

THE LEADING UK CONSUMER ELECTRONICS TECHNOLOGY MAGAZINE

TELEVISION

SERVICING · VIDEO · SATELLITE · DEVELOPMENTS

JUNE 1996 £2.35

A REED BUSINESS PUBLICATION

FREE Temperature
indicator strips

Starting a TV/video
repair business

Servicing the Hitachi
VTM720/722

Monitor fault reports

100V test supply

Inside
the Pace
MSS1000

Fault Reports *TVs, VCRs, Camcorders and Satellite*



THE COMPLETE PHILEX CD CATALOGUE NOW ON CD ROM



A comprehensive illustrated guide to components and accessories specifically designed to help you find the products you require as quickly and easily as possible

WITH:

PHOTOGRAPHS AND LINE DRAWINGS
to help you identify products

FULL CROSS REFERENCES
for components and remote controls covering hundreds of brands and thousands of: TV, VIDEO, AUDIO & SATELLITE MODELS

FAST SEARCH
by Philex part number, original part number, model number, product type, word search, your part number

CUSTOMISE FACILITY
add your own part number and comment for any product



**FOR YOUR COPY OF THE PHILEX CD CATALOGUE
PHONE NOW - TEL: 0181 202 1919**

CONTENTS

JUNE 1996

VOL. 46, NO. 8

Leader 547

Satellite Workshop 548

Jack Armstrong on his experiences running a satellite servicing business.

Test Case 402 549

Camcorner 550

100V Test Power Supply 556

Ian Rees describes a simple power supply designed to test the operation of the line output stage in a 'dead set'. It is helpful to be able to assess line output stage operation independently.

Servicing the Sony BE3B Chassis 572

In this concluding instalment Giles Pilbrow covers the signal processing and microcomputer control system in the chassis.

Servicing the Hitachi VTM720/722 576

John Coombes provides a rundown on fault-finding and maintenance procedures.

Satellite Notebook 578

TV Fault Finding 582

What a Life! 586

As well as TV and video troubles, Donald Bullock finds out about some problems with Amstrad PCW series wordprocessors.

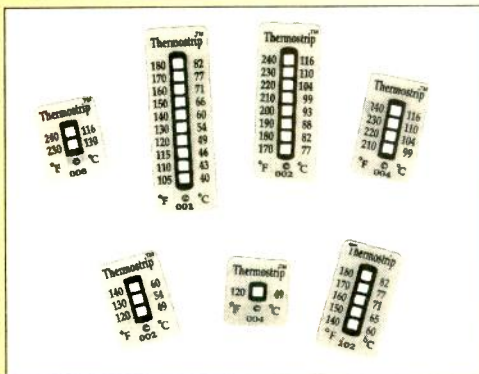
Letters 588

Amstrad SRD510 Mod 593

Peter Haylor on how to add front-panel channel up/down control to this popular satellite receiver.

Teletopics 594

Obtain your free evaluation pack of temperature indicator strips: page 557



Long-distance TV 558

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

Monitors etc 562

Readers' reports on faults experienced with monitors and allied computer equipment.

Going it Alone 564

There is much to consider when you are thinking about setting up your own servicing business. John Pitt-Francis, who branched out successfully over three years ago, tells how to go about it.

VCR Clinic 568



Inside the Pace MSS1000 597

The electronics within this satellite receiver are quite complex. J. LeJeune starts off a new series with a description of the power supply, the tuning system and the video processing.

Help Wanted 604

Next Month in Television 605

Editor
John A. Reddihough

Production Editor
Tessa Winford

Consultant Editor
Martin Eccles

Publishing Director
Susan Downey

Advertisement Manager
Carol Nobbs
0181 652 8330

Advertisement Sales Executive
Pat Bunce
0181 652 8339
Fax 0181 652 8931

Editorial Office
0181 652 8120
Fax 0181 652 8956

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

JAPANESE TRANSISTORS

Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price		
2SA1371	100p	2SC1008	20p	2SC1730	10p	2SC2270	60p	2SC2750	300p	2SC3277	280p	2SC3893	225p	2SD836A	60p	2SD1279	600p	2SD1815	100p
2SA1380	75p	2SC1010	225p	2SC1735	70p	2SC2271	30p	2SC2751	270p	2SC3280	200p	2SC3895	400p	2SD837	55p	2SD1288	175p	2SD1825	60p
2SA1381	100p	2SC1012	75p	2SC1739	800p	2SC2272	15p	2SC2752	140p	2SC3281	200p	2SC3897	400p	2SD838	300p	2SD1289	250p	2SD1843	100p
2SA1382	120p	2SC1013	170p	2SC1740	10p	2SC2275	50p	2SC2767	300p	2SC3284	600p	2SC3907	250p	2SD841	110p	2SD1291	400p	2SD1846	350p
2SA1385	180p	2SC1014	140p	2SC1741	35p	2SC2278	70p	2SC2769	400p	2SC3293	85p	2SC3927	250p	2SD844	200p	2SD1292	60p	2SD1849	325p
2SA1386	40p	2SC1030	150p	2SC1755	90p	2SC2290	1800p	2SC2773	700p	2SC3298	50p	2SC3950	120p	2SD845	250p	2SD1297	300p	2SD1850	325p
2SA1423	30p	2SC1047	20p	2SC1756	35p	2SC2291	40p	2SC2774	500p	2SC3299	120p	2SC3953	60p	2SD850	170p	2SD1302	20p	2SD1858	40p
2SA1489	300p	2SC1050	280p	2SC1758	30p	2SC2295	60p	2SC2785	60p	2SC3300	400p	2SC3973	210p	2SD856	48p	2SD1308	80p	2SD1877	175p
2SA1491	300p	2SC1060	70p	2SC1775	10p	2SC2298	35p	2SC2786	20p	2SC3303	100p	2SC3987	220p	2SD858	250p	2SD1309	140p	2SD1878	230p
2SA1493	500p	2SC1061	85p	2SC1781	20p	2SC2307	300p	2SC2787	10p	2SC3306	130p	2SC3996	1200p	2SD863	23p	2SD1310	140p	2SD1879	275p
2SA1516	280p	2SC1070	65p	2SC1789	100p	2SC2308	10p	2SC2791	500p	2SC3307	600p	2SC4006	100p	2SD864	200p	2SD1313	1000p	2SD1884	300p
2SA1535	175p	2SC1096	40p	2SC1809	40p	2SC2312	300p	2SC2792	220p	2SC3309	150p	2SC4020	280p	2SD866	120p	2SD1326	200p	2SD1886	450p
2SB324	40p	2SC1098	120p	2SC1810	250p	2SC2314	70p	2SC2793	700p	2SC3316	280p	2SC4023	325p	2SD866A	140p	2SD1328	60p	2SD1887	450p
2SB546	45p	2SC1106	180p	2SC1815	10p	2SC2316	150p	2SC2808	40p	2SC3317	350p	2SC4056	350p	2SD868	260p	2SD1347	70p	2SD1910	280p
2SB560	25p	2SC1114	415p	2SC1819	70p	2SC2320	10p	2SC2810	360p	2SC3323	480p	2SC4106	200p	2SD870	190p	2SD1348	65p	2SD1911	300p
2SB561	50p	2SC1115	280p	2SC1826	60p	2SC2322	120p	2SC2812	40p	2SC3327	60p	2SC4123	450p	2SD871	300p	2SD1350	150p	2SD1913	50p
2SB562	25p	2SC1116	290p	2SC1827	60p	2SC2329	480p	2SC2814	40p	2SC3331	25p	2SC4124	250p	2SD879	60p	2SD1376	125p	2SD1929	60p
2SB566	90p	2SC1124	270p	2SC1829	500p	2SC2331	40p	2SC2824	75p	2SC3333	120p	2SC4169	60p	2SD880	40p	2SD1379	100p	2SD1939	75p
2SB595	55p	2SC1161	110p	2SC1833	40p	2SC2333	200p	2SC2825	900p	2SC3345	100p	2SC4236	550p	2SD882	25p	2SD1380	100p	2SD1941	500p
2SB596	50p	2SC1162	30p	2SC1834	50p	2SC2334	80p	2SC2826	200p	2SC3352	200p	2SC4237	650p	2SD892A	75p	2SD1384	50p	2SD1959	280p
2SB598	30p	2SC1164	600p	2SC1844	50p	2SC2335	75p	2SC2827	300p	2SC3353	280p	2SC4242	170p	2SD894	35p	2SD1390	350p	2SD1961	50p
2SB600	500p	2SC1165	750p	2SC1845	15p	2SC2344	35p	2SC2830	200p	2SC3355	50p	2SC4301	550p	2SD895	100p	2SD1391	250p	2SD1978	50p
2SB646	40p	2SC1166	100p	2SC1846	35p	2SC2345	60p	2SC2832	400p	2SC3356	120p	2SC4742	275p	2SD896	200p	2SD1392	150p	2SD1984	450p
2SB647	20p	2SC1170	180p	2SC1847	45p	2SC2347	60p	2SC2834	250p	2SC3358	50p	2SC4769	300p	2SD900	400p	2SD1395	150p	2SD2012	50p
2SB648	45p	2SC1172	150p	2SC1855	85p	2SC2353	170p	2SC2839	70p	2SC3361	50p	2SD198	140p	2SD905	450p	2SD1396	120p	2SD2125	225p
2SB649	35p	2SC1173	40p	2SC1856	25p	2SC2360	120p	2SC2843	40p	2SC3376	300p	2SD199	195p	2SD916	130p	2SD1397	120p	2SD2233	200p
2SB688	90p	2SC1195	210p	2SC1865	700p	2SC2361	150p	2SC2853	70p	2SC3378	120p	2SD201	260p	2SD921	320p	2SD1399	300p	2SD2348	425p
2SB703	90p	2SC1212	35p	2SC1870	700p	2SC2362	50p	2SC2877	120p	2SC3377	70p	2SD202	180p	2SD923	360p	2SD1400	280p	2SD2350	425p
2SB705	200p	2SC1213	15p	2SC1875	220p	2SC2365	280p	2SC2878	20p	2SC3378	120p	2SD206	260p	2SD924	120p	2SD1402	150p	2SD2356	700p
2SB707	200p	2SC1214	15p	2SC1881	70p	2SC2369	100p	2SC2879	3200p	2SC3383	80p	2SD207	195p	2SD925	360p	2SD1403	200p	2SD2357	425p
2SB716	20p	2SC1215	25p	2SC1890	15p	2SC2371	25p	2SC2883	60p	2SC3387	550p	2SD213	25p	2SD926	120p	2SD1406	60p	2SD2361	700p
2SB718	60p	2SC1216	200p	2SC1904	125p	2SC2373	210p	2SC2890	20p	2SC3393	80p	2SD215	75p	2SD947	100p	2SD1407	60p	2SD2362	425p
2SB727	200p	2SC1222	15p	2SC1906	15p	2SC2383	50p	2SC2899	50p	2SC3399	50p	2SD216	75p	2SD947	100p	2SD1408	60p	2SD2363	425p
2SB754	80p	2SC1226	75p	2SC1907	20p	2SC2389	45p	2SC2909	60p	2SC3400	35p	2SD219	300p	2SD950	300p	2SD1409	60p	2SD2364	425p
2SB755	310p	2SC1252	850p	2SC1909	250p	2SC2407	110p	2SC2911	80p	2SC3401	50p	2SD220	65p	2SD951	290p	2SD1410	125p	2SD2365	280p
2SB772	25p	2SC1278	110p	2SC1913	90p	2SC2408	120p	2SC2912	120p	2SC3402	40p	2SD223	300p	2SD957A	50p	2SD1419	170p	2SD2366	280p
2SB774	50p	2SC1279	30p	2SC1921	15p	2SC2412K	50p	2SC2922	480p	2SC3412	800p	2SD225	40p	2SD958	60p	2SD1427	75p	2SD2367	350p
2SB775	100p	2SC1306	90p	2SC1923	10p	2SC2440	200p	2SC2927	650p	2SC3416	30p	2SD226	40p	2SD965	35p	2SD1413	60p	2SD2368	75p
2SB791	280p	2SC1308K	350p	2SC1929	180p	2SC2458	10p	2SC2928	550p	2SC3417	800p	2SD227	240p	2SD970	70p	2SD1415	190p	2SD2369	525p
2SB795	60p	2SC1312	40p	2SC1940	110p	2SC2459	50p	2SC2929	280p	2SC3419	120p	2SD228	650p	2SD973A	70p	2SD1417	125p	2SD2370	525p
2SB825	135p	2SC1317	15p	2SC1941	27p	2SC2470	65p	2SC2934	75p	2SC3419	120p	2SD229	150p	2SD973A	70p	2SD1418	125p	2SD2371	525p
2SB861	110p	2SC1318	10p	2SC1942	350p	2SC2481	120p	2SC2937	250p	2SC3420	80p	2SD230	150p	2SD973A	70p	2SD1419	125p	2SD2372	525p
2SB862	180p	2SC1325	400p	2SC1944	350p	2SC2482	20p	2SC2938	235p	2SC3422	75p	2SD231	150p	2SD973A	70p	2SD1420	125p	2SD2373	525p
2SB886	90p	2SC1327	20p	2SC1945	350p	2SC2483	120p	2SC2939	400p	2SC3423	60p	2SD232	140p	2SD973A	70p	2SD1421	125p	2SD2374	525p
2SB950	180p	2SC1328	15p	2SC1946	1500p	2SC2484	185p	2SC2944	300p	2SC3426	150p	2SD233	120p	2SD973A	70p	2SD1422	125p	2SD2375	525p
2SB951	190p	2SC1342	15p	2SC1947	450p	2SC2484	185p	2SC2944	300p	2SC3426	150p	2SD234	120p	2SD973A	70p	2SD1423	125p	2SD2376	525p
2SB1009	110p	2SC1345	15p	2SC1957	70p	2SC2491	200p	2SC2958	50p	2SC3447	200p	2SD235	55p	2SD973A	70p	2SD1424	125p	2SD2377	525p
2SB1077	180p	2SC1346	100p	2SC1959	10p	2SC2495	1900p	2SC2962	800p	2SC3456	200p	2SD236	55p	2SD973A	70p	2SD1425	125p	2SD2378	525p
2SB1109	55p	2SC1358	270p	2SC1967	1300p	2SC2498	50p	2SC2979	160p	2SC3457	125p	2SD237	55p	2SD973A	70p	2SD1426	125p	2SD2379	525p
2SC182	75p	2SC1359	15p	2SC1969	160p	2SC2500	25p	2SC2987	250p	2SC3459	180p	2SD238	350p	2SD973A	70p	2SD1427	125p	2SD2380	525p
2SC172	25p	2SC1360	70p	2SC1970	100p	2SC2502	200p	2SC2988	150p	2SC3460	130p	2SD239	35p	2SD973A	70p	2SD1428	125p	2SD2381	525p
2SC380	10p	2SC1364	25p	2SC1971	400p	2SC2519	60p	2SC2995	60p	2SC3461	350p	2SD240	15p	2SD973A	70p	2SD1429	125p	2SD2382	525p
2SC382	50p	2SC1383	25p	2SC1972	600p	2SC2527	300p	2SC2999	50p	2SC3466	225p	2SD241	15p	2SD973A	70p	2SD1430	125p	2SD2383	525p
2SC388A	60p	2SC1384	20p	2SC1973	150p	2SC2534	150p	2SC3001	1400p	2SC3468	70p	2SD242	20p	2SD973A	70p	2SD1431	125p	2SD2384	525p
2SC394	60p	2SC1393	20p	2SC1984	75p	2SC2535	300p	2SC3012	300p	2SC3481	300p	2SD243	50p	2SD973A	70p	2SD1432	125p	2SD2385	525p
2SC403	25p	2SC1394	15p	2SC1984	150p	2SC2538	100p	2SC3019	320p	2SC3482	275p	2SD244	70p	2SD973A	70p	2SD1433	125p	2SD2386	525p
2SC454	15p	2SC1398	55p	2SC1985	100p	2SC2540	1900p	2SC3025	500p	2SC3486	275p	2SD245	70p	2SD973A	70p	2SD1434	125p	2SD2387	525p
2SC458	10p	2SC1400	50p	2SC1986	100p	2SC2542	300p	2SC3032	550p	2SC3502	25p	2SD246	70p	2SD973A	70p	2SD1435	125p	2SD2388	525p
2SC460	10p	2SC1403	500p	2SC2001	15p	2SC2545	55p	2SC3030	300p	2SC3503	50p	2SD247	120p	2SD973A	70p	2SD1436	125p	2SD2389	525p
2SC461	15p	2SC1407	50p	2SC2002	15p	2SC2546	25p	2SC3037	125p	2SC3504	120p	2SD248	50p	2SD973A	70p	2SD1437	125p	2SD2390	525p
2SC495	45p	2SC1413	150p	2SC2003	20p	2SC2547	65p	2SC3038	125p	2SC3505	240p	2SD249	50p	2SD973A	70p	2SD1438	125p	2SD2391	525p
2SC496	25p	2SC1419	50p																

REPLACEMENT VIDEO HEADS

Model	Price	Model	Price	Model	Price	Model	Price	Model	Price																														
AIWA AV66AV77 GT30 G900	1200p 1100p 1500p	VCR8103, VCR8107 VIP300A MKII	2200p 1900p	VR3833, 3912, 3913, 3914, 3963, 3975, 4913, VFP3833 VR3986 VP3826, 3906, 3916, 3926, 3946, 3948 VR3927 VR3976 VR3977 VR3984, VR3994 VR3995, 3997 VR3917 VR3930, VR3731, VR3749 VR3918, VR3919, VR3938 VR3520, 3701, 3719, 3720, 3721, 3758, 9720 VR3907, VR3908 VR3968	650p 2000p 1550p 1400p 2300p 2700p 2300p 1800p 1400p 2500p 1500p 2000p 1600p 700p	NVM1, NVM3, NVM5 AG2100, AG2200 NV430 NV730, NV770 4 HEAD NV366 NV180, NVD48 NV788 NV810, NV830 NV850, NV950 NV870, NV890, NV970 NVG33, NVG46, NVL23, NVL25, NVL28 NVG10, 11, 12, 14, 16, 120, NV250, 280, 450, 465 NVG18 NVG20, 21, 22, 25, 28, 200, NVD48 NVG50, NVG300 NVG45 NVH70 NV688 NV600 AG6800, AH6810 AG6100, AG6200, AG6300 NVG7, NVG9, NV230 NV780 NVG15, NVG400 NVH7, NVMC20 NVF70	4200p 700p 1000p 1450p 1850p 2300p 2600p 2400p 2750p 3600p 1450p 1800p 1800p 1800p 2500p 3600p 2600p 1150p 1150p 2600p 1050p 2400p 2600p 3800p 5200p	VHR1100, VHR1200 VHR1500, VHR2500 VHR2700 VHR7900	1500p 2100p 2450p 3000p																														
AKAI VS105, 112, 115, 116, 125, 126, 201, 202, 205, 220, 240, 244, 245, 247, 248, 250, 301, 303, 304, VSP8, VSP92 VP7100, VSP300, VSP9500, VSP9800 VP77, VP88, VP7100, VP7200, VSP9700, VSP9800 VS1, VS2, VS3, VS4, VS5, VS10, VSP1 VS33, VS35, VS37, VS38, VS53, VS55, VS66, VS765, VS767, VS768 VS512, VS515, VS516 VS465 VS11, VS12 VS6, VS8, VS9 VSX9 VSF600, VSF650 VS155, VS165 VS20, 22, 24, 25, 26, 27, 422, 426, 427, VSP10, VSP9 VSR9 VS109, VS603, VS606, VS607 VS75	1000p 650p 1200p 1350p 2100p 2800p 2300p 1200p 2400p 2500p 2300p 1250p 1300p 2500p 2500p	FISHER FVHP420, 510, 520, 530, 615, 618, 620, 622, 710, 711, 715, 720, 721, 722, 730, 830, 905, 906, 908, 910, 911, 915, 916, 918, 5000, 5001, 5005, 5050, 5075 VBS3500, 7100, 7500, 7600, 9900, VBS3300 VBS7300, VBS7100, VBS9000 FVHP500, 711, 715, 721, 722, 730, 830, 5100, FVHD720 FVHP725, 830, 980 FVHP990 FVHP975 FVHD40, FVHD140, FVHP1, FVHP10, FVHP20	1100p 1800p 2000p 1100p 2500p 2700p 2400p 1150p	J.V.C. & FERGUSON HR2200, 3300, 3320, 3330, 3350, 3360, 3660, 3760, 3860, 4100, 3292, 8900, 8901, 8902, 8903, 8906, 8922, 8928, 3V01, 3V06, 3V22 HR3660, 7600, 7610, 7650, 7700, HRD110, 111, 120, 121, 220, 225, HRS100, 8904, 8923, 8924, 8925, 8929, 8935, 8941, 8943, 8944, 3V16, 3V23, 3V24, 3V31, 3V35, 3V36, 3V38, 3V39, 3V49 BR1600, HRD140, 141, 142, 143, 150, 152, 156, 157, 158, 160, 5101, HRS10, 8947, 8948, 3V42, 3V44, 3V45, 3V46, 3V47, 3V52, 3V54, 3V55, 3V56, 3V57 HRD154, 170, 171, 210, 211, 217, 320, 321, 330, 521, 522, 525, 526, 527, 550, 8950, 8951, 3V64, 3V65, FV10, FV11, FV20, FV21, FV25 HRD565, HRD566, 3V48 HRD725, HRD755, 3V43, 3V53 8930, 8931, 8933, 8940, 3V29, 3V30 8945 3V00, 8902, 8903, 8909, 8912, 8922 FV31 FV37, FV43H, HRD860 BR700CE, BR7005 HR7200, 7300, 7350, 2650, BR6200 HRD455 HRD520 HRD300, 400, 580, 600, 620, 650 HR4100 HRD750, HRD830 HRD250, HRD257 FV32, 8942, HR7655 HRD180, 180, 230, 610, 3V59, FV12, FV20B, 26, 30, 32, 33, VC141L HRD370, HRD430, HRD470, 3V58, FV13H HRD530, HRD700, FV14T GRC1, GRC2, 3V41 HRD330, 337, 440, 637, 641, 660, HRFC100, FV44L	625p 2000p 1500p 1400p 2000p 1400p 2300p 1000p 1500p 3500p 2600p 700p 1000p 1500p 2000p 1400p 2300p 3100p 2800p 2100p	N.E.C. N9011, 9012, 9013E, 9014E, 9014G, 9015, 9016, 901A, 902A, 9033, 9034, 9040, 9053, 9054, 9055, 9063, 9065, 9066, 9067 DX1000, 1600 N911A, 914C, 915A, 916A, 917, 9110 9120 PVC600, 740, 744, 754, 763E, 764, PV2300, 2400, 760, 794, 770, 774 N380, N381, N830, N831, N832, N833, N834, N835, N836 8261, AH1 (for model DX3000), DX4000 N9610 N9510 N9052, N9530, DX2000 N895 PVC2300, 2400, 740, 744, 760, 764 DS6000	1200p 1200p 1200p 1500p 700p 700p 3000p 3150p 1400p 1700p 3500p	NORDMENDE V1001, 1005, 1015, 1025, 1035, 1041, 1055, 1065, 1105, 2005 V110, V333 V101, 102, 103, 112, 141, 142, 200, 300, 301, 302, 350, 500, 3005 V1205, V1215, V1235, V1245 V1305 V380 V502, V503, V5005	700p 1250p 2000p 700p 1400p 2450p 2300p 3150p	ORION VH3, VH555, VH600, VH700, VH844, VH900, VH1000 (ALL MODELS) VH11, VHA24	1100p 700p	PHILIPS VR6460, VR652C, 64VR60, VR6420 VR6711 4 HEAD 6920, VR6440 VR6441, VR6540, VR6541, VR6640, VR6642	725p 1800p 2500p 1300p	RANK BV6900AS N830EA, RV300, RV310, RV320, RV330, RV340, RV350, RV380	1800p 700p	REDSON MR100	1700p	SABA 2A10, 2A70, 2B20 4A10, 4B20 6A10, 6A70 8A10, VR6038 CVR6083, VR600, 66007, 6008, 6009, 7006, 7007 PVR6068, 6070, 8070, VR2000, 6000, 6010, 6012, 7000, 9010 VHR7000, VR5005 VR6004, 6005, 6011, 6013, 6014, 6020, 6022, 6023, 6024, 7004, 7011, 7014, 7720, 7730, 81, 8014 VR6018, VR7018 VR6028 VR7016	1400p 2450p 2300p 3150p 1250p 600p 1500p 1500p 1500p 2450p 2300p 2000p	SAISHO VR100, 605, 705, 805, 905, 1000, 1100, 1200, 1600 VR3300X, VR3600X, VR3650, VR3800 VR3200, VR3500 VR2000, VR3300, VR3600	1200p 1400p 1400p 1400p	SALORA 6500, 6600 SV7300, SV8200, SV8300, SV9200 SV7400, 8400 SV8100	1600p 1500p 1500p 1200p	SAMSUNG SVX301, VB900, 910, VV7510, VT320, 5600, VX510, 511, 520, 615, 626, 627, 717, 714, 619, 629, 710, 712, 720, 730, 970, 971, 972, SV716, 717, SVX303, 305, VB8510, 520, 610, 616, 617, 619, 620, 626, 627, 629, 710, 971, V1520, 616, 621, 626, 900, VB770, V1730, V1770, VKB220, VX750, 5600, VK8225 VM1560, VN1561	2900p 2900p 2900p 2900p 2200p	SANYO VTC5000, 5400, 6000, 6500, VPR5000, VTC1500, VTCM10, 11, 20, 21, 25, VTC2000, 5100, 5150, 5300, 5400, 5350, 5370, VTCNX10, VTCNX15, 20, 30, VPR500 VTC5500, 5550, 9100, 9300, 9350, 9355, 9485, 9500 VHR1110, VHR1150, VHR1300, VHR1700, VHR2300 VHR2300, 3270, 3100, 3150, 3300, 3400, 3310, VHRD500	1800p 1150p 1900p 1200p 1200p	SIEMENS FM350, FM352, FM355, FM361, FM362, FM363 FM364 FM391, FM392, FM461 FM394, FM464 FM462, FM561 FM468 FM484, FM485, FM602, FM604, FM622, FM624 FM585 FM600	1300p 1350p 1800p 2800p 1600p 2450p 180p 1425p 1900p	SONY DSR-19R (FOR SLT 9ME) DSR-21R (FOR SLC 8-C9) SLF35R (FOR C20, C30, C40, SLF1UB, SLF1E) 2 PIN SLC24PS, SLF33E, SLC44PS, SLF30PF, SLF60PS, SLK85, SLT20ME, SLT30ME DSR-43R (FOR SLC7 RANGE, SLC5000, SL1500, SLC3000) 1 PIN SLC6E, SL136ES, SL37E SL3000, 8000, 8080, SLC5E, SLT7ME SLK201, 202 SLK95, SLT50ME SLV373VB	3100p 2600p 1500p 1500p 1500p 1300p 1600p 2900p 2600p	TOSHIBA V83 V9680 V8600, V8700 V21, V31, V33, V50, V51, V53, V9600 V55, V57 V71, V73, V74, V75, V77, V80, V81, V82, V83, V84, V85, V86, V87 V80, V93 V5470, V5480 V600 V880MS V700G V500G, V509G V9680 V300G, V301, V305, V309G V61, V63 V110, V120, V130, V140, V210, V220	1500p 3400p 3000p 1450p 700p 1200p 1450p 2350p 2600p 3700p 2500p 2900p 2550p 1700p 1500p	TRUMPH VR9500, VR9501, VR9525	1100p	TELEFUNKEN A890 A920, VR1970, 2920, 2925, 2930, 410, 7921, 7926, 7931, 7970, 970 VR400, 410, 450, 510, 519, 520, 529, 540, 610, 620, 640, 920, 1920 A930, 932, 935, VR2931, 2935, 2941, 3935, 4935, 4940, 4942, 4945, 5935, 7932 A935, VR3945, VR3950, VR7959 A940, VR1925, 1930, 1940, 1950, 2960, 440, 449, 530, 535, 539, 549, 550, 630, 650, 925, 930, 940, 950 VR1980, VR7980, VR980 VR2915 VR2970, VR7971, VR975 VR7979	2700p 125p 700p 700p 1400p 2450p 2000p	THOMSON TX8000, V309, 316, 320, 321, 323, 326, 4100, 4200, 4300, VX305T, 306T, 309BL, 3301, 312T, 410T, 411T TX8500, V318, 342, 343, 351, 352, 353, 4210, 4230, 4260 V333 V340 V357, VK309LP V360, V5500 V364, V4400 V368, V6000, V8540 V410, 510, 610, 630, 715, 4240 V430, 530, 4340 V450 VK300T, VK301T, VK302T, VK303T, VK308P VM10, VM20	1250p 1100p 1100p 2300p 2450p 2000p 2700p

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

Experience

Strange the different attitudes to experience nowadays. Ms C. Raynor in a letter (February) that produced an interesting response complained of the difficulty in getting a job, despite having a sound technical knowledge, without experience. In these hard times many employers will not offer jobs to those who cannot show that they have done the same sort of work previously. Yet in many other employment contexts experience seems to count for little. Martin Pickering, in his article on design for reliability last September, commented that experience is simply not passed on. So firms and their employees have to learn by making the same old mistakes, and customers are let down because of product failures. And of course those of us in the repair trade find ourselves dealing with the same tiresome problems – electrolytics mounted near hot resistors or transistors, heavy components in positions where they strain the PCB, and all that sort of thing – which should be old history by now. Well, perhaps it is, to the Japanese, but not to many other manufacturers. And maybe we should be thankful we still have these obvious sillies that are relatively straightforward to repair.

To my mind the failure of many, mainly Western, firms to recognise the importance of experience and benefit from it is a matter of some significance. There are a number of reasons that seem to contribute to this phenomenon. An obvious one is the current fad for workforce 'downsizing'. Get rid of all those useless people if what they are doing is not making an obvious, immediate contribution to profits (sometimes even if it is!). Thus the removal of large swathes of middle management and the vogue for early retirement to reduce staff. Some job losses as a result of changed work practices are clearly

inevitable. But this can equally clearly go too far. Because what is lost when older people are prematurely removed is the experience that companies have gained and has, in the past, enabled mistakes and misjudgements to be avoided. The experience that is built up by those who work for a firm for a number of years is a sort of collective knowledge that has great value.

Perhaps the most obvious example of the way in which things can go wrong is to be seen with the high street banks. Years ago the local bank manager was assumed – by the time he became the manager – to have gained a detailed knowledge of local businesses, their needs and viability. This enabled him to be judicious in making loans. But such an approach was not favoured in the commercial atmosphere that evolved in the late Eighties. Lend, lend, lend to grab market share was the approach, and if the traditional bank manager got in the way of this then get rid of him. The net result was extensive bad debts that contributed greatly to the recession. It has taken a long time for them to unwind. I gather that some of the main banks are coming round to realising that local managers with local experience are the best way of running their business profitably.

This is only one example, which is reasonably clear to see. Others are not quite so obvious. I strongly suspect that excessive reliance on computers is having an insidious effect. Install computers that can do much of the routine work and you can reduce your staff. But when the workers go they take their experience with them. This can't be replaced, and is one thing that the computer doesn't and can't have. You can't say to a computer "what do you think about this idea?" and get a considered reply based on a knowledge of what has happened in the past and a reasoned guess about prospects. Computers don't have

experience to call upon, and don't have views or think laterally. They may one day, but certainly not for the time being. The failures of economic modelling by the Treasury and others is a clear example of the inadequacies of computers in this respect. This is not to suggest that humans have infallible judgement, far from it. But they can call upon experience, discuss prospects with each other and evolve a reasoned opinion. Assuming, that is, that you haven't downsized the organisation to the extent that few with any worthwhile experience are left.

Things could well get worse. The current move to increased use of casual staff, along with the idea that people should expect to have to keep changing their jobs, will add to the loss of collective experience. Why should anyone taken on to do a job for a couple of months do anything other than what they are in strict terms asked to do? If someone points out deficiencies in an organisation or its plans or products, they are not likely to find favour – or be asked back again! Those with critical minds don't seem to fit in with the current commercial ethos. Positive thinkers are wanted. People who will get on with it and make silly mistakes because they don't know any better.

Not all firms allow themselves to be dominated by the latest management fads of course, and it is a matter of fine judgement to decide the respective weights to give to experience and the enthusiasm of newcomers. But next time your car breaks down, your telly goes on the blink or your sat receiver blows up, reflect on the fact that someone out there might have had the answer had he not been downsized. How many vehicles is it that Ford is to recall for modification in the USA and Canada? Some 8.7m I read. Because of an incorrectly designed switch.

COPYRIGHT

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

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

CORRESPONDENCE

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

INDEXES AND BINDERS

Indexes for Vols. 38 to 45 are available at £3.50 each from SoftCopy Ltd., who can also supply an eight-year consolidated index on computer disc. For further details see page 605

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

BACK NUMBERS

Some back issues are available at £2.75 each. For further details see box on page 574

SUBSCRIBER SERVICES

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

Subscriber Enquiries

Telephone: 01444 445 566

Fax: 01444 445 447

Credit card orders: 01622 778 000

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

Cheques made payable to: Television

Subscription rates:

UK	£28.00 per year
Overseas	£40.00 (Airmail – Europe)
Overseas	£52.00 (Airmail – Rest of World)

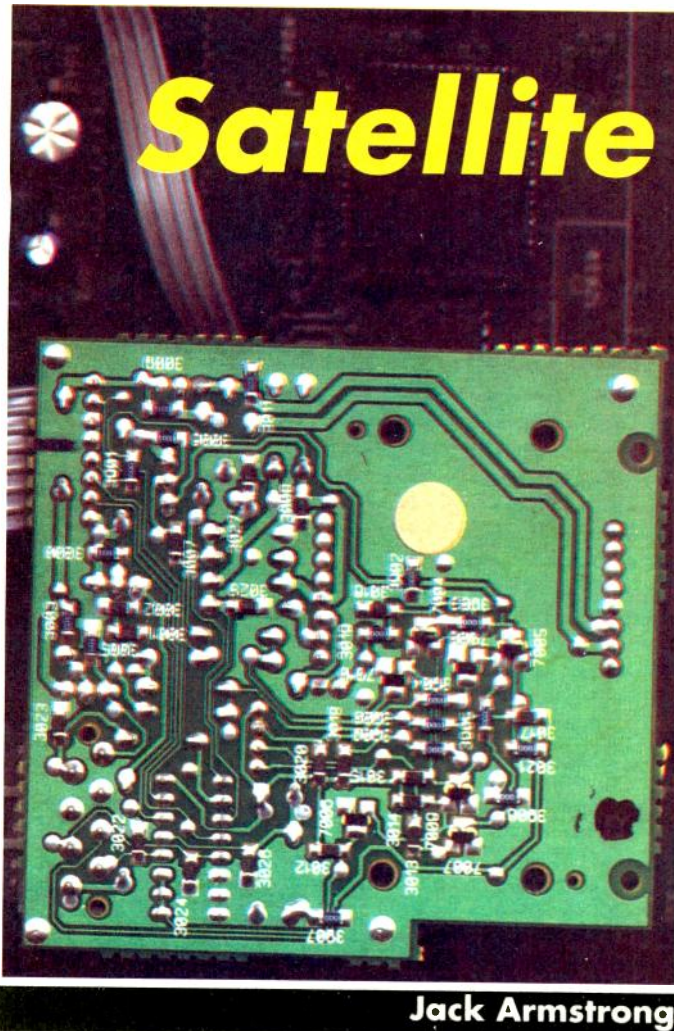
Newsagent Enquiries

Telephone: 0181 652 8171

Fax: 0181 652 8997

ISSN 0032-647X





Jack Armstrong

As it's all organic farming around here – judging by the smell, anyway – the only mad cow is the one that's married to a local farmer. I could tell she was mad by the way she banged the shop door behind her.

"It's done it again" she announced as she slammed a Pace SS9200IRD down on the counter.

I didn't need to ask what it had done again. This was the sixth Monday in a row on which she'd arrived with the receiver. When it came in for the first time I replaced the usual parts, including C9, C11, the BUT11A chopper transistor and the fusible resistors. On the second occasion only the BUT11A transistor and the fuse had failed, but I fitted a new chopper transformer (T12) and large electrolytic (C7) for good measure. Since then it had arrived punctually each Monday to have the fuse and transistor replaced. I had checked everything but could find no cause for the failures.

This definitely had to be the last time. I decided to pay a home visit. That afternoon, with the receiver

once again in working order, I drove to the farm to check the installation.

Down on the Farm

It transpired that the living room was actually an extension to the old building, and that the mains socket used for the satellite receiver was supplied from the phase used in the milking sheds. The other sockets in the house were all on a different phase.

The cause of the trouble was not the difference between the phases but the power surges caused by the milking equipment. The milking was all done by hand during the week. On Saturdays and Sundays however it was done by machine.

The solution was simply to plug the receiver into a different phase. Before leaving I gave the farmer an invoice for my call out and advised him, in the interests of safety, to get an electrician to sort out the wiring.

Water Damage

It's often tempting to tell customers, especially on a busy day, to take away their water-damaged receivers. I accepted this customer's excuses however, since it was apparently all his wife's fault. She had been watering the plants on the shelf above the TV set and . . . some things are inevitable, really.

As the receiver, a Pace PRD800, had been left in a nice warm room for a week without any attempt to dry it out I feared the worst. When I removed the cover the board had a stained appearance but there was no obvious corrosion and no green fur of the type you find when an animal has relieved itself.

After ensuring that there was no obvious water sloshing around I connected the receiver, switched on and looked at the picture. Perfect! But the only sound available was a loud hiss. Oddly, when I checked around the surface-mounted FM demodulator chip with my oscilloscope probe the stereo audio nearly blasted me off my stool.

With one hand gripping the scope probe, I tried to change the audio mode. I couldn't, so the demodulator chip was obviously working only partially, my probe

simply adding the correct capacitance to the varactor to tune in the frequency for one mode.

I replaced the beastly chip, but this made no difference. The waveform on the SDA line looked like, well, data I guess, and the clock pulses on the SCL line seemed to be OK. The amplitude of the 4MHz oscillator signal at pin 1 was decidedly low however. I traced the source back to the Nicky chip, where the signal was at 4V peak-to-peak. Aha! Careful probing revealed a tiny break where the track had corroded away. Once this damage had been repaired, the audio was perfect.

The Pace MSS1000

This has been a week for MSS1000 problems. A dealer sent me several of these receivers by carrier. They arrived a bit the worse for wear, but I think they were probably like this before the carrier had touched them – they had apparently been bought second-hand as "good working units".

In each case the receiver had been dropped and the tracks around the chopper transformer had cracked. The damage was only slight however, and I was able to carry out good, safe repairs. With the power supplies now operational, it was possible to assess the full extent of the damage.

I'm guessing, but I think that the power supplies had all lost their feedback loops, allowing the secondary voltages to become too high. In one unit the tuner and the audio processor chip were short-circuit. In another, the Dolby board had destroyed its output chips plus nearby transistors and zener diodes. Another had a short-circuit PTV chip on the card-reader board.

The Dolby board was a complete wright-off: I know when I'm licked! So I removed it and converted the receiver to an MSS500 simply by fitting a new front panel moulding – the microcontroller chip recognises the fact that a Dolby board is not connected and automatically reverts to the MSS500 menu system.

Although the receivers were now up and running, none of the front panel displays would light up.

"Obvious" I hear you saying, "he's forgotten to replace C2". Well no, I'd done that and even replaced the control chip and the vacuum fluorescent display, all to no avail. Eventually it occurred to me to read the excellent service manual, which points out that the display filament requires a 22kHz drive waveform. This was not present. It was easy to trace the cause of the fault to the ZTX749 transistor Q5.

Now here came my big mistake. Familiarity with Pace units led me to reach for my drawer full of FTX749 transistors. Yes, I'd misread the designation. Although both are medium-power pnp transistors, the pin connections are different. As a result, it took me another ten minutes to figure out why the replacement transistor wouldn't work! The receiver lit up when I'd fitted a ZTX type transistor from another working panel. As the same fault was present on three display panels, I'll order some ZTX749 transistors for stock.

Card Invalid Problem

In recent weeks I've been inundated with receivers that produce the "your card is invalid" display intermittently. At first I didn't have

any difficulties when using my own Sky card but, gradually, it started to cause the problem. The stage was finally reached where I could put my card in any Amstrad receiver and everything would be fine, but several other types of receiver would tend to say that it was invalid. If I put an old series 09 Sky card into the same receivers the display would read "your card has expired", as expected. So the cause of the problem seemed to lie with the new card.

When I inspected the card more closely I noticed a small, black square on one of the contacts. The square was very worn with my card. I checked the square on a customer's card and found that it appeared to be a film resistor of about 2k Ω , although the actual value would depend on the spring contact area inside the card slot.

This resistance is in series with the 3.5MHz clock input to the card. Could it be needed with some receivers but not the Amstrad ones? I dismantled a Pace PRD900 receiver that had been giving "card invalid" messages when my card was inserted and cut the track to the relevant spring contact. The problem was cured by soldering a

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

jackarm@netcentral.co.uk

No letters or phone calls please: he can cope with e-mail requests only. One model per message – state make/model and fault symptoms.

2.2k Ω resistor across this cut. Since then I've carried out the modification to a dozen or more PRD receivers and clones (such as the Philips STU824) with 100 per cent success.

A call to Sky's technical man elicited the reply that they were unaware of a problem with this model though they thought that there was a problem with the SS9200 (at least he didn't tell me to "wipe the card to remove static", the usual response).

The intermittent "card invalid" problem has occurred with other receivers, for example the Cambridge RD480. Oddly, no one else seems to be getting it. I must have very fussy customers! ■

Test Case 402

There's usually a lull in our workload at this time of the year, and it was as well that plenty of time was available for this particular repair. The patient was a Panasonic NVSD40 VCR which had come in on a chargeable basis, labelled "poor picture".

It was immediately obvious that the cause of the trouble lay with the video heads. The playback pictures were marred by tearing effects, with black worms and dots that streaked to the right from white edges of picture features. Playback of tapes recorded elsewhere was bad: with the machine's own recordings it was very bad. It's such a familiar sight that no further checking was required.

As this is a four-head machine, the quote was quite high. It was nevertheless accepted, and a new upper drum was ordered and fitted. In common with other modern machines, very little is required by way of setting up and alignment following head drum replacement. Once we'd checked the X setting of the ACE head and the video head-switching point we sent the machine on its way, with a three-figure bill attached.

It was a couple of days before the customer came on the phone to tell us that he wasn't happy with the performance of the repaired machine. He said that with all the recordings he'd made since its return there was a fine criss-cross/dot patterning on saturated colours in the picture. To prove that the problem was not present prior to fitting the new drum, he'd tried playing back a tape recorded when the machine was quite new. We told him to bring it in for us to sort out.

When it came back we found that the effect was as described: there was a fine cross-hatched pattern on the colours. It was also present with off-air recordings, and the more saturated the colour

the more noticeable and intrusive the patterning was. As playback of a known good tape was fine, the cause of the problem clearly lay in the record circuitry. There was no sign of patterning in the E-E picture, which exonerated the receiver section, the r.f. modulator and some of the vision processing circuitry. So our investigation centred on the colour-under section and the chroma record amplifier.

This is all buried in two ICs, the Y/C processor chip IC302 and the drive amplifier chip IC501. A check with the service manual showed that the only relevant control is the chroma record current preset VR502: adjustment is carried out by using a 5V bias source to remove the luminance component of the signal, then adjusting VR502 for 32mV across a pair of test points in the head-drive circuit. We did this very carefully – the adjustment was found to be a little off – but there was no beneficial effect at all!

Filtering is very important for the avoidance of crosstalk and patterning effects with under recording. The relevant filters are all electronic however, buried deep within the Y/C processor chip IC302. The only possible check would be chip replacement, but the chip was very unlikely to have failed during drum replacement. It seemed likely that the replacement head drum was the culprit, though faults here don't usually cause this sort of symptom.

In fact a replacement drum was not required, and the Y/C processing and drum drive chips were both OK. Could the fault have been caused by something other than the chroma circuits or the heads themselves? There was one significant clue: for the first ten seconds of each new recording, the playback picture was marred by even worse colour patterning than subsequently. For the solution, turn to page 605.

Camcorner

Reports from David C. Woodnott



Ferguson FC28

We've had intermittent power-up faults before with this model. The usual cause is a leaky capacitor that decouples the power-on line to the mechacon chip. This time there was a different cause. R302-304 in the same power-on circuit were dry-jointed.

JVC GRAX400E

This unit would switch between the SP and LP modes and back during play. In addition the clock data was intermittent. The cause of both symptoms was at the connection of the VTR operation assembly ribbon to the main PCB socket. Cleaning and refitting cleared the troubles.

Sanyo VMD1P

There was no operation with this oldie. When it was shaken, something could be heard rattling around inside. A screw had become detached and had fallen into 'the words', causing failure of the 3·15A ceramic fuse. We fitted a replacement then checked for possible short-circuits etc. A soak test proved that even old machines can produce good results.

Panasonic NVS20B

Intermittent operation was the complaint with this unit. On test we found that it worked for long periods at a time with no problems. While observing its operation we noticed that failure usually occurred at the end of tape loading. If this operation was performed correctly all was well. If not, a second attempt would usually also fail.

The final mechanical loading movement was the problem area. We first thought that the guide assembly was sticking. As checks here proved to be inconclusive, we decided to replace the mode encoder switch. This restored normal operation. The job is quite understandably left until last, as the switch is buried deep within the mechanism.

Canon A2H.E (Sony U Mechanism)

If you get one of these in with the common fault, which you also get with Sony models, of a detached coaster assembly, give a slightly higher estimate. Because of the amount of dismantling required to gain access, the time taken is likely to be considerably longer. If possible, before dismantling the unit check that the capstan motor bearing isn't noisy – this may avoid a repeat strip down.

Sony ACV25 Adaptor

There was no operation: after replacing Q301, R110 and R104/5/6 we modified the unit as laid down in the Sony bulletin.

Canon E230E

We had previously replaced most of the small can electrolytics, mentioned in other Canon reports, in this camcorder. Here it was back again, just within its guarantee. It wouldn't operate in any mode, being to all intents and purposes dead. The cause was simply failure of the VTR operation PCB assembly, which is stuck to the internal case moulding. A replacement restored normal operation.

When fitting a new unit, take care over its positioning – you don't get two goes! – and the dressing of the ribbon cable to the main PCB connector. Note that it's as well to disconnect this unit when working on the main PCB. On/off and eject can be achieved by earthing the appropriate connection to the operation PCB socket, all other functions being available via the remote control unit. Very clever to have a remote control unit that

doubles as a means of operating the service modes. Even better, it can be used with most if not all Canon models.

Canon UC16E

This is a version of the UC15 with a colour viewfinder. The fault report said "picture disappears when warmed up", and so it did: after about five minutes the E-E picture gradually darkened until it disappeared completely. So we carried out checks around the camera processing circuitry, including the iris section. We found that C2115 (1 μ F) was temperature sensitive: it's part of a clamp circuit at pin 26 of the sample-and-hold and AGC chip IC2101. Once a replacement capacitor had been fitted the picture behaved itself.

JVC GR303

Failure to record, playback OK was the complaint with this one. We found that connectors CN5 on the A-V PCB and CN14 on the main PCB had become detached from their locations: resoldering cured the problem. Reassembling the unit into its case parts can be a tricky operation – whoever designed it?

Sony CCDV30

Incorrect auto-focusing action was caused by a faulty limit switch: because of metal fatigue, one switch leaf had become detached.

