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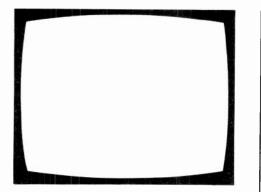
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TELEVISION

January 1990

Vol. 40, No. 3 Issue 471

On sale December 20th

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QUERIES

We regret that we cannot answer technical queries over the telephone nor supply service sheets. We will endeavour to assist readers who have queries relating to articles published in *Television*, but we cannot offer advice on modifications to our published designs nor comment on alternative ways of using them. Correspondents should enclose a stamped addressed envelope.

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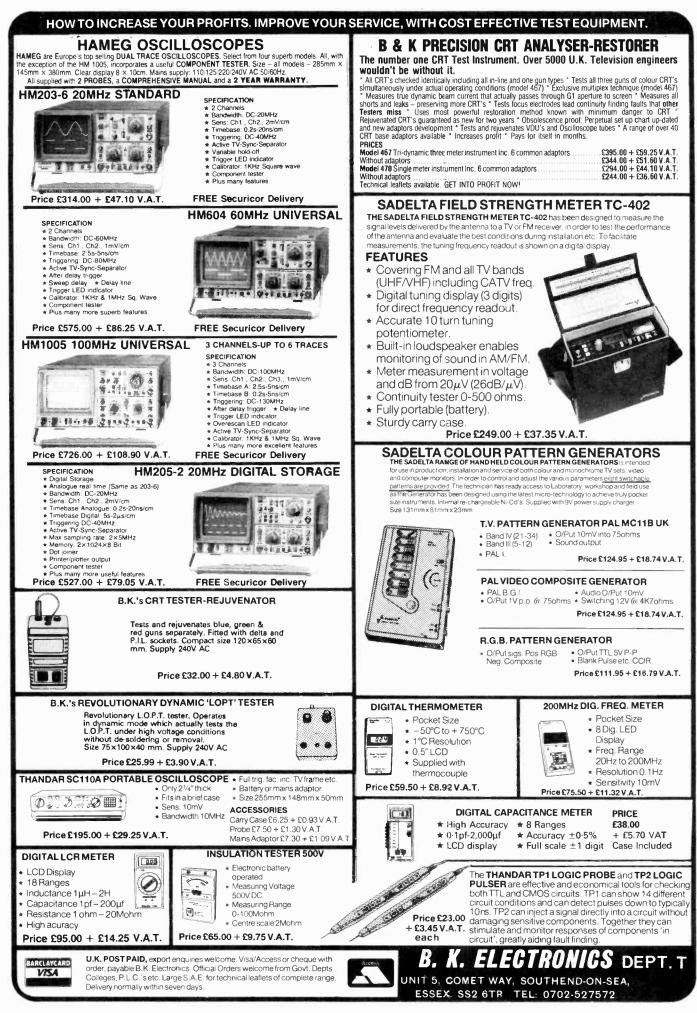
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2SA-473 35p 2SA-490 60p 2SA-505 120p 2SA-509 120p	258-886 225p 258-950 180p 258-951 190p 258-1009 110p	2SC-1907 75p 2SC-1909 250p 2SC-1913 190p 2SC-1921 60p	2SC-2774 600p 2SC-2785 60p 2SC-2791 650p 2SC-2792 550p	2SD-427 350p 2SD-438 45p 2SD-467 60p 2SD-468 25p	2SD-1310 140p 2SD-1326 200p 2SD-1328 60p 2SD-1347 70p	SG613		850p	VTC 9100/9300/9455/9500	£26.50 £28.80 £28.80
2SA-550 150p 2SA-562 50p 2SA-603 100p 2SA-606 300p	2SB-1077 180p 2SB-1105 100p 2SC-380 20p 2SC-382 120p	2SC-1923 25p 2SC-1929 180p 2SC-1940 110p 2SC-1941 40p	2SC-2808 40p 2SC-2810 360p 2SC-2812 40p 2SC-2814 40p	2SD-471 75p 2SD-525 70p 2SD-526 70p 2SD-545 60p	2SD-1348 85p 2SD-1350 150p 2SD-1376 125p 2SD-1379 100p	* * * * * * * * UHF	TUNERS	* * * 600p *	VTC 5500	£30.50
2SA-606 15 p 2SA-638 15 p 2SA-634 50 p 2SA-636 50 p 2SA-636 50 p	2SC-388A 60p 2SC-454 45p 2SC-458 15p 2SC-460 10p	2SC-1941 190p 2SC-1942 190p 2SC-1944 350p 2SC-1945 350p 2SC-1946 1500p	2SC-2834 400p 2SC-2834 400p 2SC-2837 360p 2SC-2839 40p 2SC-2853 70p	2SD-549 120p 2SD-551 400p 2SD-555 500p 2SD-560 150p	2SD-1380 100p 2SD-1380 100p 2SD-1383 100p 2SD-1390 350p 2SD-1391 450p	* U342 * * * * * * *	* * * * *	500p * 500p * * * *	SHARP	10.000
2SA-673 20p 2SA-684 60p 2SA-699 100p	2SC-461 30p 2SC-495 60p 2SC-515A 100p	2SC-1947 450p 2SC-1957 70p 2SC-1959 20p	2SC-2876 120p 2SC-2877 120p 2SC-2878 40p	2SD-571 80p 2SD-575 530p 2SD-600 80p	2SD-1392 150p 2SD-1395 150p 2SD-1396 240p	VIDEO LAMPS			VC 381, VC 383, VC 386, VC 387, VC 388, VC 483 VC 486, VC 3300, VC 8381, VC 9100,	VC 482, £18.75
2SA-708 300p 2SA-715 80p 2SA-720 20p 2SA-725 80p	2SC-535 50p 2SC-536 20p 2SC-563 120p 2SC-644 25p	2SC-1969 160p 2SC-1970 200p 2SC-1971 400p 2SC-1972 600p	2\$C-2898 400p 2\$C-2899 120p 2\$C-2911 120p 2\$C-2912 120p	2SD-601 40p 2SD-602 60p 2SD-612 100p 2SD-613 70p	2SD-1397 250p 2SD-1398 210p 2SD-1399 300p 2SD-1400 280p	UNIVERSAL VIDEO LAME 12V.60 mA (300mm WIRE RED OR BLUE		30p	VC 9300, VC 9500, VC 9700, VC 582, VC 583, VC 651, VC 681, VC 781	750, VC £18.75
2SA-726 25p 2SA-733 30p 2SA-747A 600p	2SC-647 300p 2SC-681 340p 2SC-683 120p	2SC-1973 150p 2SC-1983 130p 2SC-1984 150p	2SC-2922 610p 2SC-2928 550p 2SC-2929 280p	2SD-636 30p 2SD-637 40p 2SD-638 60p	2SD-1402 280p 2SD-1406 120p 2SD-1407 160p	VIDEO LAMP FOR PANAS	SONIC	60p		
2SA-798 55p 2SA-748 90p 2SA-769 130p 2SA-770 200p	2SC-710 20p 2SC-711 40p 2SC-730 450p 2SC-732 40p	2SC-1985 120p 2SC-1986 160p 2SC-2001 60p 2SC-2002 40p	2SC-2944 620p 2SC-2979 320p 2SC-2988 280p 2SC-2985 60p	2SD-639 60p 2SD-640 350p 2SD-642 50p 2SD-655 60p	2SD-1409 190p 2SD-1415 190p 2SD-1425 430p 2SD-1426 350p	CASSETTE DC M	OTORS		SONY DSR-35R (FOR C20, 30, 40 SLF1, 5	SLF1UB,
2SA-771 130p 2SA-781 150p 2SA-798 55p 2SA-814 170p	2SC-733 25p 2SC-761 150p 2SC-762 150p 2SC-783 105p	2SC-2003 25p 2SC-2004 60p 2SC-2021 40p 2SC-2022 200p	2SC-3012 300p 2SC-3019 320p 2SC-3025 500p 2SC-3026 550p	2SD-661 60p 2SD-666 70p 2SD-667 70p 2SD-668 120p	2SD-1427 380p 2SD-1428 450p 2SD-1429 410p 2SD-1430 280p	6V 9V 12V CW		240p 240p 240p	DSR-43R (FOR SLC7 RANGE SL 5000,	£19.00 £14.95
2SA-814 170p 2SA-844 30p 2SA-872 40p 2SA-872A 50p	2SC-790 80p 2SC-792 380p 2SC-828 25p	2SC-2023 180p 2SC-2026 60p 2SC-2027 450p	2SC-3039 140p 2SC-3040 260p 2SC-3042 300p	2SD-669 40p 2SD-673 350p 2SD-676 250p	2SD-1431 400p 2SD-1432 600p 2SD-1433 750p	12V CCW 13.2V CW 13.2V CCW		240p 290p 290p		
2SA-886 90p 2SA-899 60p 2SA-907 650p 2SA-909 700p	2SC-829 20p 2SC-839 25p 2SC-867A 150p 2SC-930 20p	2SC-2028 75p 2SC-2029 120p 2SC-2053 120p 2SC-2055 150p	2SC-3060 900p 2SC-3057 150p 2SC-3068 60p 2SC-3070 120p	2SD-716 115p 2SD-717 180p 2SD-718 100p 2SD-722 240p	2SD-1438 140p 2SD-1439 320p 2SD-1441 440p 2SD-1443 140p		* * * * *	· · ·	TOSHIBA V21/V9600	£17.80
2SA-913 200p 2SA-916 30p 2SA-921 50p	2SC-941 25p 2SC-943 160p 2SC-944 140p	2SC-2056 450p 2SC-2058 40p 2SC-2060 60p	2SC-3077 120p 2SC-3114 40p 2SC-3117 120p	2SD-725 400p 2SD-734 60p 2SD-741 120p 2SD-743 130p	2SD-1450 60p 2SD-1451 260p 2SD-1453 170p	* CASSETTE	TAPE HEADS	14 14 I	CDANDATA LT	
2SA-933 40p 2SA-934 40p 2SA-935 40p 2SA-937 40p	2SC-945 20p 2SC-950 40p 2SC-982 60p 2SC-983 120p	2SC-2071 140p 2SC-2073 70p 2SC-2075 80p	2SC-3148 410p 2SC-3149 180p 2SC-3150 200p	2SD-756 100p 2SD-757 120p 2SD-758 140p	2SD-1455 320p 2SD-1457 220p 2SD-1459 120p 2SD-1468 60p	MONO HEAD STEREO HEAD MINI HEAD		90p 150p 230p	GRANDATA LTI FOR ADDRESS & PH	
2SA-939 140p 2SA-940 50p 2SA-950 25p 2SA-952 50p	2SC-1000 60p 2SC-1012 75p 2SC-1014 140p 2SC-1030 190p	2SC-2078 95p 2SC-2081 950p 2SC-2085 100p 2SC-2086 60p	2SC-3151 230p 2SC-3152 250p 2SC-3153 320p 2SC-3156 400p	2SD-762 140p 2SD-763 140p 2SD-768 180p 2SD-772 200p	2SD-1496 450p 2SD-1497 450p 2SD-1505 120p 2SD-1554 500p	AUTO REVERSE HEAD		260p	PLEASE SEE THE	
2SA-953 60p 2SA-954 75p 2SA-958 70p	2SC-1047 60p 2SC-1050 280p 2SC-1060 90p	2SC-2120 50p 2SC-2131 550p 2SC-2141 150p	2SC-3157 200p 2SC-3158 260p 2SC-3159 200p	2SD-773 40p 2SD-774 60p 2SD-777 400p	2SD-1555 450p 2SD-1575 450p 2SD-1577 480p	UNIVERSAL TRIPLERS	5	450p 200p	REVERSE SIDE O	
2SA-965 60p 2SA-966 70p 2SA-968 70p 2SA-968 70p 2SA-970 50p	2SC-1061 85p 2SC-1070 65p 2SC-1096 60p 2SC-1106 180p	2SC-2166 80p 2SC-2168 175p 2SC-2199 600p 2SC-2221 650p	2SC-3169 200p 2SC-3173 180p 2SC-3175 340p 2SC-3178 340p	2SD-784 650p 2SD-786 100p 2SD-787 80p 2SD-788 100p	2SD-1579 120p 2SD-1591 310p 2SD-1595 160p 2SD-1604 200p	PHILIPS SWITCHES K30, K35, K40, KT3, KT4	* * * * *	150p * * *	THIS PAGE	
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VCR	FERGUSON	VIDEO MOTORS	40008 SERIES CMOS IC's		4HC251 25 p 74LS114 28 p 4HC253 36 p 74LS122 35 p	8255 200p 75188 55p
PINCHROLLERS	3292, 3V00, 3V01 150p	AMSTRAD	4000 13 p 4001 13 p	7401 16p 7 7402 18p 7	4HC257 40p 74LS123 35p 4HC258 50p 74LS124 85p	8256 1200p 75189 55p 8257 220p 75195 185p
AKAI	3V16, 3V22, 3V23 65p	VCR-7000 REEL MOTOR 1700p	4002 13p 4006 34p	7403 20p 7	74HC259 52p 74LS125 30p 74HC273 42p 74LS126 30p	8259 280p 75451 40p 8271 3400p 75454 65p
VS9300, VS9500, VS9700, VS9800 280p	3V29/30 120p 3V31/32 85p	FERGUSON & JVC CAPSTAN MOTOR 2100p	4007 13p 4008 38p	7405 10p 7	MHC279 35p 74LS132 30p MHC280 61p 74LS133 30p MHC283 61p 74LS136 30p	8272 1200p 75492 55p 8279 270p 8T26 95p 8282 300p 8T28 110p
VS1, VS2, VS3, VS4, VS5, VS6, VS9, VS10 360p	3V35/36 80p 3V38-39 80p	PU-45979 CAPSTAN MOTOR 1950p	4009 20p 4010 21p	7407 36p 7	4HC298 50p 74LS138 28p 4HC299 105p 74LS139 28p	8283 400p
AMSTRAD	3V42/43 65p 3V44/45 65p	PU-55371V DRUM MOTOR 1950p	4011 13p 4012 13p	7409 20p 7	14HC354 38p 74LS145 65p 14HC356 48p 74LS147 90p 14HC365 34p 74LS148 75p	8284 440p 8287 360p OPTO 8288 650p OPTO
VCR4500, VCR4600, VCR4600 Mk2, VCR4700 280p	3V45/54 65p 3V55 65p	PU-46414 REEL MOTOR	4013 19p 4014 32p	7414 45p 7 7416 40p 7	74HC366 36p 74LS151 27p 74HC367 36p 74LS153 31p	8748 1100p COUPLERS 8755 1400p
VCR5200 360p		PU-51381V 2650p	4016 18p 4017 29p	7420 22p 7	74HC368 36p 74LS154 78p 74HC373 46p 74LS155 36p	AY3-1015 290p
VCR7000 360p FERGUSON	FISHER	REEL MOTOR 1350p	4018 30p 4019 28p	7425 15p 7	74HC375 52p 74LS157 22p 74HC377 52p 74LS158 27p	Z80ACPU 150p 4N26 50p
3V00, 3V16, 3V22, 3V23 280p	VBS-7000 2450	MYN-135V5L FOR NV333, NV366	4020 33p 4021 36p	7437 28p	74HC386 20p 74LS160 38p 74HC390 50p 74LS161 38p	Z80ADMA 500p 4N28 50p
3V29-30, 3V31-32 280p 3V35-36, 3V38-39, 3V42-43,	VBS-7000 245p VBS-9000 120p	SANYO	4022 36p 4023 13p	7442 38p	74HC393 47p 74LS162 38p 74HC423 65p 74LS163 36p 74HC533 65p 74LS164 36p	Z80AP10 220p 4N29 50p Z80BP10 340p 4N30 90p Z80AGTC 200p 4N31 90p
3V44-45, 3V48, 280p 3V53, 3V54-55, 3V56-57, 3V58-59,		REEL MOTOR 700p	4024 25p 4025 13p	7450 22p 7 7451 10p 7	74HC534 61p 74LS165 50p 74HC540 70p 74LS166 55p	Z80BCTC 320p 4N32 100p
3V64-65, FV10-11, FV12-14	НІТАСНІ	4-529V-10800 SHARP	4026 60p 4027 18p	7470 300 7	74HC541 70p 74LS168 60p 74HC563 60p 74LS169 55p 74HC564 60p 74LS170 68p	Z80AS10 460p 4N33 100p Z80AS10-1 580p 4N36 58p Z80BP10-2 580p 4N37 58p
HITACHI VT11, VT33 280p	VT-11, VT-33 100p	REEL MOTOR 1500p	4028 29p 4029 34p	7474 35 p	74HC573 68p 74LS174 30p 74HC574 65p 74LS175 32p	Z80ADART 500p 4N38 58p 74\$289 180p
VT61-62, VT63-64, VT65, VT86-88. 280p	VT-5000 120p VT-5500 130p	RMTOV 1008 GEZZ	4030 17p 4031 90p	7481 90p	74HC583 90p 74LS190 47p 74HC595 85p 74LS191 43p 74HC597 80p 74LS192 41p	74\$387 200p
VT110-122, VT120-128, VT130-135, VT138-150, VT168,-220	VT-8000 60p VT-8500 60p	CAPSTAN MOTOR 700p	4032 52p 4033 60p	7486 28p	74HC620 110p 74LS193 41p 74HC623 110p 74LS194 41p	75107 05p LED DISPLAYS 75110 75p 75113 100p
VT5000, VT8000, VT9300,	VT-9300 50p VT-9500 50p	A-6751131A FOR SLC6 CAPSTAN MOTOR 2500p	4034 76p 4035 42p 4036 180p	7490 35p	74HC640 90p 74LS195 44p 74HC643 90p 74LS196 45p 74HC646 120p 74LS197 42p	75122 110p 75150 95p MAN.72 115p
VT9500 280p JVC	VT-9700 60p	BHF 1100D FOR SLC7	4037 75p 4038 46p	7493 35p	74HC648 120p 74LS221 45p 74HC651 100p 74LS240 45p	75154 100p MAN.74 115p 75162 700p MAN.4640 180p
HR3300, HR3330, HR3360,	JVC	VIDEO LAMPS UNIVERSAL 30p	4039 180p 4040 30p	7497 80p 74107 30p	74HC652 100p 74LS241 42p 74HC670 75p 74LS242 43p 74HC688 80p 74LS243 50p	75182 95p MAN.8910 230p 75183 95p DL.747 160p
HR3660, HR4100, HR7700 280p HR7200, HR7330, HR7660,		12V60mA (300mm WIRES) PANASONIC VIDEO LAMPS 60p	4041 36p 4042 30p	74111 52p 74116 85p	74HC690 110p 74LS244 40p 74HC691 110p 74LS245 40p	
HR7610, HR7650, HR7655 280p HRD110, HRD111, HRD120,	HR-3300, HR-3330, 150p HR-3360, HR-3660,	IDLERS & PULLEYS	4043 36p 4044 36p 4045 72p	74122 40p	74HC4002 25p 74LS247 40p 74HC4015 85p 74LS248 40p 74HC4016 75p 74LS249 70p	
HRD121, HRD140, HRD150 280p HRD160, HRD225, HRD455,	HR-4100 180p HR-7200 70p	REPLACEMENTS	4045 72p 4046 42p 4047 45p	74125 40p	74HC4017 48p 74LS251 24p 74HC4020 50p 74LS253 36p	SOLDERING IRON
HRD565, HRD725	HR-7600 80p HR-7610 95p	FF REW IDLER	4048 27p 4049 18p	74132 42p	74HC4022 40p 74LS256 52p 74HC4024 34p 74LS257 32p 74HC4028 40p 74LS258 35p	ANTEX XS25W 240V Soldering Iron
MITSUBISHI HS200, HS300, HS301, HS302,	HR-7650 75p HR-7655 90p	6886971 190p PLAY IDLER	4050 20p 4051 38p	74145 70p 74153 45p	74HC4040 34p 74LS259 50p 74HC4049 38p 74LS260 30p	240Vac 540p Spare Element for XS25W 240V 260p
HS303, HS304, HS310, 280 p HS320, HS700	HR-7700 77p HRD-110, HRD-111, 100p	V-6861482 320p	4052 35p 4053 35p	74155 45p 74157 45p	74HC4050 38p 74LS266 22p 74HC4051 85p 74LS273 44p	ANTEX C15W 240V Soldering Iron 240Vcm 540p
NATIONAL	HRD-120, HRD-225 HRD-250, HRD-455, 100p	JVC IDLER ASSEMBLY	4054 53p 4055 52p 4056 52p	74164 50p	74HC4052 85p 74LS279 33p 74HC4053 85p 74LS280 88p 74HC4059 85p 74LS283 51p	Spare Element for C15W 240V 260p
NV100, NV180, NV300, NV333,	HRD-565, HRD-566, HRD-725, HRD-755	PU-47752 450p	4060 40p 4063 52p	74167 35p 74173 50p	74HC4060 33p 74LS290 26p 74HC4066 33p 74LS293 26p	
NV340, NV366, NV600, 280p NV777, NV788		PU-51402A 145p	4066 20p 4067 120p	74175 65p	74HC4072 31p 74LS365 26p 74HC4075 26p 74LS366 31p 74HC4078 32p 74LS367 28p	
NV230, NV370, NV430, NV460, NV730, NV810, NV830, 280p	MITSHUBISHI	PU-55373 225p	4068 13p 4069 13p	74182 45p	74HC4094 50p 74LS368 30p 74HC4316 100p 74LS373 45p 74HC4351 110p 74LS374 45p	DESOLDERING PUMP
NV850, NV870, NV890, NV2000, NV2010, NV3000, NV7000,	HS-200 200 p	PU-55373-3-8 285p FAST FORWARD IDLER	4070 13p 4071 13p 4072 13p	74192 40p	74HC4352 160p 74LS375 46p 74HC4510 120p 74LS390 42p	SOLDERING IRON
NV7200, NV7800, NV8600, NV8610, NV8620, NVG14		PU-45896C 210p	4073 13p 4075 13p	74393 70p	74HC4511 70p 74LS393 37p 74HC4514 120p 74LS399 68p 74HC4515 120p 74LS399 95p	ANTEX XS25W 240V Soldering Iron 240Vac 540p
NVG7, NVG10, NVG12, NVG18 360p	NATIONAL	IDLER 200p	4076 42p 4077 13p	HIGH SPEED	74HC4515 120p 74L5629 95p 74HC4516 125p 74L5641 88p 74HC4518 55p 74L5642 105p	Spare Element for XS25W 240V 260p ANTEX C15W 240V Soldering Iron
NVG21, NVG25, NVH65 360p		SANYO	4078 13p 4081 13p	74HC00 14p	74HC4520 60p 74LS644 105p 74HC4538 75p 74LS645 105p	240Vcm 540p Spare Element for C15W 240V 260p
PHILIPS VR6460 280p	NV-300 160p NV-333 135p	REEL PULLEY 143-0-662T-01201 520p	4082 13p 4085 36p 4086 30p	74HC03 14p	74HC7266 75p 74LS674 310p 74HC22106 580p 74LS687 250p	
SANYO	NV-777 100p NV-2000 150p	SHARP	4089 75p 4093 18p	74HC08 18p 74HC10 20p	74HC40104 190p 74HC40105 250p	
VHR1100, VHR1300, VHR1500, VHR2300 360p	NV-3000 160p NV-7000 95p	IDLER NIDL0005 GEEZ 195p	4094 44 p 4095 58 p	74HC14 26p	74LS SERIES 2114 200p LOW POWER 2532 330p	DESOLDERING PUMP
VTC5000, VTC5150, VTC5500, VTC9300, VTCM10, VTCM20280p	NV-7200 90p NV-8600 160p	IDLER NIDL0006 GEEZ 195p	4098 50p 4099 42p	74HC21 20p	SCHOTTKY 2716 200p T.T.L. 2732 280p 74LS00 12p 2732A 300p	Desolder Pump 290p
SHARP		SONY	4501 27p 4502 36p 4503 30p	74HC30 20p	74LS01 12p 2764 240p 74LS02 12p 27C64 550p	Spare Nozzle 60p
VC381, VC386, VC2300, VC3300, VC7300, VC7700, VC8300 360p	PHILIPS	REW. PULLEY A-6706-348-B 400p	4504 55p 4505 180p	74HC42 30p	74LS03 12p 27128 350p 74LS04 12p 26256-25 400p 74LS05 12p 41256-12 450p	
VC9100, VC9300, VC9500, VC9700	VR-6460 170p	A-6706-348-B 400p REW. PULLEY A-6706-391-A/B 300p	4506 58p 4507 30p	74HC73 24p 74HC74 24p	74LS08 12p 256DRAM 450p 74LS09 14p 4116 75p	
VC387, VC481, VC482, VC483, VC486, VC496, VC581 360p		SERVICE AIDS	4508 67p 4510 32p	74HC76 28p	74LS10 12p 4164 150p 74LS11 12p 6116 180p 74LS12 12p 6264 400p	SOLDER MOP 65p
VC582, VC583, VC585 VC651, VC681, VC685, VC750,	SANYO	SERVICE AIDS	4511 30p 4512 38p 4513 80p	74HC85 33p	74LS13 20p 6502 300p 74LS14 24p 6502A 400p	
VC780, VC781, VC785, VC787 360 p	VTC-5000 75p	PRODUCTS	4513 80p 4514 65p 4515 65p	74HC93 50p 74HC107 28p	74LS15 14p 65C02 930p 74LS20 14p 6503 570p 74LS21 14p 6520 170p	
VC793, VCT72 SONY	VTC-5300 100p VTC-5500 95p	V. HEAD CLEANER 100p SWITCH CLEANER 115p	4516 36p 4517 100p	74HC109 28p 74HC112 28p	74LS22 14p 6522 330p 74LS24 35p 6530 1050p	SOLDER
SLC5, SLC6, SLC7 360p	VTC-9300 220p	SILICONE GREASE 135p FREEZE IT 125p	4518 36p 4519 28p 4520 36p	74HC123 35p	74LS26 14p 6532 460p 74LS27 14p 6545 880p 74LS28 14p 6551 530p	18 SWG 500g 500p 20 SWG 500g 650p
SLC9, SLC20, SLC24, SLC30, SLC33, SLC44, SLHF100 360p	SHARP	FOAM CLEANER 120p ANTI-STATIC 120p AEROKLEANE 100p	4520 36p 4521 86p 4522 43p	74HC126 33p	74LS30 14p 6800 210p 74LS32 15p 6802 220p	
SLF1, SLF11, SLF25, SLF30, SLF60, SLF100		AERO DUSTER 125p PLASTIC SEAL 115p	4526 38p 4527 41p	74HC132 33p 74HC133 33p	74LS33 15p 6803 800p 74LS31 15p 6808 800p 74LS38 15p 6809 800p	
*******	VC-381/383/386 125p VC-6300 150p	If you purchase more	4528 38p 4529 65p	74HC137 52p 74HC138 33p	74LS40 15p 6810 150p 74LS42 25p 6818 380p	SOLDERING IRON
* 75 OHM COX CABLE WITH * * SOCKETS FOR TV TO VIDEO *	VC-7300/7700/7750 150p VC-8300 150p	than one Servisol product postage will	4532 48p 4551 75p 4553 140p	74HC147 42p	74LS47 52p 6820 140p 74LS48 48p 6821 140p 74LS51 13p 6840 310p	STAND
* BLACK COLOUR 2 METRES * * LONG, ONLY £1 EACH + VAT * * * * * * * * * * * * * * * *	VC-8381, VC-9100 125p VC-9300, VC-9500 135p	be £2.00	4555 29p 4556 36p	74HC151 320	74LS54 13p 6845 620p 74LS55 15p 6850 110p	Soldering Stand 200p Spare Sponge 40p
		* * * * * * * * *	4557 140p 4583 60p	74HC154 90p 74HC155 48p	74LS73 24p 8080A 400p 74LS74 18p 8085A 300p 74LS75 24p 8086 500p	
VCR BELT KITS	SONY		4584 30p 4585 40p 40100 120p	74HC157 34p 74HC158 34p 74HC160 44p	74LS76 24p 8088 500p 74LS78 24p 8155 360p 74LS83 37p 8156 360p	
VP-7100 160p	SL-C5, SL-C6 140p	* TRIPLERS * * 450p *	40100 120p 40101 78p 40102 150p	74HC160 44p 74HC161 44p 74HC162 44p	74LS85 37p 81LS95 120p 74LS86 25p 81LS96 130p	FLOPPY DISCS
VS-1 150p VS-2EG 100p	SC-C7 140p SC-C9 165p	* 450p *	40103 120p 40104 80p	74HC163 44p 74HC164 44p	74LS90 26p 81LS97 130p 74LS91 55p 81LS98 130p 74LS92 32p 8224 240p	5 ¹ /4 inch DSDD (10 in box) Branded.
VS-4 120p VS-5EG 100p	SL-8000-8080 200p		40105 140p 40106 35p	74HC165 56p 74HC166 60p 74HC173 52p	74LS93 26p 8226 240p 74LS95 41p 8228 270p	Name £7.50 5 ¹ /4 inch DSDD (bulk pack) 25 £10.00
VS-9300 160p VS-9500 155p	TOSHIBA	* SONY ON/OFF *	40107 50p 40108 260p 40109 74p	74HC173 52p 74HC174 38p 74HC175 38p	74LS96 52p 8243 250p 74LS107 28p 8250 850p 74LS109 28p 8087 11000p	31/2 inch DSDD (10 in box) Branded Name £13.00
VS-9700 160p VS-9800 155p	. VUIIDA	* SWITCHES *	40110 170p 40114 180p	74HC181 180p 74HC182 60p	74LS103 28p 8057 1000p 74LS112 28p 8251 270p 74LS113 28p 8253 230p	3 inch CF2 Branded Name £2.40 3 inch CF2D Branded Name £3.00
AMSTRAD	V-55/57 85p V-5250/5280 230p	* 200p *	40117 180p 40147 240p	74HC190 46p 74HC191 65p	PLEASE PHONE US FOR TYPE NOT	LISTED HERE AS WE ARE HOLDING
TVR-1-2-3 210p VCR-4600 & Mk 2 210p	V-5480 210p V-5475 160p	******	40160 55p 40161 55p 40162 55p	74HC192 53p 74HC193 41p 74HC194 46p	Please send 70p P&P and VAT at 159 Quotations given for large quantities Plea	RE GIVEN FOR LARGE QUANTITIES %. Govt, Colleges, etc. Orders accepted. ise allow 7 days for delivery. All brand new
VCR-4700 210p VCR-5200 210p	V-34/5 160p V-7540 160p V-8600 150p	******	40162 55p 40163 55p 40174 48p	74HC194 46p 74HC195 46p 74HC221 80p	Components. All valves are new and be availability and may be changed without	exed. Prices quoted are subject to stock notice
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Line 0/P Trans TX90 20"	. 19.75	Video Head		Cassette Lamp			Reel Mot	or (Genuine)17.50	Amstrad VCR9000 Ferguson 3V00/22/2	9/39 15.9
Line 0/P Trans TX100 90° Line 0/P Trans TX100 110°	. 20.95	V4001/VT9300/9500 Capstan Motor		Pinch Roller			Video He	ssembly	Ferguson 3V32 Ferguson 3V42/44/4	5/5526.9
Mains Trans. (TX90) On/Off Switch (Remote)	.17.95	FF/Rew Idler FF/Rew Pulley		Reel Idler (Genuine)		E MANUALS	VC481 Canstan	Motor	Ferguson 3V43 Fisher FVH520/615/	20
Push Button TX90 Tuner	.12.95	Pinch Roller		REMOTE CONTROLS		Genuine) Complete	Reel Idle	r (Genuine)	Hitachi 8000/9300/9 Hitachi VT11/33E	500 22 .9
		Play)dler Video Head		Ferguson TX9 U/S Basic 14.50	Ferguson TX10	Complete		tor (Genuine)	Mitsubishi HS302 Mitsubishi 303/310.	
FERGUSON VIDEO SPARES		V4100/VT11E/VT33E Capstan Motor (VT11E)		Ferguson TX9/10 N/Text	Ferguson TX90		s	ONY SPARES	Panasonic NV230 Panasonic NV333	
3 V00/16/22 Capstan Motor	24.95	Capstan Motor (VT33E) Clutch Assy		Ferguson TX Stereo Text 12.95 Ferguson TX100 Text	Ferguson 1790	/1 1.95	Capstan	Motor C7 27.95	Panasonic NV366 Panasonic NV370/3	
Drum Motor	. 24.95	FF/Rew Idler (Genuine)		Ferguson 3V23 Video	Fidelity AVS 16 Fidelity AVS20	00 5.95 00 5.95	Pinch Ro	ller C5/6/7	Panasonic NV430 Panasonic NV688	
		Pinch Roller Video Head		Ferguson 3V35 Video 16.95	Edulity CTV/200	R	Rewind	Kit C6	Panasonic NV730 Panasonic NV730	
Pinch Roller Take-Up Clutch (Small)				Ferguson 3V43	Fidelity CTV201	5.95 6.95			 Panasonic NV777 Panasonic NV788 Panasonic NV2000. 	
Pinch Roller Take-Up Clutch (Small) Take-Up Clutch (Large)	5.95	V4005/VT63E	15.05	Fidelity CTV14R/S 12.95				DEO BELT KITS		/000
Pinch Roller Take-Up Clutch (Small) Take-Up Clutch (Large) Video Head 3V29/30	5.95 .15.95	V4005/VT63E Capstan Motor End Sensors (Pair)		Grundig TP200 12.95	Philips CTX-E .		Akai VS1	/2/3/51.95	Panasonic NVG7/9	
Pinch Roller Take-Up Clutch (Small) Take-Up Clutch (Large) Video Head 3V23/30 Capstan Motor	5.95 .15.95 .37.95	V4005/VT63E Capstan Motor		Grundig TP200	Philips CTX-E Philips CTX-S		Akai VS1 Amstrad	/2/3/5	Panasonic NVG7/9 Panasonic NVG10/ Panasonic NVG18.	24 11/15 29 44
Pinch Roller	5.95 .15.95 870 8.70 4.50	V4005/VT63E Capstan Motor End Sensors (Pair) Pinch Roller		Grundig TP200 12.95 Grundig TP400TT 12.95 Grundig TP630/650 12.95 ITT FS9/FS10 Text 15.95 ITT R6301/305 Text 14.50	Philips CTX-E Philips CTX-S Philips KT3 Philips K35		Akai VS1 Amstrad Amstrad Fergusoi	/2/3/5	Panasonic NVG7/9 Panasonic NVG10/	24. 11/15 29. 44. 21/25 39.
Pinch Roller	5.95 15.95 8.70 8.70 	V4005/VT63E Capstan Motor End Sensors (Pair) Pinch Roller Video Head PANASONIC V SPARES	4.95 49.95 VIDEO	Grundig TP200	Philips CTX-E . Philips CTX-S . Philips KT3 Philips K35 Philips KT4/40 Philips 2A		Akai VS1 Amstrad Amstrad Ferguson Ferguson Ferguson	/2/3/5	Panasonic NVG7/9 Panasonic NVG10/ Panasonic NVG18. Panasonic NVG20/ Philips VCR6460/65 Philips VCR6462/65	249 11/15 299 44 21/25 39 20 19 50 37
Pinch Roller Take-Up Clutch (Small) Take-Up Clutch (Large) Video Head 3V29/30 Capstan Motor Loading Motor Pinch Roller Pinch Roller Pilot Lamp Reel Idler Take-Up Clutch Take-Up Clutch	5.95 .15.95 8.70 8.70 80 	V4005/VT63E Capstan Motor End Sensors (Pair) Pinch Roller Video Head PANASONIC V SPARES NV333/366 Complete Maintenanc	495 495 4995 VIDEO	Grundig TP200 225 Grundig TP400TT 2295 Grundig TP500/500 2255 ITT R530/530/500 1255 ITT R530/530/500 1450 ITT R6306 Text 1450 Panasonic NV7200 Video 1555 Philips G11 U/S Full Rem 1595	Philips CTX-E . Philips CTX-S . Philips KT3 Philips K35 Philips KT4/40 Philips 2A Philips 2B		Akai VS 1 Amstrad Amstrad Ferguson Ferguson Ferguson Ferguson Ferguson	/2/3/5 1.95 VCR4500 1.95 VCR7000 1.50 3/00/16/22 2.50 3/23 1.75 3/29/30 1.80 3/35/39 1.95 3/34/45 1.95	Panasonic NVG7/9 Panasonic NVG10/ Panasonic NVG10/ Panasonic NVG20/ Philips VCR6460/65 Philips VCR6462/65 Samsung VX510/61 Sanyo VHR1100/13	24. 11/1529. 44. 21/2539. 2019. 5037. 627. 3029.
Pinch Roller Take-Up Clutch (Small) Take-Up Clutch (Large) Video Head 3V29/30 Capstan Motor Loading Motor Pinch Roller Pinch Roller Pilot Lamp Reel Idter Take-Up Clutch Take-Up Clutch Take-Up Clutch Video Head	5.95 .15.95 8.70 8.70 80 	V4005-VT63E Capstan Motor End Sensors (Pair) Pinch Roller Video Head PANASONIC Y SPARES NV333/366 Complete Maintenanc Kit (Genuine) Cassette LED	1.95 4.95 49.95 VIDEO 6 e 13.75 1.95	Grundig TP200 225 Grundig TP400TT 225 Grundig TP500/500 225 ITT FS9/FS10 Text 15.95 ITT RG301/305 Text 14.50 Pranssonic NV7200 Video 15.95 Philips G11 U/S Full Rem 15.95 Philips G11 U/S Full Rem 12.95 Philips G11 U/R Text 225	Philips CTX-E . Philips CTX-S. Philips KT3 Philips KT3 Philips KT4/40 Philips 2A Philips 2B VIDEO RECOR Ferguson 3V44	2.50 2.50 4.50 5.95 6.95 6.95 0DERS 1/45195	Akai VS1 Amstrad Amstrad Ferguson Ferguson Ferguson Ferguson Ferguson Fisher FN	/2/3/5	Panasonic NVG7/9 Panasonic NVG10/ Panasonic NVG10/ Panasonic NVG20/ Philips VCR6460/65 Philips VCR6462/65 Samsung VX510/61 Sanyo VHR1100/13 Sanyo VHR1100/ Sanyo VTC5000/55	24. 11/1529. 44. 21/2539. 2019. 5037. 627. 1029. 42. 1035.
Pinch Roller	5.95 .15.95 8.70 8.70 80 	V4005-VT63E Capstan Motor End Sensors (Pair) Pinch Roller Video Head PANASONIC V SPARES NV333/366 Complete Maintenanc Kit (Genuine) Cassette LED Pinch Roller		Grundig TP200 22 95 Grundig TP400TT 2.95 Grundig TP500/550 22.95 TIT FS30/530 Text 15.95 ITT RG301/305 Text 14.50 TIT RG301/305 Text 14.50 Panasonic NV7200 Video 15.95 Philips G11 U/S Full Rem. 15.95 Philips G11 U/R Full Rem. 12.95	Philips CTX-E . Philips CTX-S. Philips KT3 Philips K35 Philips KT4/40 Philips 2A Philips 2B VIDEO RECOR Ferguson 3V44 Ferguson 3V44	2.50 2.50 4.50 5.95 6.95 6.95 0DERS (45	Akai VS1 Amstrad Amstrad Fergusoi Fergusoi Fergusoi Fergusoi Fisher FV Hitachi 8 Hitachi 9	/2/3/5	Panasonic NVG7/9 Panasonic NVG10/ Panasonic NVG10/ Panasonic NVG20/ Philips VCR6460/65 Philips VCR6462/65 Samsung VX510/61 Sanyo VHR1100/13 Sanyo VHR1100/130 Sanyo VHR1500 Sanyo VHR1500 Sanyo VHR1500	24. 11/15 29. 44. 21/25 39. 20 19. 50 37. 6 27. 10 29. 42. 10 35. 24. 481 23.
Pinch Roller	5.95 .15.95 870 80 80 	V4005-VT63E Capstan Motor End Sensors (Pair) Pinch Roller Video Head SPARES NV333/366 Complete Maintenanc Kit (Genuine)	1.55 4.95 49.95 VIDEO 6 13.75 1.95 1.95 4.95 4.95	Grundig TP200 22 95 Grundig TP400TT 2.95 Grundig TP500/550 22.95 ITT R530/530/550 12.95 ITT R530/750 Text 14.50 Planasonic NV7200 Video 15.95 Philips G11 U/S Full Rem. 15.95 Philips G11 U/S Full Rem. 12.95 Philips G11 I/R Full Rem. 12.95 Philips G11 I/R Full Rem. 12.95 Philips G11 I/R Full Rem. 12.95 Philips G11 I/S FULL REM 12.95 Philips G15 C5 (Genuine) 12.95	Philips CTX-E. Philips CTX-S. Philips KT3 Philips K35 Philips K35 Philips K34 Philips 2A Philips 2A Philips 2B VIDEO RECOR Ferguson 3V44 Ferguson 3V54 Ferguson 3V55	250 250 450 595 695 695 695 695 695 695 695 695 695	Akai VS1 Amstrad Amstrad Fergusoi Fergusoi Fergusoi Fergusoi Fisher FV Hitachi 8 Hitachi 9 Hitachi V Panasor	/2/3/5 1.95 /2/3/5 1.95 VCR4500 1.95 VCR7000 1.50 3.3/00.16/22 2.50 3.3/02.175 1.35 3.3/23 1.75 3.3/24/45 1.95 3.3/44/45 1.95 3.300 1.95 3.300 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95	Panasonic NVG7/9 Panasonic NVG10/ Panasonic NVG10/ Philips VCR8462055 Philips VCR8462055 Samsung VX510/61 Sanyo VHR100/13 Sanyo VHR1500 Sanyo VTC5000/550 Sentra 8000 Sharp VCS300/381// Sharp VCS300/381/ Sharp VCS300/381/ Sharp VCS300/381/ Sharp VCS300/381/	24. 11/15 29. 44. 21/25 39. 20 19. 50 37. 6 27. 00 29. 42. 10 35. 24. 481 23. 32 27. 24.
Pinch Roller	5.95 .15.95 8.70 4.50 2.85 2.85 1.40 15.95 25.95 21.95 2.85	V4005-VT63E Capstan Motor	e 135 4935 VIDEO 1375 195 335 125 125 125 1435	Grundig TP200 22 95 Grundig TP400TT 2.95 Grundig TP500/500 2.95 Grundig TP500/500 2.95 ITT R530/505 Text 14.50 ITT R6301/305 Text 14.50 Panasonic NV7200 Video 15.95 Philips G11 U/S Full Rem. 15.95 Philips G11 U/S Full Rem. 2.95 Philips G11 U/S Full Rem. 2.95 Philips K13/30 N/Text 2.95 Philips K3/30 Text 2.95 Philips AV5600 Video 15.95 Philips AV5600 Video 15.95 Philips AV5600 Video 15.95	Philips CTX-E. Philips CTX-S. Philips KT3 Philips K35 Philips K35 Philips ZA Philips ZB VIDEO RECOR Ferguson 3V54 Ferguson 3V55 Ferguson 3V55 Ferguson FV11	250 250 450 595 695 0DERS 11.95 547/52 11.95 547/52 11.95 51.11.95 51.11.95 51.11.95 51.11.95 51.11.95 51.11.95	Akai VS1 Amstrad Amstrad Fergusoi Fergusoi Fergusoi Fisher Pi Hitachi 8 Hitachi 9 Hitachi N Panasor Panasor Panasor	//2/3/5 1.95 //2/3/5 1.95 VCR4500 1.95 //2/3/2 1.50 3.3/00/16/22 2.50 3.3/23 1.75 3.2/23 1.75 3.2/23 1.75 3.2/23 1.75 3.2/23 1.55 3.2/24/45 1.95 3.0/24/45 1.95 0.00 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.016 1.973/10 3.016 1.973/10	Panasonic NVG7/9 Panasonic NVG10/ Panasonic NVG10/ Panasonic NVG18, Panasonic NVG30/ Philips VCR646265 Philips VCR646265 Samsung VX510/61 Sanyo VHR100/13 Sanyo VHR100/13 Sanyo VHR100/13 Sanyo VHC500/551/ Santra VCS00/381/ Sharp VCS01/533/6 Salavox 1000 Sany C/567/	24. 11/15 29. 20. 20. 20. 20. 20. 20. 37. 6. 27. 20. 32. 20. 32. 20. 32. 23. 24. 42. 24. 20. 37. 6. 27. 20. 39. 20. 39. 20. 37. 20. 39. 20. 39. 20. 37. 20. 39. 20. 37. 20. 39. 20. 37. 21. 21. 22. 24. 24. 24. 24. 24. 25. 24. 24. 24. 24. 24. 24. 24. 24
Pinch Roller	5.95 .15.95 870 450 870 80 2.85 2.45 2.95 21.95 2.85 2.85 2.45 2.45 2.45 2.45 2.45 2.45 2.45 2.45 2.45	V4005-VT63E Capstan Motor End Sensors (Pair) Pinch Roller Video Head PANASONIC Y SPARES NV333/366 Complete Maintenanc Krt(Genuine) Pinch Roller Pinch Roller Play Idler (Genuine) Reel Motor (Genuine) VV370/380 Complete Maintenanc	1.55 49.95 VIDEO 6 8 13.75 1.95 1.25 1.25 14.95 17.95 8	Grundig TP200 22.95 Grundig TP400TT 22.95 Grundig TP500/500 22.95 ITT R530/505 12.95 ITT R530/505 12.95 ITT R530/505 14.50 ITT R530/505 14.50 Panasonic NV7200 Video 15.95 Philips G11 I/R Full Rem. 15.95 Philips G11 I/R Text. 12.95 Philips G11 I/R Text. 12.95 Philips G11 I/R Text. 12.95 Philips G11 G00 Video 15.95 Philips RC5 (Genuine) 12.95 Philips RC5 (Genuine) 12.95 Philips RC5 (Genuine) 13.95 Redifusion Mk 4A text. 13.95 Redifusion Mk 4A text. 13.95	Philips CTX-E. Philips CTX-S. Philips KT3 Philips KT3 Philips KT440 Philips ZA Philips ZB VIDEO RECOR Ferguson 3V4 Ferguson 3V4 Ferguson 3V4 Ferguson 3V5 Ferguson 3V5 Ferguson V11 Ferguson FV1 Philips VR646C	250 250 450 350 595 695 695 00ERS 11.95 11.95 11.95 11.95 11.95 5.11.95 11.95 5.11.95 5.11.95 5.11.95 5.11.95 5.5 11.95 5.5 1.95 5.5 1.95 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5	Akai VS1 Amstrad Amstrad Ferguson Ferguson Ferguson Fisher F/ Hitachi 8 Hitachi 9 Hitachi V Panasor Panasor Panasor Panasor Panasor	/2/3/5 1.95 /2/3/5 1.95 VCR4500 1.95 VCR4500 1.50 3.3/00.116/22 2.50 3.3/23 1.57 3/29/30 1.80 3/25/39 1.95 3/25/30 1.95 3/26/15 1.95 000 1.95 3/11 1.95 000 1.95 1711E 1.95 16/17/30 1.95 16/17/30 1.95 16/17/30 1.95 16/17/30 1.95 16/17/30 1.95	Panasonic NVG7/9 Panasonic NVG10/ Panasonic NVG10/ Panasonic NVG18. Panasonic NVG18. Philips VCR6462/65 Samsung VX510/61 Sanyo VHR100/13 Sanyo VHR100/13 Sanyo VHR100/13 Sanyo VHR100/13 Sanyo VHS00/550 Solavox 1000. Sony C30/30. Toshiba V9600/V31	24. 11/1529. 44. 21/2539. 2019. 2037. 627. 2029. 42. 2035. 24. 23. 24. 181. 23. 24. 191. 24. 24. 25. 24. 24. 24. 25. 24. 24. 24. 24. 25. 24. 24. 24. 24. 24. 24. 24. 24
Pinch Roller	5.95 .15.95 870 450 870 80 2.85 2.45 2.95 21.95 2.85 2.85 2.45 2.45 2.45 2.45 2.45 2.45 2.45 2.45 2.45	V4005-VT63E Capstan Motor	e 1375 4935 VIDEO 6 13.75 1.95 1.95 1.25 14.95 17.95 14.95 17.95 6 12.95	Grundig TP200 22 95 Grundig TP400TT 2.95 Grundig TP500/500 22.95 TIT R530/505 Text 14.50 TIT R6301/305 Text 14.50 TIT R6301/305 Text 14.50 Panasonic NV7200 Video 15.95 Philips G11 U/S Full Rem. 15.95 Philips G11 U/S Full Rem. 12.95 Philips R53/30 Text 12.95 Philips R55 (Genuine) 12.55 Philips R55 (Genuine) 12.55 Sony RM604/605/606 14.55 Sony RM612/615 14.56 <td>Philips CTX-E. Philips CTX-S. Philips KT3 Philips KT3 Philips XT440 Philips 2A Philips ZA Philips ZA VIDEO RECOR Ferguson 3V4 Ferguson 3V4 Ferguson 3V5 Ferguson 3V5 Ferguson SV1 Ferguson FV11 Philips VH6462 Philips VH6462</td> <td>250 250 450 595 695 10ERS 1195 547/52 1195 5 1195 5 1195 5 1195 5 5 1195 5 5 1195 5 5 1195 5 5 1195 5 5 1195 5 5 5</td> <td>Akai VS1 Amstrad Amstrad Ferguson Ferguson Ferguson Fisher FV Hitachi 8 Hitachi 9 Hitachi 9 Panasor Panasor Panasor Panasor Sanyo V</td> <td>/2/3/5 1.95 /2/3/5 1.95 VCR4500 1.95 VCR4500 1.50 3.3/00.116/22 2.50 3.3/23 1.57 3/29/30 1.80 3/3/35/39 1.95 3/3/35/39 1.95 3/3/30 1.95 3/3/30 1.95 3/300 1.95 3/300 1.95 3/300 1.95 111 1.95 150 1.97 151 1.97 161 1.95 1711E 1.95 152 1.00 15 1.01 15 1.01 161 1.95 161 1.95 161 1.95 161 1.95 161 1.95 161 1.95 161 1.95 161 1.95 161 1.95 161 1.95 <</td> <td>Panasonic NVG7/9 Panasonic NVG10/ Panasonic NVG10/ Philips VCR846205 Philips VCR846205 Philips VCR846205 Samsung VX510/61 Sanyo VHR150/ Sanyo VHR150/ Sanyo VHR150/ Sharp VCS30/0381/ Sharp VCS3</td> <td>243 243 293 293 204 21/25 205 203 203 203 203 203 203 203 203</td>	Philips CTX-E. Philips CTX-S. Philips KT3 Philips KT3 Philips XT440 Philips 2A Philips ZA Philips ZA VIDEO RECOR Ferguson 3V4 Ferguson 3V4 Ferguson 3V5 Ferguson 3V5 Ferguson SV1 Ferguson FV11 Philips VH6462 Philips VH6462	250 250 450 595 695 10ERS 1195 547/52 1195 5 1195 5 1195 5 1195 5 5 1195 5 5 1195 5 5 1195 5 5 1195 5 5 1195 5 5 5	Akai VS1 Amstrad Amstrad Ferguson Ferguson Ferguson Fisher FV Hitachi 8 Hitachi 9 Hitachi 9 Panasor Panasor Panasor Panasor Sanyo V	/2/3/5 1.95 /2/3/5 1.95 VCR4500 1.95 VCR4500 1.50 3.3/00.116/22 2.50 3.3/23 1.57 3/29/30 1.80 3/3/35/39 1.95 3/3/35/39 1.95 3/3/30 1.95 3/3/30 1.95 3/300 1.95 3/300 1.95 3/300 1.95 111 1.95 150 1.97 151 1.97 161 1.95 1711E 1.95 152 1.00 15 1.01 15 1.01 161 1.95 161 1.95 161 1.95 161 1.95 161 1.95 161 1.95 161 1.95 161 1.95 161 1.95 161 1.95 <	Panasonic NVG7/9 Panasonic NVG10/ Panasonic NVG10/ Philips VCR846205 Philips VCR846205 Philips VCR846205 Samsung VX510/61 Sanyo VHR150/ Sanyo VHR150/ Sanyo VHR150/ Sharp VCS30/0381/ Sharp VCS3	243 243 293 293 204 21/25 205 203 203 203 203 203 203 203 203
Pinch Roller Take-Up Clutch (Small) Take-Up Clutch (Large) Video Head 3V29/30 Capstan Motor Pinch Roller Pinch Roller Pinch Roller Pinch Roller Pinch Roller Pinch Roller Take-Up Clutch Take-Up Clutch Take-Up Clutch Capstan Motor Capstan Motor Reel Idler Take-Up Clutch Take-Up Clut	5.95 .15.95 	V4005-VT63E Capstan Motor End Sensors (Pair) Pinch Roller Video Head PANASONIC Y SPARES NV333/366 Complete Maintenanc Kit (Genuine) Reel Idder (Genuine) NV370/380 Complete Maintenanc Kit (Genuine) Pinch Roller NV370/380 Complete Maintenanc Kit (Genuine) Pinch Roller NV370/380 Complete Maintenanc Kit (Genuine) Pinch Roller Pinch Roller Pinch Roller NV370/380 Complete Maintenanc Kit (Genuine) Pinch Roller Pinch Roller Pinch Roller Complete Maintenanc Complete Main	195 495 495 495 495 495 495 495 1375 195 335 195 195 495 125 125 125 125 255 255 255	Grundig TP200 22.95 Grundig TP400TT 22.95 Grundig TP500/500 22.95 ITT R530/505 12.95 ITT R530/505 12.95 ITT R530/505 14.50 ITT R530/505 14.50 Panasonic NV7200 Video 15.95 Philips G11 I/R Full Rem. 15.95 Philips G11 I/R Text. 12.95 Philips G11 I/R Text. 12.95 Philips G11 I/R Text. 12.95 Philips G11 G00 Video 15.95 Philips RC5 (Genuine) 12.95 Philips RC5 (Genuine) 12.95 Philips RC5 (Genuine) 13.95 Redifusion Mk 4A text. 13.95 Redifusion Mk 4A text. 13.95	Philips CTX-E. Philips CTX-S. Philips KT3 Philips KT3 Philips KT4.40 Philips ZA Philips ZA Philips ZB VIDEO RECOR Ferguson 3V4 Ferguson 3V4 Ferguson 3V4 Ferguson 3V5 Ferguson 3V5 Ferguson V11 Ferguson FV1 Philips VR6462 Philips VR6462 Philips VR652C	250 250 450 350 595 695 0DERS 11.95 11.95 11.95 11.95 11.95 11.95 11.95 11.95 11.95 11.95 11.95 11.95 11.95 11.95 11.95 5.11.95 5.11.95 5.5 11.95 5.5 11.95 5.5 1.95 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5	Akai VS1 Amstrad Amstrad Fergusoi Fergusoi Fergusoi Fergusoi Fisher FX Hitachi 9 Hitachi 9 Hitachi 9 Hitachi 9 Panasor Panasor Panasor Sanyo V Sanyo V Sharp VI	/2/3/5 1.95 /2/3/5 1.95 VCR4300 1.95 VCR4300 1.50 3.016/16/22 2.50 3.023 1.75 3.023/30 1.80 3.023/30 1.95 3.023/30 1.95 3.023/31 1.95 3.023/31 1.95 3.023/31 1.95 3.024/44/5 1.95 0.00 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.000 1.95 3.016 NV730 3.05 1.05 3.06 NV2000/2010 3.95 1.05 3.06 NV2000/2010 3.95 1.95 3.06 NV2000/2010 3.95 1.95 3.06 1.95 3.07 1.95 3.06 1.90	Panasonic NVG7/9 Panasonic NVG10/ Panasonic NVG10/ Panasonic NVG18, Panasonic NVG18, Panasonic NVG20/ Philips VCR646265 Philips VCR646265 Samsung VX510/61 Sanyo VHR100/13 Sanyo VHR100/13 Sanyo VHR100/13 Sanyo VHR100/13 Sanyo VHS00/381/ Sanyo VHS00/381/ Sanyo VCS81/583/6 Salavox 1000. Sany C20/30. Toshiba V9600/V31 Toshiba V9600/V31 Toshiba V9600/V31 ORDEF Please add 759 Add 15% VAT to	243 11/15 291 444 21/25 391 20 199 50 37 50 37 50 37 50 37 50 37 50 37 50 37 50 29 50 20 50 20 50 50 20 50 20 50 20 50 20 50 20 50 20 50 50 20 50 20 50 50 50 50 50 50 50 50 50 50 50 50 50
Pinch Roller	5.95 .15.95 	V4005-VT63E Capstan Motor End Sensors (Pair) Pinch Roller Video Head PANASONIC V SPARES NV333/366 Complete Maintenanc Kit (Genuine) Play Idler (Genuine) Reel Motor (Genuine) Video Head NV370/380 Complete Maintenanc Kit (Genuine) Pinch Roller	195 4,95 495 70DEO 9 8 195 195 195 195 195 195 195 195 195 195	Grundig TP200 225 Grundig TP400TT 2295 Grundig TP50050 2255 TIT R530/530/550 2255 TIT R630/505 Text 1450 TIT R630/505 Text 1450 Panasonic NV7200 Video 1535 Philips G11 U/S Full Rem 2295 Philips G11 U/S Full Rem 2295 Philips G11 U/R Full Rem 2295 Philips G11 U/R Full Rem 2295 Philips K13/30 NText 2305 Philips K13/30 NText 2455 Sony RM604/605/606 1455 Sony RM612/615 1459 Sony RM612/63/5 1459	Philips CTX-E, Philips CTX-S, Philips KT3 Philips KT3 Philips KT440 Philips ZA Philips ZB Philips ZB Philips ZB Philips ZB Philips ZB Ferguson 3V4 Ferguson 3V4 Ferguson SV5 Ferguson SV5 Ferguson VC Ferguson FV12 Philips VR6460 Philips VR6460 Philips VR6462 Philips VR6462 Philips VR6542 Philips VR6542	250 250 450 350 596 695 057 1195 1195 1195 1195 1195 1195 1195 11	Akai VSI Amstrad Amstrad Fergusoi Fergusoi Fergusoi Fergusoi Fisher FN Hitachi 8 Hitachi 9 Hitachi 9 Hitachi 9 Panasor Panasor Panasor Panasor Sanyo V Sharp VI Sharp VI	//2/3/5 1.95 //2/3/5 1.95 VCR4500 1.95 //2/3/2 1.50 3/10/16/22 2.50 3/2/3 1.55 3/2/3 1.55 3/2/3 1.55 3/2/3 1.55 3/2/3 1.55 3/2/3 1.55 3/2/3 1.55 3/2/3 1.55 3/2/3 1.55 3/2/3 1.55 3/2/3 1.55 000 1.55 3/300 1.55 3/300 1.55 3/300 1.55 1/1 E 1.95 1/1 E 1.95<	Panasonic NVG7/9 Panasonic NVG10/ Panasonic NVG10/ Panasonic NVG10/ Panasonic NVG18, Panasonic NVG10/ Philips VCR646265 Samsung VX510/61 Sanyo VHR1100/13/ Sanyo VHR1100/13/ Sanyo VHR1100/13/ Sanyo VHR1100/13/ Sanyo VK510/530/53/6 Slatar VC580/53/6 Slatar VC580/53/	24. 11/1529. 11/1529. 20.19. 20.19. 20.19. 20.19. 20.19. 20.29. 21. 21. 22. 24. 24. 24. 24. 24. 24. 24

