OCTOBER 1994

£2.20

TELEVISION

SERVICING·VIDEO·SATELLITE·DEVELOPMENTS

FREE TV & Video Spares Guide

Inside the Ferguson ICC6 Chassis

JVC GR45 Fault Notes

Improved Nicam take-off

Servicing the Microvitec 02/03 Games Monitor

VCR Clinic

TV Fault Finding

Long-distance TV

Camcorner

A REED BUSINESS PUBLICATION

9 770032 647047 10>

WILLOW VALE ELECTRONICS LIMITED

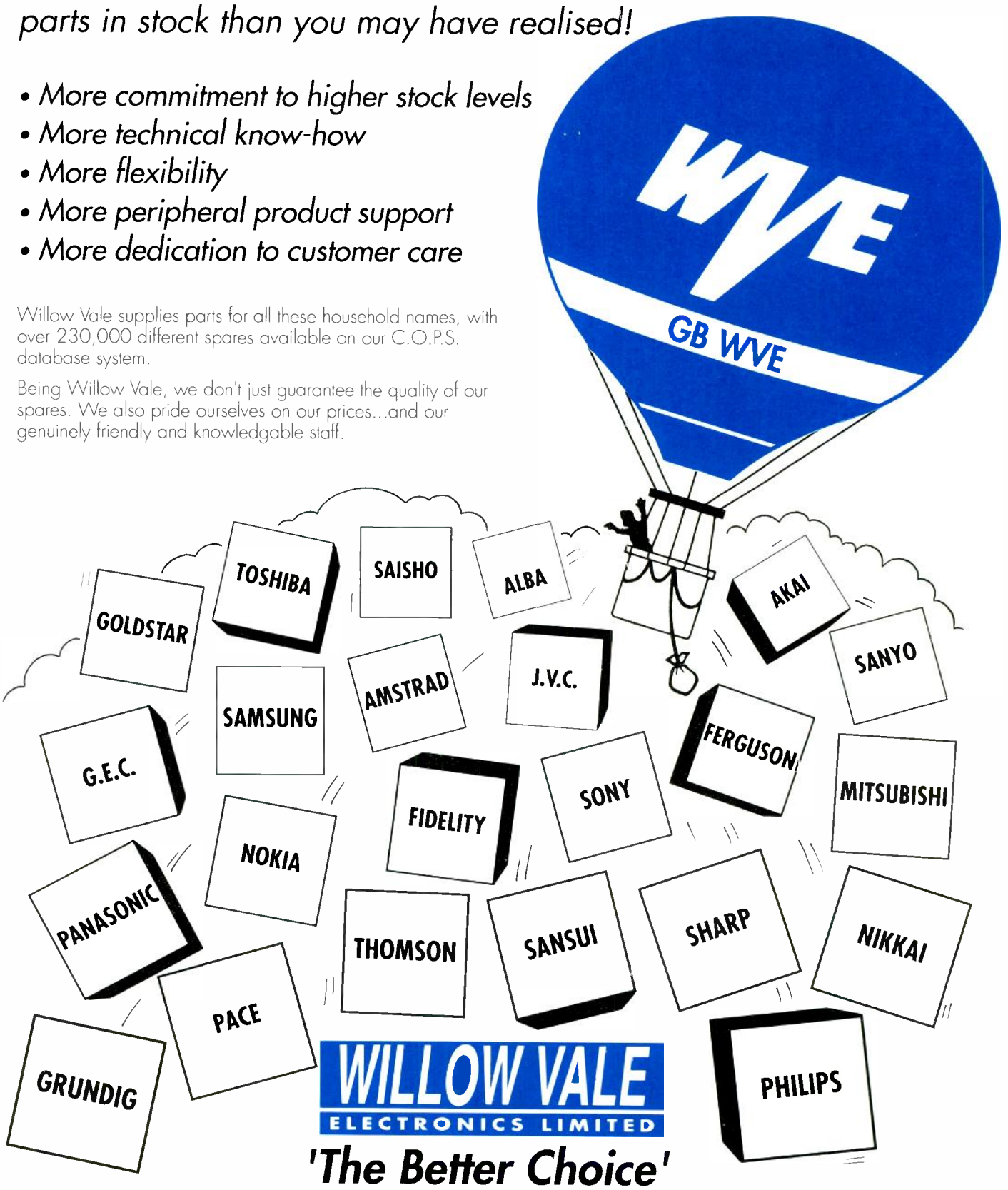
Willow Vale gives you more...

parts in stock than you may have realised!

- *More commitment to higher stock levels*
- *More technical know-how*
- *More flexibility*
- *More peripheral product support*
- *More dedication to customer care*

Willow Vale supplies parts for all these household names, with over 230,000 different spares available on our C.O.P.S. database system.

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 knowledgable staff.



'The Better Choice'

Reading (0734) 876444 Manchester (061) 682 1415

TELEVISION

OCTOBER 1994
On Sale
September 21st

Vol. 44, No. 12

Issue 528

REGULAR FEATURES

The November issue will be published on October 19th.

CORRESPONDENCE
All correspondence regarding advertisements should be addressed to the Advertisement Manager, "Television", 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 43 are available at £3.50 each from Video Interface Products Ltd., who can also supply a six-year consolidated index on computer disc. For further details see page 878.

Binders that hold twelve issues of *Television* are available for £5 each from Television Binders, 78 Whalley Road, Wilpshire, Blackburn BB1 9LF. Make cheques payable to "Television Binders".