Ferguson FC27

Intermittent power up and intermittent eject were the reported faults. The unit would sometimes run continuously without any trouble, only to fail when tried next day. We carried out cold checks on the mode switch and the buffer circuit to the mechacon chip and noted the usual readings. To cut a long story short, we eventually found that the electrolytic capacitor C317 (47 μ F) had leaked over much of the relevant circuitry. A new capacitor and a PCB clean up put matters right. Needless to say C317 was not itself involved with the circuitry that produced the fault symptoms! ■

VCR BELT KITS / REPLACEMENT VIDEO LAMPS

Model	Price	Model	Price	Model	Price	Model	Price
HRD520, 600, 620, 637, 641, 650, 830 HRD540, 550, 580, 660, 860, 960, HRS5800	95p 130p	VR6010, VR9010 VR6020, VR6022, VR6023, VR6028, VR7300 VR6024 VR6520, VR6540, VR6560 VR6710, VR6720, VR6735, VR8720 VR6720, VR6730, VR6760, VR6775, VR6780	70p 75p 75p 90p 130p 160p	Models & Description	Order Code	Price	
KENWOOD KV901 KV903	70p 90p	SAISHO VR2000, VHL3 VR3800	90p 75p	UNIVERSAL VIDEO LAMP 9V 80mV (310mm WIRES)	VL01	25p	
LOEWE OC11, OC40 OC410, OC420, OC440, OC460 OC50, OC55, OC60, OC65, OC70, OC75	95p 130p 120p	SALORA SV6500 SV6600 SV8000 SV8100 SV8500, SV8520, SV9500 SV7400, SV8400, SV8420, SV8550 SV6700, SV8710, SV8750, SV9700 SV6800, 6900, 8810, 8820, 8870, 8910, 8920, 8970 SV8600, 8620, 8700, 8720, 8830, 9600, 9810	100p 150p 120p 60p 150p 120p 120p 95p 130p 130p	PANASONIC VIDEO LAMPS	VL02	35p	
LOGIK VR955	180p	SAMSUNG SV716, 717, V1616, V1621, V1626, VX616, VX617, VX619, VX626, VX627, VX629 85p VB520, 510, 610, 616, 617, 619, 620, 626, 627, 629, V1510, 520, 611, 616, 621, 626, VX510, 520 V8900, V8910, V1900, V1910 PK900, 981, 982, SE9001, SV9001, SVX307, 319, 322, V8770, 8220, 8225, V1770, 790, 8220, 8225, VK8220, VPK31, VX750, VX790, 8220, 8225 SVX301, 303, 305, SX7301, VB710, 971, V1730, 710, VX712, VX720, 730, 970, 971, VX9880	100p 110 100 100 220p 230p 110p	SHARP VIDEO LAMPS	VL02	35p	
LUXOR 9245, 9251 9252 9253 9254 9255 9256 9270, 9271, 9273, 9274 9271, 9280 9271, 9284, 9285, 9292, VR3701, 3721, 3731, 3761, 3781	130p 140p 140p 100p 130p 130p 115p 140p 95p	MATSUI VX850	75p	AIWA, AKAI, ALBA, AMSTRAD, BLAUPUNKT, FERGUSON, FIDELITY, FISHER, FUJITSU, FUNAI, G.E.C., GOLDSTAR, GRANADA, GRUNDIG, HINARI, HITACHI, ITT, JVC (HRD SERIES), MATSUI, MITSUBISHI, NEC, CRION, NATIONAL, PHILIPS, SAISHO, SALORA, SAMSUNG, SANYO, SHARP, SIEMEN, SONY, TELEFUNKEN, THOMSON, TOSHIBA	VL05	150p	
MITSUBISHI HS200 HS300, 301, 302, 307, 310, 337, 338, 347, 349, 411, 412, 421, HSB10, 20, 30, HSE10, 20, 30, 70 HS303, HS304, HS306, HS307, HS330, HS400, HS700 HS318, HS319, HS410	200p 150p 150p 130p	N.E.C. N830, N831, N832, N833 N895 PVC2300, PVC2400 DX1000, 1600, 2000, 3000, N9012, 9013, 9014, 9016, 9033, 9034, 9053, 9054, 9055, 9066, 9110, 9120, 9510, 9520, 9530, 9610	100p 80p 180p 180p 95p	AKAI, GRANADA (VHSTJ2), HITACHI (VT3000), ITT (VR3912, VRP3833), JVC (HR2200, 3300, 3330, 3660), MITSUBISHI (HS200), TELEFUNKEN (VR510, 519, 610), THOMSON (VK300), 305, 306, 3301), FERGUSON (3V00, 16, 22, 24, 3292, 8900, 8901, 8902, 8903, 8909, 8912, 8922, 8925)	VL01	25p	
NATIONAL PANASONIC NV300, NV332, NV333, NV340, NV366 NV777, NV788 NV2000, NV2010, NV3000 NV7000, NV7200, NV7800 NV8600, NV8610, NV8620 NV230, 250, 280, 430, 431, 433, 450, 460, 465, 470, 730, 770, 810, 870, 890, AG1000, 1050 NV370, NV380, NV480, NV630, NV780, NV830, NV850 NV600, NV688, AG6010, AG6015 NVG7, 10, 12, 14, 15, 18, 30, 130, 400, NVH70	125p 100p 130p 95p 145p 125p 100p 110p 70p	SHARP VC200, 384, 385, 386, 388, 390, 9300, 9500, 9700 VC7300, VC7700, VC7750, VC7800, VC8000 VC8300 VC300, 387, 471, 473, 481, 482, 483, 486, 488, 493, 6481 VC402, 500, 571, 573, 581, 582, 583, 584, 585, VCSF3 VC600, 651, 682, 684, 685, 693, 783, 7810, 7822, VCA100, VCA102, 104, 311, 140, 170, 202, 203, 234, 501, 602, 5011, VCD806, 810, 815, VCH80, 865, 910, VCS1000, VCT310, 410, VCT1314, VCTS312	150p 110p 110p 150p 80p 70 70 115p	BLAUPUNKT, ORION (VH1, 2A), NATIONAL (NV2000, 2010, 3000, 7000, 8150, 8200, 8400, 8600, 8610, 8620), SHARP (VC2300, 6000, 6200, 6300, 7300, 7700, 8000, 8300)	VL02	40p	
NORDMENDE V100, V160 V1000M, 1005M, 1205, 1215, 1235, 1245, 1305, 1403, 1405, V1500P, 1503, 1505K, 1805K, 2000D, 2405, 2500H, 3000H, V3405H, 3105, 4405H, 5000, 8005, 900, 905 V1001, 1005, 1015, 1025, 1035, 1041, 1055, 1065, 1105, 3005, 304, 5005, 502, 503 V101, V102, V103, V112, V141, V142, V301, V302 V110, V333 V1500T, V2000B, V2000P, V400H V250, V460, V9460, V20035542, V20035543 V300, V303, V380 V500	70p 85p 80p 90p 110p 95p 130p 75p 75p	SIEMENS FM350, FM352, FM355 FM440, FM441 FM391, FM392, FM394, FM462 FM461, FM464, FM468, FM561 FM361, FM362, FM363, FM364	60p 55p 100p 150p 120p	AKAI (VS10), GRANADA (VHSXJ3), ITT (VR3913, 3994), JVC (HR2650, 7600, 7610, 7650, 7655), TELEFUNKEN (VR530, 535, 539, 550, 630, 650), THOMSON (V309, 316, 357, VK309, 411, TX8000), FERGUSON (3V31, 8941, 8942)	VL06	40p	
ORION COMBI 15000, 16000, NEVHM, TVP230RC, 9000MVH1012, VH1030, 1040, 1060, 1070, 1100, 1120, 1440, 1500, 1660, 1800, 2150, 2308, 2400, 2500, 2600, 2700, 2960, 300, 358, 360, 362, 4010, 4015, 4016, 4020, 4300, 5010, 5015, 530, 535, 536, 630, 635, 640, 730, 735, VP220, 225, 245, VR1032, 2966, 2980, 821, 925, VXL25 NEVHL, VCP, VH1204, 2004, 2204, 3050, 3060, 4008, 400, 4012, 412, 512, 600, 666, 744, 774, 7905, 800, 820, 900, 974, VP200, VR2949, 2956, 2957, VXL20 VC150, 180, VH1000, 200, 201, 205, 212, 250, 254, 288, 300, 303, 3030, 312, 33, 3312, 404, 555, 700, 704, 708, 712, 770, 780, 844, 900, VHF2, VH3 VH1, VH2A	30p 90p 100p 130p 75p 75p 80p 150p	SONY SLC6, SLJ10, SLT6ME SLC5, SLCT, SLJ7, SLJ9 SLC3, SL8000, SL8080, SLT50 SL8000E, SL8080E, SL8200, SL8600 SLV255	140p 140p 165p 175p 95p	AUTHENTIC (N850), DECCA (VR8300), GRANADA (VHSTJ3, WJ1, WJ3), ITT (VR3913, 3914, 3963), JVC (HT7200, 7300, 7350, 7700), TELEFUNKEN (VR450, 520, 529, 540, 549, 620, 640, 920, 1920), THOMSON (V4100, VK308, 309, 312, 410), FERGUSON (3V23, 29, 30, 8923, 8924, 8929, 8930, 8931, 8940)	VL07	40p	
PHILIPS VR6460, VR6920 VR6540 DV186, 286, 291, 292, 468, 471, 562, 571, 761, VR201, 202, VR20DV1, 20DV2, 20RW7, 25B01, 25B02, 302, 303, 305, VR30DV2, 35B02, 35B03, 635B7, 715B4, 715B5, 715B8, VR865B2, 915B2, 925B3, VR6180, 6185, 6285, 6290, 6291, 6293, 6367, 6390, 6391, 6393, 6467, 6468, 6470, 6561, 6570, 6581, 6670, 6676, 6760, VR685B4, 865B1, 925B3 VR6442, VR6542 VR2025, VR2580 VR445B9, BR445B920, VR445B922, BR6843 VR6548, BR6648, VR49S8620, VR644869S	170p 100p 100p 130p 75p 75p 80p 150p	THOMSON SV1000, V410, 430, 450, 510, 520, 530, 540, 620, 630, 640, 4240, SV5540 TX8000, V309, V357, VK411 TX8500, V342, 343, 351, 352, 353, 360, 364, 368, 4210, 4230, 4260, 4400, 5500, 6000, 8664 V320, V321, V323, V326, V4200, V4300 V333 V340 V4100, VK308, VK309, VK410 VK300, VK301, VK302, VK303, VK305, VK301 VK312	60p 55p 100p 150p 90p 90p 100p 100p 120p 135p 65p	GRANADA (VHSAY3), SHARP (VC200, 381, 384, 385, 386, 388, 390, 393, 9300, 9500, 9700)	VL08	60p	
SABA VR6420, 6435, 6440, 6460, 6480, 6620, 6770, 7200, 8420, 2A10, 70, 2B20, 3B20, 4A10, 4B20, 6A10, 6A70, 6B20, 8B20 VR6004, 6005, 6011, 6014, 7004, 7011, 7014, 8011, 8014, BERLIN VR2000, VR6000, VR6012, VR7000, VR7720, PVR6068 VR5005, VHR7000 VR6006, 6007, 6008, 6009, 6015, 9016, 9018, 6038, 7006, 7007, 7016, 7018, 9006	85p 100p 100p 130p 135p 120p 115p	TOSHIBA V55, V57 V33, V31, V51, V53, V9600, V9680 V61, V63, V65, V66, V67 DV808, DV800, V71, 73, 74, 75, 81, 83, 85, 120p V108, V109, V199, V209, V609 V91G, V95G	85p 85p 150p 120p 120p 115p	PANASONIC MODE SWITCHES NV2000, 2010, 7000, 7200, 7800 (VSS0048) £3.50 NV2300, 260, 430, 810, 870, 2300, 4300 (VSS0110) NV830 (VSS0091) £2.25 NV3000, 333, 340, 366, 688, 777, 778 (VSS0060) £2.10 NVG21, 25, NVH65, NVD80 (VSS0175A) £3.75 £2.00			
<h2>ON/OFF MAIN SWITCHES</h2>							
GRUNDIG PART NO: 29703, 29102 USED ON: C7500, C7500TT, C8500, C8502, C8712, C8714, C8894, M68-190, M68-190/99, M70-195, P40-345, ST66-1602, T55-340, V7722 PRICE: £2.25							
ITT PART NO: 13/1074 USED ON: CP0200, 0211F, 0323, 0323/1, 0347/14, 0345F, 0351/1, 0361, 0361/1, 9350, CT0500, 0500/1/1T, 0500T PRICE: £3.00 PART NO: LFC 005 USED ON: CVC40 PRICE: £2.00							
MATSUI/SAISHO USED ON: MATSUI-2190, SAISHO-PST2130TX PRICE: £2.00							
PHILIPS USED ON: K30, K35, K40, KT3, KT4 PRICE: £0.95							
SONY PART NO: (POWER SWITCH + REMOTE SWITCH) USED ON: KV1612 MK1, KV1612 MK2, KV1614, KV2052, KV2056, KV2062, KV2068, KV2212, KV2216, KV2252, KV2256, KV2704, KV2705, KV2706, KV2752PE3, KX20PS1, KX20PS2, KX27PS1 PRICE: £2.25 PART NO: (POWER SWITCH + REMOTE SWITCH) USED ON: KV2022, KV2024 PRICE: £3.00 PART NO: (POWER SWITCH) USED ON: KV1810 MK1, KV1810 MK2, KV1820, KV1822, KV2000 MK1 PRICE: £8.00 PART NO: (POWER SWITCH 26mm) USED ON: KV1400, KV1440, KV2040, KV2060 PRICE: £2.00 PART NO: (POWER SWITCH 21mm + REMOTE SWITCH) USED ON: KV2020 PRICE: £2.00 PART NO: 2 PIN (FUNCTION SWITCH) USED ON: KV1612 MK1, KV1612 MK2, KV2052, KV2056, KV2212, KV2215, KV2216, KV2252, KV2256, KV2704, KV2705, KV2706, KV2752PE3, KV2756PE3 PRICE: £0.35 PART NO: (4 PIN FUNCTION SWITCH) USED ON: VARIOUS PRICE: £0.50							
<h2>REPLACEMENT IDLER TYRES</h2>							
AKAI	M132773 M2366960J2	IT01 IT02					
GOLDSTAR	VXP0521	IT17					
HITACHI	6861471 6861482 6868671	IT03 IT04 IT05					
JVC/ FERGUSON	PU 48967B PU 51380 PU 51402A PU 55373 PU 55374	IT06 IT07 IT08 IT09 IT10					
NATIONAL PANASONIC	VXP 0329 VXP 0343 VXP 0344 VXP 0401 VXP 0433 VXP 0463 VXP 0521 VXP 0581	IT11 IT12 IT13 IT14 IT15 IT16 IT17 IT18					
SANYO	1430662T15620	IT20					
SHARP	NIDL005GEZZ NIDL0006GEZZ NPLY0107GEZZ	IT19 IT21 IT22					
PRICE 20p EACH 16p EACH FOR A PACK OF 5 FOR EACH MODEL 13p EACH FOR A PACK OF 10 FOR EACH MODEL							
<h2>GRANDATA LTD</h2> <p>Tel: 0181-900 2329 Fax: 0181-903 6126</p>							

VIDEO SERVICE KITS

AMSTRAD
VCR700
Contents
BELT SET PINCH ROLLER REEL IDLER VIDEO LAMP
Order Code: SK41 **£5.50**

FERGUSON & JVC
3V42/43
HRD455/HRD725
Contents
BELT SET PINCH ROLLER CLUTCH MECHANISM TENSION BAND
Order Code: SK37 **£16.00**

Economy Kit Contents
BELT SET PINCH ROLLER TYRE SUPPLY REEL TAKE UP CLUTCH
Order Code: SK38 **£9.00**

3V58/59/64/65
HRD170/180/210/230/300/320/370/400/430/530/700/750
HR55000
Contents
BELT SET PINCH ROLLER IDLER ARM TENSION BAND
Order Code: SK44 **£7.00**

3V29/3V30
HR7200/7300/7350
Contents
BELT SET PINCH ROLLER TENSION BAND IDLER TYRES
Order Code: SK05 **£5.00**

3V35/36/38/39/49
HRD110/111/120/225
Contents
BELT SET PINCH ROLLER TENSION BAND IDLER TYRES
Order Code: SK04 **£5.00**

3V31/3V42
HR7600/7610/7650/7655
Contents
BELT SET T/U REEL TABLE TYRE PINCH ROLLER REEL IDLER T/U CLUTCH T/U IDLER TENSION BAND VIDEO LAMP
Order Code: SK33 **£11.00**

Economy Kit Contents
BELT SET T/U REEL TABLE TYRE PINCH ROLLER REEL T/U CLUTCH
Order Code: SK34 **£5.00**

3V35/36/38/39/49
HRD110/111/120/121/225
Contents
BELT SET T/U REEL TABLE TYRE SUPPLY REEL TABLE TYRE PINCH ROLLER T/U CLUTCH T/U IDLER REEL IDLER TENSION BAND
Order Code: SK35 **£10.00**

Economy Kit Contents
BELT SET T/U REEL TABLE TYRE SUPPLY REEL TABLE TYRE PINCH ROLLER T/U CLUTCH T/U IDLER TYRE REEL IDLER TYRE
Order Code: SK36 **£5.50**

3V29/3V30
HR7200/7300/7350
Contents
BELT SET T/U REEL TABLE TYRE SUPPLY REEL TABLE TYRE PINCH ROLLER REEL IDLER T/U CLUTCH T/U IDLER TENSION BAND VIDEO LAMP
Order Code: SK31 **£10.00**

Economy Kit Contents
BELT SET T/U REEL IDLER TYRE SUPPLY REEL TABLE TYRE PINCH ROLLER REEL IDLER TYRE T/U IDLER TYRE T/U CLUTCH
Order Code: SK32 **£5.00**

3V44/45/48/53/54/55/57
HRP50/HRD140/150/158/160
HRD250/257/565/566/755
Contents
BELT SET PINCH ROLLER CLUTCH MECHANISM TENSION BAND
Order Code: SK39 **£15.00**

Economy Kit Contents
BELT SET PINCH ROLLER
Order Code: SK40 **£9.50**

FISHER
FVHP905/906/907/908/910/911/916/918
Contents
BELT SET PINCH ROLLER IDLER GEAR IDLER UNIT TENSION BAND
Order Code: SK57 **£13.00**

Economy Kit Contents
BELT SET PINCH ROLLER IDLER TYRE
Order Code: SK58 **£5.00**

FVHP615/618/620/622/710/711/715/716/720/721/722/725/730/830/840
Contents
BELT SET PINCH ROLLER IDLER GEAR IDLER UNIT TENSION BAND
Order Code: SK68 **£11.00**

Economy Kit Contents
BELT SET PINCH ROLLER IDLER TYRE
Order Code: SK69 **£3.00**

HITACHI
VT11/VT33
Contents
BELT SET PINCH ROLLER TENSION BAND IDLER TYRES
Order Code: SK08 **£5.00**

VIDEO SERVICE KITS (Cont.)

VT11/VT33
Contents
BELT SET T/U REEL TABLE TYRE SUPPLY REEL TABLE TYRE PINCH ROLLER FF/REW IDLER CLUTCH PLATE TENSION BAND
Order Code: SK45 **£13.00**

Economy Kit Contents
BELT SET PINCH ROLLER FF/REW IDLER TYRE T/U REEL TABLE TYRE SUPPLY REEL TABLE TYRE
Order Code: SK46 **£3.75**

VT52/61/62/63/64/65/85/86/640
Contents
BELT SET PINCH ROLLER FF/REW ARM CLUTCH PLATE TENSION BAND
Order Code: SK49 **£14.00**

Economy Kit Contents
BELT SET PINCH ROLLER FF/REW IDLER
Order Code: SK50 **£3.00**

VT400/405/410/13/14/15/18/420/25/26/28/430/31/5/48/450/498/510/520/25/26/530/35/36/540/545/46/48/570/75/576/580/85/88
Contents
TIMING BELT PINCH ROLLER FF/REW ARM CLUTCH BASE TENSION BAND
Order Code: SK52 **£9.75**

VT100/110/111/113/115/118/120/125/128/130/135/138/145/150/175/220/225/250/255/258/260/VTL30
Contents
BELT SET PINCH ROLLER FF/REW ARM CLUTCH PLATE TENSION BAND
Order Code: SK51 **£14.00**

PANASONIC
NV2000/NV2010
Contents
BELT SET PINCH ROLLER TENSION BAND IDLER TYRES
Order Code: SK03 **£5.00**

Economy Kit Contents
NV7000/NV7200/NV7800
BELT SET PINCH ROLLER TENSION BAND IDLER TYRES
Order Code: SK02 **£5.00**

NV300/NV330/NV333/NV340/NV366
Contents
BELT SET PINCH ROLLER TENSION BAND IDLER TYRE
Order Code: SK01 **£5.00**

NV2000/NV2010
Contents
BELT SET PINCH ROLLER FF IDLER PLAY IDLER TENSION BAND VIDEO LAMP
Order Code: SK13 **£6.00**

Economy Kit Contents
BELT SET PINCH ROLLER IDLER TYRE PULLEY TYRE
Order Code: SK14 **£3.50**

NV7000/NV7200/NV7800
Contents
BELT SET PINCH ROLLER IDLER UNIT PLAY IDLER TENSION BAND
Order Code: SK11 **£8.50**

Economy Kit Contents
BELT SET PINCH ROLLER IDLER TYRE CLUTCH TYRE
Order Code: SK12 **£3.25**

NV300/NV330/NV333/NV340/NV366
Contents
BELT SET PINCH ROLLER IDLER UNIT PLAY IDLER TENSION BAND
Order Code: SK15 **£7.00**

Economy Kit Contents
BELT SET PINCH ROLLER IDLER TYRE PLAY IDLER TYRE
Order Code: SK16 **£3.25**

NVG7/NVG9/VNG10/NVG11/NVG12/NVG14/NVG15/NVG16/NVG18/NVG30/NVG120/NVG130/NVG400/NVH65 (PX/AG)/AG1810 (PK)
Contents
LOADING BELT CAPSTAN BELT PINCH ROLLER IDLER TENSION BAND
Order Code: SK27 **£6.00**

Economy Kit Contents
LOADING BELT CAPSTAN BELT PINCH ROLLER IDLER TYRE
Order Code: SK28 **£3.00**

NV332
Contents
BELT SET PINCH ROLLER PLAY IDLER FF/REW IDLER TENSION BAND FF/REW TYRE
Order Code: SK29 **£12.00**

Economy Kit Contents
BELT SET PINCH ROLLER PLAY IDLER TYRE FF/REW IDLER TYRE
Order Code: SK30 **£5.10**

NV230/250/260/280/430/450/460/470/650/810/890/AG1200PK/AG1500PK
Contents
BELT SET PINCH ROLLER IDLER TENSION BAND
Order Code: SK23 **£6.00**

Economy Kit Contents
BELT SET PINCH ROLLER IDLER TYRE
Order Code: SK24 **£3.25**

NV600/NV688
Contents
BELT SET PINCH ROLLER PLAY IDLER FF/REW IDLER TENSION BAND
Order Code: SK25 **£12.00**

Economy Kit Contents
BELT SET PINCH ROLLER PLAY IDLER TYRE FF/REW IDLER TYRE
Order Code: SK26 **£6.00**

NV730/NV770
Contents
SLOT IN BELT LOADING BELT PINCH ROLLER IDLER UNIT TENSION BAND
Order Code: SK19 **£5.00**

Economy Kit Contents
SLOT IN BELT LOADING BELT PINCH ROLLER IDLER TYRE
Order Code: SK20 **£3.00**

NV370/NV380/480/630/780/830/850/AG2100PK/AG2200PK
Contents
BELT SET PINCH ROLLER IDLER TENSION BAND
Order Code: SK21 **£5.00**

Economy Kit Contents
BELT SET PINCH ROLLER IDLER TYRE
Order Code: SK22 **£2.75**

NV777/NV788
Contents
BELT SET PINCH ROLLER IDLER UNIT TENSION BAND
Order Code: SK17 **£6.00**

Economy Kit Contents
BELT SET PINCH ROLLER IDLER TYRE
Order Code: SK18 **£4.00**

VIDEO SERVICE KITS (Cont.)

SHARP
VC381
Contents
BELT SET PINCH ROLLER REEL IDLER TENSION BAND VIDEO LAMP
Order Code: SK47 **£8.00**

Economy Kit Contents
BELT SET PINCH ROLLER REEL IDLER TYRE
Order Code: SK48 **£3.25**

VC500/VC571/VC581/VC582/VC583/VC584/VC5F3
Contents
BELT SET PINCH ROLLER REEL IDLER TENSION BAND
Order Code: SK60 **£9.50**

Economy Kit Contents
BELT SET PINCH ROLLER REEL IDLER
Order Code: SK61 **£5.00**

VC781/VC7810/VC7822/VC785/VC786/VC793/VC800/VCA100/VCA102/VCA104/VCA202
Contents
BELT SET PINCH ROLLER REEL DRIVE UNIT TENSION BAND
Order Code: SK64 **£13.50**

Economy Kit Contents
BELT SET PINCH ROLLER REEL DRIVE UNIT TYRE
Order Code: SK65 **£3.75**

VC681/VC682/VC684/VC685/VC693/VC699/VC6F3/VC700
Contents
BELT SET PINCH ROLLER REEL DRIVE UNIT TENSION BAND
Order Code: SK62 **£13.50**

Economy Kit Contents
BELT SET PINCH ROLLER REEL DRIVE UNIT TYRE
Order Code: SK63 **£5.00**

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

BACKUP BATTERIES

REPLACEMENT PHILIPS NI-CAD BACKUP BATTERIES
Replaces Ferguson Part No: 00E6-067-001, used on TX10, L2V **150p**
Replaces Philips Part No's: 138-10138, 138-10313. 1.2V - 90mAh **100p**
Replaces Philips Part No's: 138-10229. 2.4V - 90mAh **180p**

REPLACEMENT FERGUSON NI-CAD BACKUP BATTERIES
Replaces Ferguson Part Nos: 00E6-066-001, 2.4V
Used on: 3V35, 3V56, 3V58, 3V65 **200p**

REPLACEMENT LINE OUTPUT TRANSFORMERS

Description	Price	Order Code
HITACHI 2433752	1500p	LOT01
ORION 3714002	1500p	LOT02
FIDELITY ZX300	1500p	LOT03
FE TX100 90 DEG	1500p	LOT04
SABA 490007182	1500p	LOT05
FE TX90 WHITE	1650p	LOT06
ITT D307/37 EQ	1600p	LOT07
BLAUPUNKT 210	1600p	LOT08
GRUNDIG 2922010	1600p	LOT09
ITT CV8000/1/3	1500p	LOT10
ITTD218/37 EQ	1600p	LOT11
NORMENDE 5255	1600p	LOT12
SABA 81000 200	1600p	LOT13
SALORA T236 EQ	1850p	LOT14
SABA 811-50-24	1600p	LOT15
SABA 770223500	1600p	LOT16
TELEFUNKEN AT1	1450p	LOT17
TELEFUNKEN EQ	1400p	LOT18
SALORA FM02188	1600p	LOT19
NORMENDE 5255	1600p	LOT20
ITT CVC 1150/1	1500p	LOT21
ITT COMPACT 80	1500p	LOT22
FE TX100 GREEN	1450p	LOT23
HINARI CT4/5 5113	1500p	LOT24
SELECO 6320410	1600p	LOT25
BLAUPUNKT 8667	1600p	LOT26
ITT COMPACT B1	1450p	LOT27
ITT CT3326 MUL	1500p	LOT28
ITT D066/37 EQ	1600p	LOT29
ITT 3546 EQ	1500p	LOT30
LUXOR 5810110	1600p	LOT31
SABA 849380920	1600p	LOT32
HITACHI 2434141 CP	1450p	LOT33
FE TX100 110 D	1700p	LOT34
HANTAREX 28021	1600p	LOT35
SHARP C3700 EQ	1600p	LOT36
HITACHI 2432981 CP	1500p	LOT37
FERGUSON 00D3-508-002	1650p	LOT38
Fits Chassis TX99 41cm + 51cm Used On: 51K2, 51J8, 51J7, 41H3, 41H9, 41H2, 51K3		
PANASONIC TLF14567F	1850p	LOT39
Used On: TC2043, TC2243, TX300		
PANASONIC TLF14568F	1850p	LOT40
Used On: TX2231, TX2244		
PANASONIC TLF14584F	2350p	LOT41
Used On: TC2210, TC2160, TX1752, TX2112		
TX2112, TX2162, TXC22		
PANASONIC TLF14586F	2350p	LOT42
TC1651, TC2051, TC2061, TC2253, TC2263, TX5500		
HINARI	1600p	LOT43
Used On: CT15		
HITACHI 2434274	1250p	LOT44
CPT2174, CPT2176, CPT2178, 2434274		

We stock line output transformers for over 100 different models. Please ring 0181-900 2329 for more information.

UNIVERSAL TRIPLER

Price: £4.50 each

AMSTRAD MODE KIT

Price: £2.75 each

SEE OTHER PAGES FOR MORE GRANDATA BARGAINS

IDLERS & PULLEYS REPLACEMENT

AKAI					
V51-2, V54-5, V515	FF-REW IDLER	M1327773	400p		
V53, 6, 12, 56, 58, 59					
V51-2, V54-5, V515	T-UP IDLER	BV327815	500p		
V53, 6, 12, 58, 59					
V5705	IDLER	BV321979	600p		
V5125, 126, 156,	IDLER ASSY	MZ366960J2	900p		
V5165, 240, 244, 245, 247, 248, 250, 512, 515, 516					
V522, 38, 105, 112, 115, 116, 205, 220	T-UP IDLER	PU47752	£4.50		
VP110, VS9300					
VS9500, VS9800	UNLOADING IDLER	PU46381	£4.00		
VP110, VS9300	REW IDLER	PU46380	500p		
VS9500, VS9800					
VPS8	IDLER	BV338067	£5.00		
V51, 3, 4, 9, 12	REEL TABLE	BR347731	450p		
V515, 58					
V523, 35, 37, 53, 55	CLUTCH	ML373043	1100p		
V566, 75, VSA77					
V59700	FF IDLER	BV321761	£3.20		
V59700	REW IDLER	W321762	£4.25		
AMSTRAD					
VCR7000	IDLER	150280	£1.50		
TVR1, VCR4500	CLUTCH	150873	£3.75		
VCR4600, VCR5200, VCR9000					
TVR1, VCR4500	GEAR HOLDER	151284	£3.50		
VCR4600, VCR5200, VCR9000					
TVR1, VCR4600	REF CLUTCH		£3.50		
VCR5200					
VCR6000, VCR6100	CLUTCH	153202	£3.80		
VCR6500, VCR9000	CLUTCH		£4.00		
VCR4500, VCR4600	MOD KIT		£4.00		
VCR4700					
MOD KIT TAPE CREATING FOR AMSTRAD			£3.00		
VCR4500, 4600, 4700					
FERGUSON					
3V00, 3V01, 3V16	T-UP IDLER	PU47752	£4.50		
3V22, 3252, 8900, 8901, 8904, 8906					
3V16, 3V22	T-UP IDLER	PU49280	£5.50		
8903, 8909, 8912, 8922					
3V23, 3V29, 3V30	REEL IDLER	PU48967	175p		
3V31, 3V32, 3V35, 8923, 8924, 8929, 8930, 8931, 8940, 8941, 8942					
3V23, 3V31	T-UP CLUTCH	PU48042A	350p		
3V29, 3V30, 3V31	T-UP IDLER	51402	100p		
3V32, 3V35, 3V36, 3V38, 3V39, 3V49, 8930, 8931, 8940, 8941, 8942					
3V29, 3V30, 3V31	T-UP CLUTCH	PU51380	200p		
3V32, 8930, 8931, 8940, 8941, 8942					
3V35, 3V36, 3V38	REEL IDLER	PU55374	200p		
3V38, 3V49, 8943, 8944					
3V35, 3V36, 3V38	T-UP CLUTCH	PU55373	150p		
3V39, 3V49, 8943, 8944					
3V58, 3V59, 3V64	IDLER ARM	PU58645	£2.25		
3V65, FV10, FV11, FV12, FV13, FV14, FV20, FV21, FV22, FV26					
FV30, FV32, FV33, 8950, VC141R	CLUTCH ASSY	PU55822	1200p		
3V42, 3V43	CLUTCH ASSY	PU57658	1050p		
3V43, 3V44, 3V45	CLUTCH ASSY				
3V48, 3V53, 3V54, 3V55, 3V57, 8947, 8948					
3V42, 3V43, 3V44	T-UP CLUTCH	PU56043-1-4	240p		
3V45, 3V48, 3V53, 3V54, 3V55, 3V56, 3V57, 8947, 8948					
3V42, 3V43, 3V44	SUPPORT CLUTCH	PU56044-1-5	160p		
3V45, 3V48, 3V53, 3V54, 3V55, 3V56, 3V57, 8947, 8948					
3V00, 3V01, 3V16	LOADING IDLER	PU43681	£4.00		
3V22, 3252, 8900, 8901, 8902, 8903, 8904, 8906, 8909, 8912, 8922					
3V00, 3V01, 3V16	REW IDLER	PU46380	500p		
3292, 8900, 8901, 8904, 8906					
3V16, 3V22, 8902	IDLER	PU49281	£1.70		
8909, 8912, 8922					
FSHER					
FVHP420, 520, 530	FF-REW PULLEY	H1638531	80p		
FVHP615, 618, 620	COMP. IDLER ASSY	F1430420400300	£220p		
FVHP622, 710, 711, FVHP720, 721, 722, FVHP725, 730, 830					
FVHP840, 905, 906, FVHP908, 910, 911, FVHP915, 916, 918	GEAR IDLER ASSY	F1430490400900	380p		
FVHP615, 618, 620					
FVHP622, 710, 711, FVHP720, 721, 722	GEAR IDLER ASSY	F1430410400900	£5.50		
FVHP725, 730, 830, FVHP840					
FVHP615, 618, 620	REEL T-UP ASSY				
FVHP662, 710, 711, FVHP720, 721, 722					
FVHP725, 730, 830, FVHP840					
FVHP905, 906, 906	GEAR IDLER ASSY	F1430490402400	275p		
FVHP915, 910, 911, FVHP916, 918					
FVHP975, 980, 990					
FVHP985, 5000, 5005					
FVHP990, 5075, 5100					
FVHD40, 55, 140	REEL DRIVE ROLLER		£6.00		
FVHP1, 10, 20					
FVHP75, 980, 990	CLUTCH	F12430510404200	£9.50		
FVHP420, 520, 530	IDLER		£2.80		
FVHP420, 520, 530	TAKE UP IDLER		290p		
FVHP990	LOADING GEAR		90p		
VBS3500	REEL DRIVE PULLEY		£3.20		
VBS3500	IDLER		250p		
VBS7000	REW IDLER		95p		
GOLDSTAR					
GHV1221, 1232, 1240	CLUTCH GEAR	435038A	£2.50		
GHV1241, 1242, 1243, GHV1244, 1245, 1246, GHV1247, 1248, 8000,					
GHV280, 8210, 8215, GHVPS1, VCP4100, 4130					
GHV1221, 1232, 1240	IDLER		110p		
GHV1241, 1242, 1243, GHV1244, 1245, 1246, GHV1247, 1248, 8000,					
GHV280, 8210, 8215, GHVPS1, VCP4100, 4130					
HINARI					
VLX3, VLX20	REEL IDLER	40000009	110p		
VLX2	IDLER		110p		
VLX4, VLX35	IDLER		£2.75		
VLX4, VLX35	CLUTCH		£8.50		
VLX4, VLX12, VLX25	LIMITER POST		£1.30		
VLX30, VLX35, VTV300					
VLX5, VLX6	CLUTCH		£3.75		
VLX5, VLX6	GEAR HOLDER		£3.50		
VLX7, VLX8, VLX9	CLUTCH		£3.80		
HITACHI					
VT11-33, VT63-64	CLUTCH ASSY	6879515	£7.50		
VT14, 17, 19, 38, 57, 86, 88, 34, 35, 39, 52, 61					
62, 65, 85, 330, 640, VT165					
VT120-220, 100, 110	CLUTCH ASSY	6886824	£7.50		
111, 113, 115, 118, 200					
125, 128, 130, 135, 138, 145, 150, 175, 225, 250,					
255, 258, 260, VTL30					
VT8000-8300, 7000	FF-REW IDLER	6413663	£2.80		
VT8500-8700					
VT8000-8300, 7000	PLAY IDLER	6414221	290p		
VT8500-8700					
VT8000-8300, 7000	FF-REW PULLEY	6383531	80p		
VT8500-8700					
VT8000-9500, 6500	FF-REW IDLER	8681471	250p		
VT680, 6800, 9700, 9800					
VT9000-9500, 6500	PLAY IDLER	6861482	230p		
VT680, 6800, 9700					
VT 9900					
VT8300-9500, 9700	IDLER	681505	230p		
VT9800, 6500, 680, 6800	IDLER	687043	£3.80		
VT11-33, VT63-64	FF-REW IDLER	6868971	125p		
VT14, 16S, 17, 19, 34, VT35, 38, 52, 61, 62					
V165, 85, 86, 88, 330, 640					
VT1000, 110, 111, 113	FF-REW ARM	6886792	240p		
VT115, 118, 119, 120, 125, 128, 130, 135, 138, 145, 150					
VT175, 220, 225, 250, 255, 258, 260, VTL30					
VT400, 405, 410, 413	FF-REW ARM	6887094	£1.30		
VT414, 415, 418, 420, 425, 426, 428, 430, 431, 435					
VT438, 450, 488, 510, 518, 520, 525, 526, 530, 535					
VT536, 540, 545, 546, 548, 570, 575, 576, 580, 585					
VT588, VTM625, 626, 630, 635, 636, 640, 645, 646, VTS80, 85					
VT400, 405, 410, 413	CLUTCH BASE	6889591	£5.00		
VT414, 415, 418, 420, 425, 426, 428, 430, 431, 435					
VT438, 450, 488, 510, 518, 520, 525, 526, 530, 535					
VT536, 540, 545, 546, 548, 570, 575, 576, 580, 585					
VT588, VTM625, 626, 630, 635, 636, 640, 645, 646, VTS80, 85					
VT3000	T-UP IDLER (LARGE)		£4.50		
VT3000	REW IDLER		£8.00		

VT680, 8500, 8600	FS-BRAKE	6861505	230p		
VT9700, 9900					
HITACHI					
OUTPUT MODULE HM 6251			£5.50		
OUTPUT MODULE HM 6232			£8		
JVC					
HR3300, 3660, 4100	T-UP IDLER SML	PU49280	£5.50		
HR7200, 7600, 7650	T-UP CLUTCH	PU53462A	220p		
HR7655, 7300, 7350, 7610					
HR7200, 7300, 7350	REEL IDLER	PU48967	175p		
HR7600, 7610, 7650, 7655,					
HR7800, 7610, 7650	ROLLER ASSY	PU49042A	350p		
HR7655, 7700					
HR3300, 3660, 4100	T-UP IDLER LRG	PU47752	£4.50		
HR7200, 7600, 7650	T-UP IDLER	PU51402A	100p		
HR7655, HRD110, HRD111, HR7300, 7350, 7610, HRD120-121, 225,					
HRD110, HRD120-121,	T-UP CLUTCH	PU55373	150p		
HRD225, HRD111,					
HRD110, HRD120-121,	IDLER ARM	PU55374-3-8	200p		
HRD225, HRD111					
HRD170, HRD210, 230	IDLER ARM	PU58465	£2.25		
HRD230, 370, 400, 430, 470, 530, 700, 750, 950, 3000					
HR55000, HR55500	CLUTCH MECH	PU558822	1200p		
HRD455, HRD725	CLUTCH MECH	PU57658	1050p		
HRD140, 150, 157, 158	CLUTCH MECH				
HRD180, 250, 257, 565, 566, 755, HRP50					
HR3300, HR3330	REW IDLER	PU46380	500p		
HR3660, HR4100					
HRD140, 150, 157, 158	TAKE UP CLUTCH	PU56043-1-4	240p		
HRD180, 250, 257, 455, 565, 566, 725, 755, HRP50					
HRD140, 150, 157, 158					
HRD180, 250, 257, 455, 565, 566, 725, 755, HRP50					
MATSUJI					
VX730, 735, 750, 755	CLUTCH	850A00005	420p		
VX810, 810, 880, 890, 990					
VX730, 735, 750, 755	LIMITED POST LEVER ASSY		£1.30		
VX770, 800, 810, 880				</	

JUST ARRIVED!!! NEW ITEMS

Satellite PSU Repair Kits

Experience shows that 50% of all receiver power supplies 'bounce' unless the correct precautionary measures are taken when being serviced. A kit of all the recommended parts is supplied for the 4 most popular models, which when fitted should overcome this.

MAKE & MODEL	ORDER CODE	PRICE
PACE PRD800, PRD900	SATPSU1	850p
PACE SS9000, 9200, 9010, 9020, 9220	SATPSU2	850p
AMSTRAD SRD510, SRD520	SATPSU3	850p
AMSTRAD SRD500	SATPSU4	650p

Replacement Video Heads

MAKE	MODELS	PRICE
HITACHI	VT570, VT575, VT576, VT580, VT585 VT588, VTF70	3100p
I.T.T.	VR3761	3100p
JVC & FERGUSSON	HRD950, HRD960, HRD980, FV46	5000p
LUXOR	VR3761	3100p
DAIICHI	HSE51	3000p
NATIONAL	NVFS200, NVFS90, NVV8000	4600p
PANASONIC	NVHD100, NVHD101, NVHF100	3100p
	NVSD	1400p
	AG7330, AG7350, AG7355, AG7450	5000p
	NVFS100	5000p
N.E.C.	D5600	3500p
SANYO	TLS1000P, TLS1001P, TLS1100	3100p
	VHR7800, VHR7810, VHR8000SP, VHR8801SP, VHRD4800	3100p
SHARP	VCH80, VCH81, VCH815	2800p
	VCA33, VCA36, VCA43, VCA44, VCA46, VCA49	1500p
	VCA55, VCA63	2200p
SONY	SLV656, SLV715, SLV757, SLV777, SLV815, SLV825	4600p
	SLV353UB	3200p
	CCDF340E, CCDF500E, CCDV90E, CCDV95E, CCDDSP5E	4800p

Original Video Heads

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

Audio Control Head

AMSTRAD ORIGINAL NO: 150751
Used on: AMSTRAD TVR1, 2, 3, VCR4600, 4600MKII, 4700, FUNAI VS2, VCR4600, 4800, 5200, 5600, 6600, VIP3000, 5000
Also fits: FIDELITY, FUNAI, HINARI, PROLINE, SCHNEIDER, TOWADA, UNIVERSUM
ORDER CODE: AH01 PRICE: 1350p

AMSTRAD ORIGINAL NO: 153134
Used on: AMSTRAD DD8900, 8904, VCR2000, 6000, 6100, 8600, 8602, 8603, VCR8604, 8700, 8704, 8714, 8800, 9005, 8244
Also fits: ANITECH, BONDSTEC, CASIO, CROWN, FIDELITY, GOLDHAND, GRANADA, HINARI, MARQUANT, OMEGA, PROFEX, SCHNEIDER, SEG, SENTRA, SHINTOM, TASHIKO, TATUNG, TOWADA, UNIVERSUM
ORDER CODE: AH02 PRICE: 1450p

Replacement Audio Control Video Sound Head for National Panasonic

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

8 Way Preprogrammed Universal Remote Control

A single remote control to operate Televisions, Videos and Satellite Receivers. Plus Auxiliary Options!!!
* Replaces up to 8 remotes with one * Simple 4 digit setup routine
* Controls 1000s of models * Teletext functions with Fastext
* Clear (large key) layout * Code Search Facility
* Stylish and easy to operate * Replace broken or lost remotes
* Original Remote not required

Order Code: 8 WAY Price 1450p + VAT

Replacement Video Cassette Housings

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

Service Aids

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

All the above items are manufactured by Servisol
If you purchase more than one Servisol Product, postage & package will be charged as follows:
300p for 5 cans 450p for more than 5 cans

CD Pick Ups

SONY OPTICAL PICK UP
PART NO: KSS210A SONY CDPC 301M, CDPC 305M 2200p
Fits most Sony, Akai & J.V.C. Portable Hi-Fi and Midi Systems

PART NO: KSS210B
USED ON MODELS:
CFD100, 105L, 120, 300, 440, 454, 455, 50, 500, 55, 58, 60
CFD68, 750, 755, 760, 765, 770, 775, 440S, W100, 100S 2200p

Cassette DC Motors

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

Cassette Tape Heads

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

Soldering Accessories

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

Transistors & ICS

BU 508A (PHIL)	80p	MJE 13009	100p	2SC 3885A	350p
BU 910	110p	MJE 18004	125p	2SD 633	70p
BUJ 90A	180p	STK 6982H	600p	2SD 1680	225p
CXA 1044P	550p	STK 7253	450p	2SK 793	400p
HA 13408	350p	TD 2030H	100p	2SK 956	1400p
IRFBC40	400p	TEA 2019	200p	2SK 1023	550p
L272	200p	TMP 47C434N	1250p	2SK 1342	750p
L6210	250p	SA 1300	200p	2SK 1358	600p
MC 3423P	100p	2SA 1540	55p	68000	500p
MJ 15015	250p	2SC 3788	80p	82S147	450p
MJ 15016	350p	2SC 3885	350p		

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

REMOTE CONTROLS

Description	Order Code	Price	Description	Order Code	Price
GRUNDIG			PHILIPS (continued)		
TP160E	RC 107	900p	RC38	RC 301	750p
TP200, TP300	RC 380	800p	KT3 TEXT	RC 5301	750p
TP400	RC 401	675p	RC5352	RC 5352	800p
TP590-600	RC 600	850p	RC5375	RC 5375	850p
TP390, TP610	RC 610	850p	RC5 STANDARD	RC 5534	850p
TP621	RC 621	850p	RC5901	RC 5901	850p
TP630, TP650	RC 650	850p	RC5903	RC 5903	700p
TP660	RC 660	850p	SABA		
TP661	RC 661	850p	T6772	RC 149	900p
HITACHI			TC319-320	RC 328	875p
CLE800-CLE830	RC 140M	700p	TC356	RC 356	875p
A617402/655602	RC 192	875p	TC358	RC 358	850p
A512120/230	RC 900	800p	TC360	RC 360	800p
A514790	RC 901	800p	TC365	RC 365	800p
A5088470	RC 902	800p	SALORA		
A518612	RC903	900p	SERIES L	RC 190	875p
SCL002	RC904	850p	86173	RC 882	850p
C2096	RC 905	850p	SANYO		
A511940	RC 906	750p	RC218, RC222, RC228, RC238	RC 140M	700p
655602H	RC 907	800p	JXGE	RC 878	850p
ITT			JXDE	RC 884	850p
IFB13, 14, 15	RC 143	875p	VHR2300	RC 890	850p
FS4	RC 148	850p	RC628	RC 865	900p
RG305	RC 305	675p	SHARP		
RG306	RC 306	825p	G0121CESA, 123CESA, 204, 251	RC 140M	850p
FS9/1-10/1	RC 307	850p	SIEMENS		
VS5 RUK	RC 308	825p	FC616	RC 130	850p
VS4-1	RC 310	850p	FC631	RC 132	850p
MULTICONTROL (17C20)	RC 311	800p	FC742	RC 164	900p
KORTING			SONY		
18279, 18396, 18460, 18521 SE	RC 108	850p	RM604, RM605, RM606	RC 140	700p
40540 VTS	RC 108	900p	32 CHANNEL	RC 140M	700p
LOEWE			RM613	RC 141	750p
DC11	RC 146	850p	RM632, RM636	RC 160	675p
MATSUI			TATUNG		
010270601	RC 889	850p	FXA	RC 877	850p
VX770	RC 892	850p	RC70	RC 883	750p
METZ			FX70 FASTTEXT	RC 894	850p
JAVA COLOR (6890)	RC 166	850p	TELEFUNKEN		
COLOR (7156)	RC 183	850p	FB632	RC 632 ST	850p
JAVA (7180)	RC 184	850p	FB639	RC 639 ST	850p
MITSUBISHI			THORN/FERGUSON		
939P/03607, 939P/03609	RC 140M	850p	3V35-42	RC 342	650p
NOKIA			3V31-32	RC 344	800p
SATELLITE	RC 550	850p	3V57-58	RC 628	800p
NORDMENDE			TX10 TEXT	RC 732	575p
TC2336	RC 351N	850p	TX10 STEREO TEXT	RC 738	575p
CMC1, TC3519	RC 356	875p	TX9-90-100	RC 740	675p
OCEANIC			3V55, FV11	RC 783	800p
390C9500	RC 339	900p	TX100 FASTTEXT	RC 785	650p
ORION			TX100 STEREO FASTTEXT	RC 789	650p
RC53	RC 892	850p	PROFESSIONAL	FC 790	650p
PANASONIC			TOSHIBA		
EUR51200	RC 200	800p	CT937	RC 950	850p
TC2200	RC 201	850p	CT9117	RC 951	800p
VSQ0357/NV730	RC 202	875p	201R4B	RC 952	800p
TNQ1621	RC 203	900p	UNIVERSAL PROGRAMMABLE REMOTE CONTROL		
PHILCO			Controls up to 4 different devices which use infra red remote controls including TV, audio, VCR and satellite. (need original remote control TC program)		
CARVEL, CONCORDE, MERCURY, TELESTAR	RC 108	850p	Order code: IR100R Price: 1950p		
TC10	RC 152	900p	We stock Remote Controls for over 5000 different models. Ring for further details on 081-900-2329.		
PHILIPS					
RC5002, 5154	RC 134	850p			
KT3 NON TEXT	RC 135	825p			
69117032	RC 178	875p			
69117194	RC 180	875p			
RC5991-UNIV	RC 300	580p			

VCR ALIGNMENT KIT

CONTAINS:

- SET OF 7 HEAD & TAPE PATH ALIGNERS
- RCA TYPE AUDIO & CONTROL HEAD POSITIONING TOOL
- RCA ADJUSTMENT TOOL FOR TAPE GUIDE POSTS
- RCA TYPE BACK TENSION TOOL
- TENSION ADJUSTMENT TOOL FOR VARIOUS USES
- VCR ADJUSTMENT TOOL

SET OF 8 ALLEN KEYS

- 0.77mm
- 0.90mm
- 1.27mm
- 1.50mm
- 1.60mm
- 2.00mm
- 2.40mm
- 3.00mm

3 Reversible Screwdrivers
Spring Hook

Circclip Pliers
Micro Screwdriver

VCR Head Extractor

Order Code: TOOL10 Price: 2900p

FUSES

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

FUSES

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

ALL THE ABOVE PRICES ARE FOR PACKS OF 10 FUSES

I.C. PROTECTOR

ICPF10 ICPF38 ICPN10 ICPN38
 ICPF15 ICPF50 ICPN15 ICPN50
 ICPF20 ICPF75 ICPN20 ICPN75
 ICPF25 ICPN5 ICPN25

Price: Only 30p each

AUDIO CONTROL HEAD
 Amstrad Original No: 150751
 Used on Amstrad TVR1 2.3, VCR4600, 4600MII, 4700
 Funai V2S, VCR4600, 4800, 5200, 5600, 6600, VIP3000, 5000
 Also fits: Fidelity, Funai, Hinari, Proline, Schneider, Towada, Ultravox

Order Code: AH01 Price: £13.50

Amstrad Original No: 153154
 Used on Amstrad 008900, 8904, VCR2000, 6000, 8600, 8602, 8603, VCR8604, 8700, 8704, 8714, 8800, 9005, 9244

Also fits: Antitec, Boadstec, Casio, Crown, Fidelity, Goldhead, Granada, Hinari, Marguant, Omega, Protex, Schneider, SEG, Sentra, Shiptom, Tashiko, Tatung, Towada, Universum

Order Code: AH02 Price: £14.50

GRANDATA LTD

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

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

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

100V

Test Power Supply

This simple power supply, devised by Ian Rees, is ideal for checking the operation of the line output stage in a dead set

It can be very useful to have available a substitute HT power supply to determine the ability of the line output stage in a dead TV set to work and the feasibility of carrying out a full repair.

While it is relatively easy to feed 5-30V DC to a set from a standard bench power supply, the 90-150V DC required by the line output stage is not readily available. The power supply described in this article will energise a line output stage at least to the point where a judgement can be made about the condition of the set, say after a lightning strike, without having to rebuild its own power supply. This can speed up the preparation of estimates, giving an overall impression of the circuit's condition with no need to carry out lengthy component substitution checks.

Circuit Details

The circuit is simple, see Fig. 1. For this application there's no need for stabilisation. In fact the lack of regulation is a virtue, enabling the power supply to kneel down in the presence of a heavy load without going phut or into the meltdown mode.

Two mains transformers from scrap monochrome TV sets are connected back-to-back. The mains input is fed to the first transformer (T1), whose low-voltage secondary winding drives the low-voltage winding of the second, identical transformer T2. This second transformer steps the voltage back up again. A switch (S2) between the two transformers controls the current flowing in the low-voltage winding of the second transformer, and hence the AC output from its high-

voltage winding, by selecting various series-connected wirewound resistors (R1-4).

The output from the bridge rectifier (D1-4), allowing for losses in the transformers, is around 250V off load. So steps are taken to hold it down on low-power switch settings. The power switch section S2B introduces R6 to discharge C1 rapidly in its off position (1), and reduce the output to 100V at its lowest setting (2).

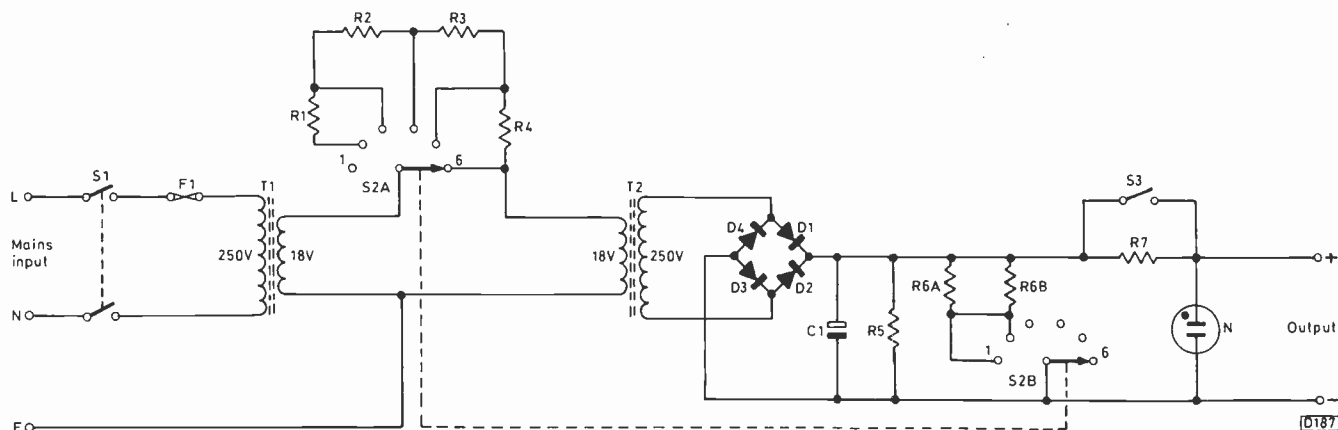
To cushion the circuit under test, the series load resistor R7 can be brought into circuit by opening switch S3. The mains neon N strikes at around 90V, giving a useful indication that the output is reaching the operating voltage and that the leads are live.

Use

The suggested operating sequence for the power supply is as follows:

- (1) Prepare the dead TV set for test. Take care to isolate and load any supplies that may be distressed by the sudden removal or insertion of expected/unexpected sources.
- (2) With mains input to the test supply switched off (S1), rotate the power selector switch S2 to position 1 (off). If concerned about the outcome, open switch S3 to bring R7 into circuit.
- (3) Connect the DC output leads to the set being tested (use a voltmeter to monitor the output). The connections to the set are best tack-soldered in place to prevent the

Fig. 1: Circuit of the 100V test power supply.



possibility of disconnection and live leads zapping a swathe across the circuit tracks!

(4) Switch on the TV set and the test supply.

(5) Move the rotary power switch S2 to position 2. Look for signs that the TV set is operating.

(6) Close S3 to short out R7 if you are confident about the circuit under test.

(7) Continue to advance S2 until, hopefully, circuit operation is established.

(8) Always return S2 to its off position (1) before disconnecting the leads – ensure that the neon indicator is out and that your meter is reading zero.

General Notes

Whenever I've used the power supply the sets have worked and provided sufficient information to enable the circuit condition to be assessed. Portable colour sets operate normally. Larger sets, while functioning, may produce a raster with reduced height and width or show signs of hum bars as the supply struggles to provide the higher current.

No layout is required for such a simple design. Care is required however because the output is above 50V – the unit should be marked accordingly. The back-to-back transformers provide excellent mains isolation. As the various wirewound resistors run warm, their position requires careful attention.

No parts were purchased for the project. They were

Component details

R1-4	2.2Ω, 10W WW
R5	100kΩ, 1W
R6	2 x 6.8kΩ, 15W WW (to give 3.4kΩ)
R7	200Ω, 10W WW
C1	40μF, 275V
D1-4	BY127
F1	250mA
N	250V neon
T1-2	250V/18V 2A
S1	DPST toggle
S2	2P6W rotary
S3	SPST toggle

from general stock or removed from scrap sets – the two mains transformers from a couple of old imports from the Far East.

If the two transformers you use are not matched, ensure that the one which produces the lower secondary output drives the other one – to prevent a higher AC output than the mains supply input. Adjusting the values of the series resistors R1-4 and the load resistor R6 will restore the outputs.

Do not leave R5 out as this is the only discharge resistor present when S2 is in positions 3-6. ■

Free to Television readers: irreversible temperature indicators

Called Thermostrips, these light, thin indicators consist of one or more heat-sensitive squares or dots. The centre of the indicator dot turns black once the temperature rating shown next to the dot is reached. The change to black is irreversible, so the strips become a permanent record of the upper temperature threshold of a component or piece of equipment.

To aid in maintaining of a piece of equipment, for example, Thermostrips applied for the usage period can be removed during servicing and attached to the service report as evidence of correct functioning. They can also be used to help detect whether goods returned under warranty have been subjected to overheating.

Performance of the strips is not affected by contact with solvents, gases, steam, etc. Because of their size and the way they operate, Thermostrips can be the only

practicable way of measuring peak temperature in situations where equipment cannot be watched round the clock, or on moving parts, etc.

Accuracy of the strips is $\pm 1^\circ\text{C}$ for ratings to 100°C and $\pm 2\%$ for ratings above.

To obtain your evaluation pack comprising:

- One single-segment strip with a 40°C threshold
- One triple-segment strip for 40, 43 and 46°C
- One five-segment strip covering 60 to 82°C
- One eight-segment strip covering 77 to 116°C
- One four-segment mini-strip for 66, 71, 77 and 82°C

...simply fill in the reply coupon opposite.

ATP Instrumentation is offering an evaluation pack comprising five irreversible temperature indication strips – completely free to Television readers.

Comprehensive instrumentation catalogue

In addition to temperature strips covering the range 40 to 260°C , ATP also supplies a vast range of instrumentation, including:

- timers
- weighers
- chart recorders
- multimeters
- pH meters

- humidity detectors
- dew-point indicators
- light meters
- power supplies.

Send your request for a free catalogue on company letterhead to ATP's address shown below.

To obtain details of the range of temperature strips that ATP Instrumentation supplies, write to Tournament Way, Ivanhoe Industrial Estate, Ashby-de-la-Zouch, Leicestershire LE65 2UU, or telephone 01530 416876, fax 01530 560373.

To ATP Instrumentation Please send my free evaluation pack of temperature strips to:

Name.....Job title.....
 Company.....Address.....
Post code.....
 Tel.....FAX.....
 E-Mail.....

Long-distance Television

DX-TV conditions and reception, satellite sightings and news, and DAB frequency allocations. Roger Bunney reports

The coming Sporadic E (SpE) season could well be a considerable improvement over those of the past few years. Signs that point to this are the improved mid-winter reception, the current sunspot minimum and a noticeable increase in the number of longer-duration though low-level signals throughout Band I during March. A mid-April SpE opening would set the scene for a mid-May start to the season, which should continue into early August. Remember to check for the possibility of transatlantic reception from mid-June to mid-July, which is normally the peak period for enhanced reception from the north west.

Quality SpE reception was minimal during March, though there was a general background increase. This is typical for the time of year. Only one small SpE

opening was reported, on March 17th. It produced unidentified ch. E3 and E4 signals.

Conditions were right for enhanced tropospheric propagation in early April, with an almost stationary high-pressure system over the UK. The chilly, circulatory winds produced by this weather system prevented any substantial build-up in DX-TV reception however: there was a slight improvement in Band III reception from France and the Benelux countries, and breakthrough of the ch. 35 radar blip was evident with domestic receivers.

A two-hour six-metre band (50MHz) SpE opening on February 3rd is reported in the VHF News column in the April issue of the RSGB journal *Radcom*. This was instigated by high levels of X-ray flux, and is another pointer to an improved forthcoming SpE season. I hope that by the time you read this column you will be enjoying excellent, exotic Band I DX!

Satellite Sightings

Two news items produced intense activity across the European satellite sky during March, the Dunblane massacre and the BSE beef crisis.

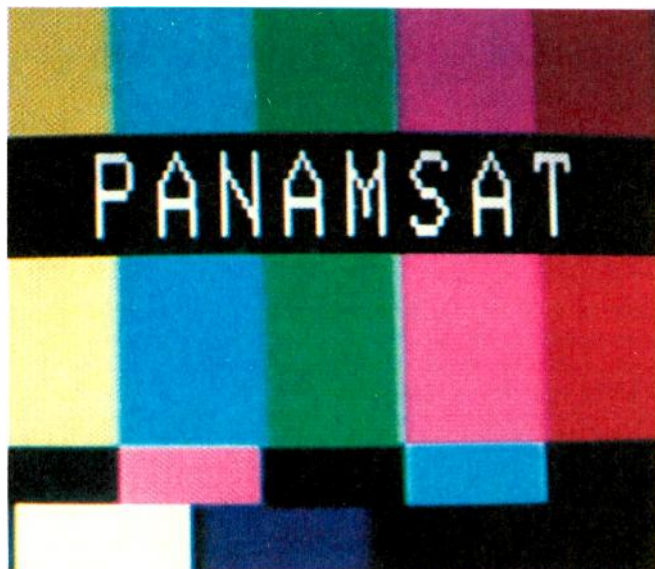
Saudi TV seems to have departed from the Gorizont/Express satellite at 11°W, as the 11.525GHz transponder has been quiet since mid-March. I would expect that with the cluster of other Arabic broadcasters providing services to Europe from 13° to 19°W it will eventually reappear, perhaps via the forthcoming Arabsat 2 series satellites. There is still no

indication of a Hebrew service from Jerusalem. Colour bars with the identification "LIB TR1 002 TV TEST" appeared via the 11.076GHz horizontal transponder aboard Eutelsat II F3 at 16°E on Sunday March 31st. There was no accompanying audio. I wonder whether this was Libya testing? I had hoped that the Tyson v. Bruno fight would have been available via Orion. There were many one- and two-way interviews and news packages during the afternoon, but come evening and the transmissions went into hard encryption!

On February 21st our old SNG friend UKI-34 was at Smithfield market, using the usual telecom-band transponder via Eutelsat II F3, with a live interview for Sky News on the safety of meat inspection in slaughterhouses. As several readers have commented, the media-led meat crisis resulted in many live programme inserts from this date onwards. GMTV for example carried a live insert from a supermarket meat department in its breakfast show on the 28th. More animals on the 29th, when UKI-76 appeared in the early morning sunshine at Aintree racecourse for discussion about the following day's Grand National. More exotic reception came via Intelsat K (21.5°W) with coverage of the elections in Taiwan via Reuters' Taipei feed.