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No. 1 LIST BAKERS DOZEN PACKS NO. I LIST BARENS LOZEN PACKS All packs are £1 each, if you order 12 then you are entitled to another free. Please state which one you want. Note the figure on the extreme left is the pack ref number and the next figure is the quantity of items in the pack, finally a short description. 5 13A spurs provide a fused outlet to a ring main where device such as a clock must not be switched BD2 where device such as a clock must not be switched off
 in flex switches with neon on/off lights, saves leaving things switched on
 6v. 1A mains transformers upright mounting with BD7 BD9 fixing clamps 61/2'' speaker cabinet ideal for extensions, takes your speaker. Ref BD137 + 50p. BD11 61/2" your speaker. Her BU137 + 30p.
 30 watt reed switches, it's surprising what you can make with these – burglar alarms, secret swit-ches, relay etc. etc.
 25 watt loud speaker two unit cross-overs
 B.O.A.C. stereo unit is wonderful breakdown value
 nicad constant current chargers adapt to charge alarget reu aced batters BD13 BD22 BD29 BD30 almost any nicad battery humidity switches, as the air becomes damper the membrane stretches and oeprates a microswitch **RD32** 2 memorane stretches and oeprates a microswitch 13A rocket switch three tag so on/off, or change over with centre off 24hr time switch, ex-Electnorty Board, automati-cally adjust for lengthening and shortening day neon valves, with series resistors, these make reod eight light. BD42 5 BD45 5 neon valves, wit good night lights BD49 good night lights mini uniselector, one use is for an electric jigsaw puzzel, we give circuit diagram for this. One pulse into motor, moves switch through one pole BD56 1 flat solenoids - you could make your multi-tester read AC amps with this BD59 2 suck or blow operated pressure switch, or it can **BD67** operated by any low pressure variations such water level in water tanks 50 750MA power supply, nicely cased with input ind output leads 6v 750MA nov BD103A stripper boards each contains a 400v 2A bridge rectifier and 14 other diodes and rectifiers as well BD120 as dozens of condensers etc very fine drills for p.c.b. boards etc Normal cost BD128 10 about 80p each plastic boxes approx, 3" cube with square hole through top so ideal for interrupted beam switch motors for model aeroplanes, spin to start so needs no switch BD132 2 10 BD134 needs no switch microphone inserts - magnetic 490 ohm also act BD139 6 as speakers reed relay kits you get 16 reed switches and 4 coil sets with notes on making c/o relays and other BD148 gadgets safety cover for 13A msockets - prevent those inquisitive little fingers getting nasty shocks neon indicators in panel mounting holders with **BD149** BD180 6 5 amp 3 pin flush mounting sockets makes a low cost disco panel – need cable clips in flex simmerstat – keeps your soldering iron etc BD193 6 **BD196** 1 always at the ready mains solenoid very powerful has 1" pull or could BD199 1 push if modified keyboard switches - made for computers but have BD201 8 other applications many other applications electric clock mains operated put this in a box and you need never be late 12v alarms make a noise about as loud as a car hom. Sightly solid but OK $6^{\circ} \times 4^{\circ}$ speakers 4 ohm made from Radiomobile to a new or descubibly. BD211 1 5 BD221 2 6 BD242 so very good quality panostat, controls output of boiling ring from 1 panostal BD252 simmer to boil 50 leads with push on 1/4" tags - a must for hook ups BD259 mains connections etc
 oblong push switches for bell or chimes, these can mains up to 5 amps so could be foot switch if fitted BD263 into pattress mini 1 watt amp for record player Will also change 8D268 1 speed of record player motor 3 mild steel boxes approximately $3'' \times 3'' \times 1''$ deep BD283 standard electrical 50 mixed silicon diodes BD293 BD305 BD667 tubular dynamic mic with optional table rest 4.7uf, non-polarised block capacitors, pcb ò 4.7uf, non-polariseu unon experimental mounting Books. Useful for beginners. Describes amplifiers, test equipment and ki sets Miniature driver transformers. Ref LT44. 20k to 1k, centre tapped 3.5 volt operated relays, each with two pairs CO contacts 4 **BD400** BD653 2 BD553a 2 contacts BD548 2 3.5 volt operated relays, each with two pairs CO contacts There are over 1,000 items in our Bakers Dozen List. If you want a complete copy please request this when videring.

EQUIPMENT WALL MOUNT. It is a multi-adjustable metal bracket that could EQUIFWENT WALL MOUTH: It is a multi-application retail bracket functions be used for mounting flood light, loud speaker. TV camera, even a fan and on almost any sort of wall or ceiling even between wall and ceiling. The man fixing brackets rotate such that an inward or an outward comer can be accommodated Front panel also titis upwards or downwards to a reasonable angle and can be easily removed separately for wiring. A very useful bracket Regular pnce would be around £6 each. Our price only £3. Our ref 3P72. Or 2 for £5. Our ref 5P152. EXTRA SPECIAL CROC CLIPS. Medium size, just right for most hook-ups. Normally self for around 10p to 15p each. These are insulated and have a length of write connected to them but this is very easy to snip off if you do not need it. 20 for

C1 Our ref BD117A COPPER CLAD PANEL for making PCB. Size approx 12in long \times 8/zin wide Double-sided on fibreglass middle which is guite thick fabout 176in) so this would support guite heavy components and could even form a chassis to hold a mains transformer, etc. Proc £1 each. Our ref BD683.

FET CAPACITOR MICROPHONE EAGLE C1.200 Output equivalent to a high class dynamic microphone while retaining the characteristics of a capacitor microphone. Price £1. Our ref BD646.

SUB-MAN TOGGLESWITCH Body size 8mm × 4r chrome dolly fixing nuts. 3 for £1.00. Order ref BD649 4mm × 7mm S8DT with

POWERFUL IONISER

Generates approx. 10 times more IONS than the ETI and similar circuits. Will refresh your home, office, shop workroom etc. Makes you feel better and work harder – a complete mains operated kit, case included $\pounds 12.50 + \pounds 2 P \& P$. Our ref 12P5/1. REAL POWER AMPLIFIER for your car, it has 150 watts output. Frequency response 20hz to 20Khz and signal to noise ratio, better than 60 db. Has built in short circuit protection and adjustable input level to sui your existing car stereo, so needs no pre-amp. Works into speakers. Ref. 30P7 described below. A real bargain at only £57.50. Order ref: 57P1

REAL POWER CAR SPEAKERS. Stereo pair output 100w each. 4-Ohm impedence and consisting of 61/2" wooter, 2" mid range and 1" tweeter. Each set in a compact purpose built shelf mouthing unt. Ideal to work with the amplifier described above. Pric sper par £29,96. Order ref:

STEREO CAR SPEAKERS. Not quite so power – 70w per channel. 3' wooler. 2' mid range and 1' diameter. Again, in a super purpose built shelf mounting unit. Price per pair: £27.95. Order ref: 28P1



ELECTRONIC SPACESHIP. Sound and impact controlled, responds to claps and shouts and reverses when it hits anything. Kit with really detailed instructions. Ideal present for budding young electrician. A youngster should be able to assemble bud you may have to help with the soldering of the compo-nents on the pcb. Complete kit £8. Our ref 8P30.

12" HIGH RESOLUTION MONITOR. Black and white screen, beautifully cased for free standing, needs only a 12-1.5 amp supply. Technical data is on its way but we understand these are TTL input. Brand new in maker's cartons. Price: \$22.00 Post Free.

14" COLOUR MONITOR made by the American Display Tek To COLOUR monitor that make by the Antendari Disparation of the Antendari Disparation of the Antendaria State and the Antendaria State and State a Order ref: 89P/1

BUSH RADIO MIDI SPEAKERS. Stereo pair. BASS reflex system, using a tull range 4in driver of 4ohms impedance. Mounted in very nicely made black fronted walnut finish cabinets. Cabinet size aporox 81/2in wide, 14in high and 31/2in deep. Fitted with a good length of speaker flex and terminating with a normal audio plug. Price £5 the pair plus £1 post. Our ref 5P141.

31/2in FLOPPY DRIVES. We still have two models in stock: Single sided, 80 track, by Chinon. This is n the manufacturers metal case with leads and ICD connectors. Price 140, reference 40P1, Also a double sided, 80 track, by NEC. This is uncased. Price 159:50. reference 60P2. Both are brand new. Insured delivery £3 on each or both



ATARI 65XE COMPUTER At 64K this is most powerful and suit-able for home and business. Brand new, complete with PSU. TV lead, own-er's manual and six games. Can be yours for only £45 plus £3 insured delivery.

REMOTE CONTROL FOR YOUR 65XE COMPUTER. With HEMOTE CONTINCE FOR TOOL SALE CONFIDENT, with this outfit you can be as much as 20 leet away as you will have a joystock that can transmit anc a receiver to plug into and operate your computer and TV. This is also just right if you want to use it with a bug screen TV. The joystock has two fire buttons and is of a really superior quality, with four suction cups for additional control and one handed play. Price £15 for the radio controlled pair. Our ref 15P27.

65XE COMPENDIUM. Containts: 65XE Computer, its data recorder XC12 and its joystick, with len games, for £62.50 plus £4 insured delivery.

ASTEC PSU. Mains operated switch mode, so very compact. Outputs: +12v 2:5A, +5v 6A, ±5v:5A, ±12v:5A. Size:71/4in long x 43/ain wide x 24/ain high, Cased ready for use. Brand new. Normal price £30+, our price only £12.95. Our ref 13P2.

VERY POWERFUL 12 VOLT MOTOR. 1/ard Horsepower Made to drive the Sinclair CS electric car but adaptable to power a go-kart, a mower, a rail car, model railway, etc. Brand new. Prace £20 plus £2 postage Our rel 20°£2.

PHILIPS LASER

This is helium-neon and has a power rating of 2mW. Completely safe so long as you do not look directly into the beam when eye damage could result. Brand new, full spec. 530 plus 53 Insured delivery. Mains operated power supply for this tube gives 8kv striking and 1.25kv et 5mA running. Complete kit with case £15, ditto for 12v bettery. Also £15. Our ref 16n2? Our ref 15p22

ORGAN MASTER, Is a three octave musical keyboard. It is beautifully made, has full size (piano size) keys, has gold plated contacts and is complete with ribbon cable and edge connector. Can be used with many computers, request information sheet. Brand new, only £15 plus £3 postage. Our rel 15P15.

FULL RANGE OF COMPONENTS at very keen proces are available from our associate company SCS COMPONENTS. You may already have their catalogue, if not request one and we will send it FOC with your goods.

HIGH RESOLUTION MONITOR. 9in black and white, uses Philips tube M24/306W. Made up in a lacquered frame and has ppen sides. Made for use with OPD computer but suitable for most others. Brand new, £16 plus £5 post. Our reference 16P1.

12 VOLT BRUSHLESS FAN. Japanese made. The popular square shape (4¹/₂in × 4¹/₂in × 1³/₄in). The electronically run fans not only consume very little current but also they do not cause interference as the brush type motors do. Ideal for cooling computers, etc., or for a caravan. E8 each. Our rel 8F26.

MINI MONO AMP. on p.c.b. size 4" × 2" (app.) Fitted volume control and abole for a tone control should you require it. The amplifier has three transistors and we estim has three transitions and we estimate the output to be 35% ms. More technical data will be included with the amp. Brand new, perfect condition, offered at the very low price of £1.15 each of 13 for £12.00

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POPULAR ITEMS - MANY NEW THIS MONTH

TELESCOPIC FM AERIAL. Stands up or folds over. Solidly constructed and heavily nuckel plated. Supplied complete with fixing nut. Price £1 each Order ref: 80717

TELEPHONE TYPE KEY PAD. Really first class rear mounting unit White lettering on black buttons. Has conductive rubbers contacts with soft click operation. Clicuit arranged in telephone type array Requires 70mm by 55mm cut out and is connected by 10-pin IDC socket. Price: 52 00 each. Order ref: 2P251.

JOYSTICKS for BBC, Atari, Dragon, Commodore, etc. All £5 each. State which required

SUB-MIN PUSH SWITCHES. Not much bigger than a plastic transistor but double pole PCB mounting. Three for \$1. Our ref BD688

NICAD CHARGER UNIT. Metal pronged, plastic case contains mains transformer and rectrifiers with output lead and plug – made to charge two cells but no doubt adaptable or wonderful spares value. Only 50p each, two for £1. Our ref DB385.

EDGEWISE PANEL METER. It you are short of panel space then this may be the answer. It has a FSD of 100 μ A and a nice full vision scale. It fits through a hole approx 1/4m x 1/2m. Another feature is that it has an indicator tamp behind the scale which you could light up, it would then serve as an onvolt indicator Price £1. Quir ref BD700.

AA CELLS. Probably the most popular of the rechargeable NICAD types. 4 for £4.

20WATT 400HM SPEAKER. With built-in tweeter Really well made unit which has the power and the quality for hi-fi reproduction $6^{1/2}$ in diameter Price Ω . Our ref 5P155. It is heavy so please add Ω to cover postage if not collecting.

MINI RADICI MODULE. Only about 2 in square with ferrite aerial and solid dia tuner with its swn knob. It is a superhet and it operates from PP3 battery and would drive a crysta headphone direct but be better with our mini mono amp. Price £1. Our ret BD71b

BULGIN MAINS PLUG AND SOCKET. The old fatthful 3 pin with screw terminals. The socket mounts through a 1¹/2in hole and the mains is brought in by the insulated plug. Used to be quite expensive but you can have 2 pairs for £1 or 4 of effther plug or socket for £1, You could make yourself a neat and compact bench panel with these. Our ref BD715, B07155 or BD715P.

NICROPHONE. If you want a low cost microphone then just arrived we have a very small hand-heid dynamic mic with on/off switch in the handle, its lead terminates with one 3 5 plug and the other a 2.5 plug for remote control Price only CT Our rel BD711

EXTENSION CABLE WITH A OIFFERENCE. It is flat on one side making it easy to fix and to look tidy. It is 4 core so suitable for telephone, bell, burglar alarms, etc. 50 yard coil for £5, Our ref 5P153.

MOSFETS FOR POWER AMPLIFIERS AND HIGH CURRENT DE-VICES. 140v 100w pair made by the famous Hitachi Company Refer 25K413 and its compliment 25J118. Only £4 the pair Our ref 4P42.

RATTERY OPERATED TRAVEL MECHANISM. On a plastic panel measuring approx gin \times 3/2in. Is driven by a reversible 12v battery motor, fitted with pulley and bett which rotates a threaded rod and causes a platform to travel backwards and forward: through a distance of approx 5in. Price £5 Our ref 5P140.

MAINS OPERATED WATER VALVE with hose connection for inlet and outlet suitable for low pressure. Auto plant watering, etc. Only £1 each. Our ref BD370.

20 VOLT 4AMP MAINS TRANSFORMER. Upright mounting with fixing feet. Proc 53. Our ref 3P59

16 OHM PM SPEAKERS. Approx 7in × 4in. 5 watts. Offered at a very low price so you can use two in parallel to give you 10 watts at 8 ohms. £t for the two. Our ref BD684.

EHT TRANSFORMER, 4kv 2mA Ex-unused equipment, £5. Our ref 5P139

4 CORE TIMSEL COPPER LEAD. As fitted to telephones, terminating with flat BT plug 2 for €1 Our ref 8D639.

EHT TRANSFORMER. 8kv 3mA £10. Our ref 10P56

VERY USEFUL MAGNETS. Flat, about 1in long, $\frac{1}{2}$ in wide and $\frac{1}{4}$ in thick. Very powerful. 6 for £1. Our ref BD274(a).

ACORN COMPUTER OATA RECORDER. Ref ALF03, Made for the Electron or BBC computers but suitable for most others. Complete with mains adaptor, leads and handbook £10 00 Ref 10P44. Add £2 special packing.

SOLAR CELLS. Will give a good current (depending on size) from sunlight or bright daylight Module A gives 100mA. Price £1. Our ref BD631. Model C gives 400mA. Prixe £2. Our ref 2P199. Module D gives 700mA. Price £3. Our ref 3P42.

SOLAR POWERED NI-CAD CHARGER 4 NI-CAO battenes AA (HP7) charged in eight hours or two in only 4 hours. It is complete, boxed ready to use unit. Price £6. Our Rel 6P3.

METAL PROJECT BOX. Ideal size for battery charger, power supply etc; sprayed grey, size $8^{\circ} \times 4^{1}/4^{\circ} \times 4^{\circ}$ high, ends are lowered for ventilation other sides are flat and undrilled. Price £3. Order Ref. 3P75

13A PLUGS. Sleeved and complete with fuse, parcel of 5 for £2 Order Ref. 2P186.

CAPACITOR BARGAIN – axial ended – 4700ut (α 25v Jap made. Normally 50p each, but you will get 4 for £1. Ref. 613

SINGLE SCREENED FLEX 7 02 copper conductors, pvc insulated then with copper screen, finally outer insulation. In fact quite normal screened flex. 10m for £1 Our ref BD668

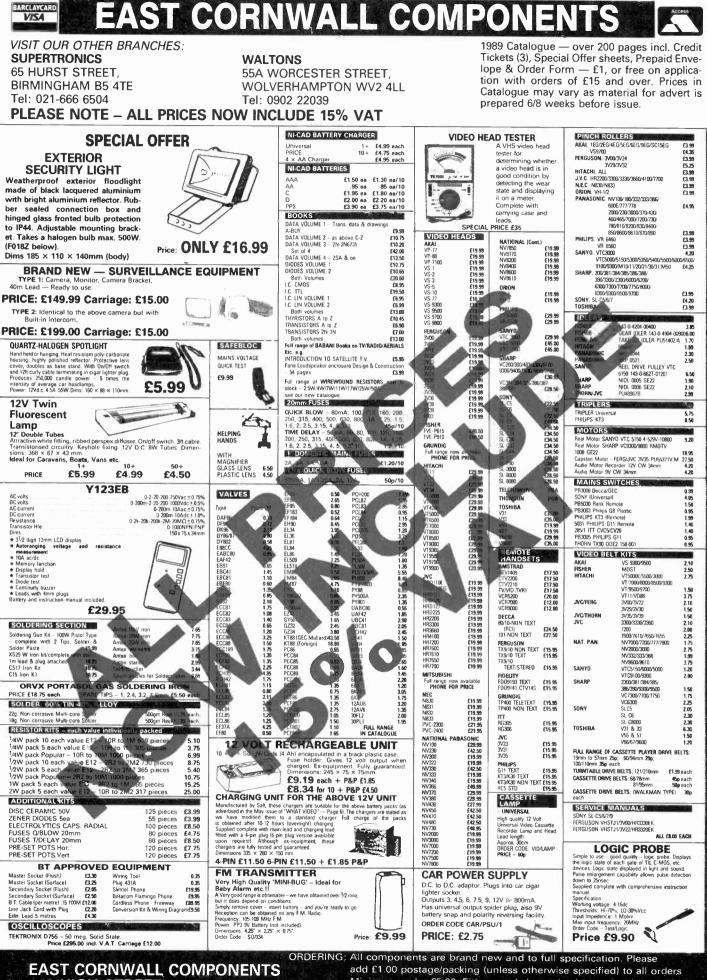
3 CORE FLEX BARGAIN No. 1 - Core size 5mm so ideal for long extension lead carrying up to 5 amps or short leads up to 10 amps 15mm £2 Ref. 2P189.

3 CORE ILEX BARGAIN No. 2 – Core size 1 25mm so suitable for long extension leads carrying up to 13 amps – or short leads up to 25A, 10m for E2. Order Ref. 2P190

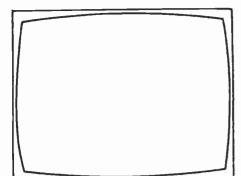
ALPHA-NUMERIC KEYBOARD — this keyboard has 73 keys with contactless capacitance switches giving long trouble free life and no contact bounce. The keys are arranged in two groups, the main area field is a QWERTY array and on the nght is a 15 key number pad. board size is approx. 13" × 4" – brand new but offered at only a fraction of its cost namely C3, plus £1 post. Ref 3P27

VaTH HORSEPOWER 12 VOLT MOTOR. Made by Smiths, the body length of this is approximately 3m, the diameter 3m and the spinole 3/16th of an inch diameter thas a centre liange for lixing or can be fixed from the end by means 02 nuts. A very powerful little motor which revs at 3,000 rpm. We have a large quantity of them so if you have any projects in mind then you could rely on supplies for at least two years. Price SE Our ref 6P1, discound for quantities of 10 or more.





119 HIGH STREET WEM SHROPSHIRE SY4 5TT TEL: 0939 32689 TELEX: 35565 FAX: 0939 33800 All components are brand new and to full specification. Please add £1.00 postage/packing (unless otherwise specified) to all orders. Minimum order £5.00. Either send cheque/cash/postal order or send/ telephone your Access or Visa number. Official orders from schools, universities, colleges etc most welcome. (Do not forget to send for our catalogue - only £1.00 per copy). Delivery by return on ex-stock items. All prices subject to change without notice. RETAIL shop open Mon-Sat 9.00-5.00. Sat 9-12.00. REMEMBER ALL PRICES NOW INCLUDE VAT



EDITOR

John A. Reddihough

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PRICE INCREASE

We regret the need to increase our cover price to £1.60 from the Frebruary issue. Increased production costs have made this rise necessary.

CORRECTIONS

See page 197.

NEW PRODUCT GUIDE

For commercial reasons the CPC New Product Guide last month was not included with copies distributed overseas. We should have made this clear and apologise for any misunderstandings.

COVER PHOTO

This month's cover photograph shows a Panasonic NV2000 with its top and front covers removed. See article on pages 195-7.

On to the Nineties

As we start upon a new decade I found myself, as long-standing editors tend to do, taking a peek at what I'd written ten years ago, back in 1979. At that time considerable retrenchment was taking place in the West European CTV setmaking industry, with Japanese manufacturers having a growing influence in the UK. Since then of course the indigenous UK setmaking industry has simply faded away. There is still a large manufacturing base in the UK, with exports at record levels, but it's now entirely owned by overseas concerns. CTV sales have waxed and waned during the past decade, with a considerable boom in the late 80s. Right now of course we're in the middle of a classic phase in the stop-go cycle. "stop"

The 80s was the decade when video established itself as a standard part of the domestic scene. At the start of the decade there was still considerable uncertainty about video systems, and the video disc had yet to come and go. By the end of the decade considerable advances had occurred – S-VHS, 8mm video, the camcorder and digital signal processing for example. All at affordable prices. It all goes to show what the Japanese consumer electronics industry can achieve in terms of offering extra value for money.

How long will the present gloom last? Ferguson's spring (1989) Market Report predicted that markets would decline as a result of continuing government efforts to curb consumer spending. 1989 followed the predicted course, with the industry suffering one of its worst years in the decade. The trade balance deteriorated during the year, so the government's clamp down on economic activity has been tightened. But, with an election due in 1992, there is bound to be some relaxation – though probably not until 1991. What a dreary start to the decade! It seems that no lessons in running the economy have been learnt, the same boom and bust pattern persisting. When the upturn does come it's unlikely to be a classic boom, since the TV and video markets in the UK are now mainly replacement ones. We shall have to rely on new products for market growth. This means satellite TV, now perking up after a slow start, more sophisticated VCRs, a further increase in video photography and the prospect of HD-TV towards the end of the decade.

The technology has certainly continued on its course of rapid development. Just a few years ago satellite TV reception was an exotic activity engaged in by a handful of professionals and enthusiasts. Now it's an everyday thing that's come to be accepted as just another of the usual offerings from the industry. There's a steady increase in the number of little dishes to be seen, and installation has turned out to be a relatively routine affair. The digitalisation of TV continues apace now that the chips required have come down in price. Small LCD TV sets are now commonplace, but the c.r.t. looks set to remain the standard device for normal viewing for many years to come. One can't see the 90s as being a period when fortunes will be made in the consumer

electronics field. Satellite TV equipment for example has from the start been offered to viewers at knock-down prices. It's likely to be a tick-over decade, as we wait for the dramatic advance represented by HD-TV.

Query Service Ends

The Query Service has been a feature of this magazine for many years - since March 1951 in fact. In the early days there was a considerable call for it. Those were the days of unreliable sets that many owners could service themselves and the faults were usually easy to diagnose. It was in fact the era of the stock fault. The situation has changed drastically since those days and owner repair is now something of a rarity. There has been a marked decline in the use of our Query Service in recent years, while diagnosis via letters of the ills suffered by modern equipment has become much more difficult. With much of today's video and TV equipment successful fault diagnosis can be achieved only by someone on the spot using sophisticated test equipment. We can guess and give some general guidance about what to look for, but access to stocks of spares, service data and suitable test gear – also very often, especially with video equipment, considerable skill – is usually required to effect repairs successfully. There's also the fact that the range of equipment now encountered, with many sets continuing to work happily for ten to fifteen years or more, is so vast that few people have practical experience of more than a relatively limited range. For all these reasons the Query Service has become steadily less feasible to run and we have reluctantly decided to terminate it.

Although we may continue to include a Service Bureau page for a month or two to publish information on file, we feel that space is better devoted to our TV Fault Finding, VCR Clinic and other servicing features. These provide feedback on actual faults and their remedies rather than guesswork. Those who require a general servicing guide will find that the recently published book "Servicing TV and Video Equipment" by Eugene Trundle is an invaluable reference source. It contains a symptom index to get you rapidly to relevant information. It's published by Heinemann Newnes, Halley Court, Jordan Hill, Oxford OX2 8EJ at £25. We must thank all those contributors who, over the years, have manned the query

service on our behalf.

Camera Tube Guide

Data on TV camera tubes is not readily available. The following list of the main types of vidicon, low-light vidicon (Newvicons and Ultricons) and lead-oxide tubes (Leddicons, Plumbicons and Vistacons) has been compiled to help those who may need to replace a camera tube. The tubes are listed by diameter and grouped by their major characteristics. Within each group the tubes are listed alphanumerically: in general they are interchangeable. Notes at the end identify the more important differences.

In some cases you may find that the type number on a tube has one or more suffix letters. This indicates the grade of tube (broadcast, industrial, amateur) or the channel for which the tube is intended (red, green, blue, luminance). The suffix A is sometimes used for a more important variation and is thus included in the list below.

Except for lead-oxide tubes, which mount as listed, tubes are normally mounted from the front (lens) end of the camera. It's not possible of course to interchange tubes with different focus and/or deflection arrangements.

In case of difficulty an integral mesh tube can be replaced with a separate mesh type of similar specification by wiring G4 and G3 together on the tube base socket. Provided care is taken, it's often possible to use as a replacement a tube with a different heater rating: for example, a tube with a 95mA heater can be used to replace one with a 300mA heater by wiring a 30Ω resistor across the tube socket heater pins.

Striped filter tubes are not listed here as they must usually be replaced with a tube of the same type.

¹/₂in Vidicons

(1) Tubes with magnetic focusing and deflection.

9697, **9737**, **9738**. These tubes have a 90mA heater and separate mesh – the mesh connection is to the ring next to the target connector.

P888. Separate mesh, 150mA heater.

(2) Tube with electrostatic focusing and magnetic deflection.

XQ1600. Separate mesh; 107mA, 2.8V heater.

1/2in Newvicons/Ultricons

See note (1). The following tubes have electrostatic focusing, magnetic deflection and a separate mesh. **XQ1601.** Has a 107mA, 2.8V heater.

XQ1602. Has a 95mA heater and radiation resistant faceplate.

¹/₂in Leddicon/Plubicon/Vistacon

P8470.

⅔in Vidicons

(1) Tubes with magnetic focusing and deflection. E1170, M7075, P8037, TV8800, XQ1271, XQ1310,

Peter Delaney, B.Sc., G8KZG

XQ1311, 20PE13, 20PE13A, 8823, 8844, 9831. Separate mesh, 90mA heater. The P8215 is a short, 65mm version.

XQ1270. Integral mesh, 110mA heater.

XQ1300, 20PE11. Integral mesh, 90mA heater.

(2) Tubes with electrostatic focusing and magnetic deflection.

E5045, **N513**, **N887**, **S4097**, **S4097A**, **XQ1272**, **XQ1590**, **4848**, **8929**, **20PE14**, **20PE19**, **20PE20**. All have separate mesh and 90mA heater.

3/3 in Newvicons/Ultricons

See note (1) at end.

(1) Tubes with magnetic focusing and deflection, a separate mesh and a 95mA heater.

S4075, TV9231, XQ1274, XQ1276 (has extended near infra-red response), XQ1380 (has a radiation resistant faceplate), Z7927, 20PE15, 4833U, 4905.

(2) Tubes with electrostatic focusing, magnetic deflection, a separate mesh and a 95mA heater.

E5071, S4092 (has bipotential focusing lens), S4102, XQ1275, XQ1277 (has bipotential focusing lens and extended near infra-red response), XQ1278 (has bipotential focusing lens), XQ1381, 4875U, 4904.

3/3in Leddicon/Plumbicon/Vistacon

P8160, P8161, XQ1427, XQ1428. Separate mesh, 95mA heater, rear loading.

1in Vidicons

(1) Tubes with magnetic focusing and deflection.

OB2, OB7, P862, P864, XQ1030, 9620, 55850. All have an integral mesh and 95mA heater. The **XQ1031, XQ1032, 7262** and **7262A** are short, 5in. versions.

TH9806, TH9807, TH9808, TH9808N, TH9812, TH9815, TH9817, 7226. All with integral mesh and 150mA heater. The TH9814 is a short, 5in. version.

C9132, C9153. Integral mesh, 300mA heater.

BC7735, HS200, HS200A, HS201, HS201A, P810, P826, P860, 4478, 4488, 7038, 7325, 7735A, 7735A, 7735B, 8484, 10667. All have an integral mesh and 600mA heater.

BC4809, BC8541, C102B, C103B, C104B, C105B, P831, P833 (has mesh connection to ring next to target' connector), P842, P844, P847, P849, P8034A, P8038, P8203, P8204, P8205, XQ1005, XQ1006, XQ1007, ZQ1008, XQ1040, XQ1041, XQ1042, XQ1043, XQ1044, XQ1240, XQ1241, XQ1280, XQ1290, XQ1291, XQ1292, XQ1293, XQ1294, XQ1295, 2260, 4542 (has extended storage target), 4809, 4846, 8541, 8541A, 8604, 8626, 9677, 55851. All have separate mesh and 90 or 95mA heater. The XQ1285, 4569 and 4589 versions have a fibre optic faceplate. The following are short, 5in. versions: P863 (has mesh connection to ring next to target connector), P866, 9706, 9730 (mesh connection as P863), 8573A. The C23151 and C23257A are versions 4in. long.

TH9806PA, TH9807PA, TH9808PA, TH9810, TH9812PA, TH9815PA, TH9817PA, TH9818PA. All with separate mesh and 150mA heater. The TH9814PA is a short, 5in. version.

C102A, C103A, C104A, C105A, C9132A, C9133A, C23281 (has extended storage target), P8030, P8031, TH9833, XQ1001, XQ1002, XQ1003, XQ1004, XQ1050, XQ1051, XQ1052, XQ1053, XQ1054, XQ1060, XQ1061, XQ1062, XQ1063, XQ1064, XQ1065, XQ1066, XQ1067, 2255, 9728, 55852. All with separate mesh and 300mA heater. The XQ1160 and XQ1161 (both with mesh connection to ring next to the target connector) and the 4503A are short, 5in. versions.

BC8507, P841, P841X, P843, P846, P848, P848D, 4589, 8507, 8507A, 8572, 8572A, 8625. All with separate mesh and 600mA heater.

(2) Tubes with electrostatic focusing and magnetic deflection.

BC8134, 4811, 8134. All with separate mesh and 90 or 95mA heater. The 4493, 4494 and 4495 are versions with reduced target area.

(3) Tubes with electrostatic focusing and deflection. 9745. Has separate mesh and 90/95mA heater. The 9802 is a short, 5in. version.

4514. Separate mesh, 300mA heater, short 5in. tube.

1in Newvicons/Ultricons

The following have magnetic focusing and deflection, a separate mesh and 95mA heater. See note (1) at end. E5041, E5058, LLSA-100, S1200, S1201, S1202, S4076, S4119 (has extended near infra-red response), TV9901, XQ1440, XQ1442 (fibre-optic faceplate), XQ1443 (extended near infra-red response), XQ1444 (has radiation resistant faceplate), Z7975, 4532U, 4906. The XQ1445 and 25PE14 are short, 5in. versions.

1in Leddicons/Plumbicons/Vistacons

The following have a separate mesh, 90 or 95mA heater and are for front loading:

BC4892, BC4893², BC4894, P8021, P8022³, P8023², P8024^{2.3}, P8025^{4.5}, P8026^{2.4.5}, P8190⁶, P8191^{2.6}, XQ1070⁵, XQ1071⁵, XQ1072⁵, XQ1073^{2.5}, XQ1074^{2.5}, XQ1075^{2.5}, XQ1076^{2.5}, XQ1090^{4.5}, XQ1091^{4.5}, XQ1093^{2.4.5}, XQ1094^{2.4.5}, XQ1095^{2.4.5}, XQ1096^{2.4.5}.

The following have a separate mesh, 90 or 95mA heater and are for rear loading:

P8141, P8142³, P8143², P8144^{2,3}, P8145^{4,5}, P8146^{2,4,5}, P8196⁶, P8197^{2,6}, P8442⁶, P8443^{2,6}, XQ1080^{4,5}, XQ1081^{4,5}, XQ1083^{2,4,5}, XQ1084^{2,4,5}, XQ1085^{2,4,5}, XQ1086^{2,4,5}, XQ1085^{2,4,5}, XQ1086^{2,4,5}, XQ1086^{4,5}, XQ108

The following have a separate mesh, 190mA heater and are for rear loading:

P8147^{3,4}, P8148^{2,3,4}, P8490⁶, P8491^{2,6}, XQ1500^{3,4},

TELEVISION JANUARY 1990

XQ1501^{3,4}, XQ1503^{2,3,4}, XQ1504^{2,3,4}, XQ1505^{2,3,4}, XQ1506^{2,3,4}.

30mm Leddicons/Plumbicons/Vistacons

The following have an integral mesh, 95mA heater and are for rear loading: P2000 4591 4816 55875 55876

P8000, 4591, 4816, 55875, 55876.

The following have a separate mesh, 95mA heater and are for rear loading: **P8001**, **P8003²**, **P8005⁵**, **P8007^{2.5}**, **P8131⁵**, **P8133^{2.5}**, **P8135^{4.5}**, **P8137^{2.4.5}**, **4592**, **4816**.

The following have a separate mesh, 190mA heater and are for rear loading: $XQ1520^{4.5}$, $XQ1521^{4.5}$, $XQ1523^{2.4.5}$, $XQ1524^{2.4.5}$, $XQ1525^{2.4.5}$, $XQ1526^{2.4.5}$.

The following have a separate mesh, 300mA heater and are for rear loading:

and are for rear loading. BC4592, BC4593², BC4594², BC4992⁵, BC4993^{2, 5}, BC4994^{2, 5}, E5040, E5055², P8008^{4, 5}, P8130⁵, P8132^{2, 5}, P8136^{4, 5}, P8138^{2, 4, 5}, P8400⁵, P8401^{2, 5}, XQ1020, XQ1021, XQ1022, XQ1023², XQ1024², XQ1025², XQ1026², XQ1410⁵, XQ1411⁵, XQ1413^{2, 5}, XQ1414^{2, 5}, XQ1415^{2, 5}, XQ1416^{2, 5}, 4593², 4817.