SUBSCRIPTIONS
An annual subscription costs £26 in the UK, £37 for Eire/Europe airmail (postage included for all rates). Rest of the world airmail available on request. Send orders with payment to Quadrant Subscription Services Ltd., Oakfield House, Perrymount Road, Haywards Heath, Sussex, RH16 3DH.

Subscription hotline for 24-hour ordering with Credit Card telephone 0622 721566 quoting INJ.

BACK NUMBERS
Some back issues are available at £2.75 each from Television, Room L302, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. Make cheques/postal orders payable to Reed Business Publishing Ltd. See box on page 871.

ISSN **0032-647X**

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

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

LINEAR ICs / JAPANESE TRANSISTORS

Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price	Part	Price
LM431	50p	STK441	680p	STK5422	375p	STR30115	275p	TA7784	250p	TDA1574	125p	TDA3586	750p	TDA8170	170p	UPC1158H	70p	2SA937	20p
LM710	45p	STK443	700p	STK5431	550p	STR30120	400p	TA8132AN	200p	TDA1576	170p	TDA3590	300p	TDA8172	250p	UPC1178H	250p	2SA939	140p
LM723	40p	STK457	470p	STK5434	570p	STR30123	450p	TA8205	250p	TDA1578A	210p	TDA3591	360p	TDA8173	280p	UPC1180C	200p	2SA940	50p
LM741DIL	18p	STK459	560p	STK5436	500p	STR30125	550p	TA8210	300p	TDA1579	200p	TDA3592A	350p	TDA8174	300p	UPC1185H2	400p	2SA942	60p
LM741MET	45p	STK460	660p	STK5441	400p	STR30130	250p	TA8215	300p	TDA1596	200p	TDA3640	350p	TDA8175	300p	UPC1186	80p	2SA949	70p
LM747	55p	STK461	620p	STK5451	390p	STR40090	350p	TA8216H	375p	TDA1598	250p	TDA3651	200p	TDA8178	400p	UPC1187	150p	2SA950	18p
LM1889	300p	STK463	950p	STK5461	500p	STR41090	400p	TA8227	250p	TDA1600	275p	TDA3652	500p	TDA8185	300p	UPC1188H	350p	2SA952	50p
LM1894N	200p	STK465	720p	STK5462	500p	STR44115	550p	TA8691N	550p	TDA1670A	230p	TDA3652TX10	800p	TDA8190	200p	UPC1197	140p	2SA953	60p
LM3900	40p	STK501	550p	STK5464	300p	STR45111	550p	TA8718N	550p	TDA1675	250p	TDA3653	150p	TDA8191	425p	UPC1198H	200p	2SA954	75p
LM3909	100p	STK561	450p	STK5466	500p	STR50020	450p	TAA550	25p	TDA1701	300p	TDA3654	90p	TDA8192	275p	UPC1222	130p	2SA958	60p
LM3914	160p	STK563	415p	STK5467	400p	STR50092	550p	TBA120S	40p	TDA1771	250p	TDA3710	300p	TDA8196	150p	UPC1225H	220p	2SA963	120p
LM3915	160p	STK583	500p	STK5468	300p	STR50103A	260p	TBA396	70p	TDA1870A	200p	TDA3720	175p	TDA8214B	225p	UPC1230	150p	2SA965	40p
LM3916	270p	STK760	600p	STK5471	330p	STR50113	500p	TBA520	120p	TDA1872A	275p	TDA3724	500p	TDA8215B	300p	UPC1238	120p	2SA966	35p
L200	200p	STK770	400p	STK5473	480p	STR50115	500p	TBA530	100p	TDA1904	80p	TDA3725	500p	TDA8303	350p	UPC1270H	250p	2SA968	55p
M491BB1	500p	STK772B	480p	STK5476	350p	STR51041	500p	TBA540	90p	TDA1905	80p	TDA3730	400p	TDA8304	600p	UPC1274V	250p	2SA970	25p
M494B1	700p	STK780	575p	STK5478	380p	STR50213	500p	TBA560	90p	TDA1908A	90p	TDA3740	480p	TDA8305	500p	UPC1277	240p	2SA979	35p
M50115P	320p	STK1039	460p	STK5479	300p	STR53041	500p	TBA800	40p	TDA1910	225p	TDA3750	400p	TDA8340	200p	UPC1278	240p	2SA984	25p
M50117P	500p	STK1040	640p	STK5481	520p	STR54041	350p	TBA810AS	40p	TDA1940	180p	TDA3760	350p	TDA8341	250p	UPC1288V	230p	2SA985	60p
M50119P	525p	STK1049	700p	STK5482	285p	STR55041	500p	TBA820	55p	TDA1941	300p	TDA3771	460p	TDA8380	200p	UPC1298V	320p	2SA988	25p
M50784	300p	STK1050	650p	STK5483	440p	STR56041	550p	TBA820M	35p	TDA1950	175p	TDA3791	300p	TDA8390A	650p	UPC1318	300p	2SA992	30p
M50786	500p	STK1060	700p	STK5486	450p	STR58041	325p	TBA920	100p	TDA2002	50p	TDA3800	350p	TDA8405	550p	UPC1335V	320p	2SA993	50p
M50790	600p	STK1070	850p	STK5488	480p	STR59041	475p	TBA950	100p	TDA2003	65p	TDA3803A	500p	TDA8415	650p	UPC1350	115p	2SA999	30p
M51161	300p	STK1080	940p	STK5490	450p	STR60001	525p	TBA990	80p	TDA2004	150p	TDA3810	200p	TDA8417	550p	UPC1363	190p	2SA1006	90p
M51381P	200p	STK2025	620p	STK5632	450p	STR61001	550p	TC5020	200p	TDA2005	150p	TDA3825	225p	TDA8421	500p	UPC1363C	300p	2SA1008	125p
