1232 = 250 Tel/Fax: 081-952 4641 SAB 3209 = 450 ALL UNDER -TA8216 = 3902SA 1302 = 300Hotline No: 081-381 1700 STK 050 = 1599 TA 8644 = 4992SB618 = 305**ONE ROOF** Free fax orderline 0800 318498 STK 0029 = 300TAA 550 = 0302SB 1292 = 150

exclusive 15% Television reader discount

100kHz to 150MHz RF signal generator for just £129

Normally, the Loadstar SG4160B 150MHz signal generator sells for £129 plus 17.5% VAT and delivery costs. But *Television* readers can obtain this instrument for just £129 – fully inclusive of VAT and delivery. This represents a saving of well over 15%.

Vann Draper's SG4160B bench generator covers 100kHz to 150MHz in six ranges – and up to 450MHz via third harmonic. It has an internal 1kHz oscillator for amplitude modulation up to 30%, which is also accessible on the front panel. There are also facilities for connecting an external modulation signal of between 50Hz and 20kHz.

Featuring a crystal checker with a range of 1 to 15MHz, the mains-powered 4160B provides an RF output of up to 100mV RMS, unloaded, at all frequencies up to 35MHz. Attenuation is controlled via a high/low switch and fine adjuster.

To receive your RF generator, simply fill in the coupon on the right and send it, together with payment, to Vann Draper Electronics at Unit 5, Premier Works, Canal Street, South Wigston, Leicester LE18 2PL. Alternatively fax credit card details with order on 0116 2773945 or telephone on 0116 2771400. Address orders and all correspondence relating to this order to Vann Draper Electronics.

Covering 100kHz to 150MHz in six ranges, this RF generator with amplitude modulation is available to *Television* readers for just £129 – fully inclusive.



Use this coupon to order your SG4160

Please send me SG4160(s) RF Signal Generators at the fully inclusive special offer price of £129 each.

Name

Company (if any)

Address

Phone number/fax

Total amount

£.....

Make cheques payable to Vann Draper Electronics Ltd Or, please debit my Master, Visa or Access card.

Card type (Access/Visa)
Card No
Expiry date

Please mail this coupon to Vann Draper Electronics, together with payment.

Alternatively fax credit card details with order on 0116 2773945 or telephone on 0116 2771400. Address orders and all correspondence relating to this order to Vann Draper Electronics at Unit 5, Premier Works, Canal Street, South Wigston, Leicester LE18 2PL.

*Overseas readers can also obtain this discount but details vary according to country. Please ring, write or fax to Vann Draper Electronics.

Long-distance Television

DX conditions and reception. Satellite sightings and news. Roger Bunney reports. Also start of a basic guide to Sat-zapping

fter an active and exciting May, Sporadic E conditions became rather quiet during June. Signal reception was mundane and repetitive, with none of the gloss of the previous month. The following SpE log sums things up:

4/6/96 RAI (Italy) ch. IA, B: Video (Italy) ch. E2; TVE (Spain) E2.

6/6/96 NRK (Norway) E2, 3. 7/6/96 TVE E3, 4; C+ (France) L2; RAI IA, B; Video É2; +PTT (Switzerland) E2, 3; RTS (Serbia) E3; NRK E3;STV (Slovakia) R2;

YT (Ukraine) R1. 10/6/96 C+ L2. 12/6/96 RAIIA

13/6/96 RAIIA.

14/6/96 RAI IA, B; Video E2; TVE E2-4; RTP (Portugal)

15/6/96 RTP E3; TVE E3, 4.

16/6/96 RTS E3; TVE E2-4. 17/6/96 RTS E3.

23/6/96 RAI IA, B; Video E2;

MOSCOW - HELSINKI

TVE E2, 3; C+ (Corsica) L4.

25/6/96 TVE E3.

28/6/96 NRK E2, 3.

30/6/96 TVE E2-4; RAI IA; Video E2; RTS E3.

We'll keep our fingers crossed for July! My thanks to Cyril Willis (King's Lynn), Peter Schubert (Rainham) and Garry Smith (Derby) for supplementing my own meagre log.

In a letter dated 19/6/96 Ryn Muntjewerff (Holland) comments that during an SpE opening the previous week he received JTV (Jordan) ch. E3, Iran ch. E2, Syria ch. E2, RTSH (Albania) ch. IC and an unidentified ch. E3 cartoon dubbed into Arabic with an octagon-shaped logo containing a palm tree in the top, left corner. Has anyone any ideas about this? Garry Smith mentions that YT-2. the Ukrainian second network, uses a white "YT-2" identification at the top left - also that Nova TV is the replacement for the former CST-1 network in the Czech Republic.

Satellite Sightings

June was a busy month in the Clarke belt, with numerous Euro '96 feeds and coverage of the G7 Summit talks in Lyon. Interesting sightings included signals from the Israeli AMOS-1 satellite and a mystery Russian satellite identified as Gorizont 15.

Our congratulations to Roy Carman (Sandown, IW) on the first UK sighting from AMOS-1 at 4°W. During the afternoon of July 1st he received, at 11-301GHz (H), weak signals using a 90cm dish and threshold extension. I checked at

1800 on July 2nd and found a sparkly though acceptable signal, using my 1.5m dish and an Echosphere LT730 receiver with the threshold set for 12MHz bandwidth. A PM5544 test pattern was being transmitted, with "Amos-1" in the top panel and numbers in the lower panel. There was no audio carrier on either the 1st or 2nd. I assume that this was the East European beam. Another report the previous weekend suggested that the Israeli spot beam had been received in the eastern Mediterranean.

The normally quiet Intelsat 515 at 18°W has been active in recent weeks with several European feeds from Moscow. NBC and CNN were both seen running NTSC news reports following the Russian elections. Further NTSC news packages were seen via 515 later in the month, at 11.582GHz (H). An unusual sighting was the Spanish "ARGANDA RETEVISION" test pattern, far from its usual Hispasat source at 30°W. Previous information indicated that the 702 satellite was to move from 1°W to 18°W, but another report suggests that 702 is to be slotted in elsewhere. The strong signal levels tend to confirm that 702 has indeed arrived at 18°W. Stay tuned!

The BBC units UKI-118 (Southampton) and UKI-231 (Plymouth) have been busy along the south/south west coasts, the former usually linking live into the Spotlight magazine programme. A recent UKI-118 transmission seen via Orion came from Barnstaple. UKI-118 was at Modbury, South Devon on the 2nd, and on June 18th it was transmitting with SIS

A colourful

identification

(Finland) via

John Locker.

Eutelsat II F4 at

received from YLE

T'E. Photo courtesy

(sound-in-syncs) from the BMA conference at Brighton via the French Telecom 2C. Ulster TV's UKI-120 is another Telecom 2C customer: on the 25th it was covering the Prince Charles' banquet aboard the Royal Yacht Brittania in Belfast harbour.

The Italian horse and trap racing that was frequently received via Eutelsat II F3 (16°E) last winter and then disappeared (we assumed that it had gone digital) has reappeared via F2 (10°E) – check at around 11·163GHz (H). The same satellite has been carrying the former Yugoslav war crimes trials in The Hague – Roy Carmen advises checking at 11·073GHz (H) for daytime coverage.

Roy Carman also received an unlisted Russian satellite of the Gorizont type at 34°E, with "Mockba 6" and "TC1 THROUGH T GORIZONT 34E" captions, on several June mornings. The frequency was the usual Gorizont Ku band 11.525GHz. Ken Suddes (Welwyn) has also reported reception from this satellite, with an obviously inclined orbit.

Subsequently John Locker checked the Norsat Internet website where Roy reported reception of Gorizont 15 at 33°E with a 5.6° inclination – it's best seen in the UK at 0800, 2000 etc. hours. Another new sighting reported by John is a GALS Russian DBS craft at 36°E. A weak (East spot?) downlink was visible in the Wirral at 12.16GHz with RHC polarisation.

Ken Suddes surfs the text pages for satellite news. He suggests trying NBC page 171, EBN 645-8 and UK Gold 333. Can anyone suggest additions to this list?

During a typical week there are many corporate and instructional transmissions via Orion (37.5°W), many still in the clear. On most mornings Orion airs its own promotional offering – an interesting video that's well worth viewing.

The Middle East

Ruud Brand of the BDXC has been on holiday recently in Israel. He reports that PBC (the Palestine Broadcasting Corporation) is in operation in the Gaza strip, using ch. E25. The PM5544 test pattern and colour bars with logo are used. Programmes have a logo at the top right corner. There was no sign of the ch. E4 transmitter listed in the World Radio and Television Handbook.

The Syrian HOMS transmitter uses ch. E2, with separate services before and after 1600 GMT. Early programmes carry the top left corner logo "SYRIA": after 1600 this changes to "SYR". There is no text or VITS in the field blanking interval.

Jordanian programmes start at 0430 GMT, preceded by the PM5544/5534 pattern. There is much information in the field blanking period with JTV-1. JTV-2 opens at 1300 GMT.

There are two Israeli networks, IBA-1 and IBA-2. The top left logo for IBA-1 is either three overlapping circles or a candlestick. IBA-2 uses a large "2".

DAB

With the growth of digital audio broadcasting in Band III, though still experimental, more TV transmissions are being transferred to UHF. The Norwegian TV2 transmitters at Bergen and Oslo are to move to chs. E45 and E30 respectively. In Germany, the MDR-1 Dequede and Sonneberg transmitters are moving from ch. E12 to chs. E24 and E44. These transmitters used to give excellent Band III signals when tropospheric conditions were right, and will be missed. No definite time scale has been announced, but the changes are likely to take place during the next twelve months.

Satellite News

As mentioned in Teletopics last month, the new Astra slot for SES's series 2 digital satellites will be at 28.2°E. Orders for the 2A and 2B satellites have already been placed: 2A is expected to be launched in August 1997.

Sony has shipped quantities of set-top decoder boxes from its Welsh plant at Pencoed to France for the start of the Canal Plus satellite digital TV service, the first in Europe. Kirch's seventeenchannel German digital TV service DF1 was due to start on July 28th. Further expansion to fifty channels is planned for late October, via Astra 1F. BSkyB has agreed to take a stake of up to 49 per cent in DF1 and will share the cost of developing the venture. The combined group envisages a 200channel service. BSkyB is continuing with plans for a 200channel UK service to start late next year. It has sent a technical specification to set-top decoder manufacturers and has told them that it would like to see a million



units available in shops by September 1997.

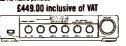
Basic Guide to Sat-zapping

Searching the Clarke belt for exotic signals is an easier hobby than traditional DX-TV, though perhaps a bit more expensive. Anyone interested in getting started would be well advised to buy a copy of the latest (5th) edition of John Breeds' Satellite Television Installation Guide, which is available from Swift Television Publications, 17

This Asiavision feed from Malaysia is another offering from 7°E. The feed to Europe is in C band, with European distribution in Ku band. Photo from John Locker. Note that the signal in this and the previous photo was SIS stabilised using an **EBU** decoder which includes audio recovery.



Portable Colour Television CTV-5512 Multi System AC/DC 230V/12-24V



■ Ruilt-in Time Base Correction (T.B.C.)

■ Line Conversion: 525 to 625 lines and 625 to

Field Conversion: 60 to 50 and 50 to 60 Fields

RR-50 MANUALLY TUNED SATELLITE RECEIVER

variable 17. bandwidth from 26MHz down a very narrow 12MHz. Variable audio bandwidth 150-350KHz, Pos/Neg video switching for C/Ku band, 14/18v LNB options, 5.5/6MHz modulator.

£199.00 inclusive of VAT

DELUXE MODEL fitted with Threshold Assistance Device (TAD), lowers threshold to between 3-4dB, switchable and adjustable, a must for very weak signal work.

£329.00 inclusive of VAT

5.5 inch (14cm) colour Television/Monitor.
Multi-System (PAL B/1 - SECAM B/G-D/K-1),
40 preset memories. Dn Screen Display,
Hyperband and full function remote control.
In-Out A/V sockets (RCA), 75Ω antenna-ripurt
and AC/DC 230V17-24V operation.
PAL System 1 (for UK); PAL System B/G (for
Europe); PAL System D (for China); SECAM L (for France); SECAM D/K (Eastern Bloc);
SECAM B/G (Middle East etc).

£299.00 inclusive of VAT

NEW PRODUCT 'PROVISION Y' Satellite Receiver/Positioner (4dB Threshold, adjustable) under £300, complete details by return with catalogue (delivery by courier £9.00).



NEW 1996 UPDATED CATALOGUE

Features all the usual popular specialist products, together with many new items, Satellite, Multi-system TVs and VCRs, Converters, Decoders, Amplifiers and Aerials.

AVAILABLE BY RETURN OF POST FOR ONLY £1,

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



Just to prove that PAS-3 (PanAmSat) does sometimes come to life with Ku band transmissions, though they are rare.

Pittsfield, Cricklade, Wilts SN6 6AN (phone 01793 750 620) at £15 plus £2 postage (UK). It's a truly practical guide that will answer 99 per cent of your questions.

Our view of the Clarke belt in the UK runs from the horizon in the south east upwards to about 25-33° elevation (depending on your location) when looking due south then back to the horizon in the south west. Thus for reception from as many satellites as possible we need to be able to track this section of the belt accurately. Tracking dishes are driven by either an H-H

(horizon-to-horizon) or a polar mount. The former is compact, neat and generally quiet in operation, but is more expensive than a polar mount.

The motor drive for the dish is remotely controlled by either the satellite receiver itself or a standapart controller. A multiway cable links the indoor unit to the motor, sending power and receiving back direction sensing pulses.

There are two main types of dish, offset and prime-focus. The former is the type used for about 99 per cent of Sky systems, with an LNB support arm that extends from beneath the dish. The prime-focus type is a circular dish with the LNB mounted centrally. For satzapping you should buy the largest dish you can afford, 90cm being the minimum. The larger the dish the higher its gain and the sharper its beam width. Lenson Heath produce well-made, cost-effective systems. This company's onemetre offset dish is a good compromise solution. Remember that planning regulations allow a dish of up to 90cm to be erected without permission in most areas.

Ideally you should be able to track from say 70°E to 70°W. Select a position that gives maximum coverage. My present location offers from 24°E to 40°W in winter. In summer the coverage to the east falls to 13° because of trees – your dish must see a clear sky.

Some dish motors are noisier than others. If you mount the dish on a wall, ensure that the motor is a lownoise type – otherwise neighbour problems will occur. Motor noise travels along a wall, which is bad news for sat-zapping late at night. Where possible it's best to use a garden stand for the dish. Always try to minimise the visual impact of the dish – avoid bright white when a laurel green version is available. It's a good idea to talk to your neighbours before you create your own Jodrell Bank!

I've had to deal with many domestic problems in the past relating to aerial masts, dishes etc. If you want advice on this and equipment sources I will try to help – include a stamped, addressed envelope please with any requests sent to me via the magazine's editorial office.

TELEVISION INDEX/DIRECTORY AND FAULTS DISCS PLUS REPRINTS SERVICE

INDEX DISC

Version 4 of the computerised index to TELEVISION magazine covers Volumes 38 to 45 (1988 – 1995). It has thousands of references to TV/VCR fault reports and articles, with synopses. A TV/VCR spares guide, an advertisers list and a directory of trade and professional organisations are included. The software is easy to use and very quick. It runs on any IBM or compatible PC with 512K RAM and a hard disc.

Price £30 (3.5"HD, alternatively 3.5DD" or 5.25" if required)

Those with previous versions can obtain an upgraded version for £15. Please quote the serial number of the original disc.

FAULT REPORT DISCS

Each disc contains the full text for TV, VCR, camcorder, satellite TV and CD fault reports published in individual volumes of TELEVISION, giving you easy access to this vital information. Note that the discs cannot be used on their own, only in conjunction with the Index disc: you load the contents of the Fault Report disc on to your computer's hard disc then access it via the Index disc. Fault Report discs are now available for:

Volume 41 (November 1990 – October 1991) Volume 42 (November 1991 – October 1992)

Volume 43 (November 1992 – October 1993) Volume 44 (November 1993 – October 1994)

Volume 45 (November 1994 - October 1995)

Price £15 each (3.5"HD, alternatively 3.5"DD or 5.25" if required)

REPRINTS

Reprints of articles from TELEVISION back to 1986 are also available: ordering information is provided with the index, or can be obtained from the address below.