The following have a separate mesh, 400mA heater/ light supply and are for rear loading: BC4392⁵, BC4393^{2.5}, BC4394^{2.5}.

1¹/₂in Vidicons

(1) With magnetic focusing and deflection. **P8207.** Has separate mesh and 95mA heater.

P8217 (with mesh connection by flying lead), **8521.** These have a separate mesh and 600mA heater.

(2) With electrostatic focusing and magnetic deflection. **BC8480, 8410, 8480.** With separate mesh and 90 or 95mA heater.

Notes

(1) The target with an Ultricon tube (U suffix to type number) should be set at 8-10V with respect to the cathode. Newvicon tubes are in general directly inter-. changeable with the equivalent vidicon with a standard target layer.

(2) Extended red response.

(3) Tube with light bias from 5V, 100mA bulb in tube socket.

(4) Tetrode electron gun (anti-comet tail tube).

(5) Tube with light bias in base. With 95mA heater tubes this is powered by a 5V, 250mA supply between pins 1 and 5. With 300mA heater tubes the power is provided by the heater circuit within the tube.

(6) Diode gun.

Whilst care has been taken with this listing of tubes that have similar parameters we cannot guarantee that a different tube type will necessarily be a satisfactory replacement.

Teletopics

SATELLITE TV

Interest in Sky Television's offerings seems to be on the increase. The number of installations surged during October to 122,000. Sky claims that over one million homes are now able to receive its service, either via a dish or cable feed. An Authorised Sky Agent scheme has been introduced. Retailers appointed as agents will receive a £25 commission for each customer they sign up as a subscriber, plus various promotional items. They will not receive extra payment for decoder installation however.

Meanwhile BSB is busy with pre-launch promotional activities. Viewers can join a "Launch Club" through retailers who participate in the scheme, paying a £10 deposit against purchase or rental of an installation. The offer will continue till the end of January. For their deposit they will be offered a free Squarial, free installation up to £60 and three months' free subscription to the Movie Channel. The viewer has to pay for the cost of the receiver of course. Ferguson has suggested a price of £259 for its first BSB receiver. Squarials are expected to sell for around £80.

Samsung has entered the UK satellite TV market with a range of dishes and receivers which are being sold as Vortec Star systems.

Chaparral Communications has opened a UK office at 10 Campbell Road, Hanwell, London W7 3EA (0157 96 587). The company was formed in 1980 and is the world's leading supplier of feedhorns. It has launched two particularly interesting items on the UK market. The 11/ 12 Twister feedhorn gives reception of both the 11 and 12GHz bands, enabling a single dish to be used to cover the complete Ku band. The 11/12 Twister has a suggested retail price of £125. It uses a ferrite polarity switching element that can be skewed for proper alignment with each transmission. The Monterey 20 international home satellite receiver, with a suggested retail price of £995, is designed for multi-satellite reception.

It's understood that as a fund raising measure the Bond Corporation is seeking to sell its 36 per cent stake in BSB. The Corporation's recent losses and debts of A\$8bn have led to consideration of this disposal.

BUSINESS NEWS

Following an eighteen month investigation, the European Commission has proposed that anti-dumping duties be imposed on small-screen TV sets from South Korea. The duties would have to be approved by the European governments. They range from 10 per cent in the case of Daewood, 12 per cent for GoldStar and 13 per cent for Samsung to 19.6 per cent for smaller exporters. The initial complaint to the Commission was made by Philips, Thomson, Grundig and Nokia. European small-screen CTV imports from South Korea rose from 23,000 in 1984 to 1,083,000 in 1988. An investigation into exports from Hong Kong and China is continuing.

Alba has bought the right to use the Hinari brand name in the UK and all stocks.

The Italian government has taken a majority stake in brown-goods manufacturer Seleco following mounting losses. Electrolux, which acquired a major stake when it took over Zanussi, plans to sell its remaining interest. The government's stake is being passed to the government-controlled holding company IRI.

CATALOGUES

The 1990 Wizard Distributors' trade catalogue is available on request from Wizard Distributors, Empress Street Works, Empress Street, Manchester M16 9EN (061 872 5438). The company has introduced a computer ordering system via a videotext operation which will also make available to users manufacturers' technical information and over 25,000 fault descriptions with remedies, covering TV, video, audio and CD equipment.

Cirkit's 1990 industrial Catalogue, with 320 pages and a newly designed layout, is now available free from Cirkit Distribution Ltd., Park Lane, Broxbourne, Herts EN10 7NQ (0992 444 111). It's divided into 28 specialised sections that give full technical and ordering details.

Bi-Pak's new 1990 catalogue is available free on request from the company at PO Box 267, Southampton SO9 7XW (0703 231 003).

ERL Ltd., 1 Moor Park Industrial Centre, Tolpits Lane, Watford, Herts WD1 8SP (0923 55 344), is now the exclusive distributor for the ECA range of semiconductor equivalents/data books. The company has available free a catalogue giving complete details of the ECA range of publications.

SERVICING AIDS

Welwyn Tool's hand-held hot-air tool for working on surface-mounted devices is now available as part of an SMD rework kit. The kit comprises a 7A1 240V Labor hot-air tool and stand, soldering nozzle, PCB holder, solder wick/gun, PCB cleaning spray can, syringe and solder paste for resoldering, magnifier and eyepiece for inspection, plus pliers, a screwdriver and tweezers. For mobility the kit is contained in a tailor-made case. The Leister Labor hot-air tool with electronic temperature control between 20 and 600°C and its extensive range of nozzles is a highly effective way of dealing with SMDs. Further details can be obtained from Welwyn Tool Co. Ltd., 4 South Mundells, Welwyn Garden City, Herts AL7 1EH (0707 331 111).

The Fast Fix TV fault card filing system available from Alan Humphreys, 13 Mansfield Avenue, St. Johns Park, Hawarden, Clwyd CH5 3SB (0244 532 961) provides a speedy means of referring to fault reports published in this magazine over the years 1981-1988 inclusive. An update pack will shortly be available covering faults published during 1989, also a new card filing system covering video faults published over the years 1981-89 inclusive.

IN BRIEF

The colour TV licence fee will be increased to £71 from April 1st 1990. The monochrome licence goes up to £24 on the same date . . . Improvements have been made to the BBC's Ceefax system. The use of parallel instead of serial transmission speeds up access to pages, which are now concentrated in blocks of 100 depending on subject matter to make them easier to find. The Screenflash feature, a development of Newsflash, enables the user to find out which programme is tuned in and what precedes and follows it without loosing the picture . . . The Cable and Satellite 90 Exhibition will take place at Olympia, London, from 9-11 April 1990.



TV SERVICE SPARES SPECIAL OFFER

VIDEO TO VIDEO dubbing mono/stereo kit, including Phono, BNC, DIN, Scart plugs £9.80 p.p. £1.50.

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KT3, K30 PANELS, tested, exchange, sound, power, bridge rect, frame, RGB £7.50 each. Decoder (Non-text) £10.00 p.p. £1.50.
G11 PANELS (tested), frame, IF, decoder £12.50 each. p.p. £2.00. Scan £15.00 p.p. £2.80.
G11 PANELS EX-RENTAL (untested) Scan, Frame, Decoder £2.50 p.p. £2.00.
G11 IF PANEL (new) less Tuner £2.50 p.p. £1.30.
G9 POWER SUPPLY UNIT £5.00 p.p. £2.30.
MANUALS p.p. 80p, K35, 2A, 2B. CP90 £3.50. KT3 £4.50, CTX-E. CTX-S, CF1 £1.50. KT4, K40, 3A £4.50 p.p. £2.50.

THORN/FERGUSON SPARES

8000, 8500, 8800, 9800 PANELS tested, exchange. £8.80, Frame, Decoder £10.00 p.p. £2.30. 9000 Series IF/Decoder tested £10.00, Linc/Power £20.00, Frame £18.00 p.
9500/9600 Line Scan £25.00, Power £20.00 p.p. £2.80.
TX9 RFI Choke L64 £3.50 p.p. 80p.
TX9/TX10 Facia, control panel incl. infra-red receiver £5.00 p.p. £2.00
TX9/TX10 Saw filter IF panel £5.30 p.p. 80p.
TX9/TX10 Saw filter IF panel £5.30 p.p. £0.
TX9/10 Remote & tuning 1508A (incl. SAA5012) £2.50.
TX9/10 Remote & tuning 1536 (incl. SAA5012) £2.50 p.p. £1.80.
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TX10 Stereo Audio Board £3.50 p.p. £1.80.
TX10 Stereo Audio Board £3.50 p.p. £1.80.
TX90 // Chassis. Brand new (urtested) £25.00 p.p. £2.80.
TX90 Mins TX £18.60 p.p. £2.80. 9000 Series IF/Decoder tested £10.00, Line/Power £20.00, Frame £18.00 p.p. £2.80. TX90 Mains TX £18.60 p.p. £2.80. TX90/TX100 Chassis complete & boxed (untested) £20.00 p.p. £2.80. **IC SELECTION** L. O LLEU 1.00 SL1432 £1.20 TDA1082 5.30 SN762200N £1.80 TDA1170 5.80 SN76705 £9.80 TDA1170 5.80 SN76705 £3.80 TDA2595 £4.80 TDA 3651 LA7800 LA7801 £2.20 TDA2600 TDA2600 £7.50 TDA2611A £1.90 TDA3652 £3.20 **£9.80** TDA1180 **£2.20 £6.80** TDA1190Z **£2.20** M293B1 TDA3653A £5 90 M293B1 MC13002P ML237 ML238 ML923 £6.80 £6.80 £6.50 £8.80 STK 5325 STK 5325 STK 5332 STK 5481 STK 7308 STK 7308 STK 7308 STK 7308 STK 7308 STK 4090 STR 4090A STR 4090A STR 4090A STR 4090S STR 4090A STR 4090A STR 4090A STR 4090A STR 4090A STR 54041 STR 6020 TBA 750 TBA 750 TBA 750 TDA2640 £3.20 TDA3653B £3.20 £3.80 £3.80 £6.80 £4.80 £5.80 TDA2653A TDA2653A TDA2654 TDA2655 TDA2670 63.20 TDA 1470 £2.80 TDA3654 £3.20 £5.70 £6.80 £3.20 TDA1670A TDA1701 £3,20 £3,80 TDA4420 £2.20 TDA4421 TDA4442 £3.21 SAA1024 £10.80 £10.80 SAA1024 SAA1025 SAA1124 SAA1250 SAA1251 SAA3027 TDA1770 £3,20 £6.80 £5.80 TDA2680 TDA2690 £3,80 TDA1870 TDA1908 £6.80 £2.80 TDA4500 TDA4501 £5.80 £10.80 £7.80 £6.80 £5.80 £8.80 £10.50 £3.50 £3.80 £3.50 £3.80 £6.80 £5.80 £2.80 £5.80 TDA2690 TDA2780 TDA3190 TDA3300 TDA3301 TDA3301 £3.50 £4.20 £6.80 £6.80 £3.50 TDA4502A £13.50
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CONTINENTAL TVK & BG RANGE	(quote exact no.) replacements £13.80
DECCA/TATUNG £7.80 p.p. £1.50.	
6.3V CRT Boost Transformers for Co	lour & Mono £5.90 p.p. £1.40

6.3V CRT Boost Transformers for Colour & Mono £5.90 p.p. £1.40. 455 CRYSTALS for Remote Control Handsets. 4 for £1.00 p.p. 50p. VHF to UHF Converters £26.50 p.p. £2.50.

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Servicing the Panasonic NV2000/2010/3000

Nick Beer

These VCRs are now fairly old. Even when new they were somewhat sparce with respect to features, they looked pretty ordinary and required regular maintenance. So why are they still being sold in large numbers in the reconditioned market, at the same price as say an NV366 which has a much higher specification – and being snapped up as well? Perhaps it's because they are lovely machines to use and to service. They give good results and the head life is good. So they are an excellent choice for budget rental or sale. Since they are still being bought and there are no real reasons to scrap them, it's worth providing an article on servicing to help you to live with them a while longer.

The NV2000 and NV2010 are basic, top-loading machines, silver-grey in colour. The NV3000 is a portable VCR with an NV2000 mechanism, hence its inclusion in this article. This particular machine was not sold in large numbers but we do get them in, so I've provided a brief fault list at the end of this article.

Dismantling

Dismantling the NV2000/2010 is straightforward and is much the same as with its big brothers the NV7000 (see the September 1985 issue) and the NV7200. The top is held on by two bolts at the back corners: the cassette flap is held by two obvious silver-coloured bolts. With these removed, you'll find that as in the NV7000 series a red screw and a red bolt hold the screening can above the video heads/drum. The top-loading cassette carriage is held by a further four red bolts as in the NV333/NV366. The bottom is secured by six brass-coloured screws: when it has been removed the lower PCB can be hinged backwards after taking out the red screws and bolts and pushing it back and pulling it down from the front. When doing this, watch the tracking control knob - I suspect that you'll get a bit mad if you reassemble the whole thing only to find that there's no tracking knob!

Mechanical Service

When you get one of these machines it's likely that you will have to carry out a complete mechanical service (the Panasonic maintenance kit is part number VUD4087KIT). I suggest that you remove the top and bottom, unhinge the lower PCB, remove the screening can and the cassette carriage and then work first on the top of the mechanism. It'll save you time – you'll see why later.

With the carriage removed, the reel idler (VXP0329) can be replaced by removing its retaining circlip and guiding its brake arm away while you lift it off the shaft. The reel torque should be in excess of 400g/cm. It's not uncommon to find that this is very low. The brake band is held by its adjusting screw at one end and by a circlip under the back tension post at the other. So the post will have to be removed. Undo its retaining circlip and spring and lift it off. The band can then be released. The back tension should be set at 25-30g half-way through an E120 tape.

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I recommend that you remove the bracket on the right-hand side at the top of the mechanism – the one that holds the loading/capstan motors, the dew sensor etc. It's secured by three brass-coloured bolts. Before doing this remove the loading and capstan belts from the motor pulleys on the underside of the mechanism. With this assembly removed you can take off the pinch roller (VXP0330) by removing its single retaining circlip and unhooking its spring. Beneath this you'll find a black plastic cover over the play idler. A single bolt secures the cover – it can be very difficult to undo due to a reaction between the screw and the chassis. Try firmly with a normal screwdriver: if it isn't easy get a very long screwdriver first rather than later – the head burrs very easily.

The play idler is available either as just the idler wheel (VXP0331), as in the VUD kit, in which case it has to be rebuilt on to its arm, or as a complete arm (VXL0763). This arm is of the same design as in the NV333/366 but with the addition of a soft brake for the take-up reel and the associated spring. To remove the arm, the pinch roller and the previously mentioned cover must first be removed. As with the NV333/NV366, when replacing the play arm ensure that it fits at the right side of the main lever underneath – use the same method as with these other machines (see the November-December 1988 issues). The take-up torque should be 130-180g/cm.

Whilst we're on the top side of the mechanism, with machines of this age you'll probably find that the hard brake pads are worn and should be replaced. They aren't in the VUD kit. Part numbers are VXZ0090 (supply) and VXZ0091 (take-up).

Video head replacement is the same as with the NV7000 and NV333/NV366 series, with two bolts and four soldered leads in this case. The discharge angle, which is secured by a single bolt, will have to be removed first of course. To simplify stock holding, the VEH0121 or VEH0103 heads can be used as replacements. The MCES Y series heads are superb replacements and offer a saving on the Panasonic ones. They are brand new, not rebuilds.

And so to the underside of the mechanism. The flat capstan belt (VDV0131) is replaced by removing the plastic cover over the pulley, the flywheel support bracket and the fan wind belt (as Panasonic call it). The latter (VDV0120) drives the reel drive assembly from the capstan flywheel. The loading belts are small and large as with the other machines we've mentioned. To replace them, unbolt the plastic guide beside the bottom of the DD unit then unclip the DD unit loom from the chassis and follow it round to the servo PCB, unplugging it here. The large belt (VDV0135) will have to be pulled up over the loom and the new one threaded over it as the loom goes through the centre of the belt's run. This palava is required because the loom isn't, as with the NV333/NV366, plugged at the DD end. The smaller belt must be replaced before fitting the new large one as it fits on the lower half of their shared loading pulley.

As with the brake band, the idlers, pinch roller etc. these belts are in the VUD kit. Two items that aren't but

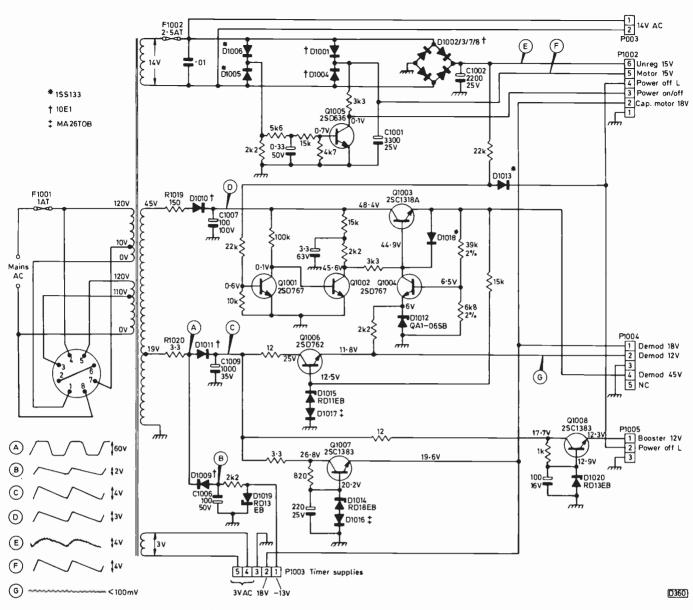


Fig. 1: Power supply circuit used in the Panasonic Model NV2000.

often need replacing are the reel pulley and the secondary pulley (VXP0351/2). These form the drive and clutch system between the belt from the flywheel and the idler itself. The clutch becomes noisy and the pulley wears. The mode switch is exceptionally reliable and thus shouldn't, as it should with more recent Panasonic models, be replaced as a matter of course.

Faults List

That sums up the mechanical side. Fig. 1 shows the power supply circuit, with some corrections with respect to the circuit in the manual. The ripple characteristics at various points are included. We'll round off with the usual faults list.

(1) Will not, or sluggish, rewind or fast forward. The most likely suspects are the reel idler (VXP0329) and the capstan belt (VDV0131). The clue is usually whether the fault is in both directions: if it is, suspect the idler; if it's in only rewind or fast forward suspect the belt. If the latter is o.k. check the so-called fan belt (VDV0120) and the two-part clutch gear assembly (VXP0351/2). Alternatively for no rewind and/or fast forward relay RY2001 (VSY2026) may have dirty contacts.

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(2) No clock/clock won't set/won't keep correct time. Usually due to a faulty MN1435VX timer chip (IC7501). Sometimes ancillary components can be at fault. Check X7501, D7501/2/3 and Q7501 (2SD636). See also fault (3).

(3) No clock, hum on E-E sound and vision, capstan servo incorrect. All due to C1009 (1,000 μ F, 35V) being faulty. (4) Mechanics stuck in the stop mode, won't eject, otherwise o.k. D6010 (MA165) faulty, inhibiting the loading motor. Also check the condition of the large loading belt (VDV0135).

(5) No mechanical operation but will eject. Cassette sensor lamp (XAMV0019) is probably open-circuit. If it's o.k., check the driver transistors Q6024/7 (2SD636/2SB641). Note that the sensor lamp is pulsed on and off, not lit continuously.

(6) No go, no E-E, clock o.k. No 9V as the MN1405VQ syscon microcomputer chip IC6001 is faulty.

(7) No E-E vision. Trace the signal path through the demodulator module. If the signal is present at TP3001, suspect IC3004 (AN6332). If not, suspect IC701 (BN5111B).

(8) Won't switch on, clock flashing. Fault in the 12V regulated supply. Check transistor Q1008 (2SC1383) and

zener diode D1020 (RD13EB).

(9) No record or playback colour. Check the following items and replace as necessary: C8035/6, D8009, IC8003 (AN6371).

(10) Capstan rotates constantly. Dry-joint on Q6032.

(11) Capstant runs at high speed. Capstan free-run control-1 R2070 open-circuit or no FG output from motor (VEM0133).

(12) No capstan rotation. Relay RY1's contacts dirty or coil open-circuit.

(13) Wow on playback sound. Check play idler (VXP0331) but usually IC2005 is faulty.

(14) No drum lock. Check Q2002, Q2003, IC2001, C2025/6.

(15) No take-up. Check play idler (VXP0331), pinch roller (VXP0332) and the loading belts (VDV0122 and VDV0135).

(16) Snowy picture via r.f. loopthrough – looks like an r.f. amplifier fault. Check the 12V supply to the booster. If missing check Q1008 for dry-joints on all legs and/or shorts and/or R1008 (12Ω , 0.25W fusible) open-circuit.

(17) No capstan motor rotation. Q2013 and/or Q2015 faulty.

(18) Sensor lamp not working, no auto stop but mechanism works. Q6025/6 in the syscon department faulty.

(19) High-speed knocking with fast wind. Replace noisy pulley/clutch VXP0351 and lubricate pinion.

(20) "WED" partially illuminated on display. D7513 leaky.

(21) Cuts out on play as capstan motor stops. Q2012 faulty.

(22) No cue. Q6206 faulty.

(23) Cassette jammed, tape stuck laced half way. Faulty loading belts.

(24) Can't set minutes and hours change with day button. Reset the blue trimmer R7507 on the timer PCB to give 6μ sec pulses measured at the potentiometer.

(25) No tuner or record operation. Q1006 (2SD762) faulty.

(26) No record colour. Colour-killer preset R8078 noisy.

(27) Random syscon misoperation/LEDs flashing. Syscon microcomputer chip IC6001 faulty.

(28) No functions with capstan motor running continuously. R6038 (68Ω , 2W) in the 5V supply to the microcomputer chip open-circuit.

(29) Timer microcomputer chip IC7501 fails. Add a 10μ F, 50V capacitor across C7503.

(30) Squeaking while lacing or unlacing. Remove reel spools and clean and lubricate the mechanism spindles. The noise usually comes from the supply spool. Be very careful not to spill oil over the drive surfaces. Use Technics RZZ0L02 #56 oil.

(31) Squeaking in play or record. Noise comes from drum due to discharge angle. Replace this item with the sturdier VXA1584.

(32) Corrugated verticals and sqeaking noise. Clean or replace the erase head (VBS0014), the impedance roller (plastic type now in maintenance kit) or the audio/ control head (VBR0036).

(33) Carriage won't stay down. Check for broken plastic lever (VXA1210) on the latching mechanism.

(34) No deck functions. Check the cassette down switch (VES0129) on the latching mechanism beneath the deck.

(35) Scraping noise in play or record. Check grease on flywheel bracket.

(36) Wow on sound with noise bars rolling through the picture. No capstan servo action due to absence of

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control pulses. Clean or replace the audio/control head (VBR0036).

(37) Grainy picture. Check the condition of the video heads and, at TP3007 and TP3008 (earth), that the record level isn't in excess of 150mV. Adjust with R3022.

The NV3000

Finally a short faults list for the NV3000.

(1) No sound with own recordings, playback o.k. Faulty microphone socket (VJJ0076).

(2) No playback or E-E vision. C3077 or IC3004 (AN6332) faulty.

(3) No deck functions, power cuts off after a few seconds. MN1405VQ syscon microcomputer IC6201 faulty.

(4) Dew light permanently on. IC6205 (AN6912) faulty.

(5) Wow on sound, noise bars on picture. IC2003 (AN6341N) faulty.

CORRECTIONS

Several points in the December issue require correction/amendment.

(1) The Salora J chassis was also used in some 16in. sets. The line driver transistor (last paragraph, page 102) is TB500, not TB501. Item (2) in the faults list, page 104, should have given CB400 and CB410 as being the usual causes of distorted field scan. CB410 is the scan coupling capacitor and is usually $1,000\mu$ F. CB412 is innocent!

(2) In CD Player Casebook, page 124, JVC Model XL-V2B, the tracking offset control is adjusted with TTS and TSS earthed (not TTS and TTS!).

(3) VCR Clinic, page 127, mentions the rack slider problem with the B and O VHS82. When this fault is encountered the rack slider should be replaced. It comes as a kit of parts, all of which must be fitted. This is a lengthy job and is tricky until you've done a few. A check on the rear edge of the old rack slider will usually reveal a pit or indentation which will confirm the diagnosis.

The mechanism is a Philips one, so the point is also applicable to many Philips machines, also Tatung and Pioneer models including the VR505 and VR707.

(4) The two electrolytics in the Rediffusion Mk. 3 chassis mentioned in Dave Mackrill's letter (page 108) should have been specified as 6C14 and 6C15 (6C12 does not cause this problem).

Christmas Caption Capers

Once again Christmas approaches and we can look forward with confidence to watching favourite TV programme repeats such as Mary Poppins and the Wizard of Oz. They just have to be favourites, since they always seem to be shown at some stage during the festive season. There's a tradition at Christmas time for the BBC to discard temporarily the usual identification symbols and present special captions designed for the festivities. Some of the identification captions and modified test cards used over the years were featured in the May 1978 and January 1984 issues of *Television*. In this article we shall again raid the archives, which should please a number of readers who wrote in following our previous explorations.

It seems that the authors' collection of photographs and videos of the BBC's graphic design output is the most extensive in existence. Certainly the BBC does not have any photographs available. This is mainly due to the fact that most of the earlier mechanical symbols consisted of colourless bits that were held together with string and sealing wax - well, almost! Normally the identification lettering was on a piece of card positioned just in front of the working model. When viewed by a TV camera and colour synthesised (or chroma keyed) the symbol came to life, but the rough and ready nature of the symbol meant that all that would appear on a finished 35mm still camera print would be a monochrome symbol complete with unwanted joints - not forgetting the string and sealing wax . . . The only way to obtain a good copy of the transmitted symbol was, and still is, to photograph it live off-air or from a video recording of it. Perhaps the BBC's graphic design department staff didn't have the time to make such a copy, so the task of keeping a permanent record has fallen on those keenly interested in the subject.

BBC Xmas Captions 1969-1976

The earliest example of a Christmas symbol in our collection dates from 1969, see Photo 1. Based on the ever-faithful globe caption, which was first used in 1963, it's a special version which was used to announce with pride that the majority of the BBC-1 Christmas programmes were in colour, following the official start of colour transmissions (BBC-1) on November 15th, 1969. The curved mirror that was normally placed behind the globe to give it an iced-cake effect was replaced with dozens of what appeared to be loose fitting sequins. These moved as a result of vibration, catching the light to give a very colourful effect. As far as we can tell the globe differed from the standard one in that it was illuminated externally and was actually coloured rather than colour-synthesised.

The following year saw a variation on this theme. The standard globe, which was approximately three inches in diameter and lit internally, was used with the set of sequins replaced by small reflective snow flakes. See Photo 2.

It would seem that in 1971 the graphic designers were perhaps running short of ideas, time or inclination. The highly coloured globe from 1969 was hurriedly pressed

Keith Hamer and Garry Smith

into service, with 1970's reflective snow flakes. Photo 3 shows the result. There wasn't any great abundance of Christmas cheer over at BBC-2 either. The standard revolving cubed 2 was used, but with coloured swirls that emanated from the centre. Just in case anyone didn't notice the change, the revolving 2 had "Christmas" underneath.

What would the graphic designers come up with for BBC-2 in 1972? Easy: use the normal revolving 2 symbol, add a little tinsel around the edges, include the word "Christmas" and there we are. Who could ask for anything more? One curious thing about this caption, see Photo 4, was the inclusion of the wording "in colour". Curious because BBC-2 had officially been in colour since December 2nd, 1967.

Christmas 1972 was one of the rare occasions when the BBC's designers produced a variation on the clock caption, which for some reason was normally left well alone. This particular effort, see Photo 5, used the standard mechanical clock with an abstract, snake-like design around the edge. If you are wondering what the BBC-1 caption was in 1972, so are we! It's one of the few that seem to be missing from our collection. If anyone has details or a copy, please write in.

In 1973 BBC-1 departed from using the traditional globe symbol. Instead, a group of Dickensian carol singers revolved during each programme link – see Photo 6. On BBC-2 the graphic designers went berserk, festooning the revolving 2 symbol with glittering stars. This caption also included a dazzling ball within the 2. See Photo 7. An unusual feature was the inclusion of the day (Christmas Eve, Christmas Day and Boxing Day).

Unfortunately Christmas 1974 is a total blank as far as our collection is concerned. So once gain if anyone has a photograph that captures the proceedings, please let us know. We come next to 1975 and, surprise, surprise, the good old globe caption reappeared, looking remarkably (see Photo 8) like the one used in 1971 despite the different style of identification. It was a very colourful symbol however, and top marks must go to those concerned with the design. This was in fact the last time that a single globe was used at Christmas.

On BBC-2 a tinselled 2 emerged on Christmas Eve 1975, at the unveiling ceremony, see Photo 9. Unfortunately this was still the pre-VCR era, so we don't have a video recording of it. Knowing the ingenuity of the grahic designers however we suspect that the 2 symbol revolved in some way.

The final year's efforts featured in this article were in 1976. Exactly the same style of identification was used on BBC-1 as in the previous year, but the globe was replaced by a large rotating snowflake, see Photo 10. The curved background had also received treatment. Once again an extremely colourful Christmas caption had been concocted. The designers were obviously proud of their identification, because 1976 was one of those very rare occasions when even the clock caption had the logo changed – see Photo 11.

BBC-2 went psychedelic in 1976. The usual revolving 2 symbol was used, with odd lines going one way and even ones the other, but for Christmas weird and



Photo 1: BBC-1, 1969.



Photo 4: BBC-2, 1972.



Photo 2: BBC-1, 1970.



Photo 3: BBC-1, 1971.



Photo 5: 1972 Xmas clock.



Photo 6: BBC-1, 1973.



Photo 7: BBC-2, 1973.



Photo 8: BBC-1, 1975.

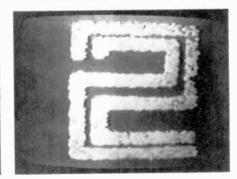


Photo 9: BBC-2, 1975.



Photo 10: BBC-1, 1976.



Photo 11: 1976 Xmas clock.

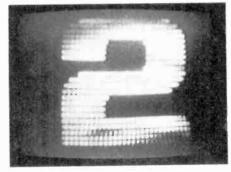


Photo 12: BBC-2, 1976.

wonderful colours emerged to give a very pleasing effect. Photo 12 shows the result. Unfortunately the full effect cannot be conveyed by a monochrome photograph, but viewers without a colour telly had the same problem and had to use their imagination.

In Conclusion

That completes our review of BBC Christmas captions from 1969 to 1976. Had space permitted we could have

gone on to tell you about Santa's revolving head or the melange of medieval trumpeters, but you'll have to wait till another time. Don't forget: if you have any photographs or video recordings of pre-1980 BBC captions or test cards, please send us details. In particular we're trying to track down a video recording of the 1963 BBC Schools pie chart/grey scale tuning signal plus any music used with the BBC Test Card C. If you can help, please write to Keith Hamer, 7 Epping Close, Derby DE3 4HR, or telephone 0332 513 399.

CD Player Casebook

Reports from Mike Leach and Nick Beer

Hinari DSK2 Midi System

A stock fault seems to be developing on the Hinari DSK2 midi system – we've had three of them in recently, all suffering from the same problem. The reported symptom is usually "won't play any disc". When you've finally managed to get the CD section into a position where you can service it, something that's not easy, you can see that when the tray is closed with a disc in it the turntable doesn't rotate. If the disc is removed and the tray is closed the optical assembly lens doesn't move up and down to achieve focus. I have to stress that you mustn't stare at the beam emitted from the lens: you can see from side viewing whether the lens moves or not.

Since the turntable won't rotate until focus has been achieved, one's first suspicion would be that there's a focus drive fault. You'll find IC803 (STA341M) mounted on the PCB beneath the laser assembly: a scope connected to pin 6 of this chip should show the focus drive waveform. In each of the cases we've had the waveform was present right the way through to the optical assembly, though no movement of the assembly was apparent. We found that in each case a delicate touch on the lens with a cotton bud produced three or four focus coil movements. In one case a tiny drop of thin oil applied to the focus coil pivot restored normal operation. It's not a good idea to go pouring oil into laser assemblies, but on this one occasion it did the trick.

As yet I've not been able to prove that the laser assemblies have been faulty. It would seem that the focus coil does give problems, but our customers have not accepted the repair estimate as the laser assembly is expensive. I'd be interested in any comments from other engineers with experience of these players. Maybe someone has actually replaced an optical unit to clear this fault. Other engineers have told me that the turntable motor gives problems. Usually the disc will start to rotate, but does so very slowly then stops. A replacement turntable motor should cure this fault. M.L.

Philips CD104

This one proved to be a difficult fault. It eventually turned out to be man made. The symptom was that the player wouldn't play past track five. There was variation from disc to disc, but towards the end of track four dropouts would occur and the machine would eventually shut down in the stop mode.

Our first move was to scope the h.f. eye pattern at pin 7 of the SAA7010 demodulator chip on the decoder panel. It was unstable, and I felt that the fault was probably mechanical rather than electrical. This was mistake number one.

Slight pressure applied to the centre of the disc clamp during play seemed to cure the trouble. I stripped the clamping mechanism to see if it was bent or disfigured in any way, then swapped over the whole clamping mechanism with one from a working machine, but no joy. As before however pressure on the clamp cured the fault. The next step was to scope the motor control waveform at pin 4 of the SAA7020 chip. It feeds the turntable motor control servo and in turn the motor, and was extremely unstable. Still suspecting a mechanical fault I changed the turntable motor, but the fault persisted.

Back to the servo board to take another look at the motor control waveform, which in Philips machines is referred to as MCES (motor control from error correction to servo). This MCES waveform enters the turntable servo via a low-pass filter that consists of C2218, C2219, R3260, R3261 and the MC1458 dual operational amplifier chip IC6209. The voltages around this chip were all slightly wrong but were not too far out. There are two zener diodes in this circuit, and these are both critical for correct operation of the servo. They should both be 2V zener diodes but someone had replaced them with 2.5V types. Fitting 2V zener diodes cured the problem.

Philips CD150

The complaint with this one was poor tracking when warm. We played the machine for three-four hours and everything seemed to be o.k. In fact it wasn't until the machine had played for about six hours that a fault appeared – it started to skip and jump.

Next morning we checked the laser current when cold. To do this you connect a d.c. voltmeter across test points 1 and 2, i.e. across resistor R3102 on the servo panel underneath the turntable, and play track 1 of the Philips test disc. The meter should read $50\text{mV} \pm 5\text{mV}$. If you don't get this reading, adjust potentiometer R3106 on the servo panel *carefully* until a reading of 50mV is obtained. As this setting was correct we ran the player again all day. Once more the fault appeared after about six hours. We checked the laser current again: bang on 50mV.

The TDA5708 photodiode signal processor produces the focus error signal for the focus drive circuit and also the RE1 and RE2 radial error signals for the TDA5709 radial error processor. It was this chip that turned out to be the culprit. A touch of freezer on it restored normal results for several minutes, a replacement providing a complete cure.

We were lucky with this one. It's been my experience that freezer doesn't always provide much help in this application. It was however a heat related problem, as we proved with the hairdryer before ordering the replacement chip.

Incidentally all the chips used in Philips players are available from CPC Ltd., 186-200 North Road, Preston, Lancs PR1 1YP.

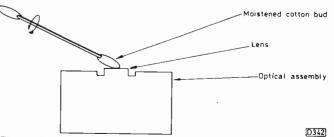


Fig. 1: Recommended method of cleaning a laser lens.

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Note that you should be very careful when using a hairdryer for fault-finding. Keep the heat well away from the laser unit as excessive heat can damage it. Be careful of the flex print too. In the above case we were able to prove the cause of the fault only by disconnecting the servo board from the laser flex print, heating the chip and then reconnecting the board again. M.L.

Marantz CD45

This Philips-based player was part of a midi system that had suffered lightning damage. Fortunately all the items in the system are separates, otherwise we wouldn't have even considered the repair. All items other than the record deck were faulty. We removed the CD player from the rest of the system and switched on. The result was that the tray opened by itself and the display resembled Blackpool illuminations! Then the tray wouldn't close. We checked the power supply rails which were all o.k., so the MAB8441 control and display microcomputer chip on the front control panel was the next suspect. Fitting a replacement restored normal operation. M.L.

Cleaning Laser Lenses

I've discussed cleaning the optical assembly with several engineers. Some use a fine soft brush while some use a soft cloth with some sort of cleaning liquid, all with varying degrees of success. It's difficult to clean anything without applying pressure, but too much pressure can damage the optical lens, rendering it useless. The safest method I know of is as follows.

First try to remove the disc clamp which can get in the way. Then slightly moisten one end of a cotton bud in alcohol and lightly roll the bud over the lens. When the lens is clean, use the other end of the cotton bud to dry it completely to avoid smears etc. I've found this to be a very effective method as it requires very little pressure. See Fig. 1 M.L.

Technics SLXP7

This portable CD player came into our workshop with no-play symptoms. Another servicing company had said a new laser assembly was required. The customer commented that it used to play some discs all right but on others it would mistrack and would not select tracks after the TOC had been read. When he got it back with the £85 estimate it wouldn't work at all.

A quick check revealed that the r.f. (eye pattern) waveform was present at pin 15 of IC301 (AN8371S). It was extremely poor however and the laser didn't read the TOC. I was beginning to suspect the laser myself when I spotted the cause of the problem - all the mechanical adjustments on the laser assembly had been twiddled. The seals on the turntable height and pickup angle adjustments had been broken. Luckily I was able to match up the position of the turntable height screw by the shape of the broken paint around the screw head. After this the machine played but the sound was poor, with dropouts, and it took some twenty seconds for the TOC to be read. The r.f. pattern was still very poor, but fine adjustment of the two angle settings produced a much better waveform. When we'd gone through the whole set-up procedure the player produced very good results. After about five minutes of play however the front display started to show incorrect track numbers

and playing time, coupled with flashing numbers on the left-hand side. A small spray of freezer on the MN6617 digital signal processing chip IC601 corrected the display, so a new chip was ordered. When this had been fitted (all 84 pins . . .) the player was returned to a very happy customer with a bill for far less than the original quote.

Two weeks later the volume control fell to bits. Still, you can't win 'em all! M.L.

Pioneer PD-M50

There was a shimmering display with a slow key scan – denoted by the very slow action of the buttons, i.e. having to keep your fingers on for ages. The cause was a faulty crystal oscillator timing circuit within IC3 (CXD1135QZ).

A similar fault but this time with a strobing rather than a flickering display (lower frequency) was caused by IC6 and its crystal X3 being faulty.

These faults could also occur with the PD-M40. N.B.

Sony CDP35

The loading belt, part number 3-653-387-00, is a weakness in this model. Check it if the tray doesn't load or unload fully or the clamping arm doesn't lift fully.

If the main PCB is not screwed in, ensure that it's earthed at all four points, using jumper leads, when taking measurements or carrying out adjustments. **N.B.**

Sony CDP-M20S

Intermittent low and very distorted sound was traced to IC9 (M515651) being thermally defective. A hairdryer and freezer were the most sophisticated items of test gear used for the diagnosis! Shame that this isn't the case every time. N.B.

Sony D50

There are two versions of this player. This fault affects the Mk. 1 version which has a standard d.c. spindle motor. The symptoms are sluggish disc rotation or complete failure of the disc to rotate. Removal of the toothed belt will appear to show that there's plenty of torque, but nevertheless the motor is the cause of the trouble. N.B.

Technics SLP-J22 Series

I've had one or two of these units with breaks in the optical unit's FPC. The symptoms have been no disc rotation due to no laser output, or intermittent skipping and/or returning to the TOC. N.B.

Pioneer PD-X77

The disc went in and the display worked but the disc didn't rotate. A quick check using my new credit-card type detector showed that there was no laser output, though the LD-on signal from the syscon microcomputer chip was present. The logical conclusion was a broken FPC, and a new optical unit (PWY1003) got things going – the laser diode could have been faulty of course. When the machine was set up we found that the new optical unit also cured the playability faults the customer had complained about prior to the complete breakdown. N.B.

Bandwidth Compression Techniques

Part 2

In this concluding instalment we'll look at bandwidth compression schemes intended for television broadcast-ing.

Analogue Coding Proposal

At about the same time that Bell Telephone Laboratories devised the experimental Picturephone system (see Fig. 4 and the associated text last month), Gouriet (BBC) and Cherry (London University) proposed an analogue coding scheme. This reduced the horizontal pixel-to-pixel redundancy by adaptively varying the speed of the line scanning. In this way more time was made available for transmission of the high-information parts of the picture while less time was taken to transmit the low-information parts.

The high-information parts of the picture are where there are sharp and frequent transitions between different brightness values. So the scanning beam's velocity is varied in accordance with the sharpness, or slope, of the waveform. Fig. 6 shows the basic idea. A differentiating circuit is used to measure the slope of the video waveform. It then determines the scan velocity. Thus the steep slope of a sharp edge tends to slow the beam down. As a result the slope itself is reduced until it settles down at an equilibrium value. Conversely a gentle slope makes the beam move faster.

The arrangement is a closed-loop control system in which the beam's velocity is controlled by a function of itself. Overall the effect is to smooth out the waveform and hence the information rate. The velocity of the scanning beam in the receiver is varied in synchronism, the information for doing this being derived from the modified slopes of the received waveform.

Early Digital Proposal

A later bandwidth compression scheme intended for broadcast-quality TV was devised by Wendland and May of AEG-Telefunken. This took advantage of intra-field pixel-to-pixel redundancy in the picture as well, using digital techniques and an adaptive form of differential pulse code modulation.

The system transmits only "relevant" information. This is continuously selected as the picture changes, the selection being based on a relevance criterion derived from the characteristics of human vision. In this way the system is able to exploit the eye's relative insensitivity to noise and distortion at edges and areas of high detail, as previously discussed. "Relevant" information consists of those pixel-to-pixel differences that exceed a threshold value which varies in accordance with the amount of detail in the picture. The encoder employed a relevance detector and a system using a buffer store to smooth out the transmitted information rate so that no sudden bursts of high digit rates that would exceed the channel capacity could occur.

Two techniques were used to achieve a constant-rate data output from the buffer store. Under-flow of digits was avoided by generating and feeding into the buffer "stuffing" code words. Overflow of the buffer as a result of an excessive rate of input digits was avoided by means of feedback from the buffer store to the relevance detector. The feedback signal depended on the number of digits held in the buffer. It controlled the relevance detector so that the output from this was limited as necessary. The developers claimed that the adaptive coder gave a data compression ratio of 5:1 relative to a 7bit p.c.m. digitised TV signal.

Recent Systems

We'll complete this survey by taking a look at how the general principles of bandwidth compression previously outlined are used in some recent TV systems. As examples we'll consider a modern telecoms codec (coder-decoder) for videoconferencing and a system under development for HD-TV broadcasting.

Videoconferencing Codec

The videoconferencing codec was initiated by British Telecom but later became part of a joint European research project. It's now used by telecoms authorities throughout Europe as standard equipment in both national and international teleconference networks. The equipment accepts a standard 625-line colour video signal, applies compression and transmits the result as a p.c.m. digital code at a standard bit rate of 2Mbit/s. This standard was adopted by the Conference of European Postal and Telecommunication Administrations (CEPT). It represents a 40:1 compression of the conventional p.c.m. data rate that would otherwise by required for a 625-line signal.

Bandwidth compression is based on the fundamental principle, already outlined, of transmitting only those parts of the image that change from picture to picture. This is done by a system called conditional element replenishment - the "element" being a picture element or pixel. Two reference pictures are stored digitally, one at the transmitter/encoder and the other at the receiver/ decoder. At the transmitter the incoming picture, which is digitised, is compared with the stored reference picture. When the system detects a change between these two pictures it transmits data representing this change. The change information continually updates, or "replenishes", the two references stores so that they always contain the current picture. Because the change information is an uneven data flow it has to be smoothed out for transmission. This is done by a digital buffer memory that receives the varying inflow but feeds out the data at a uniform rate.

Fig. 7 shows the essentials of the conditional replenishment encoder. As can be seen, it employs differential pulse code modulation. The analogue waveform is first digitised by an AD converter (this is not shown). The resulting 8-bit p.c.m. data stream is then fed into a twodimensional (spatial, temporal) digital filter which processes the image to remove noise and improve the performance of the subsequent movement detector.

Moving areas of the picture are predictively coded by a d.p.c.m. encoder. This is followed by statistically

Tom Ivall

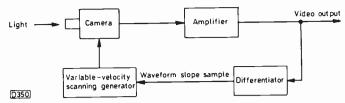


Fig. 6: Outline of a proposal for broadcast TV bandwidth compression based on the principle of varying the camera's scanning velocity automatically in accordance with the information rate (instantaneous, slope) of the video waveform.

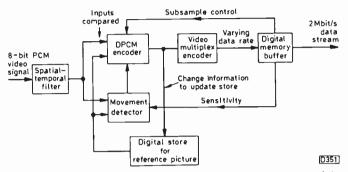


Fig. 7: Conditional element replenishment principle which is in current use in a standard telecommunications codec for videoconferencing. Reference pictures stored at the encoder and decoder are updated as picture-to-picture changes occur. Only the changes are transmitted.

matched variable length coding. In the event of a lot of movement, the resolution of the transmitted moving area is decreased by subsampling in an adaptive manner to take advantage of the fact that the eye's ability to perceive detail decreases with increasing speed of movement.

With a relatively still picture the encoder generates false moving areas to ensure that the transmitter's buffer doesn't under-flow and to replenish the picture stores at the transmitter and the receiver over several seconds to remove distortion caused by coding or transmission errors.

Control of both these modes is achieved by monitoring the content of the transmitter's buffer.

The video multiplex coder shown in Fig. 7 combines addressing data with each moving area and introduces special line and field start codes to ensure that the receiver is kept in synchronism.

For colour information an input processor either converts a composite analogue waveform into separate luminance and chrominance components (Y, U, V) or matrixes separate RGB inputs to produce YUV. It then converts these components to a digital form. The U and V chrominance components are coded in the same way as the luminance component Y.

Decoding at the receiver is of course the reverse of the encoding process shown in Fig. 7.

This codec with its bit rate of 2Mbit/s represents current practice in video telecommunications. Recently developed compression equipment is capable of operating at even lower information rates however, giving as good quality videoconference pictures at 320kbit/s as the 2Mbit/s ones and passable videophone pictures at only 48kbit/s.

Current Research

Video telecommunications research aims to reduce the bandwidth even further, employing the principle of

sending digital code words to indicate features in a picture rather than transmitting in code form the actual pixels that form these features. Thus in the case of a speaking human face it might be possible to distinguish by pattern recognition ten or more different mouth positions and send a code word for each position as it occurs. A synthesiser at the receiver would produce the appropriate pictures of mouth positions in response to the received code words.

Compatible HD-TV

HD-TV broadcasting systems use bandwidth compression to achieve compatibility with standard DBS channels, signal formats and existing TV receivers. This means that the bandwidth compression system must enable HD-TV pictures with twice the vertical and horizontal resolution of a standard TV picture, i.e. with four times the total information, to be transmitted within the 24MHz or 27MHz f.m. channels laid down in the WARC 77 frequency allocations for DBS in the 12GHz band. These channels allow basebands of about 11MHz.