M51387P	800p	STK2028	500p	STK5725	450p	STR80145	550p	TC5081AP	80p	TDA2006	70p	TDA3840	300p	TDA8432	550p	UPC1364C	350p	2SA1009	200p
M51544	150p	STK2029	480p	STK5730	450p	STR81145	600p	TC9106	500p	TDA2007	120p	TDA3843	200p	TDA8433	600p	UPC1365	250p	2SA1010	225p
M51848	150p	STK2038	700p	STK6316	300p	STRD1206	600p	TC9125BP	410p	TDA2008	100p	TDA3845	325p	TDA8440	300p	UPC1370C	300p	2SA1011	80p
M54523P	200p	STK2048	950p	STK6324B	500p	STRD1406	600p	TC9134	750p	TDA2009	160p	TDA3856	400p	TDA8442	200p	UPC1373	85p	2SA1012	85p
M54563P	200p	STK2110	550p	STK6431	850p	STRD1706	450p	TC9142	320p	TDA2010	150p	TDA3857	350p	TDA8443	350p	UPC1377C	200p	2SA1013	100p
M58484	500p	STK2125	580p	STK6722	725p	STRD1806	400p	TC9143	300p	TDA2020	120p	TDA3950	225p	TDA8451	400p	UPC1378	180p	2SA1015	15p
M51516	260p	STK2129	610p	STK6732	1000p	STRD1816	400p	TC9145	150p	TDA2030	80p	TDA4050	150p	TDA8452	200p	UPC1382	110p	2SA1016	30p
M51518	200p	STK2139	675p	STK6822	900p	STRD3035	300p	TC9148	200p	TDA2040	140p	TDA4092	350p	TDA8453	350p	UPC1384	425p	2SA1018	100p
MB3712	140p	STK2155	900p	STK6922	500p	STRD4412	500p	TC149	225p	TDA2048	600p	TDA4100	225p	TDA8490	350p	UPC1387C	250p	2SA1020	30p
MB3713	130p	STK2230	470p	STK6932	525p	STRD4512	400p	TC9150	425p	TDA2054M	110p	TDA4180	145p	TDA8702	275p	UPC1394	120p	2SA1021	35p
MB3714	270p	STK2240	740p	STK6962	275p	TA7054	190p	TC9152	425p	TDA2107	250p	TDA4190	180p	TDA8703	500p	UPC1397	350p	2SA1023	60p
MB3715	250p	STK2250	650p	STK6972	490p	TA7061	115p	TC9153	300p	TDA2148	350p	TDA4200	360p	TDA8708	900p	UPC1403CA	650p	2SA1026	90p
MB3722	280p	STK3041	370p	STK6981B	600p	TA7066	120p	TC9156	300p	TDA2151	375p	TDA4280	320p	TDA8732	400p	UPC1420CA	450p	2SA1029	60p
MB3730	160p	STK3042	375p	STK6982	600p	TA7089	300p	TC9163	375p	TDA2170	260p	TDA4282	360p	TDA8745	400p	UPC1421CA	650p	2SA1036	60p
MB3731	220p	STK3044	500p	STK7216	420p	TA7119	150p	TC9164	400p	TDA2220	200p	TDA4290	200p	TDA9045	400p	UPC1423CA	550p	2SA1037	50p
MB3756	160p	STK3062	500p	STK7217	400p	TA7120	55p	TC9172P	300p	TDA2270	250p	TDA4400	175p	TDA9080	550p	UPC1470	200p	2SA1038	40p
MB3759	200p	STK3082	550p	STK7225	500p	TA7137	60p	TCA9940	100p	TDA2320	80p	TDA4420	120p	TDA9403	180p	UPC1488H	150p	2SA1048	25p
MB8719	360p	STK3102II	530p	STK7226	600p	TA7140	100p	TCEP100	100p	TDA2501	400p	TDA4421	300p	TDA9503	150p	UPC1505C	400p	2SA1051	300p
MC1455	45p	STK3152II	900p	STK7251	500p	TA7157	100p	TD62308AP	200p	TDA2503	200p	TDA4426	170p	TDA9513	300p	UPC1514CA	200p	2SA1060	120p
MC1496	65p	STK3156	500p	STK7308	350p	TA7193	320p	TD62382	200p	TDA2504	200p	TDA4427	200p	TEA1002	650p	UPC1515CA	250p	2SA1069	150p
MC3401	45p	STK4017	400p	STK7309	400p	TA7200	200p	TD62506	200p	TDA2505	300p	TDA4431	150p	TEA1007	120p	UPC1520CA	250p	2SA1076	230p
NE555	20p	STK4018	480p	STK7310	470p	TA7205	110p	TD62705	250p	TDA2506	500p	TDA4437	300p	TEA1009	100p	UPC1536C	550p	2SA1077	300p
NE556	40p	STK4021	380p	STK7348	400p	TA7207	150p	TD6304AP	300p	TDA2510	450p	TDA4439	220p	TEA1017	280p	ZN423	100p	2SA1081	80p
NE558	80p	STK4024II	550p	STK7356	425p	TA7208	125p	TD6306P	350p	TDA2514A	500p	TDA4440	180p	TEA1019	130p	ZN424	100p	2SA1082	80p
NE565	110p	STK4025	530p	STK7358	440p	TA7214	220p	TD6350P	200p	TDA2515	450p	TDA4442	240p	TEA1024	150p	ZN425	320p	2SA1084	100p
NE567	115p	STK4026	480p	STK7402	560p	TA7217	145p	TD6359P	300p	TDA2530	450p	TDA4443	250p	TEA1045	300p	ZN426	260p	2SA1085	75p
NE571	290p	STK4028	550p	STK7404	400p	TA7220	220p	TDA1001	200p	TDA2532	120p	TDA4445	220p	TEA1060	225p	ZN427	560p	2SA1091	100p
NE592	85p	STK4032II	510p	STK7406	650p	TA7222	90p	TDA1002	200p	TDA2540	85p	TDA4450	225p	TEA1067	150p	ZN429	215p	2SA1094	190p
NE5532P	140p	STK4036	470p	STK7408	675p	TA7223	210p	TDA1003	150p	TDA2541	120p	TDA4452	250p	TEA1080P	170p	ZN459	190p	2SA1095	300p
SAA1006	300p	STK4038	680p	STK7410	900p	TA7225	300p	TDA1005A	175p	TDA2542	110p	TDA4453	275p	TEA1087	40p	ZN1040	640p	2SA1096	80p