Hard copy indexes of TELEVISION are available for Volumes 38 to 45 at £3.50 each.

All the above prices include UK postage and VAT where applicable. Add an extra £1 postage for overseas EC orders, or £5 for non-EC overseas orders. Cheques should be made payable to SoftCopy Ltd.

Allow 28 days for delivery (UK).

SoftCopy Limited, 1 Vineries Close, Cheltenham GL53 0NU, UK. Telephone 01242 241 455



WEEKLY, UP-TO-DATE, EVERY THURSDAY.



ERT helps you make informed Dusiness decisions

PLUS: YOU RECEIVE A FREE ERT DIRECTORY (WORTH £50) WHEN YOU SUBSCRIBE

THE £1 A WEEK SPECIAL OFFER

There's only one way to ensure you are keeping pace with your industry - ERT, Electrical & Radio Trading. Without it you could be missing out on vital information affecting you and your business.

Every week ERT contains comprehensive information on all aspects of the electrical retailing industry including TV's, VCR's and satellite systems. Reporting on important industry developments, reviewing new products and equipment and examining topical issues in-depth.

We'd like you to test ERT for yourself, so are offering the chance to receive ERT for just £1 a week for one year, meaning a cash saving of £18 off the normal subscription rate of £70.

All this every week

- NEWS
- BUSINESS BRIEF financial news
 EDITORIAL COMMENT
- NEW PRODUCTS
- LETTERS

- ANALYSIS
- JOBS/
- DIARY OF EVENTS

DON'T MISS OUT ON VITAL INFORMATION AFFECTING YOU AND YOUR BUSINESS SUBSCRIBE TODAY

TO START YOU SUBSCRIPTION IMMEDIATELY CALL

QUOTING REFERENCE "TVA"

SUBSCRIPTION ORDER FORM "The £1 A Week Special Offer"

Name:	
Job title:	
Company name:	
Address:	
Postcode:	
Country:	
Tel No:	
All subscribers to ERT are covered by our Full Money subscription at anytime, for whatever reason and we issues. No questions asked.	

Please return to ERT. Reed Business Publishing Limited. FREEPOST RCC2619. Haywards Heath. West Sussex RH16 3 BR. NO STAMP REQUIRED

SAVE 25% - SUBSCRIBE TODAY

Please enter my subscription to ERT for: (please tick as appropriate) £70 £52 UK & Eire \$\infty\$ £95 £71.25/\$127.50 Overseas Airmail

3 WAYS TO PAY

I enclose a cheque/money order made payable to ERT for £ Please charge my Mastercard/Access/Visa/Diners Club/American Express (please underline appropriate card) for the sum of £

Card Number:

Card expiry date:

Signature:

Date:

Please invoice me/my company for £ Purchase order number:

Company VAT registration number:

Please tick here if you do not wish to receive direct mail from other companies.

An RGB-VGA Conversion

A way of using the Microvitec Series 7 monitor as a VGA driven unit. Ray Porter, M.Sc., C.Eng., MIEE describes the principles and practicalities

any readily available surplus RGB monitors will, after relatively minor modification, operate with either older PCs that use TTL levels for their colour signal outputs (the CGA and EGA video standards) or the newer VGA analogue signal standard. The particular conversion described in this article was carried out to provide a colour display for a mono 486 lap-top computer, but it's also a way of providing a workshop test monitor for 8086, 286, 386 and 486 computer repairs. A Reuters CMV125MV monitor, which is a badged Microvitec 12L728NR3 (Series 7 chassis), was used as the patient. It was made in the late Eighties. The extra circuitry required can be laid out on a piece of stripboard, uses only a few standard components, and is powered by the monitor's 12V supply. There's room to mount the extra board behind the RGB connectors.

Standards

EGA and CGA sync and colour signals leave the PC via a 9-pin, D-type socket, entering the monitor via an identical connector. The first step is to test the monitor, using a suitable CGA/EGA PC if possible. You'll need a pin 1-to-1 etc. connected 9-pin, D-type cable for this test. VGA output from a PC is via a 15-way, high-density D-type socket (i.e. the shell size is that of a normal 9-way socket).

VGA computers have separate colour, colour return, sync and sync return pins, as shown in Fig. 1, but require a combined colour plus sync signal at each of the red (R), green (G) and blue (B) BNC input connectors. The Microvitec Series 7 chassis has a duplicate set of BNC sockets for connecting monitors in parallel. It takes its sync pulses from the G signal, but for the correct dynamic colour range the other two channels also require the voltage offset produced by the sync pulses. A test showed that 900mV of colour signal atop 300mV of negative-going sync produced full colour saturation.

Modification Details

Fig. 1 shows the circuitry. The line and field sync pulses are OR gated and added to the analogue colour signals as these are being fed to the monitor's RGB

BNC input sockets. These inputs go to differential amplifiers: the positive input is to the centre pin, the BNC socket's outer being the negative input.

A rear panel switch enables either a 75Ω or a high-impedance differential input to be selected. A VGA monitor's normal input impedance is 75Ω , but set the switch to high Z. The reason for this is that a VGA monitor requires about 600mV for full colour saturation while these monitors require 900mV. A test on the computer signal levels at the end of two metres of 75Ω coaxial cable showed that for full colour saturation 1-7V was available through a 150Ω source impedance. When a modified (220Ω) cable termination was used, the required colour signal voltage was obtained without any mis-match problems being noticeable.

The sync signals in the VGA type 3 video standard (640 x 480 pixels) use negative logic, i.e. 0V = true, 5V = false. This means that they can be OR gated using a positive logic NAND gate (ICla). The output from this is inverted (IClb) and then used to drive transistor Tr1, which switches a 300mV source on and off at the negative amplifier inputs. Addition of the sync and colour signals is carried out by the differential amplifier action. Although I connected all three negative amplifier inputs together and drove them from the same 300mV source, no crosstalk or noise was apparent during my tests.

The layout of the modification circuit is not critical, but the input cables (each 2m of 75Ω coax) should be arranged so that the outers can be earthed closely together. Keep the output cables as short as possible. The 12V supply required can be found at pins 14 (+ve) and 7 (0V) of a 4047 DIP chip mounted on the RGB input PCB. The few mA consumed by the extra circuit is provided without any difficulty.

Notes on the 12L728NR3

- (1) The model number is on a paper label which is stuck to the tube's bowl. The name Microvitec appears on only the tube base PCB.
- (2) The power supply is based on a TDA4601 chopper control chip. A red LED on the power supply PCB

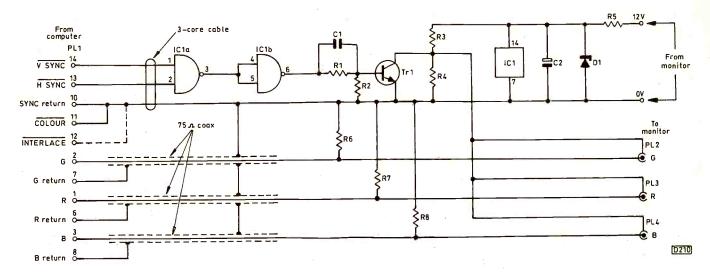


Fig. 1: Circuit diagram of the RGB-to-VGA converter. IC1's supply pins are 14 (5V) and 7 (chassis). Pin 12 of PL1 may need to be left unconnected as it is a computer input that reads the monitor's interlacing capability.

lights when the power supply is working. The chopper transistor is an SGSIF423. It will fail should C17 (1nF, 2kV) become dry-jointed. A BU508AF will work as a replacement.

(3) The HT for the line output stage is generated by a power switching monostable which operates with a 555 timer chip and is triggered by the line sync pulses. The monostable's output is smoothed by an *LC* filter to provide a supply whose voltage is proportional to the line scan frequency. This ensures that the line scanning rate is proportional to the line sync pulse frequency. A check on this voltage showed that it is 45V with CGA sync (15.625kHz) and 96V with VGA sync (31.25kHz).

When there are no sync pulses the line scanning stops but the field scanning continues: this is a 'green feature', to reduce power consumption.

The EHT voltage doesn't vary with the sync frequency. It depends on the rate-of-change of the flux in the line output transformer. This is fixed by the tuning of the windings, as with a conventional TV set.

- (4) EW correction is based on a pulse-width modulated parabolic waveform that's derived from a TDA4950 chip. There is no need for a power transistor, as the power loss with this digital technique is low.
- (5) The sync PCB has a red LED which comes on when sync pulses are being received.
- (6) It's difficult to dismantle the monitor to gain access to the bottom PCB, on which the line output transformer is mounted.

Pull off the brightness and contrast control knobs

and undo the potentiometer fixing nuts. Then undo the four CRT surround fixing screws, lift the CRT slightly and pull out the front PCB with the contrast and brightness potentiometers on it. After refixing the CRT surround you can slide out the bottom PCB, which will stand up or lie flat at the rear of the chassis, with all cables attached for servicing the module.

The side PCBs can be lifted and hooked in position to give better access generally.

Parts	requir	ed							
R1 R3 R5 All 0-2	10kΩ 2·2kΩ 1kΩ 5W, 5%	R2 R4 R6-8	4·7kΩ 270Ω 220Ω						
C1 C2		1nF, 50V ceramic 20μF, 16V electrolytic							
IC1 Tr1 D1	BC182	74HCT00 quad two-input NAND gate BC182 BZY88C4V7							
Coloui three x Sync s	15W, high-density D-type connector (Maplin JW77J) BNC cable plugs pard, wire, mounting pillars r signal coaxial cable (PL1 to stripboard), 2m 75Ω min. lengths (Maplin XR88V) signal cable (PL1 to stripboard), 1 x 2m, 3- pre, 0-2 unscreened								

Published on the third Wednesday of each month by Reed Business Publishing Ltd., Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. **Filmsetting** by Wace Publication Imaging, 2-4 Powerscroft Road, Sidcup, Kent DA14 5DT. **Printed** in England by BPCC Magazines Division, Carlisle Web Offset, Cumbria. **Distributed** by Marketforce (UK) Ltd., 247 Tottenham Court Road, London W1P 0AU (0171 261 5555). **Sole Agents** for Australia and New Zealand, Gordon and Gotch (Asia) Ltd.; South Africa, Central News Agency Ltd. **Television** is sold subject to the following conditions, namely that it shall not, without the written consent of the Publishers first having been given, be lent, resold, hired out or otherwise disposed by way of Trade at more than the recommended selling price shown on the cover, excluding Eire where the selling price is subject to currency exchange fluctuations and VAT, and that it shall not be lent, resold, hired or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever.

ILTSGROVE LTD

BRANCH: VISIONCARE

28/29 RIVER STREET, DIGBETH, BIRMINGHAM B5 5SA

21 DEACON WAY, SCOURS LANE, TILEHURST READING BERKS

TEL:0121-772-2733 FAX:0121-766-6100 TEL: 01734 420251 FAX: 01734 420555



MULTI-SYSTEM

- **28**" (67cm) 16:9 picture format.
- Easy to use remote control.
- Nicam Digital Sound.
- Fastext with 20 page memeory.

AMSTRAD FX7500AT FAX MACHINE 4 IN ONE.



PHONE ANSWERING MACHINE □FAX/COPIER

UMBEATABLE OFFER

12 MONTHS GUARANTEE



JAPANESE BRANDED GRADED STOCK

21" (51CM) NICAM

25" (59CM) NICAM

£269

28" (66CM) NICAM

ALL GOODS IN WORKINGCONDITION WITH HAND SET, INSTRUCTION BOOK & IN ORIGINAL BOX.

GRADED STOCK

5 MIXED VCR'S 1= YTM210, 1= YTM212, VTM230, 1= VTM410, 1= VTM430





ALL LP/SP VIDEO PLUS

(COMPLETE WITH HAND SET, INSTRUCTION BOOK & IN ORIGINAL BOX)

GRADED STOCK

14" REMOTE CONTROL PORTABLE TELETEXT

289.00

21" REMOTE CONTROL NICAM TELETEXT MULTI SYSTEM

£169.00

25" REMOTE CONTROL NICAM TELETEXT MULTI SYSTEM

£249.00 £279.00

28" REMOTE CONTROL NICAM TELETEXT MULTI SYSTEM

EX-RENTAL VCR'S (ALL WORKING STOCK, WITH REMOTE CONTROL HANDSET)

5 MIXED VCR'S FRONT LOADER



YOUR MAIN SUPPLIER FOR GRADED AND EX-RENTAL TV'S + VIDEO'S + MIDI SYSTEMS. UNTESTED STOCK AVAILABLE.

CALL NOW FOR UNBEATABLE OFFERS. EXPORT INQUIRES WELCOME



EX-HOTEL

16" COLOUR TELEVISION

£35

OUT NOW!! 1996/97 SPARES CATALOGUE





ALL CREDIT CARD AND LEDGER ACCOUNT HOLDERS WILL BE ISSUED WITH OUR CURRENT CATALOGUE FREE OF CHARGE.
ALL NON ACCOUNT HOLDERS WILL INCUR A FEE OF £5.00 WHICH WILL BE REFUNDED AFTER SPENDING £100.00 EXCLUSIVE OF V.A.T.
TO RECEIVE YOUR COPY DON'T DELAY FILL IN YOUR REQUEST FORM

COMPONENT CATALOGUE 1996/97 REQUEST FORM

Company Name: _ Address:.

Telephone:_

Contact Name:_

TELEVISION MAGAZINE

PLEASE CHARGE MY:

☐ ACCESS

□ VISA

CREDIT CARD NUMBER:

EXPIRY DATE.

SIGNATURE_

DATE

PLEASE SEND TO: WILTSGROVE LTD. 28/29 RIVER STREET, DIGBETH **BIRMINGHAM B5 5SA**

ALL STOCK SUBJECT TO AVAILABILITY, CARRIAGE & V.A.T



State Nature Of Business:_

FREEFAX ORDERLINE: 0500 55 05 05

TELEPRICE

LIMITED

Leaders in the supply of:

Ex-rental, End-of-line, Customer returns and Surplus stocks of Televisions, Video and Audio Equipment, and Domestic Washing Machines, Dryers, Refrigerators, etc.

to the Trade

Contact your nearest Area Manager for latest prices:

Area:

Contact:

Mobile:

Fax/Tel:

South

Colin Gordon

0374 738701

01227 741312

North/N.I.

Ian McClelland

0831 597331

01244 400602

General or Export Enquiries

Tony Lewis

0374 732784

01291 425018

Head Office: Baird House, Arlington Business Park, Theale, Reading, Berks RG7 4SA.

Tel: 01734 309933 Fax: 01734 309934

AERIALS

FOR TV & FM RADIO, PLUS 1000's OF MASTS, BRACKETS, LASHING KITS, CLAMPS, PLUGS, CABLES, OUTLETS, DIPLEXERS ETC

AMPLIFIERS

FOR DISTRIBUTION SYSTEMS AND DOMESTIC, MAST HEAD OR SET BACK. WE HAVE ONE OF THE LARGEST RANGES, AVAILABLE FROM STOCK

MAIN DISTRIBUTORS

FOR ANTIFERENCE, LABGEAR, WOLSEY, FRINGE, IKUZI, MAXVIEW, VOLEX-RAYDEX, KUBLER + MANY MORE

COASTAL

AERIAL SUPPLIES

UNIT X2, Rudford Industrial Estate, Ford, Arundel

01903 723726



NO MINIMUM ORDER VALUE NEXT DAY DELIVERY ACROSS UK CARRIAGE FREE ON ORDERS £250+



W.M.T.V.

THE LARGEST INDEPENDENT
WHOLESALERS IN WALSALL
SUPPLIERS OF HIGH QUALITY EX-RENTAL
TVs AND VIDEOS TO THE TRADE
AT COMPETITIVE PRICES
ALSO AVAILABLE: NEW B-GRADE PRODUCTS

ALSO AVAILABLE: NEW B-GRADE PRODUCTS

– TVs, VIDEOS, AUDIO & MICROWAVES –

ALL TESTED & BOXED

Satellite Receivers and Export Enquiries Welcome ½ Mile off Junction 10 M6. Easy Parking Facilities

UNIT 3, BENTLEY LANE BUSINESS PARK BENTLEY LANE, WALSALL WS2 8TL Tel: 01922-724542. Fax: 01922-722208 Mobile: 0831-246622 (24 Hours)

OPEN:
MON-FRI,
9-6pm
SAT 9-2pm
SUNDAY BY
APPOINTMENT
DELIVERY
SERVICE
THROUGHOUT
THE COUNTRY





TV & VIDEO WHOLESALERS

HCTV

THE LARGEST INDEPENDENT TV & VIDEO WHOLESALER IN THE U.K. PRESENTS

OUR BIGGEST GRADED STOCK

ACQUISITION EVER!