To achieve the required resolution, the HD-TV picture source generates signals with a bandwidth of about 30MHz for 2:1 interlaced pictures or 60MHz with sequential scanning. With both the Japanese MUSE system and the European Eureka 95 system the bandwidth compression applied gives a reduction of 4:1. The digital signal processing that achieves this reduction has two main functions, first to remove redundant information from the picture and secondly to spread selected parts of the resulting vision information over an extended period of time. The digital processing involves sampling and quantisation plus subsampling, which is resampling at a lower rate.

The Eureka 95 System

The compatible Eureka 95 system is based on an interim production standard with the following parameters: 1,250 lines interlaced 2:1; sampling at 1,440 pixels per line; a field rate of 50Hz; and a picture aspect ratio of 16:9. The redundant information which is discarded consists of diagonal image detail and fine movement detail that cannot be detected by the eye. Two two-dimensional digital filters perform this elimination task by appropriate spectrum shaping. A two-dimensional filter is one that operates in any two of the three TV picture dimensions – horizontal, vertical and time (a conventional filter such as a low-pass type is a one-dimensional filter: it modifies the vision bandwidth and thus affects the resolution in only the horizontal dimension).

As previously mentioned, the eye is less sensitive to fine detail lying in diagonal directions across the picture than to fine detail in the vertical and horizontal directions. So this fine detail is filtered out by the twodimentional filters, leaving the vertical and horizontal resolution unchanged. Use of a method of subsampling called offset or quincunx sampling enables bandwidth compression to be introduced.

Fig. 8 shows at (a) a conventional orthogonal sampling pattern applied to a picture and at (b) the corresponding offset or quincunx pattern. The term quincunx refers to the repeated arrangements of five samples, like the five dots on one face of a gaming die, that can be discerned in this pattern. The quincunx method of sampling improves

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(a)	(b)	(c) (D352)

Fig. 8: Subsampling patterns used for HD-TV bandwidth compression. (a) An orthogonal pattern. (b) An offset (quincunx) version of (a). The coarser quincunx pattern shown at (c), using a lower subsampling rate, results in a reduced bandwidth requirement.

the horizontal and vertical resolution relative to orthogonal sampling but reduces the diagonal resolution. It's possible therefore to use a coarser quincunx pattern as shown as (c). This coarser pattern provides the original horizontal and vertical resolution, corresponding to (a), while giving reduced diagonal resolution. Since the eye is relatively insensitive to diagonal detail this loss due to the sampling action doesn't matter. The system uses diagnal filtering to obtain this diagonal sampling loss. The result, as shown at (c), is a sampling pattern with half the number of samples for a given area of picture. This of course means that the sampling rate is halved. Accordingly this process reduces the bandwidth requirement by a factor of two.

Luminance Encoding

Fig. 9 shows the essentials of the Eureka 95 luminance signal encoding system. The analogue luminance signal from the 1,250-line picture source is first digitised to 8-bit resolution at a sampling rate of 54MHz. This is four times the CCIR digital coding sampling rate of 13.5MHz for luminance, and has been chosen because of the 4:1 compression that follows, thus retaining the CCIR coding standard.

The reduced-bandwidth signals produced by the two two-dimensional filters are next resampled at this lower frequency of 13.5MHz. This resampling is of course performed on the luminance signal in 8-bit digital form. The lower rate resampling (subsampling) is arranged to spread the samples over a longer period of time – in this case over four transmitted fields. Thus for transmission the information in each incoming interlaced picture of two fields is distributed over four fields. Since the time taken for each picture is doubled, the information rate and hence the bandwidth requirement is halved. This gives a second bandwidth reduction by a factor of two, providing a total bandwidth compression of 4:1.

The process is effective for bandwidth compression with stationary pictures and static parts of pictures containing movement, but introduces a loss of resolution in moving parts of the picture. So the two subsampled signals are next passed to a section of the bandwidth compression system that exploits the eye's insensitivity to high spatial frequencies in moving parts of the picture. The purpose of this section is to select dynamically from the two filtered inputs an optimum signal, depending on the nature of the picture content, for transmission. It also produces a digital assistance signal which carries instructions for controlling the decoding system in the receiver.

At this stage the luminance and chrominance signals are still on the 1,250/50/2:1 standard, though in sampled and digitised form, with the subsampled signal samples distributed over four fields as already mentioned. To achieve compatibility the 1,250-line signal must be converted into the 625-line format. This is done by a process called line shuffling. The line shuffler rearranges, in a four-field sequence, samples from two successive lines in each field of the 1,250/50/2:1 picture to produce one line of a 625/50/2:1 picture. Samples from odd-numbered fields are transferred into one 625-line field while samples from even-numbered fields go into the next, interlaced 625-line field.

After this line shuffling the resulting 625/50/2:1 luminance signal, along with the U and Y chrominance signals not shown in Fig. 9, is fed to a MAC encoder. This compresses the Y, U and V signal components in time and rearranges them as a time-division mulitiplex, all by digital processing.

Wide Aspect Ratio

The wider 16:9 aspect ratio generates extra picture information relative to the standard 4:3 aspect ratio. In the high-definition MAC encoding equipment developed by the IBA this extra information is accommodated by time compressing the luminance signal by a greater amount – a factor of 2:1 (with 4:1 colour) is used instead of 3:2 (colour 2:1) with a conventional D-MAC encoder.

The Problem of Movement

The Eureka 95 system compresses the bandwidth by taking a longer than normal time to transmit the samples that comprise one complete picture, spreading them over four fields. This affects picture quality. It gives no trouble in static parts of the picture, but in moving parts it causes loss of resolution or blurring. This is obviously not acceptable for HD-TV purposes. The Eureka system has to use additional signal processing therefore to combat this impairment where movement is present. In the provisional system demonstrated at Brighton in September 1988 a motion-adaptive method of encoding is included to mitigate the problem.

In stationary areas of the picture this technique uses the four fields of samples to construct an image with high spatial resolution but poor temporal resolution. In moving areas it uses one field of samples to construct the

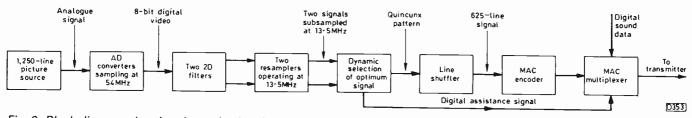


Fig. 9: Block diagram showing the main signal processing arrangements used for bandwidth compression in the Eureka 95 compatible HD-TV system. For simplicity only the luminance chain at the transmitting end is shown – this is the most critical part of the system for image resolution.

picture, the result being reduced spatial resolution but good temporal resolution. Whichever of these modes gives the better result at a given moment is selected automatically by the motion-adaptive system.

There is still an objectionable loss of resolution in areas with movement that the eye can follow, such as a slow sweep of someone's hand. Further development aims to overcome this problem by using a more refined system called motion-compensation. This measures the speed and direction of motion in small sections of the picture continuously. These "motion vectors" are transmitted to the receiver where they control digital processing circuits that enable the moving areas to be reconstructed with the same high resolution as stationary areas.

Motion-compensation is also being developed for use with visual telecommunications systems of the conditional element replenishment kind shown in Fig. 7. One purpose of this is to improve the prediction of the system and thus reduce the amount of change information that has to be transmitted.

HD-TV MAC Receiver

The digital signal processing operations shown in Fig. 9 are reversed in an HD-TV MAC receiver. This is a straightforward business: the AD conversion is reversed by DA conversion, subsampling by up-sampling, line shuffling by deshuffling and so on. The transmitted samples spread over four fields are collected together in a semiconductor memory.

We've come a long way since the proposal for bandwidth compression with mechanical scanning!





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VCR Clinic

Hitachi VT33

The problem with this machine was intermittent loss of the E-E and playback picture. The video signal was present at IC202's output but was missing at pin 8 of plug PG233. It was being lost at Q210 whose base voltage was low at 1V instead of 6.7V. Tracing back we found that Q224's base voltage was also low. The culprit was C292 which was leaky.

GEC V4007

This machine and the Philips equivalent can suffer from broken wires to switch COD3. The symptoms are acceptance of the cassette which is then immediately ejected. The wire usually breaks where it connects to the small PCB under the deck. **P.B.**

Panasonic NV730

The weakness of the worm-wheel unit, part no. VXP0575, fitted to the front-loading mechanism in this machine was mentioned on page 20 of the November issue. A possibly puzzling symptom associated with this and other front-loading assembly faults is that the left-hand side supply spool rotates backwards for several seconds before auto-shutdown of the machine. **E.T.**

Sanyo VHR3300

The symptoms were no off-air signals, failure to tune, and the orange channel display was both dim and flashed on-off. The rest of the display was also dim, though the machine provided good playback. We found that the -30V supply to the display/key board was low at -12Vbecause R5008 (47 Ω , safety type) on power panel PW1 was open-circuit. No overload could be found and the replacement resistor has not failed. **E.T.**

Hitachi VT88

This was an unusual fault. With certain tapes there was slight horizontal picture instability, especially near the bottom, and the tracking was critical for hi-fi sound. We found that the sealant used in the factory to seal the exit guide screw top had run down and formed a blob on the guide's nylon sleeve. This also prevented the sleeve from rotating.

Panasonic NV-L20

We've had a couple of these machines with the back-tension arm stiff on its pivot. The effects are failure to erase previous recordings, picture rolling, and virtually unwatchable own-recordings. The machine usually works fine when it's stood on its left-hand side! The cure is to remove the lever, check that the box-section at its pivot end is square, and reassemble with a drop of lubricant. E.T.

Panasonic NV-MS1

Modern full-feature S-VHS camcorders are complex animals. This one had an intermittent problem – failure, sometimes, to display white-balance information in the viewfinder. The actual white-balance operation, auto or manual, was fine. It took us a long time to find out where these captions come from! There's no separate character generator chip in this machine: the operation is carried out inside the main microcomputer chip IC6001 on the syscon panel. Replacement of this chip, using a mighty magnifier, restored order to the viewfinder readout. E.T.

JVC GRC9, GRC11

If you encounter one of these camcorders with a no-eject problem and the power LED winks at you when you try to eject the cassette, check the dressing of the wire to the full-erase head. If it goes astray it can get caught between the trigger and detent lever on the side of the cassette housing assembly, thus preventing release of the cradle.

Ferguson 3V32/JVC HR7655

This machine operated at about half speed. Double speed wouldn't work and the slow-speed mode was very slow indeed. After a bit of signal tracing with the oscilloscope we found that the fault was within IC6 – the waveforms at pins 3 and 4 were totally incorrect. K.R.

Ferguson 3V39/JVC HRD110

The problem was intermittent sound muting, recording and E-E depending on the picture content. Dark scenes produced sound muting, bright scenes brought the sound back, while in between the sound fluttered and caused a disturbance to the picture's luminance level. The cause of the fault was traced to L7 on the tuner/i.f. panel. It should be tuned to 15.625kHz but was found to be off frequency. Normal operation was restored when L7 was peaked, using an oscilloscope, but at resonance the core was fully tightened. An un-numbered tuning capacitor within L7's can was thought to be defective. Adding an externally mounted 330pF ceramic capacitor remedied the situation. **K.R.**

Panasonic NV-G40

We've had a couple of these machines with the following complaint. After about five seconds the machine switches itself off. When we saw the report on the job card our immediate thought was of a dodgy solenoid. In fact this wasn't the case. When the mechanism solenoid sticks, the machine can't move the mechanism into the correct mode. It thus switches back to standby.

The problem was that when the tape was moving in play, fast forward, rewind etc. it would run for only about seven seconds before the machine went into the stop mode. This sounded like a reel rotation problem, so a check was made at pin 27 of the system control chip IC6001 (t.reel input). When play was selected, this input switched correctly between 0V and 5V a few times before sticking at the high level, even though the take-up reel was still moving. There's an operational amplifier, IC6002, between the system control chip and the take-up reel phototransistor. One of its inputs (pin 3) is held at 2.5V by a potential divider while the other input (pin 2) is connected to the sensor. This latter input varies between about 1V to 3V to give a change of voltage at output pin 1. When play was selected we found that the input switched from high to low but the output remained high, proving that the operational amplifier was faulty. I.B.

Panasonic NV180

This is a 12V machine and was used in a coach. It was brought to us because a cassette was jammed in. To release, you turn the machine upside down and remove the bottom cover at the front. At the front of the machine, near the colour auto switch, there's a release hole through the PCB to a metal plate on the cassette deck. Press this with a screwdriver and the deck will release. See page 2-3 of the service manual.

When we'd done this we discovered that the machine was dead, due to a Wickman fuse (F10J). You'll find it in the middle of the servo board at the back, near TP1003. It's in the 5V line and is not shown in early circuit diagrams, so you can be puzzled if you don't know it's there. J.L.

Ferguson 3V23

This machine played back o.k. but wouldn't record any picture at all, just noise. Someone else had recently fitted a new head. Naturally we assumed that it was o.k. and spent a lot of time making checks and setting up the circuits. When we replaced the head with one obtained from Ferguson normal results were obtained. The head we took out worked all right in a 3V22. J.L.

Ferguson 3V00/16/22 etc.

This VCR got me thinking hard – it had a fault I'd not come across before on one of these venerable machines. When play was pressed, nothing happened. No motors turned, there was no loading and no sensor operation. The play key simply stayed down. All supplies were present and the sensor lamp was not open-circuit. If the after-load switch was operated the drum turned – in fact if the pinch roller was engaged the machine loaded and played. The play microswitch on the front key PCB assembly was open-circuit. S.L.

Schneider SVC245RC

This VCR's tuning was very unstable. It was just possible to tune something in, but the display soon drifted off. There was also some hum on the picture and sound. A scope check on the tuner rails showed that there was some ripple present. The cause turned out to be C3 $(47\mu F, 50V)$ on the power supply panel. S.L.

Akai VS1

There was not a beep out of this machine. The always 12V and 5V rails were found to be present and a check at pin 9 of the STK5325 chip IC1 revealed that the correct momentary low command came from the microcomputer chip when the power-on switch was operated. This instructs IC1 to switch on provided all is well. A check on its output rails proved that the supplies appeared momentarily then switched off.

Obviously the MB88401 microcomputer chip was detecting a problem. Checks here revealed that the "B

down" signal at pin 5 was permanently low instead of at 5V. As a check the NTSC switching pin 6 was shorted to pin 5. This enabled the power supply, and we were on our way. The fault was traced to TR9 being open-circuit as someone in the past had shorted out the sensor lamp.

A function check on the deck then revealed a further problem. Although the VCR seemed to acknowledge the fast forward command, no motors turned in this mode. All the other functions worked correctly. The switching signal was traced up to the BA6109 reel drive chip IC6 and was found to be normal. There was no output from the chip in the fast forward mode however. I interchanged it with the loading chip as this is of the same type and there was then no tape loading, proving that the chip was faulty. A replacement put matters right. S.L.

Amstrad VCR4600

Nothing at all could be tuned in when using the thumbwheels. As all the tuner supplies were correct a replacement was fitted. This enabled all stations to be tuned in but the station selector buttons didn't change channel. The indicator LEDs changed but the picture remained the same. The AN5015K RAM chip on the front panel proved to be at fault. S.L.

Saisho VRS4000

This machine had unstable drum servo operation. The clue was a momentary sideways movement of the picture every few seconds or so. When the fault was present, selecting pause didn't change the symptom. A variation in drum speed could be heard and seen. When the connector to the lower motor was touched there were wild drum speed and phase gyrations. Since contact couldn't be improved I removed the plug and socket and soldered the wires directly. After a long soak test however the variations continued. The cause of the problem was eventually found to be a hiccup in the output waveform of IC01 (OEC9009). It's interesting that most of the chips in this machine are labelled IC01!

Ferguson 3V59/3V65/FV11 etc.

A fault that's becoming increasingly common with this range of machines is failure of the STK5481 multiregulator chip. You usually find that the inputs are correct but one of the three outputs is missing. Symptoms include no go with the display coming on but with no on-off LED display, or dead with the cassette being accepted but not coming out. The chips are reasonably priced and are a worthwhile addition to your spares if you see a lot of these machines. **N.B.**

Panasonic NV370E

This machine isn't a UK model but works on the UK standards. It belonged to a doctor who had brought it back with him from an overseas appointment. His complaint was that since a local contractor had fitted a new aerial the vision had been snowy. On test we found that there was severe hum on the E-E and playback sound and picture and that there was no capstan servo lock. A quick check showed that the unregulated 18V supply reservoir capacitor C1102 was severely leaky. In fact it bulged physically. It's on the mains transformer PCB. N.B.

Servicing Compact Disc Players

Part 11: Servo Systems – 2

Joe Cieszvnski

Having looked last month at the focus and tracking servo arrangements used in the more common CD players we now move on to consider sled control and the disc rotation servo.

Sled Control

The sled, which is sometimes called the slide or carriage, transports the laser assembly across the disc, either in minute steps or at speed depending on the operation being performed. We saw last month that the two-axis device can move the optical lens through only $70\mu m$, and that the sled is used to push the entire assembly 70µm each time the two-axis device approaches its limit. The circuit that controls the operation of the sled motor is relatively simple. It's really an extention of the tracking servo.

Fig. 11 last month showed the tracking servo circuit used in the Sanyo Model CP-08 CD player. The output from tracking amplifier-2, at pin 27 of the CX20108 chip, drives transistors Q204/5 which in turn drive the tracking coils. See Fig. 1. The tracking drive output is also coupled back to pin 25. The tracking drive waveform (see Fig. 2) has the following characteristics. There's a fundamental frequency of between 200-500Hz, depending on the rotational speed of the disc; an h.f. component that's caused by instantaneous errors introduced during the disc stamping process; and a slow ramp waveform which tracking amplifier-2 generates to move the two-axis device progressively through its 70µm travel. This ramp has a duration of two to six seconds, depending on whether the optical assembly is scanning the inner or outer edges of the disc. As the ramp approaches its peak, the tracking movement of the twoaxis device will be near its limit. The ramp is therefore monitored so that the sled motor can be energised just before the peak of the ramp is reached. During period A in Fig. 2 the current is increasing and the two-axis device is being moved from its central position towards its $70\mu m$ extremity. At B the sled motor moves the laser assembly forward and the two-axis device returns to its

central position. Period C is the time during which the sled motor is energised.

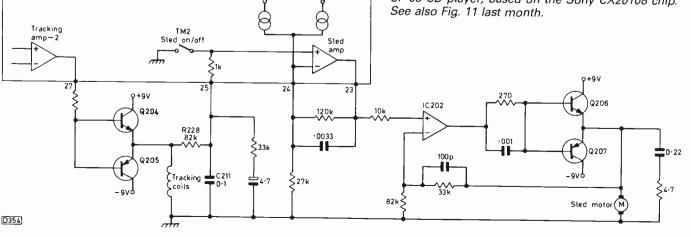
The sled motor is thus energised when the waveform at pin 25 of the CX20108 chip reaches a predetermined value. To ensure that the operation of the sled motor is smooth, the higher frequency tracking error signal components must be removed. This is done by the integrator R228/C211. The output from the sled d.c. amplifier appears at pin 23 of the chip. After further amplification by IC202 it's used to switch the sled motor drive transistors Q206/7. During normal play Q206 is used to move the sled forwards (outwards). Q207 is required so that the sled can be returned to the centre of the disc at the end of play or backwards during a reverse track jump. The direction of movement of the sled motor is controlled by switches TM5 and TM6 within the chip: when TM5 is closed the sled moves forwards; when TM6 is closed the movement is backwards.

It's important that the sled returns to the correct position at the end of play so that it's ready to read the table of contents at the next start of play. For this purpose a limit switch is incorporated on the deck. It operates when the sled has returned. The switch may be mechanical or optical and is connected to the main microcomputer chip which in turn tells the servo logic control system in IC201 that the sled has returned and that the sled motor must be de-energised (TM6 opened). This switch can be likened to the unload switch in a VCR. On some early players it's adjustable, the setting being critical. This is one of the first checks to carry out if the player fails to read the table of contents. Fig. 3 shows a switch of this type.

As a check to ensure that the sled has not been jolted out of position while the player was not in use, the sled moves forwards when power-on is pressed, operating the limit switch once. It then moves backwards to reset the limit switch. This routine is also performed each time a new disc is inserted, the action being initiated by the main microcomputer chip.

In many players the sled motor doubles as the loading (disc drawer) motor. This presents no problems from the

Fig 1: Sled motor control circuit used in the Sanvo CP-08 CD player, based on the Sony CX20108 chip. See also Fig. 11 last month.



тмб

Part IC201

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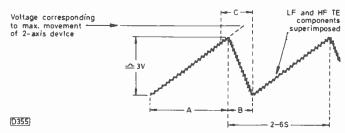


Fig. 2: Waveform at the emitters of Q204/5 in Fig. 1.

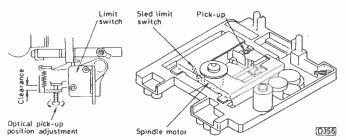


Fig. 3: Example of a limit switch used to set the initial position of the sled. On early models the switch was adjustable: the setting is critical.

point of view of the servo. The main microcomputer chip tells the servo logic control system to open TM2 and close TM5 until the draw is fully closed – closing TM6 opens the drawer. From the mechanical viewpoint this double use of the motor usually calls for a cam to perform the dual functions of sled and drawer control. We'll consider these operations in more detail when we cover deck mechanisms.

Sticking Problems

Generally speaking the sled motor control circuit is not a troublesome section of a CD player. Sticking problems are more likely to be caused by mechanical faults which we'll cover in a future instalment. You may occasionally encounter a player in which the sled remains stuck at one end of its travel and the motor possibly overheats. The most probable cause is a defective drive transistor, e.g. Q206 or Q207 in Fig. 1, a defective operational amplifier, or loss of one of the two supply lines to the sled circuit.

Philips Radial Tracking Arm

The type of mechanism with a two-axis device giving horizontal beam movement in addition to a sled is widely used in CD and other laser players. From an early stage however Philips opted to use a somewhat different arrangement that does away with the need for any horizontal optical unit movement. The principle of the Philips radial tracking arm is illustrated in Fig. 4. The arm is pivoted and is free to swing across the disc, carrying the optical assembly with it. It operates on the same principle as the moving-coil meter, but in this case the tracking servo governs the current in the coils, the servo being controlled by the tracking error signal. In Part 10 last month we saw how the TE signal is obtained with the Philips laser assembly. The direction of current through the coils for forward or reverse tracking is controlled by a transistor circuit that's similar to the one used to control two-axis device coils or a sled.

A simple way in which to compare the Philips radial arm and the double-action sled and coil is to liken the

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next month in

TELEVISION

FREE TRANSISTORS!!

Next month's cover-mounted gift pack contains assorted signal transistors suitable as replacements or for use n projects.

SERVICING SALORA COLOUR TVs

Ian Bowden and Nick Beer continue the Salora saga with an article covering the K and L chassis. This brings us to Ipsalo-3, a simplified version with just one switching transistor in the primary circuit. In fact the circuitry throughout the chassis is much less complex than in the preceding chassis. With the usual detailed faults list. These sets also appeared under the Hitachi and other guises.

MORE ON THE ICC5 CHASSIS

This follow-up to an earlier article deals with the colour decoding circuitry and the operation of the power processor chip which controls the two timebases and the chopper power supply. The Thomson/Ferguson ICC5 chassis is one of the most complex chassis currently in production.

LOW-COST COLOUR PATTERN GENERATOR

Details of a simple generator that gives a red raster, a black raster, crosshatch and colour-bar patterns, scund, alternative 75/95 per cent saturation and colour on/off.

The generator can be quickly assembled on a breadboard and offers a cheap solution to the requirement.

SRA1 SERVICING EXPERIENCES

то.....

Nick Beer reports on faults encountered to date with Ferguson's Astra satellite TV receiver.

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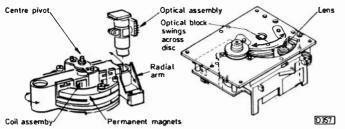


Fig. 4: The Philips radial tracking arm mechanism.

radial arm to a normal record player tone arm that tracks continuously across a disc and the sled and coil action to a linear tracking record player arm that crabs its way across the disc.

From the servicing point of view both systems are reasonably reliable as far as electronic components are concerned. Most problems seem to occur because the tracking servo is out of adjustment, possibly due to the laser ageing or changes in mechanical tolerances. Some early Philips players were prone to dry-joints, but these were fairly random and were not confined to the servo board.

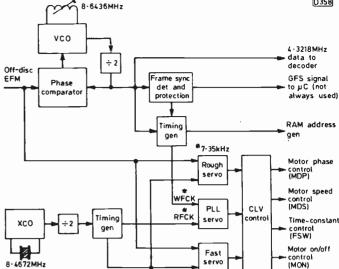
The Disc Servo

The operation of a CD player's disc servo is much the same as with any other type of motor control servo in which a sample of the motor speed is compared with a stable reference source. Because the sample consists of data from the disc, and because this sample cannot be obtained until the disc's speed is approximately correct, a start-up servo is required. As we consider the disc servo part of a CD player we'll look in particular at the Sony second generation chip set in which the disc servo is included in the CX23035 decoder i.c. You'll recall that this chip set was selected to serve as a basic example throughout the series, because it's widely used by CD player manufacturers. Fig. 5 shows in block diagram form the sections of this chip relevant to disc speed control - a block diagram for the complete chip was shown in Part 8 (Fig. 2, page 925, October) where the decoder was dealt with.

The data is recorded on the disc at a constant rate of 4.3218MHz. So for the laser scanning to be kept at a constant linear velocity (CLV) of 1.2m/sec the rotational speed must be greatest at the start of play, when the laser is scanning the inner section of the disc, slowing down as the laser moves towards the outer edge of the disc. The disc's rotational speed is 486 r.p.m. at the start of play, slowing to 196 r.p.m. at the outer edge.

The block labelled "PLL servo" in Fig. 5 runs the disc during normal play. Its sample input is derived from the frame sync signal while the reference is derived from a crystal oscillator. The block labelled "rough servo" takes care of disc run up. It also takes over during normal play whenever the disc's speed is out of the PLL servo's capture range. The block labelled "fast servo" is used during track search and skip (not every model uses this).

We'll consider first the rough servo, which is more often referred to as the speed or run-up servo. The principle is shown in Fig. 6 (this particular example is taken from the earlier Sony Model CDP101). To start things off the servo gives the motor a brief "kick" - this lasts for about 0.3sec. As a result the disc begins to rotate slowly. Once this happens data can be read off the



D358

Fig. 5: Block diagram of the disc servo system in the Sony CX23035 decoder/servo chip. Note that the VCO is external to the chip.

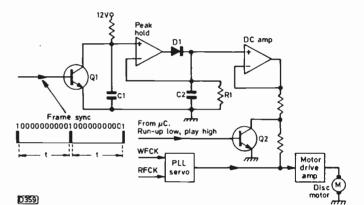


Fig. 6: Operation of the disc run-up servo.

disc, though its rate will be too slow for the decoder to be able to interpret it. The regular frame sync signal with its be recognisable however (remember that, as pointed out in Parts 6 and 8, the frame period is the only time when ten consecutive zeros occur).

This data is fed to the base of Q1, which is off when a zero is present at its base. Thus when the extended zero period (frame sync) occurs C1 will charge to a peak value. The duration of the sync period (t in Fig. 6) and thus the charge developed by C1 depends on the disc's speed. This peak value is rectified by D/1/C2, the resultant d.c. level being used to speed up the disc motor. As its speed increases, the duration of the zero periods in the frame sync signal decreases and the peak charge developed by C1 falls. R1 will discharge C2 to a new lower d.c. level which further increases the motor's speed. The process continues until the frame sync frequency becomes 7.35kHz, at which point the decoder is able to interpret the data. The main microcomputer chip then sends a high signal to Q2's base, switching it on. The output from the run-up circuit is thus shorted out and the disc motor comes under the control of the main PLL servo.

To keep the explanation of this circuit's operation simple, I've shown only the peak hold part, omitting the bottom hold circuit. If reliance was placed on peak hold only and dropouts occurred during the run up the peak hold would, if the dropouts were longer than the frame sync period t, rise to a value far greater than during the last detected frame sync period. The bottom hold circuit is included to prevent this. It has a much longer time-constant than the peak hold and is used to maintain the last good peak hold sample.

As mentioned earlier, the rough servo also takes over control when the speed of the disc moves out of the range of the PLL servo. This can occur if the player is subjected to shock or if the disc being played has an excessive amount of dirt or grease on its surface, resulting in total loss of the data and sync. Switching between these servos is controlled by monitoring the GFS (guard frame sync) signal produced by the frame sync detection and protection system.

The operation of this system was discussed in Part 8, where we saw that missing sync signals are replaced by an internally generated sync signal which is phase locked to the off-disc sync signal. This is the signal (WFCK – write frame clock, more about this next month) that's

Letters

A DEALER'S VIEW OF SATELLITE TV

Last month's answer to test case 323 led me to reflect on our experience to date with manufacturers' back-up for satellite TV equipment. The supply of systems following the launch of Astra was, as has been well publicised, a shambles. What wasn't so well publicised was the fact that with the systems that did come through at that time there was a very high percentage of missing bits, from LNBs, feedhorns and polarisers to the support rods on the early prime-focus dishes. The problem was getting replacements, spares of any kind in fact. This sort of thing applied, in our experience, with all makes. The situation has improved since then but now that we are getting receiver faults the spares supply situation is very variable. For example Salora/Luxor are superb for receiver spares, but when it comes to dish parts that have to be ordered from sales rather than NCE spares (we've had missing bits and faulty servo motor polarisers) the process is slow. There's no problem with Ferguson dish parts on the other hand, but getting spares for the less reliable receiver can sometimes take weeks.

Very few dealers or engineers had experience of satellite TV reception before Astra, and to date none of the manufacturers we deal with have offered seminars on servicing or installation. Manufacturers such as Salora and Ferguson have compensated for this omission by having excellent technical advice lines. If you've read John Breeds' books you'll appreciate the standard of back-up provided by Salora.

There are now so-called satellite TV experts around every corner. Very few are true experts, and my advice to those looking for help is to go to a company that has been established in this field for several years, with experience of things other than just Astra. The installations carried out by the local branch of a well-known High Street retailer are abysmal, for example joints in the outside downlead just coupled by means of coaxial plugs and taped up after siting the dish in the wrong place, not bothering to route a new lead. Other

used by the PLL servo as the sample. It can be generated and sustained only when the disc speed is correct and phase locked however. In some players the GFS signal is passed to the main microcomputer chip to provide identification that the run-up is complete and the PLL servo can thus be engaged. When phase lock is achieved the GFS signal is say "high", going "low" when lock is lost. During periods of extensive dropout the GFS signal goes low and after a predetermined time the microcomputer will re-engage the rough servo in an attempt to relock the motor as soon as the data is restored. In the event of the data loss persisting, one of two things will happen depending on player design. In some models the microcomputer will shut down the player. In others the rough servo will keep on initiating the kick-start routine with the result that the disc speed accelerates in definite increments. Eventually, with the disc spinning at a great speed, the microcomputer will initiate shut down and disc braking.

Next month we'll look at the PLL servo in greater detail.

organisations however prove that the "big is bad" rule is wrong. I refer to Startrak, a very well organised company. Having been present when some of their installations were carried out I've been very impressed with their work. Never once had an installation to be aborted, all the hardware required is on the van and as the staff have an engineering background TV sets and VCRs are tuned for customers with no problems. The only queries that have arisen have been with B and O equipment, but since some of this is horrendously complicated we don't expect all our own staff to be familiar with it.

Naturally I can comment on only my own experience. Other dealers may have had different experiences. Let's hear yours.

Nick Beer,

Bideford, N. Devon.

GRUNDIG CUC2401 SOUND PROBLEM

In the November Service Bureau a no-sound problem with the Grundig CUC2401 chassis was mentioned. The subject is covered in a Grundig Technical Bulletin. You should start fault finding by using your scope to look for the uncontrolled a.f. output at pin 1 of the Euroconnector. If it's not present you are on your own for a bit of conventional fault finding. If a.f. is present here however, and it probably will be, you come to the interesting bit. Try to find another TV set with the same or a later chassis, fitted with the same tuner (part no. 29504.101.01), and fit its tuner in the faulty set. You should then find that you have the sound back. Don't go and order another tuner, as it's probably not faulty but has merely lost its stored data for the analogue sound setting. Look at the microcomputer chip on the control panel. It may be the early Siemens version, type SDA2011-A003, which can be replaced with the later SDA2011-A005 (part no. 8305.158.305). This will ensure that there's no recurrence, but there's a cheaper way out.

Find another set of this or a later series and check whether it's fitted with either the later SDA2011-A005 chip or one of the Motorola ones, type XC89501 or similar. Fit your "faulty" tuner to this set and switch on. It should behave o.k., confirming that the analogue values have been restored. If all is well, return the tuner to where it belongs in the original set. As a further precaution, fit a BAT41 diode (part no. 8309.198.041) with its cathode to pin 23 of the microcomputer chip and its anode to pin 20 (chassis). I had this fault a couple of years ago. The set has behaved perfectly ever since, after taking the action just described.

I believe that the colour, brightness and contrast may be affected in a similar way, since the tuner's store holds all four analogue values which are circulated around the set on the SDA line.

Les Austin,

Kirk Michael, Isle of Man.

REMOVING SURFACE-MOUNTED ICs

Here's a tip for removing surface-mounted i.c.s, as doing this takes time and can damage the PCB. Take a small screwdriver, place the blade under one corner of the i.c. to be removed, then use a Black and Decker paintstripper hot-air gun (heat gun) directly on the i.c., taking care not to overheat the PCB. Within two-four seconds the i.c. will come off in one, leaving the board undamaged.

R. Brown,

Bradford, W. Yorks.

BROADCASTING PROSPECTS IN THE UK

While many TV writers went to the Berlin Show to boggle at the latest video offerings I made a trip to Holland to visit an old friend who had been given early retirement by a leading TV manufacturer. Living Dutch for a week in a town away from the tourist run is an excellent way of assessing the local radio/TV situation, and to me at any rate the way things are going in the UK is now much clearer.

Like much of Europe, Holland is extensively cabled. The Dutch have always thought that the country next door has better programmes, and in the past their efforts to pick up stations from across the border have damaged both their bank accounts and their gable ends. Not now. For a reasonable premium, they can get all the programmes they want, clean as a whistle, in system B/G – with 25 f.m. radio channels thrown in. Since the Dutch are delighted with this situation and need little more, VCRs and sets with teletext are very thin on the ground.

Programme selection is by "zapping". Because of their quality, BBC-1 and BBC-2 are very popular. Although the language is no problem to our Dutch friends, they did have a bit of a struggle with "Bread" and old Monty Pythons were watched with the sound down. My friend's network provided 15 channels – Dutch, Belgian and West German as well as BBC, Sky and MTV. Any new channel would have to displace an existing one, so it would have to be good to get in.

Cabling has improved the environment to the extent that there's hardly an aerial to be seen. Those wishing to instal a dish or a Yagi array face hostility from their neighbours. It seldom happens, as most are satisfied with what's on offer via the cable network.

No one knew about MAC, not even my ex-TV friend, and the impression is that the new programmes would be converted to B/G-PAL at the head end, as they did with MAC for the VCRs at the Berlin Show.

So, as the forty wind generators on the new mole at Zeebrugge waved goodbye, what was it that I was so

much clearer about? First that new programmes can succeed only if more attractive than the present offerings, which is a hard target to beat in the UK. Secondly that we are on our own with D-MAC. At Berlin, widescreen and HD TV were demonstrated on D2-MAC, and no way would my friends sacrifice their choice for a wider bandwidth. And finally that deregulation has probably come too late. People are beginning to watch less. Once again we seem to be helping someone to cross the road when they wanted to stay where they were!

Harold Peters, Lowestoft, Suffolk.

MORE ON THE PANASONIC NV730

I would like to add a few notes on the Panasonic NV730 VCR as the following faults are becoming more common. Faults (1)-(3) relate to the timer board, (4) and (5) to the servo board.

(1) Machine will not switch on, no VCR "on" and no functions but the clock is o.k. These systems occur when the MN1512VTJ chip IC7503 fails. This is rather tricky to detect as the power on (L) pulse at pins 46 and 47 is simultaneously in control with the main microcomputer chip IC6001.

(2) Machine completely dead, continuously switches on and off or runs normally then switches off after twothree minutes. The reset 5V line at pin 12 of IC7305 (AN5033) goes missing. This chip also gives faults such as inability to switch between Bands V and VL.

(3) Haywire display, with no functions. This is due to failure of the MN1455BVL chip IC7501 to oscillate correctly. In addition the regulated 12.7V at BP7502, pin 1, is dumped.

(4) Drum running at maximum speed. This occurs when IC2001 fails.

(5) Capstan running at maximum speed. IC2002 fails. Capacitors C2036 and C2037 also fail – no FG pulses.

S. Da Costa,

Nairobi, Kenya.

IMPROVED REGULATION

In order to improve the power supply regulation with the Thorn 1590/1591 chassis I carried out the modification shown in Fig. 1, using a μ A723C variable voltage regulator chip to drive the series regulator transistor VT21, which I changed to type TIP31. The 723 chip was mounted on a Tandy Experimenter's Board which was

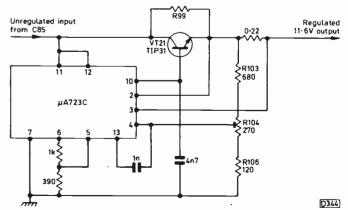


Fig. 1: Modified series regulator circuit for the Thorn 1590/ 1591 series chassis to provide improved regulation. See letter from K.J. Treeby.

fitted on the metal plate above VT21. The printed circuit was cut to accommodate the 0.22Ω current sensing resistor. Unfortunately, due to the physical layout the potentiometer chain couldn't be connected to the output side of this resistor. The following components were removed: R100, R101, R102, C83, C86, C87, W17 and VT22. R103 was changed to 680Ω , R104 to 270Ω and R106 to 120Ω .

K.J. Treeby,

Plymouth, Devon.

STOLEN

Several items were stolen from my car whilst I was staying overnight in Telford on a business trip. These are as follows: An Avo Model 8 in a brown leather carrying case, the probes well worn and repaired with insulating tape; two tool cases, one holding a soldering iron plus a plastic/green cloth tool roll containing various servicing tools, the other case containing tools for the car; and a red plastic spares box of the type with trays that fold out when the lid is opened, containing various electronic spare parts. I would be most grateful for any information leading to the recovery of these items, and would be prepared to offer a reward.

J. E. Bagley, Whitehall, Bewdley Bank, Canon Pyon Road, Herts. HR4 7SH.

CAR RADIO-CASSETTE PLAYERS

I service car radio-cassette players and frequently find that the connections to the tape head have broken. The cause is usually broken cores in the lead, or the lead

Video Trouble

Les Lawry-Johns

A belt in our Fidelity VCR broke – I'm told it's a Fisher-Sanyo machine. Now I've never repaired a video recorder in my life and don't stock the belts, so I ran down to Geoff's place in Sun Lane. He fitted a new belt and tested the machine. I took it back home and it worked all right for a week or so. Then severe hum bars started to show and you couldn't watch the picture. Back it went to Geoff who kept it for a week or so because it wouldn't record the sound.

Eddy who works for Geoff had replaced some rectifiers to cure the hum bars but didn't seem to want to spend time on the loss of sound recording. Something in the i.f. panel he said. I took it home for Honey Bunch to play with. She was able to use it to play our recorded tapes but wasn't pleased about the sound recording problem and kept on at me to have a go. If Eddy couldn't find the cause of the problem, what hope had I? After some days she visited one of her daughters and came back with an elderly Sony Betamax machine. This frightened the life out of me but, with HB's son-in-law, we managed to get it going and it performs quite well. We have to have a machine so that HB's grandson can watch "Home and Away" and "Neighbours" after we've collected him from school in the afternoon.

I feel guilty about this lack of adventurousness but don't like to risk mucking things up. I still tackle TV sets breaking away from the terminals on the head. Many manufacturers use very stiff screened cable, often poorly anchored. For many years I've overcome this problem by using record player pickup arm lead – the five-core, very fine flexible cable that's used to connect the cartridge to the sockets under the deck. The lack of screening hasn't caused any problems, in fact many manufacturers have started to use unscreened cable. But it tends to be rather heavy, not very flexible and it still breaks!

The problem is that I have to pay $\pounds 2.40$ for a 15 in. length of the pickup lead, and the source of supply will eventually dry up. I've tried to obtain this type of lead elsewhere, so far without success. Does anyone know of a source of supply, preferably by the metre? Perhaps some enterprising supplier could persuade a cable manufacturer to make some?

Geoff Davies,

Rugby, Warwickshire.

WANTED

I would like to thank those readers who have written in with details of playing NTSC tapes on UK VCRs. I'd like to obtain an 8928/JVC HR3330TR, but have so far failed to locate one. Does any dealer or individual have one for sale? If so, please write stating the condition and price (please don't send the machine until a sale has been agreed!).

If any other reader wants one, I'd be happy to keep a "want list" and pass on any offers received.

John de Rivas, West Towan House,

Porthtowan, Truro, Cornwall TR4 8AX.

of course but the call for repairs is not great nowadays, as you probably know. There are quite a lot of Ferguson portables around with dry-joints causing intermittent field collapse however.

Then there was this chap who brought in a TX10. Said it kept cutting out. He left it and I immediately checked the focus/e.h.t. unit on the right-hand side when viewed from the rear. As it was blackened I disconnected the bottom screws and hung it free as a check – I was down at the shop, and my new focus/e.h.t. units were back at the bungalow, so I had to check as best as I could. The set worked all right, showing a faded BBC-2 picture. Then suddenly there was a flashover in the faulty unit and the h.t. fuse failed. The chopper transistor had shorted, so I had to fit a new BU208A. After doing this I popped back to the bungalow for a focus/e.h.t. unit – the modified type.

When this was fitted the picture was reliable but was faint and lacked green content. I turned up the green at the c.r.t. base but the tube was obviously low. So I took the chassis out, turned it up and shorted out the resistor that's in series with the c.r.t. heaters. The heaters then glowed a bit brighter and the picture slowly improved: after a while the greens returned.

When the owner returned I showed him the picture and told him that it would improve with use. There was a problem with the remote control system, which would give only even-numbered channel selection. I couldn't find anything obviously wrong with the cables and contacts and, as the owner didn't seem to be too concerned about this, I wrapped the set up. Perhaps someone familiar with these sets would like to comment on this symptom?

TV Fault Finding

Philips KT4 and K40 Chassis

A dead set is a common fault with these chassis. If the power supply is tripping, the BU508A line output transistor is probably short-circuit due to dry-joints on the line output transformer. No output from the line oscillator can be due to a dead TDA3576B chip. If the line oscillator is running but the line driver stage isn't, check whether R3192 (680 Ω) is open-circuit. **P.B.**

Grundig Sat 20

For no sound, just a rushing noise, suspect the S042 chip on the sound module. **P.B.**

Grundig CUC3400 Chassis

This particular set, a T55-340, has been responsible for a few grey hairs recently. It first came into the workshop a few months ago because of intermittent tripping from cold. The line drive signal going into the TDA8140 line processor chip was o.k., but it was distorted at the output. A replacement TDA8140 cured this for a while. When the set came back the fault was fortunately permanent, so I was able to make quicker progress. I found that the power supply was tripping, though it was all right with a dummy load. If the line hold was adjusted so that the frequency was too low the power supply started up and a raster appeared. For the line deflection/ switch-mode power supply (it's a variant on the Ipsalo theme) to work correctly the oscillator in the power supply must operate at line frequency. It didn't, at least not quite. The timing capacitor C653 (4.7nF) had changed value. P.B.

Grundig Cinema 9050

These projection sets use an early version of the CUC series chassis for the signals etc. and suffer from the usual power supply and i.f./tuner faults. They also seem to be prone to a problem that doesn't appear to affect non-projection sets, i.e. cracks in the main chassis, to the left of the tuner/i.f. can, where the tracks go round a large hole in the PCB. Faults so far have been either intermittent sound or an intermittent blank raster. **P.B.**

B and O 9000 (33XX Series)

Pumping followed by the set going to standby was traced to a dry-joint on the S-correction capacitor C18. An arc could be clearly seen through the PCB. J.L.H.

Salora 1G5

Although the grey scale was satisfactory, the faces had a permanent sun tan. This was corrected by adjusting the chroma delay line balancing controls. J.L.H.

Ferguson TX100 Chassis

This set would go off after running for a couple of hours, with the 119V h.t. supply switching relay chattering rapidly on and off. If the set was left switched off for a couple of minutes the fault would correct itself and the set would run for some time. With the fault present a check was made on the 119V and 20V supplies, which are derived from secondary windings on the chopper transformer. They were both at approximately half the correct value, which pointed to a fault in the primary side of the circuit.

A d.c. check showed that the TDA4600-2 chopper control chip's 12V supply was low at about 7V. With the aid of a scope we found that it was actually pulsing on and off at 50Hz. As a result the chopper transistor's ouput was also pulsing at this rate. This pulsing was due to the start-up circuit (thyristor SCR1 and the associated components) operating. When the set is running normally the TDA4600-2's 12V supply is produced by rectifying the output from winding 7-10 on the chopper transformer. The rectifier was o.k., but the d.c. resistance of the winding measured 50Ω . After it had been left for a few minutes to cool the resistance had fallen to the correct figure of 0.5Ω . I.B.

Panasonic TX2480 (Alpha 1W Chassis)

The fault report was sound but no picture. When we switched the set on a loud whine came from the power supply and, an important clue, its frequency varied. This suggested that there was no sync feedback from the line output stage which in fact wasn't working. The cause of this was traced to the 1.2Ω fusible resistor R851 which had risen in value to around 600Ω . It's in the 26V supply that powers the field output chip and the line driver transistor. Fitting a replacement restored correct working and after a check for shorts the set was put on soak test.

Some two hours later the set failed again. The fusible resistor was o.k. this time but the 26V supply was being loaded down - the voltage reading was around 22V. A check at the collector of the line driver transistor produced a reading of 0V. As its drive was still present we suspected the transistor of intermittently going shortcircuit collector-to-emitter. A replacement was fitted but two hours later the set again failed. We were wondering what else could short out the collector of the driver transistor and were looking suspiciously at the driver transformer when the reason was found. There's a long aluminium heatsink that runs across the width of the main panel, between the driver transistor and the driver transformer. This heatsink is earthed by a wire that goes to a screening can. It's fixed in place by some twisted protruding legs that pass through the panel. One of these twists rested against the PCB land that's connected to the driver transistor's collector. The leg was removed with cutters and the set was again soak \bar{k} tested. This time there was no recurrence of the fault. When we looked in a newer set we noticed that the print layout in this area is different, in order to stop this fault happening. I.B.

Panasonic TX1786 (Z3-T Chassis)

The picture produced by this set had a brightness gradient. It was correct at the top left corner but was far too dark at the bottom right corner. As a first step we used the scope to check the h.t. line, the tube's first anode supply and the beam limiting voltage. Nothing was wrong with any of these. The RGB drive waveforms from the TDA3562A colour decoder chip IC601 on the vertical plug-in PCB B had a field-rate ramp superimposed on them however. Now the black level of each output is set by the d.c. voltage established by the clamp capacitors connected to pins 10, 20 and 21. These pins are connected to a common line (TPB14) via three diodes D315/6/7 which are normally reverse biased. TPB14 is connected via an $8 \cdot 2k\Omega$ resistor and pin 11 of plug/socket B1 to the collector of the UN4112 transistor Q306 on the main PCB. This transistor is used to blank the screen at switch-on - it's then conductive, pulling TPB14 down to about 5.4V. When it switches off, TPB14 should rise to 12V. The problem was that Q306 had a collector-to-emitter leak. Hence its collector voltage was low at 2V and TPB14 was low at 7V. LB.