SAA1008	450p	STK4040II	650p	STK7554	600p	TA7226	290p	TDA1010A	80p	TDA2543	210p	TDA4480	280p	TEA1101	425p	ZNA134H	2150p	2SA1102	130p
SAA1010	400p	STK4042II	800p	STK7561	650p	TA7227	170p	TDA1011	75p	TDA2545	120p	TDA4482	350p	TEA1330	65p			2SA1103	130p
SAA1024	250p	STK4044	800p	STK7562	1000p	TA7230	100p	TDA1012	120p	TDA2546A	200p	TDA4500	300p	TEA1511	150p			2SA1104	140p
SAA1025	250p	STK4046	950p	STK7563	800p	TA7232	95p	TDA1013A	110p	TDA2549	300p	TDA4501	400p	TEA2000	275p			2SA1105	250p
SAA1075	350p	STK4048	1280p	STK8050	750p	TA7233	120p	TDA1015	85p	TDA2555	175p	TDA4502	550p	TEA2014A	80p			2SA1106	160p
SAA1124	200p	STK4060	510p	STK8250	500p	TA7237	300p	TDA1016	140p	TDA2556	230p	TDA4503	300p	TEA2018A	200p			2SA1111	90p
SAA1250	280p	STK4065	650p	STK8260	1200p	TA7238	400p	TDA1020	110p	TDA2557	225p	TDA4505	300p	TEA2114	200p			2SA1112	150p
SAA1251	380p	STK4101	500p	STK8280	1850p	TA7240	160p	TDA1022	330p	TDA2558	500p	TDA4510	270p	TEA2117	450p			2SA1115	30p
SAA1274	280p	STK4111	500p	STK73410	350p	TA7241	165p	TDA1023	130p	TDA2575A	100p	TDA4555	400p	TEA5114A	200p			2SA1123	40p
SAA1293	550p	STK4112	500p	STK73410II	500p	TA7242	190p	TDA1024	150p	TDA2577A	200p	TDA4556	370p	TL431	45p			2SA1124	60p
SAA3004	400p	STK4121	480p	STK73605	375p	TA7243	320p	TDA1025	320p	TDA2578A	200p	TDA4557	450p	TL061	40p			2SA1127	50p
SAA5000	200p	STK4122	560p	STR370	300p	TA7245	225p	TDA1028	175p	TDA2579A	250p	TDA4560	270p	TL064	80p			2SA1133	120p
SAA5010	220p	STK4131	600p	STR371	400p	TA7267	220p	TDA1029	200p	TDA2582	130p	TDA4600	140p	TL071	38p			2SA1141	200p
SAA5012	400p	STK4132II	600p	STR380	350p	TA7269	260p	TDA1035	160p	TDA2590	170p	TDA4600II	160p	TL074	80p			2SA1142	100p
SAA5020	350p	STK4141II	420p	STR381	390p	TA7270	170p	TDA1041E	250p	TDA2593	110p	TDA4601	120p	TL083	55p			2SA1145	40p
SAA5030	440p	STK4142	530p	STR383	410p	TA7271	220p	TDA1041P	180p	TDA2594	300p	TDA4605	220p	TL084	70p			2SA1152	150p
SAA5040A	280p	STK4151	680p	STR384	350p	TA7272	260p	TDA1044	110p	TDA2595	200p	TDA4610	370p	TMS1000-041	400p			2SA1156	90p
SAA5040B	400p	STK4152	650p	STR440	700p	TA7273	300p	TDA1047	200p	TDA2600	250p	TDA4660	370p	TMS1000NLPM	200p			2SA1162	30p
SAA5050	650p	STK4161	650p	STR450	520p	TA7274	210p	TDA1048	200p	TDA2611A	100p	TDA4800	350p	TMS100-233	400p			2SA1169	500p
SAA5231	300p	STK4162	550p	STR541	600p	TA7280	190p	TDA1053	300p	TDA2630	300p	TDA4935	300p	TMS1024	300p			2SA1170	500p
SAA5243PE	800p	STK4171	750p	STR452	600p	TA7281	200p	TDA1054	180p	TDA2640	220p	TDA4940	325p	TMS1025	350p			2SA1175	30p
SAB3013	200p	STK4172II	680p	STR453	500p	TA7282	160p	TDA1059B	40p	TDA2653A	225p	TDA4950	120p	TMS3617NS	350p			2SA1184	120p
SAB3035	600p	STK4181	680p	STR454	400p	TA7283	200p	TDA1060	140p	TDA2654	200p	TDA5330T	300p	TMS3701BN	300p			2SA1186	500p
STA301A	200p	STK4182II	750p	STR455	500p	TA7288	220p	TDA1062	140p	TDA2670	150p	TDA5600	450p	TMS3712	350p			2SA1198	40p
STA401A	220p	STK4191	700p	STR456	470p	TA7299	200p	TDA1072	150p	TDA2690	100p	TDA5660P	250p	TMS3891	550p			2SA1206	60p
STA403A	270p	STK4192	700p	STR457	600p	TA7310	100p	TDA1074	280p	TDA2730	200p	TDA5700	200p	TPU2732	1200p			2SA1208	70p
STA406A	280p	STK4231II	700p	STR470	400p	TA7312	120p	TDA1077	250p	TDA2760	400p	TDA5708	400p	TPU2735	900p			2SA1209	100p
STA431A	250p	STK4241	1050p	STR1096	275p	TA7313	70p	TDA1082	275p	TDA2780	600p	TDA5709	450p	U111B	250p			2SA1210	120p
STA432A	220p	STK4241V	1250p	STR1195	350p	TA7314	175p	TDA1083	95p	TDA2791	275p	TDA5800	600p	U211B	300p			2SA1215	600p
STA434A	270p	STK4272	500p	STR1229	325p	TA7315	200p	TDA1085	170p	TDA2795	200p	TDA5820	370p	U254B	150p			2SA1216	550p
STA435A	270p	STK4273	550p	STR2005	400p	TA7317P	120p	TDA1087	60p	TDA2822M	60p	TDA5850	175p	U318M	350p			2SA1217	100p
STA441C	220p	STK4301	500p	STR2012	400p	TA7324	75p	TDA1092	100p	TDA2840	200p	TDA6200	750p	U321M	450p			2SA1220	75p
STA456C	240p	STK4311	650p	STR2013	300p	TA7325	90p	TDA1097	475p	TDA3047	100p	TDA7000	170p	U329M	350p			2SA1232	180p