FROM THE COMPANY THAT HAS BEEN IN BUSINESS FOR 20 YEARS COMES AN OPPORTUNITY FOR THE USED TV & VIDEO RETAILER NOT SEEN IN THE TRADE FOR YEARS!

PANASONIC
£17

PHILIPS
£15

HITACHI £20

VAX £25

ROWENTA
£20

GOBLIN £15

MIELE £35

ELECTROLUX
£17

HOOVER £20

MITSUBISHI – SONY 33"-34" LARGE SCREEN ALL OTHER SCREEN SIZES AVAILABLE

DOLBY PRO-LOGIC TV's

NICAM TV's

FASTEXT TV's

IN

STOCK

TV's -**VIDEOS** SONY **TOSHIBA PANASONIC MITSUBISHI** HITACHI JVC SHARP **PHILIPS** SANYO AKAI SAMSUNG **FERGUSON ALSO CAMCORDERS** HI-FI's **MICROWAVES**

ALL EXPORT ENQUIRIES WELCOME

SPECIAL CLEARANCE DEALS ON EX-RENTAL STOCK AVAILABLE PRICES SHOWN ARE 'FROM' AND BASED ON A QUANTITY OF 5

ALL PRICES ARE SUBJECT TO V.A.T.

- HEAD OFFICE -BIRMINGHAM 208 BROMFORD LANE ERDINGTON BIRMINGHAM B24 8DL TEL: 0121-327 3273 FAX: 0121-322 2011 CLEVEDON
UNIT 20
5C BUSINESS CENTRE
CONCORDE DRIVE
CLEVEDON
AVON BS21 6UH
TEL: 01275 341789

LONDON
UNIT 2
THE ROYAL LONDON EST.
29/35 NORTH ACTON ROAD
LONDON
NW10 6PE
TEL: 0181-961 5005

PRESTON
UNIT 439
OAKSHOTT PLACE
WALTON SUMMIT IND. EST.
PRESTON
PR5 8AU
TEL: 01772 312101

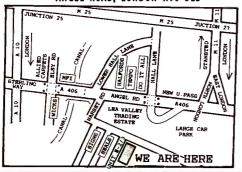
APPROVED
TELEPRICE
DISTRIBUTORS
DISTRIBUTORS

Suppliers of high quality THORN EX-RENTAL STOCK Direct from source

PHONE FOR DELIVERY DAYS ON

0181 803 0505

UNIT E2/3, Stonehill Business Park, Lea Valley Trading Estate,
ANGEL ROAD, LONDON NI8 3LD





QUALITY USED TV & VIDEO

COMPLETE RANGE OF TVs VIDEOS AND SATELLITES

Most makes and models available
TVs from £3.00 · Satellites from £8.00
Videos from £15.00
Prices Ex-VAT

Free Delivery Service to most areas of the UK

U.K.s Largest Export Wholesaler
Specialists in conversions to most countries systems

UNIT 75, BARRACKS ROAD, SANDY LANE INDUSTRIAL ESTATE, STOURPORT-ON-SEVERN, WORCESTERSHIRE DY13 9QB Just 10 Mins from M5 Junct. 6 Worcs North

> 01299-879642 (3 lines) FAX: 01299 827984

TUBES

SUMMER SPECIAL

Good TV – tube broken or low emission? Not worth the cost of a new or regunned tube?

Why not try one of our tubes reclaimed from new and used equipment. <u>ALL</u> have been picture tested by our engineers. Prices negotiable due to varying quality of tubes. We will make an allowance for any good tube that you have and can't use. Is your tube listed here?

- 14" 34EAC, 34JBU, 34JCG, 34JXM, 34JLL, 34JRH, 34KCQ, 34KFC, 34KQY, 34KVK
- 14" AXT37-001, AXM37-001, 3701B, 3702B, 3708B, 37-573, 37-590, 370EFB. 370EGB, 370ETB, 370FLB, 37GGA, 370HFB, 370KRB, 370LHB
- 15" 36EAM, 36JJR
- 16" AXM42-002, 4202B, 42-550, 42-570, 42-590, 420FLB, 42GGA, 420CZB
- 17" 41JHP
- 20" 48KCS, 48KMX, 48KMY, 48JRV, 48JSK
- 20" AXM51-002, 5109B, 510ADFB, 5130B, 51-590, 510YUB, 510YXB, 510ZYB
- 21" 51EAM, 51EAK, 51EAT, 51EAS, 51EBD, 51EBV, 51ECN, 51ECQ, 51GGD, 51JCC, 51JFC, 51JXH, 51KPD, 51KSV, 51JSY, 510WZB, 54HGB
- 22" 56-510, 56-540, 56-701, 560DYB, 560EYB, 560FZB, 560GAB, 560GEB
- 25" AXM59-001, 59EAS, 59EAU, 59ECF, 59ECY, 59JMZ, 59JWC, 60LCS
- 26" 66-540, 670EHB, 670CNB, 670EGB, 67-701
- 28" 66EAF, 66EAS, 66ECF, 66JMZ, 68EAU, 68EEH, 68JYK, 68JYL, 68LCT

Ring Irene or Jane for price and availability



Carriage and VAT extra



EXPRESS TV

The Mill, Mill Lane, RUGELEY, Staffs WS15 2JW

Tel: 01889-577600

Fax: 01889-575600

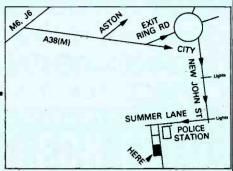
COLOURTRADE

ESTABLISHED 1973 - WHOLESALE ONLY

NEW 'B' GRADE

Major Brands ONLY. TV's – Video – Audio. Microwaves, Satellite Receivers, Decoders. Camcorders – Phones/Fax.

COMPLETE BOXED - WITH STAND - HANDSET - BOOK ETC MINT LATEST NICAM FASTEXT F.S.T.



FERGUSON

FULL RANGE - ALL CURRENT MODELS OF TV-VIDEO IN STOCK No minimum quantity

NATION-WIDE NEXT DAY DELIVERY SERVICE - VISITORS BY APPOINTMENT Phone 0121-359 7020





FAX 0121-359 6344 221-222 BRIDGE ST WEST, HOCKLEY,

BIRMINGHAM B19 2HU – JUST OFF M6-J6





BESCO LTD

YOUR PREMIER SUPPLIER FOR OVER 30 YEARS
Have a great '96 with Besco

ENTIRE RANGE OF EX RENTAL TVs, VIDEO, B GRADE HIFI, PORTABLE CD, GHETTO BLASTERS ETC.

F.S.T. remote working F.S.T. text working

from only £60 from only £70

complete with handset, makes inc' Solara, Philips. Sanvo. Hitachi etc.

Over 200 working video recorders in stock **from £40** (slim front loaders) 100s of front loading videos off the pile **from £12** – Philips, Hitachi, Sanyo, Sharp, etc.

Good quality working TVs standard **only £25** Teletext **from £40**Makes in stock — Hitachi, Ferguson, Pye, Philips, GEC etc, **RING OUR HOTLINE NOW!**

HIFI SPECIAL

Boxed HiFi with C.D., Twin tape, radio etc.

from £35 (MIN 3 UNITS)

Car radio/cass, Personal stereo, Personal C.D.,
Ghetto Blasters, etc.

BASEMENT CLEARANCE

300 ex rent colour TVs, mixed std and text, makes include Pye/Philips KT3/K30, Hitachi, GEC series 90, Ferguson TX etc. — **ONLY £2,400.00 THE LOTI**(DELIVERY ARRANGED)

By special request return of our sensational Cabaret, also our new menu FREE Hamburgers, Pizza, soup, sausage/egg, bacon sandwiches etc. *All this and rock bottom prices too!* Where else? Bring money!

Prices are plus VAT and based on quantity

Walker House, 16 Bottomley Street, Bradford BD5 7LJ Ring Tony 01274 308186 – Open 6 days – 9am-5pm

RENTAL GRANADA

CENTRAL TV WHOLESALE DISTRIBUTION LTD

THORN TX9, TX10, TX100 FST please ring now for best prices

FOR BEST DEALS ON DORICS MK4, Mk4a Basics...
RING NOW!

GRADED TVs AND VIDEOS: POA

FULL RANGE OF PANASONIC VIDEOS NOW IN STOCK: POA

WORKING VIDEOS NOW FROM ONLY: £30.00 FOR ALL EXPORT
ENQUIRIES TV AND VIDEOS,
CALL OUR BIRMINGHAM
OFFICE NOW!

PHILIPS K35, K40 Teletext TVs from: £40 Working

ATTENTION ALL BULK BUYERS RING NOW FOR DIRECT LOADS

LARGE SELECTION OF SLIMLINE VIDEOs, FULL REMOTE from £45.00

Finlandia Nicam TV 21"/24"/28" models:

D66J25x8 D66J26x2 C51H26x17 C59HP6x7 C59HZx3 C66H25x8 C66HZ6x5 C59GZ7x4

London contact: Joshi Eley Estate, Nobel Road, Edmonton N18

Tel: 0181-807 4090 Fax: 0181-884 1314

SATELLITES, VIDEO CRYPT

SRX200, SRD400, PACE 9000/9200 IRD, PACE 800, VIDEOCRYPT, AMSTRAD 510/540 and more: POA WORKING PORTABLE from only £35

LARGE SELECTION of FST TVs from £45

Birmingham contact: Mick 369 Startford Road, Sparkhill, Birmingham B121

Tel: 0121-772 1591 Fax: 0121-766 6383

RED BANK

MANCHESTER'S No. 1 WHOLESALER 1,000s of TVs IN STOCK

WORKING TELETEXT from £25

TELEVISIONS from £5
VIDEOS from £25
PORTABLES from £30
F.S.T. from £40

NICAM TVs from £65 NEW HANDSETS from £6

Open Monday to Fri 10am till 5pm

345 Stockport Road South Area, Daisy Works, MANCHESTER M13 0LF

Tel: 0161-273 8343

Fax: 0161-834 6368





Largest selection of

MAJOR MANUFACTURERS
NEW "B"
GRADE PRODUCTS

T.V. VIDEO AUDIO MICROWAVE OVENS

Contact Fred Bean

BSMART (CRAWLEY) LTD. 10/11 LLOYDS COURT, MANOR ROYAL, CRAWLEY, SUSSEX RH10 2QX

Tel (01293) 618000 Fax (01293) 400133

C.T.V.

UNIT 5, THE PHOENIX BUILDING, RUSHOCK TRADING ESTATE, DROITWICH ROAD, **DROITWICH WR9 0NR** TELEPHONE: 01299-251522

0589-888021/0850 486147 (24HR)

SUPPLIERS OF HIGH QUALITY **GRANADA AND THORN**

EX-RENTAL TELEVISIONS AND VIDEOS

LARGE STOCKS ALWAYS AVAILABLE

ALL AT COMPETITIVE PRICES

Satellite Receivers

Complete Range of Hand Sets

EXPORT ENQUIRIES WELCOME

OPEN: MON-FRI – 9.30-5.30

TEL: 01299-251522

Fax: 01299-251543

NEW LOW PRICES ON GRADED STOCK ALL BOXED WITH INSTRUCTIONS TESTED & WORKING

14" Remote Portables	£85
14" Fastext	£95
14" Televideo	£175
20" Remote	£79
20" Text	£95
21" Remote	£89
21" Nicam	£129
20" Televideo	£235
25" Fastext	£195
25" Nicam Fastext	£235
28" Nicam Fastext	£255
L/P Videos	£95
C/D Midi Systems	from £75

Various makes

Ex Rental T/Vs, lots of 50 25 x Basic 25 x Remotes £500 Front Loading Videos. Lots of 10 - £150

> Parcels of FST T/Vs £35 each Parcels of Videos £35 each Various late models

FRONT LOADING VIDEOS – WORKING £40 EACH

W. TREE TRADE WAREHOUSE

Unit 1, Sunshine Mills, Wortley Rd, Leeds

Tel: (0113) 2638804 Fax: 2310275

STARVISION

SUPPLIERS OF HIGH QUALITY EX RENTAL - EX DISPLAY TV & VIDEO

ALL SETS ARE FULLY SERVICED WITH REMOTE CONTROLS AND ARE READY FOR RETAIL SALE

MOST POPULAR MAKES ALWAYS IN STOCK AT PRICES THAT WON'T SHOCK

> **ALL PRICES INCLUDE V.A.T. NO MINIMUM QUANTITY**

RING TODAY FOR LATEST PRICES **TELEPHONE** 0121 502 3016 - 0121 505 1033

STARVISION UNIT A, BRUNSWICK PARK ROAD WEDNESBURY, WEST MIDLANDS WS109QR

REPO WHOLESALE

DAISY WORKS, 345 STOCKPORT ROAD LONGSIGHT, MANCHESTER M13 OLF 0161-273-2854/274-3409/Fax 273-4486

TOP QUALITY CLEAN WORKING FST

GOOD QUALITY "TOP RANGE" WORKING VIDEOS

If you are in the area call in and see what we can offer

COMPETITIVE PRICES

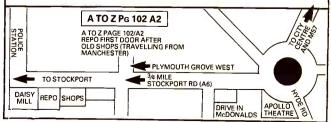
★ REGULAR SUPPLIES ★

PLEASE PHONE FOR CURRENT STOCK POSITION

★ NEW HANDSETS IN STOCK ★

No order too small – If you are new to the business call in and let us help you

CHEQUE/CASH/ACCESS/VISA/AMEX ETC.



ASSIFIED TEL:0181 652 83:

No other consumer magazine in the country can reach so effectively those readers who are wholly engaged in the television and affiliated electronics industries. They have a need to know of your products and services.

CLASSIFIE

PHONE 0181-652 8339

FAX 0181-652 8931

The prepaid rate for semi display setting is £13.50 per single column centimetre (minimum 4 cm). Classified advertisements £2.00 per word (minimum 20 words), box number £22.00 extra. All prices plus 17 1/2% VAT. All cheques. postal orders etc., to be made payable to Reed Business publishing. Advertisements, together with remittance, should be sent to Television Classified, 11th Floor, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS

SERVICE MAN

A SELECTION FROM OUR RANGE OF TECHNICAL BOOKS Television Chassis Guide. MP18. £6.50. Television Equivalents. MP150. £6.50. Fault Lists for Televisions. MP205. £8.50 Television Remote Control Circuits. MP167. £11.50. Video Recorder Beginners Fault Guide. MP5. £3.50. Switch Mode TDA4600 Power Supplies, MP37. £6.50. Teletext Repair Guide. MP38. £7.50.

We have the largest range of Service Information and Technical Data obtainable anywhere. For Televisions, Video Recorders, Test Equipment, Computer Monitors, Vintage Wireless, Domestic Equipment etc etc.

> In fact practically anything electronic. Originals or Photostats as available.

THIS MONTHS **NEW RELEASE** Also available. Our catalogue detailing Hundreds of Technical Books and Repair Guides. Return coupon for your FREE copy.

Now Available. Full Index on PC Disc of our Service Manuals available. £3.50 with FREE updates.

COMPUTER MONITOR CIRCUITS

A Giant Compilation of Monitor Circuits and Associated Servicing Information for a vast range from manuafacturers such as Amstrad, Acorn, AOC, Atari, Barco, Commodore, Compag, Electrohome, Epson, Goldstar, Hitachi, Hantarex, IBM, Mitsubishi, Microvitec, Mitac, Olivetti, NEC, Panasonic, Philips, Sony, Samsung, Taxan, Thompson, Wyse, Zenith, Normal Price £44.95. Order now for just

Access		koad, Chinnor, Oxfordshire, Oxy 4Q1 44-351694. Fax:- 01844 352554.	VISA
		catalogue for which I enclose 2 x 1st Class Books Catalogue plus Manuals Index on PC	
ADD	RESS		-
		You may pay by Cheque, PO	

SIGNATURE

MAURITRON TECHNICAL SERVICES (TV)

SERVICE MANUALS

£39.95 plus £2.94 p/p. Order MP-286a.