Salora 1H Chassis

This set was dead apart from a quiet pulsing from the power supply. When the chassis was moved down slightly however the set burst into life. A slight tap on the chassis produced line disturbance on the picture. We tracked down the dry-joint using a small plastic rod. It was at the lower end of CB529 (15nF, 1.2kV), the flyback tuning capacitor connected across the BU500P line output transistor TR500. I.B.

Pye 59KE2706 (Philips 2A Chassis)

This set had no tuning though the front display showed the correct channel number. When tuning search was initiated the voltage at the tuner unit's tuning pin remained at a constant 33V. A check on the supplies from the citac board revealed that the 5V supply to the tuner's internal 256 divider circuit was missing. R3740 (5.6Ω) on the citac module was open-circuit. A.D.

Tatung TV9448 (150 series Chassis)

The colour fault with this set was apparent on only some scenes. It produced the impression of Hanover bars. Its true nature could be seen with a colour-bar display: there were alternate bars of colour and no colour. The a.c.c. decoupler C516 ($4 \cdot 7\mu F$) was the cause of the trouble. A.D.

Ferguson TX90 Chassis

The picture produced by this set had a band that moved up the screen, with picture tearing within this band. Replacing C189 (22μ F, 50V) in the boost regulator circuit provided a cure. **A.D.**

Sharp C1412H

This set was dead – even the relay didn't click at switch on. The 12V supply from board D was present but there was no voltage at the base of transistor Q753 to switch it on and energise the relay. The base voltage is obtained via D1006 and IC1002. I checked the 5V rail, which was o.k. A miniature switch S1011 behind the colour control was then turned on. The relay gave a nice click but the set was still dead. The full voltage was present at pin 3 of IC701 but there was no output. Resistors R713 (330Ω) and R704 (47Ω) were both open-circuit and when these were replaced the set worked normally. To get the sound I had to return S1011 to its original position. Note that

when you pull the chassis out and operate the power switch the standby switch S1009 doesn't operate. J.S.R.

Telefunken 615 Chassis

These sets suffer from lots of dry-joints. You'll find them around the chopper transformer TR701 and at the collectors of the chopper transistor T464 and the line output transistor T492. When the fuse has blown almost certainly the chopper transistor (S527T or 2SC1413) will be short-circuit, in which case you'll find that T462 (BC368) and zener diode D538 have also failed. D538 is a $2 \cdot 1V$ device and it's important to replace it with the correct value. J.S.R.

Alba PTV10

I've come across several of these sets with an opencircuit mains transformer primary winding and am not surprised that Les Lawry-Johns didn't find the invisible fuse (October). Make sure that you replace the bridge rectifier supplied by the maker if you don't want to see the set back in two week's time. J.S.R.

B and O 4402

We don't see many B and O sets and it took us a while to sort this one out. The problem was no results, with only 17V on the h.t. rail and the voltages in the control section of the power supply approximately correct. The cause of the fault was 5C10 (47μ F) which had gone open-circuit. M.D.

Ferguson TX9 Chassis

The blue was very poor. A check indicated that the tube was in reasonable condition so as a next step we swapped over the tube base leads. This proved that the fault was on the main panel. The blue clamp capacitor C64 (10nF) associated with the TDA3560 colour decoder chip turned out to be the cause of the fault. M.D.

Triumph CTV8205/Amstrad CTV1600

The problem with this set was no field scan. There was no field oscillator output and we found that R709 $(22k\Omega)$, which is in series with the field hold control, had gone open-circuit. M.D.

Philips K30 Chassis

The picture became progressively greener over a period of two hours. When cold the set worked normally and no amount of shaking etc. would bring about the fault. Eventually, after two visits, I found that the green first anode potentiometer was going open-circuit at its earthy end when heated by adjacent components. This gave rise to a gradual increase in the background green. **H.MacM.**

Philips G11 Chassis

Every now and then one of the 3.15A mains input fuses would blow. The set wasn't suffering from the usual complaints that cause this – the 470μ F reservoir capacitor, the BU208A line output transistor, etc. We eventually found that R1308, which is in parallel with the mains filter choke L1305, flashed over internally every now and then. It had, on various occasions, led to failure of D3133 in the EW modulator circuit and the BU208A line output transistor. H.MacM.

More on VCR Back Tension

There have been several developments since my article on "The Importance of Back Tension" in the August 1988 issue of *Television*. Despite the fact that incorrect back tension is the root cause of many VCR faults we don't hear much about it from the manufacturers. I shall however continue to emphasise the importance of this adjustment in my articles. In addition many of you will have seen the first results of research carried out by MCES of Manchester on the effects of incorrect back tension, the life of various types of head and the effects of video cleaning cassettes. An article relating to this appeared in the August 1989 issue of *Television* and MCES has published a wall chart that's been distributed to the trade. This article provides an update on the subject and expands on various aspects of it.

New Measuring Cassette

First, Konig has introduced a combined back tension and take-up torque measurement cassette. I've tested the VHS version in the workshop and a colleague has tested it in the field. We feel that it's excellent value for money. It comes in a hard plastic case which is similar to the type used for very early library tapes.

The scales are marked on labels that are stuck over what would, with an ordinary cassette, be the windows. Back tension is measured on the supply reel, from 0-80g/ cm (this is of course actually a torque measurement). Take-up torque is measured on the take-up reel, from 50-250g/cm. A marker within the cassette is viewed against these external scales. The construction may seem to be a bit floppy but the accuracy should be within the specified range of ± 2 for back tension and ± 5 for take-up torque. The scales have to be reset to zero manually after each test, by turning the supply spool.

The cassette worked very well on test. The only slight hiccup occurred when it was tested with an old Ferguson 3V00: the VCR's rather crotchety carriage made the spools push up into the cassette and lock off centre, but a quick click returned them to the normal position. This could possibly have been prevented by stronger balance springs within the cassette. Note that back tension (torque) is measured in g/cm, not g as with a Tentelometer.

In view of the cost of the gauges available for measuring back tension most workshops will doubtless have only one type. The very reasonable cost of this Konig cassette gauge makes it a good choice.

Tension/torque Conversion

While most manufacturers quote back tension in g/cm (torque) some, Panasonic in particular, give Tentelometer readings in g. Many people ask about converting these figures. Conversion depends on several factors however. A cassette gauge measures in g/cm the take-up reel torque and the supply reel torque required to overcome the braking force present while a Tentelometer measures in g the force applied between its prongs (effectively the taughtness of the tape) at a position between the exit from the cassette and the entry guide prior to the drum. The only useful conversion therefore is between g/cm and tension (g) at this particular point, measured half way through a three-hour tape.

The problem in practice is that conversion depends on the mechanical arrangement used in a particular deck. For example, Fig. 1 shows the Tentelometer measuring point and a conversion graph for a typical Panasonic deck (actually an NV7000). As you can see, the tension readings are lower than the torque measurements. This is because with this design the back tension depends more on the supply reel braking than the action of the back-tension arm/post. Fig. 2 shows the same conditions for a JVC (Ferguson 3V55) deck. Here the tension readings are considerably higher than the torque ones, because the tension depends more on the back-tension arm. You will see that in comparison with the Panasonic design there's an extra post between the cassette exit and the back-tension post. The ideal situation of course would be for manufacturers to give figures for both types of measurement.

Back to the Konig Cassette

The Konig cassette is an excellent purchase for the workshop. It's about half the price of a Tentelometer or, for example, the Sharp cassette gauge, and in addition you have the take-up torque scale. A separate take-up torque gauge may well set you back another £200 or so, but will of course measure the higher fast-wind torques. The Konig cassette's accuracy with back-tension measurements may at first seem to be a little vague, but it falls well within most specifications. Being a combined unit it makes an ideal tool for field servicing, though care should be taken with handling and storage in these conditions. I suggest that for each engineer in a large company to be equipped with one will be an investment that's soon recouped as a result of quicker fault diagnosis and an improved repair throughput - not to mention the benefits that come with correct back-tension adjustment.

The cassette is available from Willow Vale Electronics at £149.95 trade plus VAT under order code 12-400.

A Philips VHS Deck Design

In the August 1988 article I quoted back tension for various Panasonic machines and showed a typical VHS deck layout. Deck designs vary, as we've seen, but Philips has come up with a mechanism that differs radically from the usual arrangement. It's used in the Philips VR6467 and various clones such as the Pioneer VR707 and the B and O VHS82. Back tension is altered in two ways with this design. First, by what's called "dynamic tape tension", and secondly by supply-reel friction. Both of these should be checked in cases where you'd normally check the back tension.

The tape tension is checked by playing back the Philips test tape and monitoring the phase jump in the white bar at the bottom of the display. It should be 8μ sec or less, which equates with one colour bar width. To adjust, move spring 203 along the notches of lever

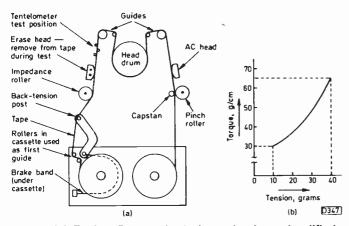


Fig. 1: (a) Typical Panasonic deck mechanism, simplified, showing the back-tension arrangement. (b) Conversion for tension/torque measurements with the D1 deck – 40-45g/cm is the correct back tension (torque).

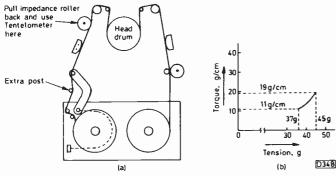
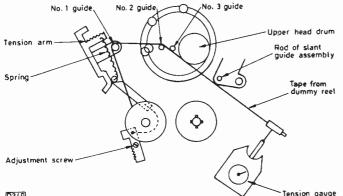
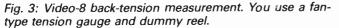


Fig. 2: (a) Typical Ferguson/JVC mechanism. (b) Tension/ torque conversion for the 3V55.



D349



204. The supply-reel friction is checked by setting the deck in the unthreaded stop position, removing the reel brakes and then, using a hand torque meter, noting the reading in the clockwise direction. It should be 13-16gf/cm (grams force per centimetre). Alternatively use a fan-type tension gauge (see later under Video-8) and a dummy reel. To adjust the friction, set the deck in the threaded stop position, with no cassette in, and alter the position of the spring that's visible through the hole in the mechanism plate, just behind the supply spool – move it to the right to increase the friction.

VHS-C Decks

With VHS-C decks back tension is measured in different ways depending on the deck's make and age. In

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the case of older Panasonic machines such as the portable NV200 a Tentelometer reading in grams is specified. With later machines such as the NV-MC10 camcorder a measurement of the landing position of the back-tension post is specified. Tape tension at the traditional measuring point between the erase head and the entry guide is so low that it doesn't register with a Tentelometer. With JVC/Ferguson machines such as the 3C03 a g/cm reading is specified and this has to be measured using a VHS-C torque cassette. JVC produces such a cassette, part number PUJ50431. It's available from Willow Vale Electronics at £239.50 trade plus VAT, order code 20-300T.

Betamax Decks

With most Betamax decks the use of a cassette gauge is specified, the reading being quoted in g/cm or gf/cm. Apparently there's a Beta version of the Konig cassette, and of course Sony have such a unit (torque cassette SL-0003C). Taking as an example the Sony SL-F1, the reading should be 45-48g/cm. In this model a preset, RV202 on board LS-8, is used to adjust the back tension. It's in the capstan servo system which provides electronic torque control. Some Betamax machines use the more traditional variable spring position means of adjustment, as with a VHS deck.

Video-8 Decks

The mechanism used in Video-8 machines is of course very small in comparison with a VHS or Betamax mechanism. As well as the repair problems that this introduces, it also means that a different alignment procedure is required. With Sony machines, to check the back tension you have to remove the mechanism from the machine (camcorder or domestic model), then the cassette carriage from the mechanism. Fig. 3 shows a Video-8 back-tension arrangement. You use a fan-type tension gauge to draw tape through the tape path. The gauge measures up to 30g in either direction, and is used with another reel for take-up torque measurement. The tape is on a dummy reel.

Reel plus tape is part number J-608-083-1A while the gauge is part number J-608-082-4A (Sony part numbers). The gauge costs £77.11 trade plus VAT, the dummy reel with tape £5 trade plus VAT.

You can thus make a practice of checking the back tension with Video-8 decks as well as VHS ones. Here's an example of the benefit of doing this. I recently had to replace a faulty video head in an 18-month old Sony EVA300. I knew that it had had very moderate use. The back tension was found to be over 28g instead of the specified 12g.

In Conclusion

I shall probably have to return to this subject again later. Meanwhile if anyone has any further information or queries, please write to me via the magazine.

Addresses

Finally a couple of addresses. MCES is at 15 Lostock Road, Davyhulme, Manchester. Willow Vale Electronics Ltd. can be contacted at 11 Arkwright Road, Reading, Berks RG2 0LU (0734 876 444).

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Long-distance Television

Roger Bunney

The striking feature of October's DX-TV conditions was the F2 reception from sources world-wide in Band I. Even Australian TV was seen by several UK DXers. Sporadic E conditions were also active, but the signals received seem almost parochial in comparison with the dramatic F2 catches. First as usual the F2 log:

5.10.89 CST (Czechoslavakia) ch. R2.

7/10/89 CST R1; TSS (USSR) R1, 2; SVT (Sweden) E2; MTV (Hungary) R1, 2; TVP (Poland) R1; RAI (Italy) IA; JRT (Yugoslavia) E3, 4,

8/10/89 DR (Denmark) E3

9/10/89 TVE (Spain) E2, 3.

10/10/89 + PTT (Switzerland) E2.

11/10/89 TVE E3.

13/10/89 TVE E2.

- 15/10/89 TSS R1; RAI IA, B; Telemarket (Italian private station) E2.
- 17/10/89 TSS R1; TVR (Rumania) R2; MTV R1; CST R1; TVP R1, 2; DR E3; RAI 1A; JRT E3; TVE E4.

16/10/89 TSS R1.

- 19/10/89 TVE E2.
- 20/10/89 CST R2; TVE E2, 3, 4; RAI IA.

21/10/89 TVE E2.

22/10/89 TVE E2, 3; RAI IA.

23/10/89 SVT E4.

26/10/89 TVP R1; SVT E2; TVE E2; RTP (Portugal) E3.

29/10/89 RAI IA; TVE E2, 4; TDF (France) L2.

Improved tropospheric conditions were noted across the UK on the 17th, producing Band III/u.h.f. reception from the Benelux countries and West Germany. A less active spell during the 25th produced signals from the same sources mainly in the eastern UK. Interesting catches were RTL (Luxemborg) chs. E36 and 52, SAT-1 ch. E62 and the SSVC UK land forces TV services from West Germany on chs. E23, 41 and 57.

The high level of solar activity resulted in enhanced auroral conditions. Band I/III signals were noted on the 20th, Band I signals on the 21st and lower-level Band I signals on the 22nd. Reception on the 23rd and 24th was largely confined to Scotland, in Band I. There was a similar "northern" event on the 26th.

The log so far would represent a fine outcome for

October. The previously mentioned F2 propagation increased the excitment considerably however with signals from very great distances almost daily, reaching up to 55MHz. The collated F2 log is as follows:

- 5/10/89 Unidentified colour bars from 1000-1035 BST on ch. F2.
- 8/10/89 Dubai UAE ch. E2 with teletext.
- 9/10/89 IRIB (Iran) E2.
- 10/10/89 ZTV (Zimbabwe) E2, with PM5534 test pattern.
- 11/10/89 RTM (Malaya) E2; ZTV E2.
- 12/10/89 TSS (USSR) R1; unidentified ch. E2 signal.
- 13/10/89 TSS R1; RTM E2; UAE E2; IRIB E2.
- 14/10/89 TSS R1; unidentified ch. R1 and E2 signals.
- 15/10/89 RTM E2; IRIB E2; UAE E2; football from Africa E2; Australia ch. 0, at 1010-1040 BST, confirmed by Garry Smith as DDQ-10 by measuring the vision carrier offset
- 16/10/89 TSS R1; RTM E2; IRIB E2; unidentified ch. R1 signal.
- 17/10/89 IRIB E2; UAE E2; ZTV E2.
- 18/10/89 ZTV E2; UAE E2; unidentified African signal on ch. F2
- 19/10/89 UAE E2; GBC (Ghana) E2.
- 20/10/89 UAE E2; ZTV E2 (F2 and TE, see later).
- 21/10/89 UAE E2; ZTV E2.
- 25/10/89 ZTV E2; GBC E2; UAE and IRIB E2.
- 26/10/89 IRIB or UAE E2 (Arabic programme).
- 27/10/89 UAE and IRIB E2; TSS R1; China C1.
- 28/10/89 TSS R1; IRIB E2.
- 29/10/89 UAE and IRIB E2.
- 30/10/89 TSS R1.
- 31/10/89 IRIB and UAE E2; unidentified ch. E2 signal at 1200, on programme.

1/11/89 Unidentified ch. E2 programmes; Australia ch. 0 at 0900 GMT onwards, a very strong signal. 3/11/89 TSS R1.

quite incredible log! Several DXers have A commented that TSS R1 has not been as prominent as it usually is at the start of winter F2 reception. At the peaks of past cycles TSS R1 has usually been the first and most reliable F2 signal. Cyril Willis had very interesting ZTV reception on the 20th. It appeared first as normal F2, then appeared at 1855-1925 in the more conventional TE form. This was followed by a short-lived auroral event after which, at 2017 through to 2125, a very late TE opening again produced ZTV.

Iain Menzies, monitoring the 30-50MHz spectrum via radio to check on the rising m.u.f., came across largescale military exercises by US forces in Egypt, with call signs such as "Cobra Control", "Desert Base" etc., at 50.5MHz. The low v.h.f. band has been full of communications signals, s.w./v.h.f. harmonics, other communications "noises", distant cordless phones, US



Left: An example of "good-quality" F2 reception. Note the multiple images. F2 pictures are generally smeary with reduced h.f. content. Centre: A test pattern transmitted by Hamburg ch. E9 for receiver alignment purposes. Right: Another test pattern transmission from Hamburg ch. E9. All photos are of reception by Ryn Muntjewerff in Holland.

taxis and highway patrol operations etc. I would recommend all those interested to obtain receiving equipment for low v.h.f. signals, such as the Eddystone 770R etc. You can hear weak TV carriers long before they can be displayed on the screen. When I received Australia ch. 0 on November 1st I heard the 46.25MHz carrier long before pictures could be resolved, but listen as I did there was no indication of New Zealand ch.NZ1 at 45.25MHz. The signal levels here at Romsey, Hants on November 1st were truly amazing: very strong, though with appalling picture quality, and suffering from extremes of deep fading.

During the month Garry Smith received System M signals on ch. R1, consisting of a crosshatch pattern and thought to be a USSR transmission error – transmitting what was in effect a vision feed between the USSR and Cuba over a Gorizont circuit.

It seems that sunspot cycle 22 could be leading up to a record high: the average count for September was 176.8, with a peak day of 296!

Enthusiasts elsewhere have of course been enjoying the enhanced F2 conditions. In Perth, Australia, Anthony Mann received European Band I TV signals on chs. E2 and R1 between October 11-16th. He reports that China carries English lessons on the first network. On September 17th Anthony received China ch. C1 (vision carrier 48.27MHz) including the sound over the period 0200-0230 GMT. His log for October confirms, by offset measurement, reception of NRK (Norway) Melhus, Greipstad and Gulen on ch. E2, also either West Germany or Sweden ch. E2 and of course many ch. R1/C1 signals. This emphasises the importance of scanner use, to be able to check on the vision carrier plus offset frequency. The first 50MHz amateur radio contacts between the UK/France and Australia (Alice Springs) took place on October 11th.

A very busy and exciting month then, with the assurance of better things to come. Remember to look on the higher channels when there are signals on the lower ones – and don't forget to look westwards for possible System M, ch. A2 reception from Puerto Rico and North America.

My thanks to the following for sending in reception reports: Tim Anderson (St. Leonards), Garry Smith (Derby), Simon Hamer (Powys), David Glenday (Arbroath), Peter Schubert (Rainham), Paul Barton (Harrogate), Bill Cotterill (Tipton), Iain Menzies (Aberdeen), Mark Baldwin (Northants), Roger Fussell (Torpoint) and Cyril Willis (King's Lynn).

News Items

Belgium: Canal Plus Belgique came on air at 0700 local time on September 27th. Our contact suggests that, judging by the data signal in the last active line of each field, the initialisation point in the Discret scrambling process (pseudo-random sequence) is being changed frequently. The 6μ sec sequence also appears at the end of field blanking and is thought to be related to decoder authorisation switching. The PM5544 test pattern is radiated in scrambled form prior to the start of programmes at 0700 local time – at least it was in early October.

Luxembourg: RTL-V (RTL Veronique) has been seen testing on ch. E24, over Dudelange. Ch. E49 is expected to be used at another site. RTL-V is at present available via Astra 1A.

Greece: Deregulation has been introduced and several independent broadcasters intend to set up operations.



In brief: Eesti TV (Estonia) has replaced the Tartu transmitter with one at Valgjarve. The UEIT test pattern is used with the identification "VJ 1988"... The e.r.p. of several of the Danish TV-2 network transmitters is to be reduced to avoid co-channel interference problems with transmitters in West Germany and Sweden... The Italian RAI-UNO and TV-5 satellite TV programmes are being transmitted in certain parts of Poland... Tunisian second service programmes are now being supplied by the French Antenne-2 service. A third network carrying RAI-UNO programmes is to be established in the near future.

Satellite TV

Several Israeli companies are offering up-market systems for reception from Astra 1A. A dish with a diameter of at least 2.5m is required. A Norwegian ice hockey outside broadcast has been seen on Intelsat 1°W, at approximately 11.5GHz horizontal. The CBS news feed to Sky TV can be seen standards-converted at certain times in the afternoon on its downlink from PanAmSat 45°W to the London Teleport.

Twe installed one of the recently reviewed 65cm Salora Astra packages and can confirm the high constructional standard and the excellent reception quality. As a PDS sync processor has been acquired I no longer have the problem of stabilising the EBU news from ECS $7^{\circ}E$ – lockable, steady pictures are obtained (the transmissions use sound-in-sync, with consequent vision instability unless steps are taken to counteract this).

Swift Television Publications, 17 Pittsfield, Cricklade,

EC	ONC	M	СБ	EV		ES P	O B	OX		5. W	0	WE	R	HAI	МÌ	ТО	N	W	Ŭ2	4Δ	7
15/90H 15/95R 17052	2.72 2SC16 3.21 2SC17 4.51 2SC18	18 1.90 11 1.25	AN2140 AN234	2.40 5.09 1.13	8C207 8C2128 8C213L	8.19 BDX 0.26 BDX 0.10 BDX	4B 0.31 2A 2.09	BU126 BU137 BU205	1.10 6.53 1.15	HA1196 HA13001 HA1306	7.43 1.73 2.26	MC1330P MC1350P MC1351P	1.90 0.45 1.25	SAS560T SAS570T SAS570S	5.42 5.42 1.95	STR1096 STR4090 STR440	11.20 9.50 5.77	TBA970 TBA990 TCA2705	3.60 1.90 2.15	TDA4440 TDA4442 TDA4500	1.95 4.15 4.75
7053 7074 7089	5.61 2SC18 9.30 2SC18 3.45 2SC18	5 0.20 6 0.67		0.99 1.71 5.04	BC214 BC225 BC237	0.10 8DY 0.40 8DY 0.10 8F11	0 1.21 1 1.18	8U206 8U207 8U208	1.27 1.65 1.12	HA13402 HA13342 HA13365	6.50 2.65 4.02	MC1352P MC1357P MC1358P	1.40 2.15 1.46	SAS580 SAS6600 SAS660	2.85 1.33 1.33	STR451 STR453	5.77 8.16	TCA270S0 TCA290A TCA420A	1.05 2.39 2.16	TDA4600-2 TDA4610 TDA4620	4./5 1.75 0.15 7.75
7127 7376 N4001	2.50 2SC18 1.58 2SC18 0.04 2SC19	3.02	AN253 AN260 AN272	1.80 3.85 7.52	BC238 BC2388 BC2398	0.10 BF11 0.00 BF11 0.25 BF12	3 0.67 0.25	BU208/02 BU208A BU208D	2.35 1.12 1.43	HA1366WR HA1367 HA13688	2.17 2.75 1.95	MC14493P MC14494P MC14497	5.50 2.15 5.94	SAS6700 SAS670 SAS6710	1.33 1.33 2.21	STR454 STR6020 T6029V	5.52 6.56 7.98	TCA440 TCA530 TCA540	2.25 2.24 2.25	TDA5500 TDA5700 TDA7270S	7.45 2.75 2.25
N4002 N4003 N4004	0.06 2SC19 0.06 2SC19 0.05 2SC19	3 0.30 9 2.25	AN295 AN301 AN302	7.63 2.45 3.09	BC251A BC294 BC300	0.31 BF12 0.50 BF12 0.35 BF13	0.13	BU209 BU226 BU326A	1.75 2.55 0.99	HA1368 HA1370 HA1374	2.65 3.71 1.80	MC14510BAL MC14511BCP MC14528BCP	3.75 1.10 2.15	SBA750 SC84203 SC9504P	1.61 19.35 1.95	T6035V T6036 T6037	0.73 10.67 2.11	TCA650 TCA6608 TCA730	3.95 2.60 2.75	TDA9403 TDA9403 TDA9503	3.52 3.70 2.52
N4005 N4006 N4007	0.05 2SC19 0.08 2SC19 0.07 2SC19	8 0.20 7 0.95	AN316	8.88 2.46 4.95	BC301 BC302 BC303	0.34 BF15 0.53 BF15 0.48 BF15	0.26	BU406 BU406D BU407	1.49 1.04 8.54	AA117 HA1377 HA13898	9 1.95 2.05	MC1712 MC5192 MC7724CP	3.00 19.50 3.49	SDA2006 SDA2112/2 SG264A	17.10 9.20 5.26	T6044V T6045 T6049	0.97 1.20 1.45	TCA750 TCA8000 TCA830S	2.25 1.60 2.38	TDA9513 TDB1033 TDE1081	3.15 2.50 7.24
N4148 N4448 N5401	0.03 2SC19 0.05 2SC19 0.11 2SC19 0.13 2SC19	2 1.93 9 1.70		9.35 5.47 2.25 6.78	BC307A BC308A BC309 BC317A	0.06 BF15 0.11 BF15 0.17 BF16 0.13 BF16	0.18 0.31	BU412 BU426A BU500 BU508A	5.29 1.67 1.53 1.50	HA1389 HA1392 HA1394 HA1397	2.39 2.22 2.37	MCR106-5/6 MCR220/7 ME0411	1.23 2.28 0.75	SG613 SG629 SG6533	10.71 11.27 9.00	T6052V T6058 T6059 T9003V	0.87 3.00 4.22	TCA890 TCA900 TCA910	5.44 2.04 1.65	TEA1002 TEA1009 TEA1014	2.30 0.80 3.80
N5402 N5403 N5404 N5408	0.13 2SC19 0.18 2SC19 0.10 2SC20 0.15 2SC20	5 1.55 19 0.34	AN337	5.37 1.53 2.95	BC327 BC328 BC337	0.13 BF17 0.18 BF17 0.11 BF17 0.09 BF17	0.34 0.55	BU536 BU608 BU705	1.50 1.55 1.65 2.50	HA1397 HA1398 HA1406 HA1452	2.75 2.75 2.07 0.05	ME6002 ME6102 ME8001 ME0411	0.26 0.28 0.34 0.75	SI1125H SI1630HD SKE2F1/04 SKE2G3/04	7.50 20.50 1.39 0.85	T9003V T9005V T9011V T9013V	125 238 140 435	TCA940 TCA940E TD3F800R	8.82 2.93 4.78	TEA1020SP TIC106C TIC106M	4.93 0.61 0.77
N914 S1555 S44	0.04 2SC20 0.31 2SC20 0.10 2SC20	18 2.11 13 0.59	AN362 AN370	1.50 3.95 3.43	BC338 BC368 BC440	0.12 BF17 0.19 BF18 0.69 BF18	0.36 0.36	BU806 BU807 BU826A	1.03 1.40 1.95	HD14538 HD38702-A2 HD38750A53	2.07 7.95 5.77	MJ2501 MJ3001 MJ481	3.39 1.43 1.53	SKE4F1/06 SKE4F2/08 SKE4F2/08	0.85 0.30 1.07 0.80	T9014V T9016 T9019W	4.50 2.42 1.02 1.90	103F900H TDA1001B TDA1003A TDA1005A	5.36 2.31 3.16 2.22	TIC44 TIC45 TIC47 TIP120	0.72 0.55 0.77 1.55
5921 N2219A N3053	0.10 2SC20 0.37 2SC20 0.35 2SC20	IS-0 1.65	AN5250	4.50 4.42 4.40	BC441 BC454 BC460	0.46 BF18 9.36 BF18 9.42 BF18	3 0.39 0.43	BUW84 BUX84 BUX85	0.66 0.50 0.69	HD38750A-7 HD38800A50 HD44801A05	7.25 14.09 12.50	MJE2955 MJE3055 MJE340	3.30 1.25 0.49	SKE4F2/10 SKE4G2/02 SKE5F3/10	1.33 0.96 1.36	T9034V T9035V T9051	1.45 6.65 7.70	TDA1006A TDA1010AF TDA1011	7.00 4.25 1.14	TIP110 TIP112 TIP117	0.35
V3054 V3055 V3442	0.99 2SC214 0.65 2SC214 1.16 2SC22	6 0.87 6 0.69	AN5612 AN5613	7.43 2.20 4.20	BC461 BC462 BC463	0.47 BF18 0.51 BF19 0.30 BF19	0.14	BY126 BY127 BY133	0.13 0.13 0.10	HISH1010 HISH1004 HISH1002	14.60 6.00 9.50	MJE520 ML231 ML2328	0.49 0.99 3.01	SKS1/10 SL1310 SL1430T	2.15 3.14 2.31	T9054V T9057V T9062V	6.43 2.77 8.49	TDA1010 TDA1011A TDA1028	1.05 1.51 2.45	TIP121 TIP126 TIP132	0,40 0,38 0,99
(3702 (3703 (3705	0.14 2SC22 0.18 2SC22 0.16 2SC22 0.16 2SC22 0.16 2SC23	6 1. 69 18 1.14	AN5630 AN5701N AN6250 AN6300	3.95 1.66 1.75	BC478 BC479 BC532 BC546	0.32 BF19 0.41 BF19 0.21 BF19 0.17 BF19	7 0.24 3 0.17	BY164 BY176 BY179 BY182	0.44	HM6231 HM6232 HM6251 HM7103	9.50 7.20 5.69	ML237B ML238 ML923	1,95 5.77 3.10	SL414 SL432A SL439	3.69 3.44 2.48	T9064 TA7027 TA7050	4.20 4.00 1.74	TDA10348 TDA1035S TDA1035T	2.42 2.95 1.85	TIP 137 TIP 29 TIP 2955	8.96 0.94 0.86
N3706 N3707 N3711 N3771	0.16 2SC23 0.11 2SC25 1.56 2SC25	5+Kit 7.00 1 1.26	AN6310 AN6340 AN6341	4.48 4.54 6.46 2.22	BC548 BC548 BC548 BC549	0.10 BF20 0.10 BF21 0.10 BF22) 0.37 9 0.36	8Y187 8Y189 8Y189	1.05 8.77 1.76 1.62	HM9032 HM9012 HM9015	4.85 4.00 3.22 3.24	ML926 MM5314N MM5316N MM5318N	3.58 9.99 3.50 3.11	SL471 SL480 SL490 SL901B	2.13 3.14 2.37 8.37	TA7051 TA7054 TA7060AP TA7061AP	1.74 2.56 0.71 1.27	TDA1037 TDA1037D TDA1044 TDA1047	1.60 2.05 2.10	TIP29A TIP298 TIP29C	0.46 0.53 0.40
13772 13773 13819	1.55 2SC25 1.55 2SC25 1.66 2SC25	10 0.00 7 1.60	AN6363 AN6531 AN6551	16.00 1.95 0.50	BC550 BC556 BC557	0.10 BF23 0.11 BF24 0.10 BF24	0.65	BY207 BY208 BY216-400	0.22 1.15 0.18	HT4207 HT4208 KA2101	13.25 20.65	MM5369N MM5387AA/N MM5841N	2.01	SL918A SN16861AN0 SN16862AN	9.07 8.02 2.90	TA7069 TA7070P TA7072P	3.13 1.83 2.57	TDA1059B TDA1054M TDA1060	3.25 0.80 1.21 2.60	TIP290 TIP3055 TIP30A TIP30C	0.75 0.66 0.41 0.40
43823 43904 43908	1.17 2SC26 0.15 2SC28 0.62 2SC31	A 1.85 3 6.50	AN7111	0.66 1.63 1.25	BC558 BC559 BC560C	0.10 BF24 0.10 BF24 0.14 BF24	6B 0.49	BY210-600 BY210-800 BY223	0.31 0.19 1.25	KC581C KC582C L200CV	7.75 4.85 1.89	MN1400VL MN1405 MN1435VX	13.65 7.92 9.50	SN 16966N SN 29717N SN 29716N	10.25 7.19 3.66	TA7074P TA7076P TA7089P	1.90 7.50 3.10	TDA1082 TDA1151 TDA1190	3.25 0.55 1.27	TIP31A TIP31B TIP31C	8.34 0.38 0.30
44101 44240 44444	1.33 2SC37 1.95 2SC37 1.96 2SC38	1.16	AN7145 AN7146	2.52 2.00 9.90	BC635 BC636 BC637	0.34 BF25 0.20 BF25 0.24 BF25	5 0.28 7 0.34	BY224-600 BY226 BY227	2.60 0.15 0.20	LA1201 LA1210 LA1230	0.75 1.56 1.18	MP1192 MP2794 MP2812	5.07 4.00 5.07	SN29715N SN29722 SN29723AN	6.04 11.95 8.77	TA7092P TA7093P TA7102P	9.94 3.99 5.88	TDA1190Z TDA1200 TDA1235	2.48 1.51 3.00	T1P32A T1P32B T1P32C	0.35 0.46 0.28
V5293 V5294 V5296	0.50 2SC38 0.50 2SC39 0.50 2SC40 0.50 2SC40	V 11.11	AN7151 AN7156 AN7158 AN7218	2.37 2.85 2.10 0.80	BC639 BC640 BCX34 BD115	0.15 BF25 0.24 BF25 0.55 BF26 0.36 BF26	9 0.34	8Y228 8Y229-1000 8Y229-600	1.12	LA1320 LA1357N LA1363	2,07 9,00 1,05	MP8512 MPC596 MPF256C	1.57 2.13 0.68	SN29764AN SN29767 SN29770BN	2.60 3.90 3.69	TA7108P TA7109 TA7122B/P	1.61 3.71 0.87	TDA1236 TDA1270 TDA1327A	4.30 3.74 6.93	TIP33 TIP33A TIP33C	8.85 1.02 0.95
45297 45298 46109 46130	0.50 25045 0.61 25049 1.50 25051 0.05 25053	0.92 A 1.95	AN7223 AU107	4.55 6.77 5.69	BD115 BD124 BD131	0.70 BF27 1.31 BF27 0.42 BF27	I 0.34 3 0.20	BY255 BY295-600 BY298 BY299	0.13 1.23 0.20 0.60	LA1364 LA1365J LA1385 LA1387	3.02 1.45 1.53 5.55	MPS6570 MPSA42 MPSA56 MPSA92	0.48 0.15 0.08 0.30	SN29772BN SN29771BN SN29791 SN29791	5.75 5.59 1.67	TA7124P TA7129P TA7130P TA7136AP	2.34 1.90 1.27 1.89	TDA1412 TDA1420 TDA1440	1.98 1.52 3.45	TIP34 TIP41A TIP41B	0.75 0.36 0.31
46133 46180 46292	1.25 2SC53 0.73 2SC53 1.60 2SC60	0,06	AU113 AY105K	14.63 2.08 2.80	BD132 BD133 BD135	0.42 BF32 0.53 BF33 0.36 BF33	0.23 5 0.33	8Y407 BY409 BY448	0.90 1.49 1.40	LA3350 LA3361 LA3390	1.43 1.60 5.52	MPSU05 MPSU10 MPSU56	0.96 1.70 0.60	SN2709 SN7400N SN7401N	5.56 0.44 0.61 0.36	TA7130AP TA7137P TA7141AP TA7146P	0.98 3.87 7.83	TDA1470 TDA1470P TDA1506 TDA1510	2.90 4.25 5.74 4.60	TIP41C TIP42A TIP42B TIP42C	0.60
A1006 A1011 A1015	1.50 2SC62 1.65 2SC64 0.20 2SC66	1.46 A 1.54	BA524 BA310	8.54 0.14 1.50	BD136 BD137 BD138	0.36 BF33 0.41 BF35 0.20 BF36	6 0.40 5 0.48	BY713 BYW56 BYX55-600	1.12 0.14 0.23	LA4032P LA4100 LA4101	235 125 130	MPSU60 MR818 MR854	1.33 0.33 0.50	SN7402N SN7404N SN7408N	0.95 0.52 0.27	TA7148P TA7149P TA7152P	1.67 3.26 2.90	TDA1512 TDA1515 TDA1515 TDA1559	4.69 2. 89 2.55 3.15	TIP42C TIP47 TIS43 TIS90	0.50 0.65 1.43 0.21
A1012 A1020Y A1027R	1.25 2SC68 8.60 2SC68 8.45 2SC68	4.46 1.82 1.85	BA1320 BA1322 BA1330	1.38 3.95 2.75	BD139 80140 8D144	9.24 BF36 0.35 BF37 1.43 BF38	3 0.50 1 0.50 7 0.25	BYX71-600 BYX71-350 BYY56	0.05 0.08 1.48	LA4102 LA4112 LA4125	0.75 0.86 2.25	MR914 MSM5816RS MSM5840H	1.20 17.35 14.45	SN7410N SN74121 SN7413N	0.27 1.60 0.37	TA7161P TA7162P TA7172P	4.50 3.61 1.41	TDA1670 TDA1770 TDA1905	4.48 2.88 1.27	TL011CP TL494CN TL072CP	1.65 8.77 1.45
SA473 SA766S SC1173Y	0.75 2SC69 4.95 2SC71 1.25 2SC71) 1.15 IA 0.50	BA148 BA154	0.19 9.25 0.40	BD150 BD157 BD160	0.75 BF41 0.67 BF41 1.60 BF42	3 1.87 2 0.18	82Y93C30 C106D C106M	1.36 0.37 0.76	LA4138 LA4140 LA4192	4.90 0.70 1.50	MVS460-02 NE542 NE555	0.34 2.75 0.19	SN74141N SN74151AN SN74154N	2.65 1.51 1.27	TA7176P TA7193P TA7204P	1.75 4.80 1.95	TDA 1906 TDA 1940 TDA 1950	2.55 5.20 2.50	TMP4320 TMS1024NLL TMS1025N	15.00 6.50 11.95
SC1474 SC1509 SA1095 SA1103	1.25 2SC71 1.35 2SC73 3.00 2SC78 6.00 2SC79	1.43	BA156 BA159	0.12 0.05 0.09 0.19	80163 80166 80175 80179	0.71 BF42 0.69 BF45 0.28 BF45 0.30 BF45	0.35	CA3046 CA3089 CA3090AQ CA3094	1.55 0.83 3.25 2.20	LA4220 LA4420 LA4422 LA4430	1.25 1.72 1.00 2.88	NE556 NP1106 0A202 0A47	0.65 11.51 0.11 0.16	SN74190 SN7420N SN7430 SN7440N	1.35 0.34 0.49 0.27	TA7206P TA7207P TA7208P TA7210P	12.49 1.48 2.15 1.45	TDA2005 TDA2006 TDA2004	1.30 1.35 6.99	TMS3720ANS TMS3748NS TMS3755	17.70 13.65
SA329 SA489 SA490	9,40 2SC82 1,17 2SC86 1,32 2SC87	0.21 A 3.04	BA222 BA302	1.66 1.24 0.65	BD181 BD182 BD183	0.99 BF45 0.99 BF45 0.99 BF46	6 0.49 0.26	CA3131EM CD4001 CD4002	2.95 0.24 0.27	LA4440 LA4445 LA4460	2.50 1.50 1.50	0A91 0A95 0C28	0.14 0.09 2.52	SN7472 SN7474N SN7490AN	1.54 0.44 0.75	TA7214P TA7215P TA7217AP	3.63 2.56 1.45	TDA2002 TDA2003 TDA2030 TDA2140	0.90 1.00 1.05 2.14	TMS3894NL TMS5102NLL TUA2000 TY6010B	19.25 6.25 8.98 2.97
5A493 5A562 5A564	2.25 2SC93 0.57 2SC93 0.52 2SC94	6 4.13 4.68	BA317	1.45 0.75 0.04	BD184 8D187 BD189	1.21 8F46 0.80 8F47 0.55 8F47	0.25	CD4008 CD4011 CD4012	1.35 0.20 0.24	LA4451 LA5112N LA7020	1.60 1.18 13.86	0C29 0C36 DC44	2.15 7.53 1.95	SN74LS26N SN76001N SN76013ND	1.45 1.65 3.50	TA7222 TA7226 TA7229P	195 3.57 4.66	TDA2150 TDA2151 TDA2160	6.29 1.30 4.01	UEN2204 UPA53C UPC1003	8.50 4.91 5.95
A614 A628 A6395	4.88 2SD11 6.37 2SD11 1.75 2SD12	38 0.94 73 1.48	BA333	0.09 1.65 1.37	8D190 BD201 BD202	0.55 BF47 0.49 BF47 0.60 BF48	9 0.61 0 0.89	CD4013 CD4016 CD4017	0.33 0.25 0.40	LA7025 LA7027 LA7040	11.97 10.52 9.20	0C45 DC72 DC75	0.18 0.44 0.44	SN76023N SN76023ND SN76033N	2.97 3.91 5.54	TA7230P TA7233P TA7240AP	1.35 3.61 2.55	TDA2161 TDA2170 TDA2270	5.11 4.75 2.50	UPC1009C UPC1025H UPC1028H	6.32 2.90 2.00
SA659 SA673 SA684 SA697	0.49 2SD14 1.50 2SD15 1.20 2SD19 0.00 2SD23	2K 2.64 3 3.87		6.27 2.15 1.95 1.00	80203 80204 80207 80208	0.46 8F49 0.41 8F50 1.73 8F53 1.23 8F59	5 0.43 2 0.24	CD4020 CD4021 CD4023 CD4025	0.75 0.39 0.28	LA7042 LA7900 LA7801	3.90 1.30 3.21	DN236 DN782 0T121	1.06 1.65 1.45	SN76110N SN76115AN SN76131	0.90 1.61 0.82	TA7245P TA7310P TA7313AP	1.95 2.15 8.65	TDA2520 TDA2522 TDA2524	2.25 11.20 4.50	UPC1032H UPC1042C UPC1156H	0.82 8.95 3.94
54699 54715 54748	1.25 2SD23 8.35 2SD24 1.55 2SD24	5 0.60 2.29	BA521	1.00 1.20 8.54 7.50	BD222 BD225 BD228	1.23 BF59 0.45 BF59 0.46 BF69 0.63 BF75	0.27 0.22	CD4025 CD4028 CD40408 CD4047	0.64 0.84 0.45 1.05	LB1274 LC7900 LD3120 LD3150	3.61 9.20 1.13 2.75	PT6042 PT8504 R1038 R1039	3.25 5.13 2.19 2.19	SN76227N SN76226DN SN76228N SN76242	2.45 2.98 3.27 5.23	TA7314 TA7323P TA7325P TA7339P	3.50 3.15 1.15 1.05	TDA2525 TDA2532 TDA2530	5.50 2.50 2.20	UPC1161C UPC1182H UPC1186H	4.90 2.05 1.05
A817 A835 A836	0.18 2SD29 2.50 2SD31 0.89 2SD32	2 4.05 3 2.52	BA527 BA532	2.90 1.20 0.99	BD229 BD232 BD234	1.05 BF75 0.49 BF76 0.42 BF76	9 0.47 1 1.05	CD4049 CD4052 CD4066	0.24 0.33 0.23	LM1017N LM1877 LM2808	1.81 2.95 5.94	R2008B R2009 R20108	1.33 1.90 2.98	SN 76243 SN 76396 SN 76533N	5.23 2.90 2.47	TA7340P TA7607AP TA7609	5.95 1.30 2.35	TDA2541 TDA2540 TDA25450 TDA2560	1.00 1.95 5.94 2.50	UPC1181H UPC1185H UPC1188 UPC1212C	1.35 2.10 0.77 0.80
A844 A872 A884	0.65 2SD35 0.59 2SD35 2.15 2SD38	3 7.50 9 2.41	BA656 BA7100	3.21 1.00 11.35	BD237 BD238 BD239 BD240	0.36 BF86 0.28 BF87 0.45 BF95 0.57 BF95	0 0.30	CD4069 CD4070 CD4081	0.29 0.25 0.14	LM2877 LM317CKC LM324N	7.45 1.08 0.90	R2029 R2030 R2257	1.33 1.33 2.35	SN76532N SN76545 SN76546N	8.91 4.87 3.47	TA7611AP TA7616P TA7622AP	2.32 5.25 8.94	TDA2575A TDA2578A TDA2576A+	0.50 2.55 Kri 12.35	UPC1225H UPC1230 UPC1238	2,55
A937R A940 A940-2 A950	0.97 2SD40 2.23 2SD41 2.14 2SD47 0.72 2SD56	1.9		28.96 3.96 5.76 0.06	BD241 BD242 BD243A	0.39 BF97 0.50 BF97 0.39 BFR3	0.50	CD4093 CD4511 CD4528 CD4556	0.40 1.10 0.37	LM339N LM340K LM348N	0.41 11.85 2.15	R2265 R2305 R2322	1.49 1.18 6.67	SN76549 SN76570 SN76611	2.45 3.88 2.59	TA7628P TA7629P TA7630P	1.40 7.50 0.95	TDA2581 TDA2582 TDA2591	1.60 1.35 2.15	UPC1278H UPC1351C UPC1350C	5.95 1.81 1.40
A951 A966-Y A999	1.75 2SD60 0.05 2SD60 0.75 2SD61) 2.9 IR 0.65	BAV19 BAV20	0.11 0.36 8.12	BD243C BD244 BD244C BD245C	0.50 BFR 0.42 BFR 0.72 BFR 0.75 BFR	2 0.50 9 0.29	CR02AM-8 CV12E CX0950	1.47 1.70 4.62 3.14	LM380N LM567CN LM6402/011 LM6402A093	1.50 1.71 10.23 10.15	R2323 R2354A R2354B R2443	0.76 0.64 2.01 1.36	SN76620 SN76660N SN76666N SN76708	2.59 2.48 1.20 4.86	TA7640AP TA7672P TA7676P TA7726P	2.40 2.75 2.81 10.25	TDA2594 TDA2593 TDA2595 TDA2600	3.40 3.40 3.84 7.00	UPC1353 UPC1355C UPC1363 UPC1362	1.63 2.13 4.20
8774 8185 8375	0.65 2SD63 1.13 2SD63 3.07 2SD65	B 0.72	BAX12 BAX13	0.11 0.49 0.11	BD246C BD253 BD278A BD317	0.05 BFR0 1.05 BFR0 0.70 BFR0 1.20 BFR0	6 1.00 9 1.63	CX104 CX108 CX109	8.77 12.48 7.20	LM748 LM8360 LM8361	0.69 3.87 2.95	R2461 R2540 R2540X	1.50 1.91 3.30	SN 76709N SN 76707N SN 76705N	9.63 1.23 2.97	TAA320A TAA350A TAA570	1.27 0.80 1.85	TDA2611AQ TDA2612Q TDA2611A		UPC1365C UPC1366 UPC1366 UPC1360C	1.80 2.50 1.85 6.51
8400 8405 8511	0,40 2SD65 1,03 2SD66 2,45 2SD73	IA 6.80 I 2.11	BC107B BC1086	0.08 0.11 0.15	BD318 BD375 BD380	2.72 BFX 0.42 BFX 0.76 BFX	4 0.37 5 0.31	CX130 CX134 CX136	8,76 4,50 11,49	LR3419 LR3471 LU1141	9.37 9.37 7.27	R2615 RCA2060 RGP01-15	0.67 2.00 0.70	SN76730 SN76810N SN76832N	5.54 0.60 1.35	TAA621AX1 TAA661B TAA691	4.85 0.95 8.58	TDA2610 TDA2620 TDA2630	2.79 1.96 2.50	UPC1378H UPC141C UPC1458	1,95
854 8546 856 8618A	1.39 2SD77 0.56 2SD81 2.00 2SD82 2.22 2SD83	7.63 3 1.91	BC113 BC119	0.14 0.14 0.36	BD410 BD433 BD434 BD435	0.49 8FX 0.44 8FX 0.45 8FX 0.49 8FX	7 0.55 8 0.34	CX139 CX157 CX158	11,13 5,52 10,45	LU52012 LU52011 LU03112	5.95 14.95 12.37	RGP10 RGP30M RT402 RT905A	0.23 0.28 1.50 3.20	SN94041 SN94042 SPS5384	5.54 4.35 1.98	TAA700 TAA930 TAA970	2.37 4.87 2.13	TDA2631 TDA2640 TDA2652	2,73 3,80 8,62	UPC151C UPC2002 UPC30C	2.95 1.48 2.51
8631 8643 8669	2.90 2SD84 6.59 2SD85 3.67 2SD85	1.75 5 1.00	BC132 BC135	0.20 0.14 0.14 0.18	BD436 BD437 BD438	0.74 BFY5 0.45 BFY5 0.52 BFY5	0 0.30 1 0.33 2 0.27	CX177 CX187 CX755 CX885A	8.80 5.26 12.95 5.85	M193 M21C M23C M293	6.83 1.10 1.90 6.71	\$1299 \$28000 \$2802	5.34 1.50 2.90	ST1702L STA401 STA441C STA471C	0.99 2.49 3.10 8.70	TAG626-600 TBA120AS TBA120SB TBA120SB	1.20 1.45 0.40 1.75	TDA2653 TDA2654 TDA2670	3.16 4.73 2.48	UPC324C UPC32C UPC339C	4,70
8681 8695 8774	3.96 2SD88 1.90 2SD89 0.65 2SD89	2 1.15 1 1.75 3 0.02	BC138 BC139 BC140	0.18 0.34 0.33 0.30	BD441 BD442 BD509 BD510	9.59 BFY3 0.50 BFY3 1.64 BLY4 0.75 BR10	0 0.42 9 2.20 0 0.23	E1222 E5024 E5386	0.40 0.28 9.25	M253 M51102L M5115P M51203L	5.24 3.15	S2818 S3702S S40W S6080B	4.05 5.21 13.10 9.98	STK0029 STK0050 STK016	11.70 9.55 7.85 6.91	TBA1200 TBA1200 TBA120A TBA1440	1.75 2.50 1.05 1.94	TDA2680 TDA2740 TDA2780A0 TDA2795	3.20 10.14 8.84 2.78	UPC41C UPC4558C UPC474 UPC554C	2.95 1.24 5.11 1.85
B819 C1096 C1104	1.13 2SK10 1.16 7805-1 3.58 7806	5H 2.15 022 8.65 8.45	BC141 BC142 BC143	0.20 0.37 0.34	BD519 BD529 BD530 BD533	0.90 BR10 0.94 BR10 0.99 BR30	1 0.78 3 0.66 3 1.15	GD243 GF758 HA11215	1.95 0.94 1.75	M51231P M5134-9341 M51353P	0.95 4.13 5.25	SA8063 SAA1006 SAA1020	5.17 1.85 4.76	STK022 STK031 STK040	8.55 12.55 13.34	TBA1441 TBA395 TBA396	1.95 1.10 1.20	TDA2791 TDA2791 TDA2910 TDA3300B	1,01 13,25 6,96	UPC575C2 UPC580C UPC587C2	1.55 6.98 1.34
C1106 C1114 C1116 C1124	4.55 7905	8.64 0.80	BC1488 BC148C	0.14 0.13 0.11	BD534 BD535 BD536	0.52 BRX 0.45 BRX 0.50 BRX	4 0.60 9 0.34 9 0.65	HA11211 HA11225 HA11229 HA11235	253 4,29 3,46 1,55	M51381P M51393AP M51394P	5.98 4.50 14.50	SAA1025 SAA1024 SAA1075 SAA1121	4.40 2.58 4.25 7.44	S1K054 STK058 STK077	9.35 27.50 9.28	TBA400 TBA440C TBA4800	2.39 2.34 1.30	TDA3330 TDA3506 TDA3501	3.26 4.40 5.50	UPC592H UPC595 UPC596 UPD1514C	2.15 2.55 1.51 4.75
C1129 C1131 C1158 C1162	1.65 AD140 0.64 AD143 3.33 AD145 0.55 AD161	1.06 1.53 1.60 0.64	BC153 BC154	0.13 0.14 0.14 0.16	BD537 BD538 BD544B BD677	0.50 BSS 0.67 BST 0.75 BST	8 0.67 10140G 4.93 10246 5.99 10233 6.12	HA11124 HA1125 HA1137W HA1138	5.25 4.29 1.38	M5142P M5144P M51513L	6.85 4.27 2.55	SAA1124 SAA1130 SAA1174	2.60 6.69 7.77	STK1039 STK2110 STK2145 STK2240	5.75 7.33 16.95	TBA510 TBA520 TBA530 TBA540	1.37 1.20 1.30	TDA3500 TDA3510 TDA3520 TDA3540	425 5.95 9.71	UPD2819C UPD553-164 UPD8049C-1	4.50 19.52 11.50
C1172 C1195 C1213	2.22 AD162 6.09 AF114 0.09 AF115	0.64 0.45 2.47 0.90	BC160 BC161 BC168	0.48 0.21 0.36	BD679 BD680 BD681	0.57 BST 0.52 BST 1.48 BSV	:C0143 3.07)1043 2.05 /78 3.91	HA11414 HA1156 HA1160	1,75 4,20 1,16 5,79	M51515BL M51517L M5192 M5194AP	2.75 2.90 3.13 5.74	SAA1250 SAA1251 SAA1351 SAA3027P	3.95 3.20 8.11 2.71	STK2240 STK2250 STK3042 STK3044	16.65 18.95 5.63 5.75	18A540 18A560C 18A5700 18A570A	1.72 1.40 1.50 1.71	TDA3541 TDA3560 TDA35710	2.29 2.22 5.13 3.63	X0022CE X0029CE X0031CE X0035TA	5.75 7.09 6.32 6.18
C1226 C1293 C1306 C1317	1.90 AF118 1.90 AF127 1.90 AF127 0.50 AF139	1.20 1.00 0.40	BC169C BC170 BC171 BC172B	0.16 0.16 0.11 0.27	BO696 BO699 BD 700 BD 707	2.47 BSW 1.85 BSX 3.70 BSX 0.60 BSY	68 0.60 9 0.34 10 0.19	HA1166X HA1167 HA11706 HA11705	6.60 6.60 3.61 8.00	M5194AP M5231L M53274P M54532P	5.74 1.58 1.33 1.50	SAA5000 SAA5010 SAA5012	3.25 3.50 5.50	STK4019 STK433 STK4332 STK435	9,29 4,78 4,75	TBA570A TBA573 TBA700 TBA720	1./1 2.99 1.85 2.95	TDA3576 TDA3590 TDA3591	2.20 2.22 5.13 3.63 7.48 6.79 6.45 5.90	X0040TA X0042CE X0043CE	4.51 4.35 2.75
SC 1364 SC 1383 SC 1391	0.49 AF178 1.20 AF179 2.45 AF180	1.45 0.55 0.55	BC173 BC174B BC177	0.27 0.17 0.27 0.35 0.25	BD709 BD710 BD809	0.00 BSY 0.00 BT10	9 0.51 8 1.45 9 1.76	HA11703 HA11701 HA11710	3.45 3.57 3.45	M54544L M58478P M58485P	2.97 6.75 14.05	SAA5020 SAA5030 SAA5050 SAB1009B	5.78 6.33 4.90 5.58	STK4352 STK436 STK437	7.12 1.95 5.95 6.50	TBA730 TBA7500 TBA760	2.30 3.55 2.50 1.71	TDA3650 TDA3652 TDA3651A0 TDA3651	2.60	X0056CE X0057GE X0065CE X0074GE	6.25 6.00 5.77
C1398 C1413A C1446 C1447	0.50 AF181 2.10 AF186 1.25 AF239 2.07 AF279	8.53 8.53 8.51	BC179 BC182	0.25 0.25 0.09 0.14	BD810 BD879 BD895 BD901	0.57. 8712 0.74 8712 2.18 8712 0.55 8715	D 2.17 1 2.48	HA11713 HA11711 HA11715 HA11714	2,50 3,10 5,59 7,76	MA06 MA8001 MA8003 MB3705	1.07 0.82 1.16	SAB3011 SAB3013 SAB3021 SAB3024	7.34 4.37 3.95	STIK4372 STIK460 STIK466	13.13 8,74 10.10	TBA800 TBA810S TBA810T	1.08 1.61 1.75	TDA3651A TDA3950 TDA40508	2.50 4.50 3.40	X0077GE X0079CE X0092CE	15.25 14.90 4.95 4.95
SC 1475 SC 1505 SC 1514	0.60 AN119 1.00 AN152 1.37 AN206	0.0 3.91 1.0 2.51 3.52	8C183LB 8C184 8C184LB	0.19 0.13 0.26 0.25	BD902 BDW83C BDW84C	0.56 BTT 0.59 BU1 0.59 BU1	018 2.42 6 2.48 8 1.50	HA11716 HA11725 HA11725MP	13.10 18,26 16.00	MB3712 MB3713 MB3730	1.98 1.85 1.69 1.75	SAB3209 SAB3210 SAF1032P	6.36 5.82 3.21 3.58	STK4833 STK501 STK502 STK5314	9.52 6.32 7.25 11.50	TBA820 TBA820M TBA890	0.66 0.82 3.30	TDA4280 TDA4290 TDA4400 TDA4400 TDA4420	3.40 7.29 1.95 4.90 2.30 8.32	X0096CE X0109CE X0113CE X0195CE	6.20 11.25 5.48 5.60
SC15730 SC1563 SC1617	1.63 AN208 8.34 AN210 3.89 AN211	3.9 2.2 3.2	BC186 BC187 BC204	0.28 0.35	BDX32 BDX53A BDX53B	1.85 BU11 4.93 BU1 3.35 BU12 LOCATION, REN	0 5.05	HA117555P HA11781 HA1180	6.23 21.15 5.15	MC13002 MC1310P MC1327P	1.86 1.95 1.33	SAF1039 SAS5010 SAS560S	1.95 8.39 1.91	STK5730 STK7216 STK772	3.20 14.90 3.71	TBA920 TBA940 TBA950	1.95 1.17 1.95	TDA4422 1DA4427S TDA4431	8.32 9.00 2.27	X0195CE X0204CE X0261CE ZPY120	1.74 1.98 3.25