STA471	210p	STK4332	365p	STR2015	550p	TA7328	110p	TDA1151	40p	TDA3048	130p	TDA7010T	120p	U338M	300p			2SA1242	80p
STA901M	280p	STK4352	500p	STR2105	600p	TA7335	85p	TDA1154	50p	TDA3082	200p	TDA7050	200p	U420B	70p			2SA1244	120p
STK0025	420p	STK4362	450p	STR3113	225p	TA7336	180p	TDA1170	85p	TDA3083	200p	TDA7052	120p	U427B	70p			2SA1246	80p
STK0029	360p	STK4372	490p	STR3115	400p	TA7341	250p	TDA1180	120p	TDA3190	100p	TDA7053	200p	U664B	175p			2SA1249	100p
STK0039	600p	STK4392	500p	STR3123	400p	TA7343	120p	TDA1180A	190p	TDA3300B	480p	TDA7056	200p	U2401B	125p			2SA1261	150p
STK0040	520p	STK4432	600p	STR3125	480p	TA7357	340p	TDA1190	80p	TDA3301B	280p	TDA7072	175p	U2829B	130p			2SA1262	110p
STK0049	510p	STK4773	820p	STR3135	250p	TA7358	85p	TDA1200B	80p	TDA3310	120p	TDA7077	175p	U4606B	600p			2SA1263	280p
STK0050	440p	STK4793	800p	STR3212	275p	TA7401	250p	TDA1220	75p	TDA3330	500p	TDA7211	150p	UC3842N	125p			2SA1264	280p
STK0059	620p	STK4803	640p	STR3214	275p	TA7607	200p	TDA1235	300p	TDA3410	150p	TDA7220	100p	UC3844	100p			2SA1265	200p
STK0060	820p	STK4813	800p	STR3215	275p	TA7608	360p	TDA1236	240p	TDA3420	200p	TDA7222	200p	ULN2002	70p			2SA1283	50p
STK0070	1100p	STK4833	700p	STR3315	275p	TA7609	170p	TDA1251	150p	TDA3501	340p	TDA7230A	225p	ULN2003	69p			2SA1284	60p
STK0080	580p	STK4843	720p	STR4090A	650p	TA7611	210p	TDA1270	150p	TDA3502	450p	TDA7233	150p	ULN2068	270p			2SA1286	60p
STK011	330p	STK4853	730p	STR4142	450p	TA7612	300p	TDA1327	200p	TDA3504	300p	TDA7240	175p	ULN2804	170p			2SA1290	150p
STK015	440p	STK4863	700p	STR4211	370p	TA7614	170p	TDA1410	220p	TDA3505	275p	TDA7241	250p	UPC20C	220p			2SA1294	450p
STK016	780p	STK4873	850p	STR4512	400p	TA7616	300p	TDA1412	35p	TDA3506	260p	TDA7250	500p	UPC554	130p			2SA1295	500p
STK025	650p	STK4893	1000p	STR5015	500p	TA7621	300p	TDA1510	170p	TDA3507	450p	TDA7255	500p	UPC555	60p			2SA1301	260p
STK050	1600p	STK4913	900p	STR5100	550p	TA7622	420p	TDA1512	180p	TDA3510	350p	TDA7256	600p	UPC556H	80p			2SA1302	300p
STK077	520p	STK5314	475p	STR5214	475p	TA7628	110p	TDA1514A	450p	TDA3520	650p	TDA7272	170p	UPC571	220p			2SA1303	400p
STK078	580p	STK5315	500p	STR5315	575p	TA7629	220p	TDA1515A	200p	TDA3530	350p	TDA7273	80p	UPC574	60p			2SA1304	110p
STK080	550p	STK5322	500p	STR5412	350p	TA7630	200p	TDA1516Q	350p	TDA3540	200p	TDA7274	60p	UPC575C2	90p			2SA1306	110p
STK082	540p	STK5324	450p	STR6020	325p	TA7632	400p	TDA1517	250p	TDA3541	175p	TDA7275	75p	UPC577	64p			2SA1307	100p
STK084	600p	STK5325	370p	STR9005	400p	TA7640	90p	TDA1519	200p	TDA3560	260p	TDA7284	100p	UPC592	95p			2SA1309	50p
STK085	900p	STK5331	300p	STR9012	450p	TA7641	140p	TDA1519A	200p	TDA3561	300p	TDA7350	650p	UPC595	190p			2SA1315	100p
STK086	800p	STK5332	180p	STR10006	450p	TA7658	100p	TDA1520	275p	TDA3561A	300p	TDA7359	300p	UPC596	190p			2SA1317	30p
STK0100	900p	STK5333	500p	STR11006	400p	TA7668	100p	TDA1521	250p	TDA3562	260p	TDA7360	700p	UPC1001	220p			2SA1318	20p
STK0100II	1200p	STK5335	350p	STR12006	450p	TA7680AP	225p	TDA1522	110p	TDA3562TFK	300p	TDA7770	225p	UPC1018	170p			2SA1321	80p
STK420	400p	STK5337	500p	STR13006	500p	TA7688	150p	TDA1524	200p	TDA3563	350p	TDA8114	225p	UPC1020	200p			2SA1329	200p
STK430	500p	STK5338	295p	STR15006	500p	TA7698	450p	TDA1540	420p	TDA3564	325p	TDA8115	200p	UPC1023	60p			2SA1346	20p
STK433	400p	STK5339	400p	STR16006	500p	TA7699	600p	TDA1541	750p	TDA3565	275p	TDA8140	200p	UPC1025	230p			2SA1352	100p
STK435	375p	STK5342	245p	STR20005	450p	TA7705	300p	TDA1542	250p	TDA3566	280p	TDA8143	160p	UPC1026	95p			2SA1353	100p
STK436	430p	STK5361	375p	STR20012	450p	TA7750	200p	TDA1543	300p	TDA3567	350p	TDA8145	120p	UPC1028	90p			2SA1356	100p
STK437	460p	STK5372	260p	STR20015	450p	TA7757	200p	TDA1571	300p	TDA3570	375p	TDA8153	250p	UPC1031H	150p			2SA1356	130p
STK439	500p	STK5421	450p	STR30110	400p	TA7769	130p	TDA1572	175p	TDA3580	400p	TDA8160	125p	UPC1032	60p			2SA1370	100p