Thousands of different models available For most U.K. European, Far East & USA makes

Prices (Stock Items):-

VCR £13.00 CTV £8.00 MTV £6.00

Other items, prices on request P/P etc. (any quantity) add £2.00 Do not add any VAT

Cheque/PO with order only please.

D-TEC

PO BOX 1171, FERNDOWN, DORSET BH22 9YG Tel: 01202 870656

SER	VICE	INFORMATIO	N

EXPIRES

CIRCUITS and SERVICE MANUALS
from 1930s - 1990s:
adios, emps, radiograms, tunners, CDs, TVs, videos,
cassette radios, ICE etc.
LARGE QUANTITY USED TV & VIDEO PANELS
BACK COPIES PW & TV MAG. Give details of your nee

DAVE WILLIAMS

16 Church Street, Owston Ferry
Doncaster, S. Yorks DN9 1RG
Tel & Fax: 01427 728046 Mail order only. No callers

SERVICE MANUALS

Have you turned work away for war of a Service Manual? Have you ever bought a Service Manual and never use it more than once? – Then why not join...

THE MANUALS LIBRARY"
r details and Membership
pplication Form Write, Phone or Fax:

Application Form Write, Phone of Fax:

HARVEY ELECTRONICS

43 Loop Road, Beachley, Chepstow,
Gwent NP6 7HE

Tel: 01291 623086 Fax: 01291 628786

VISA, ACCESS accepted

Fryerns

Service Information



Circuit Diagrams

TV'S, VCR's SATELLITE **AUDIO & HI-FI**

Most models/makes old & new covered. Also fault guidance service available Prices are from £3.50 + £2.50 P/P

 $i.e.\ 1\ item-total\ \pounds 6.00$ 2 items - total £9.50

3 items - total £13.00 4 items - total £16.50

Payment by credit card or Postal Order for next day delivery. Cheques to clear. Tel/Fax 01268 470899

24hr Answerphone outside office hours 4 Pincey Mead,



Basildon, Essex SS13 3EW

!TIMEWARP!







ALL VCR & CTV MANUALS
REDUCED TO 1990 PRICES
THIS ISN'T A SALE, THIS IS
A LONG-TERM REDUCTION
Helping you to fight rising costs

SERVICE MANUALS SERVICE SHEETS CIRCUITS FAULT GUIDES TECHNICAL BOOKS

WE Have the World's Largest Selection of

SERVICE MANUALS

...Repair-Manuals-Circuits-Fault Guides Etc... SERVICE MANUALS SERVICE SHEETS CIRCUITS FAULT GUIDES TECHNICAL BOOKS

CTV CIRCUIT COLLECTIONS

A3 SIZE / ALL POPULAR SETS / UPTO 1995

Alba	£22	Amst'd/Fid	£21	Baird/Ferg	£45
Decca	£22	GEC	£28	Goldstar	£12
Grundig	£38	Hinari	£14	Hitachi	£45
ITT T	£22	JVC	£30	Mitsubishi	£38
Pansic	£30	Philips	£40	Sanyo	£28
Sharp	£14	Sony	£49	Toshiba	£38

Top Selling Titles

PRACTICAL TV / VCR REPAIRS

£16.95 Each / £30.00 for both

£9.95 Each, or all for £25.00

Euro' Scrambling Systems/Satellite Book
Only £32.00 Each / £62.00 for both

Principals of CD/VHS Video Heads/CD Jig
Only £3.95 Each
Still £25.00

SPECIAL MANUAL OFFERS

ANY 20 MANUALS FOR £200 (Inc p&p)
All at once, or phone as you need them
OR

JOIN THE STREE LIBRARY FOR £75 (£20 yearly renewal) AND BUY ALL MANUALS FOR £10 EACH, OR SWAP AT £5 A TIME (Add £2.50 p&p)

PHONE OUR *HOTLINES* ON: (01698) 883334/884585 Fax: 884825

Technical Information Services 76 CHURCH ST, LARKHALL, LANARKS, ML9 1HE

SEND AN SAE FOR YOUR FREE QUOTE & CATALOGUE

PROFIT BOOSTERS

Efficiency in the busy workshop is more important than ever, Increase <u>your</u> productivity with our latest range of **Technical publications**.

FAULT INDEXES: Edition 15 now available, Over 11,600 references listed in 12 years of Television. covers Tv, video, camcorder, satellite & CD Thousands of copies sold worldwide - complete set £14.75

INDEXES ON DISK: PC version 1.1 Now available Covers 15 Years & over 14,000 references - Complete Program, Data & manual, A lot of information £17.50 Requires IBM PC or compatible, 8086 upwards, Mono, CGA, EGA, VGA Please specify disk size (3.5 or 5.25 inch HD) when placing your order.

OTHER TITLES AVAILABLE INCLUDE:

KWIK TIPS TELEVISION covering a wide range of makes, models & chassis, Contains over <u>2500</u> faults & solutions. ISBN 1 898394 00 8 First edition - £13.95

KWIK TIPS VIDEO an excellent collection of over <u>2000</u> video faults & solutions, Highly recommended. ISBN 1 898394 01 6 First edition - £10.95

Chassis & equivalent identification made easy with the E.C.S. Television & video equivalents, TV model to chassis guide & camcorder equivalents A massive 4500 entries in 1 book. First edition - only £4.95

E.C.S.
Technical publishing

31, PRENTON ROAD WEST, PRENTON, BIRKENHEAD, MERSEYSIDE. L42 9PY.

Please add £1.75 P & P to total (europe £2.75, r.o.w please enquire).

TRANSFORMERS

TV LINE OUTPUT TRANSFORMERS

PHONE: 0181-948 3702 FAX: 0181-332 0583

ALBA · AMSTRAD · BUSH · DECCA · DORIC · BLAUPUNKT · FERGUSON · FIDELITY · GEC · GRUNDIG · GRANADA · HITACHI · HINARI · INDESIT · ITT · KÍMARA · NIKKAI · MATSUI · MURPHY · OSAKI · NORDMENDE · LOEWE-OPTA · PANASONIC · PYE · PHILIPS · SANYO · SAISHO · SHARP · SONY · SOLOVOX · SUSUMU · TANDBERG · TELEFUNKEN · THORN · TRIUMPH · THOMSON · GOLDSTAR · BINATONE ·

FULL RANGE OF KONIG: VIDEO HEADS, BELT KITS, IDLERS, PINCH ROLLERS, TENSION BANDS.

LARGE RANGE OF REMOTE CONTROLS IN STOCK

TIDMAN MAIL ORDER LTD · 236 SANDYCOMBE ROAD · RICHMOND · SURREY · TW9 2EQ Mon-fri 9 am to 12.31

Approx. 1 mile from Kew Bridge.

Mon-Fri 9 am to 12.30 pm & 1.30-4.30 pm

LINEAGE

EXPERIENCED FIELD AND BENCH TECHNICIANS in the Slough and London areas, required by brown goods repair company. Tel: 01753 692408.

THE "HOOKINGS" INDEX More than 10,000 entries from "TELEVISION" magazine. Bang up to date. £9.00. Ring: 01766 522444 for free sample.

WANTED URGENTLY C.R.T. Tube reconditioning plant with two or four ovens. Write to Abdulla, 23A Bolton Avenue, Windsor, Berks.

PRIVATE RETAILER has excellent part exchange colour televisions and videos to clear. Tel: 01494 814317.

VIDEOCRYPT DECODER Service sheet with smartcard contact details Eurocrypt card Interlace £12.00. E.M.O. Ramsbottom, Lancs. BL0 9AG. Tel: 01706 823036.

OCHRE MILL Technical Services, Grundig TV spares for most models to 1985, fast, friendly, helpful, sensible prices. Gt Lype Farm, Charlton Nr. Malmesbury, Wilts SN16 9DR. Tel: 0666 823228.

AVO MULTIMETER Model 8, £45.00. 500 volt megers £30.00. Prices plus VAT and p&p. Send SAE for lists of Surplus Instruments and Scopes etc. A.C. Electronics, 17 Apleton Grove, Leeds LS9 9EN. Tel: 0532 496048

1956 PETOSCOTT Console TV in working order offers invited. Tel: 01200 442616.

TV/VIDEO/AUDIO

TECHNICIANS

BENCH/FIELD

To join small friendly service sartment South Birmingham Area

INTERESTED **TELEPHONE** 0121 706 7814

SPARES & COMPS

SURPLUS/REDUNDANT **ELECTRONIC COMPONENTS** WANTED

I/Cs - Tuners - Transistors - Valves - Diodes etc.

any quantity considered -immediate payment.

ADM General Trading Tel. 01827 873311 Fax. 01827 874835

RCS VARIABLE VOLTAGE D.C. BENCH POWER SUPPLY

Up to 38 volts d.c. at 6 amps continuous, 10 amps beak, fully variable from 1 to 38 volts. Twin Voltage

readout.
volt a.c.

f. Fully smoothed, size 14½ x 11 x 4½ inches.

RADIO COMPONENT SPECIALISTS

337 WHITEHORSE ROAD, CROYDON SURREY CRO 2HS. Tel: 0181-684 1665 Lots of transformers, high volt caps, valves, speakers, in stock, Phone or send your wants list for quote

BUSINESS

BUSINESS FOR SALE

NW London/Middx.

Secure long established, spacious premises TV/VCR/CCR Sales - Repair shop major accounts good potential to expand, leasehold, low rent.

Tel: 0181 841 4323

To promote your service in **Television Magazine** at cost effective rates Call Pat Bunce now on

Tel: 0181 652 8339

Fax: 0181 652 8931

You can pay by using the following credit cards.





CLASSIFIED GETS RESULTS

THE SECRET BEHIND



THEIR SUCCESS IS



TECHNICAL SUPREMACY



We also have a nationwide requirement for Consumer **Electronics Engineers. Telephone** 01422 888666 for details.

Technical Training Instructor

M6 Corridor

£Competitive + Bonus + Car

At Mastercare, the aftersales service organisation of the Dixons Group, we are dedicated to providing our customers with the highest possible standards of quality and care. The technical skills and abilities of our engineers are absolutely critical in achieving this, which is why we are so committed to ensuring that through our ongoing training they are amongst the most accomplished in the business.

To support this, we are now looking for an additional experienced Consumer Electronics Engineer to join our expanding Technical Training Department. Working closely with operational management, your role will be to identify training needs and recommend original solutions using your experience and expertise to develop and deliver high-quality, face-to-face and open-learning training packages.

Previous training experience is not necessary, but your technical skills must be impeccable. City & Guilds 224 Part III is a minimum requirement and will ideally be accompanied by an electronics degree. You will also have impressive current practical experience, strong communication and presentation skills, an innovative approach to your work and a real commitment to the importance of training.

Benefits include bonus, company car, profit related pay, an immediate entry pension scheme and discount on all Dixons Group products.

To apply, please send a concise CV, including current/expected salary details, to: Liz Purdy, Personnel Manager, Mastercare Service and Distribution Limited, Ground Floor West, Dixons House, Maylands Avenue, Hemel Hempstead,

Currys

Dixons

MASTERCARE Service

SONY SERVICE CENTRE **BENCH SERVICE ENGINEER**

Herts HP2 7TG.

The ideal candidate will have a minimum of 3 years experience, a sound technical knowledge supported by relevant trade qualifications.

Please reply in hand writing, enclosing full CV to:

Mr W. Fleming SES Glasgow Ltd 277-285 Alexandra Parade Glasgow G31 3AD

accent

ECHNIC **CAMCORDER REPAIRS**

Collection and delivery anywhere in the UK. All makes, fast service. Phone free for details.

(0800) 281009 WSA



I.C.T.V (Southern) Ltd

REQUIRES

EXPERIENCED CAMCORDER ENGINEER

Competitive Salary dependent on experience

Also

FIELD ENGINEER

To cover Portsmouth Area

For further information contact

Graham On

Portsmouth (01705) 653654

IF YOUR COMPANY HAS A VACANCY FOR

Experienced TECHNICIANS or ENGINEERS etc. Why not let TELEVISION help you find the right person by placing your recruitment advertisement with us?

> For Further Information Call PAT BUNCE on: 0181 652 8339 Fax: 0181 652 8931

BSB - D2 MAC CONVERSION KITS

Philips, Ferguson & Nokia compatible FROM ONLY £25 Min Qty 5

New Tatung kit available soon

01246 455150

CLASSIFIED

Telephone: 0181-652 8339

Fax: 0181-652 8931

TELEVISION SEPTEMBER 1996

H. S. WHOLESALE

Distributors of Aerial & Satellite Equipment

SPECIAL OFFERS

21 Pin fully wired Scart/Scart	99p ea
Y Splitters (Min order 10)	
F Connectors (Min order 100)	
LNB's 9750 10.00 GHz From '	16.95 ea
(All Single VATO Delines)	

Ring for free catalogue

Unit B3, Citadel Trading Park, Hull, HU9 1TQ **TELEPHONE: 01482 222295**

BABY 10 COMPATIBLE REGULATORS

£16 Each + £1 P&P + VAT Cheques with orders to

Mantech Industries Limited. 851 Ashton New Road Manchester M11 4AP

Tel: 0161 370 4444 Fax: 0161 370 4443 Allow 7 to 10 days for delivery

WANTED

Sanyo **CVP9111T** Working or non working for cash Call 01702 463377/8

TEST EQUIPMENT

AERIALS & AMPLIFIERS TRADE SUPPLIES LABGEAR TRIAX FRINGE 0181 500 8882

Ì	TRIAX 13db MAST HEAD	£6.50	COAX COUPLERS	.10
	12v POWER SUPPLIES FROM	£7.25	21 PIN SCART LEADS (fully wired)	.85
I	FRINGE 28db DISTRIBUTION AMP	£22.55	MALE TO FEMALE 2M FLY LEADS	.45
I	LABGEAR 8 WAY AMP (CM7298)	£36.75	2 WAY Y SPLITTERS (INDUCTIVE)	.38
ı	LABGEAR TELEVERTERS (Limited stock)	£52.75	TV AND SATELLITE MULTISWITCHES 4 WAY	£47.50
ı	BRITISH COAX PLUGS PER 100	£116.75	ANTIFERENCE X G 8 HI GAIN AERIAL	£21.63
ı				

WE ALSO PLAN AND SUPPLY AERIAL SYSTEMS ALL PRICES ARE PLUS VAT. WE PAY THE PACKAGING YOU PAY THE POST



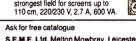
RIGGER & RETAILER LTD UNIT 5 FOREST INDUSTRIAL PARK FOREST ROAD, ILFORD. ESSEX IG6 3HL Tel 0181 500 8882 - Fax: 0181 500 9007 Callers welcome Mon-Fri



and Analyser for CRTs, regenerates picture tubes even better, also if all other machines do not suceed removes short filament-cathodegrid 1-grid 2, with FLASH-EX against remaining gas, 162 adapters available, list with 12.500 tubes-types, pays itself within 4 weeks.

 AT 2 audio multi-function tester. lutes 16 devices, has all usual sock cuts down repair time, takes you through all necessary test-steps by button controls





hone (0 16 64) 65392, Fax 63976 IRL: Dönberg Electronics, Ranafst, Co Donegai Phone (0 75) 4 82 75, Fax 7 10 31

en-Demagnetiser with





MISCELLANEOUS

CRTs for SCOPES, RADAR etc.

		(Not domes	Stic IV)		
3RP1	£19	MW6-2	£61.50	D10-210GH	£25
3WP1	£12	M38-100LG	£61.50	F28-130LD	£41
DG7-32	£14	DH3-91	£16	M31-325GH	£29
D13-51GH	£50	DG7-36	£12	M14-100GM	£18
D13-611GH	£25	DG7-5	£194	F21-130GR	£41
		Please add V/	AT 17.5%		

Please ask for our updated FREE CRT catalogue. All ex-stock but please allow ten days for delivery. CARRIAGE FREE but admin. fee of £10 per order regardless of size/quantity. Buy extra quantities to take advantage of saving on carriage!!