Fortunately Bandula Gunasekera (Sri Lanka) was unharmed by the recent bomb explosion near him in Colombo City, though he was showered with glass. He reports that most of the PAS-4 feeds use the telecom band and that there are

The first test transmission received from PAS-3 at 43°W. It carried a Morse identification at 8.2MHz.



problems in obtaining suitable LNBs for this locally at a reasonable price. Signals available include Arabic ART-3 at 11.525GHz and ART Europe at 11.655GHz, both horizontal, and NHK Television at 12.591GHz vertical.

On March 23rd Roy Carmen (Lake, Isle of Wight) counted 32 live news and reporter feeds providing Ku-band coverage of the German elections within the 1800-1900 time slot. Even Eutelsat II F1 (13°E) carried two FSS-band feeds amongst its conventional programme downlinks. On March 3rd Hispasat (30°W) was jammed with regional election-night feeds: this split over to Orion and Eutelsat capacity. Roy is one of the few to have logged an NTSC test pattern via PAS-3 (43°W) on March 20th, at 12.707GHz (vertical).

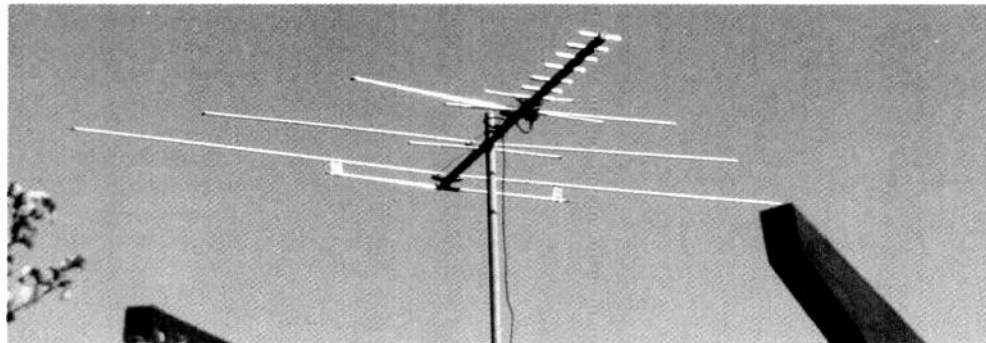
It seems that the AB-1 French cable service via Eutelsat at 13°E has gone digital. There are strong invisible telecom-band carriers at this orbital slot. Some of the news feeds previously here have moved to Eutelsat II F2 at 10°E.

John Adams (Oxford) has provided a translation of the Hebrew caption shown in the March issue (page 340). It apparently read "Live transmission from a synagogue 'Glory of Jerusalem' for the Jewish community in the Land of Israel around the World".

Finally, 'vibrant' religious programming from World Harvest Television (Berlin) has recently been present on most evenings via the 12.711GHz vertical transponder aboard Intelsat K. US evangelist folk have been featured, in recorded packages from churches across America. I assume that the feeds are intended for European public viewing venues.

News Items

Europe: Eighty five frequency blocks, many of which will be available "potentially" for digital audio broadcasting, were confirmed at the 1995 CEPT conference at Wiesbaden, Germany. This could have a direct impact on terrestrial TV transmissions across Europe. There are twelve blocks in Band I (47-68MHz), 12 in Band II (87-103MHz), 38 in Band III (174-240MHz) and 23 in Band L (1,452-1,492MHz). Most of Europe has opted to use Bands III and L, specific decisions being as follows: **Denmark:** 225-230MHz (two



blocks) to be used for national services, 235-240MHz (two-three blocks) to be used for regional services, 1,452-1,467.5MHz to be used for local services.

France: To use Band L.

Germany: To use ch. E12 (Band III) and Band L.

Sweden: In addition to the SBC's plans there is to be a Finnish DAB service to Finland from 1998, transmitted from Vaesterås in Northern Sweden.

Switzerland: To use one block (ch. E12) in Band III and one block in Band L, both for national services.

UK: 12.5kHz will be used initially, in the upper part of Band III.

Digital TV: Experimental terrestrial digital TV transmissions by Deutsche Telekom are to start in the Berlin region this summer. The signal will incorporate various multi-media enhancements. Sweden is to have a nationwide digital TV network in operation by 2001. The Swedish government has promised to back the project. **Hungary:** MTV-2 moved to PAL last year; MTV-1 is moving this year. Previously, Secam had been in use since 1965.

Slovakia: Bardejov is to move from ch. R4 to channel R40, at 100kW; Namestovo from ch. R4 to ch. R26, at 20kW; Poprad from ch. R5 to ch. R47, at 463kW. These changes follow the FM radio band move from 68-73MHz to 88-108MHz. Additional transmitters will be built in the former ch. R4 and R5 areas to compensate for the reduced coverage at UHF. The commercial TV service Markiza should be in operation by August 31st, using the former TA-3/OK-3 network. It's backed by TV Nova.

Sri Lanka: A new TV station, Dynavision, is due to start test transmissions on ch. E28. It will offer CNN and TNT/Cartoon

Network in a 60-80 mile radius around Colombo. The plan is to expand coverage to the main population centres.

DAB

The BBC's digital audio broadcasting (DAB) service continues to provide test transmissions in the London region, but there has been no DX reception as yet. In fact has anyone heard DAB at home? Grundig and Philips have both produced DAB radio receivers. I'm told that the Eindhoven test and evaluation special costs £5,000. The Grundig receiver is listed at DM3,000. Several other countries are now

The wideband VHF/UHF aerial used by Wenlock Burton in Australia.

Best seller



New Model!



CDM-800 MULTISYSTEM DIGITAL CONVERTER

- Professional quality, full digital processing
- Accommodates in-use systems of NTSC 3.58, PAL and SECAM (optional 4.43 available)
- Output systems NTSC 3.58, NTSC 4.43 and PAL
- 4M bit field memory, Static resolution 500 lines, dynamic resolution 300 lines
- Accommodates two-inputs and two outputs
- Built-in time Base correction (T.B.C.)
- Line conversion 525 to 625 lines, 625 to 525 lines
- Field conversion: 60 to 50 and 50 to 60 fields
- AC mains power!

£449.00 inclusive of VAT



RR-50 MANUALLY TUNED SATELLITE RECEIVER

Full communications facilities such as variable I.F. bandwidth from 26MHz down to a very narrow 12MHz. Variable audio bandwidth 150-350kHz. Pos/Neg video switching for C/Ku band, 14/18V LNB options, 5.5/6MHz modulator

£199.00 inclusive of VAT

DELUXE MODEL fitted with Threshold Assistance Device (TAD), lowers threshold to between 3-4dB, switchable and adjustable, a must for very weak signal work.

£329.00 inclusive of VAT

Worldwide covers 10 Standards
AKAI VS X480 EGN MULTI-SYSTEM VCR
Covers PAL 1; PAL B/G; PAL D; SECAM B/G; SECAM D/K; SECAM L (for FRANCE); NTSC 3.58MHz and NTSC 4.43MHz. VHF/UHF Hyperband Tuner. DX4 head with Long Play. NTSC playback on a PAL TV. 8 Event, 1 year timer. Auto voltage selector for use worldwide. Complete with infra-red remote control.

£499.00 inclusive of VAT

ROADSTAR CTVC-5512 MULTI SYSTEM PORTABLE COLOUR TELEVISION
5.5" SCREEN - AC/DC 230V/12-24V



5.5 inch (14cm) colour Television/Monitor, Multi-System (PAL B/G-1, SECAM B/G-D/K-L), 40 preset memories, On Screen Display, Hyperband and full function remote control. In-Out A/V sockets (RCA), 75 Ω antenna-input and AC/DC 230V/12-24V operation.

PAL System I (for UK); PAL System B/G (for Europe); PAL System D (for China); SECAM L (for France); SECAM D/K (Eastern Bloc); SECAM B/G (Middle East etc).

£299.00 inclusive of VAT

(All above prices are inclusive of VAT, delivery by courier £9.00)



NEW 1996 UPDATED CATALOGUE
Features all the usual popular spec alist products, together with many new items, Satellite, Multi-system TV's & VCR's, Converters, Decoders, Amplifiers and Aerials.

AVAILABLE BY RETURN OF POST FOR ONLY £1, or ring with your credit card.

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

Aerial Techniques



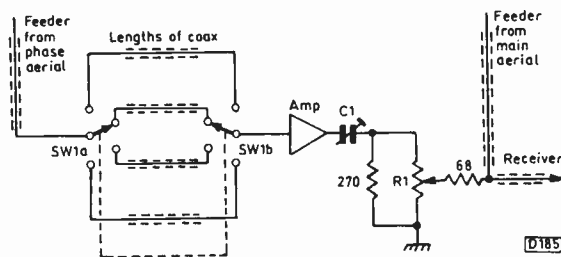


Fig. 1: A simple interference-cancelling system using two aerials plus phase shifting. The idea is that an unwanted signal picked up by the main aerial is mixed with an equal-amplitude anti-phase signal from the second aerial and is thus cancelled out. SW1 is a two-pole, 4/6-way Yaxley switch, C1 a 5-50pF air-spaced trimmer and R1 a 1k Ω linear carbon potentiometer. The amplifier has a gain of up to 20dB in the required band.

transmitting DAB on a test basis, but until receivers can be bought at Comet prices DAB is unlikely to take off.

Siemens/Plessey and chip company Enigma, which specialises in "real-time embedded digital signal processing", are working on a DAB receiver that

should reduce the cost. A prototype is expected in mid-1996 and the plan is to manufacture 10,000 digital adaptors initially.

In addition to terrestrial transmissions in Band III, satellite DAB allocations have been agreed. These are 1.5GHz in Europe, Africa, Mongolia, the Americas excluding the USA, Australasia and parts of SE Asia; 2.3GHz in the USA and Alaska; 1.5 and 2.6GHz in Russia, China and Japan; 1.5, 2.3 and 2.6GHz in India. Satellite DAB will offer CD quality reception across vast areas, possibly making short-wave radio redundant. But this will happen only when cheap receivers become available.

While Europe has adopted the term DAB, it seems that DSB (Digital Sound Broadcasting) is the preferred term in the USA.

A DXer's Satellite Receiver

Basic, manually-tuned satellite receivers have been popular amongst DXers and sat zappers for some years, being simple to operate and quick to tune across the bands. A UK importer of Korean equipment has recently promised me for evaluation a receiver that may offer DX potential with more sophisticated facilities.

Briefly, the unit has twin LNB inputs, a wideband IF tuner, threshold extension, variable-speed tuning/scanning, variable IF bandwidths, magnetic/mechanical polariser control, two external loops but no on-board decoders, optional TV screen frequency readout/menus plus LCD frequency readout on the front panel and lots of memories. There are several models in the range, which includes an in-built positioner. Of particular importance is the fact that the receivers are relatively inexpensive.

Should the receiver prove, on test, to be the answer, more details and a review will follow.

Aerial Phasers

An Australian contact has sent me an article by Andy Bolin and Dennis Jacob on the subject of aerial phasers. It covers the basic principles of aerial phasing to eliminate interference signals and provides various circuits. Andy stresses the all-important point that for unwanted signal cancellation the amplitude of the unwanted signal picked up by the main aerial and that supplied by the phase

aerial system must be equal.

The simple circuit shown in Fig. 1 enables the phase conditions to be altered should it be impossible to achieve a null condition by adjusting R1 and C1. This is done by using switch SW1 to introduce various lengths of additional feeder. For FM band use the lengths suggested are 6.5in. (30° shift), 11in. (60°), 19.5in. (90°) and 26.5in. (120°). If a 6-way switch is available, 32.5 and 39in. lengths could be added for 150° and 180° shifts. I assume that these lengths are mid-band, with a cable velocity factor of 0.85.

Satellite News

Satellite TV services in SE Asia are expanding rapidly. Star TV/News Corporation has opened Phoenix TV, which will eventually provide a three-channel package directed at mainland China from Asiasats 1 and 2. First transmissions were on March 25th, from Hong Kong, but Phoenix is to use studios at Tianjin, 70 miles from Beijing. Another service from Hong Kong is Karaoke, a 24-hour music and sing-along channel.

Hong Kong has also welcomed the satellite news gathering group Newsforce, which will provide the first single-hop digital link to Europe, via Intelsat at 57°E.

There have apparently been problems with the Pace DVR500 digital satellite receivers sold in Africa. Overheating for one thing, also operational bugs and slow delivery of channels. The African Multichoice TV service offers sixteen channels, but the only MPEG receivers available are the Pace one and another from Panasonic. Reception produces grainy pictures, with pulsing in the background of slow-moving scenes as the MPEG circuitry tries to figure out whether the picture content has changed. Irdeto scrambling produces pictures that break up into coloured squares, and audio with loud, high-pitched squeals. Sometimes the picture freezes or goes blank for a second or two: the returning picture jumps forward when the system catches up. The squealing has been more subdued recently. The above comments were noted in the March 1996 issue of *SatFacts* monthly.

Europe is to have another music channel, MTV-2. It will use digital compression and will be launched in the USA first. MTV is to use Astra 1F for its digital transmissions to Europe. ■

THE SATELLITE NEWSLINE (VOICE)

0336 413413

Updated at least once a day this Newline is available 24 hours a day, 7 days a week with all the very latest news in the satellite world including: New Channel Launches; The latest Scams and Cons; New Products and Services; The Latest Rumours and Issues; Adult Viewing - What's Going On. Simply call the number and listen to today's News.

THE SATELLITE NEWSFAX (FAX)

0336 422888

A Written Copy of the Satellite Newline (see above), available 24 hours a day, 7 days a week, and updated at least once a day. Use your fax telephone to call the number and follow the simple instructions for today's News.

TRANSPONDER WATCH (FAX)

0336 422889

A listing of the latest Transponder changes, Sightings and Feeds, updated at least once a week. Use your fax telephone to call the number and follow the simple instructions.

TRANSPONDER & CHANNEL LISTING (FAX)

0336 422886

A complete listing of all satellites, transponders and TV and radio channels from 71° East to 53° West. Use your fax telephone to call the number and follow the simple instructions.

SMARTCARD NEWS (FAX)

0336 422884

The latest news on ECM's new smartcards and encryption changes, updated every day. Use your fax telephone to call the number and follow the simple instructions.

TV Live Limited, 78 Shepherds Way, Rickmansworth, Herts WD3 2NR
Providing Satellite News & Information since 1990

All calls to all the services above cost 39p per min cheap and 49p per min at all other times.

The Copyright in these services is owned by TV LIVE Limited. No part of these recordings may be reproduced or transmitted in any form without the written permission of the copyright holder.

WILLOW VALE

ELECTRONICS LIMITED

'The Better Choice'

gives you more...

- More new products and spares
- More commitment to higher stock levels
- More technical know-how
- More choice
- More product support
- More dedication to customer care

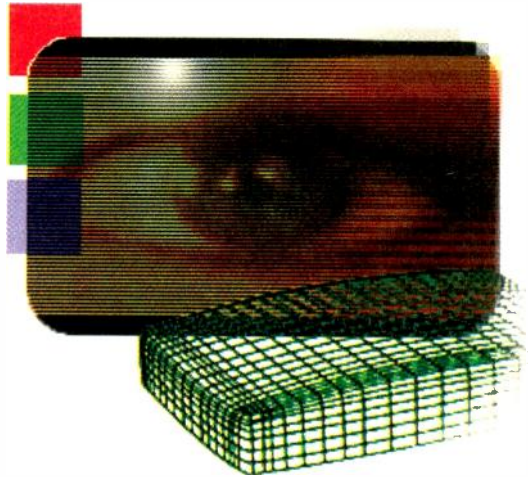
Willow Vale supplies parts for all these household names, with over 290,000 different spares available by letter, phone, fax or C.O.P.S. ('viewdata' based order/enquiry system).

Should you require any technical help, advice is available on our 'TECHLINE' **0891 615915**
(*all calls charged at premium rate).

Being **Willow Vale**, we don't just guarantee the quality of our spares. We also pride ourselves on our prices...and our genuinely friendly and knowledgeable staff.



Reading: (01734) 876444 Manchester: (0161) 682 1415



MONITORS

Reports from Stephen Lenham, B.D. Andrew, Mark Garton, P.R. Runchman, Dave Lawrence, Chris Hawkins and Chris Watton

AOC CM313

This colour VGA monitor was used 24 hours a day in high ambient temperatures. It seems that the chopper power supply was running at close to its limit, as there was repeated failure of the chopper transistor Q901. When this happens, it's as well to check the current sensing resistor R925 (0.47Ω) and the current limit circuit. The latter, consisting of R926, R928 and Q909, also generally suffers. Incidentally the monitor has proved to be 100 per cent reliable since it was moved to a cooler environment. S.L.

AOC MM413S

This cheap mono VGA monitor was dead, with no power supply operation. Resistors R703 and R704 (both 150kΩ) which bias the base of the chopper transistor Q701 were open-circuit.

The picture produced by these monitors seems to be none too square, but as there are no geometry adjustments there is little that can be done about it. S.L.

Intra Mono VGA Monitor

This monochrome monitor was part of an **Elonex** PC system and was badged **Elonex**. It powered up normally, but there was a bright white screen – the CRT was being driven flat out. The cause of the fault was the M51392P 50MHz video amplifier chip, which is mounted on the tube's base board. It's a single channel version of the M51387P triple amplifier that's commonly used in colour VGA monitors. A replacement proved to be difficult to obtain. We eventually obtained a replacement from Nikko

Electronics (telephone no. 0181-336 0566). S.L.

Amstrad HRCD VGA Monitor

Three of these 14in. monitors came along at virtually the same time, having died either at switch on or, in one case, while in use. In each case the cause of the trouble was dry-joints, mainly in the power supply and particularly around the STK7356 chopper regulator chip IC501 – one of these would have fallen out had it not been screwed to a heatsink!

Another problem you get with these monitors as they age is failure to focus, even with the LOPT based focus control set at maximum. The three units just mentioned all suffered from this fault to some extent. We understand that the potentiometers encapsulated in the Orion LOPT tend to deteriorate. With a replacement LOPT at around £30-£50, few people consider repair worthwhile. S.L.

Amstrad PCW8256

Chris Hawkins said to check the disc drive belt (February, page 255) in the event of slow disc functions or disc errors, but gave no warnings. When you remove the drive unit from the monitor, then its outer case, don't go any further until you have checked the position of the leaf switches. They are operated by small brass 'rods' about 3/16in. long. These will fall out when the two PCBs are separated for the belt check.

Spare leads will be found inside the PCW8256 when the drive unit is removed. They are for another drive unit. If the case is cut, a 3.25in. unit

can be fitted. A memory update kit can also be fitted. Both items can be obtained from Silicon City, Windermere Business Centre, Oldfield Court, Windermere LA23 2HJ (01539 448 118). B.D.A.

Taxan Monitor

C13 tends to fail in the small monitor. It's a non-polarised electrolytic that can be obtained only from Taxan (UK) Ltd., Taxan House, Cookham Road, Waterside Park, Bracknell RG12 1RB (01344 867 545). B.D.A.

Dell Monitor

The problem you get with some of these monitors, which have the controls up the right-hand side, is that in time the focus control has to be adjusted to the end of its track. Some people replace the CRT, which is wrong. It's far cheaper to fit the modification kit that's available from Dell Quality Control to correct the fault. Check with Dell Computers Corporation Ltd., Boghall Road, Co. Wicklow, Bray, Ireland (telephone 01344 720 000). B.D.A.

Milford Monitor

We've had only one of these in for repair. All the electrolytic capacitors had changed value. B.D.A.

Sigmex Monitor

If there's no EHT because the EHT unit, which is bolted to the side of the case, has failed it must be replaced – repair is not possible. In the event of power supply trouble, check the leads from the diodes etc.

on the heatsink to the PCB. They tend to break where they bend through 90°.

This monitor will operate at 46kHz or 64kHz, selected by a switch. The line can be interlaced or non-interlaced. **B.D.A.**

Mitsubishi 6200

We've had only two faults with this model. The usual one is in the power supply start-up circuit. The power supply is a well-designed, pull-out unit. Check the main diode, and make sure that it is mounted as high off the PCB as possible, otherwise it will burn the board. Check all the other components in the start-up circuit as well.

The other problem is radiation of whatever is on the screen. It will be picked up on a TV set at about channel 45. **B.D.A.**

Digivision Monitor

This is one of the better monitors to work on: the sides drop down, with the PCB attached. Check whether the large capacitor in the power supply is bulging. For loss of height, check the 27/30V supply to the field output chip. **B.D.A.**

Amstrad 1600 Series

When the STK7356 chopper chip IC501 fails, with a short-circuit between pins 15 and 13, you often find that the 0.22µF feedback capacitor C512 is open-circuit. If this is not replaced, a new STK7356 will either blow again or not work.

R505 and R506 (both 100kΩ), which bias the base of the chopper transistor in IC501, tend to go high in value. As a result there's no start up. A further item to check is R502 (1Ω) which goes open-circuit. **M.G.**

Elonex Monitors

Failure of the 0.22Ω power feed resistor R603 at first switch on occurred with a Model TE1438. We cured the problem by fitting a 3W wire-wound replacement.

With models in the CDS437K range, intermittent colour drive and mode changes can be caused by the video lead going open-circuit internally, mainly at the 15-pin D plug end. Replacing the lead cures these problems. **P.R.R.**

Hewlett-Packard Laserjet II/III (Canon SX Engine)

A problem you get with these is that the upper cooling fan bearing seizes though the fan still appears to operate, sometimes because the bearing then turns in its rubber

mounting. In most cases cleaning and lubrication is sufficient – provided the rubber mounting hasn't become hardened because of the heat. **D.L.**

Tulip SX Compact 2/AT and 3

If one of these regularly loses partial set-up, e.g. disc drive type, or floppy discs don't work properly, suspect the 82C206 chip. **D.L.**

Hewlett-Packard Laserjet IIP/IIIP (Canon LX Engine)

Grinding noises occur when the plastic bushes on the fixing roller break, with the result that the roller fouls on the lifting plates. If this is spotted early enough, before the roller's plastic surface is damaged where it normally comes into contact with the paper, only the bushes need to be replaced. **D.L.**

Acer 7111D

What had failed first in the power supply is difficult to say: the UC3842 control chip IC601 had exploded, the 2SK793 MOSFET chopper transistor Q601 was short-circuit, the four mains bridge rectifier diodes D601-4 had given up and the PCB track between the current sensing pin of IC601 and the 1kΩ, 0.125W series resistor R616 had burnt out. **C.H.**

ADI DM3114/Bull DMU1967

If the symptoms are failure to start or a pulsing power supply, check whether the 2SC3883 line output transistor Q502 or the 4.7nF, 1.6kV line output stage tuning capacitor C518 is short-circuit. Alternatively the line output transformer T502 could be faulty.

If the picture dims when the set is hot, check whether C723 (10nF, 2kV) is leaky.

Dry-joints are often found around the three 2SD1609 RGB output transistors Q701/3/5. Another problem on the tube base panel is the four 4.7µF, 250V electrolytics C703, C710, C716 and C724 which dry up. **C.H.**

Taxan Super Vision 765

If the 2.5AT fuse 901 is OK but the monitor won't start up, check the value of R906 (270kΩ, 0.5W) – it tends to rise – and the three 100µF, 35V capacitors C908, C911 and C914.

If the fuse has blown, check the bridge rectifier D901 and the 2SC3152 chopper transistor Q901 for shorts. It's good practice to replace Q901 and the TDA4601 control chip IC901 at the same

time. Don't forget to discharge the mains rectifier's reservoir capacitor C907 (220µF, 400V) first. **C.H.**

Trust 2143

If the 2.5AT mains fuse F101 has blown, check the degaussing resistor TR101, the degaussing coils connected to P101, and the mains bridge rectifier BD101. If the 2SK793 chopper MOSFET Q101 is short-circuit, replace the UC3842/SG3842M control chip at the same time. C107 (10nF, 1kV) and diode 102 have been known to go short-circuit.

If the power supply is pulsing, check the 47kΩ, 2W resistors R102 and R103 which tend to go high in value. They supply pin 7 of the control chip, where the voltage must reach 16V for the power supply to start. Also check whether C131 (47µF, 25V) and/or C108 (100µF, 25V) is leaky.

Pulsing because of a short on the secondary side of the power supply can usually be tackled by disconnecting the cathodes of diodes D107, D108, D109, D110, D111 and D112 one at a time until the pulsing stops. The most likely causes are a faulty TDA1675A field output chip (U601), which is supplied by D111, or a short-circuit BU2508DF line output transistor (Q408), which is supplied by D108. The 4.9nF, 1.6kV line output stage tuning capacitor C417 has been known to fail. **C.H.**

Hewlett-Packard D1182 (Mitsubishi)

If the mains fuse F901 has failed, check for shorts between pins 10, 11 and 14 of the STK7309 chip. This is an 80W device. An STK7310 (100W) chip can be used as a replacement. It's advisable to replace the three electrolytics C913 (47µF, 25V), C914 (22µF, 50V) and C915 (2.2µF, 50V) at the same time. The two 3.6V zener diodes D905 and D907 are often damaged when the power chip fails.

For intermittent loss of height, check for dry-joints around the 2SC1609 field output transistors Q401/2 and diodes D401, D402 and D403. **C.H.**

Microvitec Cub

Flat out brightness was the trouble with this old school monitor. We found that there was over 1kV at the tube's first anode pin because the 2.2MΩ first anode preset was open-circuit at its earthy end. Replacing this restored a very good picture. **C.W.** ■

Going it Alone

Running your own repair business is quite a different matter from being employed by someone else to do repairs. John Pitt-Francis on how to make a success of it

After spending some twenty years as an employee in the TV and video rental and retail industry I have more recently spent over three years running a similar business of my own. The following notes are based on my experience and have been put together with the aim of helping those thinking of becoming self-employed.

There is a world of difference between employment and self-employment. Engineers/technicians who work for a large national company need concentrate only on the demands laid down in the 'job description' that most people get on starting a job these days, and the 101 standing orders that everyone is supposed to know about but are often discovered only when you do it the wrong way!

With a large company the aims are better public relations, speedier diagnosis, more efficient journey times, a faster clear-up rate on second calls and enthusiastic retraining (in most cases probably self-training done in your own time). This can be called self-management. It is quite different from being self-employed.

With self employment, while you no longer have to fit into a rigid scheme of conduct devised by a company all the factors listed above remain just as important and a whole extra raft of responsibilities that someone else would have looked after have to be taken on. These include spares ordering, overall work planning, keeping accounts, chasing arrears, dealing with problem customers, finding solutions to previously unknown faults, placing advertisements, searching for new business, vehicle maintenance, the purchase and maintenance of test equipment and more.

In addition, by giving up your regular job you have given up some of its certainties, such as the regular pay packet of much the same sum each month (it may have been hard to live on, but at least it was always there), the company-assisted pension scheme, the company car, the relief engineer who could be called in when too many people were sick or on holiday, the training and support provided with new products and so on.

Advantages

Yet there are advantages! The risks are higher and the demands on your time much greater, but the freedom to decide on your own course is well worthwhile. If you think the best approach is to specialise in say just VCRs, the decision is yours. You can change your car when you want to, and buy equipment when you think it best. More importantly the long-term financial prospects are, for the following reasons, better:

- (1) Your income comes from hundreds of different customers. So you can't lose your job overnight through redundancy or a bad mistake. You still have to take great care over your reputation of course, and it is your responsibility to ensure that you are getting enough custom to keep the business going.
- (2) The money you make is all yours, less expenses and overheads. You are not paying for an over-managed organisation, manifestly bad spending decisions, or contributing to shareholder dividends.
- (3) If your workload justifies extra help with accounts or deliveries etc., you do the hiring and firing and thus maintain your own employment.
- (4) At the end of your working life you have a business to sell or pass on in your family.

Choosing your Base

There are two basic ways of running your own business, either to use rented premises on or off the high street or to work from home. Each has its advantages and disadvantages, which are summarised in the box opposite.

Some of the factors listed are not in practice so clean-cut. For example, while there will certainly be times when you wish for a clean separation between work and family, there are other times when it is a great advantage to be



Our photo above shows Michael Dranfield, a regular contributor to Television, in his workshop. Michael runs a successful business at Buxton, Derbyshire with his partner Michael Harrop who looks after the sales side.

able to call on family help. Then those who live in a flat will have no option but to start from separate premises. Nevertheless a glance at the comparison will show that for the sole trader starting out with no partners or employees the home-based business entails a far lower risk. Indeed the lower the number of commitments, the lower the minimum income you have to generate. This is the route I took, and the following notes will hopefully help anyone else who is planning – or having to plan – such a course.

When to Start

The first consideration is when to start. This will probably be the single most important decision, so it shouldn't be rushed.

If you don't have some capital to cover the start-up expenses and get-going period, you need to build up a circle of customers while you remain employed. This can be tricky. For understandable reasons, many trade employers have clauses built into their employment contracts to forbid this. Yet I've never met anyone who didn't do some work for relations, friends and their friends and relations.

Anyway, it should not be long before your own work builds up and you take the next stage, the big one – look out for part-time work, and hand in your notice. Do it in that order! There are plenty of businesses that have work for half or one and a half technicians but don't wish to take someone else on full time. Alternatively you may be lucky enough to find a warehouse or business to which you can offer a sub-contract service. But always regard these as stepping stones towards your own customer base, because the returns from such work are unlikely to lead to a long-lasting relationship.

There is of course the government enterprise allowance. It's very useful to have an extra £1,625 for the first year of trading, but it means a gap of two-three months between unemployment and start-up – more if you have received a worthwhile redundancy payment. It will do little more than fund the gap, but the local TEC (training and enterprise council) can provide a wealth of free help and information for those who are, as I was, green to the world of self-employment.

What you Require

With the start-up date fixed, what do you need? Well, you are carrying your main assets around with you! These are your skill, which has already been proved at work, and your confidence that you can overcome any new obstacles you encounter. Without these, you can forget about it.

To start up, you will need the following as a basic minimum:

- (1) A dry storage area, of which part will be your heated workshop.
- (2) An office, if this is not part of the workshop.
- (3) A fit-for-the-purpose vehicle.
- (4) A workshop spares stock.
- (5) Test equipment and reference data.
- (6) A spares kit for the vehicle.
- (7) A tool carry kit for field and workshop use.
- (8) A stock of second-hand items that you can sell, rent or loan.

Where to work

Rented premises offer these advantages:

The public location gives you a better chance of building up the business quickly.

Work and home can be kept separate.

You can have a sales section with a proper showroom.

There's a better chance of getting a good price should you decide to sell the business.

Disadvantages are:

High overheads. These include separate phone, electricity and heating bills in addition to the rent, business rates and possibly wages.

The cost of getting to your premises and the lack of flexibility – you may be tied down for the duration of the opening hours' time.

The cost of carrying a range of goods for sale – money "up front".

Working from home has the following advantages:

No travelling time or expenses are involved.

There are tax allowances for the parts of your home used for the business.

Rental and upkeep costs are much lower.

It's more easy for members of the family to help out with such things as taking telephone calls and doing collections/deliveries.

There are no business rates to pay.

Disadvantages are:

It will take you a lot longer to build up a customer base.

You will have to rely more on advertising, especially in a rural area.

It's very difficult to keep your work and home life separate.

(9) Printed stationery and advertising material.

The Workshop/Stock Room

In the typical suburban semi the garage is the obvious choice for this. But it's not ideal. In fact everything about working from home is a compromise. If the funds are available, it's better to leave the garage and build a separate workshop and stock room. Remember however that any part of your home used solely for business will, technically, attract capital gains tax when you come to sell. Few properties have enjoyed much capital gain during the past seven years, but no one knows what the next seven will bring. So reserve a corner for the lawnmower and bikes! Use the office jointly as a study, bedroom etc.

Workshop design involves a degree of personal preference. For what it's worth, the layout of mine is shown in Fig. 1. A glance at the dimensions will show how humble it is, yet provided I am tidy and methodical (wish I were!) it will cope with all the normal service requirements. There is no room for expansion, and the workshop is tailored for one person and no more.

I sectioned off approximately one third of the garage as an inner sanctum that forms the workshop proper. This makes it very easy and economical to heat in winter. Most of the structure was formed by laying standard chipboard on a 2.5 x 1.5in. timber frame.

The soak- and workbench surfaces can consist of either planking or Melamine-covered board. There's little need to buy this new when so many fitted kitchens and shopfittings are discarded to make way for a different style. My main workbench is a 3ft 2in. high chest of drawers with a Melamine top brought out an extra 9in. and a surround about 12in. high on the three sides, bringing it level with the soak bench and test shelf. A test

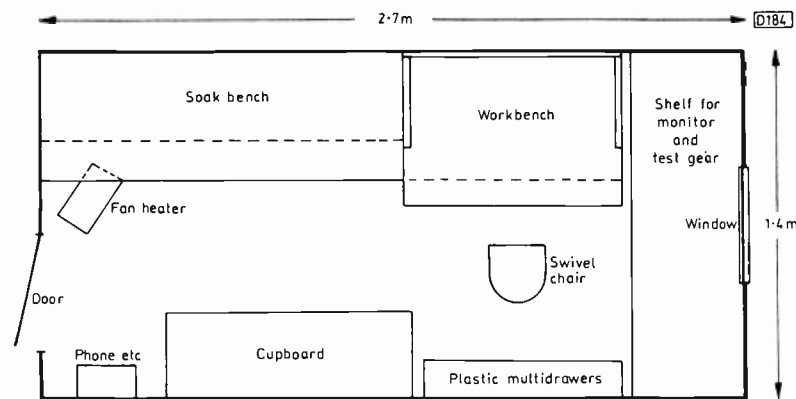


Fig. 1:
Arrangement of
John Pitt-
Francis's
workshop. The
main garage
area is 2 x 6m.

monitor, variac, soldering iron and oscilloscope are thus close to hand.

The partition wall is far enough away to enable shallow cupboards, shelves and the essential clear plastic multidrawers to be accommodated. The aerial distribution box can go in one corner, providing all available terrestrial channels, along with a pattern generator and a satellite receiver. Be generous with your allocation of 13A and coaxial plug points: you will need more than you think!

The rest of the garage forms a stock room for TV sets, VCRs, panels and manuals. Racking will save you a lot of time moving sets about to get to the bottom of the pile, but make sure that it's strong. A Dexion frame with blockboard shelves is ideal, but the frame can be of wood provided you are sensible about the weight that's to be carried.

By far the best way of storing manuals is in a couple of filing cabinets, together with a data base program to give you instant access to what you have available and where it's located. Keep your information accurate, either by altering the data base or refiling in the same location. It would be helpful to have all your stock filed in a similar way on the data base, though I haven't personally had the time to do this and it would need amending on a daily basis. If space allows, you may prefer to have an office adjoining the workshop: this would be a logical place to keep the service manuals.

The Office

In theory a one-man business can still be run from an apple box under the spare table, but a modest investment in some additional aids will help. First and foremost is a computer. This need not be a state of the art machine. I use an Atari 1040STE with a 9-pin basic printer and good programs to provide wordprocessing, spreadsheets and a data base. The wordprocessing enables letters/estimates/faxes to be prepared. The spreadsheet sets out daily invoices in (expenses) and invoices out (income). The data base sets out information on customers, manuals and stock.

This arrangement serves me well enough, though I appreciate that a PC is now the standard for commercial use and most home computing, and that integrated programs are available. What you decide to spend on this depends on the amount of work you intend to do yourself. It's perfectly possible to turn out respectable accounts with a large cardboard box, a ledger book, a supply of invoice books, large envelopes or document folders and a rubber stamp that carries your logo and address. Firms like Willow Vale and SEME can supply other items like job card/receipt books, rental contracts, etc.

Keep every scrap of information on expenditure, plus a record of invoices drawn up each month, in a new folder.

From these a ledger can be drawn up to show, over the trading year, (A) the total money received (turnover), (B) the total money paid out for goods (TV sets, VCRs, spares etc.) and (C) the other items that make up your operating expenses (heating, electricity, telephone, petrol, car repairs, stationery, advertising etc.).

(B) subtracted from (A) is called the gross profit, while (B) + (C) subtracted from (A) is the net profit. Even this is not the equivalent of take-home pay however, since you will have to take into account tax, self-employment stamps and, if you are prudent (or your circumstances allow!), a planned sum to cover investment and/or slack periods.

As mentioned above, a PC is nowadays standard for commercial and most home computing and programs are available to cover these requirements. Those who wish to go down this route will find previous articles such as those by David Botto (*Television* July and August 1994 and January 1995) useful.

No system is much good without a basic printer. A bubblejet printer enables you to produce your own stationery and advertising to a respectable standard (those with an Amstrad PCW should refer to Keith Wevill's article in the January 1994 issue).

Once you have a computer system the ledger can be done away with. In its place a spreadsheet that shows in an instant all key parameters of the business can be built up. There is no need to involve yourself in great expense – £200 should buy a reasonable system on the second-hand market.

With my Atari 1040 I use a Kuma V2 spreadsheet, First Word wordprocessor program and Equinox personal organiser for the data base. Good programs are also available on the Amiga and early Amstrad machines.

Your office will also need a phone and fax. The fax is not essential but is very useful for sending urgent orders. A phone and answering machine are essential. If the phone isn't mobile you will need two, one for the office or house and one for the workshop.

It would be nice to have a secretary to deal with calls, orders etc. I can't afford this luxury, but various members of the family help out. One thing I cannot do without is an accountant, to take my records and sift out what can be presented and what can't and, most important, what I didn't realise could be presented in the first place! This is a couple of hundred that's well spent.

Field Servicing

I won't say much about vehicles, since everyone has different ideas and resources. There is of course the option of not making any field service calls, with all equipment to be brought in and collected by the customer. This may work in a large town or city, but was never a serious option for me in the depths of rural Devon.

The main requirements are that the vehicle, a van or hatchback, should be reliable with a good, clean appearance. Regular care of the bodywork and livery and regular servicing will pay off. A 'Trotters Independent Traders' image will do nothing for your prospects! Get a good signwriter to provide the final touch. We have two cars, with professionally made magnetic signs on the sides and hatch. Make sure that your field call charges reflect the extra cost, in time and maintenance, compared with a bench repair.

If you are going some distance to attend to a repair it's worth putting on board everything you are likely to need – if you've got it! You will usually know the model and symptom. In addition to specific spares and manuals, I carry the following items that will fit into a small multicompartment components box:

Essential Equipment

A general-purpose 25W soldering iron that will tolerate being left switched on, also a micro-iron for small ICs and surface-mounted devices.

A good digital multimeter – one with a capacitance range will save a separate purchase later. I'm very happy with the Escort EDM168 which is available from CPC. It also has a frequency counter and transistor and diode tests.

A double-beam scope with a minimum bandwidth of 20MHz, such as the Hameg HM203-7 (60MHz would be better). You may need to use it only occasionally but you can't do without one.

A variac (variable transformer) such as the Regavolt 402-PSA. This will save you a fortune in blown chopper transistors. A portable TV set will be required for VCR repairs – you can't always use the customer's.

A degaussing stick. Beware of purity errors that don't look like purity errors!

A tube tester and reactivator is a worthwhile investment.

A VCR head puller – make sure you fit it right, otherwise you may break the rotating transformer beneath.

10 most popular mains switches.

100 mixed fuses, 20mm and PC types.

20 mixed safety resistors.

20 mixed wirewound resistors (mainly 10Ω or less).

100 mixed 0.5W and 1W resistors.

50 mixed electrolytics.

25 assorted transistors, to include BU208A, BU508A, BUT11A, BD137/138, TIP29E, TIP112/110, BD241C/242C, BF757 and BC639/640.

25 assorted diodes – four BY133, four BY255, twelve assorted 1.3A zeners and some 1N4148s.

2 positors, types 98009 and 98012.

12 batteries – four AA, four AAA, one PP3, one BR2/3A lithium, one 1.2V nicad and one 2.4V nicad.

1 EHT anode cap and a couple of 2kV ceramics, values 1.5nF and 2.2nF.

10 assorted plugs – phono, coax, coax joiner, coax attenuator (6dB and 9dB), F connector and DIN.

Also a small bottle of isopropanol alcohol, switchcleaner wipes, butane (for the gas soldering iron), a wideband aerial amplifier, a portable aerial and a universal remote control unit.

The Tool Kit

Get a good quality executive case that has an aluminium band to hold the edges of the two halves. Cut some foam, as used in cushions, sliced to the depth of the case to fill it. Then cut out the shapes of your chosen tools in the top surface. Finally cut a piece of 5mm plywood to the same shape and cover its underside with 1cm of foam. This will keep your tools in position so that they don't fall all over the place, and also give you an instant tool check at the end of each job – I spent the first half of my working life parting with lost tools worth a fortune.

The top part of the case will hold your invoices, reference books etc., the bottom half your tools. Mine are as follows:

A side cutter, snipe-nose pliers and combination pliers.

Large, medium, small and mini slotted screwdrivers.

Large, medium, small and mini Pozidrive screwdrivers.

A pick-up tool, desolder pump and braid.

A Portasol gas soldering iron kit.

An economy analogue multimeter.

I don't advise an expensive meter leaving the workshop.

Stock

This will be a more comprehensive version of the vehicle carry kit. If you are just starting up, open accounts with a range of suppliers and order as you need. Avoid stocking any high-cost items unless you know you are going to

need them – parts that don't move are dead money!

Get hold of some non-working VCRs and TV sets. Repairing them is a good time filler when business is slack, and you will have a stock of loan sets to get you out of a jam. They can be rented out or sold, which will produce a greater short-term profit than selling a new equipment.

Workshop Equipment

Unless you have a blank cheque, equipment is best bought as and when you need it. Some items are essential at the outset however. I suggest those listed in the box above.

If your field service kit doubles up as a workshop kit you will also need a set of small Allen keys, jeweller and Torx screwdrivers, needle files, alignment tools, tweezers, inspection mirrors – and of course a good anglepoise lamp.

Manuals and Reference Data

A good set of semiconductor comparison tables is without any doubt the most important thing here. Probably the best ones currently on the market are the ECA range. Manuals are often needed and nearly always expensive. As I see it there are three courses:

(1) Join a manuals library. One or two advertise in this magazine. Make a copy of what you consider you might need again as you go along. This may infringe copyright law, but manuals are often out of print or the manufacturer may no longer be in business. Manuals may thus be unobtainable in any other way.

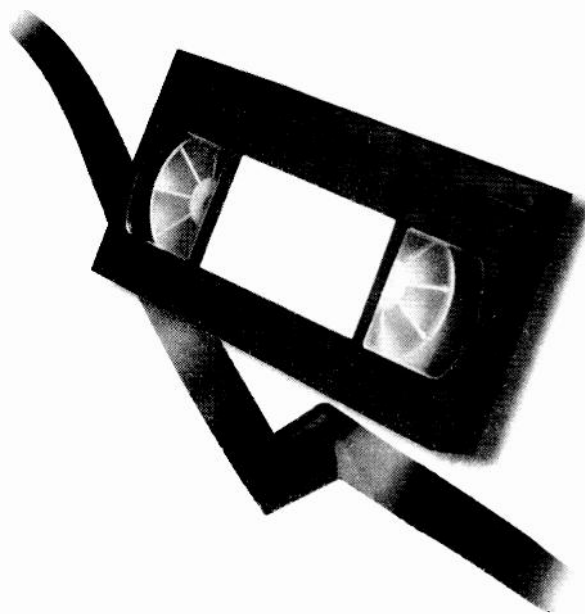
(2) Buy circuit/servicing books such as those available from U-View. This is an expensive outlay but is much cheaper than buying individual manuals.

(3) Buy manuals as you go along.

I had a bad experience with a manuals library, so I now use option (3) if option (4) doesn't work. Option (4)? Yes, borrow and lend locally: manuals must represent the highest single item in our overheads, so we all need to help each other with this one.

In Conclusion

I hope that these notes will help some of you to make a success of self-employment in the servicing business. A number of things have not been mentioned here, such as dealing with awkward customers. You will have to work out your own approach to such problems. Finally, good luck! ■



VCR Clinic

Reports from Philip Blundell, AMIEEIE, Richard Flowerday, Paul Hardy, Justin Smith, John Pitt-Francis, Brian Storm, Michael Dranfield, Michael Maurice, Graham Richards and Roger White

Philips VR6470

"Chews tapes" was the complaint with this VCR. When we tested the machine the tape played for a while then the take-up spool stopped. With the clear cassette in place we saw that the brake magnet released, the brakes then coming on. Transistor 7053 on the servo board operates the brake magnet. The transistor was OK, but the wire between it and the magnet was open-circuit: there was a dry-joint where the wire is connected to the magnet. **P.B.**

Toshiba V509B

Usually when play was tried the drum didn't rotate. Sometimes however it ran much too fast. Checks around the TD6361 servo chip showed that the voltage at pin 35 was incorrect. The Toshiba stock fault book suggests that C516 (0.01 μ F) can be responsible for this. It was OK however. A new TD6361-A6 chip was required. **P.B.**

Grundig VS600/700/800/900 Series

If the start and end sensors don't work, check that the LED tower is receiving drive pulses. Loss of these pulses can be caused by failure of transistor CT275 or CT285 (circuit reference depends on the model). It was originally type BC848B. Uprate it to type BC818A or B. **P.B.**

Hitachi VTM722E

A cassette had got stuck in this machine and had been removed by the customer (why do they do it?).

When we'd reassembled the housing the machine wouldn't accept a cassette. Checks at the loading motor drive chip IC753 showed that its 14V supply was missing. The cause of this was failure of the 2SD1765 series regulator transistor Q601, which had gone open-circuit. It's mounted on the main PCB. When we'd fitted a replacement the machine still wouldn't accept a tape, reverting to standby after a short time.

We eventually found that the loading motor was trying to run in the unload direction, despite the fact that the cassette lift was fully up. The reason for this was that the unload pin (42) of the system microcontroller chip IC751 (type CXP50116-116Q) was permanently high. Replacing this 80-pin chip restored normal operation. **R.F.**

Mitsubishi HSM54

A cassette was stuck in this machine, with a large loop of tape in the works. When I removed the bottom cover to operate the wind mechanism manually I found that the pulley on the capstan motor was split. My manual doesn't show this as a separate item, but Willow Vale stock it (reference no. 77054P). It's not cheap for a bit of plastic but is a lot cheaper than a new motor. **P.H.**

Toshiba V57/JVC HRD225/ Ferguson 3V36

This machine needed new heads. We fitted a new drum and carried out a full mechanical service. After

a couple of weeks however the customer reported that there was a problem with the sound – any sustained note suffered from wow. As a new pinch roller made no difference, I took the machine back to the workshop.

A scope check showed that the capstan servo would periodically hunt. The control pulses and signals from the capstan motor were present, and servo alignment failed to improve matters. So a new motor was tried. This again made no difference. The culprit turned out to be the capstan belt. The one I'd fitted as part of the service obviously had a tight spot, though it felt all right and there were no obvious signs of poor manufacture. **P.H.**

Hitachi VT8000

After carrying out a mechanical service there was still intermittent fast-forward operation. The cause was traced to the rear-most microswitch on the deck. It had a loose fitting case, which resulted in premature operation. A replacement cured the trouble. **P.H.**

Ferguson 3V42/JVC HRD455

Poor audio was the complaint with this machine. A piece of sticky label was found attached to the AC head. I removed this and cleaned the head but the fault persisted. Audio was fine at the AV socket and was present at the input to the modulator, which was the cause of the trouble. I sent it to MCES for attention. The returned unit fixed

the problem. Full marks to MCES, as usual. **P.H.**

Panasonic NVJ35

The complaint was that this machine wouldn't eject a cassette. On test it wouldn't power up. C9 in the power supply was open-circuit. After replacing this I found that the capstan speed was erratic and there were tracking problems on the picture. C18 and C22 in the power supply were low in value. **P.H.**

Sharp VC681HM

After replacing the belts, pinch roller and reel drive unit this machine seemed to be all right. Several weeks later it was back on the bench, with the complaint that the audio was poor. This turned out to be intermittent, so we asked the customer for a tape that showed the symptom. Sure enough it sounded as if the capstan was running slow – but only at the start of a tape. The sound was fine a few minutes later.

I eventually traced the cause of the trouble to the tape guide between the audio/control head and the pinch roller. It showed signs of wear on its lower edge and was slightly out of alignment. Slight readjustment cured the problem. **P.H.**

Ferguson FV31R

The original fault was failure to load. This was cured by removing the debris that jammed the entry guide. I then gave the machine a good clean up and tested it. Playback produced normal sound but no picture: the display consisted of white diamond shapes, about the size of a large postage stamp, on a black background. Using the AV connector output produced the same result.

I hinged out the top board and attached the scope probe to test point BW10. Normal video was present. Refitting the board produced the same fault symptom. The cause of the trouble was traced to the board fixing screw at the right-hand side, where it screws into the cassette housing. It was shorting an adjacent PCB track. An insulating washer beneath the screw cured the problem.

You could get the same trouble with Models **FV30** and **FV32**. **P.H.**

Sharp VC750

The customer's complaint was that this machine would sometimes jam and now had a tape firmly stuck in it. I found that loading gear A had a broken tooth and that the master cam was worn. Replacing these

items and the mode switch put matters right. **P.H.**

Grundig VS310

This machine was reluctant to accept a tape and showed F9 in the display. Once many dry-joints had been resoldered and subpanel mounting pins cleaned the machine seemed to be more keen on the idea of working, but it still wasn't very co-operative. I then noticed that there was no tuning memory. After replacing the back-up battery the F9 indication disappeared and full operation was restored. The battery is mounted on the main panel and is heavily disguised.

Unfortunately however the E-E vision was very poor, especially from cold. Faults that appear before equipment has warmed up are usually caused by either dry-joints or defective capacitors. When all three capacitors (C2251, C2254 and C2261) on the video board, next to the tuner, had been replaced the customer was able to resume his endless taping of *Neighbours* and other such anodyne examples of antipodian culture. . . **J.S.**

Hitachi VT520

Low sound and intermittent jumping/critical tracking indicated that the audio/control head was faulty. At last we seem to be getting some sensibly priced alternatives. **J.P-F.**

Amstrad VCR4700

Fast forward and rewind were OK but when play was selected all we got was about two seconds of freeze frame. Surprisingly, the cause was simply the pinch lever arm action being too stiff. The 'grease' was more akin to glue that has nearly set. A good clean up with alcohol and a smear of Moly slip put the machine to rights.