JAPANESE TRANSISTORS

Part	Price	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	2SC2274	15p	2SC2752	140p	2SC3281	200p	2SC3897	650p	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	400p	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	250p
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	500p	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	2SC2324	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	50p	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	100p	2SD1384	50p	2SD1959	280p
2SB598	30p	2SC1164	600p	2SC1844	50p	2SC2335	75p	2SC2827	200p	2SC3353	280p	2SC4242	170p	2SD894	35p	2SD1390	350p	2SD1961	50p
2SB600	500p	2SC1165	750p	2SC1845	15p	2SC2344	150p	2SC2832	300p	2SC3355	50p	2SC4301	550p	2SD895	200p	2SD1391	250p	2SD1978	50p
2SB646	40p	2SC1166	100p	2SC1846	35p	2SC2347	60p	2SC2834	400p	2SC3356	120p	2SC4742	275p	2SD896	200p	2SD1392	150p	2SD1984	450p
2SB647	20p	2SC1170	180p	2SC1847	45p	2SC2353	120p	2SC2837	250p	2SC3358	50p	2SC4769	300p	2SD900	400p	2SD1395	150p	2SD2012	50p
2SB648	45p	2SC1172	150p	2SC1855	85p	2SC2360	120p	2SC2839	40p	2SC3361	50p	2SD198	140p	2SD905	450p	2SD1396	120p	2SD2125	225p
2SB649	35p	2SC1173	40p	2SC1856	25p	2SC2361	150p	2SC2853	70p	2SC3376	300p	2SD199	195p	2SD916	130p	2SD1397	120p	2SD2333	300p
2SB688	90p	2SC1195	210p	2SC1865	700p	2SC2362	50p	2SC2877	120p	2SC3377	50p	2SD200	180p	2SD917	300p	2SD1398	120p	2SJ48	425p
2SB703	90p	2SC1212	35p	2SC1870	700p	2SC2365	280p	2SC2878	20p	2SC3378	120p	2SD201	260p	2SD921	320p	2SD1399	300p	2SJ49	425p
2SB705	200p	2SC1213	15p	2SC1875	220p	2SC2369	100p	2SC2879	3200p	2SC3383	80p	2SD257	195p	2SD923	360p	2SD1400	280p	2SJ50	425p
2SB707	200p	2SC1214	15p	2SC1881	70p	2SC2371	25p	2SC2883	60p	2SC3387	550p	2SD313	25p	2SD946	120p	2SD1402	150p	2SJ56	700p
2SB716	20p	2SC1215	25p	2SC1890	15p	2SC2373	210p	2SC2898	200p	2SC3393	80p	2SD315	75p	2SD947	100p	2SD1406	60p	2SJ74	60p
2SB718	60p	2SC1216	200p	2SC1904	125p	2SC2383	50p	2SC2899	50p	2SC3399	50p	2SD325	30p	2SD950	300p	2SD1407	60p	2SJ75	280p
2SB727	200p	2SC1222	15p	2SC1906	15p	2SC2389	45p	2SC2909	60p	2SC3400	35p	2SD330	65p	2SD951	290p	2SD1408	125p	2SJ76	220p
2SB754	80p	2SC1226	75p	2SC1907	20p	2SC2407	110p	2SC2911	80p	2SC3401	50p	2SD348	300p	2SD957A	520p	2SD1409	170p	2SJ77	350p
2SB755	310p	2SC1252	850p	2SC1909	250p	2SC2408	120p	2SC2912	120p	2SC3402	40p	2SD357	40p	2SD958	60p	2SD1412	75p	2SJ79	225p
2SB772	25p	2SC1278	110p	2SC1913	90p	2SC2412K	50p	2SC2921	650p	2SC3409	400p	2SD358	40p	2SD965	35p	2SD1413	60p	2SJ103	75p
2SB774	50p	2SC1279	30p	2SC1921	15p	2SC2440	200p	2SC2922	480p	2SC3412	800p	2SD371	240p	2SD970	170p	2SD1415	190p	2SJ108	60p
2SB775	100p	2SC1306	90p	2SC1923	10p	2SC2458	10p	2SC2928	550p	2SC3416	30p	2SD380	650p	2SD973	60p	2SD1417	125p	2SJ115	525p
2SB791	280p	2SC1308K	350p	2SC1929	180p	2SC2459	50p	2SC2929	280p	2SC3417	90p	2SD381	50p	2SD973A	70p	2SD1425	260p	2SJ117	550p