D D E	YOUR	ACCESS	OR E	BARCLA	YCA	RD	ଞ T	EL (902	7120	083
\star	VID		IE/	ADS	\star	FRO	ъм £	1	3.9) 5 E	АСН
		VP7200 VS1 VS2 VS3 VS5	VHS A	NATIONAL PANASO Head Part Nos.: VEH009 Machine Nos.: NV300 NV NV3000 NV7000 NV72	NIC 9 0103 0115 (322 NV332 N) 121 0131 V333 NV340 NV	390 NV2000		HEADS Head Part No. BETA A		Price 1 + £16,95
Machine Nos	.: VCR4500 VCR5200 VC	R9000	VHS T VHS R	NV8200 NV8400 NV8600 Head Part Nos.: VEH017 Machine No.: NV370 NV Head Part Nos.: VEH017	NV8610 NV84 1 VEH0218 3708	520	30 1100170	VHS B VHS M	BETA B BETA D BETA E BETA T		£16,95 £27,50 £34,49 £21,00
	.: 3292 8903 3V00 3V01	3V06 3V16 3V22 3V23 3V24	9VH4600 VHS A	Machine No.: NV330 NV Head Part Nos.: VEH028 Machine No.: NV430 Head Part Nos.: VEH017	777 6			VHS N VHS W	BETA W BETA X VHS VIDI VHS A	EO	E19.95 E31.92 E13.95
FISHER Machine Nos	V31 3V35 3V36 3V38 3V FVH D520 D530 0 620 P622 P710 P720 P7	620 D720 P420 P510 P520	AH2 N	Machine No.: NV366 SHARP Head Part Nos.: DDRMU Machine No.: VC581/2/3	0002 HE17/2			VHS S	VHS B VHS C VHS D VHS E VHS F		£13.95 £18.75 £81.76 £75.43 £81.69
GEC Head Part No	ps.: 5458161 5458165 .: 4000H 4001H 4002H		VHS I	Head Part Nos.: DDRMU Machine No.: 2C9 VC1 VC386 VC387 VC388 VC VC9100 VC9300 VC9400	0001 HE00 0 10 VC200 VC 477 VC481 VC VC9500 VC96	002 HE02 04 05 220 VC300 VC 2482 VC930 VC	C381 VC384	VHS C	VHSH VHSI VHSK VHSL		£21.25 £21.25 £21.25 £81.87
Head Part No	os.: 5458282 5458413 54 .: 4001H 4004H	58415 5458992	VHS K	Head Part Nos.: DDRMU Machine No.: VC7300 VC Head Part Nos.: DDRMU	7700 VC7750			VHS D	VHS M VHS N		£14.75 £26.95
HITACHI			VHS A	Machine No.: VC6300 Head Part Nos.: DDRMU				VHS E	VHSR VHSS VHST		£21.00 £18.75 £19.95
Machine Nos Head Part No Machine Nos	: v13000 bs.: 5458104 : VT4000 VT4200 VT500	0 VT5500	VHS H	Machine No.: VC8300 Head Part Nos.: DDRMU	0001 HE14			VHS L	VHS U VHS V		£20.50 £29.00
Head Part No Machine Nos	s.: 5458161 5458165	00 VT8040 VT8100 VT8500	VHS I	Machine No.: VC2300 SANYO Head Part Nos.: 1430242 Machine No.: 1430242	2 T01700 1430	242 T22300		VHS F BETA D	VHS W VHS X VHS Z ORIGINAL	. Ferguson	£21.95 £35.00 £14.25
Head Part No Machine Nos	s.: 5458282 5458413 54 VT11 V14 VT33 VT34 V	58415 5458992 VT330 VT340 VT5030 VTP10 VTI	P30 VHS K	 Machine No.: VTC5000 V Head Part Nos.: 1430242 Machine No.: VTC5350 V 	2 T02200	300 0103400		BETA D	01X0 003 01X0 027	222 085	£31.35 £46.02
π				Head Part Nos.: 1430762 Machine No.: VTC9300 V	2 T02000 /TC9455 VTE9	500		BETA X	01X0 033 01X0 040	002	£47.05 £48.32
VR3943 VR39	.:: VR3605 VR3033 VR39 963 VR3993 VR3975 VR3 also Ferguson)	05 VR3913 VR3914 VR3935 1985 VR3986 VR3833	VHS A	Head Part Nos.; 143072 Machine No.; VTC9300P SONY	T02100 5 VTC9350			BETA X	01X0 056 01X0 057 01X0 082 01X0 083	002 001	£61.55 £31.36 £46.02 £66.03
Machine Nos HR3360 HR3	.: HP4000 HR2200 HR33 3660 HR3750 HR3860 0110 HRD111 HRD120	00 HR3320 HR3330 HR3350 HR4100 HR7200 HR7600 HRD121 HRD140 HRD150	VHS A	Head Part Nos.: A6762 (Machine No.: SL3000, 8 Head Part Nos.: A6762 (Machine No.: SL5W, 500 Head Part Nos.: A6762 (000, 8080, SL 112A, 038A, 0 10 5100 SLC5,	T 6Me, 7, 7E, 55A, 129A , C6, C7		BETA A BETA B	PHILIPS 310 274 4 691 200 5 691 200 9 691 201 1	4 4 8	POA £49.68 £62.02 £61.66
MITSUBIS Machine No.: HS700 HS303	: HS200		VHS A VH700	Machine No.: SLC20, C3 SLF1, F30, HF72, T20, T Please see next col. for	0, C33, C40, 30	C44		BETA W	691 201 6 691 201 7 691 202 8	6 8	£61.93 £49.96 £55.37
555044											
	SON/JVC	Tabaian hand T2000/DUE4	50044		2 55		DRI	VE	BEL	TS	
VID1 VID2	01X0-003-381 01X0-018-024	Tension band T3292/PU54 Take up idler T3292/PU47 Bewind idler assembly T3V	752		2.55 5.00 6.20		AKAI		BEL	JVC	
VID1 VID2 VID3 VID4	01X0-003-381 01X0-018-024 01X0-018-025 01X0-018-729	Take up idler T3292/PU47 Rewind idler assembly T3V Take up idler T3V00/PU49	752 /16/PU49282 280			VP 77 VP 68 VP 7100	AKAI 08K135 08K135 08K103	£0.86 £0.86 £1.42	HR 2200 HR 3300 HR 3330	JVC DBK137 DBK107 OBK126	ល.68 ព.65 ព.65
VID1 VID2 VID3	01X0-003-381 01X0-018-024 01X0-018-025	Take up idler T3292/PU477 Rewind idler assembly T3V	752 (16/PU49282 280 18941-2 1) T3V23/PU		5.00 6.20 6.95 0.26 4.50 2.90	VP 68 VP 7100 VS 1 VS 2 EG VS 3	AKAI OBK 135 DBK 135 DBK 103 OBK 103 DBK 101 DBK 101 DBK 134	£0.86 £0.86 £1.42 £1.76 £1.08 £1.76	HR 2200 HR 3300 HR 3330 HR 3360 HR 3600 HR 3660	JVC DBK137 DBK107 DBK126 0BK103 DBK107 DBK103	1.65 1.65 1.42 22.66 1.42
VID1 VID2 VID3 VID4 VID5 VID6	01X0-003-381 01X0-018-024 01X0-018-025 01X0-018-729 01X0-040-006 01X0-033-454	Take up idler T3292/PU47 Rewind idler assembly T3V Take up idler T3V00/PU49 Loading belt T3V29/30/PU4 Roller Assy. (cass. Housing	752 (16/PU49282 280 (8941-2 (1) T3V23/PU 89678 (30/PU5138 (39/PU55371	49042 V V	5.00 6.20 6.95 0.26 4.50	VP 68 VP 7100 VS 1 VS 2 EG VS 3 VS 5 EG VS 10 VS 9300 VS 9500	AKAI DBK135 DBK103 DBK103 DBK103 DBK104 DBK101 DBK104 DBK103 DBK103 DBK103	£0.86 £0.86 £1.42 £1.76 £1.08	HR 2200 HR 3300 HR 3360 HR 3600 HR 3660 HR 4100 HR 7200 HR 7650	JVC DBK137 DBK107 DBK106 OBK103 DBK103 DBK127 OBK139 DBK138 DBK132	£1.65 £1.65 £1.42 £2.66
VID1 VID2 VID3 VID4 VID5 VID6 VID7 VID8 VID9	01X0-003-381 01X0-018-024 01X0-018-025 01X0-018-729 01X0-040-006 01X0-03-454 01X0-040-007 01X0-040-017 01X0-040-017 01X0-065-009 01X0-065-016	Take up idler T3292/PU47 Rewind idler assembly T3V Take up idler T3V00/PU49 Loading bett T3V29/30/PU4 Roller Assy. (cass. Housing Take up idler 3V29/30/PU4 Reel motor assembly 3V29 Capston motor 3V35/36/38	752 (16/PU49282 280 (8941-2 (1) T3V23/PU 89678 (30/PU5138 (39/PU55371	49042 V V	5.00 6.20 6.95 0.26 4.50 2.90 27.95 22.10 22.00	VP 68 VP 7100 VS 1 VS 2 EG VS 3 VS 5 EG VS 10 VS 9300 VS 9300 VS 9500 VS 9500 VS 9800	AKAI DBK135 DBK135 DBK103 DBK103 DBK101 DBK101 DBK101 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103	10.86 11.42 11.76 11.76 11.88 11.68 11.65 11.42 11.42 11.42 11.42	HR 2200 HR 3300 HR 3330 HR 3600 HR 3660 HR 4100 HR 7200 HR 7650 HR 7700 NATIO	JVC DBK137 DBK107 DBK126 OBK103 DBK107 OBK103 DBK139 DBK138 DBK132 DBK138 DBK132 DBK108	11.65 11.65 11.42 12.66 11.42 12.25 10.86 10.86 10.86 10.86 11.76
VID1 VID2 VID3 VID4 VID5 VID6 VID7 VID8 VID9 VID10 VID10 VID11 VID11 VID11	01X0-003-381 01X0-018-024 01X0-018-025 01X0-018-729 01X0-040-006 01X0-033-454 01X0-040-007 01X0-040-017 01X0-040-017 01X0-040-017 01X0-065-009 01X0-065-016 FACHI V5577355 V6413663	Take up idler T3292/PU47 Rewind idler assembly T3V Take up idler T3V0/PU49 Loading belt T3V29/30/PU4 Roller Assy. (cass. Housing Take up idler 3V29/30/PU4 Reel motor assembly 3V25 Capston motor 3V35/36/38 Cass. housing Assy. 3V35/ GEC 4100/Hitachi VT11E (GEC 4000/Hitachi VT13 //	752 (16/PU49282 280 (18941-2 (1) T3V23/PU 89678 (30/PU5138) (30/PU5138) (39/PU55371 36/38/39/PU capston motic rewind arm	49042 V 29825	5.00 6.20 6.95 0.26 4.50 2.90 27.95 22.10 22.00 23.50 2.75	VP 68 VP 7100 VS 1 VS 2 EG VS 3 VS 5 EG VS 10 VS 9300 VS 9500 VS 9500 VS 9500 VS 9600 VS 9600	AKAI OBK135 DBK135 DBK135 DBK133 DBK133 DBK133 DBK103 DBK103 DBK103 DBK103 OBK103 OBK103 OBK103 OBK103 OBK103 OBK103 OBK103	£0.86 £1.42 £1.76 £1.08 £1.76 £1.65 £1.42 £1.42 £1.42 £1.42 £1.42 £1.42 £1.42 £1.42 £1.42 £1.42	HR 2200 HR 3300 HR 3360 HR 3660 HR 3660 HR 7500 HR 7500 HR 7550 HR 7550 HR 7500 NV 300 NV 330 NV 332 NV 332	JVC DBK137 DBK107 DBK107 DBK103 DBK103 DBK103 DBK103 DBK127 DBK139 DBK139 DBK132 DBK100 DBK100 DBK110 DBK110 DBK110 DBK110	11.65 11.65 11.42 12.66 11.42 12.25 10.86 10.86 10.86 11.76
VID1 VID2 VID3 VID4 VID5 VID6 VID7 VID8 VID9 VID10 VID10 VID11 VID12 VID13 VID13 VID14	01X0-003-381 01X0-018-024 01X0-018-025 01X0-018-025 01X0-040-006 01X0-033-454 01X0-040-007 01X0-045-009 01X0-065-009 01X0-065-016 FACHI V5577355 V6413663 V6861471 V6861482	Take up idler T3292/PU47 Rewind idler assembly T3V Take up idler T3V00/PU49 Loading belt T3V00/PU49 Roller Assy. (cass. Housing Take up idler 3V29/30/PU4 Reel motor assembly 3V25 Capston motor 3V35/36/38 Cass. housing Assy. 3V35/ GEC 4100/Hitachi 9X950 GEC 4001/2/Hitachi 93/950 GEC 4001/2/Hitachi 93/950	752 (16/PU49282 280 (18941-2) () T3V23/PU 89678 (30/PU5138) (30/PU5138) (39/PU55371 36/38/39/PU capston moto rewind arm 0 tif rewind i 0 play idler i	49042 V 29825 r	5.00 6.20 6.95 0.26 4.50 2.90 27.95 22.10 22.00 23.50 2.75 1.95 4.20	VP 68 VP 7100 VS 1 VS 2 EG VS 3 VS 5 EG VS 10 VS 9300 VS 9500 VS 9500 VS 9500 VS 9600 VS 9600	AKAI DBK135 DBK135 DBK135 DBK136 DBK136 DBK136 DBK137 DBK136 DBK102 DBK102 DBK103 DBK102 DBK103 DBK1	10.86 11.42 11.76 11.68 11.68 11.68 11.65 11.42 1.	HR 2200 HR 3300 HR 3360 HR 3660 HR 3660 HR 7500 HR 7500 HR 7500 NV 300 NV 330 NV 330 NV 330 NV 350 NV 350 NV 350 NV 350 NV 350	JVC DBK137 DBK107 DBK107 DBK103 DBK103 DBK103 DBK132 DBK132 DBK132 DBK132 DBK132 DBK132 DBK132 DBK132 DBK132 DBK133 DBK132 DBK133 DBK133 DBK133 DBK133 DBK133 DBK133 DBK133 DBK133 DBK133 DBK133 DBK133 DBK133 DBK137 DBK137 DBK137 DBK137 DBK137 DBK107 DBK137 D	C1.65 C1.65 C1.42 C2.66 C1.42 C2.25 C0.86 C1.42 C2.25 C0.86 C1.42 C1.42 C1.42 C1.42 C1.42 C1.42 C1.42 C1.52 C1.52 C1.52 C1.52 C1.52 C1.52 C1.52 C1.52 C1.55 C1.52 C1.55
VID1 VID2 VID3 VID4 VID5 VID6 VID7 VID8 VID9 VID10 VID10 VID11 VID12 VID13 VID14 VID15 VID16	01X0-003-381 01X0-018-024 01X0-018-025 01X0-018-025 01X0-040-006 01X0-033-454 01X0-040-007 01X0-065-009 01X0-065-009 01X0-065-016 FACHI V5577355 V6413663 V6861471 V6861482 V6886971 V2423461	Take up idler T3292/PU47 Rewind idler assembly T3V Take up idler T3V00/PU49 Loading belt T3V00/PU49 Roller Assy, (cass. Housing Take up idler 3V29/30/PU4 Reel motor assembly 3V25 Capston motor 3V35/36/38 Cass. housing Assy. 3V35/ GEC 4100//Hitachi 9X950 GEC 4001/2/Hitachi 93/950 GEC 400/2/Hitachi	752 (16/PU49282 280 (18941-2) () T3V23/PU 89678 (30/PU5138) (30/PU5138) (39/PU55371 36/38/39/PU capston moto rewind arm 0 tif rewind i 0 play idler i	49042 V 29825 r	5.00 6.20 6.95 0.26 4.50 2.90 27.95 22.10 22.00 23.50 2.350 2.75 1.95	YP 68 YP 7100 VS 1 VS 2 EG VS 3 VS 5 EG VS 10 VS 9500 VS 9500 VS 9500 VS 9500 VS 9700 VS 9800 VS 9700 VS 9700	AKA1 DBK135 DBK135 DBK103	10.86 00.86 11.42 11.76 11.76 11.76 11.76 11.42	HR 2200 HR 3300 HR 3330 HR 3600 HR 4100 HR 7500 HR 7500 HR 7500 WN 300 WN 330 WN 332 WN 332 WN 336 WN 336 WN 336 WN 350 WN 300 WN 350 WN 300 WN 300 WN 300 W	JVC DBK137 DBK107 DBK107 DBK107 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK110 DBK110 DBK110 DBK111 DBK1140 DBK1110 DBK1107 DBK1107 DBK100 DBK100 DBK100 DBK100 DBK100 DBK1110 DBK10 DBK10	C1.65 C1.65 C1.42 C2.42 C2.42 C1.76 C1.76
VID1 VID2 VID3 VID4 VID5 VID6 VID7 VID8 VID9 VID10 GEC/HIT VID11 VID11 VID12 VID13 VID14 VID15 VID16 NATION VID17	01X0-003-381 01X0-018-024 01X0-018-025 01X0-018-729 01X0-040-006 01X0-033-454 01X0-040-007 01X0-040-017 01X0-065-009 01X0-065-016 FACHI V5577355 V6413663 V6661482 V66861471 V66861471 V66861471 V66861471 V66861471 V66861471 V66861482 V66861471 V66861482 V66861471 V66861482 V66861471 V66861482 V66861471 V66861482 V66861471 V66861482 V66861471 V66861482 V66861471 V66861482 V668661482 V668661482 V6686661482 V6686661482 V6686661482 V6686661482 V6686661482 V6686661482 V66866661482 V6686661482 V6686661482 V6686661482 V6686661482 V66866661482 V66866661482 V668666666666666666666666666666666666	Take up idler T3292/PU47 Rewind idler assembly T3V Take up idler T3V00/PU49 Loading belt T3V00/PU49 Holler Assy. (cass. Housing Take up idler 3V29/30/PU4 Reel motor assembly 3V22 Capston motor 3V29/30/PU4 Reel motor assembly 3V22 Capston motor 3V29/30/PU4 Reel motor assembly 3V25 Capston motor 3V29/30/PU4 Reel motor assembly 3V25 Reel motor assembly	752 (16/PU49282 280 (18941-2) (173V23/PU (189678) (30/PU5138) (39/PU55371) 36/38/39/PU (30/PU55371) 36/38/39/PU (36/38/39/PU (19/10) (49042 V 29825 ¢ arm assy.	5.00 6.20 6.95 0.26 4.50 2.90 27.95 22.10 22.00 23.50 2.75 1.95 4.20 1.80 6.00	YP 68 YP 7100 VS 1 VS 2 VS 2 VS 5 VS 9600 3292 3 3 292 3 3 3 292 3 3 3 292 3 3 3 292 3 3 3 202 3 3 3 203 3 203 3 203 3 203 3 203 3 203 3 203 3 203 3 203 3 203 <	AKAI DBK135 DBK135 DBK135 DBK136 DBK136 DBK136 DBK136 DBK137 DBK102 DBK102 DBK102 DBK103 DBK102 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK105 DBK155 DBK1	10.86 00.86 01.86 11.42	HR 2200 HR 3300 HR 3360 HR 3660 HR 4100 HR 7500 HR 7500 HR 7500 HR 7500 HR 7500 WN 330 WN 330 WN 330 WN 336 WN 336 WN 350 WN 450 WN 7200 NV 7200 NV 7200 NV 7200 NV 7200 NV 7200	JVC DBK137 DBK107 DBK107 DBK105 DBK103 DBK139 DBK139 DBK139 DBK139 DBK139 DBK139 DBK139 DBK139 DBK139 DBK139 DBK139 DBK131 DBK132 DBK131 DBK132 DBK131 DBK132 DBK131 DBK132 DBK131 DBK132 D	C1.65 C1.65 C1.62 C2.66 C1.42 C1.23 C1.25
VID1 VID2 VID3 VID4 VID5 VID6 VID7 VID8 VID9 VID10 VID10 VID11 VID12 VID12 VID12 VID13 VID14 VID15 VID16 NATION VID17 VID17 VID18 VID17	01X0-003-381 01X0-018-024 01X0-018-025 01X0-018-729 01X0-040-006 01X0-033-454 01X0-040-007 01X0-040-017 01X0-040-017 01X0-065-009 01X0-065-016 FACHI V5577355 V6413663 V6861482 V68861471 V66861482 V6886971 V2423461 VALPANASONI VXP0329 VXP0324 VXP0324 VX20078	Take up idler T3292/PU47 Rewind idler assembly T3V Take up idler T3V0/PU49 Loading belt T3V29/30/PU4 Roller Assy. (cass. Housing Take up idler 3V29/30/PU4 Reel motor assembly 3V25 Capston motor 3V35/36/38 Cass. housing Assy. 3V35/ GEC 4100/Hitachi VT11E c GEC 4000//Hitachi VT33 t/f GEC 4001/2/Hitachi 93/95C GEC 4001/2/Hitachi 93/95C GEC 4004/Hitachi VT33 t/f ET541 Tuner Unit C Fast forward idler NV2000 Idler NV7000/7200 Tension Band NV7000	752 (16/PU49282 280 (19941-2) (1) T3V23/PU (2007) (49042 V 229825 arm assy.	5.00 6.20 6.95 0.26 4.50 2.90 27.95 22.10 22.00 23.50 2.75 1.95 4.20 1.80 6.00 0.85 3.50	VP 68 VP 7100 VS 1 VS 2 VS 2 VS 2 VS 3 VS 16 VS 3 VS 9500 VS 9500 3 292 3 292 3 242 3 243 3 243 3 242 3 3 3 424/3444 3 45/45/7 VBS<7000	AKAI DBK135 DBK135 DBK135 DBK135 DBK101 DBK101 DBK101 DBK102 DBK102 DBK102 DBK102 DBK102 DBK102 DBK103 DBK150	00.86 00.86 01.42 01.67 01.68	HR 2200 HR 3300 HR 3330 HR 3660 HR 4100 HR 7600 HR 7500 HR 7500 NV 330 NV 330 NV 330 NV 332 NV 336 NV 332 NV 336 NV 332 NV 336 NV 336 NV 330 NV 300 NV 7000 NV 7000 NV 8500 NV 8500 N	JVC DBK137 DBK107 DBK107 DBK126 DBK107 DBK127 DBK127 DBK137 DBK137 DBK137 DBK137 DBK137 DBK137 DBK110 DBK110 DBK111 DBK11 DBK111 DBK11	665 C165 C165 C175
VID1 VID2 VID3 VID4 VID5 VID6 VID7 VID9 VID9 VID10 GEC/HI1 VID11 VID12 VID13 VID13 VID15 VID16 NATION VID17 VID18 VID19 VID20 VID21	01X0-003-381 01X0-018-024 01X0-018-025 01X0-018-729 01X0-040-006 01X0-033-454 01X0-040-007 01X0-040-017 01X0-040-017 01X0-065-009 01X0-065-016 FACHI V5577355 V6413663 V6661471 V6661482 V6686971 V2423461 V2424451 V2424451 V24545454545454545555555555555555555555	Take up idler T3292/PU47 Rewind idler assembly T3V Take up idler T3V00/PU49 Loading belt T3V00/PU49 Loading belt T3V29/30/PU4 Roller Assy. (cass. Housing Take up idler 3V29/30/PU4 Reel motor assembly 3V25 Capston motor 3V35/36/38 Cass. housing Assy. 3V35/ GEC 4000/Hitachi VT131 t/f GEC 4001/2/Hitachi 93/950 GEC 4001/2/Hitachi 93/950 Hitachi 93/950 Hit	752 (16/PU49282 280 (19941-2) (1) T3V23/PU (2007) (49042 V 29825 arm assy. PLEASE NOTE VIDEO SPARES	5.00 6.20 6.95 0.26 4.50 2.90 27.95 22.10 22.00 22.55 1.95 4.20 1.80 6.00 0.85 3.50 2.65 3.40	VP 68 VP 7100 VS 1 VS 1 VS 1 VS 1 VS 1 VS 1 VS 1 VS 1 VS 2 EG VS 2 EG VS 3 FG VS 9700 VS 9800 3292 3 3 V 01/16 3 V 22 3 V 23 3 V 33 3 V 23 3 V 33 3 V 33/32 3 V 33/32 3 V 45/48/54 3 V 45/48/54 VBS 7000 VBS 7000 VBS 7000 VBS 7000 VBS 7000 VFS 9000 FVHF 420 900	АКАІ DBK135 DBK135 DBK135 DBK136 DBK136 DBK136 DBK136 DBK137 DBK102 DBK102 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK103 DBK105 DBK150	10.86 00.86 01.86 11.42	HR 2200 HR 3300 HR 3360 HR 3660 HR 7500 HR 7500 HR 7500 HR 7500 NV 300 NV 300 NV 322333 NV 350 NV 350 NV 350 NV 777 NV 2000 NV 350 NV 350 NV 350 NV 350 NV 350 NV 350 NV 550 NV 5	JVC DBK137 DBK107 OBK107 OBK105 OBK103 DBK132 DBK132 DBK132 DBK132 DBK132 DBK132 DBK132 DBK132 DBK142 DBK142 DBK116 DBK111 DBK111 DBK111 DBK111 DBK111 DBK112 DBK115 DBK116 DBK117 DBK137 D	165 1665 1665 179 179 179 179 179 179 179 179
VID1 VID2 VID3 VID4 VID5 VID6 VID7 VID8 VID9 VID10 GEC/HI1 VID11 VID12 VID13 VID13 VID15 VID16 NATION VID17 VID16 VID17 VID18 VID19 VID20 VID20 VID22 VID22 VID22 VID23	01X0-003-381 01X0-018-024 01X0-018-025 01X0-018-025 01X0-040-006 01X0-033-454 01X0-040-007 01X0-040-017 01X0-040-017 01X0-065-009 01X0-065-016 FACHI V5577355 V6413663 V6661471 V6661471 V6661471 V6661471 V6661471 V6661471 V6661471 V6661471 V760329 VXF0324 VXF0324 VXF0324 VXF00324 VXF00324 VXF00324 VXF00324 VXF00324 VXF00463 VXF00401	Take up idler T3292/PU47 Rewind idler assembly T3V Take up idler T3V00/PU49 Loading belt T3V00/PU49 Roller Assy. (cass. Housing Take up idler 3V29/30/PU4 Reel motor assembly 3V22 Capston motor 3V39/30/PU4 Reel motor assembly 3V22 Capston motor 3V39/36/38 Cass. housing Assy. 3V35/ GEC 4100/Hitachi VT131 t/ GEC 4001/2/Hitachi 93/950 GEC 4004/Hitachi VT33 t/ ET541 Tuner Unit C Fast forward idler NV2000 Idler NV7000/7200 Tension Band NV7000 Idler NV370	752 (16/PU49282 280 (19) T3V23/PU 8967B (30)/PU5138 (30)/PU55371 36/38/39/PU capston moto rewind arm 0 play idler rewind arm	49042 V 29825 Amm Assy. PLEASE NOTE VIDEO SPARES HANDLING	5.00 6.20 6.95 0.26 4.50 2.90 27.95 22.10 22.00 23.50 2.75 1.95 4.20 1.80 6.00 0.85 0.85 0.85 0.85 0.265	VP 68 VP 7100 VS 1 VS 2 US 2 US 3 VS 3 VS 3 VS 3 VS 9500 VS 9800 3 9700 3 23 3 23 3 23 3 23 3 23 3 23 3 23 3 23 3 24 3 24 3 24 3 24 3 24 24 3 3 455 3 255 VBS 7000 VBS 7000 VBS 7000	AKAI DBK135 DBK135 DBK135 DBK101 DBK103 DBK105	10.86 00.86 01.82 01.75 01.85 01.75 01.85 01.65	HR 2200 HR 3300 HR 3330 HR 3450 HR 3600 HR 7500 HR 7500 HR 7500 HR 7700 NV 330 NV 330 NV 330 NV 330 NV 330 NV 350 NV 350 NV 777 NV 7000 NV 700 NV 700	JVC DBK137 DBK107 DBK107 DBK107 DBK103 DBK103 DBK103 DBK103 DBK103 DBK102 DBK102 DBK102 DBK100 DBK110 DBK110 DBK110 DBK111 DBK1112 DBK1112 DBK116 DBK116 DBK116 DBK116 DBK116 DBK116 DBK117 DBK17	
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VID1 VID2 VID3 VID4 VID5 VID6 VID7 VID8 VID9 VID10 VID10 VID10 VID12 VID12 VID13 VID13 VID15 VID16 NATION VID17 VID16 VID17 VID16 VID17 VID16 VID17 VID18 VID19 VID20 VID20 VID20 VID22 VID23 SANYO / VID24 VID25 VID26 VID26 VID26 VID26 VID26 VID27	01X0-003-381 01X0-018-024 01X0-018-025 01X0-018-025 01X0-040-006 01X0-033-454 01X0-040-007 01X0-040-017 01X0-040-017 01X0-065-009 01X0-065-016 FACHI V5577355 V6413663 V6661471 V6661471 V6661471 V6661471 V6661471 V6661471 V6661471 V6661471 V6661471 V6661471 V6661471 V6661471 V6661471 V6661471 V70329 VXP0324 VXP0324 VXP0324 VXP0324 VXP0463 VXP0451 VXP0450 VXP04	Take up idler T3292/PU47 Rewind idler assembly T3V Take up idler T3V00/PU49 Loading belt T3V29/30/PU4 Roller Assy. (cass. Housing Take up idler 3V29/30/PU4 Reel motor assembly 3V22 Capston motor 3V35/36/38 Cass. housing Assy. 3V35/ GEC 4100/Hitachi VT131 t/ GEC 4001/2/Hitachi 9395C GEC 4001/2	752 (16/PU49282 280 18941-2 (3) T3V23/PU 89678 (30/PU5138* (39/PU55371 36/38/39/PU capston moto rewind arm 0 th rewind i 0 play idler a rewind arm	49042 V 29825 Amm Assy. PLEASE NOTE VIDEO SPARES HANDLING	5.00 6.20 6.95 0.26 4.50 2.90 27.95 22.10 22.00 23.50 2.75 1.95 4.20 1.80 6.00 0.85 0.85 3.50 2.65 3.40 3.30 1.25 9.50 4.95 3.88 3.85 3.85 3.85	VP 68 VP 7100 VS 1 C VS 2 EG VS 3 FG VS 3 FG VS 3900 VS 3900 VS 9900 VS 9900 3022 3 V 23 3 V 23 3 V 23 3 V 45264 3 V 45264 3 V 45269 3 V 45269 3 V 45269 3 V 45269 VBS 7000 PKF 7000 VBS 7000 HS 7000 VHP 7420 V 4000 H V 4002 H V 4002 H VT 11-VT 88 VT 3000 VT 5500 VT 5500	AKAI DBK135 DBK135 DBK135 DBK135 DBK101 DBK101 DBK101 DBK101 DBK101 DBK102 DBK102 DBK102 DBK103 DBK123	10.86 00.86 00.86 01.42	HR 2200 HR 3300 HR 3330 HR 3450 HR 4600 HR 7200 HR 7200 HR 7700 NATHO N 330 NV 330 NV 330 NV 330 NV 330 NV 330 NV 330 NV 3450 NV 450 NV 770 NV 700 NV	JVC DBK137 DBK137 DBK107 DBK126 DBK107 DBK127 DBK139 DBK139 DBK138 DBK138 DBK138 DBK138 DBK138 DBK138 DBK138 DBK138 DBK140 DBK116 DBK116 DBK116 DBK116 DBK116 DBK117 DBK17 DB	
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REGISTERED OFFICE: THE COACH HOUSE, MUXTON LANE, TELFORD 🚖 MAIL ORDER – CALLERS STRICTLY BY APPOINTMENT

Swindon, Wilts SN6 6AN has introduced a personalised satellite location printout service. If you send £3 to the address given you'll receive a printout detailing dish angle settings, elevation and azimuth, and modified polar and apex elevation angles for motorised systems, at your location. This enables the dish to be set up accurately to track the whole visible geo-arc. Some thirty satellites are listed, in the 2.5, 4, 11 and 12.5GHz bands. A book list is available free on receipt of a foolscap s.a.e.

A third, updated edition of the "Guide to World-wide Television Test Cards" is available from HS Publications, 7 Epping Close, Mackwoth Estate, Derby DE3 4HR. The price is $\pounds4.95$ UK, $\pounds5.95$ continental Europe and $\pounds7.25$ by airmail world-wide.

Latest EBU Listings

At last there is an official listing of Remada RTT-1 (Tunisia), ch. E4. The location is 10E22 32N19 and the e.r.p. 40kW horizontal.

The following Danish stations are now listed:

••• (b.t. b.)					
Fyne (North)	E22	500kW H TV2	Svendborg	E43	1kWHL
Aarhus	E23	3kWHL	Jyderup	E48	600kW H TV2
Koebenhavn	E23	3kWHL	Odense	E49	3kWHL
Esbjerg	E23	0-5kW V L	Aalborg	E51	3kW V L
Naestved	E23	0-5kW V L	Koebenhavn	E53	600kW H TV2
Fyne (South)	E32	250kW H TV2	Neksoe	E53	1kWVL
Bramming	E33	500kW H TV2	Aarhus	E55	3kWHL
Aalborg	E35	600kW H TV2	Bornholm	E56	800kW H TV2
Vendsyssel	E37	50kW H TV2	Skive	E56	500kW H TV2
Holbaek	E37	0.2kW V L	Vendsyssel	E57	50kWH DR1
Roenne	E39	1kWVL	Koebenhavn	E60	3kWHL
Ringkoebing	E40	600kW H TV2	Fredericia	E60	0.2kW V L
Fejoe	E40	0.2kW V L			
H/V = horizon	tal/vert	ical I = local stat	tion		

H/V = horizontal/vertical, L = local station.

F2 Reception

A few words on this subject in view of the current interest. With increased sunspot activity there's greater likelihood of low-band v.h.f. signal reflection via the F2 layer, which during the day is at 200-220 miles above the Earth. Since reflection depends on the sun, it follows

VCR Tips

Dave Mackrill

Here are a few tips for those who regularly service VCRs, especially the older types.

Obtain the following: an ink rubber, some pipe cleaners, a hard toothbrush, a sheet of very fine wet-anddry paper (marked "00 FLOUR") and, from the car accessory shop, a rubber car mat approximately 20×27 in. for the bench – mine has 5% in. squares, which hold all the screws, circlips etc. as they are removed from the machine. Don't forget some cheap, odd shapes of chamois leather for tape path cleaning and, of course, isopropyl alchohol from the chemist. The latter is sometimes called Isopropanol, which seems to be cheaper.

How do you remove those very stubborn tape oxide deposits from capstan shafts, and ground-in rubber from capstan motor pulleys, without taking ages, using half a bottle of alcohol, or scratching the surface? Simple. Use a hard ink rubber in the same way that we used to clean car rotor arms and distributor cap electrodes. Then, for that for distant reception to be possible the sun must illuminate part of the signal path. The highest m.u.f. (maximum usable frequency) occurs at solar noon along the path. If, in the UK, an aerial is pointed to the east in good conditions during the early morning period, F2 reflection can provide ch. R1 signals from far into the USSR, a station clock showing a time four-five hours ahead of GMT. Towards midday more southerly signals will be received, e.g. ZTV (Zimbabwe) ch. E2. Towards mid-afternoon ch. A2 signals from N. America may be received.

Multiple-hop propagation is common via the F2 layer, so that signals may be received in the UK from as far away as Australia. Unfortunately with this type of propagation you get multiple images that are smeary and lacking in detail, making identification difficult at times.

The aerial should be mounted as high as possible, for horizontal polarisation. F2 signals often appear out of a noisy screen from nil to quite strong in a relatively short time, as brief as a minute. Openings can last from half an hour to five hours.