We've had the same problem with other decks. **J.P-F.**

Sony SLV315

The cause of power failure was traced to C111 which had gone low in value. **J.P-F.**

Panasonic NVG21

This machine suffered from unreliable tape unlacing action. The cure was to replace the play arm unit, part no. VXL1490. **J.P-F.**

Matsui VR805

The fast forward and rewind operations were poor and the machine chewed tapes. Although cleaning the idler helped with

rewind, the reel motor wouldn't work at the low voltages supplied in the take-up mode. After ten years or so this VCR deserved and got a new motor. **J.P-F.**

Samsung SI7230

Unreliable eject was the problem with this machine. After fitting a new loading belt and release belt I received a recall. The final solution was a new motor, CPC code no. SS64769-052-140. **J.P-F.**

Panasonic NVHD100

The owner of this machine had included a recording to illustrate the fault: about once every half hour there was an interruption – a missing word, a flick of the picture or a jump in the scene. We came to the conclusion that the fault was probably caused by the capstan motor stopping briefly or slowing down every so often. Inspection of the XRA6439P capstan drive chip showed that its heatsink was very loose. For good measure we replaced the chip and refitted the heatsink securely. So far there have been no further interruptions. **B.S.**

Panasonic NVJ47

The head drum was very reluctant to rotate. It would eventually do so on about the third attempt. The result however was a picture that readily smeared across the screen as the drum servo struggled to maintain lock. Checks around the drum drive chip showed that C206, which is connected to pin 12, was defective. A new 0.1µF electrolytic capacitor cured the fault. **B.S.**

Panasonic NVFS100

The playback picture was marred by faint diagonal patterning. C3311 in the HQ pack is the usual suspect when this symptom is present. On this occasion it was OK. Deep in the bowels of the machine you will find the 1H CCD delay line pack – on the sub-luminance and chrominance board. Several small capacitors here can die: C3501, C3506 and C3516 often fail. This time C3509 (3.3µF) had expired. After replacing it we had a very good, clean picture. **B.S.**

Matsui VP9501

This machine's deck was jammed up solid: it would move neither forwards nor backwards. The cause of the problem turned out to be the reel drive clutch shift quadrant, which had jumped out of its track on the master cam. As a precaution we replaced the mode switch, in case it

allowed the deck to over run. We've not seen the machine since. **M.Dr.**

Matsui VP9301

Poor IF stability and streaking can be cured by replacing the three 0.47 μ F, 50V capacitors in the IF module. We use 1 μ F replacements. **M.Dr.**

Panasonic NVJ35

The reported fault was that the counter had gone berserk. On inspection I found that in the search mode the tape moved up the head. The cause was post assembly P5 which was bent. Replacement restored normal operation. **M.M.**

Matsui VX2000Y

This machine would cut out intermittently and would snap the tape at the end of rewind. The cause of the trouble was a dry-joint at D01, the sensor LED on the deck PCB. **M.M.**

Panasonic NVJ47

This machine kept on coming back to the workshop because it would intermittently switch itself on or off. The cause was simple: the VCR button on the front panel was gummed up. As a result it randomly switched on the power. A good clean up cleared the fault. **M.M.**

Akai VSF510

This machine wouldn't play tapes – the screen went green. The cause of the fault was absence of the playback 5V line because of a damaged port at IC504. A new chip cured the trouble. **M.M.**

Matsui VP9301

The playback picture suffered from static interference which was caused by the drum assembly. Unfortunately the upper and lower drums cannot be separated for cleaning, so a complete new unit had to be fitted. **M.M.**

Hitachi VTM822

There were intermittent problems with this machine: it would stop playing or go into other modes – in fact it seemed to have a mind of its own. Resoldering the micro-controller chip seemed to put matters right, but the repair bounced. The cause of the trouble was that the connectors between the main PCB and the operating PCB were dry-jointed. Resoldering them put an end to the playing about. **M.M.**

Panasonic NVL25

There were two faults with this VCR. The first was mechanical – it required a new carriage RHS,

connection gear and retiming of the gears. Secondly the booster circuit in the tuner block had low gain. We usually have to fit a new tuner, but these are expensive. On inspection however we found that there were several dry-joints in the booster section. Resoldering cured the fault. **M.M.**

Toshiba V711B

There was no power and we found that Z613 on the sub-PCB was open-circuit. Traces of liquid spillage were present in the vicinity of connector P603. Replacing Z613 and P603 and giving the machine a good clean up brought it back to life. **M.M.**

Panasonic NVF65

This machine would turn itself off when any function was selected. The cause of the fault was the reel optocouplers, part no. ON2170. **M.M.**

Sharp VC105HM/VCA111HM

Replace the belt if cassettes are ejected immediately. For erratic mechanical functions, remove and clean the mode switch or, better still, replace it. The cure for poor rewind is to remove the spools and clean both shafts. The up/down movement of the clutch reel mechanism can sometimes stick, causing search and wind problems. In most cases this problem can be cured by cleaning the shaft and lubricating with silicone grease spray. **G.R.**

Toshiba V312B

The complaint was no functions. Voltage checks showed that the 14V supply was missing. A resistance measurement at pin 1 of the L2726 loading motor drive chip IC760 produced a short-circuit reading. The cause of the problem was the loading motor, which produced a reading of 4 Ω . The chip and motor were replaced, also the cassette door lever, restoring the machine to rights. **G.R.**

Amstrad DD8900

This is the double decker. The problem we had with one of them was intermittent recording. We found that the cause was dry-joints at IC53 (78M05) on the lower video PCB. Another of these devices, on the upper PCB, was OK. **G.R.**

Samsung S11260

This machine wouldn't respond when a cassette was inserted. A scope check on the logic condition at input pin 5 of the KA8301/BA6209 loading motor drive chip

IC206 showed that it changed state. So we replaced the chip, fitting a BA6209 as it seems to be much more reliable. This brought the machine back to life. The BA6219 is also a suitable replacement – it's higher rated than the BA6209. **G.R.**

ITT VR3907/Samsung VI611

If there are hum bars on the E-E picture, check the 100 μ F, 100V smoothing electrolytic capacitor C4 connected to the 33V line. **G.R.**

Alba VCR6700/Bush VCR185

There was no playback FM – though we'd cleaned the heads first! Careful checks on the record and playback 12V supplies to the head amplifier showed that in both modes the rec 12V line was stuck at 2.5V. Although it read OK, we replaced the rec supply switching transistor Q505. This cleared the fault. We used a BC546. **G.R.**

Saisho VR1200

There was very poor take-up. Rewind and fast forward were OK, and the clutch seemed to be working. When I removed the idler it was obviously too stiff. So I dismantled it and cleaned the spindle. On reassembly all was well. **R.W.**

Sony SVL625

Some cassettes, but only a few, would go in but wouldn't go all the way down. After a few seconds they would come back up. After inserting one of these cassettes many times and watching what happened I noticed that the left-hand carriage release lever was bent back towards the cassette. Straightening it cured the fault. **R.W.**

Alba VTV10

There was no playback picture. It was as though the heads were dirty. The cause of the trouble was that the record high supply to the head amplifier was present in the playback mode. Q10 was short-circuit. **R.W.**

Samsung VI1860

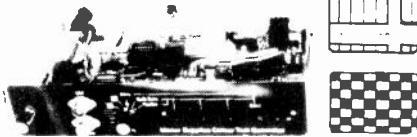
This machine wouldn't accept a tape. The tape-in light was on, and when the power button was pressed the head rotated and the supply reel wound back. This lasted for about five seconds, then everything stopped with the power light flashing. It looked very much like an end sensor fault. In fact the 5V supply to the deck PCB was only 0.5V. D601, a 1N4148 diode on the print side of the syscon PCB, was faulty. **R.W.** ■

MANOR SUPPLIES

QUALITY TV & VIDEO SPARES SUPPLIED FOR ENGINEERS BY ENGINEERS

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

TEST
DEMONSTRATIONS
AT 172
WEST END LANE



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

Price of Kit **£79.00**
Case (10" x 6" x 2 1/4") app **£19.00**
Optional Sound Module (6MHz or 5.5MHz) **£5.90**
Built & Tested in Case including Sound Module **£139.00**
Post/Packing £4.50
Add VAT 17.5% TO ALL PRICES

PAL COLOUR BAR GENERATOR (Mk4)

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

PRICE OF Mk4 COLOUR BAR GENERATOR KIT **£39.00.**

CASE **£6.90.** BATT HOLDERS **£4.20**

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

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

ADD
VAT
17.5%

LINE OUTPUT TRANSFORMER TESTER

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

PRICE **£24.00**
POST/PACKING **£2.50**

ADD
VAT
17.5%

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

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

PRICE **£99.00** POST/PACKING **£3.50**

CRT TESTER & REACTIVATOR KIT

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

KITS AND PROJECTS

- SAW IF AND TURNER UNIT complete and tested for video & audio outputs **£28.50 p.p. £1.80.**
- PAL DECODER KIT (Video to RGB) for Monitors **£27.00 p.p. £1.80.**
- PAL ENCODER KIT (RGB to Video) **£20.00 p.p. £1.80.**
- INFRA RED REMOTE CONTROL TESTER Infra Rcd Remote Control Tester **£10.00 P.P. £2.50.**

TV & VIDEO SPARES

REMOTE CONTROLS

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

IC SELECTION p.p. 90p

14DN487	£15.80	SAB3037	£8.80	TA7681P	£7.80	TDA2594	£3.80	TDA6200	£22.50
AN5521	£3.80	SAF1039	£2.20	TA7698P	£6.80	TDA2595	£4.80	TDA7052	£2.50
AN5960	£2.20	SIA2516	£9.90	TA7699	£13.50	TDA2600	£6.80	TDA8138	£2.20
BA6259	£6.80	SIA2535	£9.00	TA8694	£22.50	TDA2611A	£1.90	TDA8140	£2.20
BA6259	£3.80	SL470/471	£4.00	TA8691N	£6.80	TDA2653A	£2.90	TDA8153	£13.80
BA6259	£3.80	SL486	£3.20	TA8739P	£4.50	TDA2654	£5.70	TDA8170	£3.00
BA6238A	£6.80	SL490	£3.80	TBA121	£5.80	TDA2670	£3.20	TDA8172	£3.00
BA6259	£3.80	SL1430	£6.80	TBA1205	£6.80	TDA2680	£3.80	TDA8175	£3.50
BA6435	£9.80	SL1432	£6.80	TBA750	£2.20	TDA2690	£3.80	TDA8180 Kit	£7.50
CCUFREG07	£14.40	SN76226DN	£1.80	TBA950	£2.20	TDA3031	£6.80	TDA8190	£3.80
CNR50	£6.00	SN76705	£9.80	TBA2800	£1.80	TDA3033	£19.80	TDA8805	£12.90
DXK550	£6.80	STR4090	£3.80	TDA3170	£3.80	TDA3034	£12.80	TDA8805	£12.90
CNX62	£4.00	STK5322	£21.80	TDA316A	£4.80	TDA3054	£6.80	TDA8372A	£8.40
CNX83A	£4.80	STK5325	£6.80	TDA1011	£2.20	TDA3055	£15.80	TDA8380	£3.20
HA11211	£2.80	STK5326	£6.80	TDA1013	£2.20	TDA3056	£4.80	TDA8442	£2.50
HA1423	£3.80	STK5327	£5.80	TDA1014	£2.20	TDA3057	£4.80	TEA2104	£2.50
HA513385P	£21.50	STK5332	£4.80	TDA1035T	£2.80	TDA3541	£3.50	TDA9503	£3.80
LA4270	£4.95	STK5333	£13.80	TDA1044	£2.90	TDA3561A	£5.80	TDA9513	£4.80
LA4445	£3.00	STK5337	£4.80	TDA1060	£3.80	TDA3562A	£4.00	TEA1009	£2.20
LA4520	£3.80	STK5338	£4.80	TDA1072	£2.20	TDA3560	£2.50	TEA1014	£2.50
LA7520	£2.80	STK5339	£6.80	TDA1170S	£1.80	TDA3562ATFK	£5.80	TEA1039	£1.90
LA7530	£8.50	STK5342	£4.80	TDA1180	£2.20	TDA3561A	£2.50	TEA2014	£3.80
LA7800	£1.80	STK5372H	£8.80	TDA1185A	£3.20	TDA3565	£3.80	TEA2018A	£2.20
LA7801	£3.80	STR5392	£6.80	TDA1190	£2.20	TDA3566	£5.80	TEA2026	£5.80
LA7820	£3.80	STK5423	£3.80	TDA1324	£2.80	TDA3571B	£9.50	TEA2029	£5.80
LA7830	£2.80	STK5422	£5.30	TDA1512	£3.20	TDA3576B	£10.25	TEA2031	£1.80
LA7835	£2.20	STK5471	£4.50	TDA1515	£4.50	TDA3640	£5.20	TEA2164	£3.95
M10481	£6.80	STK5481	£8.80	TDA1521	£2.50	TDA3650	£8.50	TEA2165A	£6.80
M29181	£21.80	STK5482	£6.80	TDA1524	£6.80	TDA3651	£3.20	TEA5101	£2.80
M490BB1	£18.80	STK5487	£6.80	TDA1670A	£3.20	TDA3653A	£3.20	TEA5115	£6.80
M491BB1	£9.80	STK5490	£7.80	TDA1701	£3.80	TDA3653B	£3.20	TMS1000N211	£5.80
M494	£9.80	STK6962	£3.80	TDA1870	£6.80	TDA3655	£1.80	TM47C432AP	£1.50
EA12062	£3.80	STR1006	£5.80	TDA2072	£2.20	TDA3650	£5.80	TM47C432AP	£1.50
ML926	£4.80	STR7308	£4.80	TDA1904	£2.80	TDA4420	£2.20	TM47C434A	£1.50
MN1220	£6.80	STR7348	£5.40	TDA1908	£2.80	TDA4426	£3.20	TM47C432AP	£1.50
MN15425	£15.80	STR8125	£4.80	TDA1940	£3.20	TDA4427	£3.20	TM47C434A	£1.50
PCD8372P	£9.80	STR4090	£3.80	TDA2072	£2.80	TDA4428	£2.80	TM47C434A	£1.50
SAA1024	£5.80	STR4211	£7.80	TDA2004	£2.80	TDA4443	£7.80	TM47C434A	£1.50
SAA1061	£5.80	STR5412	£4.95	TDA2006	£2.80	TDA4500	£4.00	TM47C434N	£1.50
SAA1124	£3.50	STR6020	£7.80	TDA2009A	£2.80	TDA4501	£5.00	TM47C434N	£1.50
SAA1250	£3.80	STR4090	£3.80	TDA2030	£2.80	TDA4502A	£18.50	TUA2000	£5.50
SAA1351	£8.40	STR4090	£6.80	TDA2030A	£3.80	TDA4503	£7.80	U2829B	£5.50
SAA1393.02	£7.50	STR44115	£9.80	TDA2040	£7.80	TDA4505E	£5.80	U4206	£1.80
SAA1393.03	£6.80	STR50020	£6.80	TDA2050	£4.80	TDA4510	£3.80	UC3842	£2.20
SAA1394.2	£25.00	STR50020	£6.80	TDA2070	£4.80	TDA4515	£9.80	UC3844	£2.20
SAA1396	£12.00	STR50115	£14.50	TDA2540	£2.20	TDA4565	£3.80	UC3844	£2.20
SAA5000	£6.80	STR54041	£6.80	TDA2548	£5.80	TDA4600	£2.85	UPC1363C	£5.80
SAA5010	£5.80	STR55041	£10.50	TDA2576A	£5.80	TDA4601	£2.80	UPC1363CA	£5.80
SAA5012	£5.80	STR58041	£6.80	TDA2577A	£5.80	TDA4602	£2.80	UPC1378A	£1.90
SAA5020	£5.80	STR59041	£6.80	TDA2578A	£2.70	TDA4605	£2.20	UPC1394	£3.80
SAA5050	£11.80	STRD1806E	£6.80	TDA2579A	£3.60	TDA4610	£6.80	UPC1420CA	£12.20
SAA5231	£7.80	STRD4420	£12.80	TDA2581	£3.80	TDA4950	£1.60	UPC1488	£3.20
SAB3035	£17.80	STRD6108E	£5.80	TDA2582	£2.50	TDA4950	£12.50	UPC1488	£3.20
SAB3035	£9.80	TA7680AP	£5.80	TDA2593	£1.50	TDA5850	£2.80	UPD1397C	£4.80

LINE OUTPUT TRANSFORMERS p.p. £1.80

ALBA CTV14RS	£23.80	PHILIPS K30	£22.80
B&O LX2500, 2800 AT2077/81	£23.50	PHILIPS CTX-E/S	£23.80
B&O MX2000	£23.50	PHILIPS KT4	£16.90
BUSH 2914T	£15.50	PHILIPS 2A	£16.90
BUSH AT2079/10	£34.80	PHILIPS K40	£27.50
DECCA/TATUNG 145, 146, 147 P/N8537/20	£21.80	PHILIPS 5A	£16.90
FIDELITY ZX2000	£15.50	PHILIPS 9B	£16.90
FIDELITY ZX3000	£14.50	PHILIPS CF1	£23.80
FIDELITY ZX3000 22"	£21.80	PHILIPS CP90	£15.50
FIDELITY (TV)140	£15.00	PHILIPS CP110	£32.00
GOLDESTAR 154-132	£19.80	PHILIPS GR1AX	£16.90
GOLDESTAR 154-194	£19.80	PHILIPS NC3	£29.50
GOLDESTAR CTT9325 154-125 A	£16.95	SAISHO CT14R, CT141, 3714002	£15.00
GOLDMANS TV20	£15.50	SAISHO CT141B, CT142B, 3214009	£16.80
GRUNDIG CUG70	£19.80	SAMSUNG CCM 20A201	£22.80
GRUNDIG CUC2201, 2401, 3300, 3400	£19.80	SANYO CBP2144, 2145	£22.80
HINARI CT4, CT5	£14.00	SANYO CPT7132, 7135	£39.80
HITACHI CPT1455, 1456, 1476, 2434/471	£14.50	SELECO 145E 121 UK	£24.00
HITACHI CPT1456, 1457, 2434/471	£14.50	SOLAVOX 14R19	£16.50
HITACHI CPT1446, 1626, 2432/981	£15.90	SOLAVOX 16R19	£16.50
HITACHI CPT2174, 2176, 2178, 2434/274	£14.00	SOLAVOX 20T19	£21.80
HITACHI CPT2476, 2478, 2434/4002	£16.50	SOLAVOX 22R19	£15.00
HITACHI CPT2707, 2710, 2712, 2434/3752	£15.50	SOLAVOX 22S19	£15.00
HITACHI/SALORA FMS03A	£49.80	SOLAVOX 22T09	£15.00
HITACHI/SALORA FMS013	£55.00	SOLAVOX 22T19	£15.00
ITT/NOKIA Compact B 110"	£17.80	SONY KV16121/UB2	£21.80
ITT/NOKIA Compact 80, 110"	£14.80	SONY KV1882	£18.50
ITT/NOKIA Compact 80, 90"	£14.70	SONY KV2020	£21.80
ITT/NOKIA Compact 80, 110" FST	£19.80	SONY KV2052/56, 2060/62	£24.80
ITT/NOKIA Monoprint A	£15.80	SONY KV2090/92/96	£24.80
ITT/NOKIA Monoprint B	£14.70	SONY 21XMTU11439-416-11	£25.80
ITT/NOKIA CVC 25, 30, 32	£10.00	SONY KV21XR1U	£21.80
ITT/NOKIA CVC 800, 801, 803	£14.95	SONY KV2212/15/17	£24.80
ITT/NOKIA CVC1100, Picos	£16.50	SONY KV2652/56RX	£24.80
ITT/NOKIA CVC1150, 1175	£14.95	SONY KV27XR1U	£15.50
ITT/NOKIA CVC1200, 1201, Mm 2	£16.80	SONY KV2704	£29.00
ITT/NOKIA CVC1204	£11.50	SONY KV2752/56RX	£29.00
ITT/NOKIA CVC1210/12/15/17	£15.80	SONY KV2752/56PE3	£29.00
ITT/NOKIA Digi 3, 1274, 2434/3752	£15.50	SONY KV27PS1	£22.80
ITT/NOKIA Core 100", 4515-03-46	£19.80	THORN/FERG TX85, 86	£22.80
ITT/NOKIA Core 110", 4515-03-48	£15.50	THORN/FERG TX89	£23.50
ITT/NOKIA Core 110" FST	£15.80	THORN/FERG TX90 14", T9031, Red Spot	£16.90
LOEWE C9000, Art.1, Art.721, Art.728	£114.80	THORN/FERG TX90 10", White Spot	£14.80
T24, T28, Profi T28	£18.50	THORN/FERG TX100/110" T6033L	£13.50
LOEWE C8001, Classic M24, S127, S28, Contur	£22.50	THORN/FERG TX100/90" 243892,	£16.90
S124, S127, S128, S24, S28, Profi S28	£22.50	Yellow Spot	£16.90
LOEWE Class M24, M27, Contur M27	£34.40	THORN/FERG TX100/110" FST, T6045L	£16.80
LOEWE Profi M21	£27.60	THORN/FERG TX100/90", T6031, Blue Spot	£17.90
LUXOR 5810110.01	£15.00	THORN/FERG AS1E	£17.90
MATSUI 1440A, 1480A, 3714002	£15.00	THORN/FERG SIK5, SIK7, S9P7, 47319700	£19.50
MATSUI 1420B, 1440B, 3214009	£16.80	THORN/FERG 51P7	£15.00
MATSUI 1422, 1450, 1455	£16.80	THORN/FERG 59K5, 68K4, 47235901	£15.50
MATSUI 1465	£21.80	THORN/FERG 59M5, 68M5	£16.50
PANASONIC TLF14520F, TLF14568F	£23.80	THORN/FERG 47328700	£15.50
PANASONIC TLF14521F, TLF14576F	£23.80	TOSHIBA 1400RB, AT2079/23	£15.00
PANASONIC TLF14586F	£23.80	TOSHIBA 15086B, AT2079/09	£15.00
PHILIPS KT3	£15.50		

MANY OTHER OPTS IN STOCK. PLEASE PHONE WITH MAKE AND MODEL NUMBER

TRIPLERS EHT MULTIPLIERS p.p. £1.80

Servicing the

Sony BE3B Chassis

In this concluding article Giles Pilbrow deals with the signals and microcontroller sections of the chassis

PCB A carries all the signal processing circuitry including the tuner. In UK versions this is type U944C. It provides full frequency-synthesis tuning without need for any external components. Three supplies are required: 5V at pin 4 for the synthesiser chip; 12V at pin 2 for the signals circuits; and 33V at pin 3 for varicap tuning. There's an AGC input at pin 1 and the IF output is at pin 9.

Although the tuner is controlled by an I2C bus, the tuning voltage at pin 3 can be monitored since there's an external load resistor here. The voltage should vary between 1.9V for channel 21 and 24.5V for channel 68.

In the search mode Q134 is switched on to reduce the AGC voltage and prevent unwanted channels being selected.

The IF output is buffered by Q102 and is then fed to two separate SAW filters, SWF102 for the sound signal and SWF101 for the vision signal. Both signals go to the TDA9814P IF chip. This produces a composite video output signal at pin 8, demodulated mono FM sound at pin 10 and a Nicam carrier at pin 17.

The Audio System

The SAA7283 chip IC1101 contains the complete Nicam decoder, with the 6.552MHz input (0.4V p-p) at pin 62. In some early sets (e.g. Model KVX2102U) Nicam dropout could occur under certain signal conditions. The symptoms would be clicks on the sound and the mono symbol flashing on the screen at random. The following modification puts this right:

- (1) Change C1110 from 22nF to 47nF, part no. 116380991.
- (2) Change R1104 from 100k Ω to 33k Ω , part no. 121608591.
- (3) Change R1105 from 2.2k Ω (or 4.7k Ω) to 1.8k Ω , part no. 121605591.

These are surface-mounted components.

IC1101 is controlled via the I2C bus, the connections being at pins 53 and 54. The bus also relays information about the received signal, i.e. whether Nicam or FM.

IC1101's audio outputs are at pins 11 and 3 for L and R respectively. They go to the TDA6622 chip IC201.

Although this device is referred to as a stereo decoder (it is, for the German system), in the UK version of the set it is used simply for audio control (volume, bass, treble etc.). The outputs at pins 15 (right) and 16 (left) drive the main audio amplifier chip on board D. There are also right and left outputs at pins 19 and 20. These drive the headphone amplifier chip which is also on board D and can be controlled separately.

AV Switching

Depending on their specification, sets fitted with the BE3B chassis may have up to three scart connectors and one front-mounted AV input. Signal switching is carried out by the CXA1855Q chip IC401 which is fully I2C controlled and is capable of routing signals from either the aerial or an external input to a scart output while a different channel is being viewed on the screen, thus enabling external equipment to be easily integrated.

The AV switching circuitry is very reliable. Any faults are usually caused by external factors. The input lines are protected from transients by zener diodes D401-411. These can go short-circuit, the result being the loss of the relevant input.

Teletext

The chassis uses the Texas Instruments' Eurotext chip set. This consists of two ICs, the CF72416 data slicer IC1001 and the CF70200CFNR decoder IC1002. In UK models, data is extracted from the teletext signal and is used during the auto-tune process to label programmes and sort them into the correct order.

The video input to the text circuit comes from pin 17 of the AV switch chip IC401, via buffer transistor Q402. The RGB outputs from IC1002 are fed to switch chip IC003, which selects either teletext or scart RGB.

A blank screen when text is selected is usually caused by a corrupt memory (see later). Should nothing happen when text is selected the 13.875MHz crystal X1001 is probably faulty. The text chips themselves have proved to be wholly reliable to date.

The TDA8366 Chip

The TDA8366 'jungle' chip IC301 carries out the following functions: luminance signal processing, chroma signal decoding, generation of the line and field drive signals, EW correction control and auto grey-scale tracking. There are no external presets associated with it: all adjustable values can be set in the service mode, where numbers 45 apply. Pins 16 and 17 are used for I2C bus control.

Video from the IF chip enters at pin 24. The external video input is at pin 29 while S video inputs are at pins 20 (C) and 21 (Y). An internal switch selects the required signal under I2C control. The selected output appears at pin 55 where it passes to the luminance delay line. This is split into three parts. The first is variable and can be altered via the service mode; the second is fixed at 110ns; the third (50ns) is used to bypass the chroma trap in the S video mode. The luminance signal emerges at pin 42 of IC301, at 450mV p-p, and is looped back at pin 43.

Colour Decoding

IC301 contains circuitry for either PAL or NTSC chroma signal decoding, only an external delay line and crystals being required. An additional chip (IC303) is used in sets with Secam capability. R - Y and B - Y outputs appear at pins 45 and 44 respectively of IC301 and pass to the delay line chip IC302. They re-enter IC301 at pins 47 and 46. The crystals are connected to pins 49 (3.58MHz) and 50 (4.43MHz).

Colour faults tend to be caused by the delay line chip, which produces some strange effects - the usual result is that the chroma information is separated from the luminance information in the picture. Loss of colour or flashing incorrect colours can be caused by incorrect service mode settings.

RGB Circuitry

After re-entering IC301 the colour-difference signals are clamped then passed to a variable-gain amplifier where colour control is applied. This is followed by matrixing with the Y signal to produce RGB signals. Teletext RGB inputs are introduced at this point and are selected when pin 40 goes high. Next come brightness, contrast and white-point adjustments, with signals for auto grey-scale control being added during the field blanking period.

The RGB outputs at pins 31-33 go to the tube base panel. At this point signals from the microcontroller chip are added to provide the on-screen displays. Circuitry on the CRT base panel monitors the cathode currents, with feedback to pin 30 of IC301. If, because of a fault on the CRT base panel, this feedback is incorrect the RGB outputs from IC301 will be blanked. IC301 can be forced into operation by connecting a 7.5V supply to pin 30.

Beam Limiting

The voltage at the earthy end of the EHT winding on the line output transformer is monitored for beam limiting purposes, with feedback to pin 35 of IC301. If the beam current is excessive, the contrast is reduced. The voltage at pin 35 should be in the region of 3V for peak white and 4V for black. If it's missing there will be no picture.

Line Drive

The line oscillator circuit within IC301 requires no external components. Correct timing is ensured by using a reference signal obtained from the colour subcarrier.

Table 1: IC001 key function voltages

Key function	Pin 35	Pin 36
No key pressed	4.85V	4.85V
Autotune	0V	.85V
AV select	1.19V	4.85V
Volume -	2.43V	4.85V
Volume +	4.85V	0V
Programme -	4.85V	1.19V
Programme +	4.85V	2.43V

This is done only at switch on and when sync is lost, e.g. on a channel change. If the subcarrier oscillator has stopped, line drive will still be present but the picture will be blanked.

The line drive output is at pin 57. A 6.4V p-p feedback pulse from the line output stage enters at pin 58 - if this pulse is missing there will be no picture.

Field Drive

There is no field oscillator. Instead, frequency division from the line oscillator is used for field timing. A capacitor connected to pin 5 of IC301 generates a field ramp. To ensure linearity, this capacitor is charged by an accurate internal current reference.

The ramp waveform is passed to the vertical geometry section of IC301, where size, linearity and shift adjustments are carried out under I2C bus control. The field drive emerges at pins 64 (+) and 1 (-) of IC301, passing to IC500 on board D.

Geometry Correction

IC301 also drives the EW modulator on board D. All adjustments except V angle are controlled via the I2C bus in the service mode. RV301 on board D sets the V angle.

Pin 4 of IC301 receives a sample voltage from pin 7 of the line output transformer. This is connected to the line and field amplitude circuits within IC301 to prevent picture breathing with beam current variations. Pin 4 can also be used for X-ray protection, but this feature is not used.

System Control

The CXP85232-117Q microcontroller chip IC001 is powered by the standby 5V supply. At switch on, IC001's reset input is held low until the 5V supply has stabilised. This is carried out by the MN1382S chip IC003. There's a test output at pin 1 of IC001: if the supply, the reset and

Table 2: Effects of disconnecting devices from the I2C bus

Device	Effect
Tuner (TU101)	Standby LED flashes 13 times
Memory chip (IC002)	Continuous short flashes from standby LED
Jungle chip (IC301)	Set goes to standby after 1.5 sec
Nicam chip (IC1101)	No Nicam - FM OK
Audio control (IC201)	No sound. Everything else OK
AV switch chip (IC401)	No AV, no text sync, sound/picture OK
Teletext chip (IC002)	No text. No other effects

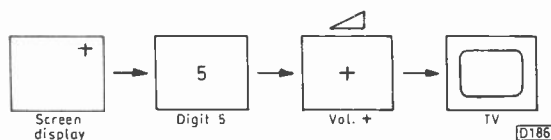


Fig. 1: Press this remote control unit key sequence to enter the service mode.

the internal self-test are all OK there will be a 5V p-p squarewave here.

The six on-board keys at the front of the set, on panel H3, are interfaced with IC001 by means of two ADC inputs at pins 35 and 36. Table 1 shows the voltages that should be present at these pins for the different functions. If the set tries to perform the same function continuously, or appears to have locked up, disconnect board H3 and look for signs of spillage.

Pin 38 of IC001 is the protection input. If this goes high for 1.5 seconds the set will go to standby.

IC001 generates on-screen displays and for sync purposes requires line and field pulses at pins 59 and 60 respectively. Loss of the field pulses will shut the set down after approximately fifteen seconds: this cannot be overridden.

I2C Buses

There are two I2C buses, one for the memory chip IC002 and the other for the rest of the chips that are linked to the control system. The service manual describes a diagnostic system to show communication failure of the devices connected to the buses: it doesn't appear to have been fully implemented however. Table 2 shows the effect of disconnecting various items from the I2C bus.

The Service Mode

To enter the service mode switch the set on at the mains, put it into the standby mode then press the remote control unit key sequence shown in Fig. 1.

The service mode is divided into two parts. The TT mode is mainly for manufacturing use: functions are selected by typing in the relevant number. Pressing the remote control unit's menu button selects the adjustment mode, which enables the variables in the items connected to the I2C bus to be changed. For UK use, only those listed in the TDA8366 1 menu should be altered. They enable the geometry and grey scale to be set up – this may be necessary after component replacement.

Memory Corruption

As nearly all the controls are carried out digitally, with the settings held in the memory chip IC002, memory corruption can cause perplexing symptoms. We have had the following:

No teletext. When text is selected the screen blanks – faint chroma may be seen. Erase the memory and reprogram it.

Set stuck in standby: Erase the memory and reprogram it – the possibility of a field scan fault should be investigated first.

Unlocked colour: Reset 'XTAL PLL' in the TDA8366 2 menu to 0.

Loss of one colour: Adjust the 'HWB' value in the TDA8366 1 menu accordingly.

Incorrect picture size or geometry: Adjust accordingly.

It's advisable, before attempting adjustment or reprogramming, to make a note of the settings for the particular set – the symptoms could have been caused by a genuine fault!

If corruption recurs, replace IC002 and investigate possible causes such as CRT flashovers.

The following procedure enables the contents of IC002 to be erased and reset to factory values for system I:

- (1) Select prog 59 and enter the service mode.
- (2) Select TT49 (erase NVM test byte).
- (3) Switch off at the mains supply, wait for a few seconds, then switch back on again.
- (4) Select prog 59 and enter the service mode.
- (5) Select TT24 (destination U).
- (6) Select TT42 (general reset).
- (7) Switch of at the mains supply, wait for a few seconds, then switch back on again.
- (8) Autotune channels and carry out a complete set adjustment as described in the service manual.

BACK COPIES

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

- | | |
|-------------|---|
| 1992 | February, April, May, July, August, September, October, November and December |
| 1993 | January, May, June, July, August, September, October and December |
| 1994 | January, February, March, April, May, June, July, August, September, October, November and December |
| 1995 | January, February, April, May, June, July, August, September, October and December |
| 1996 | January, February, March, April and May |

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

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

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

SATMASTER PRO 3.40

- ✓ Fully detailed SCPC digital link budget calculator. Takes co-channel, adjacent satellite and transponder intermodulation interference into account. Finds uplink power requirements, transponder bandwidth and power usage per carrier. Atmospheric losses and appropriate rain fade margins are automatically calculated, anywhere in the world, according to a desired link availability. Use information rates from 56kbps to beyond 40Mbps.
- ✓ Handles all common modulation schemes including BPSK, QPSK, 8-PSK or 16QAM with any FEC code rate. A useful option is provided such that for a given input back-off total the corresponding output back-off total and intermodulation interference may be estimated from the stored parameters of a 'typical' TWTA or an SSPA transponder. Ideal software for SNG, Ku trucks, data transmission and radio station feeds.
- ✓ All output may be directly pasted into common spreadsheet packages, as tab delimited text, for editing, customisation or including in other documents.
- ✓ Calculates short form downlink budgets for both analogue and digital modulated TV broadcast signals. Ideal for TVRO dish sizing! Fast minimum dish size optimise for any selected target value of C/N, C/No, S/N, CCIR Grade, Eb/No or LNB output level. Furthermore, you can home in on either 'clear sky' or 'degraded sky' target values. After any link parameter and instantly see the result! Find LNB output carrier levels and the corresponding antenna size needed to design small IF distribution systems.
- ✓ All link budget modules calculate atmospheric absorption, tropospheric scintillation fading and rain attenuation with its corresponding noise increase on the downlink. Calculations are performed for any desired signal availability and earth-space path and apply even at low elevations!
- ✓ Display world and regional maps of CCIR climatic zones, seasonal water vapour density and mean surface temperatures (necessary for detailed link analysis). Partially completed forms are preserved if you need to consult other reference data.
- ✓ Incorporates fast and accurate solar outage prediction, presenting annual lists of date and time windows, for any satellite/ground station combination. All international time zones supported with convenient reference data.
- ✓ Accurately locates north/south anywhere in the world for polar mount set-up by producing selected monthly tabulation of 'Solar Transit Times' (the local time when the sun appears to cross your longitude).
- ✓ Select monthly tabulations of the local time when the sun and a selected satellite have the same azimuth. Enables a fixed dish to be installed where local magnetic anomalies may affect compass readings.
- ✓ Plots dish parabola graphs clearly showing focal distance. Calculates antenna focal distances from two simple dish measurements.
- ✓ Calculate elevation, true azimuth, compass bearing and skew for any geostationary satellite from any selected location.
- ✓ Automatic calculation of magnetic variation. Parameter files are automatically updated with current value when opened.
- ✓ Supplied with many tens of thousands of town and city records arranged in over 200 separate country data files. Easy browser transfer of this data to dialogue boxes. All town/city and satellite databases are fully editable.
- ✓ Input data from the last activated parameter file is automatically transferred to all supplementary dialogues to reduce form filling. A 'Clear' button is provided if not needed.
- ✓ Full context sensitive help on all input data fields by pressing the F1 key. This gives advice on typical values to enter such as co-channel interference and adjacent satellite interference. Abbreviated hints are also displayed on a status bar.
- ✓ Generate tables of antenna set-up data, including local compass bearings, for any geostationary satellite from multiple town/city locations in any selected country.
- ✓ Generates many graphs and tables relating to digital modulation, rain attenuation, atmospheric absorption and more.
- ✓ 40,000 + word help file packed with easy-to-understand theory. Ideal as a staff training or self learning aid.
- ✓ Performs often used calculations and conversions but includes an editable mathematical expression evaluator for more complex needs.
- ✓ Supplied with a wide selection of popular footprint maps but you may use a scanner and graphics application to add more.
- ✓ Generate tables of 'visible' satellites from any selected global location. Print data to any Windows compatible printer with your company name at the top.
- ✓ Convenient text editor for project notes etc.
- ✓ Plots main and side lobe patterns for uniformly illuminated antennas.
- ✓ Plots relationships between various useful link parameters.
- ✓ Includes convenient speed buttons for most often used menu selections.
- ✓ Multiple document interface allows simultaneous display of all reports, maps, graphs and tables on your desktop.
- ✓ Written entirely in C++ for incredibly fast response times.

NEW SATMASTER for Windows

System Requirements: Windows 3.1 / 95 / Windows 95 IBM 386 or better with 4Mb RAM, 1.44Mb 3.5in diskette drive, 11Mb free disk space.

NEW version 3.4 digital link budget calculations, and solar transit/outage calculations!

How this brilliant new PC program, by DJ Stephenson, will help you!

Time saving, integrated software tools for the satellite professional. This new version builds on the easy-to-use framework used by many broadcasters, antenna manufacturers and installation companies around the World.

Features include antenna aiming with calculated compass bearings, downlink TVRO dish sizing, solar outage prediction, digital SCPC link budget calculations, footprint maps and a large global town/city co-ordinate browser.

Now includes a detailed digital SCPC link budget calculator. Indicates transponder bandwidth and power usage. Calculates rain fade margins for Ku and Ka bands, anywhere in the world, for any desired link availability.

Handles BPSK, M-PSK and M-QAM modulation with any FEC code rate. Information rates from 56kbps to beyond 40Mbps. Ideally suited for SNG, data transmission and radio feeds.

99 TRY IT FREE ON:
<http://www.u-net.com/~arrow/>

POSTAGE:
 UK: £1.50
 Europe: £2.50
 R of W: £6

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

SWIFT TELEVISION PUBLICATIONS

17 Pittsfield, Cricklade, Wilts, SN6 6AN, England
 Tel 44 (0)1793 750620 Fax 44 (0)1793 752399

Servicing the Hitachi VTM720/722

John Coombes on dealing with the problems you may encounter with these VCRs

The VTM720 and VTM722 were Hitachi's basic models during the period 1990-2, the 722 being a two-speed version. We've had the following fault conditions with them.

Mechanical Faults

Failure to accept or eject a cassette: The cassette side holders can jam in the runners. If these are not jammed, check whether the base holder is bent – this will also result in jammed side holders. Another possibility is the shaft assemblies: if force is used to insert a cassette the plastic ends break off. Should you have to replace the shaft assembly, be sure to lubricate the ends with Sonic Slidas oil (#1600).

If the gear bracket has to be removed because of a jammed tape, ensure that the worm shaft and worm are lubricated, the former with Slidas oil and the latter with Froil (G31SAY). The worm wheel assembly should be lubricated with Froil.

If a cassette is accepted but won't come back out because the door fails to open, you will find that the bracket which fits into the cassette door assembly to lift it is broken.

Noisy rewind and/or fast forward: Check the capstan motor – it may be necessary to remove the flywheel to clean and relubricate the shaft and bearing. If the capstan motor is at fault it will usually also be noisy when ejecting a tape. See below.

Alternatively the clutch base assembly could be at fault. Either replace or dismantle and clean all the cogs, removing any hard grease that could be causing friction and noise.

Change the reel belt if this has stretched.

Lines across the picture: If the off-tape FM waveform is incorrect, check that the guide poles are correctly set up. Reset as necessary, then lock the Allen screw tight and seal.

Loading problems: The loading motor block may be faulty. If the block is OK, check the worm gear and mode gear – the latter could have damaged teeth.

Tape looping: This can be caused by a worn pinch roller. Alternatively the take-up spool may not be running freely – clean and relubricate the spindle.

Noisy operation: The capstan motor could be faulty. In most cases however the cure is a spot of grease on the drum brush. The lower drum motor may be noisy.

Poor sound and possible poor picture: The audio/control head may be misaligned. If there is tape creasing at the bottom, check that the azimuth tilt is correct. Alternatively the head may be clogged – bad clogging will result in

muffled sound and/or a broken up picture, and the sound may be slow. If cleaning doesn't cure this, replace the head.

Picture tearing or jumping: If the tearing is mainly at the top of the picture, the audio-control head is probably faulty. The basic fault can be caused by incorrect back tension because the tension band is misadjusted or damaged. Don't confuse this fault with the TV set not being on an AV channel – this will cause hooking.

Poor playback picture, sound OK: The cause may simply be dirty video heads. When the VTM722 is used in the LP mode the picture may jump, roll or just be very unstable because the lower drum is worn. This may also make it look as if only one head is working. If you are unsure, check the off-tape FM waveform.

Failure to erase the previous sound track: If cleaning the erase head doesn't provide a cure, check the erase head connections.

Guides not loading correctly: Check that the guide rollers are tight and correctly positioned. If still in trouble check the plate for a bent piece of metal that prevents the guide reaching the stop position.

Capstan motor faults: The capstan motor requires regular servicing. There can be various symptoms: noisy rewind and/or fast forward operation, also very noisy eject, or sometimes you may get intermittent pauses during playback. Cleaning and relubricating the spindle will usually put matters right. If the spindle has a ridge on it and/or a heat mark however the capstan motor will have to be replaced. The motor can also stop and jam the tape. The result may be tape chewing or the VCR coming to a halt. With all these problems it is as well to replace the reel belt.

Colour beating: Possible causes are an excessively dirty erase head, poor connections to the head, also broken leads because of incorrect positioning.

Incorrect Loading

This can be caused by electrical or mechanical (see previous note) faults. It's often very intermittent and can usually be cured by replacing the loading motor block complete. You may get intermittent loading, half loading or half loading then eject, with the tape chewed or left half in/out. The VCR may fail to lace the tape and just eject it. These things can all be caused by the mode selector switch.

Alternatively the CXP50116-116Q microcontroller chip IC751 can cause the same problems when faulty.

When faulty the XRA6209U4 loading motor drive chip IC753 can be responsible for failure to load, intermittent

loading or slow eject. Check that its 14V supply is present at pin 7. If this is missing, check back to source. Before replacing IC753 check whether the HZS9A-2 zener diode D753 is short-circuit.

Electrical Faults

Incorrect capstan motor speed: The capstan motor can be the cause of this but, apart from the previous note under mechanical faults, it has proved to be reliable. Check that the FG pulses are reaching pin 2 of the BA6993 FG amplifier chip IC602. If they are missing, trace the path back to the capstan motor and FG pickup. If they are present, check for output pulses at pin 1. Replace IC602 if there are no pulses here. If IC602 is OK, check for pulses at pin 21 of the HD49747NT servo control chip IC601. No pulses here could mean that IC601 is faulty or perhaps C622 (0.47 μ F, 50V) is short-circuit. Next check for pulses at pin 27 of IC601. If there's no output, replace IC601. If IC601 is OK, trace through to the SA2007A capstan motor drive chip IC1M.

Drum motor not locked: The symptoms may be intermittent noise over the picture then normal lock for a short time. If there are no drum FG pulses, check the BA6459P1 drum motor drive chip IC1651. If this is OK, the FG coils could be at fault. They are in the lower drum unit. If this is all OK, suspect IC601 (HD49747NT) – check its output at pin 12. If this is present, trace back to the drum motor drive chip. If not, C603 (1 μ F, 50V) could be open-circuit. If C603 is OK, replace IC601.

No colour: Ensure that the DC conditions are correct around the M52057FP chip IC301. If all is OK here, X301 (4.433MHz) could be dry-jointed or faulty.

Power Supply Faults

The most common fault with these VCRs is no results. The cause might be an open-circuit mains feed, open-circuit input fuses or faulty bridge rectifier diodes. If these items are all OK, check the regulator chips. The 5V regulator is IC851 (RC78M05E), the 12V regulator IC852 (RC78M12FA). They can go open- or short-circuit. If necessary check whether C860 (10 μ F, 16V) in the 12V supply is short-circuit.

No Display

Ensure that the -30V supply is reaching the system control PCB. This powers the display unit's filament. If the supply is missing, check back to its source on the power supply PCB. If the supply is present, the display unit could be faulty. Check that the CXP50116-116Q chip IC751 is receiving the -30V supply at pin 76, and that its 5V supply is present. If so but the display is not being driven, crystal X751 (4.19MHz) could be dry-jointed or faulty or IC751 defective. Check by replacement.

If various segments are not lit or are partly lit, IC751 or the display could be faulty. Again check by replacement.

Remote Control Faults

If the remote control unit provides no functions or display, check that the battery connections are soldered correctly with no dry-joints and that the spring is pulled out far enough to make contact, also that the batteries themselves are OK. If the display is lit up but there are no commands, check the connections to the LED. The connections to the crystals could be broken, damaged or dry-jointed. If necessary replace the crystals. If the remote control unit is producing an infra-red output but there is no remote control operation, check whether the TV/VTR2/VTR1 switch SW01 is correctly set. There will be no operation if it's in

the TV position, or if the VCR is set to VTR1 and the handset to VTR2 or vice versa.

If various buttons don't work, check the rubber sheet for wear or clean the pad and buttons. Alternatively the M50933-102FP chip IC01 could be faulty. IC01 can also be responsible for no display, a dim display and/or various segments not lighting up.

The handset could have been damaged by rough use. If it has been dropped the PCB could be broken, giving total failure or intermittent operation. Spillage is another possible cause of intermittent operation.

Regular Maintenance

Regular replacement of the head cleaning roller is important. It can get very dirty; this can result in ruined heads. Check the complete tape transport system. Dirty video heads can cause loss of colour and/or field jitter, even horizontal jitter.

Replace the reel belt if fast forward/rewind don't work. If these operations are slow, the belt could be dirty. Clean the belt and all pulleys.

Check the pinch roller. If this is worn the tape might not run or be slack.

If the back tension is excessive the result can be bent verticals or hooking at the top of the picture. Check that the spring is set in position A. It may be necessary to check the tension pole position – refer to the service manual.

Always ensure that the plug top pins are insulated and that the correct (3A) fuse is fitted. Inspect the mains lead for cuts, damage or insulation breakdown. ■

from only
£69
ex VAT '95

TELETEST

Handheld Audio and Video Test Equipment

Freecall: 0500 009070 "30 day money back guarantee"

For your free information & ordering pack.

Lines open everyday from 7am to 10pm



TELETEST TONE Audio Test Signal Generator
4 frequencies, 3 output levels. Phonos: stereo line outs. XLRs: stereo balanced outs. Stereo ident. **New!**



New! CAPTION TELETEST
Programmable Video Caption Generator

Program text over comp. & S video using built in keys. 4 memories, host of features inc different size text & internal sync generator.



TEXTBOOK ACCURACY
TELETEST
Test Pattern Generators

4 TV test patterns. Phonos: composite video, 1kHz line audio. Co-axial: RF ch32-39
PRO: 8 TV test patterns. BNC: composite video. S connector: S-video. XLRs: 1 & 10kHz balanced audio.



TELETEST PRO

WORLD WIDE WEB
<http://www.bucc.co.uk/vbp/ozan>




Official orders welcome from Colleges, Government depts. & PLCs.
Same day despatch. 24 hr worldwide delivery option available.

Tel: + 44 1202 877270 Fax: + 44 1202 877271
37 Havland Rd, Ferndown Ind Est Wimborne, Dorset, BH21 7SA, UK

Satellite Notebook

Reports from Hugh Cocks, Ian Rees, Graham Thomson,
Eugene Trundle and R.J. Longhurst

Magnetic Polarisers

I still come across a lot of magnetic polarisers, with both rotatable dish systems and the older fixed Astra installations using prime-focus dishes (it's rare to come across a 9-75GHz Astra 1D LNB with a magnetic polariser).

They seem to give problems after a lot of rain, either going open-circuit (the normal resistance reading should be in the region of 100Ω) or seeming to lose their swing at the top and bottom of the band. More polariser current is required with channels at the ends of the band, so CNN and Children's Channel seem to be the ones that suffer. Possibly water gets in between the plastic moulding and the metalwork, causing reduced efficiency. The open-circuit effect seems to occur more during the hot summer months.

When trouble occurs I replace the polariser and LNB, where possible, with a prime-focus 13/17V LNB which has Astra 1D switching. To receive Telecom band signals with offset skew would, if this was a customer requirement, call for a wideband LNB and polariser.

Placing a cover over the polariser will prevent ingress of water and reduce problems in general. To prevent spiders getting into the prime-focus feed tube, place a thinnish piece of polystyrene at the front of the pipe – this doesn't seem to attenuate the signals to any extent and keeps the customer happy. **H.C.**

Akai SX1000/Alba ISR7000

We had one of these receiver in recently with a blown mains fuse. The cause was varistor MOV1 which was short-circuit. **I.R.**

Philips STU802/ Pace PRD800

The cause of loss of picture/sound after the warm up period was traced to the FTX749 transistor Q2 at the front right-hand corner.

The cause of a dead or tripping

receiver is generally the two 10μF, 25V capacitors C7 and C8 in the power supply. In a recent case we found that they measured less than 4μF. C5 (22μF, 16V) is also worth checking. **I.R.**

Amstrad SRD510

This receiver's mains fuse would blow every two-three weeks. The failure wasn't violent, and there was no apparent cause. When I checked with Amstrad Technical I was advised to change the mains filter capacitor from 1μF to 0.22μF. Being a safety type, the correct component should be used – the Amstrad part no. is 253612. Doing this provide a complete cure. Thank you Amstrad Technical. **G.T.**

Pace SS9200

I had a case recently where the latest Sky 10 card became "invalid" with one of these receivers for no particular reason. One test to try first with any receiver should the card produce the invalid message is to disconnect the receiver from the mains supply and allow the decoder to reset itself. This was never necessary with earlier issue Sky cards. If you still get "invalid", check the card with another receiver and clean the card contacts in the normal way.

As a precaution with this SS9200 receiver I removed the high-voltage Vpp supply to the card reader. Since then it has produced no more "invalids" – it had disposed of two cards in the month prior to this modification! To remove the Vpp supply, cut the track that goes to the centre leg of the BD139 transistor Q16 near the front of the decoder board. **H.C.**

Legende Receiver

This receiver was new to me. It said Legende at the front and "by Echostar" at the back, made in China. There is no decoder, and the Sharp type tuner is mounted at one end of the main PCB. The switch-mode power supply PCB also

incorporates the UHF modulator. The whole thing is reminiscent of the Amstrad 510/520 series in its construction.

This particular Legende didn't work. As I knew its owner I agreed to take a look, even though I didn't have any circuit information. The mains fuse was intact, and fortunately there were no signs of any carbonised components. I managed to find the switch-mode power supply's start-up resistor (R802, 100kΩ) which was open-circuit. A replacement restored the set to life.

As the resistor seemed to be underrated, the replacement I fitted was a more substantial type. I then noticed a 1μF, 50V electrolytic near the chopper transistor Q801. This was changed to be on the safe side. The power supply produces a slight, HF rustling noise, but seems to be quite happy to run like this! **H.C.**

Supply Problems

The owner of a Pace MSS200 receiver I had installed a few months previously phoned to say that it "goes off in the evening". I called to look at it, as it would surely be well-behaved in the workshop and there might be an LNB problem.

When I arrived in the late afternoon all was well. But I noticed that the lights were a little on the dim side. Switching on an electric heater did the trick. The lights dimmed even more and the Pace receiver stopped. The mains voltage measured around 170V. The TV set kept going, but the fridge motor in the kitchen sound a little unhappy!

This kind of problem was quite common here in the Algarve a few years ago, especially at houses in the countryside at the end of a long supply line. It's now much more rare, fortunately. A standard domestic electrical installation here is rated at 6kW maximum consumption. Believe it or not, you can go down to 3kW and pay a lower standing charge per month. If you want more than 6kW you have

to go over to a three-phase input at 6kW. Electricity here in Portugal is also expensive compared with the UK. **H.C.**

Uniden UST7007

The problem with this receiver was poor video quality in general, whether via the decoder or video out connections. Checks took me back to the tuner, which runs very hot. At the demodulator end (farthest from the F socket) there are four 16V electrolytic capacitors – a 4µF one, a 100µF one and two 10µF ones. They looked decidedly the worse for wear. Replacing them restored normal pictures.

Be careful not to overtighten the F socket when reassembling the unit – the inner can part company with the link to the PCB. **H.C.**

Cable Troubles

Not long ago we installed a satellite IF distribution system that serves a number of holiday villas. Just recently reception of the higher-frequency IF channels, above about 1,500MHz, became poor at one of them.

As the cable was difficult to get at, a substitute length of around 40m was connected along the ground from the “Magic Switch” to

Satellite Decoder Cleaner

Dirt and oxidation can cause poor connection with all electrical contacts and switches. This is not too much of a problem where the contacts are accessible for cleaning, but a lot of dismantling is required to reach those in a smart-card reader. Hence the recent introduction of a decoder cleaning card.

We were sent one of these to test. Its dimensions and ‘feel’ are identical to those of a smart card, but the area normally occupied by the contact lands is covered by a square inch of special dry cleaning material that’s similar in appearance to fine linen cloth. To clean the delicate internal card-reader contacts, the card is inserted and removed a few times.

We tried the card with both VideoCrypt and Eurocrypt card readers and found that it worked well enough. Priced at £7.99 for ten including postage, we feel that the cards are a useful and inexpensive addition to the technician’s armoury.

They are available from Allen’s TV and Video, 53 Fordbrook Lane, Pelsall, W. Midlands WS3 4BW (telephone 01922 692 078). **E.T.**

the villa concerned. This gave perfect results, confirming our diagnosis.

Since the original cable was only a few months old, it was a bit of a mystery to us why the problem had arisen. Once we reached the roof the cause of the trouble was immediately apparent: an old TV aerial (not installed by us, I hasten to add!) had keeled over during recent high winds, one of its elements piercing the cable’s outer sheath. Heavy rain had followed the wind and water had got into the cable. The result was quite rapid signal degradation. **H.C.**

Amstrad VS1000 Satcorder

The satellite receiver section of this unit was faulty. When it was cold, the picture was marred by pulling and distortion. The non-encrypted channels were fine once the unit had warmed up, but no card instructions or card invalid message was displayed with the other channels.

The cure is to replace the electrolytic capacitors CA02, CA05, CA07, CV09 and CV42 inside the top, screened decoder section. My thanks to Amstrad Technical for helping me out with this one. **R.J.L.**

NEW STOCK — NEW STOCK

- AKAI: VS400/765/VSF222/310/410 SERIES FRONT LOADING GEAR (M2387333) = VS4687G = 110
 - AKAI: SERIES AS ABOVE TENSION BAND (ML390768) = TB = 310
 - ALBA/DAEWOO: PINCH ROLLER = PW3205 = 180
 - AMSTRAD: DD8900/VCR8600/8604/8700/8800 GEAR FF (153210) = VS4674G = 115
 - FERGUSON: FV61LV/62LV/67HV VIDEO HEAD ASS + LOWER DRUM (2 HEAD) = VH8238G = 3999
 - FERGUSON: FV61LV/62LV/67HV/68TX/70B/71LV/74LVX BELT KIT = BK1058 = 085P
 - FERGUSON: FV67HV/68TX/77 VIDEO HEAD COMPLETE WITH DRUM + MOUNTING (GH) = VH8236G =
 - HITACHI: VTM728/740/746/756/840/920/930 CLEANING ROLLER (7472125) = VS4681G = 485
 - HITACHI: VTF770/VTM598/720/722/728/753/830 SIDE PLATE (6804982) = VS4682G = 815
 - JVC: HRD520/720/800/980/HRDX20/HRSS800 STOPPER (PQ43525) = VS4690G = 049
 - MATSUI: VS866/888/VX800/750/880/890 CAM GEAR (850P60014) = VS4684G = 375
 - MITSUBISHI: HS337/338/421/HSB30/HSE10G GEAR DRIVE (641C543010) = VS4436G = 445
 - MITSUBISHI: HSE12/32/52/82/HSM16G/35/55 GEAR REEL UNIT (522C083010) = VS4437GR685
 - ORION: COMBI5000/VH1500MRC/VH888/VR2980 MODE SWITCH = MS = 650
 - PANASONIC: NVD48/NVFS1 NVG20/21/300/NVH65 MODE SWITCH = MS =
 - PANASONIC: NVF65/70/75/NVFS100/200/90/NVJ30 SIDE PLATE (VXA4076) = VS4691G = 975
 - PANASONIC: NVF55/55F/NVJ40/445/46/48 SIDE PLATE (VXA4468) = VS4680G = 1299
 - PANASONIC: NV370/480/830PX/780 CLUTCH SUB UNIT (VXP0595) = VS4172G = 150
 - PANASONIC: NVD48/NVFS5/65/70/NVFS100 RETURN LEVER UNIT (VXA2672) = VS4677G = 095
 - PANASONIC: NVD48/NVFS5/65/70/NVFS100 RETURN LEVER UNIT RIGHT (VML1858) = VS4678G = 095
 - PANASONIC: NVD48/NVFS5/65/70/NVFS100 RETURN LEVER UNIT LEFT (VML1857) = VS4679G = 095
 - SHARP: VCA10/103/1031/106/254/VCD815/VCH80/81 MASTER CAM (1129GEZ7) = VS4299G = 110
 - SHARP: VC780/785/VCA100/VCA140/5011/VC801/VC172 MASTER CAM (1108GEZ2) = VS4685G = 145
- STOP PRESS: RING FOR HOME CINEMA LEADS WITH OXYGEN FREE CABLES**

NEW CD OPTICAL PICK UPS

- SANYO: SF91 (6450055966) = CDL1232G = 3499
- SAMSUNG: HOPM3 = CDL1235G = 2525
- SONY: KSS331A/330A = CDL1233G = 3825
- SONY: KSS220/162A = CDL1234G = 3450

NEW SEMI CONDUCTORS FOR SONY CD PICK UPS (ICS)

- CXA1081Q = 299, CXD2500AQ = 950
- CXA1081S = 285, CXD2500BQ = 475
- CXA1082BQ = 475, LA6510 = 285
- LA6532M = 450

NEW COMPUTER ACCESSORIES LEADS — PLEASE RING FOR PRICE LIST

- MINI GENDER CHANGER
- PS/2 MOUSE ADAPTOR
- KEYBOARD EXTENSION CABLE
- MICE
- RS232 DATA SWITCH BOXES
- ICE POWERLESS AUTO SWITCH
- PARALLEL PRINTER LEADS
- NULL MODEM LEADS
- DISK DRIVE DATA LEADS
- POWER SUPPLY CORD
- SCSI II LEADS
- SCSI II TERMINATORS
- BNC TERMINATOR
- MONITOR FILTERS
- MOUSE ADAPTOR & AT MODEM
- AT TO PS/2 KEYBOARD ADAPTOR
- JOYSTICK ADAPTOR CABLE
- SPONGE MOUSE MATS
- POCKET AUTO SWITCH
- RS232 LEADS
- PLUS IN NULL MODELS
- MONITOR LEADS
- DISK DRIVE POWER LEADS
- SCSI I LEADS
- SCSI I TERMINATORS
- SCSI III TERMINATORS
- MAC TO VGA ADAPTOR

Please phone us for the types not listed. Please add 60p post & packing and then add 17.5% VAT to the total. Callers by appointment only.

J.J. COMPONENTS

63 THE CHASE, EDGWARE, MIDDX. HA8 5DN, ENGLAND

Tel Fax: 081-952 4541 Hotline No: 081-381 1700.