2SB795	60p	2SC1312	40p	2SC1940	110p	2SC2470	65p	2SC2934	75p	2SC3419	120p	2SD388	150p	2SD985	120p	2SD1426	160p	2SJ119	700p
2SB825	135p	2SC1317	15p	2SC1941	27p	2SC2481	120p	2SC2937	250p	2SC3420	80p	2SD389	60p	2SD986	120p	2SD1427	180p	2SJ161	650p
2SB861	110p	2SC1318	10p	2SC1942	350p	2SC2482	20p	2SC2938	235p	2SC3422	75p	2SD400	14p	2SD1012	40p	2SD1428	220p	2SJ162	680p
2SB882	180p	2SC1325	400p	2SC1944	350p	2SC2483	120p	2SC2939	400p	2SC3423	60p	2SD401	50p	2SD1020	40p	2SD1429	410p	2SK19	45p
2SB886	90p	2SC1327	20p	2SC1945	350p	2SC2484	185p	2SC2944	300p	2SC3446	150p	2SD402	120p	2SD1021	120p	2SD1430	280p	2SK40	50p
2SB950	180p	2SC1328	15p	2SC1946	1500p	2SC2491	200p	2SC2958	50p	2SC3447	200p	2SD415	55p	2SD1022	400p	2SD1431	400p	2SK49	50p
2SB951	190p	2SC1342	15p	2SC1947	450p	2SC2495	1900p	2SC2962	800p	2SC3456	200p	2SD424	350p	2SD1024	130p	2SD1432	400p	2SK55	100p
2SB1009	110p	2SC1345	15p	2SC1957	70p	2SC2498	50p	2SC2979	160p	2SC3457	125p	2SD426	150p	2SD1030	75p	2SD1433	750p	2SK68	100p
2SB1077	180p	2SC1346	100p	2SC1959	10p	2SC2500	25p	2SC2987	250p	2SC3459	180p	2SD427	350p	2SD1031	70p	2SD1438	140p	2SK73	75p
2SB1109	100p	2SC1358	270p	2SC1967	1300p	2SC2502	200p	2SC2988	150p	2SC3460	180p	2SD438	35p	2SD1046	200p	2SD1439	165p	2SK106	40p
2SC182	75p	2SC1359	15p	2SC1969	160p	2SC2519	60p	2SC2995	60p	2SC3461	350p	2SD457	15p	2SD1047	180p	2SD1441	280p	2SK107	40p
2SC372	25p	2SC1360	70p	2SC1970	100p	2SC2527	300p	2SC2999	50p	2SC3466	225p	2SD468	15p	2SD1051	130p	2SD1445	200p	2SK118	50p
2SC380	10p	2SC1364	25p	2SC1971	400p	2SC2534	150p	2SC3001	1400p	2SC3468	70p	2SD471	20p	2SD1060	130p	2SD1450	60p	2SK125	100p
2SC382	50p	2SC1383	25p	2SC1972	600p	2SC2535	300p	2SC3012	300p	2SC3481	300p	2SD525	50p	2SD1062	150p	2SD1451	260p	2SK133	650p
2SC388A	60p	2SC1384	20p	2SC1973	150p	2SC2538	100p	2SC3019	320p	2SC3482	275p	2SD526	70p	2SD1063	200p	2SD1462	350p	2SK134	415p
2SC394	60p	2SC1393	20p	2SC1983	75p	2SC2540	1900p	2SC3025	500p	2SC3486	275p	2SD545	18p	2SD1064	250p	2SD1453	140p	2SK135	415p
2SC403	25p	2SC1394	15p	2SC1984	150p	2SC2542	300p	2SC3026	550p	2SC3502	100p	2SD549	120p	2SD1065	160p	2SD1455	250p	2SK147	160p
2SC454	15p	2SC1398	55p	2SC1985	100p	2SC2545	55p	2SC3030	300p	2SC3503	50p	2SD551	300p	2SD1069	150p	2SD1457	165p	2SK150	150p
2SC458	10p	2SC1400	50p	2SC1986	100p	2SC2546	25p	2SC3037	125p	2SC3504	120p	2SD555	500p	2SD1071	450p	2SD1459	120p	2SK163	40p
2SC460	10p	2SC1403	500p	2SC2001	15p	2SC2547	65p	2SC3038	125p	2SC3505	240p	2SD560	50p	2SD1073	350p	2SD1468	60p	2SK168	40p
2SC461	15p	2SC1407	550p	2SC2002	15p	2SC2550	50p	2SC3039	80p	2SC3506	250p	2SD571	20p	2SD1088	150p	2SD1479	200p	2SK176	800p
2SC495	45p	2SC1413	150p	2SC2003	20p	2SC2551	70p	2SC3040	260p	2SC3507	650p	2SD575	530p	2SD1094	520p	2SD1487	225p	2SK192	45p