> **BILLINGTON EXPORT LIMITED Billingshurst, West Sussex RH14 9EZ** Tel: 01403 784961 Fax: 01403 783519

PANASONIC ITT SHARP PHILIPS LOGIK AMSTRAD HINARI MATSUI FISHER GRUNDIG KSA WHOLESALE COMPONENTS 582 Green Lane Small Heath Birmingham B95 QG Tel 0121 772 2834 Fax 0121 772 7487 BU508AF BU508DF BU508DFR BUT11AF BUT12AF BUT12AF BUT156A BUT56A BUT56A BUT56A BUT56A CNX62A CNX62A £0.85 £1.10 £2.95 £0.50 £0.65 £1.25 £0.80 £0.95 £1.75 £2.50 £1.10 £5.95 £1.75 £1.075 £2.25 £1.75 £1.399 £11.75 £2.25 £0.90 £3.75 £3.50 £1.00 £1.99 £1.95 £1.80 £1.99 £12.95 £10.75 £1.65 IARP PHILIPS LOGIK AMSTRAD HINARI MATSU £9.75 £1.70 £12.95 £15.75 £8.95 £8.95 £10.95 £1.75 £1.25 £0.75 TA8221H TA8225 TA8232H TA8232H TA8238K TDA1515 TDA1516 TDA1557 TDA1558 TDA3654 TDA7370 TDA7374 £5.99 £5.75 £1.25 £9.95 £9.95 £2.75 £8.95 £5.99 £1.29 £3.50 £0.95 £1.10 £3.25 Boby 10 Reg Ferg Loptx AS1F Ferg Green Loptx Philips Loptx CPI Sony Loptx RV27 \$13.95 \$11.95 \$10.75 \$9.95 \$14.95 PLEASE RING FOR TYPES NOT LISTED P&P AT COST NEXT DELIVERY SEND S.A.E. PANASONIC ITT SHARP PHILIPS LOGIK AMSTRAD HINARI MATSUI FISHER GRUNDIG

ADVERTISERS' INDEX

Aerial Techniques829	Manor Supplies805
	Muter, Ulrich844
Besco838	
Broughframe820	OZAN797
Bull Electrical812	
	PhilexIFC
Campion Wholesale TV Ltd837	PV Tubes793
Central TV Wholesale839	
Centrax Directories801	Red Bank839
Coastal Aerial Supplies835	Repo TV840
Colour Trade838	
Cricklewood Electronics815	Sendz Components IBC & BC
CTV (Midlands)840	Star Vision840
	Stewart of Reading799
Economic Devices808-809	Swift Television Publications817
ELC799	
Electronic Sound Systems788	Teleprice Ltd835
Euras820	Transworld799
Express TV837	W.Tree840
G 1 . I . I	
Grandata Ltd770-774 779-783	Vista Electronics821
Hardy, J.W820	Welwyn Tool793
Harrison Electronics793	West Midlands TV835
HCTV836	Willow Vale789
HST Distributors London837	Wiltsgrove834
J.J. Components826	6-9-9-9-9-9-9-9-9-9-9-9-9-9-9-9-9-9-9-9
r	