Free fax orderline 0800 318498

15 80H	3.83	2SC2073	0.77	2S0639	0.60	BC252B	0.07	BF470	0.33	BY399	0.11	HA13119	2.05	MJE18004	1.80	STK7358	5.81	TDA1519A	2.74	TDA8178FS	3.81
1N4001	0.04	2SC2078	0.86	2S0667	0.38	BC258	0.09	BF493	0.36	BY014J	0.26	HA13403	3.59	MJE2955	0.68	STR40090	6.28	TDA1520B	2.48	TDA8180	4.87
1N4002	0.07	2SC2120	0.23	2S0669A	0.64	BC300	0.48	BF494	0.12	BY033D	0.43	HA1377	2.62	MJE2955T	0.58	STR4211	12.63	TDA1521	3.76	TDA8190	2.91
1N4003	0.05	2SC2166	1.29	2S0716	1.46	BC301	0.28	BF757	0.43	BY033J	0.27	HA51338SP3	7.69	MJE3055	0.62	STR441	28.40	TDA1524A	1.88	TDA8305	7.21
1N4004	0.07	2SC2229	0.28	2SD718	2.21	BC303	0.24	BF758	0.32	BY033M	0.21	HM6232	10.46	MJE3055T	0.74	STR451	23.50	TDA1553Q	4.79	TDA8380	2.53
1N4005	0.00	2SC2230	1.66	2SD734	0.26	BC307	0.06	BF759	0.38	BY110-40	2.55	HM6251	9.57	MJE340	0.50	STR50020	9.02	TDA1554Q	8.12	TDA9503	2.13
1N4006	0.06	2SC2235	0.36	2SD762	1.80	BC307B	0.14	BF760	0.26	BY958B	0.19	JOB	0.00	MM650	0.98	STR50103	4.10	TDA1670A	2.98	TEA1014	1.87
1N4007	0.06	2SC2236	0.36	2SD802	5.06	BC307C	0.15	BF762	0.30	BY959C	0.21	KR2206	1.32	MPSA06	0.35	STR54041	4.36	TDA1675A	3.65	TEA1039	2.14
1N4148	0.06	2SC2240	0.16	2SD837B	1.12	BC308	0.06	BF788	0.52	BY960D	0.27	KR2223	0.60	MPSA42	0.23	STR5412	3.68	TDA17701	2.85	TEA2018A	1.70
1N5061	0.00	2SC2271	0.67	2SD856	1.03	BC308A	0.09	BF789	0.25	BY956	0.31	KA2263	0.55	MPSA43	0.15	STR58041	6.41	TDA1770A	30.29	TEA2029C	5.69
1N5062	0.51	2SC2274	0.35	2SD863	0.35	BC308C	0.06	BF789	0.29	BY956E	0.65	KA8301	1.46	MPSA55	0.26	STR59041	6.47	TDA1872A	4.83	TEA2031A	3.40
1N5400	0.07	2SC2314	0.38	2SD869	5.18	BC309	0.04	BF871	0.41	BY956G	0.23	KIAG210AH	6.15	MPSA92	0.12	STR6020	5.38	TDA1905	2.12	TEA2164	2.96
1N5401	0.14	2SC2335	1.12	2SD870	5.81	BC309C	0.14	BF871	0.18	BY956G	0.15	KSR1001	0.14	MPSA92	0.65	STR6020K15	15.05	TDA1908A	2.14	TEA2165	4.27
1N5402	0.14	2SC2458	0.14	2SD871	5.08	BC327	0.10	BF959	0.30	BZ703C120	0.62	KSR1004	0.14	MR856	0.11	STR60420	11.16	TDA1950	1.86	TEA2165A	9.58
1N5404	0.13	2SC2482	0.35	2SD880	0.36	BC327B	0.17	BF960	0.26	BZV10	1.34	KSR2001	0.14	NE5458	3.20	T6064V	2.63	TDA2002	1.12	TEA5101A	3.95
1N5406	0.12	2SC2570A	0.30	2SD882	0.43	BC328	0.07	BF966	0.30	BZV10	1.34	KSR2001	0.14	NE5458	3.20	T6076V	5.04	TDA2003	0.90	TEA5115	2.91
1N5408	0.09	2SC2581	3.08	2SD898B	6.41	BC337	0.14	BF970	0.30	BZV10	1.34	KSR2001	0.14	NE5458	3.20	T6076V	5.04	TDA2003	0.90	TEA5115	2.91
1N914	0.04	2SC2603	0.25	2SD965	0.67	BC337L	0.22	BF970	0.30	BZV10	1.34	KSR2001	0.14	NE5458	3.20	T6076V	5.04	TDA2003	0.90	TEA5115	2.91
2N2222	0.22	2SC2625	2.94	2SD973	0.38	BC338	0.06	BF990	0.59	BZK6110	0.19	L2003V	2.19	NE5556	0.43	T9053V	0.93	TDA2004	2.57	TIC106D	0.82
2N2222A	0.23	2SC2655	0.31	2S1115	7.69	BC368	0.11	BF990	0.59	BZK6112	0.12	LA1200	1.95	NE5556	0.43	T9064V	1.51	TDA2005	1.63	TIC106M	0.75
2N369A	0.18	2SC2705	0.22	2SK1117	3.06	BC369	0.17	BF991	0.60	BZK61120	0.09	LA1503	1.29	NE646N	4.45	TA7109AP	3.23	TDA2006	1.06	TIC225M	1.02
2N2907	0.20	2SC2724	0.19	2SK192A	0.36	BC372	0.43	BF991A	0.92	BZK6120	0.19	LA4270	2.73	0A90	5.03	TA7205AP	1.68	TDA2030H	0.74	TIC226D	0.68
2N3053	0.38	2SC2979	2.74	2SK794	6.41	BC461	0.31	BF996	0.55	BZK6127	0.19	LA4282	2.89	0A200	0.22	TA7217AP	1.48	TDA2030V	0.71	TIP306D	1.95
2N3055	0.50	2SC3117	0.60	3SK88	2.57	BC517	0.14	BF951	0.39	BZK6133	0.19	LA4422	1.36	P600A	0.33	TA7222P	2.29	TDA2170	7.08	TIP110	0.36
2N3440	0.35	2SC3153	2.40	74LS247	0.62	BC546A	0.07	BR100	0.21	BZK6156V6	0.11	LA4440	1.80	PC814	1.29	TA7223P	1.97	TDA2170	2.45	TIP112H	0.95
2N3442	1.00	2SC3156	6.61	7805	0.78	BC546B	0.12	BR103	0.53	BZK6162V7	0.07	LA4445	2.99	PIC16C57XTSO	6.61	TA7240P	4.74	TDA2540	1.72	TIP121	0.42
2N3707	0.12	2SC3179	0.82	7806	0.60	BC547	0.11	BR303	1.22	BZK6174V5	0.09	LA4460	2.31	R2M	0.21	TA7250	4.07	TDA2541	0.72	TIP127	0.47
2N3773	1.34	2SC3182	2.49	7808	0.72	BC547A	0.04	BR444	1.02	BZK6182V2	0.19	LA4461	1.71	R4050	3.00	TA7250BP	3.59	TDA2576A	5.95	TIP132	0.65
2N3819	0.55	2SC3199	0.43	7809	0.69	BC547B	0.11	BR449	0.43	BZK6191V1	0.09	LA4475	2.99	R4051	4.04	TA7270P	1.74	TDA2577A	2.99	TIP137	0.48
2N3904	0.32	2SC3225	0.60	7812	0.52	BC548A	0.11	BR555	1.20	BZK61910	0.30	LA4476	2.99	RB156	2.40	TA7271P	11.33	TDA2578A	2.91	TIP2955	0.94
2N3906	0.00	2SC3242	0.19	7815	0.82	BC548B	0.06	BR556	0.43	BZK61912	0.10	LA4508	2.77	RC4558	0.48	TA7273P	4.10	TDA2579A	4.91	TIP29C	0.31
2N4123	0.30	2SC3310	2.12	78105	0.35	BC548C	0.06	BR556	0.75	BZK61915	0.09	LA4700	4.27	REGBABY10	17.56	TA7274P	2.74	TDA2581	4.27	TIP29E	0.47
2N5296	0.69	2SC3311	0.29	78M05	0.35	BC549B	0.11	BSS38	1.77	BZK61930	0.11	LA6358S	0.60	RGP10G	0.26	TA7280P	2.98	TDA2581Q	2.99	TIP305	0.94
2SA1013	0.35	2SC3330	0.26	7905	0.35	BC550	0.15	BT139600	1.29	BZK61936	0.10	LA6510	2.94	RGP15G	0.33	TA7281P	2.98	TDA2582	2.05	TIP305S	0.17
2SA1015	0.11	2SC3355	0.86	7915	0.82	BC550C	0.09	BT151500R	1.44	BZK61947	0.07	LA7520	4.80	RGP15M	0.24	TA7288P	2.64	TDA2593	0.76	TIP31A	0.33
2SA1015GR	0.11	2SC3358	0.69	AA119	0.36	BC556A	0.06	BT151800	1.15	BZK61956V6	0.05	LA7800	2.41	RGP15M	0.44	TA7299P	2.05	TDA2594	2.21	TIP31C	0.77
2SA1016	0.26	2SC3420	0.55	AA143	0.13	BC557	0.05	BU104	1.43	BZK61962V2	0.08	LA7801	1.41	RGP30M	0.30	TA7317P	3.44	TDA2595	3.19	TIP32A	0.41
2SA1020	0.44	2SC3423	0.60	AC127	0.52	BC557A	0.15	BU205	1.07	BZK61963V9	0.09	LA7820	2.71	RM11C	1.71	TA7609P	2.19	TDA2600	4.86	TIP32C	0.40
2SA1029	0.26	2SC3502	0.45	AC151	0.52	BC557B	0.06	BU208A	1.44	BZK61965V1	0.05	LA7830	1.88	S2000A	1.98	TA7680AP	4.55	TDA2611A	0.64	TIP35C	1.39
2SA1048	0.19	2SC3565	0.18	AC153K	0.40	BC635	0.19	BU406	0.69	BZK619813	0.11	LD33R	0.10	SAA129303	8.25	TA7688AP	4.60	TDA2611AQ	1.32	TIP36C	1.37
2SA1286	0.60	2SC3679	4.45	AC187K	0.53	BC650C	0.06	BU406D	1.61	BZK619810	0.11	LD7332	4.63	S2000AF	1.68	TA7769P	3.01	TDA2653A	2.99	TIP41C	0.43
2SA1370	0.43	2SC3788	0.77	AC188	0.40	BC635	0.19	BU406E	1.36	BZK619812	0.07	LED3G	0.10	SAA129302	8.25	TA7784P	2.25	TDA2655B	19.93	TIP42A	0.35
2SA1489	2.40	2SC3795	1.97	AC188K	0.82	BC636	0.14	BU406E	1.36	BZK619813	0.11	LED3R	0.10	SAA129303	8.25	TA7784P	2.25	TDA2655B	19.93	TIP42C	0.35
2SA1706	0.52	2SC3795B	2.63	AD149	0.52	BC637	0.19	BU406E	1.36	BZK619813	0.11	LED3R	0.10	SAA129303	8.25	TA7784P	2.25	TDA2655B	19.93	TIP42C	0.35
2SA562	0.17	2SC3807	0.84	AF124	1.75	BC639	0.09	BU406E	1.02	BZK619824	0.11	LM1203	0.87	SAA5012	3.34	TA8205	3.93	TDA3301B	6.75	TIP1761A	1.59
2SA564	0.17	2SC3883	5.92	AF125	0.82	BC640	0.06	BU407	0.53	BZK619827	0.11	LM1303N	10.48	SAA5243PE	10.87	TA8205AH	4.50	TDA3330	12.29	TIP1791A	1.20
2SA608	0.24	2SC3892A	4.79	AF126	2.23	BC679	0.40	BU407D	0.98	BZK619827V1	0.11	LM1317T	1.29	SAB3035	1.71	TA8207	2.74	TDA3505	2.20	TIP62	0.60
2SA673	0.12	2SC4242	0.72	AF127	0.77	BC717	0.27	BU426A	1.03	BZK619833	0.11	LM3324N	1.48	SC264A	11.57	TA8210H	5.28	TDA3541	0.98	TIP69	0.69
2SA684	0.43	2SC4106	2.05	AF139	0.29	BD131	0.26	BU500	1.41	BZK619836V	0.11	LM3399N	0.50	SGSIF344	1.92	TA8215H	5.73	TDA3560	2.96	TIP71CP	0.60
2SA723	0.18	2SC4242	2.31	AN5265	1.76	BD132	0.26	BU505DF	1.35	BZK619839V3	0.03	LM3400T5	0.41	SL1430	1.28	TA8216H	6.01	TDA3561A	5.30	TIP72	1.03
2SA769	1.29	2SC4517	4.70	AN5435	1.46	BD135	0.33	BU506DF	2.31	BZK619847V	0.06	LM3558	0.60	SL1431	2.40	TA8220H	6.56	TDA3562A	3.30	TIP72CP	1.03
2SA844	0.55	2SC4517A	2.52	AN5512	1.01	BD136	0.20	BU508A	0.95	BZK619851V1	0.13	LM358N	0.42	SL1432	2.19	TA8222H	7.69	TDA3562ATF	3.94	TIP74	1.15
2SA872	0.35	2SC458	0.12	AN5515	1.29	BD137	0.46	BU508AF	1.08	BZK619852V2	0.11	LM380N	1.03	SL471	1.70	TA8221L	4.19	TDA3565	3.40	TIP82CP	0.21
2SA872A	0.35	2SC4742	4.70	AN5521	1.66	BD139	0.18	BU508APH	1.99	BZK619852V2	0.11	LM386N	0.57	SN76705AN	1.70	TA8410K	7.27	TDA3566	6.41	TMP47C432AP818B	1.88
2SA916	0.57	2SC536	0.30	AN6610	0.94	BD140	0.24	BU508D	1.32	BZK619859V1	0.11	LM3914N	2.74	STA341M	3.35	TA8691N	7.01	TDA3576B	11.31	TMP47C432AP818B	15.19
2SA933	1.00	2SC639	0.56	AN7161N	3.47	BD203	0.47	BU508DF	1.88	CAR8B	9.95	LM393N	1.19	STA441C	2.82	TA8550B	0.26	TDA3640	0.36	TIP42C	0.35
2SA940	0.82	2SC710	0.12																		

Thousands of semiconductors I.C's etc.
of video parts, heads, belt kits etc.
of remote controls. etc. etc.
over 80,000 database records to help find the difficult
video parts quickly. Stock availability & price in seconds

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

.....and look at the special offers.

(strictly while stocks last)

BU208A	X 5	£4.95	BUT11AF	X 5	£3.45
BU508A	X 5	£3.60	BU426A	X 5	£3.75
BU508AF	X 5	£5.00	TDA4601	X 2	£2.55
BUT11A	X 5	£2.25	TDA3654	X 2	£2.50
Philips type 1.2 volt	Back up battery	X 5	£4.50		
Philips type 2.4 volt	Back up battery	X 5	£8.75		
Scart - Scart lead 1.5m	Fully wired	X 2	£2.90		
3V29 etc.	Belt kit	X 5	£4.50		
3V35/36 etc.	Belt kit	X 5	£4.25		
VT11E etc.	Belt kit	X 5	£5.50		
Standard video sensor lamp		X10	£2.50		
Std video sensor lamp + plug		X10	£4.00		
Thorn TX9/10	Remote control	each	£7.49		
Thorn TX10	Green spot LOPTX	each	£14.95		

.....and now ask for a full price list.

(please add £1.00 handling all + VAT)

YOU!!



NEED ECONOMIC

- *Economic supply TV & Video parts. *VERY FAST*
- *Our experienced staff *WANT* to help you !!
- *We can give you an instant answer from our database that contains over 80,000 items and we can give that answer *IN SECONDS*
- *If we cannot find it immediately

- *We will *'SEARCH THE HEAVENS'*
- *We will hassle our suppliers
- *We will hassle the manufacturer
- *We will make phone call after phone call
- *We will send Fax after Fax on your behalf
- ***WE WILL DO ALL THIS FOR YOU**

*We do it willingly and for free - *YOU NEED ECONOMIC!!*

Satellite PSU Repair / Refurb kits
Over 20000 kits sold

Experience in one of the largest repair centres has shown that all repairs to Power supply units require special treatment with not only the obviously faulty parts being replaced but a number of others also changed to ensure a satisfactory repair. Experience shows that up to 50% of all power supply repairs 'bounce' unless the correct procedure and the correct precautionary changes to certain components are made.

At last 4 repair kits are available to cover the majority of all Amstrad and Pace receivers each with a simple to understand instruction sheet to guide you through the correct way of repairing and refurbishing satellite receiver

	MANUFACTURER	MODEL NO.		PRICE
SATKIT1	PACE	PRD800	PRD900	£6.95
SATKIT2	PACE	SS9000	SS9200	£6.95
		SS9010	SS9210	
		SS9020	SS9220	
SATKIT3	AMSTRAD	SRD510	SRD520	£6.95
SATKIT4	AMSTRAD	SRD500		£6.95

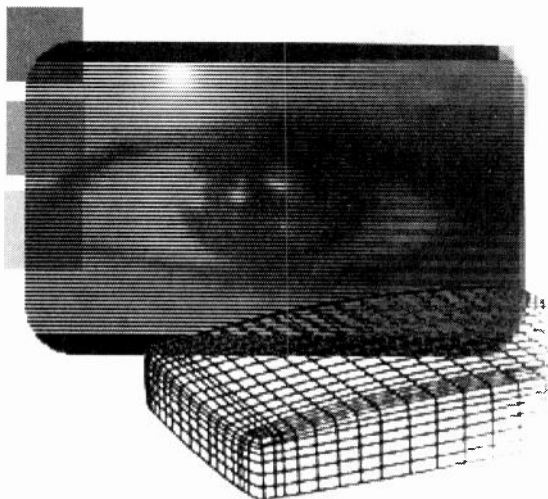
Please add £1.00 handling all + VAT

Economic Devices
PHONE (01902) 773122 FAX (01902) 29052

32 Temple Street, Wolverhampton WV2 4 AN, United Kingdom.
International Phone ++ 44 1902 773122 Fax ++ 44 1902 29052
Also available - D2mac Decoders - RTL Decoders - Secam/PAL Transcoders - A/B Switches
Tone Switches - Multiswitches - Please phone for current prices.
Larger Quantity Trade enquiries welcomed.

TV Fault Finding

Reports from Chris Watton, John Edwards, Andrew Tebbutt, Terry Lamoon, Brian Storm, Nick Beer, Eugene Trundle, Michael Dranfield, Graham Thompson and Graham Riachards



Salora M Chassis

This set had no picture. I hate it when I look in the back of a set and think "where do I start?" All those huge chips! As the sound was present and the tube's heaters were alight it seemed that the combined power supply/line output stage was working normally. Then, for the briefest moment, I noticed a narrow band up the screen. This led me to the BS208 EW modulator driver transistor TB526, which is a FET type. Replacing it restored normal operation. All I then needed was a few yards of solder to stick all the dry-joints together. . . C.W.

Philips G110 Chassis

This set would start up and run perfectly all day. But if it was switched to standby by remote control it would go dead, with no standby LED illumination. Switching it on and off at the mains would then restore normal operation. The culprit turned out to be the 20V zener diode D6657. C.W.

Hitachi C2118T (G7PS2 Chassis)

When we tried to tune this set in the correct display appeared on the screen but there were no signals. The 33V tuning voltage supply was

missing because R044 (12k Ω) was open-circuit. C.W.

Orion 14ARX

This set was stuck in standby. For the microcontroller chip to respond to remote control commands it must have a 5V supply. Only 2.8V was present. The 5V regulator that provides this supply obtains its input from the mains circuit, via D531, R531 and R158, the voltage at the junction of these resistors being smoothed by C530. Only 4.8V was present here, because C530 was open-circuit. This voltage was insufficient to operate the regulator correctly.

Incidentally, once the set is running the 5V supply is derived from the line output transformer. We discovered that if we applied 5V to the regulator's output the set would start up and continue to run - until it was switched off and then asked to start from cold. C.W.

Finlux 1000 Series Chassis

This set would start off all right. But after about half an hour a band of torn lines would roll down the screen from the top to the bottom at a rate of about two per second. The cause was Ch11 (47 μ F, 63V). C.W.

Loewe MS56

This set's picture was marred by very severe Venetian blinds. We found that the 1k Ω LZ AMP preset P323 had gone open-circuit. C.W.

Grundig CUC2800 Chassis

The tripler had failed. After replacing it the set got going but there were other problems: the sound

came from only one speaker, and the brightness couldn't be adjusted. They were caused by a duff microcontroller chip. It's type SDA2011-A005. Make sure that you get the right one for the set. C.W.

Salora L50 Chassis

The cause of intermittent poor starting was traced to CB601 (10 μ F, 63V) which smooths the supply to the LF0059 chopper control chip HB600. It had gone low in value. In the 110° version of the chassis a 2.2 μ F capacitor is used in this position. C.W.

Salora J Chassis

This set was dead though the power supply was trying - we found that there was about 50V at the collector of the line output transistor. A few resistance checks soon revealed that the BY133 diode DB510 in the EW modulator circuit was leaky. C.W.

Nikkai TLG1409

This set was dead. A squealing noise came from the chopper power supply and there was a smell of something cooking. The cause of the trouble was C617 (4,700pF, 1kV) which had split open and was very hot. You'll find it connected across the 109V HT rectifier diode D116, in series with R618. J.E.

GoldStar CIT2181FG

The customer said that for a long time the set had been switching itself off at random. As it was now permanently dead he figured it was time to get the set fixed. We found that the pins of the standby relay RL801 were all dry-jointed. The slightest tap on the relay's case

would instigate the fault. Resoldering cured the problem. **J.E.**

Samsung CI541ZG

This set would intermittently shut down with the standby LED illuminated. It could take minutes or hours after switch on for the fault to occur. The set could be brought back into operation only by using its power button to switch it off then waiting for a few minutes before switching it on again. None of the remote functions worked when the set had shut itself down. We traced the cause of the problem to barely detectable poor joints at the pins of the chopper transformer. They looked healthy until viewed with a magnifying glass. Resoldering the pins cured the problem. **J.E.**

Hitachi CPT2476 (G6P Chassis)

This set displayed a bright green raster with flyback lines. Time was wasted checking components on the tube base panel until the penny dropped. When the M50450-023P character generator chip IC1104 was removed there was a normal picture (with no green on-screen displays of course). A new chip restored everything to normal. **J.E.**

Granada C66GZA

The problem with this Hitachi-based set was field collapse – the TDA3654 field output chip IC501 had failed. A replacement restored the raster, but flyback lines occupied the top of the screen. C574 (100 μ F, 50V) was found to have fallen in value to only 49 μ F. A new electrolytic put that right. The capacitor is mounted very close to the field output chip's heatsink, which gets quite warm. We decided to fit a 105° capacitor for improved reliability. **J.E.**

Samsung CI7230 (U88MT-1 Chassis)

This set's picture was shifted to the left. As a result the extreme right-hand part of the picture was present at the middle of the screen. After a few seconds the EW modulator driver transistor started to smoke. The cause of all this was a badly dry-jointed connection at the anode of D405 (BYD33) in the line output stage. **J.E.**

Sharp DV51083H (D3000 Chassis)

This set was dead. When we disconnected the collector of the 2SD1546 line output transistor the HT voltage returned to the correct

figure. With a new transistor fitted there was a slight EHT pulse at switch on but the set immediately shut down. The line output transformer was faulty.

We fitted a replacement and powered the set up slowly via our variac. At about 100V input the set went into the tripping mode. The TDA8175 field output chip was found to be short-circuit and the 1 Ω resistor in its power supply open-circuit. Once these items had been replaced the set worked normally. **J.E.**

Ferguson 51A2 (TX100 Chassis)

This set switched on all right and channel one was displayed, along with a perfect picture and sound. But no other operations were possible, using either the remote control unit or the set's up-down buttons. The set's programme and LED display remained on channel one. The PCD8571P memory chip IC1805 was faulty. **J.E.**

Samsung CI6230 (U88MT-1 Chassis)

This set was dead, with just a high-pitched squeal from the power supply. A check on the electrolytics showed that C416 (2.2 μ F, 250V) was short-circuit. It decouples the supply to the line output stage. **J.E.**

Philips 2A Chassis

This set was dead apart from a faint squeal from the power supply. When the supply to the line output transformer was disconnected (pin 7), the HT voltage returned to the correct level. As no faults could be found in the secondary supplies obtained from the transformer we suspected the transformer itself. The primary winding (pins 5 and 7) was OK, but our checker indicated that there was a fault between this winding and chassis, at pin 18. Resistance readings were normal, but a new transformer restored the set to life, proving the tester's worth. **J.E.**

GoldStar CIT9508

A problem you seem to get with these sets is the first anode (screen) control on the line output transformer becoming intermittent. This gives either the no picture or very dark picture symptom. I've had the fault on three of these sets now. **A.T.**

Alba CTV841

This set would tune in only the low (Band IV) channels, with the tuning

scale at the top of its range.

Although the output from pin 40 of the microcontroller chip was sweeping in the search mode and the voltage at pin 2 of the tuner module was sweeping with it, the actual tuning voltage at pin 2 was not within the correct range. The cause was R646 (10k Ω , 2W) which feeds the 33V tuning voltage regulator. It was open-circuit. I had some difficulty finding it. So to help you if you encounter this particular fault, R646 is mounted in front of the line output transformer. **A.T.**

Sony KV1621

At switch on this set produced a rustle of EHT then remained dead. Suspecting a line output stage fault I started to check for heavy loading in this area, to no avail. When the HT voltage was measured it became apparent that the fault was being caused by lack of activity in the power supply. This was in turn caused by nothing more than one leg of the mains switch being open-circuit! I can only conclude that the switch made momentary contact at switch on, giving the misleading symptoms noted above. **A.T.**

Alba CTV841/Bush 2114 and Clones

If, after repairing one of these sets, you have either no sound or field collapse, check whether you've connected the two-pin speaker plug to either CN602 (no sound) or CN403 (field collapse). It should be connected to CN201. **A.T.**

GoldStar CIT2190F

As there was no line drive this set didn't produce any EHT. The cause of the problem was D401 (1N4003) in the supply to the line driver stage. It was open-circuit, removing Q401's collector voltage. A replacement restored normal operation. **T.L.**

Matsui 2092T

The brightness level would drop drastically when this set had been on for a while. Tapping around brought me to R195. It was not dry-jointed: instead it was bent over, with the result that it made intermittent contact with a jump link. Straightening it cured the fault. **T.L.**

Panasonic TX25A3 (Euro 1 Chassis)

There was no sound or picture. Quick checks showed that the tube's supplies were all present and

correct. Subsequent checks showed that the 10V supply to the AV switching chips on board A was missing. This supply is provided by Q1011 (2SC3940), which was open-circuit. Its 4.7Ω feed resistor R1102 was also open-circuit. The cause of these failures was the 0.1μF surface-mounted decoupling capacitor C1102. It had become leaky, shorting out the 10V supply. **B.S.**

Panasonic TC1785 (Z3 Chassis)

This set suffered from a nasty looking and sounding intermittent fault. The picture size would fluctuate quite dramatically, with arcing in the neck of the CRT, then the set would shut down to standby. When the fault occurred, the HT voltage rose to about 155V. The cause of the trouble was the STR50103A chip in the power supply. Unfortunately the activity in the tube's neck had led to an intermittent blue gun short. I was able to sort that out by judicious use of the B&K 467 tube tester. **N.B.**

Daewoo T512

This was an unusual fault. It was impossible to get the grey-scale correct. The CRT's guns could be matched at any one point in the range of the luminance signal, but they wouldn't track over the whole range. We eventually found that C504, a ceramic capacitor that couples the R - Y signal into the RGB chip, was short-circuit. **E.T.**

Hitachi C2574TN

A problem that has cropped up with several of these sets is sporadic and random failure of the EW output chip IC751 and EW modulator diode D706. The fault is most likely to occur when the set is switched on from cold. The cause is a dry-joint at R610 on the signals panel. **E.T.**

Bush 2714

This set was stuck in standby, with the power supply running normally. We found that the line driver transistor's 3.9kΩ, 5W feed resistor R603 was open-circuit. **M.Dr.**

Samsung CI517Z

This set produced a blank, unmodulated raster, as if it was in the external video input mode. When video was selected, a signal could be displayed via the rear-mounted AV input socket. So we took a look around the IF strip. The 2SC815 transistor EQ101 mutes the IF signal when the set is in the

video mode. In fact the IF strip was permanently muted because EQ101 was leaky collector-to-emitter. We pressed a 2SC1815, which has a different pin configuration, into service. This cured the fault. **M.Dr.**

JVC AV21H1EK

This fairly new set came in with a list of odd, intermittent faults. On test it worked faultlessly. When we took the back off however we found that IC552, a three-terminal regulator on a large heatsink, was dry-jointed at all three pins. We subsequently had another of these sets in with the same problem, so it looks as if it could become a stock fault. **M.Dr.**

Hitachi G8Q Chassis

No teletext was the complaint with this set. That's what we thought too, but on closer examination very weakly contrasted teletext was present in the mix mode. The on-screen channel display was similarly affected. We tried a new teletext panel but this made no difference. Over to the video section therefore, where the text signals are inserted at pins 12, 14 and 16 of the TDA3562A colour decoder chip. A new TDA3562A cured the fault. **M.Dr.**

Matsui 1455

The auto sweep tuning wouldn't stop when a station was found. This was because there was no sync pulse at pin 36 of IC202 when a station was passed, though the pulse was OK at the base of Q404. The cause of the problem was a small crack in the print. **M.Dr.**

Akai CT2179NUK

This set is a Samsung clone. At switch on the power supply chirped then died out. We found that C807 (47μF, 25V) had dried out. It lives next to the hot-running chopper transistor's heatsink. **M.Dr.**

Panasonic TX2112 (U5N Chassis)

This set had a very odd fault: the sound mute was too long when channel changing with the remote control unit. It lasted anything from five to twenty seconds. The fault didn't occur when the set's manual controls were used. After careful study of the circuitry we decided that the cause of the fault must lie with the MAB8441-T005 micro-controller chip. But every supplier we contacted said that this device is no longer available. A fax to Panasonic confirmed this. It's a pity

that sets are often scrapped for want of a relatively inexpensive component such as this. **M.Dr.**

Philips System 4 Chassis

This set was dead because the power supply had shut down. A quick check produced a short-circuit reading across the line output transistor. When it was removed for test we found that the transistor was OK. The culprit was the blue 1nF, 2kV tuning capacitor C2161. **M.Dr.**

Bush 2057/2059/2157/2159NTX

If the complaint is fluctuating brightness, or you find that the field output chip IC401, the line output transistor Q402 and ZD402 which stabilises the line output transformer derived 12V supply have failed, check the HT voltage. It should be 112V. The above problems arise when this supply is unstable.

The following components are usually responsible: Q901, Q902, Q903, ZD901, ZD902, C909, C910 and R907. They are all in the power supply, and as they are relatively inexpensive and the fault can be intermittent I replace the lot. This saves a recall. The power supply is used in several other models.

Another problem you get is dead, no standby. You will find that the 0.68Ω safety resistor R919, which is connected to pin 4 of the chopper transformer, is open-circuit. **G.T.**

Realistic Portavision 16-7070

This is a monochrome portable with a radio and a cassette player. It lived in the kitchen and had no picture. I had to prise the case open because of the amount of grease on it. Why do I always get the best jobs? The PCB was in a similar condition. When I'd cleaned it I was able to get to the root of the problem, which was the 4.7μF, 25V bipolar line scan coupling capacitor C74 - it was leaky. Cleaning the cassette deck and the case completed the repair. **G.T.**

NEI C28F1FXN

The reported fault was "dead". As usual the mains fuse had blown because one of the diodes in the mains bridge rectifier was short-circuit. Component reference numbers are D100-3. They are type BY255. **G.T.**

Alba CTV14R/Nikkai TLG14R

Field bounce was the complaint with this portable. After a long

search we found that one end of the 10k Ω , 2W resistor R137 was dry-jointed. It's situated near the line hold control. G.T.

Samsung CI5012Z

This set was dead. After a good clean out with the vacuum we could see the PCB and start work! We found that the 5-6 Ω , 7W surge limiter resistor R801 was open-circuit, the cause being failure of C816 which was short-circuit. This 222pF, 1kV capacitor is connected in parallel with the chopper transistor Q801. G.T.

Samsung CI3312Z

This portable refused to search tune. A check showed that the tuning line voltage BT was stuck at 29.75V. The cause was resistor RQ01 which was dry-jointed. G.T.

Decca D14RDD5

This portable had no sound. The on-screen display came up, but the cursor moved only about a quarter of an inch. With this set the maximum volume can be preset and locked. To unlock it, press the volume up button on the set and the button to the right of the zero button on the remote control unit. Thank

you Tatung Technical for this information. G.T.

Quickies

Bush 1407: For a dead set check whether R913 in the power supply is open-circuit.

Philips GR1-AX Chassis: If there's no tuning voltage, check whether R3703 is open-circuit. G.T.

Mitsubishi CT2227M

If the set is stuck in standby/dead, with no relay operation, check the 1-2 Ω , 0.5W carbon resistor R7A0 on the remote control panel. G.R.

Toshiba 213R4B

The fault was field collapse, which to start with had been intermittent. A scope check at pin 1 of the TDA3651A field output chip showed that there was no drive. In fact a resistance check from pin 1 to chassis produced a reading of only 20 Ω . The culprit was C312 (10nF) which was leaky. G.R.

Harwood CTV14

If the set is dead but there is 114V at the collector of the line output transistor, check the line driver transistors. There are two, TR3 (BC558) and TR4 (BC639).

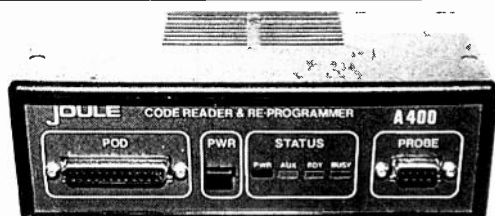
Replace them both as they are a DC-coupled pair. G.R.

Ferguson A59F (ICC7 Chassis)

This set had come from another dealer, the fault being power supply shut down at switch on. Following instructions from Ferguson, they had replaced the TDA8178F field output chip. On this occasion the solution hadn't worked. The cause of the trouble turned out to be field related however. There was a short on the UL2 (65V) feed to the field output stage because the BA157 rectifier diode DL09 was short-circuit. It's connected to pin 12 of the line output transformer. G.R.

Hinari CT15/ST200/ VTV200/CDTV2/CT14/ Goodmans 5160T

A fault you sometimes get with these sets is a bright, blank raster that sometimes clears if the set is left switched on. You will find that the 12V and 15V lines have line-frequency pulses on them - I've scoped 15V peak-to-peak on the 15V line. The problem is caused by C629, a 100 μ F, 25V electrolytic capacitor. It lives in a hot corner, so must eventually suffer. I've had this fault three times now. G.R. ■



JOULE A-400

ADVANCED CAR RADIO CODE READER

CE

The A-400 and associated computer software is a factory produced system designed and manufactured by our own team of experienced technicians.

Covering the majority of models including the latest Blaupunkt RDS radios, the A-400 decoding system is a must for any repair workshop. Ongoing research and development means new makes and models are being added regularly.

We offer full technical assistance via a telephone helpline to all registered users which even includes help with repairs and can make supply spares for a larger number of makes and models.

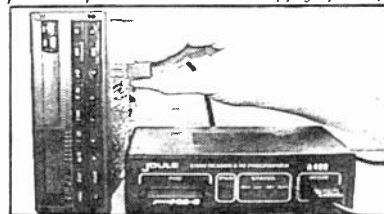
Decoding a radio is simple - remove the base plate, place the probe on the PCB, press a key and the code is instantly displayed. Changing the code or fully re-programming is just as easy.

On screen help and PCB layouts showing probe location and information on how to enter the code once the set has been decoded.

Works on any IBM or compatible pc from an Amstrad 1512 to a 486.

As well as its ability to decode and re-code, the advanced design of the A-400 permits total re-programming of eeproms, lending itself for use in the servicing of television receivers etc.

Place the probe on the PCB and the code is instantly displayed



There are now three options available to you in ordering your A-400 decoding system ...

Option 1: Purchase the A-400 decoding system outright, price for full starter package (now covers over 100 models): £375.00 + VAT. Additional software modules available separately.

Option 2: Take advantage of the new INDEX system where for a £100 refundable deposit you will be supplied with ALL of the available eeprom based software plus the Grundig processor based software.

Decodes are charged at £5 + VAT each. **There is no rental charge.**

If required, the Blaupunkt processor based software can be added to the index system. Please ask for details.

Option 3: You may have the best of both worlds by purchasing any of the software and taking the remainder on the index system, therefore obtaining a very cost effective solution to your decoding requirements.

The index system was pioneered by Electronic Sound Systems and we do not know of any other company offering a similar product.

The A-400 has recently been tested for electromagnetic compatibility (EMC) and conforms to the stringent tests that were imposed. As a result, the product now bears the CE mark of conformity. This regulation came into force on the 1st January 1996 and it should be borne in mind that, from this date, it is illegal to supply or use any electrical or electronic equipment that does not carry the CE mark.

The A-400 is manufactured by a company that has been involved in the servicing of car audio and TV/video for over 20 years and is a service agency for Philips, Grundig and Blaupunkt.

Phone now for a free brochure and demonstration disk.

ELECTRONIC SOUND SYSTEMS

Hilton Road, Aycliffe Industrial Estate, Co. Durham DL5 6EN

Tel: 01325 301007 or 307442 Fax: 01325 300189



What a life!

Donald Bullock finds the solution to an Amstrad PCW8512 problem and deals with a crop of TV faults

While back I wrote about the troubles I was experiencing with the Amstrad word-processors I use here in Spain, especially the two PCW8512s. Both started to give trouble when taken to Spain, after years of perfect operation in the UK. Field collapse with one of them was the first problem, caused by a faulty LA1385 chip. Then both of them became temperamental. They would gobble up writing that had been saved and which I thought I had for ever.

Two *Television* readers came to my aid. S. Pearson of Chipping Norton said that the fault was likely to be either with the discs or drive B. He suggested that I try to copy anything of importance on one of the suspect discs then reformat it with the PCW9512. If reformatting worked, the disc was OK. This would point to drive B as the cause of the trouble. He points out that the drives are belt driven, and that a slipping belt will result in the disc rotating at varying speeds, corrupting its format when an attempt is made to save data. This would explain the "disc format not

recognised" message on the screen. In passing he said that he believes the 3in. Amstrad discs are made by Matsushita, and also commented on my son Steven's "romantic" solder – the stuff that makes our workshop smell like a Casablanca ladies' powder room. He says that this sounds like a new product which is starting to gain popularity with some manufacturers. It differs in containing a synthetic flux that doesn't coat printed circuit boards, as rosin flux does, but requires a hotter iron (about 420°C) to activate it. Another advantage is that it makes the use of ozone-destroying solvents to clean off flux residues unnecessary. We live and learn!

Colin McCormick of Plymouth suggests that I retire the Amstrads and change to a PC with the LocoScript Pro 2 wordprocessor program – it's similar to the one I use, and would therefore be easy to change to. This is an interesting possibility, but I had to get the Amstrads right since only their format can handle every disc I have.

Belts

Anyway, I opened one of the PCW8512s, removed the B disc drive and dismantled it to examine the flat belt. It was stretched, and when I removed it I found that it was permanently pear shaped and stiff. I then looked at drive A and found that the belt was in the same state. When I opened the other PCW8512 the story was the same.

I ordered the right belts from JJ Components, then called at the village TV shop for some flat belts to tide me over. I bought four, all slightly different though similar in size and width. They got the machines working reliably, and I was able to work on. But the PCW8512s wouldn't handle each other's discs: obviously there was a

slight difference in the way in which they were being driven. I was glad when the JJ belts arrived a few days later. Both machines are now working perfectly.

My thanks to Mr Pearson and to Colin McCormick for their interest and advice.

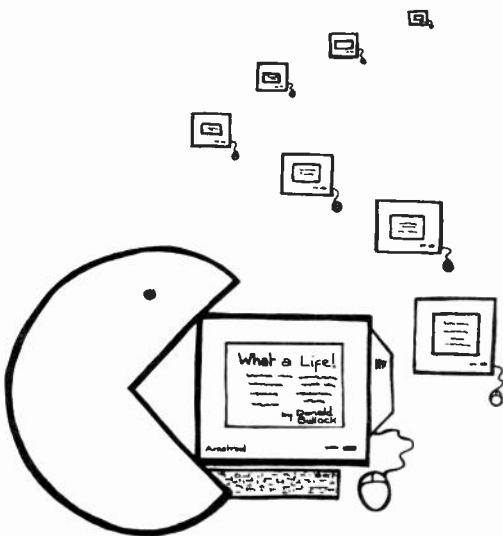
I soon tumbled to the reason for the sudden demise of the original belts. They'd led a hard life before they went to Spain, where my Amstrads live in a 12 x 10ft wooden chalet in our garden. In summer the heat inside is unbearable from mid-morning onwards. My printer ribbons have suffered similarly – the ink has dried out, so that even 'new' ones print faintly. My remedy has been to erect a covered gantry above the chalet to protect it from the sun and provide a draught between the chalet and the cover.

Disc Drive Tip

Here's a tip for anyone about to dismantle an Amstrad PCW disc drive. The drive uses a three-quarter inch long brass pin, about a millimetre in diameter, to detect the disc's write-enabling shutter. This pin is located, but not secured, in a hole in the disc drive's cast deck, in line with the disc shutter. It can drop out and be lost without you knowing that it was there. You don't discover this until you've reassembled the drive, refitted it, reassembled the machine and then tried to use it. You find that the drive is prepared to write to your disc whether it's write-protected or not.

The Difficult Ones

Steven reckons that the difficult sets come in every time I slip off to Spain. I'm not too sure. I think he does the easy ones and saves the rest for me. He likes a quiet life, but doesn't get it. He's in the wrong trade for that.



The other day he presented me with a GoldStar CT2168P that was completely dead – there was not even a standby glow. This is unusual as these sets normally get stuck in standby. We didn't have the circuit diagram, but I dived in and checked the fuse and the 2-2Ω, 5W surge limiting resistor. They have sometimes been the cause of this symptom, but were all right. So I moved to the primary side of the chopper circuit and found that there was no drive at the base of the chopper transistor Q801P. A check on the 100μF, 16V coupling capacitor C805P showed that it had fallen in value to only a couple of microfarads. As it didn't look up to the job I fitted a 35V replacement, which restored the set to life.

A Philips CTX-S

Steven took the GoldStar set off and brought along a Philips receiver fitted with the CTX-S chassis. It was unwilling to start up, tripping three times at each of our first attempts. When the set did stay on it seemed to be suffering from a migraine attack. The picture was hopelessly scrambled, with no colour except some thick bands of green flashing about. Then the picture improved a little.

"Electrolytics" I said. Steven nodded and headed for the ones in the power supply. He found that the 4-7μF, 63V chopper drive coupling capacitor C2351 and the driver transistor's 220μF, 10V emitter decoupling capacitor C2323 were both very low in value. When they had been replaced the picture was all right at low brightness/contrast control settings, but as soon as the controls were advanced a host of ragged black stripes appeared on the picture.

Steven checked the various electrolytics around the colour decoder chip and found that C2205 (4-7μF), which decouples the slider of the preset contrast control, was short-circuit. The rest were all right. He then moved to the sync circuitry where most of the electrolytics were low in value. When these had been replaced the set produced an exceptionally good picture.

Kirk Douglas

A decided oddball arrived with a Grundig set which turned out to be fitted with the CUC3400 chassis.

"I'm Grewsome, Mr Buckland" he said, putting it down. "God, you look like Kirk Douglas."

"What's up with the set?" I asked.

"Dead" he said, "but it works". I looked at him for a second or two then waved him out.

I put the set on the bench and switched it on. It came out of standby, and the channel indicators lit up. It also changed channels. But there was no sound or raster. When I took the back off I found that the tube's heaters were out and there was no EHT.

A check on the voltages around the line output transformer showed that they were all haywire. So I removed the transformer and checked the resistance of the windings. Every pin read short to every other one. A new transformer cured the trouble and I prepared to make out the bill, intending to add a couple of quid for Grewsome's wisecrack. Then I looked in the mirror and added a pound.

Mr Gravel's General VCR

Mr Gravel is usually to be found in our local, nursing half a pint of lager. I've never seen him drink any. He shoved an ancient General VGX520B VCR across the counter.

"Not good enough" he complained. "Ain't had the thing long. Even bought a Testoscope to mend it, but no good." He waved a neon tester at us.

The machine's Panasonic deck had a tie-pin wedged in the mechanism. When this had been removed the machine worked well mechanically, but the video was haywire. We soon found that the RF converter's tuning screw had been screwed and screwed, mangling the circuitry inside.

Even MCES couldn't help with this one, saying that it was beyond repair. Still wanting to help, though I can't think why, we contacted General and were told that spares are no longer available, the machine dating from 1984. So we handed it back to Mr Gravel, who gave us his Testoscope. It was his way of saying thanks. Some readers might wonder why we don't learn. So do we.

A Vodka and Orange

Glenda Glenhorn's Ferguson 14M9 portable (TX86 chassis) led us a dance for two reasons. First because we'd not seen one before, though they've been around for four or five years. And secondly because she'd spilt a large vodka and orange into the back. The set was dead. A panel assembly to do with 12V DC operation is set on the back. It has to be removed before the rear cover can be taken

off. We found it difficult to remove the panel, but managed it. Then we dismantled the set.

The switch-mode power supply uses a TEA2018A chip that was short-circuit. The 1-25A mains fuse had blown, as had the surge limiter resistor R88. Two of the bridge rectifier diodes were short-circuit. The TIPL791A chopper transistor TR6 was also short-circuit. When we'd replaced these items the primary side of the power supply was all right, but there was an HT short on the secondary side. Disconnecting the 95V feed cleared the short. We headed for the line output transistor, which is also a TIPL791A. It was short-circuit, and when this had been replaced the set sprang to life.

We stopped for a mug of tea before embarking on the job of reassembling the set and its 12V appendage. I won't mind if we don't see another of these sets for four or five years.

Groucho Marx

Bill Branston walks like Groucho Marx and seems to use his scripts. He strode in with a Tatung TN1616 portable (160 chassis).

"Tube's gone" he said, "line across the screen."

I pointed to the door. In fact the field collapse was intermittent. I took off the back and made for the TDA3651 field output chip I301. As nearly every one of its pins was dry-jointed, I reached for Steven's romantic solder and carefully resoldered them. Then I switched on, reasonably confident that I'd see a full picture. I didn't. There was still field collapse, and safety resistor R411 had popped open.

Feeling a bit like Stan Laurel, I replaced the chip and the resistor. Up came the picture, but after about five minutes it began to roll and I feared the worst. I needn't have done. All that was required was slight adjustment of the field hold control R303.

An Hinari CT18

Marilyn Murgatroyde came in with an Hinari CT18 portable that was stuck in standby. This set uses an STR50103A chopper chip (IC801) with an SR2M protection diode (D813) across its 112V output. The diode was short circuit and the 6-2Ω, 10W surge limiter resistor R801 open-circuit. The HT voltage had obviously risen drastically, as it does in these sets. When I replaced IC801, D813, R801 and switched the set on it sprang to life. ■

LETTERS



Prepared Mains Lead

My 'beef' – excuse the pun – is that with cheaper models of certain white goods you get a detachable lead but *no* 13A plugtop, just a 'prepared end'.

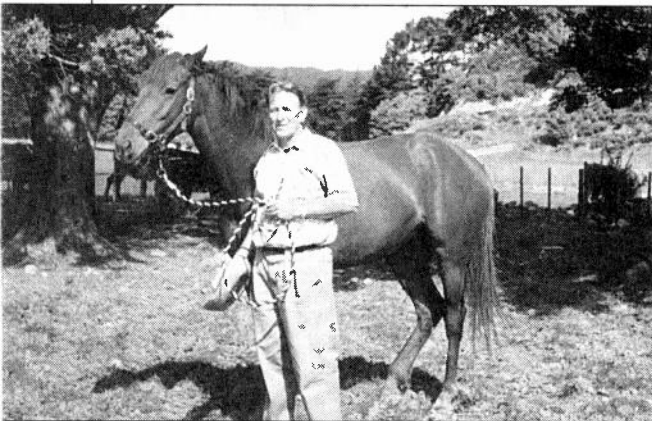
On many an occasion when collecting a TV for repair from a customer's home I've seen a unit's prepared lead fitted to the plugtop as it is, not trimmed properly to fit the plug. Consequently the cable grip is in fact not gripping anything, so sooner or later I get a call to say "my electric gismo has just blown, can you repair it?" (I service white as well as brown goods).

I just wish manufacturers would not do this, as in my opinion the general public is ignorant of the dangers of electrical equipment and some sort of education is required. Perhaps a good place to start would

Antipodean Cowboys

During the past year I have followed with interest the letters and comments regarding cowboys in the trade. I would like to point out that things are not always as they seem to be. In the photograph alongside you see a local cowboy with a very ordinary looking horse. The facts are that the horse is 'Just Red', winner of the 1996 *Air New Zealand Grand National Steeple Chase*. The cowboy is yours truly, a highly qualified TV serviceman.

*Derek Roylands,
Wellington, New Zealand.*



be with school children, regardless of their gender.

I have commented to various adults about the correct fitting of plugtops, but most of them do not seem to care. Such an attitude often leads to tears.

*M.K. Hayter,
Moseley, Birmingham.*

Film or Videotape

I was most interested to read Alan Pemberton's explanation (letters, March) of 'film-like' videotape dramas. Like others, I wondered where the specks of dust had gone! If tape has to be used, I would prefer to see this 'film-like' technique adopted than to have our screens dominated by 'soap-opera style' clean videotape dramas. Film/film-like productions look more professional, the 'degrading' method being highly effective – at least to these eyes. I was certainly fooled!

Perhaps for different reasons, 'degrading' the image isn't a new idea. Many *Wednesday Play* dramas from the Sixties for example were made from telerecorded studio material and external film stock. Telerecording was even listed in the end credits, together with the film editor! As 35mm film was easier to edit than tape, some episodes of *Doctor Who*, as another example, were directly telerecorded for ease of editing (a good example is *The Krotons*, episode one). Videotaped material was of course telerecorded for world wide sales, in variable quality.

US NTSC conversions have always looked terrible, often unwatchable unless you don't find the smears and jerky movements distracting. This is certainly a disturbing trend, as no doubt our own productions must look awful over there. As videotape is generally used nowadays, with all telecine material transferred to tape for transmission, some older US programmes – such as the current reruns of the original *Star Trek* series – come as NTSC conversions

and not the clean, crisp and colourful film stock seen on our screen ten years ago.

*Brian Renforth,
Sandyford, Newcastle.*

Second-Class Citizens

A letter to your sister magazine *Electronics Weekly* (10/4/96) from Andrew Garret, who is studying for his M.Eng., complains about the status of engineers in the UK. He says that he is "keenly aware of the second-class citizenship a British engineer must put up with", then goes on to say that he "would feel more proud of his chosen field if it were not generally considered as "television repair" work.

So Andrew Garret first complains about engineers' status, then airs his own perception, which appears to be that TV servicemen are of such low status that he doesn't wish to be identified with them! He signs off his letter with the comment that he "has never fixed a TV in his life and has absolutely no desire to ..."

My guess is that this demeaning attitude towards TV technicians will have upset others besides me. It's 20 years since I worked in the trade, but I believe I could hardly have had a better training, either trouble-shooting or in the rough and tumble world of the general public. I now work in the electronics industry and enjoy a good salary, along with some colleagues who are very well qualified but don't have much knowledge of things I take in my stride (like TVs or even how a fluorescent lamp works). They seek my advice on such matters.

I'm sure many reputable TV technicians could run rings round Mr Garrett, who might well find a day spent in a busy TV workshop to be a chastening and humbling experience.

The sad part is the meagre profit margin in the trade. This prevents many a TV man being paid his true worth.

*Keith Cummins,
Holbury, Hampshire.*

Importance of Training

May I add some comments on the subject of entering the TV/video repair business, following the correspondence started by Ms Raynor's letter in the February issue?

Many engineers today have a negative view of the trade. This is understandable. There are various ways of being employed in the trade: if you work for a national multiple or rental company, the low rewards and pressure to achieve a high turnaround, despite the ever more complex technology with which we have to deal, are likely to lead to a negative view of the state of the trade and the prospects. Another common complaint is the difficulties caused by an ever more demanding and unreasonable public.

But there are many good things about the trade, and anyone who shows an interest in joining us should be made aware of how best to get involved. I think we have to be energetic and positive about replenishing our numbers. For many years I have trained 16-year old apprentices, leading them to the highest levels by taking full advantage of the local resources available. They have become a valuable asset, and provided we do

well by each other we will have guaranteed engineering capabilities well into the future.

It is my intention to recruit again this year. The Devon and Cornwall TEC provides finance for the travelling and training costs, and students can be either employed (as ours are) or on placement. Exeter College provides CGLI 2240 courses at levels 1, 2 and 3, and we also have training support from manufacturers.

Unfortunately many small businesses don't have access to manufacturers' courses, and in some areas college courses are no longer available. But most established engineers are interested in their work, and this makes them naturally good teachers. We should all think seriously about the medium - and long-term benefits of training, and encourage youngsters to take advantage of it and not be dissuaded by those with negative attitudes.

The financial rewards are not what they should be in our branch of electronics. We all know the basic reason for this - low retail prices. But personally, having done the job since leaving school at fifteen, I have been more than happy. My belief is that the basic requirements are an ability to see opportunities and patience in developing them. There is always

something new that will require technical know-how for its successful implementation.

While remaining a practicing engineer, I have recently joined the staff of Exeter College. I will shortly be mailing engineers and dealers in this region, canvassing interest in all CGLI 2240 courses starting in September 1996. This will enable us to decide which options to run, for example short, specific courses on such subjects as Nicam, camcorders etc. If anyone would like to receive details, I can be contacted at Exeter College, Room G1, School of Engineering, Hele Road, Exeter, Devon EX4 4JS. *Nick Beer, Bideford, Devon.*

Thank You

I would like to thank all the *Television* readers who took the trouble to write to me following my plea in the February issue.

I am overwhelmed by the response and the offers of help. It's going to take me some time to get everything in order, so if I have missed anyone it's not because I'm ignorant - what a magazine!

Once again I thank everyone for their interest and *Television* for publishing my letter.

Ms C. Raynor, Cheshire.

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

REMOTE CONTROLS FROM £7.99
IDLER TYRES 50p 1+, 25p 10+
VIDEO HEADS FROM £6.99
Over 200 models at very attractive prices
AKAI, AMSTRAD, FERGUSON, FISHER,
GOLDSTAR, HINARI, HITACHI, LOGI,
MATSUI, ORION, PANASONIC, SAISHO.
SHARP AND MANY MORE
VIDEO SPARES.