Towards dusk the F1 and F2 layers tend to merge and the m.u.f. can rise to say fifty per cent above the daytime level. This is known as transequatorial skip (TE) propagation and will give reception from the south (in the northern hemisphere).

Be sure to send in reports of any exotic reception!

The Late Roy Allen

I first met Roy Allen in 1963, when I was just starting with DX-TV reception. At that time he lived at Christchurch, Hants. He was particularly interested in reception of low-power stations such as Channel and the RTF outlets along the French coast, and in later years his interest spread to local radio stations. Roy subsequently moved to Bristol and became more active with radio. He was a true enthusiast and was one of the pioneers of DX-TV in the UK. Roy fought a brave fight against illness and is now at peace. Farewell, old friend.

the final deposits and a polish, use a fibre pencil such as the one available from SEME.

I usually remove the clamp to the capstan flywheel and withdraw it, making sure not to loose the oil seal washer that sits between the flywheel and its bottom bush. This gives easier access to both the shaft and the motor pulley. First however I remove the pressure roller and capstan shaft oil seal washer, plus oil pad washer if present, from the top of the deck. It's a good idea to lay an A4 sheet of paper on the bench mat, under the capstan bush, to catch the drops of oil. Then I run a pipe cleaner dipped in alcohol through the bushes, followed by one soaked in oil. This can be kept in a plastic bag, folded and taped to accommodate it, which will contain any excess oil.

The milled friction surfaces of reel tables, motor pulleys and certain Hitachi reel idlers should be scrubbed with the toothbrush after dipping it in alcohol.

If the pressure roller is to be reused, the glaze can be carefully removed using very fine wet-and-dry. Then clean with either soapy water or paraffin then water, followed by thorough drying. Alcohol and methylated spirit are too volatile for use with rubber items – they have a high evaporation rate which can cause cracks in the surface. I still use something called "video fluid", which used to be sold by SEME and is most suitable.



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Each month we provide an interesting case of TV/video servicing to exercise your ingenuity. These are not trick questions but are based on actual practical faults.

A camcorder's viewfinder is a tiny monochrome monitor that uses the same building blocks as a conventional TV set or monitor. So the story about to be told is applicable to any TV set – and you wouldn't need specific service data to be able to solve it! Our customer phoned to say that the picture produced by the viewfinder of his Sharp VL-C73 camcorder was blurred. Sliding the lens didn't help, neither did adjustment of the preset focus potentiometer. When the camcorder was brought into the workshop we found that the image on the screen was just a defocused blob. It filled the screen vertically but the horizontal scan fell short. Something was very wrong! Otherwise, the camcorder worked perfectly.

We dug into the viewfinder and found a tiny but perfectly conventional line output stage. It has a sugarcube sized line output transformer that contains the e.h.t. rectifier. Other supplies derived from the transformer are a 450V boost line that feeds a resistive chain to provide operating voltages for the tube's electrodes, a negative line for the video output stage and to provide grid bias for the c.r.t., and a winding to feed the fleapower c.r.t. heater. Testing started in this area, the first check being on the supply to the line output stage. It was correct at 5V. The 450V boost supply was low at 225V however. Ohmmeter tests showed that the rectifier diode D706 and the resistive chain (total 5M Ω) were o.k., but to be sure we disconnected the diode and checked the input pulse with a scope. The pulses had an amplitude of about 230V, which suggested that the trouble wasn't due to overloading. They were of a strange shape however.

The technician next checked the pulse at the collector of the line output transistor Q704. No pulse amplitude figure is quoted in the service manual, but the fact that the pulses were of 55V peak-to-peak amplitude seemed reasonable in view of the 5V supply to the stage. Again however the pulses had a somewhat peculiar shape – they had slight shoulders. The technician decided to check the duration of the flyback pulses: he adjusted the scope's timebase setting and found that they were of 6μ sec duration, well short of the expected 11-12 μ sec.

Now a too narrow line flyback pulse usually suggests that there's something wrong with the tuning of the line output stage. The LC circuit consists of the line output transistor's inductive load and the tuning capacitor, in this case C719. After checking the capacitor by substitu-

tion, our man became convinced that the transformer was at fault – with shorted turns maybe, or perhaps something was wrong with an internal diode. Be that as it may, a new one was ordered. It was fitted with care but the result was the same distorted blur as before on the screen. The waveforms and voltages were also pretty well as before. Nought out of ten for diagnostic skill – and great consternation on the part of the owner who, typically, wanted it this Saturday for a wedding.

Back into the little beastie with the scope then, this time to check the line drive waveform. It was good and square at the line driver transistor, and the coupling capacitor was o.k. The electrolytic capacitor that provides coupling to the line scan coils was also all right. A substitute efficiency diode and line output transistor did nought to help matters.

A while later the technician was kicking himself. If only he'd looked more closely at his scope! – or brought in another test instrument. So what was the cause of the trouble? See next month for the answer.

ANSWER TO TEST CASE 324 – page 136 last month –

No, a new luminance drive chip didn't cure the problem with the Hitachi VT33 VCR. You'll remember that it wouldn't record a picture, though the E-E picture was fine.

Really, there should have been no great surprise: there was a fundamental flaw in John's reasoning as he attempted to diagnose the cause of the trouble. The value of the coupling capacitor C248 at pin 28 of the chip is 0.022μ F. At the vision carrier frequency (4MHz) its reactance would be about 2Ω . To drop a 4MHz signal across 2Ω you'd need very high power from a driver stage with a very low output impedance - and that's no description of Q201 and its associated components! Plainly C248 had gone open-circuit, leaving the luminance-plus-chrominance signal at the collector of Q201 to "walk the plank". Shunting another capacitor across C248 restored normal writing current and good recordings were then made. The original capacitor measured but a few puffs on Television Ted's 1954 capacitance bridge.

The inevitable customer relations problem followed the technical one. It was left to Sage to sort out – "it's his bloody job", as John rightly said. The estimate had been made on the basis of replacing the reel idler, but the prolonged sortie into the luminance recording department had more than doubled the bill even without the cost of the chip being charged. Not to worry said the customer. He never used the machine for recording – there was no aerial point in his bedroom where he used it for playback only . . .

QUERY SERVICE CLOSED

See note on page 189.

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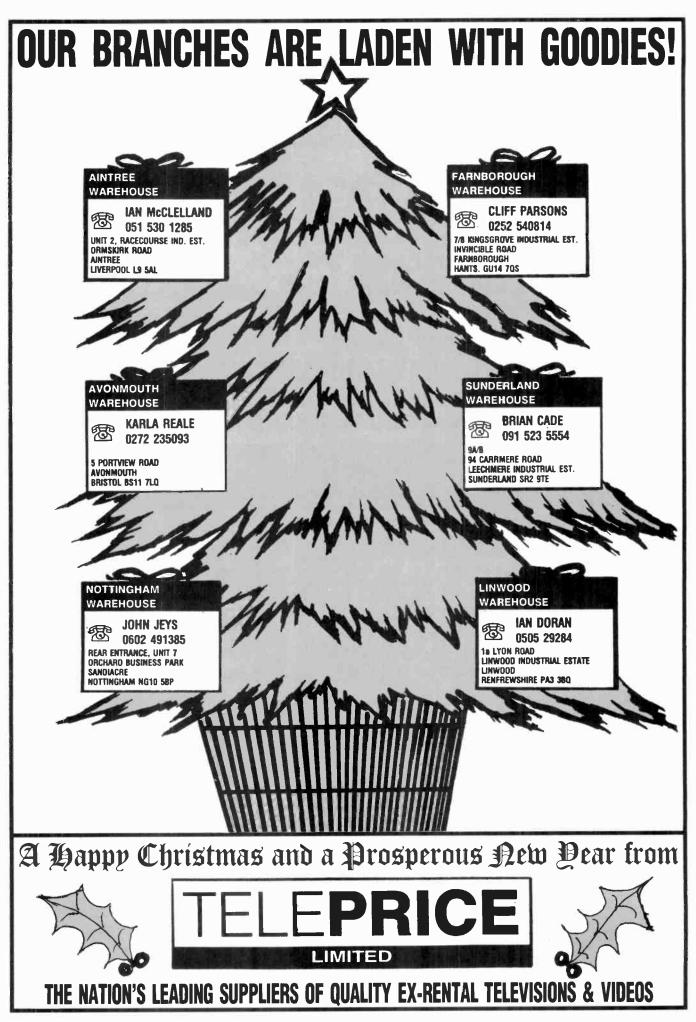
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TELEVISION JANUARY 1990

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FERGUSON Take Up Idler Reel Idler Take Up Clutch Belt Kit Pinch Roller	3V29/30 1.85 2.75 2.75 1.95 3.95	FERGUSON Take Up Idler Reel idler Take Up Clutch Bett Kit Pinch Roller	3V35/39 1.85 3.25 2.80 1.75 3.95	Idler Belt Kit Pinch Roller	FVH-P615 4.95 1.95 3.95	HITACHI F/F Rewind Idl. Wind Roller Reel Table Bett Kit Pinch Roller	78000 Series 3.95 0.80 2.45 1.50 3.95	Play Idler Play Pulley Belt Kit Pinch Roller	VT9000 Series 4.35 0.90 1.50 3.95
KIT 1	£13.25 £10.75	KIT 2	£10.85	KIT 3	£10.85 £8.95	KIT 4	£12.65 £10.85	KIT 5	£9.45
HITACHI	VT11/17/ 19/33	PANASONIC	NV300/333	PANASONIC	NV370/830/ 850	PANASONIC	NV2000 2010	PANASONIC	NV7000 Series
F/F Rewind Idl. Belt Kit Pinch Roller	2.75 2.95 3.95	VXP 0433 Idler VXP 0401 Idler Belt Kit Pinch Roller	4.95 1.05 2.95 3.95	VXP 0521 Idler Belit Kit Pinch Roller	3.95 1.95 3.95	VXP 0329 Idler VXP 0331 Idler Belt Kit Pinch Roller	0.95 0.95 2.25 3.95	VXP 0343 Idler VXP 0344 Idler Belt Kit Pinch Roller	5.95 1.05 1.95 3.95
KIT 6A	£7.95	KIT 7	£12.90 £10.75	KIT 8	£7.95	KIT 9	£6.95	KIT 10	£10.15
As abov		SANYO	VTC5000	SHARP	VC9300/ 9500	SHARP	VC381- 390	MER	RY
includ Cluto	h	Reel Drive Reel Motor Belt Kit	5.95 6.95 0.95	ldler 0005 Belt Kit Pinch Roller	3.50 2.50 3.95	ldler 0005 Belt Kit Pinch Roller	3.50 2.50 3.95	CHRIST	
Mechar KIT 6B	£17.50	KIT 11	£13.65 £11.95	KIT 12	£8.50	KIT 17	19.95 £8.50	PROSPI	
TT - 1856 - 1824 - 111 - 124 - 1830 -	OH	EAD	S		DEO	HEA	DS	TO ALL CUSTO	1
VP 7100/7200/970 VP 77-88 VSI-2.5	Each 00 13.50 13.50 13.50	HINARI VXL2/3 VXL4 VXL5 VXL6 VXL6	Each 23.00 23.00 22.00 23.75	PHILIPS VR6420/6460 VR6462/3/4 VR6560	Each 21.50 37.50 37.50	SOLAVOX 1000 SONY	Each 22.25	<i>PLEASE</i> WE ARE FRID	CLOSED
ALDA 4000 AMSTRAD	22.25	VXL35 V20H MATSUI	23.00 22.00	VR705-805-905 VR1000-1600	23.00 23.00	C5/6/7 SLC 20/24/30/33 TOSHIBA		22 DECI Until tu 2 Jani	ESDAY,
4500/5200 4600/4700 7000 9000	21.00 23.50 23.50 21.00	VX600 VX800 MITSUBISHI	21.00 21.00	VB900-910 VX510/20 VX616/626/627 VX717	24.00 24.00 24.00 24.00	V31/33 9600 V55-57 V71-87 V93	22.50 14.50 23.00 23.00	VOLTA REGULAT	GE
3V00-3V22 3V29 (P.C.B. or " 3V23/35-39 3V32 3V32 3V48 3V44/45/54/55	13.50 L") 13.50 13.50 38.00 38.00 24.50	HS303/304 HS320 HS700 HS300/1/2 ORION VH 2500-2948 inc		SHARP VC200/VC300/33 381/4/5/7/VC388 477/481 VC220 VC581/3/5 VC9300/9500/97/ VC2300/8300	21.50 21.50 21.50 21.50		23.00 23.00 23.00	STK 772B STK 5332 STK 5361 STK 5421 STK 5481 STK 5482 STK 7348	Each 5.95 3.95 6.95 3.95 5.95 5.95 4.95
1000	22.00	VR 2949-821 inc. PANASONIC NV2000/3000/700	23.00	VC7300/8300 SANYO VTC9100/9300 VTC5000/6500	39.50 35.00 29.50	(P.C.B. Type) N N 3V23 3V29-39 N	V300/333 V2000 Series ₩3000 Series ₩7000 Series ₩8000 Series	STR 441 STR 451 STR 454 STR 4211	5.95 5.95 5.95 4.50
FISHER FVHP 420-910 (in GEC/HITACHI		8000 NV300/332/33 NV230/260/270/2 NV470/480/NV10 NV370 NV380 NV330	13.50 13.50 80 27.50 0 27.50 16.00 27.00	VTCM10/11/20/2 HR 1100/1300 SENTRA 8000		2 U £12. EACH	50	STR 5412 STR 6020 (kit) STR 50103 * STR 58041 *R2M AVA DIODE 0.6	
5000 VT6500/8000/930/ VT11/33 VT17/19 VT35/38/39 GOLDSTAR	23.50 0 22.50 19.50 39.00 39.00	NV366 NV430/460 NV730 NV777 NV788 NVG10/12/14 NVG18 NVG21/2/5	33.00 23.00 33.00 27.00 46.00 27.50 43.00 44.00	UNIT 2 BURTC	200, J.C. A)N RD., SH	ECTROI	EX, BBX.	ORDEF Please au Post & P Then add 1 C.W.O (dd 50p acking 5% VAT DNLY
4000 Series 8000	22.25 22.25	NVG21/2/5 NVG33 NVG120	44.00 46.00 27.50	V.A.T. Reg. No		, y	(Est. 1973)	Sorr Trade	



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 5 bide potentiometers (popular values)
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In the cut-throat world of consumer electronics, one of the questions designers apparently pon-der over is "Will anyone notice if we save money by chopping this out?" In the domestic TV set, one of the first casualties seems to be the sound quality. Small speakers and no tone controls are quite common and that really is quite sad, as the TV companies do their best to transmit the highest quality sound. Given this background a com-pact independent TV tuner that connects direct pact independent IV tuner that connects direct to your Hi-FI is a must for quality reproduction. The unit is mains operated. This TV SOUND TUNER offers full UHF coverage with 5 pre-selected tuning controls. It can also be used in conjunction with your video recorder f29.50 +f2 50 p8p

As above but with built-in stereo headphone amplifier for the hard of hearing

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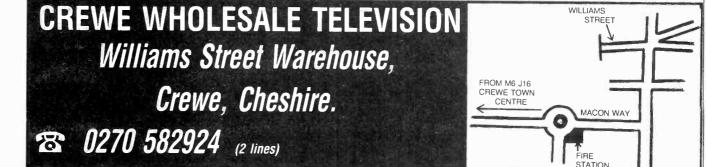
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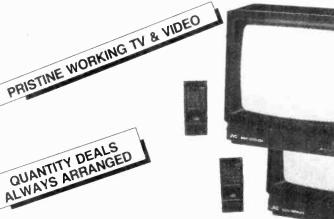
WORKING TV's & VIDEO's ALWAYS AVAILABLE

CAN YOU AFFORD TO BUY TV'S OR VIDEO'S WITHOUT GETTING A QUOTE FROM US?



JOHN TODD TELEVISION & VIDEO WHOLESALERS 4,000 sq ft OF TV & VIDEO





All 9000 Series Televisions, Working/Non-Working, Untouched, as since disconnected, from rental user Thorn/No Thorn Portable Televisions, all makes,	
working, from	£40
I horn 1 X9 Off the Pile	£26
I horn TX9 Working and Tested	635
I horn TX10 Non Text Off the Pile	£30
Thorn TX10 Non Text Working and Tested	£40
Thorn TX9 & 10 Text Off the Pile.	\$45
Thorn TX9 & 10 Text Working and Tested	£55
ITT Digivision Off the Pile Working/Non Working	£80
USUAL BARGAIN CORNER COLOUR SETS FROM £5.	
PHILIPS G8, DECCA, BRADFORDS FTC	

FERGUSON R/C PORTABLE TV'S ALMOST NEW – RECENT HOTEL DISCONNECTIONS 16A2/14D1/14D2 IMMACULATE £75. each + VAT

CAMERA EQUIPMENT, BATTERIES AND ACC., CAMCORDERS, PORTABLE UNITS, FULL SIZE, C FORMAT VHS, TUNER TIMERS, CHARGERS ETC. ETC.

Thorn 3V29/30 Working£6	5
Thorn 3V29/30 Non-Working£5	5
Thorn 3V35 Working	5
Thorn 3V35 Non-Working	5
Thom 3V31/32 Working£100	5
Thorn 3V31/32 Non-Working	
Various Front Loading VHS Videos from Sharp, Philips, Hinari etc, etc	

OTHER REGULAR LINES IN STOCK

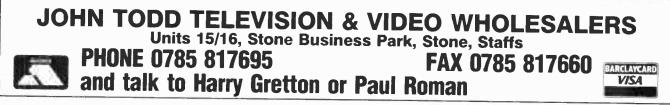
Television & Video Recorder Service Manuals (Ferguson, JVC,	Sony,
Panasonic, GEC, Toshiba, Fidelity etc). New Triplers (various) Thom 9000, Philips G8, Universal etc, etc.	£5.00 ea.
Hub/composite video Adaptors for Ferguson TX10 (non-text)	
with Diagram, New	£10.00 ea
Remote Control Units for Fidelity Teletext (New) 50 only. Video Front Panels for 3V23. Brand New £10.00 each, Used	£5.00 ea
Video Top Covers for 3V22/ Basili New 210.00 each, 05ed	£5.00 ea
Remote Control Units for Mitsubishi, GEC, Hitachi, etc. New	
 various motors, audio Head Assemblies. RF Modulators tune 	r
Presenter Boards 3V29	£10 00 ea
Mixer Booster 3V29 New	£15.00 ea
Teletext Boards Various Thom New	£15.00 ea
Remote Control Boards Thorn TX10 New_	£10.00 ea
Detetated 00	

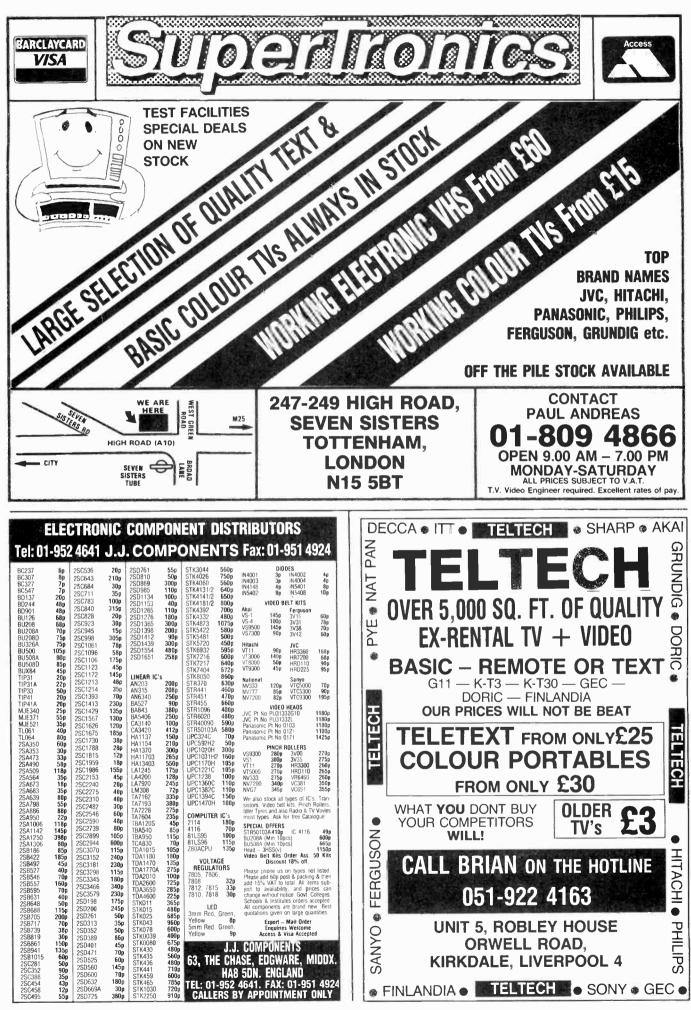
Datatext 90 portables, text portables, graphic pnnters, thermal printers, video printers, keyboards, viewdata terminals, TX9 Cathode ray tubes, tested and perfect at \$15.00. And Many, Many More

STOP PRESS! FERGUSON FREE STANDING STEREO TELEVISION SPEAKERS BLACK ASH FINISH. WILL SUIT ALL STEREO TELEVISIONS INCLUDING FERGUSON 22BS, 51AS, 59BS, 66BS PLUS MANY MORE — IN FACT ANY TV. WITH AN EXTENSION SPEAKER SOCKET. THESE UNITS CAN BE USED IN CLOSE PROXIMITY WITH THE TV WITHOUT CAUSING PROBLEMS. BRAND NEW & BOXED £15

Per Pair Plus VAT

PRICES. ALL PRICES EXCLUDE VAT. NEW HANDSETS CHARGED EXTRA. ORIGINAL HANDSETS FREE. DELIVERY. COMPREHENSIVE VAN DELIVERY SERVICE (U.K. MAINLAND ONLY) SMALL ITEMS POST & PACKING £3 TRADE ONLY SUPPLIED









REPLACEMENTS

BELT KITS

GENIJINE

ALL STOCK ITEMS ARE DESPATCHED BY RETURN OF POST

MOED UEADO

VIDEO) HËADS
REPLACEMENTS	
All our replacement heads are brand new precision Japanese heads not refurbished.	NV2000, N
Panasonic \$16.00 3HSS(N) £16.00 Fits model numbers: NV2000, NV2010, NV7000, NV7200, NV233, NV4600, NV97000, NV7200, NV7200, NV7200,	NV7000, N NV333, NV NV366
NV2000, NV2010, NV7000, NV7200, NV333, NV8600, NV8610. 3HSS-UI(N)£19.90 Fits model numbers: NV370 & Philips	NV688, NV NV730
VR6460. 3HSS(4N)	All others a Ferguso 3V00, 3V16
SHSS(4NB)£38.50 Fits model number: NV730	3V29, 3V30 3V32
Ferguson 3HSS(V)£16.00 Fits model numbers: 3\/00_3\/16_3\/22	3V35, 3V36 Sharp
E16.00 £16.00 Fits model numbers: 3/00, 3/16, 3/22, 3/29, 3/30, 3/31, 3/35, 3/36, 3/38, 3/39, HR2200 HR3300, HR3300, HR3300, HR3360, HR3360, HR3360, HR3300, HR3000, HR3300, HR300, HR300, HR3300, HR3300, HR3300, HR3300, HR300, HR3	VC7300, V VC8300 VC9300, V
Fits model numbers: 3V32.	VC381, VC VC482
Sharp 3HSS(SP)	All others a Sanyo
VC9500, VC9700, VC381, VC8381, VC383, VC388, VC482, Tochiba	VTC5000, V VTC5300, V VTC9300
PS3B(T)	Sony SLC5. SLC
Hitachi £26.50 SHSS(H) £26.50 Fits model numbers: VT8000, VT9300 etc.	SL8000, SL SLC20, SLC SLC9
Sony PS3B(S) £19.95 Fits model numbers: SLC5, SLC6, SLC7,	Toshiba V9600 V8600
SL3000 also various NEC models. P84B(2S)	V31, V33 V55, V56
SLF1. PS5B(3S) <u>£44.20</u> Fits model numbers: SLC9, SLT50, SLC6, SLF60.	Hitachi VT5000, VT VT6500, VT
Amstrad/Saisho 3HSS(R)	VT8500, VT VT9300, VT
Fits model numbers: VCR7000 and all mod- els using Orion chassis. 3HSS(FI)	VT11E, VT1 VT17E, VT1 VT33E
Fits model numbers: VCR4500, VCR5200, VCR9000 etc. Fisher/Fidelity	Philips VR6460
3HSS(SF)	VR6462, VF Please call i

LARGE RANGE OF REMOTE CONTROL'S FOR TV AND VIDEO

THIS MONTH'S

SPECIALS

STK 5481 CHIP

£5.80 PLUS VAT

HEADS 3HSS(V) FERGUSON & JVC

> 3V00 - 3V16 - 3V22 3V29 - 3V30 - 3V31

3V35 - 3V36 - 3V38 etc

3HSS (N) PANASONIC NV2000 - NV2010 - NV3000 NV7000 - NV7200 - NV333

BOTH AT £14.50 + VAT

ADD 70p POST & PACKING

EC) HEADS	
	GENUINE HEADS	
new	Panasonic	
d.	NV2000, NV2010	£44.00
.00	NV7000, NV7200	£44.00
.00	NV333, NV370	£44.00
00,	NV366 NV688, NV777, NV788	£64.50 £64.50
.90	NV730	£67.50
lips	All others available P.O.A.	
.50	Ferguson	
	3V00, 3V16, 3V22	£59.90
.50	3V29, 3V30	£59.90
	3V32 3V35, 3V36, 3V38, 3V39	£66.90
.00		£59.90
22,	Sharp VC7300, VC7700, VC7750	000.00
39, 60.	VC8300, VC7700, VC7750	£69.90 £69.90
	VC8300. VC9300, VC9500, VC9700	£62.00
.50	VC381, VC383, VC386	£62.00
	VC482	£62.00
.50	All others available P.O.A.	
00,	Sanyo	
83,	VTC5000, VTC5150 VTC5300, VTC5400	£39.90 £39.90
	VTC9300	239.90
50	Sony	200.00
	SLC5, SLC6, SLC7	£49.50
	SL8000, SL8080	£49.50
50	SLC20, SLC30	£54.50
:.	SLC9.	£54.50
95	Toshiba	
7,	V9600 V8600	£59.90 £69.90
50	V31, V33	259.90
10	V55, V56	£59.90
20	Hitachi	
20	VT5000, VT5500	£49.50
	VT6500, VT8000, VT8300	£49.50
	VT8500, VT8700	£49.50
50 d-	VT11E, VT14E	£49.50 £45.50
-U	VT17E, VT19E	254.60
50	VT33E	£49.50
ю,	Philips	
	VR6460	£44.00
90	VR6462, VR6467	£42.90
0,	Please call if your model is not listed.	