TDA1510 #	£3.00 BUX84AI	F £0.50	HGA1124A	£0.50	TWOOT, been Deer	L CE 00	0 '- 14	
TDA1521A	£2.00 BY187 £2.00 BY228 £1.00 BY229	£0.05 £0.10	HA11440 HA11485 HA11485ANT	£1.00 £1.00 £1.50	TX89 Tubase Pane TX98 Tubase Pane TX99 Tubase Pane	£5.00	Orion Motor 50p each Canon Motor 12v 50	p
TDA2460	£2.00 BY255 £1.00 BY299/200 £1.00 BY299/800 £2.00 BYT71/80 £1.00 BYV19-30 £1.00 BYV28-20	£0.05 0 £0.15 0 £0.30 00 £0.15 0 £0.15 00 £0.15	HA118041NT HA1196 HA51338SP-1 HA51338SP-3 HCF4520 HCF4520BE	£1.50 £0.50 £2.00 £2.00 £0.50 £0.50	5N6/2KV 6N2/2KV	PULS 15p EACH	Capstan Motor £4 Mitsubishi HSE41 IC on Motor M5178 Burglar Alarm Kit - Professional unit, closed circuits, entry/exit delay, adjus audible, arming, panic, anti-tamper size direct, 12V DC, fire quality glass rolle PCB £7.00	open and table, n driven
	£1.00 BYV95 £3.00 BYV95B		HD6140425 J1 HEF4029BP	£0.20	35V/3300 Can	25p		
TDA3565	£3.00 BZW-C1	110 £0.05	HEF4093	£0.20	U412 Tuner	£5.00	8 Way Tuning Pots	50p
	£3.00 BZW83- £3.00 CA3123Q		HE4528BP HM6264ALP-	£0.15 15 £3.50	UHF Small Tuner UE30	and UE33 £3.00	4944 Tuner	£3.00
BU801 £	£0.50 CD4555B1	E £0.20	IN5401	£0.03		Power Suppl		
	£0.40 FE3B – C £0.40 Diode	General Inst £0.04	IR106A	£0.10		for Ferguson Video S	tar Camera £4.00	
AN5551	£1.00		FERGUSON		24V Sub Min Relays		3 Pin PO5. PTH451	£0.25
ST6385BB 1/BFY SN96551 NL		Car Adaptor T	FA183 12v In 7 500M/A	.5v Out	Positor 2322 662 98009 Positor 2322 662 98012	50p 50p	Black Type 50p	
SAA1061 SAA3018	£3.00 £1.00		£5		CLE 874B HATACHI H	PERISWITO	.H 10.00	£8.00
STR58041	£4.00	S	STK5481 £4		FERGUSON UPPER D			£20.00
BF870	£0.20 -	STR4211		£5	FERGUSON UPPER D FERGUSON UPPER D	RUM YDM2018B		£10.00 £20.00
BF869s UPD6376CS	£0.20 £3.00	STK4211 STK4793		ಬ £5	FERGUSON LOWER D	RUM PDM2024A-1		£20.00
BC550C	£0.20	LA7830		£1	FERGUSON LOWER D			£20.00 £15.00
M58658P	£1.00	LA7831		£1	FERGUSON HAND SE			£20.00
M708 ABI	£1.50 -	ST639IB		£2	FERGUSON HAND SE	T FV41R/3V59		£20.00
M708 LBI BY208-800	£1.50 £0.10	FERC	GUSON ICC7		PANASONIC HAND SI		2011011110	£10.00
BYV28/200	£0.10		Amplifier	£8	RGB CONVERTER MO MATSUI VP9501 DECK		20N 2-AH2	£20.00
2435121	£10.00	2 way Ga		20	MATSUI VP9501 DECK		VPE STK 5343	£8.00
2436792 2436797	£10.00 £10.00		C7 NICAM 2 PANEL	£7	MATSUI 1500 REMOTI		1163113343	£5.00
Small panel meter				£1.50			ODELS FV61 LV - FV62 LV - FV67 L	.v-
Phono Plugs	1500, 11,500 001			£0.10	FV68 LV - FV70B - FV7			£30.00
	tic clips 100 off box	v		£0.50	FERGUSON CAMCOR 0.7 X 2 OFF	DER LENSE TELEPI	HOTO CONVERSION 1.4 X WIDE A	E5.00
Infra-red TX100 I				£0.50	1500 MATSUI SWITCH	MOD POWER SUPP	_Y	£3.50
				£15.00	ISSUE 10 HITACHI PO	WER SUPPLY T/V SV	VITCH MOD (STR4211)	83.00
Hitachi 68P Issue					HITACHI VIDEO SWI		T – M312 ELM	£10.00
	Issue 7 Teletext F			£15.00	ISSUE 6 HITACHI G8P		TOTAL STATE OF LIGHT	£10.00
	Issue 4 Teletext I			£15.00			IDEO PANELS - SEND FOR LIST	£3.00 1C
2435063 2435085 L.O	D.P.T. £10		Focus Pots K40 £2		HITACHI T/V HD 630 I SAT TUNER SXT 23021			£3.00
Etri 240v fan 6in				£8.00	HITACHI (CLE883A) T		1820)	£10.00
DL701 Delay	50p	TME	47C634N/2685		LOPT - TC2203 - NATIO	ONAL PANASONIC		£15.00
DL701 Delay DL711 Line	50p	1 1411	£1		LOPT - TFB3035D LOPT - TFB3089D - TO			\$10.00 00.83
Matsui VX3000 H	land Set £3.00	Ti	MP47C634N		LOPT - TFB4023AD - T LOPT - TFB4032BD - T			£10.00 £10.00
VCR Head VX30			£1		LOPT - TFB4038AD LOPT - TFB4088AD - T	OSHIBA		00.01 00.83
Matsui VSRI500	Head			£10.00	LOPT - TFB4110AD - T LOPT - TLF1456B - NA	OSHIBA	C	£10.00 £15.00
Hand Set Power Supply				£5.00 £6.00	LOPT - TLF1457B - NA	TIONAL PANASONI	č	
A CHICA CUDDIY				£5.00			•	£15.00
Main Panel	3. N. 145/730 A S.D.	[E			LOPT - TLF701/6 - NAT LOPT - TX89			£15.00 £12.00
Main Panel Capstan Motor IC	C No M56730 ASP			£10.00	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99	'IONAL PANASONIC		£15.00 £12.00 £12.00 £12.00
Main Panel Capstan Motor IC Hitachi Capstan N	Motor ACE G4-B		В	£10.00	LOPT - TLF701/6 - NA7 LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - Y260781 - FER0 MOTOR - CASSETTE '	TONAL PANASONIC GUSON FYPE – 12V WITH SPI	EED CONTROL	£15.00 £12.00 £12.00 £12.00 £8.00 £0.50
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha	Motor ACE G4-B		В	£10.00 £10.00 £30.00	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE ' PANEL - CMC115 - TT PANEL - CVC80 POWE	TONAL PANASONIC GUSON FYPE – 12V WITH SPI FRONT PANEL – 17 ER PANEL	EED CONTROL T	£15.00 £12.00 £12.00 £12.00 £8.00
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp	Motor ACE G4-B and Set RM933E	to ACE G40-	B	£10.00 £10.00 £30.00 £10.00	LOPT - TLF701/6 - NA7 LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - Y260781 - FER MOTOR - CASSETTE ' PANEL - CMC115 - TT PANEL - CVC80 POW PANEL - ICCS CHROM	GUSON TYPE – 12V WITH SPI F FRONT PANEL – 17 R PANEL EBOARD – 1C No. C	EED CONTROL	£15.00 £12.00 £12.00 £12.00 £8.00 £0.50 £6.00
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000-	Motor ACE G4-B and Set RM933E	to ACE G40-	В	£10.00 £10.00 £30.00	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE' PANEL - CWC115 - TT PANEL - CVC80 POWE PANEL - ICCS - CHROM PANEL - ICCS - TUBE PANEL - IKZ - FM2211	GUSON FYPE - 12V WITH SPI FR FRONT PANEL - 11 FR FANEL E BOARD - 1C No. C BASE PANEL STEREO	EED CONTROL T IN BOARD U4647 TKF OR HAI1498	£15.00 £12.00 £12.00 £12.00 £8.00 £0.50 £6.00 £5.00 £5.00 £5.00
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS	Motor ACE G4-B and Set RM933E -VS1100 Power Su	upply Text P	anel No. T1228	£10.00 £10.00 £30.00 £10.00 £6.00	LOPT - TLF701/6 - NA1 LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE - PANEL - CMC115 - TT PANEL - CVC80 POWE PANEL - ICCS CHROM PANEL - ICCS - TUBE PANEL - IK2 - FM2211 PANEL - SEL 69112407 PANEL - SEL 16B 194P	GUSON TYPE – 12V WITH SPI T FRONT PANEL – 17 R PANEL IE BOARD – 1C No. C BASE PANEL STEREO – TIT FRONT PANEI – TIT FRONT PANE	EED CONTROL T IN BOARD U4647 TKF OR HA11498 L-SAME AS CMC303 L-ITT	£15.00 £12.00 £12.00 £12.00 £8.00 £0.50 £6.00 £5.00 £5.00 £5.00 £5.00 £6.00
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000-	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p	upply Text P	anel No. T1228 or Ferguson	£10.00 £10.00 £30.00 £10.00 £6.00	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - TX99 LOPT - TX90781 - FERC MOTOR - CASSETTE - PANEL - CMC115 - TT PANEL - CCS CHROM PANEL - ICCS - TUBE PANEL - ICCS - TUBE PANEL - IK2 - FM2211 PANEL - SEL 69112407 PANEL - SEL 1FB 194P PANEL - SEL 1FB 194P PANEL - SEL 1FB 194P PANEL - SEL 1FB 300 -	GUSON FYPE - 12V WITH SPI F FRONT PANEL - 17 ER PANEL B BOARD - 1C No. C BASE PANEL STEREO - TIT FRONT PANE - TIT FRONT PANE K- TITT FRONT PANE TITT FRONT PANE	EED CONTROL T IN BOARD U4647 TKF OR HA11498 L – SAME AS CMC303 L – ITT - ITT	£15.00 £12.00 £12.00 £12.00 £8.00 £0.50 £6.00 £5.00 £5.00 £5.00 £10.00
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS 6MHz XTALS	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p Fach	upply Text P	anel No. T1228	£10.00 £10.00 £30.00 £10.00 £6.00	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE - PANEL - CMC115 - TT PANEL - CVC80 POWP PANEL - ICC5 CHROM PANEL - ICC5 - TUBE PANEL - IEC5 - TUBE PANEL - SEL 69112407 PANEL - SEL 1FB 194P PANEL - SEL 1FB 194P PANEL - SEL 1FB 1940 PANEL - SEL 1FB 150 U PANEL - SEL 1FB 150 U PANEL - TX10 - T PANEL - TX9 - TX10 - T PANEL - TX10 - REMC	GUSON FYPE – 12V WITH SPI FIER FONT PANEL – 17 FE PANEL FE BOARD – 1C No. C FEREO FITT FRONT PANEL FITT FRONT PANEL K – TITT FRONT PANEL FITT FRONT PANEL TUTT FRONT PANEL TUTT FRONT PANEL TUTT FRONT PANEL TUTT FRONT PANEL TUTNING PANEL 1509	EED CONTROL T IN BOARD U4647 TKF OR HA11498 L – SAME AS CMC303 L – ITT - ITT	£15.00 £12.00 £12.00 £12.00 £3.00 £0.50 £6.00 £5.00 £5.00 £6.00 £10.00 £5.00 £5.00 £5.00
Main Panel Capstan Motor IC Hitachi Capstan N Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS 6MHz XTALS 4.4 T/V XTALS	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p FALS	upply Text P	anel No. T1228 or Ferguson	£10.00 £10.00 £30.00 £10.00 £6.00	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE ' PANEL - CMC115 - TT PANEL - CVC80 POWP PANEL - ICC5 CHROM PANEL - ICC5 - TUBE PANEL - IEC5 - TUBE PANEL - SEL 1FB 194P PANEL - SEL 1FB 194P PANEL - SEL 1FB 150 U PANEL - SEL 1FB 300 - PANEL - TX9. TX10 - T PANEL - TX9. TX10 - T PANEL - TX9. TR10 - T PANEL - TX89 PANEL - TX89 PANEL - TX90 - THOR	GUSON FYPE - 12V WITH SPI FRONT PANEL - 11 FRONT PANEL - 11 FRONT PANEL BASE PANEL STEREO - TIT FRONT PANE - TIT FRONT PANEL TIT FRONT PANEL TIT FRONT PANEL UNING PANEL 1509 TTE PANEL 540/01 N FRONT PANEL - 8	EED CONTROL T ON BOARD U4647 TKF OR HA11498 L – SAME AS CMC303 L – ITT EEL – ITT G PUSH BUTTONS 01M4-515-002	£15.00 £12.00 £12.00 £12.00 £12.00 £8.00 £6.00 £5.00 £6.00 £5.00 £6.00 £5.00 £6.00 £10.00 £10.00
Main Panel Capstan Motor IC Hitachi Capstan N Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS 6MHz XTALS 4.4 T/V XTALS 8.8MHz T/V XT Amstrad – Perde Fidelity – Decke	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p Each FALS eo er – Tatung	rext P	anel No. T1228 or Ferguson 9-TX98-TX100	£10.00 £10.00 £30.00 £10.00 £6.00	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - TX90 PANEL - CXCS - TUBE PANEL - ICCS - TUBE PANEL - ICCS - TUBE PANEL - SEL 69112407 PANEL - SEL 1FB 194P PANEL - SEL 1FB 194P PANEL - SEL 1FB 194P PANEL - SEL 1FB 300 - PANEL - TX9 - TX10 - T PANEL - TX9 - TX10 - T PANEL - TX10 - T PANEL - TX99 - THOR PANEL - TX99 - THOR PANEL - TX98 - T13538	GUSON FYPE - 12V WITH SPI FRONT PANEL - 17 FRONT PANEL - 17 FRONT PANEL BOARD - 1C No. C BASE PANEL STEREO - TIT FRONT PANE - TIT FRONT PANE - TIT FRONT PANE - WITT FRONT PANE UNING PANEL 1509 DIE PANEL 540/01 N FRONT PANEL - 8 FRONT PANEL - 8	EED CONTROL T IN BOARD U4647 TKF OR HA11498 L – SAME AS CMC303 L – ITT - ITT	£15.00 £12.00 £12.00 £12.00 £12.00 £8.00 £0.50 £5.00 £5.00 £5.00 £6.00 £5.00 £6.00 £10.00 £10.00 £10.00
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS 6MHz XTALS 6MHz XTALS 8.8MHz T/V XT Amstrad - Perde Fidelity - Decke Plastic - Front Pa	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p FALS eo er - Tatung unels for all 1992 M	upply Text P. fc TX89	anel No. T1228 or Ferguson 9-TX98-TX100	£10.00 £10.00 £30.00 £10.00 £6.00 8B	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE: PANEL - CMC115 - TT PANEL - CMC115 - TT PANEL - ICCS CHROM PANEL - ICCS - TUBE PANEL - IK2 - FM2211 PANEL - SEL 69112407 PANEL - SEL 1FB 194P PANEL - SEL 1FB 194P PANEL - SEL 1FB 1940 PANEL - SEL 1FB 300 - PANEL - TX9. TX10 - T PANEL - TX9. TX10 - T PANEL - TX9. THOR PANEL - TX98 - THOR PANEL - TX98 - THOR PANEL - TX98 - TUBE PANEL - TX98 - TUBE PANEL - TX98 - TX91.	GUSON FYPE - 12V WITH SPI FRONT PANEL - 17 FRONT PANEL - 17 FRONT PANEL STEREO - TIT FRONT PANEL - TIT FRONT PANEL TIT FRONT PANEL TIT FRONT PANEL UNING PANEL 1509 DTE PANEL 540/01 N FRONT PANEL - 8	EED CONTROL T IN BOARD U4647 TKF OR HA11498 L-SAME AS CMC303 L-ITT VEL - ITT -ITT G PUSH BUTTONS 01M4-515-002 NFRA-RED RECEIVER 494BI - 01V6/ 223/104	£15.00 £12.00 £12.00 £12.00 £1.00 £0.50 £6.00 £5.00 £5.00 £5.00 £5.00 £5.00 £10.00 £10.00 £10.00 £10.00 £10.00 £10.00
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS 6MHz XTALS 6MHz XTALS 8.8MHz T/V XT Amstrad - Perde Fidelity - Decke Plastic - Front Pa	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p Each FALS eo er – Tatung	upply Text P. fc TX89	anel No. T1228 or Ferguson 9-TX98-TX100	£10.00 £10.00 £30.00 £10.00 £6.00	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE - PANEL - CMC115 - TT PANEL - CVC80 POWP PANEL - ICC5 CHROM PANEL - ICC5 - TUBE PANEL - IK2 - FM2211 PANEL - SEL 1FB 194P PANEL - SEL 1FB 194P PANEL - SEL 1FB 194P PANEL - SEL 1FB 190 - PANEL - SEL 1FB 300 - PANEL - TX9. TX10 - T PANEL - TX9. TX10 - T PANEL - TX98 - T1353 PANEL - TX98 - T1353 PANEL - TX98 - T1368 PANEL - TX98 - T1368 PANEL - TX98, TX99, T PANEL - TX98, TX99, T PANEL - TX98, TX99, T	GUSON FYPE - 12V WITH SPI FRONT PANEL - 11 FR PANEL FRONT PANEL - 11 FR PANEL BASE PANEL TITT FRONT PANE TITT FRONT PANE TITT FRONT PANE TITT FRONT PANE UNING PANEL 1509 TE PANEL 540/01 N FRONT PANEL W/I BASE PANEL X100 - REMOTE - M X100 - REMOTE - M	EED CONTROL T IN BOARD U4647 TKF OR HA11498 L - SAME AS CMC303 L - ITT VEL - ITT G PUSH BUTTONS 01M4-515-002 NFRA-RED RECEIVER 494B1 - 01V6/682/003	£15.00 £12.00 £12.00 £12.00 £0.50 £6.00 £6.00 £5.00 £5.00 £5.00 £10.00 £10.00 £10.00 £10.00 £10.00 £10.00 £10.00 £5.00 £10.00 £5.00 £10.00 £5.00
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS 6MHz XTALS 6MHz XTALS 8.8MHz T/V XT Amstrad - Perde Fidelity - Decke Plastic - Front Pa	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p FALS eo er – Tatung unels for all 1992 M 35 Hand Set Vide	upply Text P. fc TX89	anel No. T1228 or Ferguson 9-TX98-TX100	£10.00 £10.00 £30.00 £10.00 £6.00 8B	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - TY260781 - FERG MOTOR - CASSETTE - PANEL - CMC115 - TT PANEL - ICCS CHROM PANEL - ICCS - TUBE PANEL - IK2 - FM2211 PANEL - SEL 69112407 PANEL - SEL 1FB150 U PANEL - SEL 1FB150 U PANEL - SEL 1FB300 - PANEL - TX9, TX10 - 1 PANEL - TX9. TX10 - 1 PANEL - TX9 - THOR PANEL - TX98 - T1353 PANEL - TX98 - T1353 PANEL - TX98 - T1353 PANEL - TX98 - TUBE PANEL - TX98, TX99, 7 PANEL - TX98, TX99, 7	GUSON FYPE - 12V WITH SPI FRONT PANEL - 17 FRONT PANEL - 17 FRONT PANEL BOARD - 1C NO. C BASE PANEL STEREO - TIT FRONT PANE UNING PANEL 1509 DITE PANEL 540/01 N FRONT PANEL - 8	EED CONTROL T IN BOARD U4647 TKF OR HAI1498 L-SAME AS CMC303 L-ITT IEL - ITT G PUSH BUTTONS 01M4-515-002 NFRA-RED RECEIVER 494B1 - 01V6/682/003 200 PF TO 20 MF	£15.00 £12.00 £12.00 £12.00 £12.00 £0.50 £5.00 £5.00 £5.00 £5.00 £10.00 £10.00 £10.00 £5.00 £10.00 £5.00
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS 6MHz XTALS 4.4 T/V XTALS 8.8MHz T/V XT Amstrad - Perde Fidelity - Decke Plastic - Front Pa Mitsubishi RMM	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p Each TALS eo er - Tatung unels for all 1992 M 35 Hand Set Video nd Set	Text P. fc TX89	anel No. T1228 or Ferguson 9-TX98-TX100	£10.00 £10.00 £30.00 £10.00 £6.00 8B	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX99 LOPT - TX99 LOPT - TX99 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE - PANEL - CMC115 - TT PANEL - CCV60 POWP PANEL - ICCS - TUBE PANEL - ICCS - TUBE PANEL - ISEL 1FB 194P PANEL - SEL 1FB 300 PANEL - TX9 - TX10 - T PANEL - TX9 - TX10 - T PANEL - TX9 - TX10 - T PANEL - TX9 - T1053 PANEL - TX98 - T1053 PANEL - TX98 - TUBE PANEL - TX98 - TUBE PANEL - TX98 - TUBE PANEL - TX98 - TX99 . T PANEL - TX98 - TX99 . T PANEL - TX98 - TX99 . T PANEL - TX99 CMC 200 DIGITAL CA R2000 SERIES FERGU	GUSON GUSON GUSON FYPE - 12V WITH SPI FRONT PANEL - 11 R PANEL B BOARD - 1C No. C BASE PANEL STEREO - TIT FRONT PANEL - TIT FRONT PANEL TIT FRONT PANEL TIT FRONT PANEL UNING PANEL 1509 DE PANEL 540/01 N FRONT PANEL W/I BASE PANEL X100 - REMOTE - M TX100 - REMOTE - M PACITANCE METER SON VIDEO STAR D Camecorder	EED CONTROL T IN BOARD U4647 TKF OR HAJ1498 L-SAME AS CMC303 L-JIT VEL - ITT - ITT G PUSH BUTTONS 01M4-515-002 NFRA-RED RECEIVER 494B1 - 01V6/622003 200 PF TO 20 MF ECK MECHANISM	£15.00 £12.00 £12.00 £12.00 £8.00 £0.50 £6.00 £5.00 £5.00 £5.00 £5.00 £10.00 £10.00 £10.00 £10.00 £10.00 £5.00 £5.00 £5.00 £5.00 £10.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS 6MHz XTALS 4.4 T/V XTALS 8.8MHz T/V XT Amstrad – Perde Fidelity – Decke Plastic – Front Pa Mitsubishi RMM: Nokia RC202 Har	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p Each FALS eo Er – Tatung anels for all 1992 M 35 Hand Set Videa and Set et 1994 Model T/V	Text P. fc TX89	anel No. T1228 or Ferguson 9-TX98-TX100	£10.00 £10.00 £30.00 £10.00 £6.00 BB	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE - PANEL - CMC115 - TT PANEL - CVC80 POWP PANEL - ICCS - GHROM PANEL - ICCS - TUBE PANEL - ICCS - TUBE PANEL - ICCS - TUBE PANEL - SEL IFB 1940 PANEL - SEL IFB 1940 PANEL - SEL IFB 1940 PANEL - SEL IFB300 - PANEL - TX910 - T PANEL - TX93 - THOR PANEL - TX95 - THOR PANEL - TX98 - T13533 PANEL - TX98 - T10538 PANEL - TX98 - TUBE PANEL - TX99 - THOR PANEL - TX98 - TUBE PANEL - TX99 - TOM SCHES FERGU Tripod shoulder pod for of Ferguson VA super 218 c	GUSON FYPE - 12V WITH SPI FRONT PANEL - 17 FRONT PANEL - 17 FR PANEL B BOARD - 1C No. C BASE PANEL STEREO TITI FRONT PANE UNING PANEL 1509 DE PANEL 540/01 N FRONT PANEL WI BASE PANEL XX100 - REMOTE - M XX100 - REMOTE - M XX100 - REMOTE - M TX100 - REMOTE - M TX10	EED CONTROL T IN BOARD U4647 TKF OR HAI1498 L-SAME AS CMC303 L-ITT NEL-ITT -ITT G PUSH BUTTONS 01M4-515-002 NFRA-RED RECEIVER 494B1 - 01V6/682/003 200 PF TO 20 MF ECK MECHANISM	£15.00 £12.00 £12.00 £12.00 £8.00 £6.00 £5.00 £5.00 £5.00 £6.00 £5.00 £10.00 £10.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00