VIDEO IDLERS, CLUTCHES
BELT KITS, PINCH ROLLERS
BACK UP BATTERIES, TV
SWITCHES, CD SPIN MOTORS
FAULT FINDING BOOKS
EQUIVALENT BOOKS
JAPANESE TRANSISTORS
RESONATORS, THERMISTORS
HITACHI TH902 £2.00
96009 £1.30
TRIPLERS UNIVERSAL £4.99
WITH FOCUS £7.99
CUC2410 £16.99
POWER SUPPLY MOD KITS
FUNCTION SWITCH 85P

ELC EAST LONDON COMPONENTS
63 PLASHET GROVE, EAST HAM,
LONDON E6 1AD. TEL: 0181-472 4871
two minutes walk from Upton Park Tube Station
VISIT OUR SHOP
OPEN MON-SAT 9AM-7PM
100's OF TOOLS, COMPONENTS,
INSTRUMENTS, REPAIR KITS,
BOOKS & CABLES TO CHOOSE FROM
ADD £1.50 P/P + 17.5% VAT
ALL GOODS DESPATCHED SAME DAY
PRICE SUBJECT TO CHANGE WITHOUT
NOTICE VISA ACCESS ACCEPTED. MIN
ORDER £5.00

LINE OUTPUT TRANSFORMERS OVER 100 MODELS AT LOW PRICES

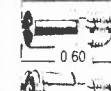
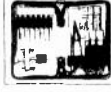
AKAI	MATSUI	AN3822K	7.99	LA7836	1.99	STK5730	6.00	TD1510	3.50
CT2570E	1420	AN5151	6.99	LA7836	3.00	STK6962	5.80	TD1515	2.50
CT2870	1440B	AN5435	2.50	LF0059	30.00	S7K7216	7.00	TD1516	4.00
ALBA	1450	AN5515	2.99	M4918B1	8.50	STK7226	8.50	TD1518	4.00
CTV14RS	1465	AN5900	2.99	M4940A B4	16.00	STK7308	4.25	TD1520	4.00
BAGY 10	1480A	AN7171	3.40	M54543L	2.99	STK7356	9.00	TD1552	3.50
CT1745	1999	BA6121	4.25	M54544L	2.99	STK8250	8.00	TD1554	7.00
AMSTRAD	CT2528ETX	BA6209	2.60	M54545L	2.99	STK8250	8.00	TD1557	7.00
CTV2200	CT2730ETX	BA6218	2.99	M54547L	3.00	STR4211	5.99	TD1558	7.00
CTV2710	149X	BA6229	2.99	M54548L	4.25	SFR3125	5.99	TD1558	7.00
TVR174	149X	BA6238	2.99	M54549L	4.50	STR4211	5.99	TD1908	1.00
BUSH	PHILIPS	BA6239	1.99	M54644L	3.99	STR4211	4.50	TD1908	1.00
2020T	KT3	BA6259	2.50	M54645L	3.99	STR4211	4.50	TD2003	1.30
2020T	KT3	BA6259	2.50	M54647L	3.99	STR4211	4.50	TD2003	1.30
2714	K14	BA6272	2.99	M54648L	3.99	STR4211	4.50	TD2030	1.30
FIDELITY	K130	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
ZX2000	K140	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
ZX3000	K140	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
ZX3000	2A	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
FERGUSON	3A	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
TX85/86	CTX E-S	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
TX90	CF1	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
REDSHOT	NCR	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
WHITE	GR1 AX	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
TX98	G90 AE	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
TX99	PANASONIC	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
TX100	TLF14520F	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
FLST	TLF14521F	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
BUESPOT	TLF14567F	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
GREEN	TLF14568F	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
YELLOW	TLF14584F	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
GOLDSTAR	TLF14586F	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CBT4282	SAISHO	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
HINARI	CT114F	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CT45	CT141FB	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CTV140	21C6G	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
HITACHI	CT141FB	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT1446	25C51	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT1455	SANYO	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT1476	CBP246	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT1493	CTP3246	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT1646	CTP6262	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT2028	CTP730	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT2036	CTP732	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT2048	CTP735	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT2078	SENTRA	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT2084	GX9000	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT2087	GX9700	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT2158	SHARP	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT2174	C1410S	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT2176	C3700	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT2178	22R193	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT2238	SOLAVOX	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT2248	16R19	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT2278	20R13	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT2476	22R193	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25
CPT2478	26R09	BA6272	2.99	M54649L	3.99	STR4211	4.50	TD2270	3.25

ASTRA D Converter £17.99

Satellite Finder Kit PG-753



VCR TOOL KIT £29.99



RF PLUG & SOCKET

DEGUSSING ROD
£29.99

VHS ALIGNMENT TAPE
BAND TRACKING, TAPE
TRANSPORT, FM PICTU
CURVE, AUDIO SYNC HEAD
AZIMUTH TRACKING
PLAYBACK SWITCHING POINT
£39.99

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

Capacitance Meters
Capacitance Meter PG015

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

0 TO 2000UF
ACCURACY 0.5%
£29.99

Transparent Service/Cassette

£6.50

Hitachi/Salora Mains Switch
£1.99

REMOTE TESTER £14.99 LOPT TESTER £29.99 VIDEO HEAD TESTER £29.99 SOLDERING STATION 50 00
SATELLITE FINDER KIT £29.99 MICROWAVE LEAK DETECTOR £14.99 DIGITAL MULTIMETER FROM £9.99

**ARE YOU STUCK
FOR ANY
TRANSISTORS
INTEGRATED CIRCUITS**

TO RECEIVE OUR NEW FREE 1996 STOCK LIST

TELEPHONE OR FAX US.

**VOLT REGS
DIODES**

FULL EXPORT SERVICE

MAIL ORDER SPECIALISTS
Over 12,000 Components Available

AUTOGARD (U.K.) LTD
UNIT 3, ACORN FIRMS CENTRE
ABLEWELL STREET, WALSALL
WEST MIDLANDS WS1 2EG
ELECTRONIC COMPONENTS
DIVISION
TEL/FAX 01922 613654

MARAPET ELECTRONIC COMPONENTS

Tel: (01452) 53 22 53 24hr Answering Service
for out of hours ordering

We still have many SINCLAIR, COMMODORE & ATARI Home Computer Spares available from stock - Please send S.A.E. for list.

MONITOR FLYBACK TRANSFORMERS		SEMICONDUCTORS	
ACORN/DIGITAL/IBM etc	P.O.A.	BUV48A	£2.99
AMSTRAD PC14HRCD 0	P.O.A.	DTCL14ES	£1.28
CALIBRA AT2090/48	P.O.A.	LM1203N	£2.92
COMMODORE 1084SD1 (2 type)	P.O.A.	PC713V	£2.99
COMMODORE 1084S1/1084SP	P.O.A.	R2G	£1.28
COMMODORE 1084ST	P.O.A.	TAB410K	£4.59
ELONEX AT2090/33	P.O.A.	UC3842	£1.99
GOLDSTAR/DELL 154-186A	£26.95	140N4760	£1.30
OLIVETTI FB200A	£26.40	27C256-200	£3.50
OLIVETTI 1172.001B	£26.15	251675	10.85
PHILIPS CM8833 MK1 (popular u2lot type)	£20.95	25C2482	£0.45
PHILIPS CM11342 (CM8833 MK2)	£23.95	25D471	£0.45

CONTACT US FOR TYPES NOT SHOWN. NB: Please supply all markings from the original boxbook as some monitors utilize more than one type number.

SELECTED AUDIO SPARES		SEMICONDUCTORS	
AWA CAW51K	£1.96	KNOB - Play (R/H DECK)	£1.34
AMSTRAD CDX Midi (Funai) M200 Midi	£1.34	SPRING - Cassette Door	£3.40
AMSTRAD CDX Midi (Funai) M200 Midi	£3.40	DOOR - Cassette (R/H)	£2.85
HITACHI CX4500EK	£8.75	KNOB - Operate (On/Off)	£3.57
PIONEER PDX550	£2.78	MOTOR - Loading	£2.78
SANYO M2114L	£2.78	BELT - Capstan	£1.33
SHARP RGF278/281/284 B13K/816	£9.99	BELT - Main Drive	£9.99
TOSHIBA ST-U2/UZL		TRANSFORMER - Mains	

Our range of Video Spares is now much expanded - we can supply parts for over 150 makes. Try us also for a wide range of Remote Controls, TV On-Off Switches, Posters, Resistors, Capacitors, Fuses, Connectors, Cables, Tools, Domestic Electrical Accessories and much more. Please send a Stamped Addressed Envelope for our latest Newsletter

EQUIPMENT MANUALS		COMPUTER LEADS	
Large selection of Manufacturers Service & User information available. Original manuals supplied if possible. We only show a few examples here.		AMSTRAD PC14CDR (D) Signal Cord	£21.85
Awa NSX 800 Service	£9.56	COMMODORE AMIGA to PHILIPS CM8833	£7.95
Amstrad PC4386SX Service	£16.29	IBM KEYBOARD EXTN. (Standard DIN)	£2.95
Amstrad PC5086/5286 Service	£18.31	SPECTRUM G64 TV	£2.95
Biatchone 01/9771 Service	£8.25		
C64C or C+4 User	£4.99		
Hitchi CPT2656/2658 Service	£9.42		
Panasonic KXP-1123 Service	£14.95		
Philips 4CM4270 Service	£8.99		
Philips CM8524 Service	£7.95		
Philips CM8833 (MK1) Service	£8.99		
Philips CM8834 Service Supp	£3.00		
Philips CM8873 Service	£8.76		
Philips CM11342/62 Service	£10.56		

TV LINE OUTPUT TRANSFORMERS	
FERGUSON TX30 30 (RED SPOT)	£16.99
FERGUSON TX100 51 cm FST	£16.99
FIDELITY ZX2000/3000 (2 types - please check)	P.O.A.
HINARI CT17/18 (2 types - please check)	£18.95

We can supply many other LOPT's, for ALBA & BEKO through to TOSHIBA & ZANUSI. Please supply model no. and full information from original part.

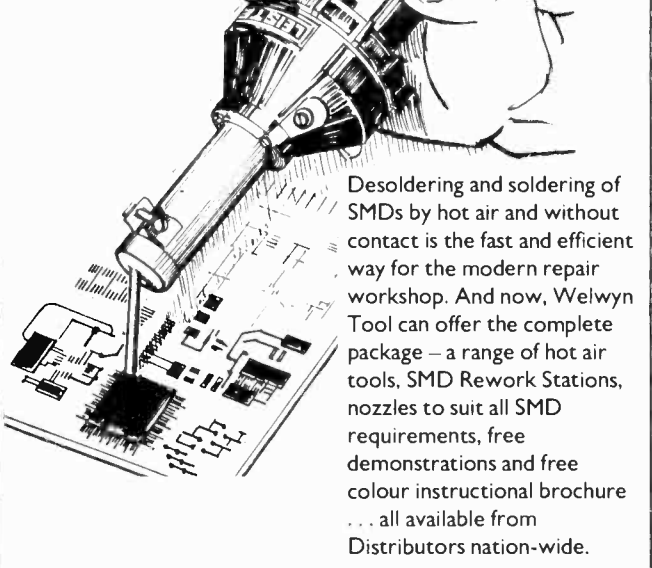
SELECTED VIDEO HEADS	
AMSTRAD TVR1/AVCR500/5200	£13.59
FISHER FVHP420 615/720/721/722	£15.59
HITACHI VT110/111/113/115/118/120/220	£16.99

When ordering from this advert... please add £1.25 P & P (50p for LOPT's) then add 17.5% VAT (NB. VAT is due on P&P - Manuals are Zero-rated) Validity dates required for card orders. Also issue No. for SWITCH. Please send S.A.E. with all written enquiries. Overseas orders welcome - minimum P&P charge is £3.00 - please enquire. All items subject to availability - Prices can change without notice.

We are Unable to accept callers at present
PLEASE ORDER BY POST OR PHONE
We accept payment by
VISA, Access, DELTA, SWITCH, Cheque or P.O.

MAIL ORDER ONLY to:
M.E.C. (Dept. TV)
1 HORNBEAM MEWS
GLOUCESTER GL2 0UE

**Repair SMDs on PCBs
in seconds
with the
NEW
Hot Jet 'S'**



Desoldering and soldering of SMDs by hot air and without contact is the fast and efficient way for the modern repair workshop. And now, Welwyn Tool can offer the complete package - a range of hot air tools, SMD Rework Stations, nozzles to suit all SMD requirements, free demonstrations and free colour instructional brochure... all available from Distributors nation-wide.

For further information, please ask for Reference No. TSM
WELWYN TOOL COMPANY LIMITED
4 SOUTH MUNDELLS, WELWYN GARDEN CITY, HERTS AL7 1EH
TEL: WELWYN GARDEN (01707) 331111. FAX: (01707) 372175.

PUT HOT AIR TO WORK FOR YOU

WE HAVE THE WIDEST CHOICE OF USED OSCILLOSCOPES IN THE COUNTRY	
Philips PM3295 Dual Trace 350MHz Delay, Cursors etc	£2000
H.P. 54200A Digitizing Oscilloscope 50MHz	£1000
Tektronix 485 Dual Trace 350MHz Delay Sweep	£750
Tektronix 475 Dual Trace 200MHz Delay Sweep	£500
Tektronix 465 Dual Trace 100MHz Delay Sweep	£400
Tektronix SC504 Dual Trace 80MHz in TMS01	£400
Philips 3055 2 Channel 200MHz Dual Trace	£700
Tektronix 2213 Dual Trace 60MHz Delay Sweep	£400
Tektronix 2213 Dual Trace 60MHz	£350
Hameg 705 Dual Trace 20MHz Delay Sweep	£375
Hameg 605 Dual Trace 60MHz Delay Sweep Component Tester	£450
Philips PM3217 Dual Trace 30MHz Delay Sweep	£400
Gould OS1 100 Dual Trace 35MHz	£275
Kikusui 5530A Dual Trace 35MHz	£220
Iwatsu SS5702 Dual Trace 20MHz	£200
Gould OS300 Dual Trace 20MHz	£200
Hitchi V209 Dual Trace 20MHz Mains Battery	£400
Philips PM97 Dual Trace 50MHz SCOPE-METER Dig Storage 25M Samples	£1000
Leader LCD100 DMM/SCOPE 200KHz Digital Storage LCD Display	£300
Tektronix 468 Dual Trace 100MHz Delay Sweep Digital Storage	£750
Hitchi VC604 Dual Trace 40MHz Dig Storage 40 Mega Sample	£650
H.P. 1741A Dual Trace 100MHz Analogue Storage	£400
Tektronix 434 Dual Trace 25MHz Analogue Storage	£2000

SPECTRUM ANALYSERS	
H.P. 8555A 0.01-22GHz	£4000
Takeda Riken CR4122B 100KHz-150MHz	£3000
H.P. 141T with 8555A & 8552B 10MHz-18GHz	£1700
H.P. 141T with 8554B & 8552B 500KHz-1250MHz	£1200
H.P. 141T with 8553B & 8552A 1KHz-110MHz	£800
H.P. 141T with 8553L & 8552A 1KHz-110MHz	£700
Marconi TF2370 30Hz-110MHz	£1000
H.P. 3580A 5Hz-50KHz	£1000

NEW EQUIPMENT
Hameg OScope HM1005 Triple Trace 100MHz Delay Trace... £847
Hameg OScope HM604 Dual Trace 60MHz Delay Sweep... £453
Hameg OScope HM303 Dual Trace 30MHz Comp. Testor... £422
Hameg OScope HM205 3 Dual Trace 20MHz Digital Storage... £653
All other models available - all oscilloscopes supplied with 2 probes

Used Equipment - Guaranteed. Manuals supplied if possible.
This is a VERY SMALL SAMPLE OF STOCK. SAE or Telephone for list. Please check availability before ordering.
CARRIAGE all units £16. VAT to be added to Total of Goods and Carriage.

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

COMPONENTS CATALOGUE

(FREE TO TRADE ONLY)

NEW

1000's

OF TV AND VCR
SERVICE SPARES AND
ACCESSORIES IN
STOCK

NO CARRIAGE CHARGE
FOR ORDERS ABOVE

£10

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

RING 01429 838057 FOR OUR FRIENDLY, HELPFUL SERVICE

SPECIALISTS

**VIDEO
HEADS**

IN VIDEO HEAD TECHNOLOGY

OVER
200 MODELS
IN STOCK

COMPREHENSIVE
CATALOGUE
AVAILABLE

MANUFACTURERS OF RE-GUN CRT'S

TUBES

SUPPLIERS
OF
NEW 'B' GRADE
AND
NEW TUBES

100'S
OF TYPES
IN
STOCK

BSI APPROVED
TO
BS 415 Clause 18
Certificate No. 002

OVER 30 YEARS EXPERIENCE IN TUBE TECHNOLOGY

TELEPHONE **COMPONENTS**
TUBES

01429 838057

01429 837100

FAX

01429 837101

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



A Z ELECTRICS

18 BROOKWOOD ROAD, SOUTHFIELDS, DISTRICT LINE, LONDON, SW18 5BP
Telephone: (0181) 333 1886 / (0181) 877 3492 Fax: (0181) 877 3518

NEAREST TUBE STATION - SOUTHFIELDS

Stock items despatched by return

VIDEO HEADS

Amstrad	
TVR1, 2, 3, 4, VCR4500, 5200, 4600, 4700, 6000, 6100, 81600, 9000, DD8900, 8904 etc	£14.00
Ferguson/JVC	
Universal 2 Head many models	£7.50
8950, 8951, 3V64, 3V65, FV10, 11, 20, 21, 22, 26, 30 etc	£14.50
FV31, 14, HRD210, 211, 520, 540, 550 etc	£17.50
Hitachi	
VT130, 135, 250, 420, 425, 430, 530, 630 etc	£22.00
VTVT100, 110, 120, 220, 400 etc	£19.00
VT52, 60, 61, 63, 640 etc	£16.00
VT11, 33, 6500, 8000, 9300 etc	£14.00
Matsui/Saisho	
VX730, 750, 735, 755, 990, VR2000, 3200, 3300, 3500, 3600	£18.00
Panasonic	
Universal 2 Head many models	£7.50
NVG130, 30, 40, NVJ30, NVL20 etc	£17.50
NVG33, NVJ35, NVL25	£22.50
Sharp	
VC9300, 381, 481, 500, 571, 600, 682, 772, VCA100, 105, 106, 202, VCD801, VCM73, T72	£14.50
Not all models are shown for each make. A vast range of other makes & models i.e. Akai, Alba, Ajwa, Fidelity, Fisher, Funai, GEC, Goldstar, Granada, Grundig, Hisan, Orion, Philips, Sanyo, Sentra, Proline, Salora, Sony, Samsung, Toshiba & Mitsubishi are available	
IDLER ASSEMBLIES	
Akai	
Clutch Assemb. VS112, 105, 125, 165, 205	£10.00
Cassette Housing Repair Kit VS22, 23	£10.50
Amstrad	
Tape Creasing Kit VCR4500, 4600, TVR1	£5.00
Ferguson	
Idler Arm 3V58, 59, 65, FV10, 11, 13 etc	£2.25
Cam Control Gear FV37, 43, 44, 46	£2.75
Cap Motor Cog Repair Kit FV37 etc	£3.50

Fisher	
Idler Assembly FVHP615, 715, 905 etc	£5.00
Gear Idler Assembly for above models	£4.50
Hitachi	
FF/Rew Idler VT11, 14, 33, 64, 88 etc	£2.50
Clutch Assembly VT11, 14, 33, 64, 88 etc	£8.50
Idlers for earlier models in stock also	
Panasonic	
Idler Arm Unit NV370, 430, 830, G7, 10	£3.50
Idler Unit NV332, 777, 780	£3.00
All G Mechanism Parts & Kits available	
Sanyo	
Idler VHR1100, 1300, 1500, 2100, 2500	£5.50
Sharp	
Idler Assembly VC9300, 381, 481, 581	£3.50
Idler Assembly VC651, 751, 781 etc	£6.50
Master Cam VC651, 772, VCA100 etc	£1.50
Not all the models are given under each make. Please ask for models & makes not listed.	

PINCH ROLLERS & BELT KITS
 A large selection of pinch rollers and belt kits for most models are in stock. Belt kit prices start from 40p and most of the pinch rollers are priced @ £2.80. Please ask for list.

TRIPLERS	
Universal Tripler	£6.50
Universal Tripler with Focus Unit	£10.50
Decca 120/130 Serries	£8.50
Thorn TX10 Focus Unit	£6.50
Grundig Triplers	POA

REPAIR KITS - TV/SATELLITE/VIDEO	
Akai - Power Board VS22, 23 etc	
Akai - PSU Kit PRO500, 510 Satellite	£7.50
Ferguson - PSU Kit Video	£7.50
ITT - Pico 1/1A Chassis	£11.00
Philips - PSU Kit Anubis "A" Kit	£8.50
PSU Kit G110 Chassis	£12.00
PSU Kit G90AE/G90B Chassis	£11.00
PSU Kit Philips Video	£9.00

Pace - PSU Kit 800, 900, 8000, 9000	£7.50
Panasonic - G Deck genuine kits in stock	£12.00
A wide range of maintenance kits also in stock	
BACK UP BATTERIES	
Philips 1.2V Back Up Battery	£1.75
Philips 2.4V Back Up Battery	£2.80
Ferguson TX10 1.2V	£2.10
Ferguson TX10 2.4V	£3.85
0.1 Farad 5.5V Capacitor	£1.85
State model and make for television on off switches and video mode switches.	

OTHER SPARES	
Hitachi TV Frame Module HM6251	£8.00
Hitachi TV Frame Module HM6232	£10.00
Degaussing Positor White	£1.30
Degaussing Positor Blue	£4.00
Degaussing Positor Philips	£3.00
Degaussing Positor Hitachi	£3.40
IC Circuit Protectors Most Values	£0.60
Matsui Limiter Post	£1.75
Clear Service Cassette	£6.90
Panasonic G Mechanism Kit	£12.00
1995 TV Fault Guide	£16.50
1995 Video Fault Guide	£16.00
Satellite Fault Guide	£12.00
LNB Enhanced/Standard	£24.00
High Voltage Caps used in Philips and other makes Values available 3n9 2KV, 9n1 1.5KV, 3n3 2KV, 1n 2KV, 1n5 2KV, 8n2 2KV, 100pf 200pf 470pf 2n2 4n7 at 2KV etc Prices	
etc	£0.90

MOBILE PHONE BATTERIES NOW AVAILABLE.
 A LARGE SELECTION OF SEMICONDUCTORS IN STOCK.

VIDEO MOTORS	
Audio Motors 12v, 9v cw & ccw	£2.90
Hitachi Capstan Motors - VT100 to VTM935 series	from £28.00
Motors for other makes i.e. JVC, Ferguson also available.	

REMOTE CONTROLS

A VAST RANGE OF REMOTE CONTROLS FOR TVs & SATELLITES FOR £8.00. SOME OF THE MODELS COVERED ARE:
 AMSTRAD: SRD400, 510, 520, 550 ETC.
 BUSH: 151RD, 2020, 2114, 2714, 2820 ETC.
 HITACHI: C2057, CPT2036, 2246, 2598, ETC.
 MATSUI: 12050, 2190, 2580, 2890, ETC.
 PACE: PRD800, 900, 9000, 9200, ETC.
 SONY: KV2212, 2705, 27XRTU, KVDX27, KVM2511 etc.

HUNDREDS OF OTHER MODELS FOR A NUMBER OF MAKES ALSO AVAILABLE!

LINE OUTPUT TRANSFORMERS

HR LOPTS NOW AVAILABLE @ £15.00 OR LESS!!!
 Makes covered: Akai, Akura, Alba, Amstrad, B&O, Bush, Commodore, Crown, Daewoo, Ferguson, GEC, Goldstar, Goodmans, Granada, Hinar, Hitachi, Ingersoll, ITT, Logik, Luxor, Matsui, Mitsubishi, NEW, Nikkai, Orion, Osaki, Perdio, Philips, Pioneer, Pye, RBM, Saisho, Salor, Schneider, Seleco, Sentra, Solavox, Sony, Tashiko, TEC, Telefunken, Tansai, Thomson, Toshiba, Triumph etc.

Almost 100 models covered
 SOME EXAMPLES ARE:
 BUSH: 2020, 2520, 2814, 2102, 2620 ETC.
 HITACHI: CPT1444, 1471, 1474, 1476, 1482, 1644, 2024, 2035, 2048, 2076, 2236, 2276, 2476, 2158 ETC.
 MITSUBISHI: CT2154, 2532, 2534, 2553 ETC.
 PHILIPS: 2A, CP90, G90AE, GR1AX, G110, G2 ETC.
 SONY: KVX16MTU, 19MTU, KV21XRT, 2212, 2252, 2752, 2704, 2705, 27XRTU ETC.
 TOSHIBA: 1400RBT, 1510RBT, 156T9WB, 1440RB, 258T70 ETC.
 PANASONIC LOPTS START FROM £17.50

Prices subject to change without notice. Please add £1.25 per order for p&p and then add 17.5% VAT.
 POSTAGE VARIES ON HEAVY ITEMS. SEND A4 SAE FOR LIST
 Cheques and Postal Orders should be crossed and made payable to A.Z. Electrics


No.1 for Aerial and Satellite EST. **COMETO THE EXPERT** 1977 **Your One Stop Shop**

J.W. HARDY 0121-784 8478

Midlands' Leading Supplier
 0121 784 8478 (3 lines)
 Trade Price List available on request to Bona Fide TV Aerial & Satellite Dealers

<p>• EXTENSIVE RANGE OF QUALITY LINES</p> <p>• EVERYTHING AVAILABLE EX STOCK</p> <p>• EXCELLENT DEMONSTRATION FACILITIES</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="text-align: left;">RECEIVERS</th> <th style="text-align: left;">SAT ANTENNAE</th> </tr> <tr> <td>WE STOCK ALL THAT'S BEST IN RECEIVERS INCLUDING - PACE/ APOLLO, PALCOM, NOKIA, GRUNDIG, DRAKE</td> <td>LENSON HEATH · CHANNEL MASTER ECHOSTAR · CHAMELEON · ARCON SWEETY -All sizes from 45cm to 3.1m plus</td> </tr> <tr> <th style="text-align: left;">LNBS</th> <th style="text-align: left;">DECODERS</th> </tr> <tr> <td>CONTINENTAL MICROWAVE GRUNDIG ECHOSTAR CHAPPAREL</td> <td>THOMPSONS · RAI UNO · DUE SECAM PAL · D2 MAC · RTL 4, 5 & VERONICA</td> </tr> <tr> <th style="text-align: left;">MULTI LNB HOLDERS</th> <th style="text-align: left;">HOT BIRD/ASTRA</th> </tr> <tr> <td>MULTI EXTRA · LITTLE WIZARD LENSON HEATH · CHANNEL MASTER 2 - 6 Way LNB Switches</td> <td>FULL NO-COMPROMISE SPECIFICATIONS. HOT BIRD UPGRADE AVAILABLE.</td> </tr> <tr> <th style="text-align: left;">EXTENDERS</th> <th style="text-align: left;">MOTORISED SYSTEMS</th> </tr> <tr> <td>ADX-PLUS ASTRA 1D FREQUENCY EXTENDER ALSO REMOTE CONTROLLED EXTENDERS BY POWER LINK & XTRA LINK</td> <td>PACE MSS 500IP/MSS 1000IP H to H MOUNTS · POLAR MOUNTS JACK ACTUATORS · POSITIONERS TRIPLE/QUATRO BAND LNBS · POLARISERS · FEEDS</td> </tr> </table>	RECEIVERS	SAT ANTENNAE	WE STOCK ALL THAT'S BEST IN RECEIVERS INCLUDING - PACE/ APOLLO, PALCOM, NOKIA, GRUNDIG, DRAKE	LENSON HEATH · CHANNEL MASTER ECHOSTAR · CHAMELEON · ARCON SWEETY -All sizes from 45cm to 3.1m plus	LNBS	DECODERS	CONTINENTAL MICROWAVE GRUNDIG ECHOSTAR CHAPPAREL	THOMPSONS · RAI UNO · DUE SECAM PAL · D2 MAC · RTL 4, 5 & VERONICA	MULTI LNB HOLDERS	HOT BIRD/ASTRA	MULTI EXTRA · LITTLE WIZARD LENSON HEATH · CHANNEL MASTER 2 - 6 Way LNB Switches	FULL NO-COMPROMISE SPECIFICATIONS. HOT BIRD UPGRADE AVAILABLE.	EXTENDERS	MOTORISED SYSTEMS	ADX-PLUS ASTRA 1D FREQUENCY EXTENDER ALSO REMOTE CONTROLLED EXTENDERS BY POWER LINK & XTRA LINK	PACE MSS 500IP/MSS 1000IP H to H MOUNTS · POLAR MOUNTS JACK ACTUATORS · POSITIONERS TRIPLE/QUATRO BAND LNBS · POLARISERS · FEEDS	<ul style="list-style-type: none"> • UHF AERIALS • VHF AERIALS • LOFT STAND & BRACKET • MASTS • CHIMNEY LASHING • CLAMPS • COAXIAL CABLE • CABLE ACCESSORIES • WALL FIXING • AMPLIFIERS • SPLITTERS & T UNITS • COAX OUTLET PLATES <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;">SMATV</p> <p style="text-align: center;">HOTELS, FLATS, HOSPITALS etc.</p> <p style="text-align: center;">Full range ex stock</p> <p style="text-align: center;">We provide expertise, planning, design and commissioning</p> </div>
RECEIVERS	SAT ANTENNAE																
WE STOCK ALL THAT'S BEST IN RECEIVERS INCLUDING - PACE/ APOLLO, PALCOM, NOKIA, GRUNDIG, DRAKE	LENSON HEATH · CHANNEL MASTER ECHOSTAR · CHAMELEON · ARCON SWEETY -All sizes from 45cm to 3.1m plus																
LNBS	DECODERS																
CONTINENTAL MICROWAVE GRUNDIG ECHOSTAR CHAPPAREL	THOMPSONS · RAI UNO · DUE SECAM PAL · D2 MAC · RTL 4, 5 & VERONICA																
MULTI LNB HOLDERS	HOT BIRD/ASTRA																
MULTI EXTRA · LITTLE WIZARD LENSON HEATH · CHANNEL MASTER 2 - 6 Way LNB Switches	FULL NO-COMPROMISE SPECIFICATIONS. HOT BIRD UPGRADE AVAILABLE.																
EXTENDERS	MOTORISED SYSTEMS																
ADX-PLUS ASTRA 1D FREQUENCY EXTENDER ALSO REMOTE CONTROLLED EXTENDERS BY POWER LINK & XTRA LINK	PACE MSS 500IP/MSS 1000IP H to H MOUNTS · POLAR MOUNTS JACK ACTUATORS · POSITIONERS TRIPLE/QUATRO BAND LNBS · POLARISERS · FEEDS																

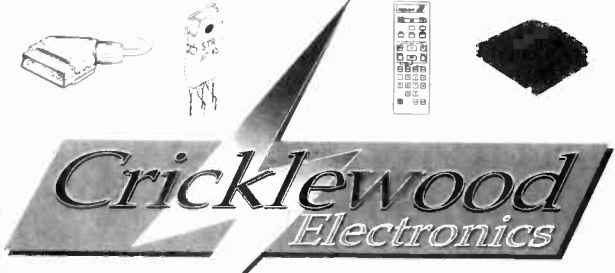
J. W. HARDY COMMUNICATIONS
 231 STATION ROAD, STECHFORD, BIRMINGHAM B33 8BB



FREE CATALOGUE

THINK COMPONENTS - THINK CRICKLEWOOD

- TELEVISION & VIDEO SPARES • RESISTORS & CAPACITORS • HI-FI GADGETS & SPEAKERS
- TRANSISTORS & I.C.'s • AUDIOPHILE CAPACITORS
- IN CAR AUDIO • COMPUTER BOARDS • TOOLS & TEST EQUIPMENT • PLUGS SOCKETS & LEADS



Cricklewood Electronics

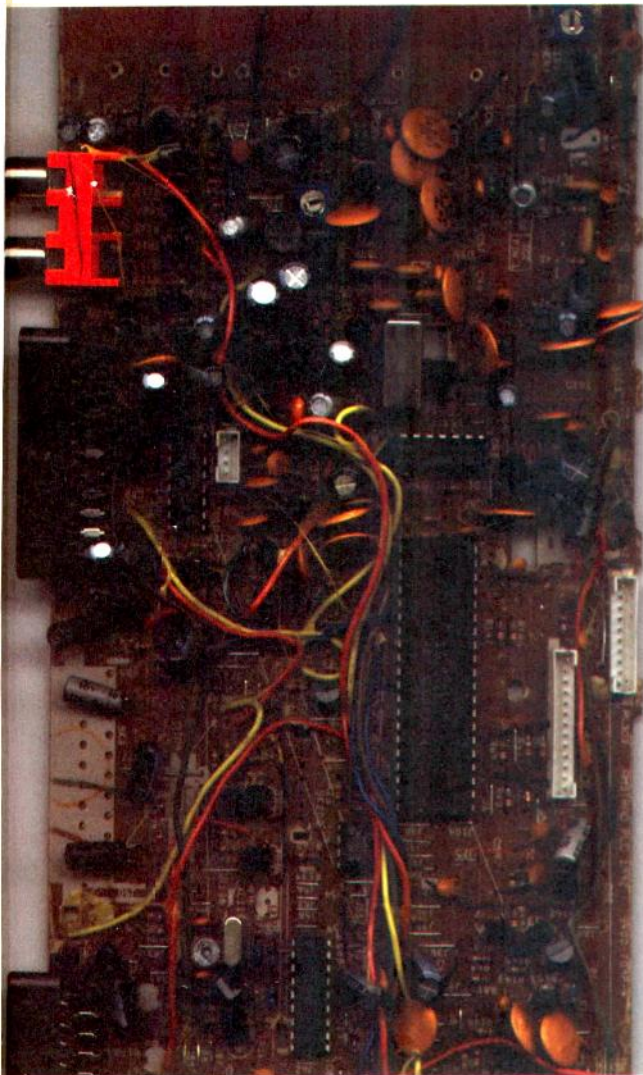
PLEASE SEND ME A COPY OF THE CRICKLEWOOD CATALOGUE.

Name:

Address:

TVM

Cricklewood Electronics Ltd, 40-42 Cricklewood Broadway, London NW2 3ET. Tel: 0181-450 0995 Fax: 0181-208 1441



Amstrad SRD510 Channel Change Mod

The popular Amstrad SRD510 satellite TV receiver has one drawback – lack of a front-panel channel-change facility. Peter Haylor, G6DRN, describes a modification that enables the standby buttons to be used instead

The design of the Amstrad SRD510 has a curious feature: there are two standby buttons on the front panel but no channel up and down buttons! The modification described here enables the standby buttons to be used for changing channels up and down, with standby controlled by the remote control unit – as with most receivers.

Pins 11, 12 and 13 of PL1 are used for channel changing – see Fig. 1. The modification procedure is as follows. Disconnect the unit from the mains supply.

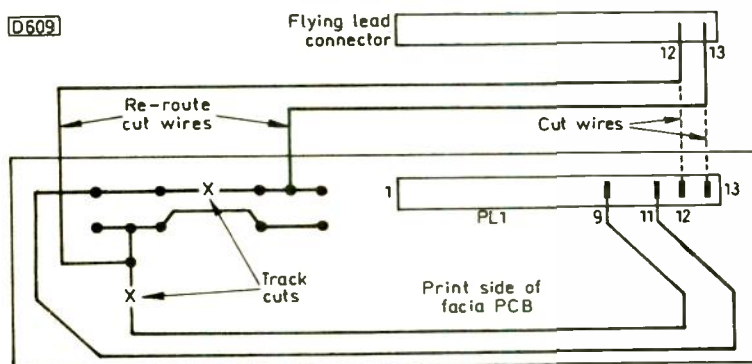


Fig. 1: Modifications to the facia PCB in the Amstrad SRD510 satellite receiver to provide front-panel channel up/down selection.

Remove all connections to the receiver, then the top cover, the card reader PCB and the front panel complete with the small PCB. Remove the small PCB and lay it out so that the multipin connector (PL1) is at the top right when viewed from the print side.

There are two types of PCB. One uses a ribbon cable while the other has separate cables – they are both wired in the same way. Cut the wires to pins 12 and 13 as close to the connector as possible.

Cut the print as shown. Solder the wire that went to pin 12 to the bottom left-hand button connection, just above the print cut, and the wire that went to pin 13 to the right-hand button top connection, to the right of the cut.

If the front PCB is the type that uses ribbon cable, cut leads 12 and 13 with care then split them with a sharp knife.

Test

This completes the modification. Reconnect the PCB to the front panel and reassemble the receiver. When the mains supply is connected the standby light should be on. Press either the left or the right side of the standby button: the red LED should change to green and the receiver should come on. Pressing the receiver's left-hand button should provide channel up selection and the right-hand button channel down. Standby is now available only via the remote control unit. ■

TELETOPICS

Digital TV – terrestrial, satellite and cable

A forecast by market research organisation Vision Group suggests that terrestrial digital TV, which is expected to start in the UK late next year, could bring us 13-25 new channels. The area to the south of Teeside, covering about 65 per cent of the UK, would be able to receive all the new channels. The area stretching from Northern England to Southern Scotland would be able to receive 7-15 of the new channels, with a further reduction of services farther north.

The five DBS channels assigned to British Satellite Broadcasting by the ITC could be re-advertised. They have remained unused since BSB merged with Sky Television in November 1990. With the advent of digital technology the spectrum space could be used for up to fifty channels.

The first European satellite digital TV service has been started in Italy by DStv-Atena Servizi. Atena plans to run eight TV channels and ten audio channels, providing a subscription service. One of the main attractions will be up to 19 Serie A and B football games broadcast live each week. Pace is supplying MPEG-2 standard set-top boxes for reception of the service.

BT feels that its VOD experiment, with signals delivered via standard copper telephone lines to 5,000 homes in the Ipswich and Colchester areas, has been a success. Average paid use of the service has been five hours a week, with twenty per cent of homes making use of it for over ten hours a week. BT is considering a substantial investment in developing the service.

The BBC has transmitted and received digital TV signals that conform to the DVB (Digital Video Broadcasting) specification for terrestrial TV (DVB-T). It is understood to have been the first end-to-end broadcast using this specification, which was finalised in February. Transmission was from Crystal Palace, with reception at Kingswood Warren and the TV Centre in West London. The BBC intends to follow up with tests of electronic programme guides and other digital services.

Hitachi is to start producing DVB decoders at Hirwaun early next year. The initial production rate is expected to be 25,000 a month.

Firms that have announced DVB chips include Mitsubishi, IBM, SGS-Thomson, Toshiba and Hyundai.



One of the new range of prepacked aerials and accessories introduced by Micromark, Devonshire House, 550 White Hart Lane, London N17 7RQ. Telephone 0181 880 2001. This 10-element array is intended for use in strong signal areas.

Trade Scene

Sales figures for the last quarter of 1995, released by GfK Marketing Services, reveal widely varying fortunes in the UK consumer electronics market. Satellite receivers did best, with a year-on-year increase of 27.2 per cent to 248,000. Games consoles fared worst, with a decline of 28.4 per cent to 328,400. Total TV sales were around 1,050,000, with an increase of 9 per cent in large-screen receiver sales and a fall of 7.5 per cent in small-screen receiver sales. VCR sales rose 7.3 per cent to 817,000 while camcorder sales fell 7.4 per cent to 101,000.

Cable TV

The latest broadband cable TV subscriber figures released by the ITC reveal a threefold increase over the last three years to a total of 1,326,842. During the course of 1995 there was a 45 per cent increase in the number of subscribers – over 400,000. Installed telephone lines have almost doubled over the last two years, the total at January 1st 1996 being 1,417,819 – a slightly greater total than that for TV subscribers.

Technical Information

Edition 27 of Mauritron's technical books catalogue is now available from Mauritron Technical Services, 8 Cherry Tree Road, Chinnor, Oxfordshire OX9 4QY (phone 01844 351 694, fax 01844 352 554). An interesting addition is the CD-ROM that contains the power supply circuits used in hundreds of VCRs, enabling them to be displayed on a PC.

Product News

Toshiba has released its first widescreen TV set, Model 32W6DB, at a suggested retail price of £2,000. The specification includes Dolby Pro-Logic Surround Sound, picture size options and a 512-page teletext memory. Pro-Logic sound is also a feature with two rear-projection sets, the 48in. Model 48PJ6DB at £3,000 and a 55in. version at £3,500. Toshiba's latest VCR, Model V856B at £500, incorporates the company's digital noise reduction system and colour-signal enhancement circuitry in a single chip.

Thomson brand products have been launched in the UK. The company has also introduced its Technozen technology. This is designed to improve TV picture quality: features include 100Hz scanning, dynamic focusing and a digital mastering system to remove picture smear and improve the definition and colour stability.

Features of Samsung's new range of widescreen TV sets include a dynamic multiple focus system. A low-noise amplifier system for use in poor-reception areas boosts the signal by 8dB.

A new TV range that incorporates features called IQ Concept has been introduced by Sony. There are three elements. First IQ Picture. This uses digital technology and a photo-transistor for automatic brightness, contrast, colour and sharpness adjustment. At low light levels the saturation and sharpness are increased while the contrast and brightness are reduced. In addition to reducing eye strain, Sony claim that this can reduce power consumption by up to twenty per cent. Secondly IQ Operation uses an on-screen menu and remote control joystick to operate various features. Finally IQ Sound uses a new digital processor chip to give improved sound quality.

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

RADIATION DETECTOR SYSTEM Designed to be wall mounted and connected into a PC, ideal for remote monitoring, whole building coverage etc. Complete with detector, cable and software. £19.95 ref BAR75

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

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

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

REMOTE CONTROL/TAN DATA TD1400 MODEM/VIEWDATA Complete system comprising 1200/75 modem, auto dialler, infra red remote keyboard, (could be adapted for PC use?) psu, UHF and RGB output, phone lead, RS232 output, composite output. Absolute bargain for parts alone!! £9.95 ref BAR33

9 WATT CHIEFTAN TANK LASERS

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

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

NEW HIGH POWER RF TRANSMITTERS

AMPLIFIERS Assembled PCB transmitters, 4 types available, 12.6vdc 90 watt 1.5-30mhz 75 ohm in/out FM/AM £75 ref RF1
12.6vdc 40 watt 50-200mhz 50 ohm in/out FM/AM £65 ref RF2
28vdc 125 watt 1.5-30mhz 75 ohm in/out FM/AM £85 ref RF3
28vdc 100 watt 50-200mhz 50 ohm in/out FM/AM £75 ref RF4
A heat sink will be required, ring for price and availability. If you intend using these as audio transmitters you will need a also need a preamp. Complex module available at £40 ref RF5

COMPUTER/WORKSHOP/HIFI RC BUB UNITS Complete protection from faulty equipment for everybody! Inline unit fits in standard IEC lead (extends it by 750mm), fitted in less than 10 seconds, reset button, 10A rating £9 each Ref MM5

RADIO CONTROLLED CARS FROM £6 EACH!!!!

All returns from famous manufacturer, 3 types available, single channel (left, right, forwards, backwards) £6 ref LOT1. Two channel with more features £12 ref LOT2. Two channel proportional (plug in crystals etc) £35 ref LOT3.

THOUSANDS AVAILABLE RING/FAX FOR DETAILS!

MAGNETIC CARD READERS (Swipes) £9.95 Cased with flyleads, designed to read standard credit cards! they have 3 wires coming out of the head so they may write as well! complete with control electronics PCB just £9.95 ref BAR31

WANT TO MAKE SOME MONEY? STUCK FOR AN IDEA? We have collated 140 business manuals that give you information on setting up different businesses, you peruse these at your leisure using the text editor on your PC. Also included is the certificate enabling you to reproduce (and sell) the manuals as much as you like! £14 ref EP74

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

COIN OPERATED TIMER KIT Complete with coin slot mechanism, adjustable time delay, relay output, put a coin on anything you like! TV's, videos, fridges, drinks cupboards, HIFI, takes 50p's and £1 coins. DC operated, price just £7.99 ref BAR27.

ZENITH 900 X MAGNIFICATION MICROSCOPE Zoom, metal construction, built in light, shrimp farm, group viewing screen, lots of accessories. £29 ref ANAYLT.

AA NICAD PACK Pack of 4 tagged AA nicads £2.99 ref BAR34

PLASMA SCREENS 22x310mm, no data hence £4.99 ref BAR67

NIGHTSIGHTS Model TZ54 with infra red illuminator, views up to 75 metres in full darkness in infrared mode, 150m range, 45mm lens, 13 deg angle of view, focussing range 1.5m to infinity 2 AA batteries required. 950g weight. £199 ref BAR61. 1 years warranty

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

TAL-1 110MM NEWTONIAN REFLECTOR TELESCOPE Russian. Superb astronomical scope, everything you need for some serious star gazing! up to 169x magnification. Send or fax for further details £249 ref TAL-1

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

GOT AN EXPENSIVE ANYTHING? You need one of our cased vibration alarms, keyswitch operated, fully cased just fit it to

WOLVERHAMPTON BRANCH NOW OPEN AT WORCESTER ST W'HAMPTON TEL 01902 22039

anything from videos to caravans, provides a years protection from a PP3 battery, UK made. SALE PRICE £4.99 REF SA33

DAMAGED ANSWER PHONES These are probably beyond repair so just £4.99 each. BT response 200 machines. REF SA30.

COMPUTER DISC CLEAROUT We are left with a lot of software packs that need clearing so we are selling at disc value only 50 discs for £4, that's just 8p each!! (our choice of discs) £4 ref EP66

IBM PS2 MODEL 160Z CASE AND POWER SUPPLY Complete with fan etc and 200 watt power supply. £9.95 ref EP67

DELL PC POWER SUPPLIES 145 watt, +5, -5, +12, -12, 150x150x85mm complete with switch, flyleads and IEC socket. SALE PRICE £9.99 ref EP55

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

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

PP3 NICADS Unused but some storage marks. £4.99 ref EP52

DELL PC POWER SUPPLIES (Customer returns) Standard PC psu's complete with fly leads, case and fan. +12v, +12v -5v. SALE PRICE £1.99 EACH worth it for the bits alone! ref DL1. TRADE PACK OF 20 £29.95 REF DL2.

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

RED EYE SECURITY PROTECTOR 1,000 watt outdoor PIR switch. SALE PRICE £8.99 ref EP57

ENERGY BANK KIT 100 6x6" 6v 100mA panels, 100 diodes, connection details etc. £69.95 ref EF112.

PASTEL ACCOUNTS SOFTWARE does everything for all sizes of businesses, includes word processor, report writer, windowing, networkable up to 10 stations, multiple cash books etc. 200 page comprehensive manual. 90 days free technical support (0345-326009 try before you buy!) Current retail price is £128, SALE PRICE £9.95 ref SA12. SAVE £120!!

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

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



Check out our
WEB SITE

<http://www.pavillon.co.uk/bull-electrical>

RACAL MODEM BONANZA! 1 Racal MPS1223 1200/75 modem, telephone lead, mains lead, manual and comms software, the cheapest way onto the net! all this for just £13 ref DEC13.

4.6mw LASER POINTER. BRAND NEW MODEL NOW IN STOCK! supplied in fully built form (looks like a nice pen) complete with handy pocket clip (which also acts as the on/off switch.) About 60 metres range! Runs on 2 AAA batteries. Produces thin red beam ideal for levels, gun sights, experiments etc. just £39.95 ref DEC49. TRADE PRICE £28 MIN 10 PIECES

BULL TENS UNIT Fully built and tested TENS (Transcutaneous Electrical Nerve Stimulation) unit, complete with electrodes and full instructions. TENS is used for the relief of pain etc in up to 70% of sufferers. Drug free pain relief, safe and easy to use, can be used in conjunction with analgesics etc. £49 Ref TEN1

RUSSIAN MONOCULARS Amazing 20 times magnification, coated lenses, carrying case and shoulder strap. £29.95 REF BAR73

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

EMERGENCY LIGHTING UNIT Complete unit with 2 double bulb floodlights, built in charger and auto switch. Fully cased. 6v 8AH lead acid req'd. (secondhand) £4 ref MAG4P11.

YUASHA SEALED LEAD AC BATTERIES Two sizes currently available this month. 12v 15AH at £18 ref LOT8 and 6v 10AH (suitable for emergency lights above) at just £6 ref LOT7.

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

AUTO SUNCHARGER 155x300mm solar panel with diode and 3 metre lead fitted with a cigar plug. 12v 2 watt. £8.99 REF SA25.

ECLATRON FLASH TUBE As used in police car flashing lights etc, full spec supplied, 60-100 flashes a min. £8.99 REF SA15B.

*SOME OF OUR PRODUCTS MAY BE UNLICENSABLE IN THE UK

BULL ELECTRICAL

250 PORTLAND ROAD, HOVE, SUSSEX.

BN3 5QT. (ESTABLISHED 50 YEARS).

MAIL ORDER TERMS: CASH, PO OR CHEQUE

WITH ORDER PLUS £3 P&P PLUS VAT.

PLEASE ALLOW 7-10 DAYS FOR DELIVERY PHONE ORDERS WELCOME (ACCESS VISA, SWITCH, AMERICAN EXPRESS)

TEL: 01273 203500
FAX: 01273 323077
E-mail bull@pavillon.co.uk

24v AC 96WATT Cased power supply. New. £9.99 REF SA40

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

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

RGB/CGA/EGA/ATL COLOUR MONITORS 12" in good condition. Back anodised metal case. SALE PRICE £49 REF SA16B

PLUG IN ACORN PSU 19v AC 14w. £2.99 REF MAG3P10

13.8V 1.9A PSU cased with leads. Just £9.99 REF MAG10P3

UNIVERSAL SPEED CONTROLLER KIT Designed by us for the C5 motor but ok for any 12v motor up to 30A. Complete with PCB etc. A heat sink may be required. £17.00 REF: MAG17

PHONE CABLE AND COMPUTER COMMUNICATIONS PACK Kit contains 100m of 6 core cable, 100 cable clips, 2 line drivers with RS232 interfaces and all connectors etc. Ideal low cost method of communicating between PCs over a long distance utilizing the serial ports. Complete kit £8.99. Ref comp 1.

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

AIR RIFLES .22As used by the Chinese army for training purposes, so there is a lot about! £39.95 Ref EF78. 500 pellets £4.50 ref EF80.

PLUG IN POWER SUPPLY SALE FROM £1.50 Plugs in to 13A socket with output lead, three types available, 9vdc 150mA £1.50 ref SA19, 9vdc 200mA £2.00 ref SA20, 6.5vdc 500mA £2 ref SA21.

VIDEO SENDER UNIT. Transmits both audio and video signals from either a video camera, videorecorder, TV or Computer etc to any standard TV set in a 100' range! (tune TV to a spare channel) 12v DC op. Price is £15 REF: MAG15. 12v psu is £5 extra REF: MAG5P2.

"MINIATURE RADIO TRANSCIEVERS A pair of walkie talkies with a range up to 2km in open country. Units measure 22x52x155mm, including cases and earpieces. 2xPP3 req'd. £30.00 pr. REF: MAG30

"FM TRANSMITTER KIT housed in a standard working 13A adapter! the bug runs directly off the mains so lasts forever why pay £7.00? or price is £15 REF: EF62 (kit) Transmits to any FM radio.

"FM BUG BUILT AND TESTED superior design to kit. Supplied to detective agencies. 9v battery req'd. £14 REF: MAG14

TALKING COINBOX STRIPPER COMPLETE WITH COIN SLOT MECHANISMS originally made to retail at £79 each, these units are designed to convert an ordinary phone into a payphone. The units have the locks missing and sometimes broken hinges. However they can be adapted for their original use or used for something else?? SALE PRICE JUST £2.50 REF SA23

GAT AIR PISTOL PACK Complete with pistol, darts and pellets £12.95 Ref EF82B extra pellets (500) £4.50 ref EF80

6"x12" AMORPHOUS SOLAR PANEL 12v 155x310mm 130mA. SALE PRICE £4.99 REF SA24

FIBRE OPTIC CABLE BUMPER PACK 10 metres for £4.99 ref MAG5P13 ideal for experimenters! 30m for £12.99 ref MAG13P1

MIXED GOODIES BOX OF
MIXED COMPONENTS WEIGHING 2 KILOS
YOURS FOR JUST £5.99

4X28 TELESCOPIC SIGHTS Suitable for all air rifles, ground lenses, good light gathering properties. £19.95 ref R77.

RATTLE BACKS Interesting things these, small piece of solid perspex like material that it you try to spin it on the desk it only spins one way! in fact if you spin it the 'wrong' way it stops of its own accord and go's back the other way! £1.99 ref G1J01.

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

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

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

RECHARGE ORDINARY BATTERIES UP TO 12 TIMES! With the Battery Wizard! Uses the latest pulse wave charge system to charge all popular brands of ordinary batteries AAA, AA, C, D, four at a time! Led system shows when batteries are charged, automatically rejects unsuitable cells, complete with mains adaptor. BS approved. Price is £21.95 ref EP31.

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

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

SANYO NICAD PACKS 1200mAh 14mm 4.8v 270 mA/h suitable for cordless phones etc. Pack of 2 just £5 ref EP78.

3" DISCS As used on older Amstrad machines. Spectrum plus 3's etc £3 each ref BAR400

STEREO MICROSPONES BACK IN STOCK Russian, 200x complete with lenses, lights, filters etc etc very comprehensive microscope that would normally be around the £700 mark, our price is just £299 (full money back guarantee) full details in catalogue. Ref 95300.

WE BUY SURPLUS STOCK FOR CASH

BUYERS DIRECT LINE 0860 425692

FREE CATALOGUE

100 PAGE CATALOGUE NOW

AVAILABLE, 50P STAMP OR FREE

ON REQUEST WITH ORDER.



ServiceBase



PROFESSIONAL SOFTWARE FOR THE SERVICE INDUSTRY

CONTROL SYSTEMS

Normally £199

Specifically designed for service companies *new* to computing

ServiceBase *Lite* is easy to use, cost effective and fully upgradable

It's good to know that if your business grows or changes direction your favourite computer software can keep pace. With a full upgrade path to the industry standard ServiceBase Professional suite of computer programs there really isn't much this powerful software can't supply.

Straight forward and simple to use ServiceBase Lite is the definitive answer to entry level computing whatever your current or future requirements.



SYSTEM SPECIFICATION
486DX4-100 Computer - PCI Board - 256K Cache - 4MB RAM - Mini Tower
1 MB Video Card - 520MB Hard Disk Drive - 1.44 Floppy Disk Drive
14" SVGA Multisync Colour Monitor
Panasonic KX-P 1150 Dot-Matrix Printer

3 Simple Steps to ServiceBase Lite ...

Step 1: Complete a data entry screen to record the customer & unit details then press a single key to produce a receipt.

Step 2: Enter the engineers screen to create and display the billing information. Write a description of the work carried out and append any spare parts used.

Step 3: A simple print routine will bring all the required information together to produce a professional looking invoice.

If it's software only then ServiceBase Lite is the answer

but if you are looking for a complete solution contact the ServiceBase...

ONE STOP SHOP

When you are ready to computerise your business speak to PC Control Systems. We will help you choose a computer system and if necessary a finance plan that best suits your requirements.

Our *One Stop Team* will deliver a pre-configured computer directly to your premises and spend a full day teaching your staff how to maximise its potential.

Interest Free Credit

Plan A 3 Year System Lease

Hardware Cost*	799.00
ServiceBase Lite**	149.00
Full Day System Training	250.00
Total System Cost	1,198.00
Deposit	127.65
Followed By 11 Qtr. Payments of	127.65
Total Paid Over 3 Years	1,531.80
Amount of Interest	333.80

Equivalent Weekly Cost **9.82**

*System specification as detailed above

Plan B 1 Year System Lease

Hardware Cost*	799.00
ServiceBase Lite**	149.00
Full Day System Training	250.00
Total System Cost	1,198.00
Deposit 50% of Cost	599.00
Followed By 11 Monthly Payments of	54.45
Total Paid Over 1 Year	1,198.00
Amount of Interest	0.00

Equivalent Weekly Cost **12.47**

**Upgrade To ServiceBase Pro Add £250

Plan C 1 Year Software Lease

ServiceBase Professional	399.00
Faults Database (78,000 Faults)	299.00
Full Day System Training	250.00
Total System Cost	948.00
Deposit 30% of Cost	284.40
Followed By 11 Monthly Payments of	60.32
Total Paid Over 1 Year	948.00
Amount of Interest	0.00

Equivalent Weekly Cost **13.82**

All prices quoted are + vat at current rate

ServiceBase Lite

If you service consumer electronics you need to keep accurate records detailing:

- Customer Name & Address
- Booking Date
- Fault Description
- Unit Type, Make & Model
- Workshop Repair/Site Visit
- Parts List
- Invoicing Details
- Contact Instructions
- Method Of Payment

ServiceBase Lite will breeze through these functions in seconds printing job cards for engineers and invoices for customers.

ServiceBase Pro

Fully upgradable from Lite ServiceBase Professional is packed with features other programs only "dream" about

- Automatic Parts Ordering
- Full Stock Control
- Self Building Bill of Materials
- Field Call Diary
- IRIS Code Selection Tables
- Electronic Mailing
- Contacts Database
- Wants Database
- Enquiry Source Analysis
- Loan Unit Look-up Tables
- Report Generator
- On Board Word Processor
- Mail Merge Facility

ServiceBase will finally allow you to *computerise* In confidence...