EADS		Panasonic	GENUINI			Benera	REPLACEMEN	ITS
		NV2000, NV20	10		66.50	Panasor NV2000	NV2010	02.50
	£44.00	NV7000, NV720	00	••••••	26.50	NV7000 I	1V72010	£3.50
		NV333, NV366			£6.50	NV333, N	V366	£3.00
		NV370, NV830,	NV850		£2.80	NV8600, I	V7200 V366 V8610	£3.95
		NV688			£6.50	rerguso	n	
		NV777, NV788 NV8600, NV861	10	•••••	£4.70	3V00, 3V1	6, 3V22	£3.50
	. 107.30	NV730			20.30	3V23	0	£2.90
		NV230, NV430,	NV870		23.20	3V35 3V3	6,3V38,3V39	£3.50
	650.00	NV870, NV810			£2.80	Sanvo		
· · · · · · · · · · · · · · · · · · ·		Ferguson				VTC5000	VTC5150 VTC5400	£1.00
		3V00, 3V16, 3V	22		£6.50	VTC5300	VTC5400	£2.50
		3V23			£3.90	VIC9300		64.25
		3V29, 3V30 3V35, 3V36, 3V3	00/10 00	•••••	£4.90	Sony		
	269.90	Sanvo	30, 3739	•••••	£2.90	SLC5, SLC		£3.60
		VTC5000, VTC5	5150		61.00	SL00	L8080	£4.95
	£62.00	VTC5300, VTC5	400		£4.50	Sharp		14.23
		VTC9300			£6.50	VC7300.	C7700, VC7780	63.50
	£62.00	Sony				VC8300		£3.90
		SLC5, SLC7	••••••		£6.50	VC9100, V	C9300, VC9500	£3.90
		SLC6		•••••	£7.50	VC381, VC	383, VC386	£3.90
		SL8000, SL8080 Sharp		•••••	£6.50	Hitachi		
		VC7300, VC770	0 1/07750		06 60	V15000, V	T5500	£4.50
	239.90	VC8300	0, 00//30		C6 50	VT9300 V	T8300, VT8500 T9500, VT9700	£1.50
		VC9100, VC930	0. VC9500		26.50	VT11E V1	14E, VT17E, VT19	
		VC381, VC383,	VC386		£6.50	VT33E		
	249.00	Hitachi				Akai		
	204.00	VT5000, VT5500)		£6.50	VS9700	·····	£3.90
		VT8000, VT8300	J, V18500		£2.90	VS2, VS3.	VS4. VS5	63.95
	659 00	VT9300, VT9500	J, V 19/00		13.30	VS9300, V	S9500, VS9800	£3.50
	69.90	VT11E, VT14E, VT33E	v117≿,V119		10.00	Many other	s available	
	£59.90	Akai			£0.30		SENSOR LAMP	s
	£59.90	VS9700			26.50	All Panaso	nic	C1 80
		VS2, VS3, VS4,	VS5		£4.90	All Ferguso	n/JVC	£0.65
	£49.50	VS9300, VS9500), VS9700		£6.50	Sharp VC9	300 etc	£2.90
		Many others ava	ailable			Sharp VC7	300 etc	£1.80
						All Hitachi	NJVC	
						All Hilderii.	SENSOR L.E.D.	£1.80
		CREDIT CAI	RD		_	AllPanaso	lic	5 (2.00)
		ORDERS BY		Access		All Ferguso	n/JVC	C2 90
	£49.50	TELEPHONE	5 I			All Hitachi.	n/JVC	£5.75
		RECEIVED E	3Y				END SENSORS	
		4 PM. ARE		BARCLAYC	RD	Hitachi VTE	4E	
		DESPATCHE SAME DAY	=D	VISA		T INCOLOR IN IT I		
not listed.		SAME DAT				0	REEL MOTOR	S
						Snarp VC9	300, VC381 etc	£18.20
						Amstrad/Sa Panasonic	IISRO EIC	£18.20
r						Panasonic	NV333, NV366	£16.80
WE	CARRY HU	INDREDS OF V	IDEO SPAI	RES		Panasonic Sanyo VTC	NV333, NV366 5000, 5300, 5400	£16.80
		INDREDS OF V				Panasonic Sanyo VTC	VV333, NV366 5000, 5300, 5400 VV7000, 7200	£16.80 £9.90 £19.80
INC	. PLAY IDL	ERS, CLUTCH	ES, MOTO	RS,		Panasonic Sanyo VTC Panasonic	NV333, NV366 5000, 5300, 5400 NV7000, 7200 DRUM MOTOR	£16.80 £9.90 £19.80
INC	. PLAY IDL Ervice Ma	ERS, CLUTCH	es, moto on bands	RS,		Panasonic Sanyo VTC Panasonic Ferguson/.	NV333, NV366 5000, 5300, 5400 NV7000, 7200 DRUM MOTOR IVC 3V00, 3V22, etc	£16.80 £9.90 £19.80 \$
INC	. PLAY IDL Ervice Ma	ERS, CLUTCH	es, moto on bands	RS,		Panasonic Sanyo VTC Panasonic Ferguson/. Sharp VC7	NV333, NV366 5000, 5300, 5400 NV7000, 7200 DRUM MOTOR IVC 3V00, 3V22, etc 300, VC7700	£16.80 £9.90 £19.80 \$ \$ £29.90 £26.40
INC	ERVICE MA BELTS AL	ERS, CLUTCH NUALS, TENSI JDIO/CONTROL	ES, MOTO ON BANDS HEADS,	RS, 6,		Panasonic Sanyo VTC Panasonic Ferguson/ Sharp VC7 Sharp VC8	NV333, NV366 5000, 5300, 5400 NV7000, 7200 DRUM MOTOR IVC 3V00, 3V22, etc 300, VC7700 300.	£16.80 £9.90 £19.80 25 £29.90 £26.40 £26.40
INC	: PLAY IDL ERVICE MA BELTS AL LIGNMENT	ERS, CLUTCHI NUALS, TENSI JDIO/CONTROL TOOLS AND T	ES, MOTO ON BANDS HEADS, APES ETC	RS, 6,		Panasonic Sanyo VTC Panasonic Ferguson/ Sharp VC3 Hitachi VTS	NV333, NV366 5000, 5300, 5400 NV7000, 7200 DRUM MOTOR IVC 3V00, 3V22, etc 300, VC7700 300	£16.80 £9.90 £19.80 S £29.90 £26.40 £26.40 £26.40 £25.80
INC	. PLAY IDL ERVICE MA BELTS AL LIGNMENT **SPECIA	ERS, CLUTCH MUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI	ES, MOTO ON BANDS HEADS, APES ETC LITIES**	RS, 6,		Panasonic Sanyo VTC Panasonic Ferguson/. Sharp VC7 Sharp VC8 Hitachi VTS	NV333, NV366 5000, 5300, 5400 NV7000, 7200 DRUM MOTOR IVC 3V00, 3V22, etc 300, VC7700 300 000 APSTAN MOTO	£16.80 £9.90 £19.80 \$ \$ £29.90 £26.40 £26.40 £25.80 \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
INC	. PLAY IDL ERVICE MA BELTS AL LIGNMENT **SPECIA	ERS, CLUTCHI NUALS, TENSI JDIO/CONTROL TOOLS AND T	ES, MOTO ON BANDS HEADS, APES ETC LITIES**	RS, 6,		Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC8 Sharp VC8 Sharp VC8 Sharp VC7	VV333, NV366 5000, 5300, 5400 VV7000, 7200 DRUM MOTOR IVC 3V00, 3V22, etc 300, VC7700 300 000 APSTAN MOTO 500, VC7700	£16.80 £9.90 £19.80 \$ \$ £26.40 £26.40 £25.80 \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
INC	C. PLAY IDL ERVICE MA BELTS AL LIGNMENT **SPECIA **FOR I	ERS, CLUTCHI INUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK IT	ES, MOTO ON BANDS HEADS, APES ETC LITIES**	RS, 5,	N/CF	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC8 Sharp VC8 Sharp VC8 Sharp VC7	VV333, NV366 5000, 5300, 5400 VV7000, 7200 DRUM MOTOR IVC 3V00, 3V22, etc 300, VC7700 300 000 APSTAN MOTO 500, VC7700	£16.80 £9.90 £19.80 \$ \$ £26.40 £26.40 £25.80 \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
INC S A	C. PLAY IDL ERVICE MA BELTS AL LIGNMENT **SPECIA **FOR I PINCH	ERS, CLUTCH MUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI	ES, MOTO ON BANDS HEADS, APES ETC LITIES**	RS, ;, LARGE RAI	NGE	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC8 Sharp VC8 Sharp VC8 Sharp VC7	VV333, NV366 5000, 5300, 5400 VV7000, 7200 DRUM MOTOR IVC 3V00, 3V22, etc 300, VC7700 300 000 APSTAN MOTO 500, VC7700	£16.80 £9.90 £19.80 \$ \$ £26.40 £26.40 £25.80 \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
Panas	C. PLAY IDL ERVICE MA BELTS AL LIGNMENT **SPECIA **FOR I PINCH isonic	ERS, CLUTCHI INUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK ITI ROLLERS	ES, MOTO ON BANDS HEADS, APES ETC LITIES** EMS**	ARS, S, LARGE RAI OF IC's & SEMI-	NGE	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC8 Sharp VC8 Sharp VC8	VV333, NV366 5000, 5300, 5400 VV7000, 7200 DRUM MOTOR IVC 3V00, 3V22, etc 300, VC7700 300 000 APSTAN MOTO 500, VC7700	£16.80 £9.90 £19.80 \$ \$ £26.40 £26.40 £25.80 \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
Panas NV200	C. PLAY IDL ERVICE MA BELTS AL LLIGNMENT **SPECIA **SPECIA **FOR I PINCH i sonic 0, NV2010, N	ERS, CLUTCHI NUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK IT ROLLERS	ES, MOTO ON BANDS HEADS, APES ETC LITIES** EMS**	LARGE RAI OF IC'S & SEMI- CONDUCTO	NGE JRS	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC8 Sharp VC8 Sharp VC8 Sharp VC8 Ferguson/J Ferguson/J Ferguson/J	VV333, NV366 5000, 5300, 5400 VV7000, 7200 DRUM MOTOR VC 3V00, 3V22, etc 300, VC7700 300, C7700 MOV C 3V00, 3V16, 3V2 VC 3V20, 3V30 VC 3V23, 3V36, etc. 000	£16.80 £9.90 £19.80 £29.90 £26.40 £26.40 £25.80 RS £39.90 £29.30 £29.50 £29.50 £29.50 £29.50 £29.50 £29.50 £29.50 £29.50 £29.50 £29.50 £29.50 £29.50 £29.50 £
INC S A Panas NV200 NV333	C. PLAY IDL ERVICE MA BELTS AL LIGNMENT **SPECIA **FOR I PINCH I 50nic 0, NV2010, N, NV366, NV3	ERS, CLUTCHI NUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK ITT ROLLERS	ES, MOTO ON BANDS HEADS, APES ETC LITIES** EMS**	LARGE RAI OF IC's & SEMI- CONDUCTO AVAILABL	.E	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC8 Sharp VC8 Sharp VC8 Sharp VC8 Ferguson/J Ferguson/J Ferguson/J	VV333, NV366 5000, 5300, 5400 VV7000, 7200 DRUM MOTOR VC 3V00, 3V22, etc 300, VC7700 300, C7700 MOV C 3V00, 3V16, 3V2 VC 3V20, 3V30 VC 3V23, 3V36, etc. 000	£16.80 £9.90 £19.80 £29.90 £26.40 £26.40 £25.80 RS £39.90 £29.30 £29.50 £29.50 £29.50 £29.50 £29.50 £29.50 £29.50 £29.50 £29.50 £29.50 £29.50 £29.50 £29.50 £
Panas NV200 NV333 NV730	C. PLAY IDL ERVICE MA BELTS AL LIGNMENT **SPECIA **SPECIA **FOR I PINCH 50nic 0, NV2010, N NV2010, N	ERS, CLUTCHI NUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK IT ROLLERS	ES, MOTO ON BANDS HEADS, APES ETC LITIES** EMS**	LARGE RAI OF IC'S & SEMI- CONDUCTO AVAILABI FOR TV,	LE t	Panasonic Sanyo VTC Panasonic Sharp VC7 Sharp VC8 Hitachi VT3 Ferguson/J Ferguson/J Ferguson/J Ferguson/J Ferguson/J Hitachi VT5 Hitachi VT8	VV333, NV366 5000, 5300, 5400, 5400, 7400, 7400, 7400, 7400, 7400, 7400, 700, 7	£16.80 £9.90 £19.80 £29.90 £26.40 £26.40 £25.80 RS £39.90 £29.90 £28.90 £29.90 £28.90 £28.90 £24.75 £34.50 £25.80 £25.80 £25.80 £25.80 £25.80
Panas NV2000 NV333 NV730 Fergu	C. PLAY IDL ERVICE MA BELTS AL LIGNMENT **SPECIA **SPECIA **FOR I PINCH 1 sonic 0, NV2010, N NV366, NV3 ison/JVC	ERS, CLUTCHI NUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK ITT ROLLERS	ES, MOTO ON BANDS HEADS, APES ETC LITIES** EMS** EMS** EA.95 £4.95 £4.95 £7.95	LARGE RAI OF IC'S & SEMI- CONDUCTO AVAILABI FOR TV, AUDIO 8	LE t	Panasonic Sanyo VTC Panasonic Sharp VC7 Sharp VC8 Hitachi VT3 Ferguson/J Ferguson/J Ferguson/J Ferguson/J Ferguson/J Hitachi VT5 Hitachi VT8	VV333, NV366 5000, 5300, 5400, 5400, 7400, 7400, 7400, 7400, 7400, 7400, 700, 7	£16.80 £9.90 £19.80 £29.90 £26.40 £26.40 £25.80 RS £39.90 £29.90 £28.90 £29.90 £28.90 £28.90 £24.75 £34.50 £25.80 £25.80 £25.80 £25.80 £25.80
Panas NV200 NV333 NV730 Fergu 3V0(3	C. PLAY IDL ERVICE MA BELTS AL BELTS AL LIGNMENT **SPECIA **SPECIA **FOR I PINCH 1 Sonic 0, NV2010, N NV366, NV3 isson/JVC	ERS, CLUTCHI NUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK ITT ROLLERS	ES, MOTO ON BANDS HEADS, APES ETC LITIES** EMS** £4.95 £4.95 £7.95 £4.95 £4.95	LARGE RAI OF IC'S & SEMI- CONDUCTO AVAILABI FOR TV,	.E	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC8 Sharp VC8 Sharp VC8 Sharp VC8 Sharp VC8 Ferguson/J Ferguson/J Hitachi VT3 Hitachi VT3 Hitachi VT3 Sony C5, C Akai VS1-V	VV333, NV366 5000, 5300, 5400, 5400, 5400, 5400, 7200 DRUM MOTOR VC 3V00, 3V22, etc 300, VC7700 300, VC7700 300, VC7700 VC 3V29, 3V30, 400 VC 3V35, 3V36, etc 300, 9500, etc. 300, 9500, etc. 1, VT14, VT17 55	£16.80 £9.90 £19.80 £29.90 £26.40 £26.40 £25.80 RS £39.90 £29.90 £28.90 £29.90 £28.90 £28.90 £24.75 £34.50 £25.80 £25.80 £25.80 £25.80 £25.80
INC S Panas NV200 NV200 NV200 NV730 Fergu 3V00,3 HR330 3V29,3	C. PLAY IDL ERVICE MA BELTS AL BELTS AL LIGNMENT **SPECIA **SPECIA **FOR I PINCH I Sonic 0, NV2010, N, NV366, NV3 **Son/JVC V16, 3V22, 3V 0, HR3360, H X16, 3V22, 3V 0, HR3360, H X16, 3V22, 3V	LERS, CLUTCHI NUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK ITT ROLLERS 107000, NV7200 70, NV430 107000, NV7200 70, NV430 1010 1010 1010 1010 1010 1010 1010 1	ES, MOTO ON BANDS HEADS, APES ETC LITIES** EMS** EA.95 £4.95 £4.95 £4.95 £4.95 £4.95 £4.95	LARGE RAI OF IC'S & SEMI- CONDUCTO AVAILABI FOR TV, AUDIO 8	.E	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC8 Sharp VC8 Sharp VC8 Sharp VC8 Sharp VC8 Ferguson/J Ferguson/J Hitachi VT3 Hitachi VT3 Hitachi VT3 Sony C5, C Akai VS1-V	VV333, NV366 5000, 5300, 5400, 5400, 7400, 7400, 7400, 7400, 7400, 7400, 700, 7	£16.80 £9.90 £19.80 £29.90 £26.40 £26.40 £25.80 RS £39.90 £29.90 £28.90 £29.90 £28.90 £28.90 £24.75 £34.50 £25.80 £25.80 £25.80 £25.80 £25.80
Panas NV200 NV333 NV730 Fergu 3V0,3 HR330 3V29,3 3V35,3	C. PLAY IDL ERVICE MA BELTS AL BELTS AL **SPECIA **SPECIA **FOR I PINCH / SONIC 0, NV2010, N NV2010, N NV2010, N NV2010, N SONIC 1, NV2010, N NV2010, N NV2010, N NV2010, N SONIC SONIC SONIC NU2010 NU20 NU2010 NU20 NU2010 NU2010 NU20	LERS, CLUTCHI INUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI INON-STOCK ITI ROLLERS IV7000, NV7200. 70, NV430	ES, MOTO ON BANDS HEADS, APES ETC LITIES** EMS** EA.95 £4.95 £4.95 £4.95 £4.95 £4.95 £4.95	RS, , , , , , , , , , , , , , , , , , ,	LE	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC7 Hitachi VT2 Ferguson/J Ferguson/J Ferguson/J Ferguson/J Hitachi VT9 Hitachi VT9 Hitachi VT9 Hitachi VT9 Mitachi VT9 Wany, many	VV333, NV366 5000, 5300, 5400, 5400, 5400, 5400, 7200 DRUM MOTOR VC 3V00, 3V22, etc 300, VC7700 300, VC7700 300, VC7700 VC 3V29, 3V30, 400 VC 3V35, 3V36, etc 300, 9500, etc. 300, 9500, etc. 1, VT14, VT17 55	£16.80 £9.90 £19.80 £29.90 £26.40 £26.40 £25.80 RS £39.90 £29.90 £28.90 £29.90 £28.90 £28.90 £24.75 £34.50 £25.80 £25.80 £25.80 £25.80 £25.80
Panas NV200 NV333 NV730 Fergu 3V03,3 3V35,3 Sanyo	C. PLAY IDL ERVICE MA BELTS AU BELTS AU LIGNMENT ** FOR I PINCH I Sonic 0, NV2010, N NV366, NV3 ISON/JVC ISON/JVC ISON/JVC ISON/JVC ISON/JVC	ERS, CLUTCHI NUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK ITI ROLLERS IV7000, NV7200. 70, NV430. V23 3V24. III53660, HR2200 , HR7300. V39 HRD 120	ES, MOTO ON BANDS HEADS, APES ETC LITIES** EMS** EMS** EA.95 £4.95 £7.95 £4.95 £4.95 £4.95 £4.95 £4.95 £4.95 £4.95 £4.95	RS, , , , , , , , , , , , , , , , , , ,	E nic	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC7 Hitachi VT2 Ferguson/J Ferguson/J Ferguson/J Ferguson/J Ferguson/J Hitachi VT9 Hitachi VT9 Hitachi VT9 Hitachi VT9 Mary, many IDLER	VV333, NV366 5000, 5300, 5400, 5400 VV7000, 7200 DRUM MOTOR 300, VC7700 300, VC7700 WC 3V00, 3V22, etc 300, VC7700 WC 3V00, 3V16, 3V2 VC 3V35, 3V30, etc. 300, 8500, etc. 300, 8500, etc. 300, 8500, etc. 355 more! WHEELS	£16.80 £9.90 £19.80 5 £29.90 £26.40 £26.40 £25.80 £29.30 £29.30 £29.30 £29.30 £24.75 £34.50 £24.50 £24.50 £34.50 £24.50 £24.50 £24.90 £29.90
Panas NV200 NV200 NV730 Fergu 3V0,3 HR330 3V29,3 3V5,3 Sanyo VTC911	C. PLAY IDL ERVICE MA BELTS AL BELTS AL LIGNMENT **SPECIA **SPECIA **FOR I PINCH I SONCO 0, NV2010, N, NV366, NV3 W16, 3V22, 3V 0, HR3260, H W16, 3V22, 3V 0, HR3260, H R7200 V30, HR7200 V30, 3V38, 3V38, 3V 0, VTC9300	ERS, CLUTCHI NUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK ITI ROLLERS IV7000, NV7200 . 70, NV430	ES, MOTO ON BANDS HEADS, APES ETC LITIES** EMS** EMS** EA.95 £4.95 £7.95 £4.95 £4.95 £4.95 £4.95 £4.95 £4.95 £4.95 £4.95	ARGE RAI OF IC'S S SEMI- CONDUCTO AVAILABL FOR TV, AVAIDIO & VIDEO	.E n <i>ic</i> NV201	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC7 Hitachi VT2 Ferguson/J Ferguson/J Hitachi VT5 Hitachi VT5 Hitachi VT5 Hitachi VT5 Hitachi VT5 Mitachi VT5 Davy Stranger Mary, many IDLER 0	VV333, NV366 5000, 5300, 5400, 5400, VV7000, 7200 DRUM MOTOR 300, VC7700 300, VC7700 300, VC7700 300, VC7700 VC 3V00, 3V16, 3V2 VC 3V00, 3V16, 3V2 VC 3V29, 3V30, Store to the store to the store 300, 8500, etc. 300, 8500, etc. 300, 8500, etc. 300, 8500, etc. 35 more! WHEELS (Genuine).	£16.80 £9.90 £19.80 £29.90 £26.40 £26.40 £25.80 RS £29.90 £29.90 £29.30 £29.30 £24.75 £34.50 £24.75 £34.50 £24.50 £24.50 £24.90 £29.90
INC S A A Panas Nv2000 NV730 B Fergu 3V07,30 First Sanyc VTC511 VTC511	C. PLAY IDL ERVICE MA BELTS AL BELTS AL XIJGMMENT **SPECIA **SPECIA **FOR I PINCH Sonic 0, NV2010, N NV366, NV3 **Sonic 0, NV2010, N NV366, NV3 **Sonic 0, NV2010, N NV366, NV3 **Sonic 0, NT2010, N NV36, NV3 **Sonic 0, NT2010, N NV36, NV3 **Sonic 0, NT2010, N NV36, NV3 **Sonic 0, NT2010, N NV36, NV3 **Sonic **	ERS, CLUTCHI INUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK ITI ROLLERS IV7000, NV7200. 70, NV430	ES, MOTO ON BANDS HEADS, APES ETC LITIES** EMS** EMS** EA.95 E7.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95	RS, S, OFIC's & SEMI CONDUCTO AVAILABI FOR TV, ALDID & VIDEO Panaso NV2000, NV2000,	E n <i>ic</i> NV201 NV720	Panasonic Sanyo YTC Panasonicl Ferguson/, Sharp VC7 Sharp VC8 Sharp VC7 Ferguson/J Ferguson/J Ferguson/J Hitachi VT5 Hitachi VT5 Hitachi VT5 Many, many IDLER 0	NV333, NV366 Stool, 5300, 5400. V7000, 7200 DRUM MOTOR VC 3V00, 3V22, etc 300, VC7700 VC 3V02, 3V16, 3V2 300, VC7700 VC 3V29, 3V30 VC 3V29, 3V36, etc. 300, 9500, etc. 300, 9500, etc. 7 more! WHEELS (Genuine) (Genuine)	£16.80 £9.90 £19.80 £29.90 £26.40 £26.40 £26.40 £25.80 RS £39.90 £29.30 £24.75 £34.50 £24.75 £34.50 £24.50 £34.50 £24.50 £34.50 £25.80 £26.80 £27.90 £29.90
Panas NV200 NV233 NV730 Fergu 3V0,3 3V29,3 3V35,3 Sanyc VTC911 VTC50	C. PLAY IDL ERVICE MA BELTS AU BELTS AU **FOR I **FOR I PINCH I **FOR I PINCH I **ONIC 0, NV2010, N NV366, NV3 ** ** ** ** ** ** ** ** ** ** ** ** **	ERS, CLUTCHI NUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK ITI ROLLERS V7000, NV7200. 70, NV430	ES, MOTO ON BANDS HEADS, APES ETC LITIES** EMS** EMS** EA.95 E4.95	RS, , , , , , , , , , , , , , , , , , ,	.E n <i>ic</i> NV201 NV720 NV366.	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC7 Hitachi VT2 Ferguson/J Ferguson/J Ferguson/J Ferguson/J Ferguson/J Hitachi VT5 Hitachi VT5 Hitachi VT5 Mitachi VT5 Mitachi VT5 Mitachi VT5 Mitachi VT5 Mary, many IDLER 0	VV333, NV366 5000, 5300, 5400, 5400, 7400,	£16.80 £9.90 £19.80 £29.90 £26.40 £26.40 £25.80 RS £39.90 £29.30 £29.30 £24.75 £34.50 £25.80 £25.80 £25.80 £24.50 £34.50 £
Panas NV200 NV233 NV730 Fergu 3V0,3 3V29,3 3V35,3 Sanyc VTC911 VTC50	C. PLAY IDL ERVICE MA BELTS AU BELTS AU **FOR I **FOR I PINCH I **FOR I PINCH I **ONIC 0, NV2010, N NV366, NV3 ** ** ** ** ** ** ** ** ** ** ** ** **	ERS, CLUTCHI NUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK ITI ROLLERS V7000, NV7200. 70, NV430	ES, MOTO ON BANDS HEADS, APES ETC LITIES** EMS** EMS** EA.95 E4.95	RS, , LARGE RAI OF IC'S & SEMI CONDUCTO AVAILABI FOR TV, ALDID & VIDEO Panaso NV2000, NV200, NV2	E NV201 NV720 NV366. NV230.	Panasonic Sanyo VTC Panasonici Ferguson/, Sharp VC3 Hitachi VTS Sharp VC8 Sharp VC8 Sharp VC7 Ferguson/J Ferguson/J Hitachi VT5 Hitachi VT5 Hitachi VT5 Many, many IDLER 0	VV333, NV366 5000, 5300, 5400 VV7000, 7200 VV7000, 7200 VVC 3V00, 3V22, 000 300, VC7700 000. APSTAN MOTO 000. VC 3V00, 3V16, 3V2 VC 3V29, 3V30 VC 3V29, 3V36, etc. 000, 8500, etc. 000, 8500, etc. 1, VT14, VT17. S5. more! WHEELS (Genuine) (Genuine) (Genuine) (Genuine)	£16.80 £9.90 £19.80 £29.90 £26.40 £26.40 £26.40 £26.80 £25.80 £39.90 £29.30 £24.75 £34.50 £24.75 £34.50 £24.50 £34.50 £24.50 £24.50 £24.50 £24.50 £24.50 £24.50 £24.50 £24.50 £24.50 £25.80 £25.90 £2.90 £2.90 £2.90 £2.90
Panas NV200 NV200 NV733 NV730 Fergu 3V0,3 HR330 VTC91 VTC50 VTC54 VTC54 VTC54 VTC54 Sony SLC5,5	C. PLAY IDL ERVICE MA BELTS AL BELTS AL XIGNMENT **SPECIA **SPECIA **FOR I PINCH 0, NV2010, N NV366, NV3 V16, 3V22, 3V NV16, 3V NV16	ERS, CLUTCHI INUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI INON-STOCK ITI ROLLERS IV7000, NV7200 . 70, NV430. 70, NV430. 70, NV430. 723 3V24 IR3660, HR2200 , HR7300 /39 HRD120.	ES, MOTOI ON BANDS HEADS, APES ETC LITIES** EMS** EMS** EA.95 E7.95 E4.9	RS, , LARGE RAI OF IC'S & SEMI CONDUCTO AVAILABI FOR TV, ALDID & VIOEO Panaso NV2000, NV2300, NV2300, NV2300, NV2300, NV2000, NV2300, NV200, NV200, NV2	E NV201 NV720 NV366. NV230.	Panasonic Sanyo VTC Panasonici Ferguson/, Sharp VC3 Hitachi VTS Sharp VC8 Sharp VC8 Sharp VC7 Ferguson/J Ferguson/J Hitachi VT5 Hitachi VT5 Hitachi VT5 Many, many IDLER 0	VV333, NV366 5000, 5300, 5400 VV7000, 7200 VV7000, 7200 VVC 3V00, 3V22, 000 300, VC7700 000. APSTAN MOTO 000. VC 3V00, 3V16, 3V2 VC 3V29, 3V30 VC 3V29, 3V36, etc. 000, 8500, etc. 000, 8500, etc. 1, VT14, VT17. S5. more! WHEELS (Genuine) (Genuine) (Genuine) (Genuine)	£16.80 £9.90 £19.80 £29.90 £26.40 £26.40 £26.40 £26.80 £25.80 £39.90 £29.30 £24.75 £34.50 £24.75 £34.50 £24.50 £34.50 £24.50 £24.50 £24.50 £24.50 £24.50 £24.50 £24.50 £24.50 £24.50 £25.80 £25.90 £2.90 £2.90 £2.90 £2.90
Panas NV200 NV233 NV730 Fergu 3V0,3 HR330 SV29,3 3V35,3 Sanyc VTC51 VTC50 VTC54 Sony SLC5,5 SLC6.	C. PLAY IDL ERVICE MA BELTS AU BELTS AU **FOR I PINCH I **FOR I PINCH I **FOR I PINCH I **00, NV2010, N NV366, NV3 ** ** ** ** ** ** ** ** ** ** ** ** **	ERS, CLUTCHI NUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK ITI ROLLERS V7000, NV7200. 70, NV430	ES, MOTO ON BANDS HEADS, APES ETC LITIES** EMS** EMS** EA.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95	RS, , , , , , , , , , , , , ,	E NV201 NV720 NV366. NV230, NV788.	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC7 Hitachi VT2 Ferguson/J Ferguson/J Ferguson/J Ferguson/J Ferguson/J Hitachi VT9 Hitachi VT9 Hitachi VT9 Hitachi VT9 Hitachi VT9 Mary, many IDLER 0.	VV333, NV366 5000, 5300, 5400, 5400, 5400, 7400, 7200 DRUM MOTOR NC 3V00, 3V22, etc 300, VC7700 300, VC7700 300, VC7700 VC 3V00, 3V16, 3V2 VC 3V35, 3V36, etc. 300, 9500, etc. 300, 8500, 8500, etc. 300, 8500, 8500, 8500, 8500, 8500, 8500, 8500, 8500, 8500, 8500, 8500, 85	£16.80 £9.90 £19.80 £19.80 £26.40 £26.40 £25.40 £25.80 £29.30 £29.30 £29.30 £29.30 £24.75 £34.50 £34.50 £34.50 £34.50 £34.50 £24.90 £29.90 £29.90 £29.90 £29.90 £29.90 £29.90 £29.90 £29.90 £29.90
Рапаз Рапаз NV200 NV230 Rergu 3V0,3 HR330 3V29,3 3V35,3 Sanyc VTC91 VTC54 Sony SLC5,5 S	C. PLAY IDL ERVICE MA BELTS AL BELTS AL ISSUE **SPECIA **SPECIA **FOR I PINCH 1 5001C 0, NV2010, N NV2010, N NV2010, N NV2010, N SON, SUC 0, NV2010, N SON, SUC SUC 0, VTC3100 00, VTC3100 SLC7 SL8080	ERS, CLUTCHI INUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI INON-STOCK ITI ROLLERS IV7000, NV7200 . 70, NV430. 70, NV430. 70, NV430. 723 3V24 IR3660, HR2200 , HR7300 /39 HRD120.	ES, MOTO ON BANDS HEADS, APES ETC LITIES** EMS** EMS** EA.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95	KS, G, LARGE RAI OF IC'S & SEMI- CONDUCTS AVAILABL POR TV, AUDIO & VIOEO PARASO NV2000, NV7000, NV330, I NV370, I NV370, I NV370, I NV370, I NV370, I NV77,	E NV201 NV720 NV366. NV788. NV788.	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC7 Hitachi VT2 Ferguson/J Ferguson/J Ferguson/J Hitachi VT5 Hitachi VT5 Hitachi VT5 Hitachi VT5 Mary, many IDLER 0	VV333, NV366 5000, 5300, 5400 VV7000, 7200 VV7000, 7200 VVC 3V00, 3V22, etc 300, VC7700 300, S00, VC7700 VC 3V00, 3V16, 3V2 VC 3V29, 3V30 VC 3V00, 3V16, 3V2 VC 3V35, 3V36, etc. 300, 9500, etc 300, 8500,	£16.80 £9.90 £19.80 £29.90 £26.40 £26.40 £25.80 PS £39.90 £29.90 £29.90 £29.90 £29.30 £24.75 £34.50 £34.50 £34.50 £34.50 £24.80 £29.90 £2.90
Panas NV200 NV200 NV333 NV730 Fergu 3V0,3 HR330 Sanyo VTC541 VTC50 VTC541 VTC50 VTC541 VTC50 VTC544 Sanyo SLC5.5 SLC6 SL8000 Sharp	C. PLAY IDL ERVICE MA BELTS AU BELTS AU ILIGNMENT **FOR I PINCH \$0, NV2010, N NV366, NV3 **FOR I PINCH \$0, HR3560, H V300, HR7200 \$00, VTC5150, 00, VTC5150, 00, VTC5150, 00, SL8080	ERS, CLUTCHI INUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK ITI ROLLERS IV7000, NV7200. 70, NV430. //23 3V24 //23 3V24	ES, MOTO ON BANDS HEADS, APES ETC LITES** EMS** EMS** EA.95 E7.95 E4.95	RS, CARGE RAI OF IC'S & SEMI- CONDUCTO AVAILABI FOR TV, AUDIO & NV2000, NV200, NV20	E NV2011 NV720 NV366. V230, V788. Dr/JVC 16, 3V2 16, 3V2	Panasonic Sanyo VTC Panasonicl Ferguson/, Sharp VC7 Sharp VC8 Sharp VC7 Ferguson/J Ferguson/J Ferguson/J Ferguson/J Hitachi VT9 Hitachi VT9 Hitachi VT9 Hitachi VT9 Many, many IDLER 0	VV333, NV366 5000, 5300, 5400 VV7000, 7200 VV7000, 7200 VV7000, 3720, etc 300, VC7700 300, VC7700 300, VC7700 VC3V29, 3V30 VC3V29, 3V30 VC3V29, 3V36, etc. 300, 9500, etc. 300, 9500, etc. S5. more! WHEELS (Genuine)	£16.80 £9.90 £19.80 £29.90 £26.40 £26.40 £26.40 £25.80 £39.90 £29.90 £29.90 £24.75 £34.50 £24.75 £34.50 £24.50 £24.50 £24.50 £29.90 £2.90 £2.90 £2.90 £2.90 £2.90 £2.90 £2.90 £4.50 £5.95
Panas NV200 NV333 NV730 Fergu 3V03,3 Sanyo VTC544 Sony SLC5,5 SL26,5 SL26,5 SL26,5 SL26,5 Sharp VC7300	C. PLAY IDL ERVICE MA BELTS AL BELTS AL INTERPORT **SPECIA **SPECIA **FOR I PINCH / Sonic 0, NV3010, N NV366, NV3 Sonic 0, NV306, NV3 Sonic 0, NV3010, N SONIC V30, HR7200 NV36, 3V38, 3V 00, VTC5150, 00, VTC5150, 00, VTC5150, 00, VTC7700, VC	ERS, CLUTCHI INUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK ITT ROLLERS IV/7000, NV7200, 70, NV430	ES, MOTOI ON BANDS HEADS, APES ETC LITIES** EMS** EA.95 E4.9	ARGE RAI OF IC'S 0F IC'S & SEMH CONDUCTOR AVAILABI FOR TV, AUDIO & NV2000, NV333, h NV7707, h NV7777, h NV7770, S Ferguas 3V00, 3V 3V00, 3V 3V29, 3V2, 3V29, S SV29, 3V2	LE NV201 NV720 NV720 NV780 NV788 NV788 NV788 NV788 NV788 NV788 NV788 NV788 NV788 NV788 NV788 NV788 NV788 NV201 NV200 NV20 NV2	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC7 Hitachi VT2 Hitachi VT5 Herguson/J Fer	VV333, NV366 5000, 5300, 5400. VV7000, 7200. DRUM MOTOR NC 3V00, 3V22, etc 300, VC7700. 300. MPSTAN MOTO 300, VC7700. VC 3V00, 3V16, 3V2. VC 3V35, 3V36, etc. 300, 9500, etc. 300, 850	£16.80 £9.90 £19.80 £19.80 £29.90 £26.40 £26.40 £25.80 £25.80 £23.90 £23.90 £24.75 £34.50 £25.80 £25.80 £25.80 £25.80 £25.80 £25.80 £25.80 £25.80 £24.50 £4.50 £2.90 £3.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £5.95 £6.95 £6.95
Panas NV200 NV200 NV730 NV730 SV00,3 VV701 VTC51 VTC51 VTC51 VTC54 Sony SLC5,5 SLC6 SL800 Sharp VC730 VC230	C. PLAY IDL ERVICE MA BELTS AL BELTS AL ILIGNMENT **SPECIA **SPECIA **SPECIA **SPONC 0, NV2010, N, NV366, NV3 **SONJVC 0, NV2010, N, NV366, NV3 **SONJVC SON, JVC SON 00, VTC9300 00, VTC900 00, VTC900	ERS, CLUTCHI INUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI INON-STOCK ITI ROLLERS IV7000, NV7200 . 70, NV430	ES, MOTOI ON BANDS HEADS, APES ETC LITIES** EMS** EMS** EA.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E5.95 E5.95 E5.95 E4.95 E4.95 E4.95	LARGE RAI OF IC's & SEMI CONDUCTO AVAILABL FOR TV, AUDIO & VIDEO Panaso NV2000, NV730 FOR TV, NV370, IN NV370, IN NV77, IN NY77, IN NY7	LE NV201 NV720 NV720 NV780 NV788 NV788 NV788 NV788 NV788 NV788 NV788 NV788 NV788 NV788 NV788 NV788 NV788 NV201 NV200 NV20 NV2	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC7 Hitachi VT2 Hitachi VT5 Herguson/J Fer	VV333, NV366 5000, 5300, 5400 VV7000, 7200 VV7000, 7200 VV7000, 7200 NV7000, 300, 2000 300, VC7700 NO00. APSTAN MOTO 300, VC7700 VC 3V02, 3V16, 3V2 VC 3V29, 3V30 VC 3V29, 3V36, etc. 300, 9500, etc. NO0, 8500, etc. NO0, 8500, etc. S5. more! WHEELS (Genuine) (Ge	£16.80 £9.90 £19.80 £19.80 £29.90 £26.40 £26.40 £25.80 £25.80 £23.90 £23.90 £24.75 £34.50 £25.80 £25.80 £25.80 £25.80 £25.80 £25.80 £25.80 £25.80 £24.50 £4.50 £2.90 £3.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £5.95 £6.95 £6.95
Panas Nv200 Nv200 Nv233 Nv730 Fergu 3v03,3 Sanyo VTC54I VTC54I Sc5. SLC5	C. PLAY IDL ERVICE MA BELTS AU BELTS AU SPECIA **FOR I PINCH I SONIC 0, NV2010, N NV366, NV3 BSON/JVC IV16, 3V22, 31 NV36, 3V38, 31 00, VTC9300, VC SLC7 0, SL8080 0, VC7700, VC 0, VC79300, VC	ERS, CLUTCHI NUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK ITI ROLLERS V7000, NV7200. 70, NV430. V23 3V24. INF3660, HR2200 , HR7300 V39 HRD 120. VTC5300, VTC5300,	ES, MOTO ON BANDS HEADS, APES ETC LITIES** EMS** EMS** EA.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E5.95 E5.95 E5.95 E5.95 E4.95 E4.95 E4.95	Panaso VV2000, NV7000, NV7000, NV7000, NV7000, NV7000, NV7000, NV370, P NV777, P NV770, N SV29, 3V 3V00, 3V 3V29, 3V Sanyo	E NV201 NV720 NV366. VV366. VV230, VV788. D7/JVC 16,3V2 16,3V2 30,HR7 36,3V3	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC7 Sharp VC8 Sharp VC7 Ferguson/J Ferguson/J Ferguson/J Ferguson/J Hitachi VT5 Hitachi VT5 Hitachi VT5 Hitachi VT5 Hitachi VT5 Nitachi VT5 O Nitachi VT5 Nitachi VT5	VV333, NV366 5000, 5300, 5400, 5400, 5400, 5400, 7200 WC 3V00, 3V22, etc 300, VC7700 300, VC7700 WC 3V00, 3V16, 3V2 WC 3V35, 3V36, etc. 300, 9500, etc. 300, 9500, etc. 300, 8500,	£16.80 £9.90 £19.80 £19.80 £29.90 £26.40 £25.40 £25.80 £29.30 £29.30 £29.30 £29.30 £29.30 £24.75 £34.50 £25.80 £25.80 £25.80 £25.80 £25.80 £25.80 £24.50 £4.50 £2.90 £3.90 £3.90
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Panas NV200 NV233 NV730 Fergu 3V03,3 Sanyc VTC911 VTC54 Sony SL25,5 SL26	C. PLAY IDL ERVICE MA BELTS AL BELTS AL ULIGNMENT **SPECIA **SPECIA **FOR I PINCH / Sonic 0, NV3010, N NV306, NV3 (), NV3010, N NV306, NV3 (), NV3010, N SONIC (), NV3	ERS, CLUTCHI INUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK ITT ROLLERS IV7000, NV7200, 70, NV430	ES, MOTOI ON BANDS HEADS, APES ETC LITIES** EMS** EX.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E5.96 E5.96 E5.96 E4.95 E4.9	RS,	E NV201 NV2720 VV280, VV280, VV280, VV280, VV280, VV280, VV788 NV770 NV70	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC7 Sharp VC7 Sharp VC8 Sharp VC7 Ferguson/J Ferguson	NV333, NV365 Stool, 5300, 5400 NV7000, 7200 DRUM MOTOR NC 3V00, 3V22, etc 300, VC7700 300, VC7700 WO X00, 3V16, 3V2, etc 300, VC7700 VC 3V03, 3V16, 3V3, VC3V9, 3V30, VC3V93, 3V36, etc. 300, 8500, etc. 900, 900, 8500, etc. 900, 900, 8500, 900, 900, 8000, 900, 8000, 900, 8000, 900, 9	£16.80 £9.90 £19.80 £19.80 £29.90 £26.40 £26.40 £25.80 FS £39.90 £29.30 £29.30 £29.30 £24.50 £24.50 £24.50 £24.50 £24.50 £24.50 £24.50 £29.90 £2.90 £2.90 £2.90 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £3.90
Panas NV200 NV333 NV730 Fergu 3V35,3 Sanyc VTC911 VTC500 VTC911 VTC500 VTC911 VTC544 Sony SLC6. SL800C Sharp VC7300 VC530 VC500 VC500 VC50	C. PLAY IDL ERVICE MA BELTS AL BELTS AL ILIGNMENT **SPECIA **FOR II PINCH / Sonic 0, NV366, NV3 ison/JVC W16, 3V22, 31 0, HR3360, H W16, 3V22, 31 0, HR3360, H 0, VTC5150 00, VTC5150 0, VC7700, VC 3, VC9300, VC VC9300, VT 1, VT9500, VT VT14E, VT17 S3, VS4, VS5 1, VT9500, VS S3, VS4, VS5 1, VT9500, VS S3, VS4, VS5 1, VT9500, VS S3, VS4, VS5 1, VS9500, VS S3, VS4, VS5 1, VS9500, VS S3, VS4, VS5 1, VS9500, VS 1, VS950	ERS, CLUTCHI INUALS, TENSI JDIO/CONTROL TOOLS AND T L ORDER FACI NON-STOCK ITT ROLLERS IV7000, NV7200, 70, NV430	ES, MOTOI ON BANDS HEADS, APES ETC LITIES** EMS** EX.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E4.95 E5.96 E5.96 E5.96 E4.95 E4.9	RS,	E NV201 NV2720 VV280, VV280, VV280, VV280, VV280, VV280, VV788 NV770 NV70	Panasonic Sanyo VTC Panasonic Ferguson/, Sharp VC7 Sharp VC7 Sharp VC7 Sharp VC8 Sharp VC7 Ferguson/J Ferguson	VV333, NV366 5000, 5300, 5400. VV7000, 7200. DRUM MOTOR VC 3V00, 3V22, etc 300, VC7700 300. MPSTAN MOTO 300, VC7700 VC 3V00, 3V16, 3V2 VC 3V29, 3V30. VC 3V29, 3V30. VC 3V29, 3V30. VC 3V29, 3V36, etc. 300, 9500, etc. 300, 9500, etc. 300, 8500, 8500, etc. 300, 8500, 8500,	£16.80 £9.90 £19.80 £19.80 £29.90 £26.40 £26.40 £25.80 FS £39.90 £29.30 £29.30 £29.30 £24.50 £24.50 £24.50 £24.50 £24.50 £24.50 £24.50 £29.90 £2.90 £2.90 £2.90 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £4.50 £3.90

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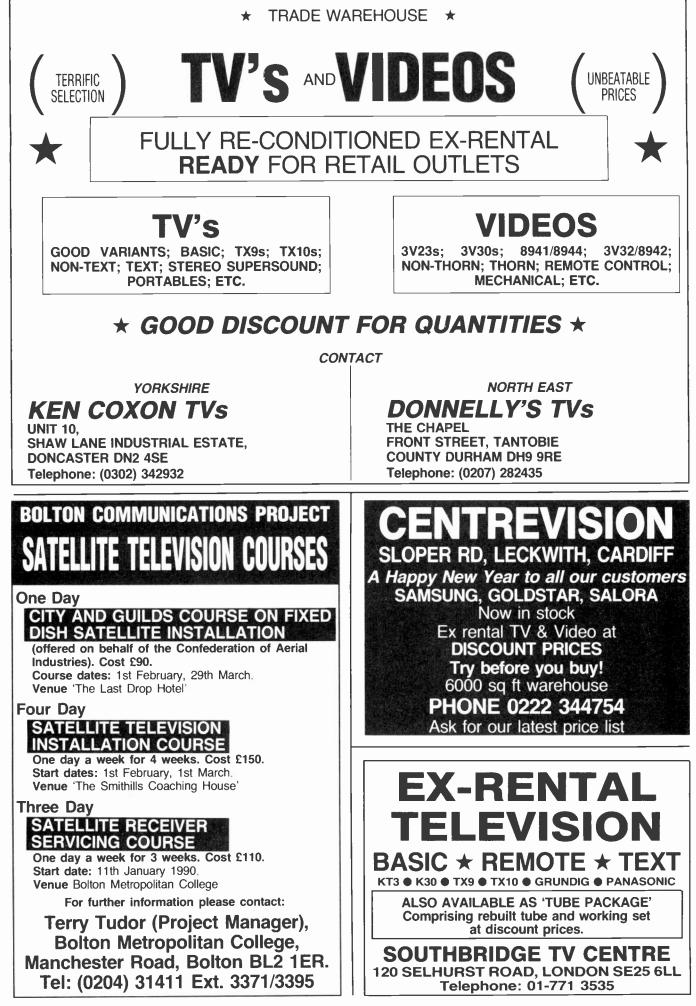
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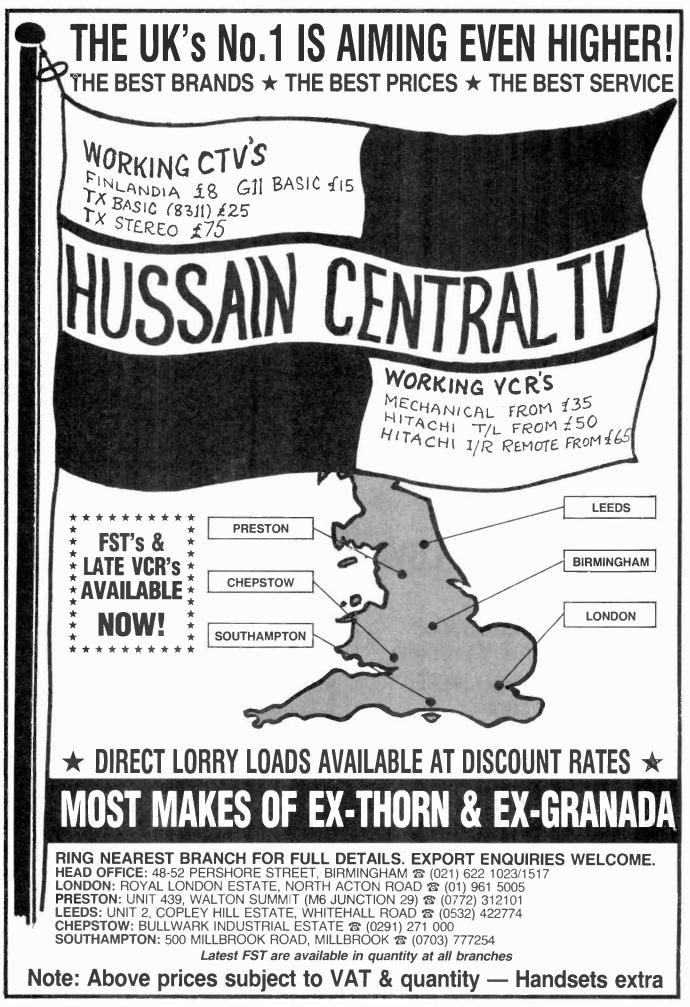
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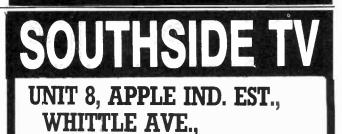
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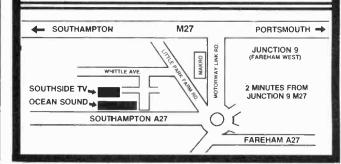
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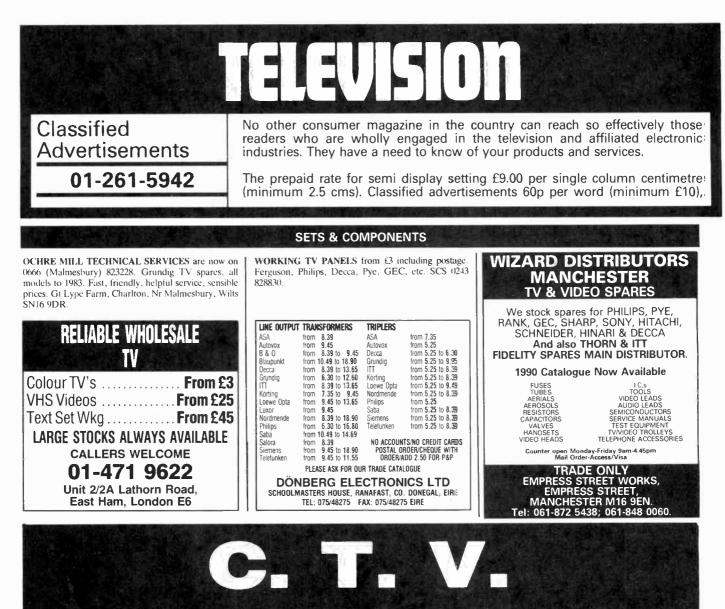


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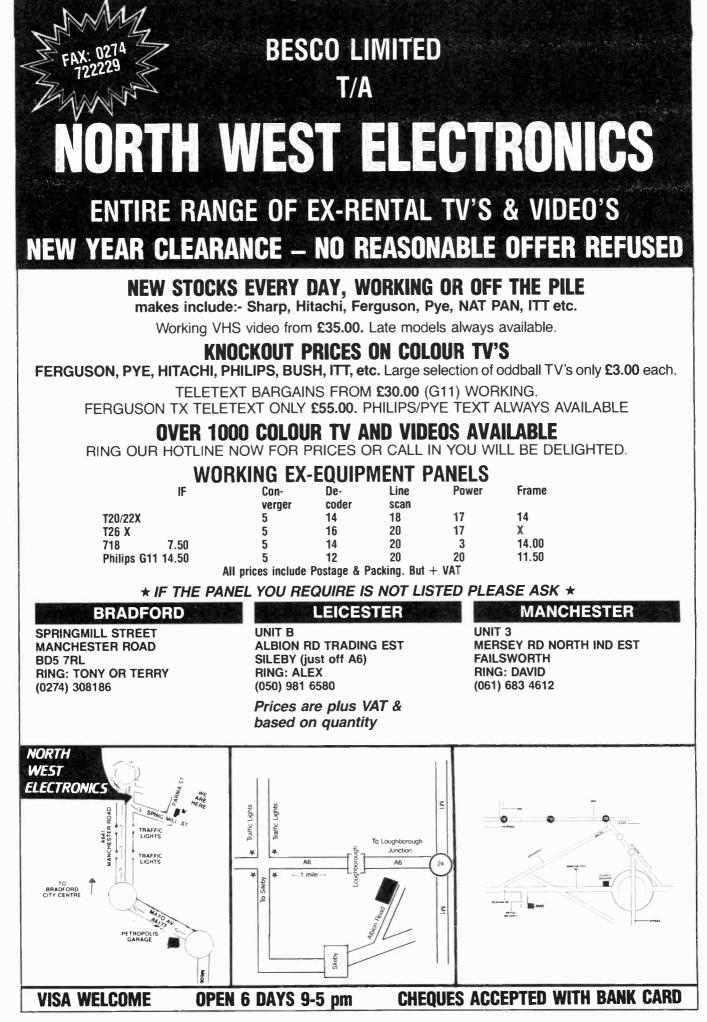


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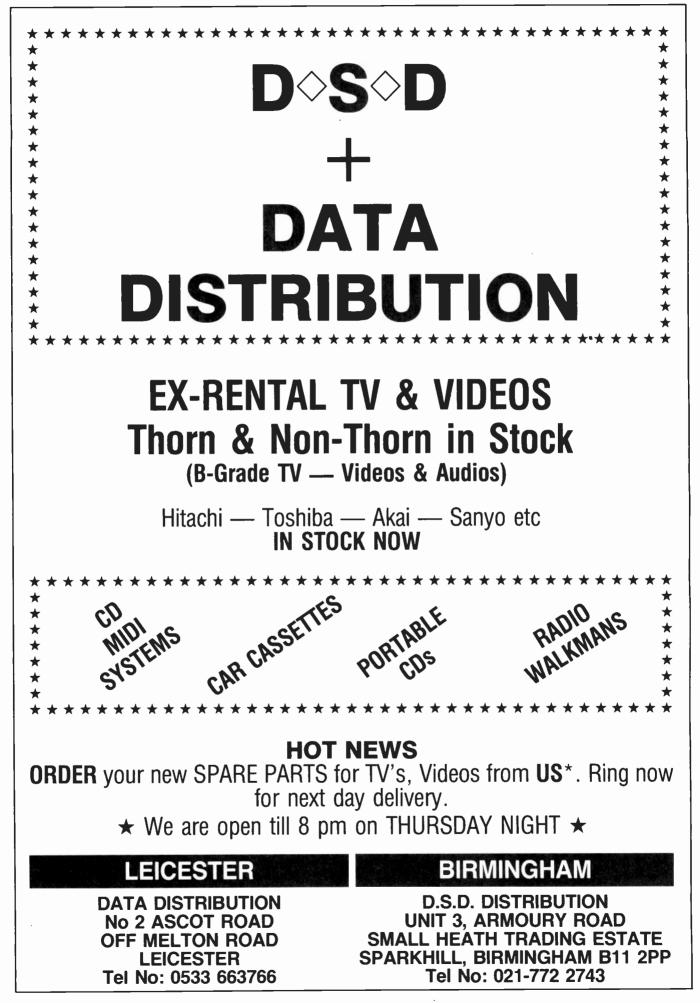
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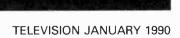
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KT3 12 Push button unit £2.00 KT3 (Export) 12 P .B.u £2	LOPI Rank Z763 £5.00 K35 Split Diode 3122/13835930 £10.00	Large Type Decca Small	75р 75р	.22/400 8/400	10р 15р	£10.00 RC4001 Full Remote K'L3 K30 Teletext
6 Push button Unit Thorn £1.00 6 Push button GRC £6.00	Universal Tripler with small focus pot Green type £7.00	KT3 Focus Unit K30 Focus Pot	75p 75p	<u>33/400</u> 400/400	20р 40р	Handsets exchanged £15.00 NEW Type RC4001.9 CH not 12 £6.00
6 Push button PYE 731 £6.00 Hearing aid unit £3.00	Black Triplers	K30 Tube base on panel TX10 Focus Units	£1.00 £8.50	394K/400V 1000m-160v	20p £1.00	GEC Full Remote Infra-red, 1983 model
Rank Ž718 4 P/B/Unit MECH \$4.00 7 Button Unit GEC with Lamps \$7.00	KT3 Triplers £6.00 STC Universal Tripler £6.00 11 TJF £2.50	CVC 32 Focus Unit Fidelity Focus Unit 14R-14S	75p 30p	220/450 .47/500	-40р 25р	E15.0 FOSHIBA HAND SETS
697 Push Button Unit £6.00 Z916B panel £5.00 T513AP panel £5.00	11 FGA £2.00 11'1 CVC 5-8-9 £3.50	3500 Thorn Focus Unit ITT Small for use with Split Z718 Bush Focus	£1.00 £2.00	0,1/600 0,1/1200V wire end	15p 20p	(*T9185 £4.0 (*T9176 £4.0
Video Tuner	Rank T25LE Tripler £2.00 Rank 11TCP A823 £3.50	Diode Remo TV12SP	50p 50p	0 1/450 A/C wire end .22/1000	20p 20p	CT9133 £4.0 Rediffusion MK3 £5.0
Test-Dep Ex-Philips V.6100/05 T/V and Tel/Text unit and	FU 25 30K Rank £3.00 11 TEZ Rank £3.00 G9 Philips £4.00	1600 Thorn LHT Rec and Lead TV14	50p 50p	.047/600 13 047/1100	15p 10p	FOSHIBA HAND SETS
hand set £50.00 Send for data.	GFC 2110 £4.00 3500 Thorp £3.00	TV20 TV45	£1.00 50p	0-01/1000 0-11/1600v	tOp	24 Button (T1938 Fuliremote 32 Button (T1983 Videotext £6.00
TT14 GEC TEX-DECODER 13 IC Panel with cable form £9.50	8500 Thorn £4.00 9000 Thorn £7.00	TX98 Button Unit	£6.00	150m/385v .47/1000v	£1.00 65p	THORN VCR Front Display Panel £7.0
PHILIPS	9500 Thorn £4.50 9600 Thorn £4.00 2040 GEC £3.50			.47/250V A.C 001K 1250	10p	Large type ITE IV and V C R Handset £15.0
Decoder SAA IC 5020-5030 5040B-5050	GEC TVM25 Tripler £2.00 Universal Tripler £5.00	TX90 8 Button Unit	£6.00	0.0047/1500 005/1500	10p	GEC Ultrasonic 8CH Full Remote £10.0
K40 Text Panel £8.00	G8 Tripler £5.00 CVC20-32 £5.00	TX90-TX925 8 Button	£6.00	0105/1500 1n8/1500	10p 15p	G11 Full Remote Ultrasonic £32.0 G11 Ultrasonic Teletext Handset £20.0
KT3-K30 OF-425 OF-550 E.W. 10p	Decca 80 100 £4.50 Grundig 1VK 52 £2.50 HTBQ Pye 731 £3.00	TX100 8 Button Unit	£6.00	2n2/1500 .01/1600	15p 15p	8 C.H. Ultrasonic GEC Full Remote C2014H/C2219H £15.0 New Replacement for G11 Ultrasonic
OF-513 correction 10p OF-557 50p	11 THY £4.00 D22 for Pye 18" colour portable £4.00	TX10 8 Button Unit	£10.00	G11 8200/2KV 0 1/2KV	15p 20p	Full Remote £12.0 Thorn 4000 insert with 7 buttons £5.0
DRODES	LP 1193/63 £4.00 BG 100/41 £3.25	TX10/TX100 16 Button	£10.00	0.02KV 3n9/2KV 0.0015/2KV	15p 10p	Decca RC H £14.0 Decca RC 12 £14.0 G11 Infra-red full teletext £20.0
Bridge KBF-08 40p BY 126 10p BY 127 10p	ERO Tripler print type with foacs PO7 BG2087 £5 1/text ultrasonic rec'r panel £14.00	UHF-VHF BAND S W		6n2/2KV	15p	Dynatron-Full remote CTV 62, 63, 64 £19.00
BY 133 10p BY 134 10p	12-14V 20 for £5.00 200 for £25.00 GEC 8 touch unit assy complete with all	G11 drawer ASS 3 pots Mains swi	itch	2n2/2KV 470pf 4KV 7500pf/2KV	15р 10р 10р	Hitachi infra red handset £18.0 Philips full remote K.1.3, 16C928/20C934; 7228/7324; K.12.26C 797/1ST 66K
BY 176 25p BY 179 40p	I C s + pots £4.00 G1) L W Transformer 50p G11 E W coils £1.00	and lead	£2.00	7500pD2KV 3000PF/3000V 4n7/2KV	10p 10p 15p	1826 £12.0 G11 Full remote ton button assy £12.0
BY 184 25p BY 187 10p BY 190 40p	G11 Transient Suppressors 245V 20p G11 Scan Coils £5.00	K30 Drawer Ass with pots cable forme	£1.00	4n7/2KV 6n2/2KV 7n1/1500V	10p 10p	G11, Full remote repair service (exchanguni) £18.0 G1:C infra red full remote 8 channel (I.C SAA1250) £14.0
BY 190 40p BY 196 30p BY 198 10p	G11 100K tuner pots 12 for £1 KT3 IF panel £6.00	TX10 Drawer with 8 way pots. as	£2.50	8n2/1500V 9n1/2000V and 1500V	10p 20p	Philips infra red full remote 9 channel for
BY 204/4 8p BY 206 - BY 407 Eqv. 8p	KT3/K30 infra-red receiver beau £1	IX10 Ex. port with band switch		8n2/2KV 0/0082/2500	15p 15p	Philips infra red full remote 12 channel for 60 CP2605 £12.0 K35
BY 208/800 8p BY 210/400 5p	K30 drawer unit with IC's (home) £10	(drawer) and U.H.F. only	£2.50	150/3500 1800/4K/V	10p 5p	KT3/K30 1/Text £12.5 KT3/K30 Full remote £15.0 KT3/K30 Full remote £15.0 KT3/K30 Full remote £15.0
BY 210/800 10p BY 223 60p BY 224/600 4 8A/600v bridge 50p	K30 drawer unit with IC's (export) £10 K73 AF Sockets 50p	Hills Meter for the car man, volts		4 7nf/5KV 170/8KV	10p 10p	K F3 Power supply £4.0 GEC infra-red 2236-2026 £4.0 GEC 8 button Iull remote £14.0
BY 226 15p BY 227 15p	KT3 receiver panel £8 KT3 line driver transformer 50p	ohm with dwell and r.p.m.	£35.00	180/8KV 210/8KV 1000/19KV	10p 10p	GEC push pad handset button blobs 10 each Pre & Philips handset K13-K30 chassis
BY 228 1500v 20p Flat BY229 black 15p	Pye, K30, GEC, etc. Pre-mains stand-by switch £1	Hills 9 piece tool kit in case	£5.00	1000/10KV 47/100V Tube Thermpath 167	10p 80p £1.00	No RC5150-RC5176-RC5171-RC5177 Special Price £13.0
BY 299 Red 20p BY 229/400 30p	Decca 80/100 IF panel 5 NPN PNP 80V 6 Amp 1066 O P Irans. pair 25p	Abbey Security Smoke Alarm Mc 101	del £4.00	Rank Secam Decoder Pan VHF T115A		RC4001 KT3 and Teletex £14.0 1F CVC 32 handset repaired £15.0 CVC 32 Hand Set £15.0
BY 299/60p Tag. 30p BY 237 5p BY 254 10p	5 button touch tuner BBC1/2 11V1/2 video with ic SAS 5601/5701 £7.00		-	10 off .91 CAP G11 Philips K4 CAP 150M/385	£2.00 V 50p	CVC 45.3 and 2 Pm TX10 Hand Set Text £12.5 TX9 with Text £12.5
BY 254 10p BY 255 30p BY 298 10p	Control panel 5 sliders # mains lead £1.50 G11 8 touch button unit replaces old 6	Philips Coaxial Cable Stripper SB £7.50	0325	Philips Coaxial Cable Strip SBC325	oper -	1.X9 with Text £12.5 FX9 & TX10 button print £2.0 7X10 Focus Pots £5.5
BY 299 10p BY 406 8p	P B U £24 Tube base + base unit for 820 Euro chassis £4.00	CVC 20-25-30 Mains Switches		60p	0	ITT T/V & Video Processor. 1200 Type £10.0
BY 527 20p BY 407a 10p	GFC Line O/P Trans & Rec Stick for Portable £3.00	Infra Red and Ultrasonic G11 Tel RANK & ITT Mains Remote On-	Off Swit	coder Panel £.90 ch (720R) £1.50	2	PHILIPS UNIVERSAL HAND SET £12.00 RC5
BY 448 10p BY 500/200 — 5 amp 8p BY 527 10p	CVC 20/25/30/35/40 decoder panel £10 CVC 20/25/30/35/40 decoder panel (unrested) £5	RANK & ITT Remote Switch 280 G11 Mains Switch	Uohm	£1.50 50p	Ē	KT3 – K45
BY 527 10p BY 602 10p BY∀ 26C 10p	CVC 40/45 H panel £5 40K Transducer 50p	4 amp Mains Switch GEC Mains Switch 4 amp		25p 30p	C	We have all parts for Philips Handsets RC5353 £15.0
F 247 10p GP20G 5p	PHILIPS NES/1N £1.20 LM337M Reg 30p	KT3 Mainswitch G8 Mains Switch G11 Preh Red LED P/Button for	сце	£1.00 75p ange 20p	N	RC5300 £12.0 Philips RC5 £15.0
GRP80G (TX10) 30p XK 3102 50p	KT3 Front Panel Control	RANK TOSHIBA Transductors Mains Switch IT1 Long Type Prir	FPC-201			FEXT-TYPE Replace Hand Set for Philips K F3-K30, K4 etc £12.3
BYV 28/200 20p Bridge TX10 800/3 amps 30p KBPC35-02 Bridge £1.50		Mains Switch Philip Long Type T. Mains Switch GEC Long Type T/	AG AG	75p 75p	n	THORN HAND SETS
KBPC35-02 Bridge £1.50 Bridge Rec. D35B10 40p		2000 Chassis Fidelity Mains Switc 250V/4A White Lorlin Mains Swit	h (4 TA) Ich	i) 60p 35p		9000 9600 – FX9 – TX10 – TX100 Text and Non-Text £10.0
International Rectifier EHT Diodes G 6A/600V Stud Diodes 20p		KT3-K30-K35 Full Remote Mains Feletext Adaptor Kit TY-500 Pan	Switch asonic	£12	7	PHILIPS RC5171 £12.0
6A/1000V Stud Diodes 20p		Philips Battery Tester All Types a Philips K4 Mains Switch with stan	nd charg	ег vis £6 80-р		K35-K4 HAND SET Repaired for £5.00
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Fail Family with Data Model: Mallestange Malle	TDA2591 €1.00 TDA2593 €3.00 TDA2593 €3.00 TDA2593 €3.00 TDA2593 €3.00 TDA2594 €3.00 TDA2595 €1.50 TDA2511A €1.00 TDA2513 €1.00 TDA2514 €1.00 TDA2515 €1.00 TDA253 €1.00 TDA2540 €1.00 TDA2553 €1.00 TDA2564 €1.00 TDA2573 €1.00 TDA2584 €1.00 TDA2584 €1.00 TDA3688 €2.00 TDA3888 €3.00 TDA3898 €3.00 TDA3898 €3.00 TDA3891 €4.00 TDA3891 €4.00 TDA3891 €4.00 TDA3891 €4.00 TDA3892 €3.00 TDA3891 €4.00 TDA3892 €3.00 TDA3891 €4.00 TDA3892
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