Main Panel Capstan Motor IC Hitachi Capstan N Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS 6MHz XTALS 4.4 T/V XTALS 8.8MHz T/V XT Amstrad - Perde Fidelity - Decke Plastic - Front Pa Mitsubishi RMM: Nokia RC202 Hat Siemens Hand Se Tuner Env-57459	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p Each FALS eo er – Tatung unels for all 1992 M 35 Hand Set Vide nd Set et 1994 Model T/V GI UHF-VHF	Text P. fc TX89	anel No. T1228 or Ferguson 9-TX98-TX100	£10.00 £10.00 £30.00 £10.00 £6.00 8B	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE PANEL - CMC115 - TT PANEL - CVC80 POWP PANEL - ICCS - CHROM PANEL - ICCS - CHROM PANEL - ICCS - TUBE PANEL - IK2 - FM221 PANEL - SEL IFB 1940 PANEL - SEL IFB 1940 PANEL - SEL IFB 1940 PANEL - SEL IFB300 - PANEL - SEL IFB300 PANEL - TX9 - TX10 - T PANEL - TX10 - T PANEL - TX98 - T1353 PANEL - TX98 - T1353 PANEL - TX98 - TUBE PANEL - TX98 - TUBE PANEL - TX98, TX99, T PANEL - TX99, T PANEL - TX98, T PANEL - TX98, T P PANEL - TX98, T P PANEL - TX98, T P P P P P P P P P P P P P P P P P P P	GUSON FYPE - 12V WITH SPI FRONT PANEL - 11 FR PANEL FRONT PANEL BASE PANEL STEREO - TIT FRONT PANEL - SONT PANEL - SONT PANEL - SONT PANEL - SONT PANEL - WILL -	EED CONTROL T IN BOARD U4647 TKF OR HAI1498 L-SAME AS CMC303 L-ITT NEL-ITT -ITT G PUSH BUTTONS 01M4-515-002 NFRA-RED RECEIVER 494B1 - 01V6/682/003 200 PF TO 20 MF ECK MECHANISM	£15.00 £12.00 £12.00 £12.00 £8.00 £6.00 £5.00 £5.00 £5.00 £5.00 £10.00 £10.00 £5.00 £5.00 £10.00 £5.00
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS 6MHz XTALS 4.4 T/V XTALS 8.8MHz T/V XT Amstrad – Perde Fidelity – Decke Plastic – Front Pa Mitsubishi RMM: Nokia RC202 Hat Siemens Hand Se Tuner Env-57459 UF754B UHF Tu	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p Each FALS eo er - Tatung unels for all 1992 M 35 Hand Set Video at 1994 Model T/V GI UHF-VHF uner	Text P. fc TX89	anel No. T1228 or Ferguson 9-TX98-TX100	£10.00 £10.00 £30.00 £10.00 £6.00 BB	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE - PANEL - CMC115 - TT PANEL - CVC80 POWP PANEL - ICC5 CHROM PANEL - ICC5 - TUBE PANEL - IK2 - FM2211 PANEL - SEL 1FB 1940 PANEL - SEL 1FB 300 - PANEL - SEL 1FB 300 - PANEL - TX9. TX10 - T PANEL - TX9. TX10 - T PANEL - TX98 - T1353 PANEL - TX98 - T1364 PANEL - TX98 - T1364 PANEL - TX98 - T1365 PANEL - TX98 - T1367 PANEL - TX99 - T1367 PANEL - TX98 - TX99 - T1367 PANEL - TX99 - T1367 PANEL - TX99 - T1367 PANEL - TX98 - TX99 - T1367 PANEL - TX98 - TX99 - T1367 PANEL - TX98 - T1367 PANEL - TX99 - T1367 PANEL - TX90 - T1	GUSON GUSON FYPE - 12V WITH SPI FRONT PANEL - 11 R PANEL R PANEL BASE PANEL TIT FRONT PANEL WING PANEL 1509 TE PANEL 540/01 N FRONT PANEL W/I BASE PANEL X100 - REMOTE - M X100 - REMOTE - M PACITANCE METER SON VIDEO STAR D amoorder ardioid camera micropl ery VA366 6v-1400 M/I r.m.m. 45	EED CONTROL T IN BOARD U4647 TKF OR HA11498 L-SAME AS CMC303 L-ITT ITT G PUSH BUTTONS 01M4-515-002 NFRA-RED RECEIVER 494B1 - 01V6/ 223/104 494B1 - 01V6/ 682/003 200 PF TO 20 MF ECK MECHANISM IONE telescopic boom and stand	£15.00 £12.00 £12.00 £12.00 £8.00 £6.00 £5.00 £5.00 £5.00 £6.00 £5.00 £10.00 £10.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS 6MHz XTALS 4.4 T/V XTALS 8.8MHz T/V XT Amstrad - Perde Fidelity - Decke Plastic - Front Pa Mitsubishi RMM: Nokia RC202 Hat Siemens Hand Se Tuner Env-57459 UF754B UHF Tu	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p Each FALS eo er - Tatung unels for all 1992 M 35 Hand Set Video at 1994 Model T/V GI UHF-VHF uner 31R FERGUSON	Text Profession of Video	anel No. T1228 or Ferguson 9-TX98-TX100	£10.00 £10.00 £30.00 £10.00 £6.00 BB	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE - PANEL - CMC115 - TT PANEL - CVC80 POWE PANEL - ICC5 CHRON PANEL - ICC5 - TUBE PANEL - IK2 - FM2211 PANEL - SEL 1FB 1940 PANEL - SEL 1FB 300 - PANEL - SEL 1FB 300 - PANEL - TX9. TX10 - T PANEL - TX9. TX10 - T PANEL - TX98 - T PANEL - TX99 - T PANEL - TX99 - T PANEL - TX99 - T PANEL - TX98 - T PANEL - TX98 - T PANEL - TX99 - T PANEL - TX98 - T PANEL - TX99 - T PANEL - TX99 - T PANEL - TX98 - T PANEL - TX98 - T PANEL - TX99 - T PANEL - TX98 - T PANEL - TX99 - T PANEL - TX98 - T PANEL - TX99 - T PANEL - TX98 - T PANEL - TX	GUSON TYPE - 12V WITH SPI T FRONT PANEL - 11 R PANEL IR PANEL IS BOARD - 1C NO. C BASE PANEL STEREO - TITT FRONT PANE - TITT FRONT PANE ITTT FRONT PANEL TITT FRONT PANEL TITT FRONT PANEL TITT FRONT PANEL UNING PANEL 1509 TTE PANEL 1509 TE PANEL 540/01 N FRONT PANEL - 8 E FRONT PANEL W/I BASE PANEL TX100 - REMOTE - M	EED CONTROL T IN BOARD U4647 TKF OR HA11498 L-SAME AS CMC303 L-ITT ITT G PUSH BUTTONS 01M4-515-002 NFRA-RED RECEIVER 494B1 - 01V6/ 223/104 494B1 - 01V6/ 682/003 200 PF TO 20 MF ECK MECHANISM IONE telescopic boom and stand	£15.00 £12.00 £12.00 £12.00 £8.00 £6.00 £5.00 £5.00 £5.00 £6.00 £10.00 £10.00 £10.00 £10.00 £5.0
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS 6MHz XTALS 4.4 T/V XTALS 8.8MHz T/V XT Amstrad – Perde Fidelity – Decke Plastic – Front Pa Mitsubishi RMM: Nokia RC202 Hai Siemens Hand Se Tuner Env-57459 UF754B UHF Tu FV 64 pin Ma	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p Each TALS eo Er - Tatung Inels for all 1992 M 35 Hand Set Video Ind Set Et 1994 Model T/V IGI UHF-VHF Inter C31R FERGUSON Ain IC HD6140815	Text Post of TX89	anel No. T1228 or Ferguson 9-TX98-TX100	£10.00 £10.00 £30.00 £10.00 £6.00 BB	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE - PANEL - CMC115 - TT PANEL - CVC80 POWE PANEL - ICC5 CHRON PANEL - ICC5 - TUBE PANEL - IK2 - FM2211 PANEL - SEL 1FB 1940 PANEL - SEL 1FB 1940 PANEL - SEL 1FB 1900 - PANEL - SEL 1FB 1900 PANEL - SEL 1FB 1900 PANEL - TX91 - TX90 - THOR PANEL - TX90 - THOR PANEL - TX90 - THOR PANEL - TX98 - TUBE PANEL - TX90 - THOR PANEL - TX98 - TUBE PANEL - TX99 - TUBE PANEL - TX98 - TUBE PANEL - TX99 - TUBE PANEL - TX99 - TUBE PANEL - TX99 - TUBE FERGUSON SERIES FERGU TIPOD Shoulder pod for CERGUSON VA super 218 c Ferguson camecorder batt Mitsubishi vidco hand set Ferguson IERS for camcor Ferguson TX98, TX99 To	GUSON FYPE - 12V WITH SPI FRONT PANEL - 17 FRONT PANEL - 17 FR PANEL BASE PANEL STEREO - TITF FRONT PANE - TITF FRONT PANE - TITF FRONT PANE - TITF FRONT PANE ITTF FRONT PANE WITH FRONT PANE WITH FRONT PANE FRONT PANEL 1509 TO PANEL 1509 TO PANEL 1509 TO PANEL 1509 TO PANEL 40/01 N FRONT PANEL - 8 FRONT PANEL - 8 FRONT PANEL W/I BASE PANEL WI BASE PANEL STANO - REMOTE - M TX100 - R	EED CONTROL T IN BOARD U4647 TKF OR HA11498 L-SAME AS CMC303 L-ITT ITT G PUSH BUTTONS 01M4-515-002 NFRA-RED RECEIVER 494B1 - 01V6/ 223/104 494B1 - 01V6/ 682/003 200 PF TO 20 MF ECK MECHANISM IONE telescopic boom and stand	£15.00 £12.00 £12.00 £12.00 £8.00 £6.00 £5.00 £5.00 £5.00 £5.00 £6.00 £10.00 £10.00 £10.00 £10.00 £5.0
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS 6MHz XTALS 4.4 T/V XTALS 8.8MHz T/V XT Amstrad - Perde Fidelity - Decke Plastic - Front Pa Mitsubishi RMM: Nokia RC202 Hat Siemens Hand Se Tuner Env-57459 UF754B UHF Tu FV 64 pin Ma	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p Each FALS eo Er - Tatung unels for all 1992 M 35 Hand Set Videa at 1994 Model T/V GI UHF-VHF uner 31R FERGUSON ain IC HD6140815 GUSON TX9 - T>	Text P. fc TX89 Models Video Video	anel No. T1228 or Ferguson 9-TX98-TX100 ea	£10.00 £10.00 £30.00 £10.00 £6.00 8B ch £4.00 £5.00 £4.00 £3.00	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - TX99 LOPT - TX99 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE PANEL - CMC115 - TT PANEL - CWC115 - TT PANEL - ICCS - TUBE PANEL - ICCS - TUBE PANEL - ICCS - TUBE PANEL - IEC - FM2211 PANEL - SEL 69112407 PANEL - SEL 1FB 194P PANEL - SEL 1FB 194P PANEL - SEL 1FB300 PANEL - TX910 - TP PANEL - TX90 - THOR PANEL - TX90 - THOR PANEL - TX90 - THOR PANEL - TX98 - TUBE PANEL - TX99 CMC 200 DIGITAL CA R2000 SERIES FERGU Tripod shoulder pod for of Ferguson VA super 218 c Ferguson camcorder batt Mitsubishi vidco hand set Ferguson IS98 - TX99 TO RC Matsui hand set \$5. E	GUSON GUSON GUSON FYPE - 12V WITH SPI FRONT PANEL - 11 R PANEL B PANEL B BOARD - 1C No. C BASE PANEL STEREO TIT FRONT PANE TIT FRONT PANEL TIT FRONT PANEL TIT FRONT PANEL UNING PANEL 1509 TE PANEL 540/01 N FRONT PANEL—8 E ROONT PANEL—8 E ROONT PANEL—8 E ROONT PANEL WI BASE PANEL XX 100 - REMOTE - M TX	EED CONTROL T IN BOARD U4647 TKF OR HA11498 L-SAME AS CMC303 L-ITT IEL - ITT ITT G PUSH BUTTONS 01M4-515-002 NFRA-RED RECEIVER 494BI - 01V6/ 223/104 494BI - 01V6/ 682/003 200 PF TO 20 MF ECK MECHANISM None telescopic boom and stand A Items x 1.4 and x 0.7 900, hand set Ferguson, Sony, Grundig ted main transformer 0-120v-0-120v Pri 0-9v	£15.00 £12.00 £12.00 £12.00 £12.00 £12.00 £12.00 £8.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £5.00 £10.00 £10.00 £10.00 £5.00
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS 6MHz XTALS 4.4 T/V XTALS 8.8MHz T/V XT Amstrad - Perde Fidelity - Decke Plastic - Front Pa Mitsubishi RMM: Nokia RC202 Hai Siemens Hand Se Tuner Env-57459 UF754B UHF Tu FV 64 pin Ma FERC IF PA	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p Each FALS eo er - Tatung unels for all 1992 M 35 Hand Set Video at 1994 Model T/V GI UHF-VHF uner 31R FERGUSON ain IC HD6140815 GUSON TX9 - TX	Text Profession of Video Video Video Video Video	anel No. T1228 or Ferguson 9-TX98-TX100 ea	£10.00 £10.00 £30.00 £10.00 £6.00 8B ch £4.00 £5.00 £4.00 £3.00	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - TX99 LOPT - TX99 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE PANEL - CMC115 - TT PANEL - CWC115 - TT PANEL - ICCS - TUBE PANEL - ICCS - TUBE PANEL - ICCS - TUBE PANEL - IEC - FM2211 PANEL - SEL 69112407 PANEL - SEL 1FB 194P PANEL - SEL 1FB 194P PANEL - SEL 1FB300 PANEL - TX910 - TP PANEL - TX90 - THOR PANEL - TX90 - THOR PANEL - TX90 - THOR PANEL - TX98 - TUBE PANEL - TX99 CMC 200 DIGITAL CA R2000 SERIES FERGU Tripod shoulder pod for of Ferguson VA super 218 c Ferguson camcorder batt Mitsubishi vidco hand set Ferguson IS98 - TX99 TO RC Matsui hand set \$5. E	GUSON GUSON GUSON FYPE - 12V WITH SPI FRONT PANEL - 11 R PANEL B PANEL B BOARD - 1C No. C BASE PANEL STEREO TIT FRONT PANE TIT FRONT PANEL TIT FRONT PANEL TIT FRONT PANEL UNING PANEL 1509 TE PANEL 540/01 N FRONT PANEL—8 E ROONT PANEL—8 E ROONT PANEL—8 E ROONT PANEL WI BASE PANEL XX 100 - REMOTE - M TX	EED CONTROL T IN BOARD U4647 TKF OR HAJ1498 L-SAME AS CMC303 L-ITT NEL-ITT-ITT G PUSH BUTTONS 01M4-515-002 NFRA-RED RECEIVER 494B1 - 01V6/6220/104 494B1 - 01V6/682/003 200 PF TO 20 MF ECK MECHANISM In lens x 1.4 and x 0.7 900, hand set Ferguson, Sony, Grundig ted main transformer 0-120v-0-120v Pri0-9v main control panel. Send for data	£15.00 £12.00 £12.00 £12.00 £12.00 £8.00 £8.00 £5.00
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS 6MHz XTALS 4.4 T/V XTALS 8.8MHz T/V XT Amstrad - Perde Fidelity - Decke Plastic - Front Pa Mitsubishi RMM: Nokia RC202 Hai Siemens Hand Se Tuner Env-57459 UF754B UHF Tu FV 64 pin Ma FERC IF PA TX85 8 F	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p Each FALS eo Er - Tatung unels for all 1992 M 35 Hand Set Videa at 1994 Model T/V GI UHF-VHF uner 31R FERGUSON ain IC HD6140815 GUSON TX9 - T>	Text Profession of Video Video X 10 £1 X10 £4	anel No. T1228 or Ferguson 9-TX98-TX100	£10.00 £10.00 £30.00 £10.00 £6.00 BB	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE: PANEL - CMC115 - TT PANEL - CMC115 - TT PANEL - CWC115 - TT PANEL - CSC - TUBE PANEL - ICC5 - TUBE PANEL - IK2 - FM2211 PANEL - SEL IFB 194P PANEL - SEL IFB 194P PANEL - SEL IFB 1900 - PANEL - SEL IFB 1900 - PANEL - TX91 - TX10 - T PANEL - TX95 - TX10 - T PANEL - TX98 - TX10 - T PANEL - TX98 - TX10 - T PANEL - TX98 - TX98; PANEL - TX98 - TUBE PANEL - TX98 - TOBE PANEL - TX98 - TUBE PANEL - TX98 - TOBE PANEL - TX99 - TOBE PANEL - TX98 - TAS9 - TOBE PANEL - TX98 - TAS9 - TOBE PANEL - TX98 - TY89 - TOBE PANEL - TX99 - TOBE PANEL -	GUSON GUSON GUSON GUSON GUSON FYPE - 12V WITH SPI FRANEL FRANEL FRANEL BASE PANEL STEREO TIT FRONT PANE UNING PANEL SO FRONT PANEL WING FRONT PANEL WING FRONT PANEL WIOD REMOTE - M CAN MARCH CAN TO THE THE	EED CONTROL T IN BOARD U4647 TKF OR HAI1498 L-SAME AS CMC303 L-ITT VEL - ITT ITT G IPUSH BUTTONS 01M4-515-002 NFRA-RED RECEIVER 494BI - 01V6/ 223/104 494BI - 01V6/682/003 L-200 PF TO 20 MF ECK MECHANISM IN IT SECOND AND A STANDARD	£15.00 £12.00 £12.00 £12.00 £12.00 £8.00 £8.00 £5.00 £5.00 £5.00 £6.00 £5.00 £6.00 £10.00 £10.00 £10.00 £5.00
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS 6MHz XTALS 6MHz XTALS 8.8MHz T/V XT Amstrad - Perde Fidelity - Decke Plastic - Front Pa Mitsubishi RMM: Nokia RC202 Har Siemens Hand Se Tuner Env-57459 UF754B UHF Tu FV 64 pin Ma FERC IF PA TX85 8 F TX86 8 F TX85 Swi	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p Each FALS eo er – Tatung unels for all 1992 M 35 Hand Set Vide nd Set et 1994 Model T/V GI UHF-VHF uner (31R FERGUSON ain IC HD6140815 GUSON TX9 – T) NEL Push Button Unit	Text Profession of Video Video X 10 £1 X10 £4	anel No. T1228 or Ferguson 9-TX98-TX100	£10.00 £10.00 £30.00 £10.00 £6.00 BB	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - TX99 LOPT - TX99 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE PANEL - CMC115 - TT PANEL - CWC115 - TT PANEL - ICCS - TUBE PANEL - ICCS - TUBE PANEL - ICCS - TUBE PANEL - IEC - FM2211 PANEL - SEL 69112407 PANEL - SEL 1FB 194P PANEL - SEL 1FB 194P PANEL - SEL 1FB300 PANEL - TX910 - TP PANEL - TX90 - THOR PANEL - TX90 - THOR PANEL - TX90 - THOR PANEL - TX98 - TUBE PANEL - TX99 CMC 200 DIGITAL CA R2000 SERIES FERGU Tripod shoulder pod for of Ferguson VA super 218 c Ferguson camcorder batt Mitsubishi vidco hand set Ferguson IS98 - TX99 TO RC Matsui hand set \$5. E	GUSON FYPE - 12V WITH SPI FRONT PANEL - 17 FRONT PANEL - 17 FRONT PANEL - 17 FRONT PANEL TIT FRONT PANEL TONING PANEL 1509 TE PANEL 540/01 IN FRONT PANEL W/I BASE PANEL X100 - REMOTE - M	EED CONTROL T IN BOARD U4647 TKF OR HAJ1498 L-SAME AS CMC303 L-ITT NEL-ITT-ITT G PUSH BUTTONS 01M4-515-002 NFRA-RED RECEIVER 494B1 - 01V6/6220/104 494B1 - 01V6/682/003 200 PF TO 20 MF ECK MECHANISM Interest 1.4 and x 0.7 900, hand set Ferguson, Sony, Grundig ted main transformer 0-120v-0-120v Pri 0-9v main control panel. Send for data arge type £15 £1.50 B.S. (Not Tested 10.7 to 11.7 GHz)	£15.00 £12.00 £12.00 £12.00 £12.00 £12.00 £8.00 £6.00 £5.00 £5.00 £6.00 £10.00 £10.00 £10.00 £5.00
Main Panel Capstan Motor IC Hitachi Capstan M Hitachi Video Ha VT530 Pre-Amp Amstrad VS1000- 4MHz XTALS 6MHz XTALS 4.4 T/V XTALS 8.8MHz T/V XT Amstrad - Perde Fidelity - Decke Plastic - Front Pa Mitsubishi RMM: Nokia RC202 Hai Siemens Hand Se Tuner Env-57459 UF754B UHF Tu FV 64 pin Ma FERC IF PA TX85 8 F TX86 8 F	Motor ACE G4-B and Set RM933E -VS1100 Power Su 30p Each FALS eo er – Tatung unels for all 1992 M 35 Hand Set Vide et 1994 Model T/V GI UHF-VHF uner 31R FERGUSON ain IC HD6140815 GUSON TX9 – T> .NEL Push Button Unit Push Button Unit	Text Profession of Video Video X 10 £1 X10 £4	anel No. T1228 or Ferguson 9-TX98-TX100	£10.00 £10.00 £30.00 £10.00 £6.00 8B ch £4.00 £5.00 £3.00 £3.00	LOPT - TLF701/6 - NAT LOPT - TX89 LOPT - TX98 LOPT - TX99 LOPT - Y260781 - FERC MOTOR - CASSETTE: PANEL - CMC115 - TT PANEL - CMC115 - TT PANEL - CWC115 - TT PANEL - CSC - TUBE PANEL - ICC5 - TUBE PANEL - IK2 - FM2211 PANEL - SEL IFB 194P PANEL - SEL IFB 194P PANEL - SEL IFB 1900 - PANEL - SEL IFB 1900 - PANEL - TX91 - TX10 - T PANEL - TX95 - TX10 - T PANEL - TX98 - TX10 - T PANEL - TX98 - TX10 - T PANEL - TX98 - TX98; PANEL - TX98 - TUBE PANEL - TX98 - TOBE PANEL - TX98 - TUBE PANEL - TX98 - TOBE PANEL - TX99 - TOBE PANEL - TX98 - TAS9 - TOBE PANEL - TX98 - TAS9 - TOBE PANEL - TX98 - TY89 - TOBE PANEL - TX99 - TOBE PANEL -	GUSON GUSON GUSON GUSON GUSON FYPE - 12V WITH SPI FRANEL FRANEL FRANEL BASE PANEL STEREO TIT FRONT PANE UNING PANEL SO FRONT PANEL WING FRONT PANEL WING FRONT PANEL WIOD REMOTE - M CAN MARCH CAN TO THE THE	EED CONTROL T IN BOARD U4647 TKF OR HAI1498 L - SAME AS CMC303 L - ITT NEL - ITT - ITT G PUSH BUTTONS 01M4-515-002 NFRA-RED RECEIVER 494B1 - 01V6/62203 200 PF TO 20 MF ECK MECHANISM Intens x 1.4 and x 0.7 900, hand set Ferguson, Sony, Grundig ted main transformer 0-120v-0-120v Pri0-9v main control panel. Send for data arge type £15 £1.50 B.S. (Not Tested 10.7 to 11.7 GHz) DMA £1.00 P.S.U. AC 9v 1A £1	£15.00 £12.00 £12.00 £12.00 £12.00 £12.00 £8.00 £6.00 £5.00 £5.00 £6.00 £10.00 £10.00 £10.00 £5.00