ServiceBase Lite Order Form

Name: _____
 Company: _____
 Address: _____

 Post Code: _____
 Tel: _____
 Fax: _____

Please rush me a full copy of **ServiceBase Lite** at the special TELEVISION price of £149.00 +vat. I understand that I can claim a refund if I am not entirely satisfied within 14 days.

I enclose a cheque to the value of £175.08 made payable to:

PC Control Systems Limited

Please send me information on the full ServiceBase product array.

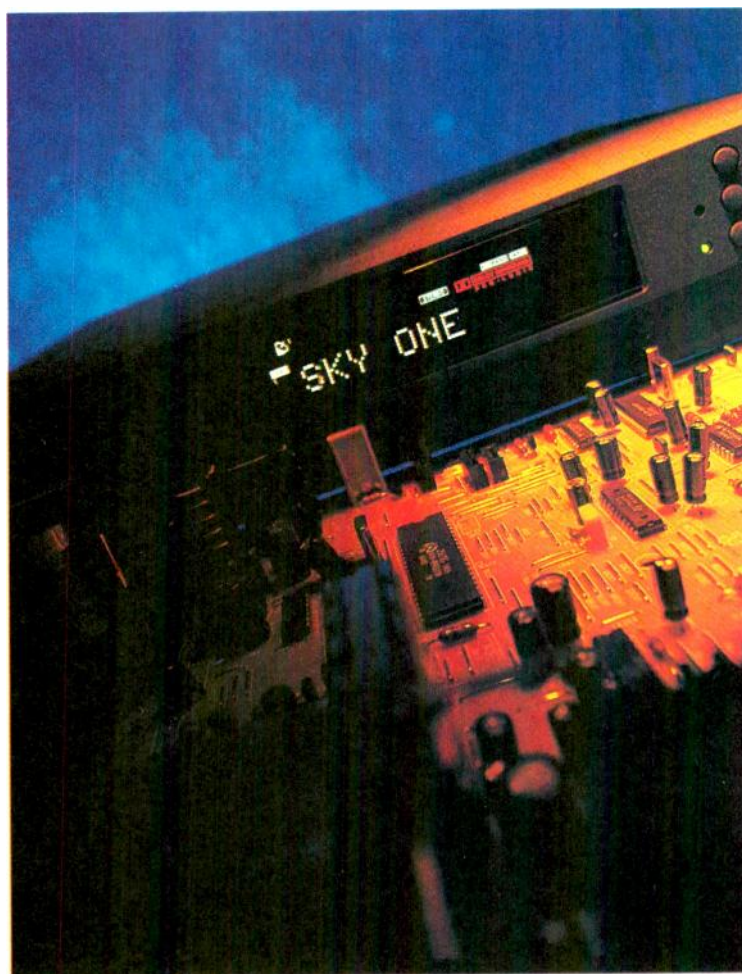
Other ServiceBase Products Include: ServiceBase Professional £399 - Retail Module £299 - Rental Module £299
 Faults Database (empty) £99 - Faults Database (78,000 Faults) £299 - Manufacturers Warranty Module £299.00 - Network Prices on Application



PC CONTROL SYSTEMS LTD
 HAMILTON HOUSE
 66 PALMERSTON ROAD
 NORTHAMPTON
 NN1 5EX

TEL: 01604 601677
 FAX: 01604 601676

This new series will describe the electronics in **Pace MSS1000** series receivers. In this opening instalment **J. LeJeune** provides an overall view of the receiver and covers the power supply, the tuning arrangements and video processing



Inside the MSS1000 Satellite Receiver

The Pace MSS1000 satellite receiver has been on sale for almost two years. It fills a niche in the market, for those who want Dolby Pro-Logic Surround Sound without having to replace a reasonably new TV set. A review of the receiver appeared in the August 1994 issue of *Television*. It described the basic features thoroughly. Briefly, the main ones are: Dolby Pro-Logic Surround Sound; twin LNB inputs; an ultra wideband tuner (750-2,100MHz); line-level audio sockets to feed a larger audio amplifier; twin card reader slots; and a comprehensive menu system to control the receiver. The basic UK version of the receiver is Model MSS1001-I.

More recently Pace has added the long-promised dish-positioner module, which will be described in a separate article. At present this is factory fitted, but a dealer retrofit kit is to be introduced. Another version of the receiver caters for D2MAC transmissions – we'll deal with only the PAL/VideoCrypt 1 version here, as this is the one generally found in the UK and Ireland.

Block Diagram

There are several microcontroller chips in the MSS1000. In addition to the main Z8 micro, another one controls the fluorescent display and processes the remote-control commands, there's one in the VideoCrypt decoder and, if a dish-positioner is fitted, this also has one. Fig. 1, a simplified block diagram, shows the bus lines for the clock, data and enable

signals that interconnect the microcontroller chips and the circuits under their control.

A point to note is that the chip-enable lines are of the pulsed type, toggling the chips so that they receive or send data. In the Dolby Surround area however the chips are enabled by turning on the normally-absent clock signal – a cunning way of saving precious IC pins.

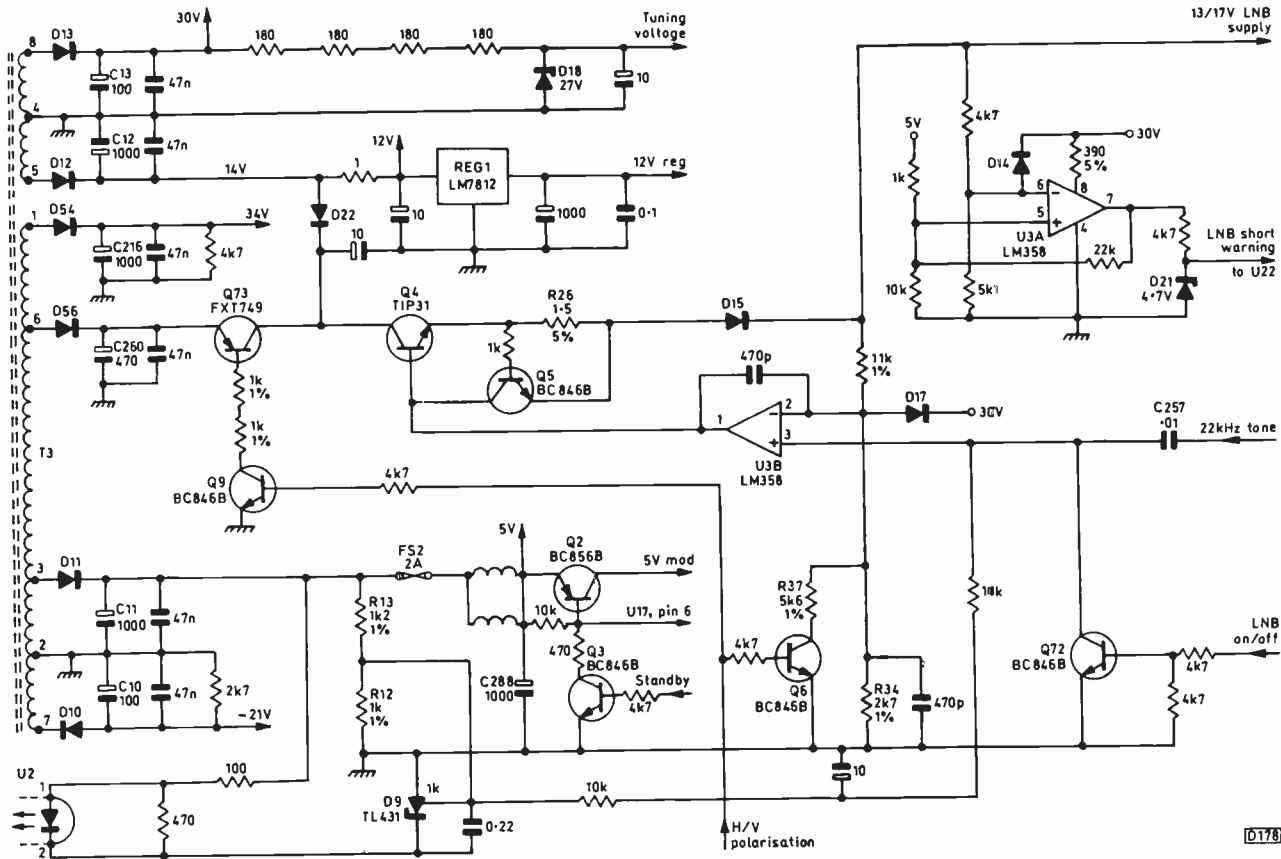
Much of the MSS1000 will be familiar to those acquainted with previous Pace models. The video processor chip is a Nicky III while the modulator, microprocessor subassembly and on-screen display generator are all old friends.

There's a new switch-mode power supply which uses a field-effect chopper transistor controlled by an MC3842 chip. This is also used in the MSS1000's non-Surround Sound stable mate, the MSS500. Feedback from the secondary side of the circuit to the primary side is via an optocoupler. A variable-voltage zener diode on the secondary side of the circuit provides the feedback signal.

Power Supply Operation

Because the power supply departs from previous practice in some respects we'll look at it in a little more detail. Fig. 2 shows the primary side of the circuit.

The mains input is fed via the surge limiter resistor R1 to filter C1,T1 which is included primarily to prevent inrush from the power supply reaching the mains in any great quantity. Four 1N4007 diodes (D1-4) in a bridge



D178

D56 produces 20V across C260. Q9 is switched on, and in turn Q73 switches on. Thus the 20V is presented to the collector of the TIP31 series regulator transistor Q4 and D22 is reverse biased to prevent the 20V being passed into the unregulated 12V supply. Q6 is also switched on, placing R37 in parallel with R34. This adjusts the voltage at pin 2 of U3B, which drives Q4. Q4 now produces a regulated 18V output which is fed to the LNB via D15.

When vertical polarisation is selected, Q6, Q9 and Q73 are switched off, the collector of Q4 being fed via D22. R37 is open-circuit and the regulator supplies 13V to the LNB.

Q5 is a simple current limiter that samples the voltage developed across R26. If there is a short-circuit in the LNB or the coaxial downlead, the voltage across R26 will increase and Q5 will switch on, placing a short-circuit across the emitter and base of Q4 which switches off to protect the power supply.

U3A senses the LNB supply voltage, sending a warning to the main microcontroller U22 which produces an on-screen message. Failure of the regulator circuit or D15, giving a low or absent LNB supply, will also result in the LNB SHORT warning display. If you get this message for more than a few seconds, check whether the fault is external or internal by removing the input F connector. When the fault condition is present, U22 will keep switching the LNB supply on and off at a frequency of 2Hz.

The LNB can also be turned off via the software in U22. The drive for this comes from pin 4 of U25 (a shift register/store chip) to the base of Q72. Under these conditions the software cancels the LNB SHORT warning. A high from U25 switches Q72 on, earthing pin 3 of U3B to switch off the LNB power.

The LNB power status is also set by the programming

of the LNB power menu, which gives a choice of LNB1 or LNB2. The switches that direct the power to the selected LNB are Q44 for LNB1 and Q43 for LNB2. They are driven by Q45-48. This part of the circuitry is not illustrated here.

Tone switching for a universal LNB is produced by the 22kHz multivibrator Q12/13 shown in Fig. 4. The switching signal is superimposed on the LNB supply, being fed via buffer transistor Q11 and C257 (Fig. 3) to pin 3 of U3B. Q7 switches the tone on or off by controlling the base of Q11.

The other important function of the 22kHz oscillator is to provide a drive for the fluorescent display device's filament - this drive is taken from the collector of Q12, being buffered at the front panel PCB.

The main 5V supply for the receiver is produced by D11, which rectifies the waveform at pin 3 of T3. Its reservoir capacitor is C11.

D10 produces a -21V supply across C10. This is part of the filament supply system for the display device.

Standby Switching

Standby switching is controlled by Q3 and Q2. A low from U25 indicates standby, switching off Q3. The high at Q3's collector inhibits the switches in the 4053 chip U17, blanking all video. It also switches off Q2, removing the 5V supply to the modulator. The UHF loop-through, the LNB supply, the tuner supply and the VideoCrypt decoder are all kept alive.

The Tuning System

The tuning system is shown in block diagram form in Fig. 5. The tuner itself is a Pace design, with a local oscillator that runs at 479.5MHz above the incoming IF. Tuning is under the control of the main microcontroller chip U22. It talks to the Nicky chip

Fig. 3: Circuitry on the secondary side of the power supply.

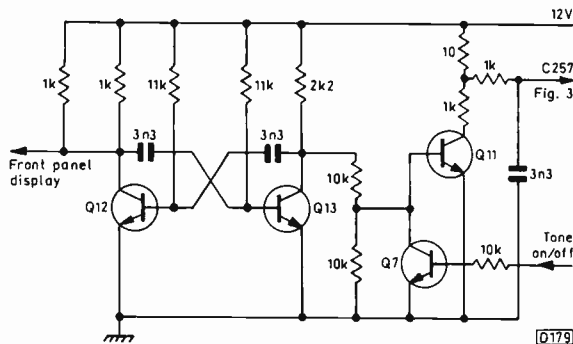


Fig. 4: The 22kHz tone oscillator circuit.

U26, which contains the phase-locked tuning loop.

The local oscillator frequency is divided by 128 within the tuner and is then fed, as the PLL sample, to pin 18 of U26. This input has a range of 9.5-19.5MHz. The tuning voltage output from pin 16 of U26 is fed to Q52, which is a MOSFET device, then to the tuner's local oscillator. The bandwidth of the second IF can be switched between 15 and 27MHz.

The tuner constantly monitors the position of the signal within the selected passband, making any adjustment required to the local oscillator frequency to maintain the IF signal's central position – the action is the equivalent of applying AFC. More on this later.

As with all modern satellite TV tuners, another phase-locked loop system within the body of the tuner demodulates the signal.

Video Processing

Fig. 6 shows in block diagram form the video paths within the MSS1000 receiver. Demodulated video from pin 13 of the tuner is fed to pin 3 of the Nicky video processor chip U26 via a C-band switch circuit whose purpose is to invert the signal polarity for C-band operation. It uses four transistors, Q49, Q50, Q51 and Q77.

The video input at pin 3 of U26 is amplified and then passed via pin 2 to the RC de-emphasis circuits. There are two of these. One is a dual PAL/D2MAC arrangement. The output from this returns to U26 at pin 1 where it goes to a baseband amplifier whose output appears at pin 22. This signal is further amplified by Q54/5/6 to a level of approximately 1.5V peak-to-peak and is then sent to pin 19 of scart sockets AV1 and AV2.

The second de-emphasis circuit is for PAL only. The

signal from this one returns to U26 at pin 4, where it's fed via an amplifier to the video source selector switch. This selects either internal PAL video or video from pin 20 of AV1 or AV2.

This switching arrangement provides for two external decoders, either PAL or D2MAC, or different descrambling systems. The baseband video output at AV1 is not suitable for recording, only for feeding another decoder or descrambling system of a different standard. The return video signals from the AV1 and AV2 sockets return to U26 at pins 9 and 8 respectively.

The video source selected by the switch in U26 is passed via the contrast control amplifier to pin 20. Expect about 1.5V peak-to-peak unclamped video at this point with a PAL transmission. The purpose of the contrast control amplifier is to enable the user to adjust the video level should descrambling drop-out be experienced. A normal contrast setting is level 5: below 4 will probably result in unreliable descrambling.

Before we leave U26, note that it contains two phase-locked loop systems for frequency-synthesis tuning, one for the tuner and the other for the modulator (see Fig. 5). Pin 12 receives a 4MHz reference clock signal from U31, which divides by four the 16MHz master clock signal used by U22. Pin 16 delivers a pulse-width modulated waveform to tune the satellite TV channels. This output is not present all the time: it appears in bursts when tuning correction is required and when another channel is selected. A similar arrangement is used for the modulator. The prescaled input from the modulator is at pin 13, the modulator tuning output appearing at pin 14.

The bus connections to U26 are at pins 11 (enable), 15 (data) and 19 (clock).

The selected video at pin 20 of U26 is fed via filtering and phase-compensation networks to the sound trap. Once the audio subcarriers have been removed the video can be clamped, on a line-by-line basis, to remove the energy dispersal signal. The reference level for clamping is set by circuitry within the VideoCrypt decoder. Clamping, to achieve a constant black level, is essential for the correct operation of the decoder.

The clamped signal from Q62 is fed to pin 1 of the 4053 switching chip U17 and to the VideoCrypt decoder. We have to draw a veil over what goes on here, since the circuitry is subject to a confidentiality agreement. The clamped video also passes via Q64 to pin 19 of the timing and sync generator chip U29.

U17 contains three independent two-way switches. These are used to select clear or descrambled video and to assist with the insertion of on-screen messages relating to the descrambling operations. Clear video enters U17 at pin 1 and leaves at pin 15. Video that comes via the VideoCrypt decoder enters at pin 13. If selected it emerges at pin 14 and returns at pin 2, again leaving at pin 15. Switching is controlled by the VideoCrypt decoder.

After buffering (Q101) and clamping (Q63), the video signal is passed to pin 19 of the VCR scart socket. This arrangement allows graphics-free video recordings to be made.

Graphics

The video signal from Q63 is fed via a further buffer, Q105, to pin 13 of the U50555 on-screen display graphics generator chip U7 – on its way, eventually, to

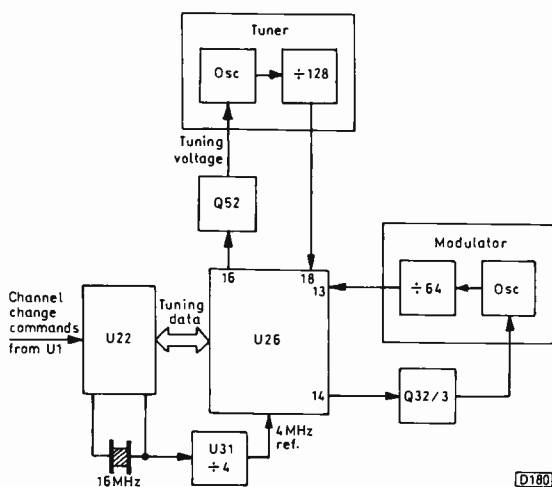


Fig. 5: Block diagram of the tuning system.

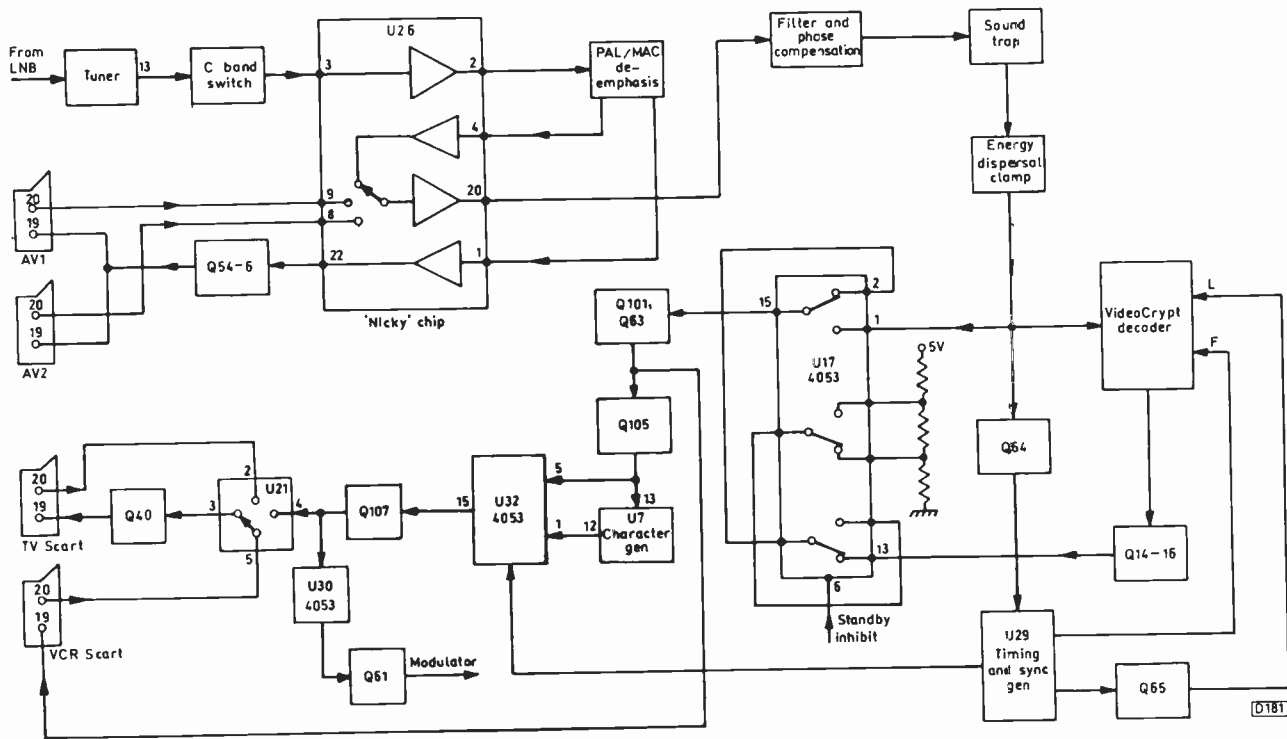


Fig. 6: Block diagram of the video circuitry.

the TV scart socket or the modulator. It leaves U7 at pin 12. Line and field sync pulses are fed in at pins 30 and 31 respectively of this chip. The internal graphics colour generator is clocked at 17.734MHz, four times the colour subcarrier frequency. Character readout is clocked by an LC oscillator (pins 4 and 5) at about 7MHz.

U32 is included basically to cater for 'out of hours' operation. Fig. 7 shows the arrangement. In normal operation the video signal enters at pin 1 then emerges at pin 15, where it goes to another buffer transistor Q107. Switching between the inputs at pins 1 and 2 of U32 is controlled by the Station ID line, which is connected to pin 10. This input comes from pin 7 of the timing and sync generator chip U29.

The Station ID line is also connected to pin 33 of the main microcontroller chip U22. When it goes low, U22 generally tells U7 to send U32 a plain coloured screen with the words NO SIGNAL on it. This can be cancelled by pressing F then STORE on the remote control unit. You will then see a screen with noise. When the Station ID line goes high, U22 may instruct U7 to superimpose menu graphics (for tuning etc.) on the picture. By pressing the TV/SAT button, the menu is displayed on a plain coloured background instead of the picture.

When there is no valid video signal the Station ID line goes low. Transistor Q78 then switches off, enabling the composite sync signal from pin 27 of U7 to reach pin 11 of U32. Under these conditions the noise signal from Q105, arriving at pin 5 of U32, is switched through to the output (pin 15) via pins 4, 13, 14 and 2. The sync signal is inserted into the noise,

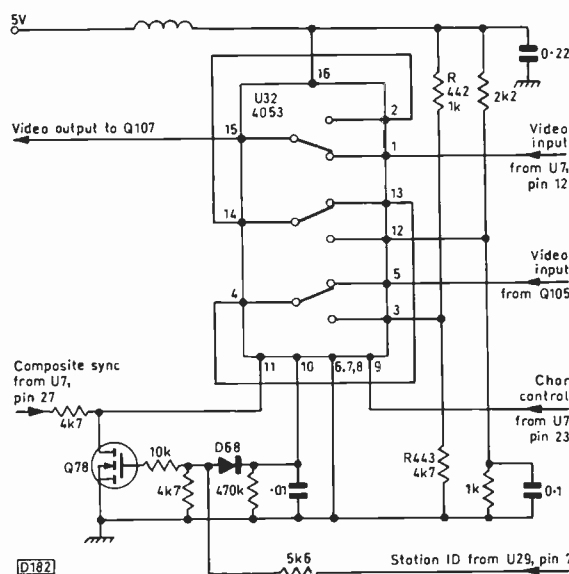


Fig. 7: Switching chip U32, which is used to provide 'out of hours' graphics insertion.

which is an essential condition for adding on-screen graphics. Character insertion is controlled by the CHAR input at pin 9. This comes from pin 23 of U7. When it goes high, the peak white input at pin 3 is selected to create the character. The values of R442 and R443 set the white level.

In our description of the complex video path in the MSS1000 satellite receiver we have reached buffer transistor Q107, which leads to the AV and other source switching. This is a convenient point at which to break off. We will take up the video arrangements following Q107 next month.

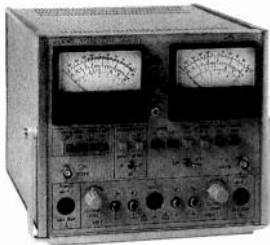


PROMAX

ELECTRONIC TEST EQUIPMENT

Audio - Video - Television - Satellite TV - Telecommunications

The manufacturer who cares about quality & features rather than being lowest in price !



Audio Analyser
Model AA-930

Multi-function meter. Measures distortion, wow & flutter, stereo power, signal levels in & out; generates audio test signals. Features include large clearly marked analogue meters. Performs the work of many individual instruments. £ 498

Television Pattern Generator

Model GV-698/11

32 patterns, 32 internal memories. PAL/NTSC/SECAM standards, with I, B, G, H, M, M, N, D & K, NICAM, teletext all in one instrument. Optional on screen logotype. (Other pattern generators available from £ 210). £ 1428



Television Pattern Generator

Model GV-298

Compact high performance generator, RF and video outputs. Frequency range same as GV-698/11, 37 to 865 MHz. Circle pattern included. £ 433



TV & Satellite Level Meter

Model MC-360

Ideal instrument for the professional installer of FM/TV aerials and satellite TV dishes. Covers 48 to 856 MHz and 950 to 2050 MHz. Lightweight, compact and rechargeable battery operated. £ 599



Frequency counters Models FD-250 & FD-252

FD-250 covers 20 Hz to 160 MHz and FD-252 covers same plus, 100 MHz to 2.4 GHz. Large L.E.D. display. Wide performance at low cost. £ 153 & £ 206



TV & Satellite Level Meter
Model MC-944

This meter has everything for the top flight installer of aerials, dishes, CCTV, MATV, SMATV and other systems. Features include TV monitor, spectrum analyser, sync pulse, teletext, printer output, 99 memories, tune-able audio subcarriers, etc. Full autocorrection for superb, unequalled accuracy!

RS-232 as standard. £ 1949

Low Distortion Low Frequency Generator

Model GB-212

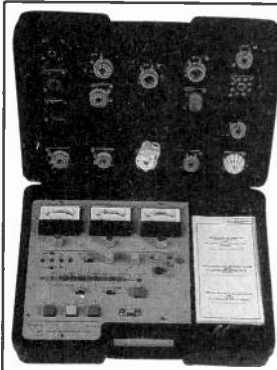
20 Hz to 200 kHz, harmonic distortion 0.02 % maximum over audio band. Frequency counter resolution as high as 0.1 Hz. 600 ohms impedance. Output level attenuation range 60 dB, with analogue meter for setting accuracy. Excellent output level flatness. £ 240



Functions Generators

Models GF-230 & GF-232

Two versions available: 0.1 z to 1 MHz and 0.2 Hz to 2 MHz. Producing sine, triangular and square waveforms, with variable symmetry. Excellent performance. £ 153 & £ 206



CRT Rejuvenator
Model TA-903

Similar to TA-901, but has three meters to monitor cathode current. Special technique allows repeated rejuvenation of CRT. Supplied in attaché style case, for easy field and workshop use. £ 498

CRT Rejuvenator

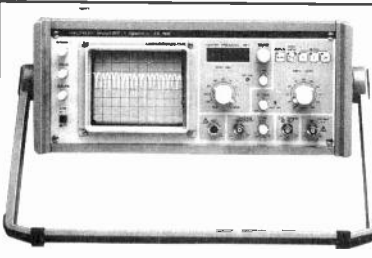
Model TA-901

An essential tool for every TV workshop. Promax have made many thousands. Supplied complete with a set of base adaptors. £ 235



TV/FM Level Meter
Model MC-160B

The aerial installers best friend. Calibrated for accurate signal level measurements. Digital frequency display ensures correct signal selection and identification. Built-in demodulator for easy station ident, and audible tone for easy positioning. This meter is light in weight, but has outstanding technical features. £ 299



R.F. Spectrum Analyser
Model AE-566

1 to 1000 MHz, with 950 MHz to 1750 MHz option. Built-in tracking generator. Offers spanwidths from 1 MHz to 1000 MHz. Includes normalizer. This analyser is ideal for production and educational applications, as well as R+D. £ 2800



PROMAX

The company has been producing test equipment in Spain for over thirty years, earning a strong reputation for excellent engineering, quality performance at budget prices. The equipment is supported by Alban Electronics from their St Albans facility. These products are suitable for only professional and educational applications.



Prices shown exclude VAT and delivery charge. Most items available for immediate despatch.

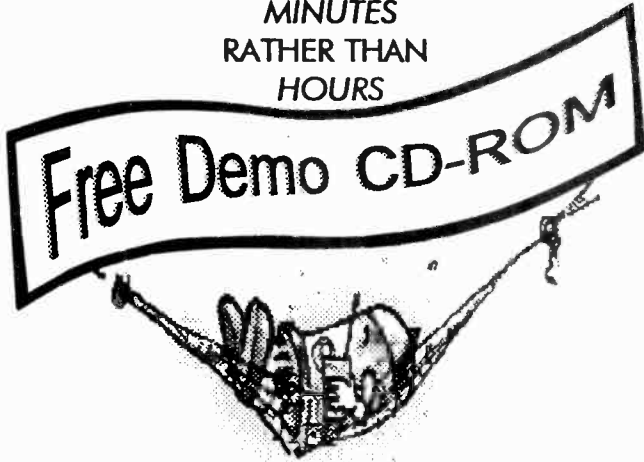


ALBAN ELECTRONIC LIMITED

6 Caxton Centre - Porters Wood
St Albans - Hertfordshire - AL3 6XT
Tel: 01727 832266 - Fax: 01727 810546

How much time
do you spend
on repairs ?

IF A REPAIR TAKES
MINUTES
RATHER THAN
HOURS



YOU

REAP THE BENEFITS !

TACKLE MORE REPAIRS IN LESS TIME BY USING
THE EURAS REPAIR INFORMATION DATABASE
Save time and make a profit!

Following our policy of continuous improvement
we have added:

- over 2000 models
- more than 6000 faults
for our June release

Just fill in and detach the coupon!

Please send me a FREE demo CD-ROM
I do not have a CD-ROM drive, please send me
information about EURAS
(Please tick the appropriate)



Name: _____

Company: _____

Address: _____

Postcode: _____ Tel: _____

EURAS

Please return to:
EURAS International,
EURAS House, 51 Bristol Road,
Keynsham, Bristol BS18 2BA,
Tel: (0117) 9860900, Fax: (0117) 9860343.
Only registered businesses need apply.

New Products – 1996

Soldering Equipment



£190-00

2004 Digital Temperature
Controlled Station

- * Stepless temperature selection between 150 deg C and 420 deg C (302 deg F and 842 deg F)
 - * Thermocouple sensing to maintain the tip temperature within + or - 5 deg C of selected temperature.
 - * Electronic proportional control varies the heating period as required to maintain set temperature.
 - * Continuous 3 digit LED display with 1 deg C resolution.
 - * Heating pulse indicator.
 - * Unit earthed with potential balance socket.
 - * Triac switching at zero-crossover point eliminates RFI effects.
- * Safety spring holder and cleaning sponge. Robust ABS cabinet, illuminated rocker switch.
- 2004 station supplied with MAGNUM 1002 24V 50W soldering iron. Magnum Irons, use the E.C. range of tips

To Order One Off Price
Quote 112004 £190-00

TELEPHONE/FAX
0151 639 8076



104 ABBEY STREET, ACCRINGTON
LANCS BB5 1EE
Tel: 01254 236521/390336
Fax: 01254 395361
SEND LARGE S.A.E. FOR TRADE CATALOGUE

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

CARAVAN HOLIDAY THIS YEAR? HOME FROM HOME COMFORTS FROM **ROADSTAR**

5" AC/DC T.V. SET MONO UHF/VHF	£44.00
7" AC/DC TV/FM/AM RADIO, MONO	£66.00
5.5" AC/DC COLOUR TV	£132.00
5.5" AC/DC COLOUR MULTI-SYSTEM R/C	£195.00
10" AC/DC COLOUR T.V. R/C	£162.00
VIDEO PLAYER AC/DC	£117.00

ACTIVE MAGIC CIRCLE VHF AERIAL (4AA batteries)	£12.62
MAGIC MUSH CONE OMNI UHF/VHF AERIAL (DC)	£49.85
OVERLANDER UHF AERIAL KIT (Sucker fitting)	
TILTS AND SWIVELS	£9.99
3x3' MASTS AND JOCKEY MOUNT CARAVAN	£8.50

BUT PROTECT YOUR HOME WHILST AWAY!! WITH OUR RANGE OF SECURITY SYSTEMS/CCTV.

7" MONITOR, CCD MINI CAMERA (Takes up to 2 cam)	£159.00
EXTRA CAMERA + 20m CABLE	£90.00
12" MONITOR, CCD MINI CAMERA (Takes up to 4 cam)	£242.00
EXTRA CAMERA + 20m CABLE	£111.62
WIRELESS SECURITY SYSTEMS (Inc 3 x PIR)	£229.00

WE CAN'T LIST EVERYTHING THAT WE STOCK. OUR RANGE IS EXTENSIVE. WE HAVE A TRADE CATALOGUE. WE SELL: AERIALS, BRACKETS, BATTERIES, CABLE CONNECTORS, CMOS CAPACITORS, DISCS, DIODES, ELECTRICAL ACCESS, FUSES ICS, LOPTX LEADS, MANUALS, PUSH BUTTON LIGHTS, PHONES, PHONE ACCESS, POTENTIOMETERS, RELAYS, SEMICONDUCTORS, STRIPBOARD, SWITCHES, TUNERS, TV BATTERY LEADS, TV WALL BRACKETS, TOOLS, TEST EQUIPMENT, VALVES AND EVERYTHING YOU NEED FOR VIDEO REPAIRS - HEADS, IDLERS, TYRES, PINCH ROLLERS, CLEANERS, TEST CASSETTES, VIDEO TAPE (and V2000) etc.

P.V. TUBES

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

Goods are despatched on the day we receive your order. If for any reason we are out of stock we will try to inform you as quickly as possible. We try our best to give a speedy, fair and efficient service. VAT invoice on request. Give us a ring - we'll give you service. Please ask if what you need is not listed - we will try to help. Prices are subject to change without notice. In some cases we may have to supply an equivalent. We need expiry dates for credit card orders. MIN. ORDER £5.



Help Wanted

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

Wanted: Circuit diagram and any setting up information (photocopy OK) for the Chuntex CTX multisync monitor Model CPS1760DF. Dan Shaw, 4 Brentcot Close, Ealing, London W13 8EH. 0181 998 5138.

Wanted: October, November and December 1991 issues of *Television*. John Banner, Lydes Road, Malvern, Worcs WR14 2BY. 01684 569 285.

Wanted: Loan or hire of operator's instruction manual for the Sharp VC651HM VCR. R.B. Hall, 14 Wakeman Road, Rippon, N. Yorkshire HG4 1SE.

Wanted: Front panel with good pushbuttons for the JVC HR7300EK VCR. Also instruction book and circuit diagram (photocopy OK). A. Ashurst, 62 Westfield Road, Harpenden, Herts AL5 4JU. 01582 767 990.

Wanted: Base and Mumetal screen for tube type VCR97/VCR517 to help with replica TV project. Peter Tomlinson, 34 Strathmore Road, Bristol BS7 9QJ. 0117 951 4755 (home), 0117 924 9231 (office).

Wanted: Mains transformer for the Telequipment D54 scope. Have for disposal Granada/Labgear colour-bar generator, Leader LCT910A CRT tester/rejuvenator and BK Precision 467 CRT tester/analyser. Ross Electrics, 1 Church Street, Ainsworth, Bolton BL2 5RA. 01204 524 736 or 01204 521 408.

Wanted: Mains lead to fit Panasonic and Toshiba mains/battery portable sets. One end fitted with six-pin socket. Leon Electronics, 11 Woodend Close, Three Bridges, Crawley, West Sussex. 01293 520 536.

Wanted: Circuit diagram and source of spares for the Pioneer SV2801. S. Akers, 8 Farm Road, Lakeside, Redditch, Worcs B98 8LB. 01527 501 598.

Wanted: STR451 voltage regulator for the Matsui Model 1430. Need not be new. Remote control unit for the Amstrad VCR4500. Michael Payne, 294 Whiteleas Way, South Shields, Tyne and Wear NE34 8HW. 01915 192 848.

Wanted: For repairs to pensioners'

sets. (1) Main PCB for the Panasonic Model TC2175 (Z1 chassis). (2) Main PCB for the Spectrum 128-2 computer (cassette-loading version).

(3) Screen for an Advent (Barco) 750E projection TV (used in club).

(4) *Radio and TV Servicing* books 1975-76, 1979-80, 1981-82. (5) CRT tester/rejuvenator, any type. Malcolm Lambert, 1 Dundale Farm Cottages, Dundle Lane, Bells Yew Green, Tunbridge Wells, Kent TN3 9AQ. 01892 824 657.

Wanted: Source of spares for the Thorn TV Model CT202T etc. sold by Rumbelows. They don't seem to be available from the usual sources. Have for disposal a new Philips SBC522 colour-bar generator. M.D. Stevenson, 124 Green Lane, Eastwood, Essex SS9 5QJ. 01702 522 929.

Wanted: Lower drum for the Panasonic Model NVG10B. R.J. Evans, JE Electronics, 27 High Street, Lossiemouth, Moray IV31 6AA. 01343 813 913.

Wanted: Circuit diagram (photocopy OK) for the B&O TV type 3119. Also remote control unit or where one can be obtained. M.A. Doody, 5 Mounts Close, Hillslane, Madeley, Telford, Shropshire TF7 4BU.

Wanted: Bullet-type BSB LNB as used with BSB compact dish. C. Mitchell, 12 Canberra Road, Bexleyheath, Kent DA7 5SG. 0813 106 227.

Wanted: A76JTS90X08 tube for the Grundig Model M82575. Pat Reveillino, 24 Broom Avenue, Broom, Rotherham, South Yorkshire S60 3NQ. 01709 378 693.

Wanted: ECC85, ECH81 and ECL86 valves and 7V, 0.3A dial bulbs for the Arkansas stereo radiogram type 807405, made in Germany. V. Alexis, 12 Pearcroft Road, Leytonstone London E11 4DR.

For disposal: Several Philips VR2020 VCRs, some working, all free. Also quantity of service manuals, mainly Nat. Panasonic, Sony and Philips audio all dating from the mid Eighties. Again free. R. Lucas, Heather View, Dorking Road.

Tadworth, Surrey KT20 5SA. 01737 812 703.

Wanted: Mains transformer for the VideoCrypt SVA1 decoder. Also most copies of *Television* for 1984-1991 inclusive and the January 1992 issue. T. Milverton, 121 Borrowdale Road, Northfield, Birmingham B31 5QL. 01214 772 044 (evenings).

Wanted: Circuit diagrams (photocopy OK) for the Rediffusion RSR50 satellite receiver and RDC50 driver control. H. Douglas, Craigandonna, 1 William Street, Gourdon by Montrose, Scotland DD10 0PS. 01561 361 529.

Wanted: Complete working or non-working Panasonic NV780EM VCR for spares. W. Parris, 6 Knappers Way, Brandon, Suffolk IP27 0DA. 01842 811 793.

Wanted: On/off switch for the Ferguson 38030 mono portable (1590 chassis). D.J. Maule, 58 Greenhill Way, Shirley, Solihull, W. Midlands B90 3PX. 01217 338 629.

Wanted: Any information (circuit diagrams etc.) for ICL OPD units. John Savery, Unit 6, Kellys Farm, Birdham, Chichester, W. Sussex. 01243 514 188.

Wanted: Remote control handsets for the Dual Model TV5504 CTV and the Sony Model SLV415 VCR. R. Askew, 17 Coltishall Avenue, Bramley, Rotherham, S. Yorks S66 0SR. 01709 546 396.

Wanted: VHF/UHF versions of the tuner/IF panel (06) and presetter panel (07) used in some JVC/Ferguson HR7200/3V29

VCRs and clones (e.g. the Telefunken VR520). Ex-equipment will do. Brian Renforth, 174 Helmsley Road, Sandyford, Newcastle-Upon-Tyne NE2 1RD.

Wanted: Scan coils for the Amstrad TVR3. Any reasonable amount considered for just the coils or the coils plus an old tube. The tube fitted is an Amstrad 510UFB22-TC and the coils bear the label YS-60250K. D.R. Bracknell, 9 Tweed Close, Farnborough, Hants GU14 9NF. 01252 513 062.

Answer to Test Case 402

– see page 549 –

Compared with the other sections of a VCR, the signal-processing and record amplifier circuits give very little trouble. As a result they are perhaps less well understood. It's also a fact that the manufacturing precision now achieved with mechanical and electrical components can sometimes lead technicians to neglect the few set-up adjustments provided in a modern machine – in the VCRs of a decade or more ago, a great deal of adjustment and setting up was required after component replacement or a repair.

The colour-under signal uses the luminance FM carrier as a bias signal for recording on the tape. Thus the luminance carrier drive level is as important for correct chrominance signal recording as the record bias level is in linear audio recording and playback systems. The cause of the patterning with the Panasonic NVSD40 was excessive 'bias': the luminance record current level had not been checked and was too great. With the luminance carrier set to the correct level of 130mV peak-to-peak, colour recording and playback were interference free. The technician had come so close to getting it right when he'd checked the chroma record current level!

Why was the patterning stronger during the first ten seconds of each recording? Because the luminance record current is automatically boosted during this time to minimise the visibility of colour patterning caused by any previous, overwritten recording.

NEXT MONTH

SERVICING THE MITSUBISHI EURO 6 CHASSIS

John Coombes provides servicing guidance on these sets, which include Models CT2145BM and CT2146TX.

ZENER DIODE TESTER

Zener diodes are a common cause of faults, but can't be checked with a multimeter. They may test OK in the forward direction but stabilise at the wrong voltage or not at all. Michael Dranfield's tester applies a current-limited high voltage, displaying the actual breakdown voltage – to an accuracy of 0.1V – on a liquid-crystal display. A very helpful addition to the workshop facilities.

TOSHIBA SERVICE BRIEFS

Latest TV and video know-how from Toshiba Technical.

AERIAL RIGGING

Maybe you would like to add this to your TV/video business? In a follow up, John Pitt-Francis describes what you will need.

TELEVISION INDEX/DIRECTORY AND FAULTS DISCS PLUS REPRINTS SERVICE

INDEX DISC

Version 4 of the computerised index to TELEVISION magazine covers Volumes 38 to 45 (1988 – 1995). It has thousands of references to TV/VCR fault reports and articles, with synopses. A TV/VCR spares guide, an advertisers list and a directory of trade and professional organisations are included. The software is easy to use and very quick. It runs on any IBM or compatible PC with 512K RAM and a hard disc.

Price £30 (3.5"HD, alternatively 3.5DD" or 5.25" if required)

Those with previous versions can obtain an upgraded version for £15. Please quote the serial number of the original disc.

FAULT REPORT DISCS

Each disc contains the full text for TV, VCR, camcorder, satellite TV and CD fault reports published in individual volumes of TELEVISION, giving you easy access to this vital information. Note that the discs cannot be used on their own, only in conjunction with the Index disc: you load the contents of the Fault Report disc on to your computer's hard disc then access it via the Index disc. Fault Report discs are now available for:

Volume 41 (November 1990 – October 1991)
Volume 42 (November 1991 – October 1992)
Volume 43 (November 1992 – October 1993)
Volume 44 (November 1993 – October 1994)
Volume 45 (November 1994 – October 1995)

Price £15 each (3.5"HD, alternatively 3.5"DD or 5.25" if required)

REPRINTS

Reprints of articles from TELEVISION back to 1986 are also available: ordering information is provided with the index, or can be obtained from the address below.

Hard copy indexes of TELEVISION are available for Volumes 38 to 45 at £3.50 each.

All the above prices include UK postage and VAT where applicable. Add an extra £1 postage for overseas EC orders, or £5 for non-EC overseas orders. Cheques should be made payable to SoftCopy Ltd.

Allow 28 days for delivery (UK).

**SoftCopy Limited, 1 Vineries Close,
Cheltenham GL53 0NU, UK.**

Telephone 01242 241 455

Published on the third Wednesday of each month by Reed Business Publishing Ltd., Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. **Filmsetting** by Wace Publication Imaging, 2-4 Powerscroft Road, Sidcup, Kent DA14 5DT. **Printed** in England by BPCC Magazines Division, Carlisle Web Offset, Cumbria. **Distributed** by Marketforce (UK) Ltd., 247 Tottenham Court Road, London W1P 0AU (0171 261 5555). **Sole Agents** for Australia and New Zealand, Gordon and Gotch (Asia) Ltd.; South Africa, Central News Agency Ltd. **Television** is sold subject to the following conditions, namely that it shall not, without the written consent of the Publishers first having been given, be lent, resold, hired out or otherwise disposed of by way of Trade at more than the recommended selling price shown on the cover, excluding Eire where the selling price is subject to currency exchange fluctuations and VAT, and that it shall not be lent, resold, hired or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever.

FAX: 0274
722229

BESCO LTD

YOUR PREMIER SUPPLIER FOR OVER 30 YEARS

Have a great '96 with Besco

ENTIRE RANGE OF EX RENTAL TVs, VIDEO, B GRADE HIFI, PORTABLE CD, GHETTO BLASTERS ETC.

F.S.T. remote working from only £60
F.S.T. text working from only £70

complete with handset, makes inc' Solara, Philips, Sanyo, Hitachi etc.

Over 200 working video recorders in stock **from £40** (slim front loaders)
100s of front loading videos off the pile **from £12** – Philips, Hitachi, Sanyo, Sharp, etc.

Good quality working TVs standard **only £25** Teletext **from £40**
Makes in stock – Hitachi, Ferguson, Pye, Philips, GEC etc, **RING OUR HOTLINE NOW!**

HIFI SPECIAL

Boxed HiFi with C.D., Twin tape, radio etc.
from £35 (MIN 3 UNITS)
Car radio/cass, Personal stereo, Personal C.D.,
Ghetto Blasters, etc.

BASEMENT CLEARANCE

300 ex rent colour TVs, mixed std and text, makes
include Pye/Philips KT3/K30, Hitachi, GEC series 90,
Ferguson TX etc. – **ONLY £2,400.00 THE LOT!**
(DELIVERY ARRANGED)

By special request return of our sensational Cabaret, also our new menu FREE Hamburgers, Pizza, soup,
sausage/egg, bacon sandwiches etc. *All this and rock bottom prices too!* Where else? Bring money!

Prices are plus VAT
and based on quantity

Walker House, 16 Bottomley Street, Bradford BD5 7LJ
Ring Tony 01274 308186 – Open 6 days – 9am-5pm

TV WHOLESALE

AMSTRAD HANDSETS

VCR4600, 4600 MkII	7.05
VCR4700	17.63
VCR5200	11.75
VCR6100 (Barcode Indexer)	32.44
VCR6200 Barcode	32.44
TVR 2	8.46
TVR 3 (Equivalent)	10.70
SRD400	18.15
SRD400 (Equivalent)	11.05
SRD500	11.75
SRD510/520 (Equivalent)	10.70

AMSTRAD TUNERS/IF

UE33-B01 VCR4600/4700	9.40
TPS7-B0005 VCR4600/4700	9.40
TPS7-L0002	14.10

AMSTRAD MODULATORS

18108221 VCR5200	7.05
4600 MkII, 4700	9.40

AMSTRAD SERVICE MANUALS

VCR3000/9500	14.85
VCR4600 MkII, 4700	9.00
VCR6000/6100	11.50
VCR7000	9.00
VCR8700	8.00
VCR8800	9.75
VCR9000/9004	9.00

VMC100	16.50
SRX100/200	4.70
SRX100/200 SRD400	13.25
SRD510/520	6.50
SRD550	3.85
SRD600	20.65
PPC512/640	11.50
PC2086	12.00
PC2286	19.50
PC2386	15.00
PC3086	11.00
PC4386	15.00
PC5086	15.00
PC7486SLC	7.00
ALT286	8.50
PC14M28/29	3.25
FX9600 FAX	20.15

AMSTRAD COMPUTER OPERATORS MANUAL

PC1640	11.75
PC2286/2386	11.75
PPC512/640	11.75
ZX SPECTRUM +2	5.50
PC1512 (Tech. Ref.)	6.00
PC1640 (Tech. Ref.)	8.00

AMSTRAD SOFTWARE

ACCOUNTSMASSTER	19.98
(Full accounts program for running small business on any PC)	

AMSTRAD FAX PCB

FX9600 FAX PSU	29.38
----------------	-------

AMSTRAD VCR 4600 4700, TVR1,2,3

HEAD BASE ASSY. (Audio)	14.10
FRICTION GEAR 779	2.06

AMSTRAD MOTORS

Capstan Motor LLA4B02	10.28
Capstan Motor LLN4B21	10.28
Tape Loading MCF9B02	9.99

AMSTRAD LOPTS

CTV1400 FB165KA	23.50
TVR3 181297	14.69

AMSTRAD PCBs	16.50
(Complete, fully populated)	4.70
4600 Systems Control/Servo,	13.25
Display & Control PCBs	6.50
4600 Video & Audio	3.85
4600MkII Head Amp	20.65
4600MkII Power Supply	11.50
4600MkII Hybrid, Luminance	12.00
4700 Main PCB Assy.	19.50
4700 Head Amp Assy.	15.00
4700 Power Supply	11.00
6100 Main PCB	15.00
6100 Hybrid, Chrominance	15.00
6100 Hybrid, Luminance	7.00
CTV1400 MkII Main TV PCB	8.50
TVR2 Main TV PCB	3.25
TVR2 Video Front Display PCB	20.15

TVR3 Head Amp Assy.	5.88
TVR3 Video Power Supply	6.46
31.73	
19.98	
5.88	
6.46	
9.40	
43.17	
5.88	
6.46	
31.73	
9.40	
9.40	
31.73	
41.13	
15.88	

AMSTRAD COMPUTER MONITOR/PARTS

12" HRCD (Daewoo) Monitor PCB	32.32
PC/ECD Monitor Tube	56.40
CRT 3701B22	29.38
PPC512/640 Modern PCB	18.80
AMSTRAD MOUSE	7.64
51/4"-31/2" FDD KIT	7.05
PCW9512 Armature	4.70
Many AMSTRAD COMPUTER & PRINTER SPARES available, please phone for price.	

PRICES INCLUDE VAT.

ALL ITEMS ARE BRAND NEW AND GUARANTEED

★★ SAME DAY DESPATCH ★★

Write or Phone for FULL LIST.

★★POST & PACKING★★



£1.18



Harrison Electronics

CENTURY WAY, MARCH, CAMBS PE15 8QW.
FAX: (01354) 51416. TEL: (01354) 51289



COMPATIBLE VIDEO HEADS

Highest Quality Components

IMPORTED AND DISTRIBUTED BY:

Harrison Electronics



LARGE RANGE AVAILABLE TO FIT MOST MODELS

HIGH QUALITY AT COMPETITIVE PRICES

WRITE OR PHONE FOR CATALOGUE

C.T.V.

UNIT 5, THE PHOENIX BUILDING, RUSHOCK
TRADING ESTATE, DROITWICH ROAD,
DROITWICH WR9 0NR
TELEPHONE: 01299-251522
0589-888021/0850 486147 (24HR)

SUPPLIERS OF HIGH QUALITY
GRANADA AND THORN
EX-RENTAL TELEVISIONS AND VIDEOS
LARGE STOCKS ALWAYS AVAILABLE
ALL AT COMPETITIVE PRICES

Satellite Receivers

Complete Range of Hand Sets
EXPORT ENQUIRIES WELCOME

OPEN: MON-FRI - 9.30-5.30

TEL: 01299-251522

Fax: 01299-251543

APPROVED
TELEPRICE
DISTRIBUTOR

HST

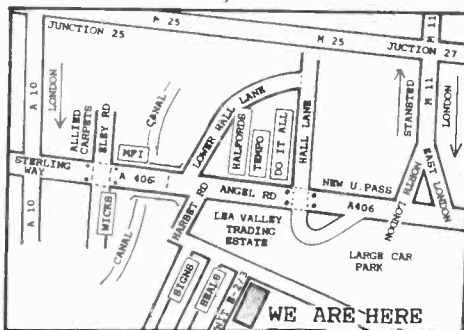
DISTRIBUTORS LONDON

Suppliers of high quality
THORN EX-RENTAL STOCK
Direct from source

PHONE FOR DELIVERY DAYS ON

0181 803 0505

UNIT E2/3, Stonehill Business Park, Lea Valley Trading Estate,
ANGEL ROAD, LONDON N18 3LD



CAMPION WHOLESALE LTD.

QUALITY USED TV & VIDEO

COMPLETE RANGE OF TVs
VIDEOS AND SATELLITES

Most makes and models available
TVs from £3.00 · Satellites from £8.00
Videos from £15.00
Prices Ex-VAT

Free Delivery Service to most areas of the UK

U.K.s Largest Export Wholesaler
Specialists in conversions to most countries systems

UNIT 75, BARRACKS ROAD,
SANDY LANE INDUSTRIAL ESTATE,
STOURPORT-ON-SEVERN,
WORCESTERSHIRE DY13 9QB
Just 10 Mins from M5 Junct. 6 Worcs North

01299-879642 (3 lines)
FAX: 01299 827984

WHY BUY EX-RENTAL?
**WHEN YOU CAN BUY B GRADE AT
THESE PRICES (LTD STOCK First Come First Served)**

20" Remote	£80	20" Text	£90
21" Remote	£90	20" Fastext	£100
20" Nicam	£110	21" Nicam	£120

	1+	10+
Twin Speed Videos	95	90
14" Remote Portables.....	85	80
14" Fastext Portables.....	105	95
25" Nicam Fastext.....	235	225
28" Nicam Fastext.....	260	250
CD Microsystem	50	45
CD Radio Twin Cassette.....	45	40
Stereo Twin Cassette	15	14

All stock tested & working and boxed
with remote & instructions

Also 7000 sq ft of returned TV,
Video and Hi-Fi

Example Radio Cassette £5.00 CD Midi and Micro £25.
Basic Midi £11 Colour Portable £30 VHS Video £35

GOGGLEBOX TEL: LEEDS
(0113) 2310359
DISCOUNT ELECTRICAL WAREHOUSE ASK FOR ROBERT
ALL ABOVE PRICES PLUS VAT AT 17.5%

TV WHOLESALE



TV & VIDEO WHOLESALERS LTD

OUR BIGGEST GRADED STOCK ACQUISITION **EVER!**

NOBODY BEATS OUR PRICES

GRADED STOCK – Boxed with remote and instructions

14" REMOTE
14" FASTEXT
51cm REMOTE
51cm FASTEXT
51cm NICAM
59cm FASTEXT
59cm NICAM
68cm FASTEXT
68cm NICAM
PLUS A
COMPLETE
RANGE OF
VCRs ALSO
AVAILABLE

**UHF/VHF TVs
DESIGNED FOR EXPORT TO EUROPE
DIRECT FROM THE
MANUFACTURER**

**SUMMER BARGAINS NOW AVAILABLE!
DON'T MISS THIS OPPORTUNITY TO BUY STOCK AT**

UNBELIEVABLE PRICES

CAN YOU AFFORD NOT TO TAKE ADVANTAGE OF OUR

INCREDIBLE OFFERS

TRUST YOUR BUSINESS ACUMEN!