		E BEAM - V212 £188.00	
£10 each	ICC5 Tube Base on Panel ICC5 Decoder Panel each £5.00	SANYO	Amstrad Tuner UE33-B01 £3
FERGUSON		U/V Video Hand Set £3	TX10 Focus Units £6 for £10
Line Transformers	KT3/K30 T/Text £8.00 Handset £8.00	HITACHI	Conversion Kit ITT Teletext £8
FST Y260482 £10	KT3/K30 Full Remote £8.00	Handset CLE 874B £5.00 each	Burglar Alarm Siren 12 Volt 5
TX9 LOPT £4	Pye & Philips Handset	CPT2158 (No Replacement) £5.00	
TX10 LOPT £6 Green Spot £10	KT3/K30 Chassis	IR3506 All modules £8 each	Good Lower Drum £3
White Spot £8	No. RC5150-RC5176-RC5071-	CPT1408T ITT IF Modules	Tuners
Blue Spot £10	RC5177 Special Price £8.00	CDT2176	Nat. Pan. Small. UHF/VHF £3
Yellow Spot £8	RC4001 KT3 and Teletext £8.00	CPT2178 NEW LNB	U321 - U341 - U342 - U343 - U344 - U944
Red Spot £6	TX10 Handset Text £12.50	CPT2176 IUMHZ IO	Tuners each £5
TX85 £8	TX9 with Text £12.50	CPT2478 11./MHZ	U743 – U744 £3
TX86 £8	TX9 & TX10 Button Print £1.00	BLUE CAP	Tuner. 1F TERC8-022A TBJZ4-00ZA
FERGUSON	TX10 Focus Pots £4.00	£10 INVERTER MARCONI	Alps £7
FST LOPT		12V IN £5	15 Mixed hand set LCD Video T/V
Y260482 £12	Mains Stand-by Switch	24V OUT	All new £20
DECCA LCD	with Coil £1.00	9 AMPS 5827-01-51	
NICAM HAND SET £4	Nicam Boards	5827-03-51	Kcyboard Mains Adaptor 12v/800m/a £5
RECEIVER	Texas Instruments MkII £10.00	TV 5828-04-10	U411 - U412 Tuners each £5
PHILIP INFRA RED £1	Toshiba Nicam Board £6.00	DIODES 5929-02-58	LNB'S MARCONI
Ideal for Hand Set Tester	/	MIXED 5929-03-41	Ex Rental Black Cap £2
	TDA2170 £8.00' BYX55/600	100 for £3	No Guarantee
35013 £10 47003481 £10 36771 each 36761 each	TDA3561A £3.00 (Bead) 10p	100 101 2.5	Bridge Rectifiers 10 fr 1
36773 36061 each	TDA3566 £3.50 BYT71/600 15p	PANASONIC-TV	
35012 36162	TDA3564 £4.00 BYV95B 10p	Handsets for models:	Matsumi Miniature Infra Red Receiver 1.
35085 36362	TDA3565 £3.00 BYV95C 12p	TC1632, TC1642, TC2232, TX2034,	Turntable Satellite Modulator TV
36795 36383	TDA3581 £3.00 BYV96D 10p	TX2044, TX2200, TX2234, TX2244,	Sound 5.5 MHz MPM 1000T
36792 366481	TDA3590 £3.00 BYZ106 10p	TX2200, TX2234, TX2244, TX2300,	Sound 6.0 MHz MPM 1040
35066 36482	TDA3591 £1.00 BPW41 15p	TX2636, TX3300, RC201 replaces	FERGUSON CHASSIS
35063 36831	TDA3592A £3.00 BYW562A/	TNQ1411/2 £8.00 each	New
35016 36832	TDA3650 £7.00 1000v. 8p	HITACHI sets HANDSETS	TX100 Yellow Spot
35064 36922	TDA3651 £3.00 BYW29/50 15p	CLE871A £5.00 Amstrad Export £3.00	TX98 Chassis
34002 36943	TD 4 2652 52 50 D 1 W 93C 10p	STR6020 £6.00 Amstrad U/V £3.00	Ferguson FV31R / £5
36792 36962	TDA 2652AO 62.00 25C3/95 30p	SS2000AF Amstrad 6800 £4.00 line 0.p. £1.00 Amstrad 6000 £15.00	Remote and Powe Display
35062 AT 2078/25	TD 4 3654 \$1 00 45 C39 /3D 30P	line o.p. £1.00 Amstrad 6000 £15.00 2SC940 £1.00 Amstrad 4700 £5.00	Panel £5
36797 AT 2076/78	TDA36540 £2.00 25C4313 £1.00	BU105/04 80p Amstrad 4600 £3.00	Quartz Haloge•
33752 AT 2077/81-£15	TDA 3710 \$3.50 2SC7350 15p	BU108 £1.00 —	500w. 200v. F & £1
33952 AT 2076/88 34141	TDA3710 25.50 2SD180 TO3	BU124 50p 10081 GEC £3.00	
34451 TFB 3035D	TDA3803A £4.00 80v/t 15p	BU126 80p	AMSTRAD
34494 - £12 TFB 3069D	TDA3180 £2.00 2SD200 £2.00	BU180a 65p FERGUSON BU204 60p FERGUSON	Plastic Fre £3 Clock Dir £5
34492 - £12 TFB 4023AD	TDA4260 50p 2SD401 £1.00	BU204 60p BU205 75n Handsets	
34393 TFB 4039AD	TDA4501 £3.00 2SD716 £1.00	BU206 £1.00 BSB £1.50	Sharp Ti
32981 TFB 4066AD	TDA4505NE £3.00 2SD787 30p	BU207 £1.00 ICCS £5.00	1810587.
35372	TDA4420 £2.00 2SD789 30p	BU200 000 11/2000	KT3/K30 Tn ₃ . £5
SS701 LOPTS	TDA4439 £2.00 2SD820 £1.00	DO200A 21.50 OND 3	U/V Tripler £4
32351 £10 EACH	TDA4600 £3.00 2SD868 75p	RU222 \$1.00 SRD 3 £1.00	· · · · · · · · · · · · · · · · · · ·
32211	TDA4601 £2.00 2SD880 30p	B1 1326 £1.00 T780 £2.00	Grundig Tripler with Focus Pot £7
32984 Y260482	TDA8190 £3.00 2SD1264 £1.00	BU407 60p SRD 4 £1.00	Grundig Universal Tripler.
32491 2435121	TDA8703 £3.00 2SD1266 £1.00	BU508A 90p	Upright Printed Circuit type £7
32871 FERGUSON	TDA8349 £3.00 2SD1398 £1.00	BU508AF £1.00 HITACHI	BG 2087-642-1005 Triplers £7
52651	TDA9403 £1.50 2SD1415 £1.00	BU508D 80p Microwave BU705 £1.00 Turntable Motor	BG 2032-642-3002 £7
20029 TUNERS	TDA9503 £3.00 2SD1427 £1.00	DI 1904 A C1 00	PERDIO PV 1188 Handsets £3
14016 TX90/TO100 - £4	TDB2033 £1.00 2SD1432 £1.00	BU807 £1.00	BU 208A, BU 508A, BU 508D,
16001	TDD1610S 50p 2SD1453 £1.00	BU808DFI £1.00	BU 508AF, BU 508DF £1.00 es
ST 85B 235/40153200	TD6303P £2.00 2SD1576 £1.00	BU826 £1.00 SANYO BUK454/600 £1.00 TDO 124EB	BU 801
40000C A D C10	IDA1060 £3.00 25D1577 £2.00	BU824 50p UHF VHF Tuner	2SD 1398 £1
ST 88N 234/47805200 L £10	TEA1009 500 2001070 51.00	BUT11 50p £3	BUT 11AF cqv
ST 81N 243/472593 00 each	1EA1039 \$2.00 TD 4 2500 02 00	BUT11AF £1.00	Min Sat Receiver with IC M491 BB1, has
ST 186N 243/472393 00	12/1000 22:00	BUT13 600V-28A £1.00 BUT18AF £1.00 SUPER	tuner modulator etc £5
	TEA2029C £3.00 TDA3654 90p IK7 ST6391 B1 £3.00 TDA3653AQ £1.00	BOTTON 21.00	FERGUSON Sat. Modulator SRD-3-4 £2
HITACHI	IK7 ST6391 B1 £3.00 TDA3633AQ £1.00 ST6393 B1/1M £3.00 TDA3562A £0.00	BUW84 60p HIGH CAPACITY BYW20-08-9 £1.00 BATTERY VA310	
M9204A Thick Film £3.50		BYW95 10P 9.6V 1700 MA £4	FERGUSON SRBI modulator 25p et
and 4x Magnifier £3.50		BUX39 25A-150V £1.00	Regulated power supply, 500m/a 3-12v £5
ATSUI 3000 Orion Video	BYX38/300 25p STR6020 £6.00 BYX55/350 10p STR6602D £4.00	BUX84 50p VPT ADAPTOR	HITACHI 620E head and drum £12
cks with heads £16.00	D17030330 10p 3170002D 24.00	BU149 ZUD VARAEEDCUCON	
& Video hand set £2.00	REMOTE LEADS	BUK444/800 £2.00 £5.00 (TEXT)	AMSTRAD Nicam head and drum £12
ion TV & Video Handset £2.00	TX100 Scart to Scart	BUK445/600 £2.00	AMSTRAD 6000 head and drum £12
Sky.B VHF to IF	Front Panel all pin connected	TDA3047 £1.00 06D4-025-001	TATUNG universal tuner 205, or eqv with aeri
ock Converter 50p	£4 £2.00	TDA3048 £3.00 Mains Input	socket £8
	1½ metres	TDA3083 £2.00 Choke for	U/V REMOTE HANDSET
Panels Ferguson	TX 9 Remote Panels£5	TDA3190 £1.00 TYO 64	SIN ONE TVI - TV2 - VCR £15
xed from TX9 to ICC5 £20.00	1	TDA3505 £3.00 TDA3506 £3.00	SAT - AUX
Aerial Ring Type 40p	TX 10 Remote Panels£5	TDA3566 £3.00 THORN	
100 Remote Handsets (780) £6.00	TX 90 Remote Panel No. 139-001	TDA3560 £4.00 M494B1	BURGLAR ALARM Use Infra Red Detector
	IC Nos. M293B1 & TMS 1000£10 each	Text-Type	Wide or Short Angle
IF Tuner for ICCS £5.00	TX 100 Remote Panels	Replace Handset for Philips KT3/K30,	Wall Mount, with Relay £8.00
F Tuner for ICC5 £5.00	IC M293B1-SAA5012£10	K4 etc £6.00	MODULATOR KIT £5
strad-Double Decker Switch Mode	TX 100 Remote Panels with Stand-by Battery	Thorn Handsets	5v to 12v for all cameras etc.
WER SUPPLY £5.00	and ICs£10	9000-9600-TX9-TX10-TX100	
strad-Long Chassis and Short Chassis	TX 85 - 86 - 89 - 90 - 98 -	Text and Non-Text £10.00	6251 FRAME O/P THICK FILM HITACHI GEC £9.00
ver Supply £3.00	99 – 100 Tuners£4	Philips RC5171 Handset £8.00	THICK FILM
Models 1991/1992	Orion Modulator Video MDLK		HITACHI HM9205A £4.00
guson Switch Mode Transformer TX85	6B513A£2.50	1992 to 1993 Mod. Orion Video handset with LCD £5.00	
86, TX100 each £5.00	Hitachi Mains Switch with Stand-by 50p		PHILIPS NEW TYPE
	Scart to 4 Phone Leads 1½m£2.50	SATELLITE TUNER UNIT 2427611	U/V HANDSET £10
C5 Ferguson Switch Mod	SXT2302234 Sat. Tuner with	with Base Band, Video Out £6.00	06D4-025-001
ns 3112-338-32642 £4.00	Base Band Min£4	AMSTRAD Long Chassis	Mains input choke for TX9 £4
DC and 24v DC Power Supply	Dase Dang min	Display Panel 1992/1993 £4.00	TX100 REMOTE PANEL
ulated £2.00	O TANDE		No. 56413IC M293B/
guson U/V Camcorder 1800 MA	SENDZ c	OMPONENTS	and SAA5012 £10 etc.
guson 07v Camcorder 1800 MA ttery VA310 9.6v £4.00	63 BISHOPSTEIGNTON, SHOE	BUDYNESS ESSEY SCLOAF	LEADER LMV-181A milli voltmeter
	NORMALLY SAME DAY SERVICE	SUBJECT TO AVAILABILITY	(cost £255) 240v mains input
solder Pump £2.00	No accounts a Tachnical information	by talanhana only a No cradit cards	Electronic voltmeter (1mv F.S.) 1mv-300v
Panel for	Unless specified add £1.70 P P to sm	all orders • Additional charges for	Calibrated £35
lips CP90-CP110 £5.00	heavier items • Specific P P charges	are PER ITEM • For UK addresses	
	Unless specified add 1.70 P P to sm heavier items • Specific P P charges please add P P T O ORDER THEN 171 % EC unless VAT No. is given	VAT TO TOTAL • This applies for the	R.S. SAFE BLOC
	EC unless VAT No. is given	• EXPORTS – P/P at cost •	£5
lips Solder Iron 225w-240v £6.00			
tasol Hobby Gas Solder Iron £10.00	Postal Order Che	Southend • Open 9 30-1 2 15-5	FERGUSON TY 100
	Postal Order Che Callers to shop - 212 London Road Tel: 01702 332992 • F GVMT School orders	. Southend ◆ Open 9,30-1, 2,15-5, ax: 01702 338805 ◆	FERGUSON TX100 Chassis Yellow Spot