CALL NOW AND PAY US A VISIT

— HEAD OFFICE —

BIRMINGHAM
208 BROMFORD LANE
ERDINGTON
BIRMINGHAM B24 8DL
TEL: 0121-327 3273
FAX: 0121-322 2011

CLEVEDON

UNIT 20
5C BUSINESS CENTRE
CONCORDE DRIVE
CLEVEDON
AVON BS21 6UH
TEL: 01275 341789

LONDON

UNIT 2
THE ROYAL LONDON EST.
29/35 NORTH ACTON ROAD
LONDON NW10 6PE
TEL: 0181-961 5005

PRESTON

UNIT 439
OAKSHOTT PLACE
WALTON SUMMIT IND. EST
PRESTON PR5 8AU
TEL: 01772 312101

TV WHOLESALE

COLOURTRADE

ESTABLISHED 1973 - WHOLESALE ONLY

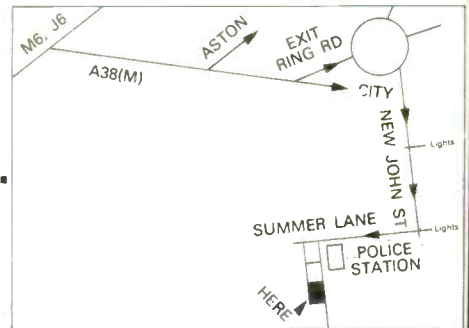
NEW 'B' GRADE

Major Brands ONLY. TV's - Video - Audio.
Microwaves, Satellite Receivers, Decoders.
Camcorders - Phones/Fax.

COMPLETE BOXED - WITH STAND - HANDSET - BOOK ETC
MINT LATEST NICAM FASTEXT F.S.T.

FERGUSON

FULL RANGE - ALL CURRENT MODELS OF TV-VIDEO IN STOCK No minimum quantity



NATION-WIDE NEXT DAY DELIVERY SERVICE - VISITORS BY APPOINTMENT

Phone 0121-359 7020

FAX 0121-359 6344

221-222 BRIDGE ST WEST, HOCKLEY,
BIRMINGHAM B19 2HU - JUST OFF M6-J6



AERIALS

FOR TV & FM RADIO, PLUS 1000's
OF MASTS, BRACKETS, LASHING
KITS, CLAMPS, PLUGS, CABLES,
OUTLETS, DIPLEXERS ETC

AMPLIFIERS

FOR DISTRIBUTION SYSTEMS
AND DOMESTIC, MAST HEAD
OR SET BACK. WE HAVE ONE
OF THE LARGEST RANGES,
AVAILABLE FROM STOCK

MAIN DISTRIBUTORS

FOR ANTIFERRENCE, LABGEAR,
WOLSEY, FRINGE, IKUZI,
MAXVIEW, VOLEX-RAYDEX,
KUBLER + MANY MORE

COASTAL

AERIAL SUPPLIES

UNIT X2, Rudford Industrial Estate, Ford, Arundel

01903 723726

NO MINIMUM ORDER VALUE
NEXT DAY DELIVERY ACROSS UK
CARRIAGE FREE ON ORDERS £250+



STARVISION

**SUPPLIERS OF HIGH QUALITY
EX RENTAL - EX DISPLAY
TV & VIDEO**

ALL SETS ARE FULLY SERVICED WITH
REMOTE CONTROLS AND ARE READY
FOR RETAIL SALE

MOST POPULAR MAKES ALWAYS IN
STOCK AT PRICES THAT WON'T SHOCK

ALL PRICES INCLUDE V.A.T.
NO MINIMUM QUANTITY

RING TODAY FOR LATEST PRICES
TELEPHONE
0121 502 3016 - 0121 505 1033

**STARVISION
UNIT A, BRUNSWICK PARK ROAD
WEDNESBURY, WEST MIDLANDS
WS10 9QR**

TV WHOLESALE

**THORNS
RENTAL
GRANADA**

CENTRAL TV WHOLESALE DISTRIBUTION LTD

THORN TX9, TX10, TX100 FST
please ring now for best prices

FOR BEST DEALS ON
DORICS MK4, Mk4a Basics...
RING NOW!

GRADED TVs
AND VIDEOS:
POA

FULL RANGE OF
PANASONIC VIDEOS
NOW IN STOCK: POA

WORKING VIDEOS
NOW FROM ONLY:
£30.00

FOR ALL EXPORT
ENQUIRIES TV AND VIDEOS,
CALL OUR BIRMINGHAM
OFFICE NOW!

PHILIPS K35, K40
Teletext TVs
from: £40 Working

**ATTENTION ALL BULK BUYERS
RING NOW FOR DIRECT LOADS**

**LARGE SELECTION OF SLIMLINE
VIDEOS, FULL REMOTE from £45.00**

**Finlandia Nicam TV
21"/24"/28' models:**

D66J25x8 D66J26x2 C51H26x17
C59HP6x7 C59HZx3 C66H25x8
C66HZ6x5 C59GZ7x4

SATELLITES, VIDEO CRYPT

SRX200. SRD400, PACE 9000 9200 IRD.
PACE 800. VIDEOCRYPT. AMSTRAD
510/540 and more: POA

**WORKING PORTABLE
from only £35**

**LARGE SELECTION of FST TVs
from £45**

**London contact: Joshi
Eley Estate, Nobel Road,
Edmonton N18**

Tel: 0181-807 4090 Fax: 0181-884 1314

**Birmingham contact: Mick
369 Startford Road, Sparkhill,
Birmingham B121**

Tel: 0121-772 1591 Fax: 0121-766 6383

TV WHOLESALE

RED BANK

MANCHESTER'S No. 1 WHOLESALER

HAS MOVED!!
BIGGER PREMISES, MORE CHOICE

WORKING TELETEXT FROM £25

Televisions from £5. Videos from £25
Portables from £30, FST from £40

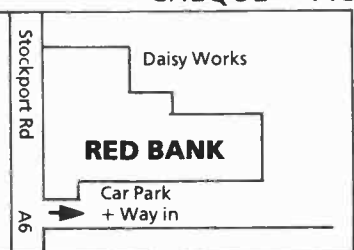
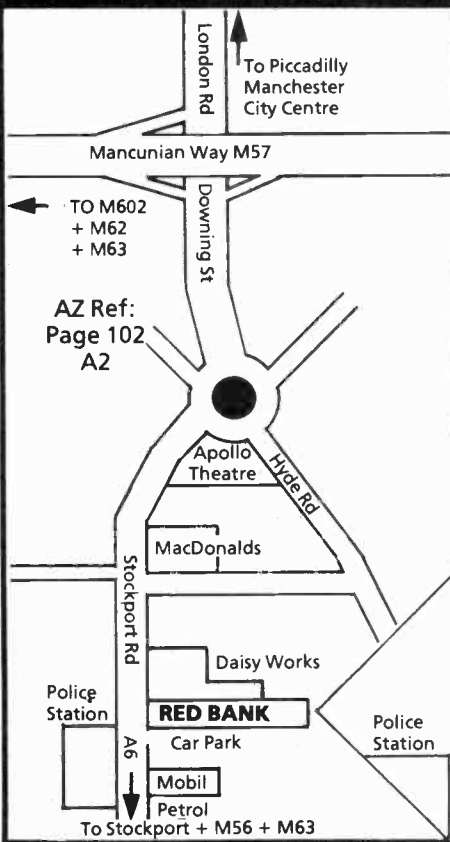
NICAM TVs FROM £65

New Hand Sets from £6
Open Mon to Fri 10am till 5pm
1000s TV's In Stock

CHEQUE — ACCESS — VISA — SWITCH

**345 Stockport Road
Ground Floor
South Area
Daisy Works
Longsight
Manchester**

Phone: 0161 273 8343
Fax: 0161 834 6368
Prices subject
to
VAT



REPO WHOLESALE

DAISY WORKS, 345 STOCKPORT ROAD
LONGSIGHT, MANCHESTER M13 0LF
0161-273-2854/274-3409/Fax 273-4486

**TOP QUALITY
CLEAN WORKING FST
GOOD QUALITY "TOP RANGE"
WORKING VIDEOS**

If you are in the area call in and see what we can offer

COMPETITIVE PRICES

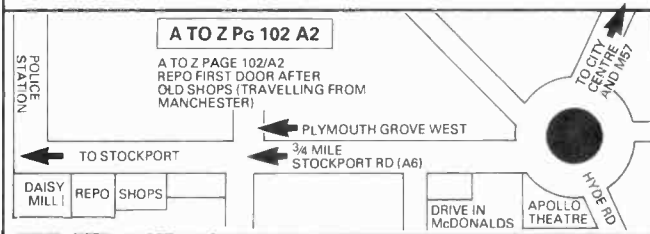
★ REGULAR SUPPLIES ★

PLEASE PHONE FOR CURRENT STOCK POSITION

★ NEW HANDSETS IN STOCK ★

*No order too small – If you are new to the
business call in and let us help you*

CHEQUE/CASH/ACCESS/VISA/AMEX ETC.



MANUFACTURERS 'B' GRADED STOCK

**Televisions, Videos
Audio, Music Centres
Microwave Ovens**

Complete, reboxed, working
Current model stock

**Turner Lyons Enterprises Ltd
9 Howard Place,
Shelton**

Stoke on Trent ST1 4NN

Contact David or Ken

01782 285416

TUBES

THIS MONTH'S SPECIAL OFFERS

59EAK00X01	NEW	£109
51EAK01X04	NEW	£49
3702B22	NEW	£39
34EAC	B grade	£39
2701B22	B grade	£29

We have a vast range of **FIRST CLASS RE-GUNNED TUBES** for domestic televisions. (Your original tube may be required in advance).

We stock a huge range of **EX-EQUIPMENT TUBES** reclaimed from new or used sets

1000's of C.R.T's in stock

Ring Irene or Jane for
price and availability

Carriage and VAT extra

EXPRESS TV

The Mill, Mill Lane,
RUGELEY, Staffs WS15 2JW

Tel: 01889-577600

Fax: 01889-575600

TV WHOLESALE

TELEPRICE

LIMITED

Leaders in the supply of:

Ex-rental, End-of-line, Customer returns and Surplus stocks of Televisions,
Video and Audio Equipment, and Domestic Washing Machines,
Dryers, Refrigerators, etc.

to the Trade

Contact your nearest Area Manager for latest prices:

Area	Contact:	Mobile:	Fax/Tel:
South East	Colin Gordon	0374 738701	01227 741312
South West	Tony Lewis	0374 732784	01291 425018
North/N.I.	Ian McClelland	0831 597331	01244 400602

Head Office: Baird House, Arlington Business Park, Theale, Reading, Berks RG7 4SA.

Tel: 01734 309933 Fax: 01734 309934

TV WHOLESALE

NEW LOW PRICES ON GRADED STOCK ALL BOXED WITH INSTRUCTIONS TESTED & WORKING

14" Remote Portables.....	£85
14" Fastext.....	£95
14" Televideo.....	£175
20" Remote.....	£79
20" Text.....	£95
21" Remote.....	£89
21" Nicam.....	£129
20" Televideo.....	£235
25" Fastext.....	£195
25" Nicam Fastext.....	£235
28" Nicam Fastext.....	£255
L/P Videos.....	£95
C/D Midi Systems.....	from £75

Various makes

Ex Rental T/Vs, lots of 50
25 x Basic 25 x Remotes £500
Front Loading Videos. Lots of 10 – £150

Parcels of FST T/Vs £35 each
Parcels of Videos £35 each
Various late models

FRONT LOADING VIDEOS – WORKING
£40 EACH

W. TREE TRADE WAREHOUSE
Unit 1, Sunshine Mills, Wortley Rd, Leeds
Tel: (0113) 2638804 Fax: 2310275

W.M.T.V.

THE LARGEST INDEPENDENT
WHOLESALERS IN WALSALL

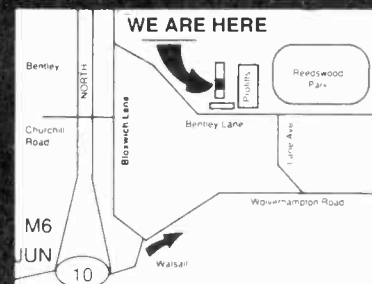
– SUPPLIERS OF HIGH QUALITY EX-RENTAL
TVs AND VIDEOS TO THE TRADE
AT COMPETITIVE PRICES

ALSO AVAILABLE: NEW B-GRADE PRODUCTS
– TVs, VIDEOS, AUDIO & MICROWAVES –
ALL TESTED & BOXED

Satellite Receivers and Export Enquiries Welcome
½ Mile off Junction 10 M6. *Easy Parking Facilities*

UNIT 3, BENTLEY LANE BUSINESS PARK
BENTLEY LANE, WALSALL WS2 8TL
Tel: 01922-724542. Fax: 01922-722208
Mobile: 0831-246622 (24 Hours)

OPEN:
MON-FRI,
9-6pm
SAT 9-2pm
SUNDAY BY
APPOINTMENT
DELIVERY
SERVICE
THROUGHOUT
THE COUNTRY



No other consumer magazine in the country can reach so effectively those readers who are wholly engaged in the television and affiliated electronics industries. They have a need to know of your products and services.

CLASSIFIED

PHONE 0181-652 8339

FAX 0181-652 8931

The prepaid rate for semi display setting is £13.50 per single column centimetre (minimum 4 cm). Classified advertisements £2.00 per word (minimum 20 words), box number £22.00 extra. All prices plus 17 1/2% VAT. All cheques, postal orders etc., to be made payable to Reed Business publishing. Advertisements, together with remittance, should be sent to Television Classified, 11th Floor, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS

SERVICE MANUALS & TECHNICAL BOOKS

NEW

VIDEO RECORDER POWER SECTION CIRCUITS ON PC CD-ROM

The most common electrical faults found in Video Recorders relate to the Power Supply section. Why purchase a full manual just to repair a power supply fault. This new publication, only available on PC CD-ROM format contains the power supply sections, both circuits and layouts etc for hundreds of assorted Makes and Models of Video Recorder. Just the job if you repair Video's on a regular basis. For use on any reasonably fast PC with CD-ROM and Printer attached. Just view or print out the .PCX image of the model you are working on.

Normal Price £49.95 Plus VAT.
Special Introductory Price just
£44.95 + VAT & £2.50 P/P. Total £55.75
Order Code MP-203

Computer Monitor Compilations Volumes 1 and 2.
Now combined on 1 CD-ROM including
FREE Servicing Guide. Order Code MP-333.
Just £44.95 + VAT & £2.50 P/P. Total £55.75.

We have the largest range of Service Information and Technical Data obtainable anywhere. For Televisions, Video Recorders, Test Equipment, Computer Monitors, Vintage Wireless, Domestic Equipment etc etc.

In fact practically anything electronic.
Originals or Photostats as available.

Also available. Our catalogues detailing Hundreds of Technical Books and Repair Guides. Return coupon for your FREE copy. Also available, our entire Index of Service Manuals available on PC Disc. (Code MP-285) Just £3.50 + VAT (Total £4.11) with FREE updates.

MAURITRON TECHNICAL SERVICES (TV)

8 Cherry Tree Road, Chinner, Oxfordshire, OX9 4QY
Tel:- 01844-351694. Fax:- 01844 352554.

Please forward your latest catalogue for which I enclose 2 x 1st Class Stamps. I enclose payment for MP-203 CD-ROM (£55.75). MP-333 CD-ROM (£55.75). Please supply Index on PC Disc for £4.11 inclusive. **Circle items required**

NAME _____

ADDRESS _____

POSTCODE _____ You may pay by Cheque, PO or

Visa, Access, Delta, Electron, JCB, Mastercard, Eurocard etc

EXPIRES _____ SIGNATURE _____

CLASSIFIED TEL: 0181 652 8339

SERVICE MANUALS

Thousands of different models available
For most U.K. European, Far East & USA makes

Prices (Stock Items):-

VCR - £13.00
CTV - £8.00
MTV - £6.00

Other items, prices on request
P/P etc. (any quantity) add £2.00
Do not add any VAT

Cheque/PO with order only please.

D-TEC

PO BOX 1171, FERNDOWN, DORSET BH22 9YG
Tel: 01202 870656

TV/VIDEO/SATELLITE/HI-FI FAULT GUIDES and SERVICE SHEETS FRYERNS

Most makes covered Old and New.
This Service offers Workshop Service Sheets
and Technical Advice Fault Guidance.

Prices from £3.50 plus £2.50 P/P and handling on
2 items or more P/P free, but add £1.50 per item
handling charge.
i.e. 1 item - total £6.00. 2 items - total £9.50.
3 items - £13.00. 4 items - £16.50.

PAYMENT BY CREDIT CARD OR POSTAL ORDER.
NEXT DAY DELIVERY PLEASE PHONE FOR
AVAILABILITY.

Telephone/Fax: 01268 470899
Phone anytime, 7 days a week.
4 Pincey Mead, Basildon, Essex SS13 3EW.

"Due to the untimely and sudden death of James, who will be sadly missed. A period of disruption has finally ended and the family business will continue as James would wish"

CLEARANCE SALE

30 Nicam TV's
Finlandia,
Phillips

Untested £50 each.
Other FST's available

Telephone
0114 231 2832

PROFIT BOOSTERS

Efficiency in the busy workshop is more important than ever, Increase **your** productivity with our latest range of **Technical publications**.

FAULT INDEXES: Edition 15 now available, Over **11,600** references listed in 12 years of Television. covers **Tv, video, camcorder, satellite & CD** Thousands of copies sold worldwide - **complete set £14.75**

INDEXES ON DISK: PC version 1.1 Now available Covers **15 Years & over 14,000** references - Complete Program, Data & manual, A **lot** of information **£17.50** Requires IBM PC or compatible, 8086 upwards, Mono, CGA, EGA, VGA **Please specify disk size (3.5 or 5.25 inch HD) when placing your order.**

OTHER TITLES AVAILABLE INCLUDE :

KWIK TIPS TELEVISION covering a wide range of makes, models & chassis, Contains over **2500** faults & solutions. ISBN 1 898394 00 8 First edition - **£13.95**

KWIK TIPS VIDEO an excellent collection of over **2000** video faults & solutions, Highly recommended. ISBN 1 898394 01 6 First edition - **£10.95**

Chassis & equivalent identification made easy with the **E.C.S. Television & video equivalents, TV model to chassis guide & camcorder equivalents** A massive **4500** entries in 1 book. First edition - **only £4.95**

E.C.S. 31, PRENTON ROAD WEST,
PRENTON, BIRKENHEAD,
MERSEYSIDE. L42 9PY.

Technical publishing

Please add **£1.75 P & P** to total (europe **£2.75**, r.o.w please enquire).

TRANSFORMERS

TV LINE OUTPUT TRANSFORMERS

PHONE: 0181-948 3702 FAX: 0181-332 0583

ALBA · AMSTRAD · BUSH · DECCA · DORIC · BLAUPUNKT · FERGUSON · FIDELITY · GEC · GRUNDIG · GRANADA · HITACHI · HINARI · INDESIT · ITT · KIMARA · NIKKAI · MATSUI · MURPHY · OSAKI · NORDMENDE · LOEWE-OPTA · PANASONIC · PYE · PHILIPS · SANYO · SAISHO · SHARP · SONY · SOLOVOX · SUSUMU · TANDBERG · TELEFUNKEN · THORN · TRIUMPH · THOMSON · GOLDSTAR · BINATONE ·

FULL RANGE OF KONIG: VIDEO HEADS, BELT KITS, IDLERS, PINCH ROLLERS, TENSION BANDS. LARGE RANGE OF REMOTE CONTROLS IN STOCK

TIDMAN MAIL ORDER LTD · 236 SANDYCOMBE ROAD · RICHMOND · SURREY · TW9 2EQ

Approx. 1 mile from Kew Bridge.

Mon-Fri 9 am to 12.30 pm & 1.30-4.30 pm

WANTED

BILLINGTON Billingshurst, West
EXPORT LIMITED Sussex RH14 9EZ

VALVES WANTED FOR CASH

(KT88 £48, PX4 £50, PX25 £80, DA100 £90, EL34 £10, EL37 £9, CV4004, ECC83 £2.50) Valves must be Mullard/GEC West European to achieve the prices mentioned. • We will always equal any genuine rival offer on the above valves • Ask for our free Wanted List.

WE SUPPLY VALVES, C.R.T., VIDICONS ETC

Visitors, please phone for an appointment, we're a very busy export warehouse.

Tel: (01403) 784 961
Fax: (01403) 783 519

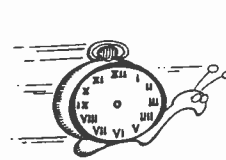
MÜTER, BMR 95 AT2, BMR 700



Best quality test and regenerating equipment at Best prices.

P. & E. Services
34 Glan-y-Mor Road, Penrhyn Bay
Llandudno LL30 3PF
Tel: 01492 549246
Fax: 01492 547880

!TIMEWARP!



ALL VCR & CTV MANUALS REDUCED TO 1990 PRICES

THIS ISN'T A SALE, THIS IS A LONG-TERM REDUCTION

Helping you to fight rising costs

SERVICE MANUALS SERVICE SHEETS CIRCUITS FAULT GUIDES TECHNICAL BOOKS
We Have the World's Largest Selection of

SERVICE MANUALS

...Repair-Manuals-Circuits-Fault Guides Etc...
SERVICE MANUALS SERVICE SHEETS CIRCUITS FAULT GUIDES TECHNICAL BOOKS

CTV CIRCUIT COLLECTIONS

A3 SIZE / ALL POPULAR SETS / UPTO 1995

Alba	£22	Amst'd/Fid	£21	Baird/Ferg	£45
Decca	£22	GEC	£28	Goldstar	£12
Grundig	£38	Hinari	£14	Hitachi	£45
ITT	£22	JVC	£30	Mitsubishi	£38
Pansic	£30	Philips	£40	Sanyo	£28
Sharp	£14	Sony	£49	Toshiba	£38

Top Selling Titles

PRACTICAL TV / VCR REPAIRS Buy, Sell, Service, Used CD's/VCR's/CTV's
£16.95 Each / £30.00 for both £9.95 Each, or all for £25.00
Euro' Scrambling Systems/Satellite Book MICROWAVES: Energy & Ovens
Only £32.00 Each / £62.00 for both Still only £12.95
Principals of CD/VHS Video Heads/CD Jlg VCR Servicing by Beeching
Only £3.95 Each Still £25.00

SPECIAL MANUAL OFFERS

ANY 20 MANUALS FOR £200 (Inc p&p)
All at once, or phone as you need them

OR

JOIN THE STREE LIBRARY FOR £75
(£20 yearly renewal) AND BUY ALL
MANUALS FOR **£10 EACH**, OR SWAP AT
£5 A TIME (Add £2.50 p&p)

PHONE OUR **HOTLINES ON:**

(01698) 883334/884585 Fax: 884825

Technical Information Services
76 CHURCH ST, LARKHALL, LANARKS, ML9 1HE

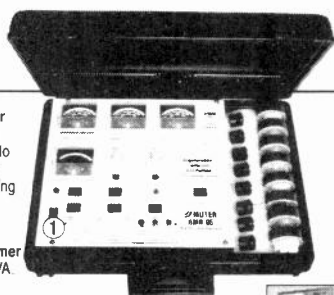
SEND AN SAE FOR YOUR FREE QUOTE & CATALOGUE

CLASSIFIED TEL: 0181 652 8339

TEST EQUIPMENT

LINEAGE

MÜTER

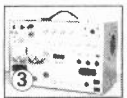


● **BMR 95** unique Regenerating-Computer and Analyser for CRTs, regenerates picture tubes even better, also if all other machines do not succeed, removes short filament-cathode-grid 1-grid 2, with FLASH-EX against remaining gas, 162 adapters available, list with 12.500 tubes-types, pays itself within 4 weeks

● **RTT 3** Safety isolated variable Transformer input 220/230 V, output 0-270 V / 4 A, 1100 VA

● **AT 2** audio multi-function tester, substitutes 16 devices, has all usual sockets, cuts down repair time, takes you through all necessary test-steps by button controls

● **CBE** Screen-Demagnetiser with strongest field for screens up to 110 cm. 220/230 V, 2.7 A, 600 VA



Ask for free catalogue

S.E.M.E. Ltd, Melton Mowbray, Leicester
Phone (0 16 64) 65392, Fax 63976

IRL: Dönberg Electronics, Ranafst, Co Donegal
Phone (0 75) 4 82 75, Fax 7 10 31

THE "HOOKINGS" INDEX More than 10,000 entries from the "TELEVISION" magazine. Bang up to date. £9.00. Ring 01766 522444 for free sample.

FOR SALE by independent rental company, substantial quantities of working Ferguson 20"/22" TX9/TX100 basic TV's together with top loader video's. Approx 500 units in all, offers to clear or will consider selling in smaller parcels. Telephone: Mr Costello on 01203 636162.

VINTAGE SERVICE DATA - Circuits and manuals - for Hi Fi, Military, Television, Electrical, etc up to 1970s. Free brochures. Tudor Gwilliam-Rees, 50 Meddon Street, Bideford, North Devon EX39 2EQ. Tel: 01237 424280.

WANTED PHILLIPS Ex BSB Satellite receivers wanted for cash. Tel/Fax: 0181 984 0831.

AVO MULTIMETER Model 8, £45.00. 500 volt meggers £30.00. Prices plus VAT and p&p. Send SAE for lists of Surplus Instruments and Scopes etc. A.C. Electronics, 17 Apleton Grove, Leeds LS9 9EN. Tel: 0532 496048.

OCHRE MILL Technical Services, Grundig TV spares for most models to 1985, fast, friendly, helpful, sensible prices. Gt Lype Farm, Charlton Nr, Malmesbury, Wilts SN16 9DR. Tel: 0666 823228.

SONY, PANASONIC, Grundig, JVC, Phillips, Manuals, Various spares, Triplers, Loop I.C.'s, Transistors, Resistors, Instruments, Audio-Spares, Chassis, M/wave job lots. Tel: 0181 200 0987.

25 MICROWAVES £250 spares or repairs, can deliver. Tel: 01831 788362.

PRIVATE RETAILER has excellent part exchange colour televisions and videos to clear. Tel: 0494 814317.

FOR SALE

J. W. OZELTON & SON

Secondhand car radio cassette for sale prices from £40.00 plus post and package.

(Most Makes Available)

Car radios decoded, repaired and serviced

100 Church Road, Stockton On Tees, Cleveland TS18 1TW
Tel: 01642 614172

SPARES & COMPS

RCS VARIABLE VOLTAGE D.C. BENCH POWER SUPPLY



Up to 38 volts DC at 6 amps continuous, 10 amps peak. Fully variable from 1 to 38 volts. Twin voltage and current meters for easy read out. 240 Volt AC input. Fully smoothed. Size 14 1/2" x 11" x 4 1/2".

RADIO COMPONENT SPECIALISTS

337 WHITEHORSE ROAD, CROYDON, SURREY, UK. Tel: 0181 684 1645
Lot of transformers, high volt caps, valves, speakers, in stock. Please or send your wants list for quote

SURPLUS/REDUNDANT ELECTRONIC COMPONENTS WANTED

I/Cs - Tuners - Transistors - Valves - Diodes etc. any quantity considered - immediate payment.

ADM General Trading

Tel. 01827 873311 Fax. 01827 874835

For all your classified requirements contact

Pat Bunce

Tel: 0181-652 8339

Fax: 0181-652 8931

RECRUITMENT

Philips Communication and Security Systems

A part of the successful Philips group, Philips Communication and Security Systems manufacture a wide range of products and solutions for on-site communication and electronic security.

A powerful combination of technical expertise, marketing flair and quality products has ensured our leadership in this field.

Our Customer Service Department is responsible for providing an efficient and courteous support operation over the Company's range of products and services. We are currently seeking an enthusiastic individual to join this highly professional team.

Customer Support Engineer

Based at our Watford office you will be required to install, commission and service the Company's product portfolio, concentrating particularly on our CCTV range.

As the Company's representative you will be expected to deal with a wide variety of customers from industry and commerce in a professional and effective manner. You may also be asked to appoint and manage sub-contractors on site, ensuring that they maintain the high standards expected by our customers.

To succeed in this challenging role you will fully utilise your skills in fault finding to component level. You will be qualified to HND level or to City and Guilds 224 Part 3 in Electronic Servicing and have gained experience in radio or television servicing. Equally important is your ability to work on your own initiative with a high standard of personal presentation.

A full driving licence is essential as the position will require travel around the M25 Corridor.

To apply please write with your CV, stating your current salary and quoting reference CS072W, to: The Personnel Department, Philips Communication and Security Systems, Cromwell Road, Cambridge CB1 3HE.

(NO AGENCIES PLEASE)

Let's make things better.

Philips Communication and Security Systems



PHILIPS

accent

TECHNIC CAMCORDER REPAIRS

Collection and delivery anywhere in the UK. All makes, fast service. Phone free for details.

(0800) 281009 VISA

WANTED

WANTED

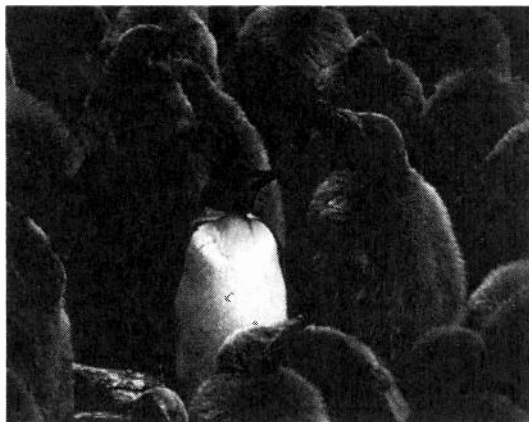
> BSB <
DECODERS
CASH PAID
TELEPHONE

01246 455150

RECRUITMENT

Kidderminster, Bridgwater, Bedford, Macclesfield, Burnley, Leeds, Kendal, Poole.

AUDIO/VISUAL BENCH ENGINEERS



We're looking for people who really stand out!

NORWEB is one of the leading electrical retailers in the country with a large chain of high street shops and out-of-town stores.

We have vacancies for Bench Engineers based at the above stores and a variety of field positions based throughout the country.

You will use your technical skills to ensure that all customer and stock repairs are carried out quickly, accurately and with the minimum of fuss. However this is only part of the story: a lot of your time will be spent with customers, talking over any A/V problems they may be experiencing and offering advice and reassurance in a friendly and sympathetic manner. Therefore your role is crucial to maintaining our current high standards of customer service.

To fill this role to its full potential demands a special blend of experience and skills. You will need to be a fully qualified engineer with well developed communication skills and the motivation and enthusiasm to deliver your best at all times.

You will work a 39 hour, five day week spread over six days, which includes every Saturday and two late evenings. Because we value highly the skills and commitment you will bring to the role, we offer a competitive salary, excellent holiday allowance and generous staff discount. You would expect nothing less from NORWEB Retail, one of the country's leading electrical retailers.

If you are interested in these positions, please send a full CV outlining your experience and current salary and stating preference for Bench or Field, to: NORWEB Retail Personnel, PO Box 148, Manchester Road, Bolton BL3 2SW no later than Friday 31st May 1996.

Applications will only be acknowledged on receipt of an S.A.E. If you have not heard from us within three weeks of the closing date, please assume that you have been unsuccessful.

Equal consideration will be given to all applications, irrespective of sex, race, creed or disability. To support a healthy working environment NORWEB operates a No Smoking policy.



NORWEB
ELECTRICAL SUPERSTORES

T15063

To promote your service in Television Magazine at cost effective rates
Call Pat Bunce now on
Tel: 0181 652 8339
Fax: 0181 652 8931
You can pay by using the following credit cards.

CLASSIFIED GETS RESULTS

IF YOUR COMPANY HAS A VACANCY

For Experienced TECHNICIANS Or ENGINEERS Etc

Why not let TELEVISION help you find the right person by placing your recruitment advertisement with us

For Further Information Call

PAT BUNCE on

Tel: 0181 652 8339

Fax: 0181 652 8931

CLASSIFIED TEL: 0181 652 8339

ADVERTISERS' INDEX

Aerial Techniques.....	559	Euras	603	PV Tubes	603
Alban Electric.....	602	Gogglebox	607	Red Bank	610
AZ Electrics	592	Grandata Ltd.....	542-546, 551-555	Repo TV.....	611
Autogard.....	590	Hardy, J. W.....	592	Senz Components	IBC & BC
Besco	606	Harrison Electronics	606	Star Vision	609
Bull Electrical	595	HCTV.....	608	Steward of Reading	590
Campion Wholesale TV Ltd.....	607	HST Distributors London.....	607	Swift Television Publications.....	575
Central TV Wholesale	610	J.J. Components.....	579	TV Live	560
Coastal Aerial Supplies	609	Manor Supplies	571	Teleprice Ltd	612
Colour Trade	609	Manzan	603	Turner Lyons.....	611
Cricklewood Electronics	592	Marapet Electronic Components... ..	590	Vista Electronics	591
CTV	607	Muter, Ulrich	613	Welwyn Tool	590
East London Components	589	OZAN	577	Willow Vale Electronics Ltd.....	561
Economic Devices	580-581	P.C. Control.....	596	W. Tree	612
Electronic Sound Systems.....	585	Philex.....	IFC	West Mid TV	612
Express TV	611				

TA8691N	£3.00	BUX84AF	£0.50	HGA1124A	£0.50
TDA1510	£2.00	BY187	£0.05	HA11440	£1.00
TDA1521A	£2.00	BY228	£0.10	HA11485	£1.00
TDA1543	£1.00	BY229	£0.06	HA11485ANT	£1.50
TDA2460	£2.00	BY255	£0.05	HA118041NT	£1.50
TDA2582	£1.00	BY299/200	£0.15	HA1196	£0.50
TDA2541	£1.00	BY299/800	£0.30	HA51338SP-1	£2.00
TDA2600	£2.00	BY171/800	£0.15	HA51338SP-3	£2.00
TDA2611A	£1.00	BYV19-30	£0.15	HCF4520	£0.50
TDA2613	£1.00	BYV28-200	£0.15	HCF4520BE	£0.50
TDA3048	£1.00	BYV95	£0.03	HD6140425 J11	£0.50
TDA3564	£3.00	BYV95B	£0.04	HEF4029BP	£0.20
TDA3565	£3.00	BZW - C110	£0.05	HEF4093	£0.20
TDA4650	£3.00	BZW83 - C20	£0.03	HE4528BP	£0.15
TDA8417-3	£3.00	CA3123Q	£0.50	HM6264ALP-15	£3.50
BU801	£0.50	CD4555BE	£0.20	INS401	£0.03
BUK454/600	£0.40	FE3B - General Inst	IR106A	£0.10	
BW11	£0.40	Diode	£0.04		

AN5551	£1.00	T/V FERGUSON	
ST6385BB 1/BFY	£2.00	Car Adaptor TA183 12v In 7.5v Out	
SN96551 NL	£3.00	500M/A	
SAA1061	£3.00	£5	
SAA3018	£1.00	STK5481	
STR5804I	£4.00	£4	
BF870	£0.20		
BF869s	£0.20	STR4211	£5
UPD6376CS	£3.00	STK4793	£5
BC550C	£0.20	LA7830	£1
M58658P	£1.00	LA7831	£1
M708 AB1	£1.50	ST6391BI/BC	£2
M708 LB1	£1.50		
BY208-800	£0.10	FERGUSON ICC7	
BYV28/200	£0.10	T/V Amplifier	
		2 way Gain 7DB	£8
2435121	£10.00	ICC7 NICAM	£7
2436792	£10.00	IK2 PANEL	
2436797	£10.00		

Small panel meter 500. °A, 500 Centre	£1.50
Phono Plugs	£0.10
Tower 7mm Plastic clips 100 off box	£0.50
Infra-red TX100 Receiver IC SL486	£0.50
Hitachi 68P Issue 6 Teletext PWB F.S.T.	£15.00
Hitachi PC315-11 Issue 7 Teletext Panel	£15.00
Hitachi PC232A5 Issue 4 Teletext Decoder	£15.00

2435063	L.O.P.T.	£10	Focus Pots	
2435085			K40	£2

Etri 240v fan 6in	£8.00		
DL701 Delay	50p	TMP47C634N/2685	
DL711 Line	50p	£1	

Matsui VX3000 Hand Set	£3.00	TMP47C634N	
VCR Head VX3000	£10.00	£1	

Matsui VSRI500 Head	£10.00
Hand Set	£5.00
Power Supply	£6.00
Main Panel	£5.00
Capstan Motor IC No M56730 ASP	£10.00

Hitachi Capstan Motor ACE G4-B to ACE G40-B	£10.00
Hitachi Video Hand Set RM933E	£30.00
VT530 Pre-Amp	£10.00

Amstrad VS1000-VS1100 Power Supply	£6.00
------------------------------------	-------

4MHz XTALS	30p Each	Text Panel No. T1228B	
6MHz XTALS		for Ferguson	
4.4 T/V XTALS		TX89-TX98-TX100	
8.8MHz T/V XTALS			

Amstrad - Perdeo	
Fidelity - Decker - Tatung	
Plastic - Front Panels for all 1992 Models	each £4.00

Mitsubishi RMM35 Hand Set Video	£5.00
Nokia RC202 Hand Set	£4.00
Sanyo A09801 Hand Set Video L.C.D.	£7.00
Siemens Hand Set 1994 Model T/V Video	£5.00
Tuner Env-57459G1 UHF-VHF	£3.00
UF754B UHF Tuner	£3.00

FV31R FERGUSON	
64 pin Main IC HD6140815	£1

FERGUSON TX9 - TX10	
IF PANEL	£4
TX85 8 Push Button Unit	
TX86 8 Push Button Unit	£5
TX85 Switch MOD	
TX86	
TX89	

J. V. C., Ferguson and Philips Cassette Adapter
VHSC/VHS, also for S-VHS £10

TX89 Tubase Panel	£5.00	Orion Motor	
TX98 Tubase Panel	£5.00	50p each	
TX99 Tubase Panel	£5.00	Canon Motor 12v	50p

2N2/2KV	PULS 15p EACH	Capstan Motor £4	
4N7/4KV		Mitsubishi HSE41 IC on Motor M51782ASP	
5N6/2KV		Burglar Alarm Kit - Professional unit, open and closed circuits, entry/exit delay, adjustable, audible, arming, panic, anti-tamper siren driven direct, 12V DC, fire quality glass rollerlensed PCB	£12.00
6N2/2KV			
9N1/2KV			
11N/2KV			

35V/3300 Can	25p		
U412 Tuner	£5.00	8 Way Tuning Pots	50p
UHF Small Tuner UE30 and UE33			£3.00

Power Supply 12V - 3amp			
for Ferguson Video Star Camera			£4.00
24V Sub Min Relays			£0.25

Positor 2322 662 98009	50p	3 Pin POS. PTH451	
Positor 2322 662 98012	50p	Black Type	50p

PERISWITCH	£6.00
------------	-------

LOPT - 3216001	£5.00
LOPT - 3714016	£5.00
LOPT - AT207125 - TOSHIBA	£10.00
LOPT - AT207781	£12.00
LOPT - DST186N243 473-058	£10.00
LOPT - DST85B243 401-532-00	£10.00
LOPT - DST85B243 401-532-00	£10.00
LOPT - DST85B243 401-532-00NC - FERGUSON	£10.00
LOPT - DST85B243 472-359-01NC - ICCS	£10.00
LOPT - DST85B243 473-197-00NC - FERGUSON	£15.00
LOPT - DST88B243 400-086-AONC - FERGUSON	£10.00
LOPT - DST88B243 400-086-AONC - IK2	£10.00
LOPT - DST88B243 400-086-AONC - TOSHIBA	£10.00
LOPT - DST88N243 478-052-000 - TOSHIBA	£12.00
LOPT - DST88N243 478-052-00C - IK2 FERGUSON	£10.00
LOPT - DST88N243 478-052-00C - TOSHIBA	£10.00
LOPT - DT2076-78	£10.00
LOPT - FCC2015DE	£12.00
LOPT - FERGUSON - GREEN SPOT	£12.00
LOPT - FERGUSON - WHITE SPOT	£12.00
LOPT - T60451 - FERGUSON	£10.00
LOPT - TC2203 - NATIONAL PANASONIC	£15.00
LOPT - TFB3035D	£10.00
LOPT - TFB3089D - TOSHIBA	£8.00
LOPT - TFB4023AD - TOSHIBA	£10.00
LOPT - TFB4032HD - TOSHIBA	£10.00
LOPT - TFB4038AD	£10.00
LOPT - TFB4088AD - TOSHIBA	£8.00
LOPT - TFB4110AD - TOSHIBA	£10.00
LOPT - TLF1456B - NATIONAL PANASONIC	£15.00
LOPT - TLF1457B - NATIONAL PANASONIC	£15.00
LOPT - TLF7016 - NATIONAL PANASONIC	£15.00
LOPT - TX89	£12.00
LOPT - TX98	£12.00
LOPT - TX99	£12.00
LOPT - Y260781 - FERGUSON	£8.00

MOTOR - CASSETTE TYPE - 12V WITH SPEED CONTROL	£0.50
PANEL - CMC115 - ITT FRONT PANEL - ITT	£6.00
PANEL - CVC80 POWER PANEL	£5.00
PANEL - ICCS CHROME BOARD - IC No. ON BOARD	
U4647 TKF OR HA11498	£6.00
PANEL - ICCS - TUBE BASE PANEL	£5.00
PANEL - IK2 - FM2211 STEREO	£5.00
PANEL - SEL 69112407 - ITT FRONT PANEL - SAME AS CMC303	£6.00
PANEL - SEL IFB 194P - ITT FRONT PANEL - ITT	£6.00
PANEL - SEL IFB150 U.K. - ITT FRONT PANEL - ITT	£10.00
PANEL - SEL IFB300 - ITT FRONT PANEL - ITT	£10.00
PANEL - TX9, TX10 - TUNING PANEL 1509G	£5.00
PANEL - TX10 - REMOTE PANEL 5400I	£5.00
PANEL - TX89	£10.00
PANEL - TX90 - THORN FRONT PANEL - 8 PUSH BUTTONS 01M4 515 002	£10.00
PANEL - TX98 - T135E FRONT PANEL W/INFRA-RED RECEIVER	£5.00
PANEL - TX98 - TUBE BASE PANEL	£5.00
PANEL - TX98, TX99, TX100 - REMOTE - M494B1 - 01V6/223/104	£10.00
PANEL - TX98, TX99, TX100 - REMOTE - M494B1 - 01V6/682/003	£10.00
PANEL - TX99	£5.00
CMC 200 DIGITAL CAPACITANCE MEETER 200 PF TO 20 MF	£28.00
R2000 SERIES FERGUSON VIDEO STAR DECK MECHANISM	£30.00

Tripod shoulder pod for camcorder	£5
Ferguson VA super 218 cardioid camera microphone telescopic boom and stand	£12.50
Ferguson camcorder battery VA366 6v-1400 M/A	£5
Mitsubishi video hand set r.m.m. 45	£7
Ferguson lens for camcorder 2 off tele conversion lens x 1.4 and x 0.7	£6
Ferguson TX98, TX99 Text Panel T1228B	£15

RC Matsui hand set	£5. Equivalant models Pace 900, hand set Ferguson, Sony, Grundig	£8
6 VA RS Encapsulated main transformer 0-120v-0-120v Pri 0-9v-0-9v Sec		
Burglar alarm kit main control panel. Send for data		£12.50

Ferguson tripods large type	£15 £1.50 post each
-----------------------------	---------------------

Bullet Type L.N.B.S. New	£3
Not Tested 10.7 to 11.7 GHz	

P.S.U. AC 12v 500MA	£1.00
P.S.U. AC 9v 1A	£1.50

ITT CMC201 Panel	£10
------------------	-----

SENDZ COMPONENTS
01702 338894
(To order see back page)

<p>£10 each FERGUSON Line Transformers</p> <p>FST Y260482 £10 TX9 LOPT £4 TX10 LOPT £6 Green Spot £10 White Spot £8 Blue Spot £10 Yellow Spot £8 Red Spot £6 TX85 £8 TX86 £8</p> <p>FERGUSON FST LOPT</p> <p>Y260482 £12</p>		<p>ICC5 Tube Base on Panel ICC5 Decoder Panel each £5.00</p> <p>KT3/K30 T/Text Handset £8.00 KT3/K30 Full Remote Pye & Philips Handset £8.00 KT3/K30 Chassis No. RC5150-RC5176-RC5071-RC5177 Special Price £8.00 RC4001 KT3 and Teletext £8.00 TX10 Handset Text £12.50 TX9 with Text £12.50 TX9 & TX10 Button Print £1.00 TX10 Focus Pots £4.00</p> <p>Mains Stand-by Switch with Coil £1.00</p> <p>Nicam Boards Texas Instruments Mk II £10.00</p> <p>Toshiba Nicam Board £6.00</p>	<p>SANYO U/V Video Hand Set £3</p> <p>HITACHI Handset £5.00 each CLE 874A CLE 883A CPT2158 (No Replacement) £5.00</p> <p>IR3506 All modules £8 each CPT1408T ITT IF Modules CPT2176 5827-01-51 CPT2178 5827-02-51 CPT2176 5827-03-51 CPT2478 5828-04-10 5829-02-58 5829-05-52</p> <p>£10 INVERTER 12V IN 24V OUT 9 AMPS</p> <p>ITT - NOKIA RF-IF Modules 4828-04-10 5827-01-51 5827-02-51 5827-03-51 5829-01-05 5828-03-41</p> <p>TV DIODES MIXED 100 for £3</p> <p>PANASONIC-TV Handsets for models: TC1632, TC1642, TC2232, TX2034, TX2044, TX2200, TX2234, TX2244, TX2200, TX2234, TX2244, TX2300, TX2636, TX3300, RC201 replaces TNQ1411/2 £8.00 each</p> <p>HITACHI sets STR454 £2.00 STR620 £6.00 SS2000AF £1.00 line o.p. £1.00 25C940 £1.00 BU105104 80p BU108 £1.00 BU1124 50p BU126 80p BU180h 65p BU204 75p BU205 60p BU206 £1.00 BU207 £1.00 BU208 80p BU208A £1.50 BU208D 90p BU222 £1.00 BU326 £1.00 BU407 60p BU508A 90p BU508AF £1.00 BU508D 80p BU705 £1.00 BU806A £1.00 BU807 £1.00 BU808DFI £1.00 BU826 £1.00 BUK454/600 £1.00 BUK24 50p BU111 50p BU11AF £1.00 BU113 600V-28A £1.00 BU118AF £1.00 BUW84 60p BYW208-9 £1.00 BYW95 10p BUX39 25A-150V £1.00 BUX84 50p BUY49 20p BUX444/800 £2.00 BUX445/600 £2.00 BUX454/600 £2.00 TDA3047 £1.00 TDA3048 £3.00 TDA3083 £2.00 TDA3190 £1.00 TDA3505 £3.00 TDA3506 £3.00 TDA3561 £3.00 TDA3560 £4.00</p> <p>Handsets Amstrad Export £3.00 Amstrad U/V £3.00 Amstrad 6800 £4.00 Amstrad 6000 £15.00 Amstrad 4700 £5.00 Amstrad 4600 £3.00 I0081 GEC £3.00</p> <p>FERGUSON Handsets iSB £1.50 ICCS £5.00 IK2000 £5.00 IK2000 £5.00 SRD 2 £1.00 SRD 3 £1.00 T780 £2.00 SRD 4 £1.00</p> <p>HITACHI Microwave Turntable Motor £10</p> <p>SANYO TDO 124EB UHF VHF Tuner £3</p> <p>SUPER HIGH CAPACITY BATTERY VA310 9.6V 1700 MA £4</p> <p>VPT ADAPTOR VA354 FERGUSON £5.00 (TEXT)</p> <p>06D4-025-001 Mains Input Choke for TX9 £4</p> <p>THORN M494B1 on Remote Panel £5</p>	<p>Amstrad Tuner UE33-B01 £3.00</p> <p>TX10 Focus Units £6 for £10.00</p> <p>Conversion Kit 111 Teletext £8.00</p> <p>Burglar Alarm Siren 12 Volt 50p</p> <p>Amstrad 6000 Head with motor L.P. £10.00 Good Lower Drum £3.00</p> <p>Tuners Nat. Pan. Small. UHF/VHF £3.00</p> <p>U321 - U341 - U342 - U343 - U344 - U944 Tuners each £5.00 U743 - U744 £3.00 Tuner. IF TERC8-022A TBJZ4-00ZA Alps £7.00</p> <p>15 Mixed hand set LCD Video T/V All new £20.00</p> <p>Keyboard Mains Adaptor 12v/800ma £5.00</p> <p>U411 - U412 Tuners each £5.00</p> <p>LNB'S MARCONI Ex Rental Black Cap £2.00 No Guarantee</p> <p>Bridge Rectifiers 10 for £1.00</p> <p>Matsumi Miniature Infra Red Receiver £1.00</p> <p>Turntable Satellite Modulator TV £1.00 Sound 5.5 MHz MPM 100T £1.00 Sound 6.0 MHz MPM 1040 £1.00</p> <p>FERGUSON CHASSIS Post £5.00 New TX 100 Yellow Spot £14.00 TX98 Chassis £20 ICC5 Chassis with all panels £35</p> <p>Ferguson FV31R Remote and Power Supply FV31R Display Panel Post £2 £5.00</p> <p>Quartz Halogen 500w. 200v. For outdoor lamps £1.00</p> <p>AMSTRAD Plastic Front with Flap 8.900 £3.00 Clock Display Panel 8.900 £5.00</p> <p>TX 100 FST Chassis LOPT No. 260482 £5 Post £20.00</p> <p>Sharp Tuner & IF 1810587 PA1 UK £3.00</p> <p>KT3/K30 Tripler £5.00</p> <p>U/V Tripler £4.00</p> <p>Grundig Tripler with Focus Pot £7.00 Grundig Universal Tripler Upright Printed Circuit type £7.00</p> <p>BG 2087-642-1005 Triplers £7.00 BG 2032-642-3002 £7.00</p> <p>PERDIO PV 1188 Handsets £3.00</p> <p>BU 208A, BU 508A, BU 508D, BU 508AF, BU 508DF £1.00 each BU 801 60p 2SD 1398 £1.00 BU111AF eqv 30p</p> <p>Min Sat Receiver with IC M491 BBI, has tuner modulator etc £5.00</p> <p>FERGUSON Sat. Modulator SRD-3-4 £2.00</p> <p>FERGUSON SRBI modulator 25p each</p> <p>Regulated power supply, 500ma 3-12v £5.00</p> <p>HITACHI 620E head and drum £12.00 AMSTRAD Nicam head and drum £12.00 AMSTRAD 6000 head and drum £12.00</p> <p>TAI FUNG universal tuner 205, or eqv with aerial socket £8.00</p> <p>U/V REMOTE HANDSET 5 IN ONE TV1 - TV2 - VCR £15 SAT - AUX</p> <p>BURGLAR ALARM Use Infra Red Detector Wide or Short Angle Wall Mount, with Relay £8.00</p> <p>MODULATOR KIT £5 5v to 12v for all cameras etc.</p> <p>6251 FRAME O/P THICK FILM HITACHI GEC £9.00 THICK FILM HITACHI HM9205A £4.00</p> <p>PHILIPS NEW TYPE U/V HANDSET £10</p> <p>06D4-025-001 Mains input choke for TX9 £4</p> <p>TX100 REMOTE PANEL No. 56413IC M293B/ and SAA5012 £10 etc.</p>
<p>2435013 £10 each 47003481 £10 each</p> <p>2436771 36761 2436773 36061 2435012 36162 2435085 36362 2436795 36383 2436792 36481 2435066 36482 2435063 36831 2435016 36832 2435064 36922 2434002 36943 2435062 36962 2436797 AT 2078/25 2433752 AT 2076 78 2433952 AT 2077/81-£15 2434141 AT 2076/88</p> <p>2434451 TFB 3035D 2434494 -£12 TFB 3069D 2434274 TFB 4023AD 2434393 TFB 4039AD 2432981 TFB 4066AD 2435372 2435701 2432351 2432211 2432984 2432491 2432871 2432851 3220029 3714016 3216001</p> <p>Y260482 2435121</p> <p>LOPTS £10 EACH</p> <p>FERGUSON TUNERS TX90/TO100 - £4</p>	<p>TDA2170 £5.00 BYX55/600 TDA3561A £3.00 (Bead) 10p TDA3566 £3.50 BYT71/600 15p TDA3564 £4.00 BYV95B 10p TDA3565 £3.00 BYV95C 12p TDA3581 £3.00 BYV96D 10p TDA3590 £3.00 BYZ106 10p TDA3591 £1.00 BPW41 15p TDA3592A £3.00 BYW56 2A/ TDA3650 £7.00 100K0 8p TDA3651 £3.00 BYW29/50 15p TDA3651AQ £3.50 BYW95C 10p TDA3652 £3.50 25C3795 30p TDA3653AQ £2.00 25C3973B 30p TDA3654 £1.00 25C4313 £1.00 TDA3654Q £2.00 25C7350 15p TDA3710 £3.50 2SD180 TO3 TDA3800 £4.00 80v/1 15p TDA3803A £4.00 2SD200 £2.00 TDA3180 £2.00 2SD401 £1.00 TDA4260 50p TDA4501 £3.00 2SD716 £1.00 TDA4505NE £3.00 2SD787 30p TDA4420 £2.00 2SD789 30p TDA4439 £2.00 2SD820 £1.00 TDA4600 £3.00 2SD868 75p TDA4601 £2.00 2SD880 30p TDA8190 £3.00 2SD1264 £1.00 TDA8703 £3.00 2SD1266 £1.00 TDA8349 £3.00 2SD1398 £1.00 TDA9403 £1.50 2SD1415 £1.00 TDA9503 £3.00 2SD1427 £1.00 TDB2033 £1.00 2SD1432 £1.00 TDD1610S 50p 2SD1453 £1.00 TD6303P £2.00 2SD1576 £1.00 TDA1060 £3.00 2SD1577 £2.00 TEA1009 50p 2SD1878 £1.00 TEA1039 £2.00 TDA3560 £2.00 TEA1060 £2.00 TDA3654 90p TEA2029C £3.00 TDA3654 90p IK7S16391 B1 £3.00 TDA3653AQ £1.00 ST6393 B1/1M £3.00 TDA3562A £0.00 BYX10 10p STR4211 £6.00 BYX38/300 25p STR6020 £6.00 BYX55/350 10p STR6602D £4.00</p>	<p>REMOTE TX100 Front Panel £4</p> <p>LEADS Scart to Scart all pin connected £2.00 1/2 metres</p> <p>TX 9 Remote Panels £5 TX 10 Remote Panels £5 TX 90 Remote Panel No. 139-001 IC Nos. M293B1 & TMS 1000 £10 each</p> <p>TX 100 Remote Panels IC M293B1-SAA5012 £10 TX 100 Remote Panels with Stand-by Battery and ICs £10</p> <p>TX 85 - 86 - 89 - 90 - 98 - 99 - 100 Tuners £4</p> <p>Orion Modulator Video MDLK 6B513A £2.50 Hitachi Mains Switch with Stand-by 50p Scart to 4 Phone Leads 1/2m £2.50 SXT2302234 Sat. Tuner with Base Band Min. £4</p>	<p>SENDZ COMPONENTS 63 BISHOPSTEIGNTON, SHOEBURYNNESS, ESSEX SS3 8AF NORMALLY SAME DAY SERVICE • SUBJECT TO AVAILABILITY No accounts • Technical information by telephone only • No credit cards Unless specified add £1.70 P/P to small orders • Additional charges for heavier items • Specific P/P charges are PER ITEM • For UK addresses please add P/P TO ORDER THEN 17 1/2% VAT TO TOTAL • This applies for the EC unless VAT No. is given • EXPORTS - P/P at cost • Postal Order/Cheque with order. Callers to shop - 212 London Road, Southend • Open 9.30-1. 2.15-5. Tel: 01702 332992 • Fax: 01702 338805 • GVMT/School orders on official headings</p>	