2SC496	25p	2SC1419	50p	2SC2004	20p	2SC2552	60p	2SC3042	300p	2SC3509	750p	2SD600	30p	2SD1110	225p	2SD1491	100p	2SK195	150p
2SC497	85p	2SC1429	50p	2SC2021	10p	2SC2553	200p	2SC3057	150p	2SC3518	120p	2SD601	40p	2SD1111	20p	2SD1494	300p	2SK197	140p
2SC515	100p	2SC1444	275p	2SC2022	110p	2SC2555	120p	2SC3058	2500p	2SC3519	250p	2SD602	60p	2SD1113	225p	2SD1496	350p	2SK214	170p
2SC535	30p	2SC1446	55p	2SC2023	180p	2SC2562	90p	2SC3068	60p	2SC3531	225p	2SD612	50p	2SD1128	200p	2SD1497	230p	2SK216	200p
2SC536	20p	2SC1447	70p	2SC2026	30p	2SC2563	200p	2SC3070	35p	2SC3549	200p	2SD613	70p	2SD1133	100p	2SD1497-02	350p	2SK218	400p
2SC558	275p	2SC1448	100p	2SC2027	200p	2SC2564	230p	2SC3074	200p	2SC3552	300p	2SD636	10p	2SD1135	75p	2SD1505	120p	2SK240	140p
2SC563	120p	2SC1449	120p	2SC2028	75p	2SC2565	260p	2SC3075	150p	2SC3568	200p	2SD637	15p	2SD1138	50p	2SD1507	60p	2SK312	750p
2SC605	100p	2SC1450	200p	2SC2029	120p	2SC2568	120p	2SC3077	120p	2SC3584	200p	2SD638	15p	2SD1140	40p	2SD1509	100p	2SK315	70p
2SC619	100p	2SC1454	250p	2SC2037	50p	2SC2570	30p	2SC3086	150p	2SC3595	220p	2SD639	20p	2SD1142	350p	2SD1511	100p	2SK320	120p
2SC641	80p	2SC1470	120p	2SC2053	120p	2SC2571	350p	2SC3089	130p	2SC3605	60p	2SD640	350p	2SD1148	175p	2SD1519	250p	2SK323	130p
2SC644	10p	2SC1472	40p	2SC2055	150p	2SC2577	110p	2SC3101	750p	2SC3606	100p	2SD655	18p	2SD1159	90p	2SD1521	70p	2SK386	600p
2SC647	300p	2SC1473	15p	2SC2058	20p	2SC2578	170p	2SC3112	35p	2SC3607	150p	2SD661	60p	2SD1160	150p	2SD1541	350p	2SK405	450p
2SC681	250p	2SC1474	45p	2SC2060	60p	2SC2579	110p	2SC3114	40p	2SC3636	280p	2SD666	25p	2SD1163A	220p	2SD1548	450p	2SK413	500p
2SC683	35p	2SC1475	60p	2SC2061	75p	2SC2580	175p	2SC3116	75p	2SC3657	400p	2SD667	20p	2SD1164	75p	2SD1554	170p	2SK415	500p
2SC708	100p	2SC1505	80p	2SC2068	60p	2SC2581	225p	2SC3117	120p	2SC3659	600p	2SD668	120p	2SD1168	270p	2SD1555	170p	2SK429	180p
2SC710	15p	2SC1507	45p	2SC2071	140p	2SC2588	600p	2SC3122	50p	2SC3668	120p	2SD669	35p	2SD1169	280p	2SD1556	400p	2SK511	450p
2SC711	15p	2SC1509	35p	2SC2073	40p	2SC2590	40p	2SC3148	185p	2SC3675	100p	2SD673	350p	2SD1173	350p	2SD1564	100p	2SK513	325p
2SC730	350p	2SC1514	35p	2SC2075	60p	2SC2591	50p	2SC3149	180p	2SC3678	280p	2SD676	250p	2SD1185	400p	2SD1565	75p	2SK531	350p
2SC732	40p	2SC1515	60p	2SC2078	95p	2SC2592	200p	2SC3150	125p	2SC3679	180p	2SD716	80p	2SD1186	400p	2SD1571	170p	2SK534	700p
2SC733	15p	2SC1520	45p	2SC2085	100p	2SC2603	10p	2SC3151	230p	2SC3680	380p	2SD717	180p	2SD1187	250p	2SD1572	100p	2SK537	900p
2SC735	40p	2SC1541	110p	2SC2086	60p	2SC2610	60p	2SC3152	130p	2SC3685	450p	2SD718	85p	2SD1189	55p	2SD1576	250p	2SK538	450p
2SC738	15p	2SC1545	120p	2SC2092	100p	2SC2611	30p	2SC3153	230p	2SC3687	600p	2SD722	240p	2SD1190	150p	2SD1577	250p	2SK539	1100p
2SC739	150p	2SC1567	40p	2SC2094	1200p	2SC2621	70p	2SC3156	350p	2SC3688	550p	2SD725	270p	2SD1191	120p	2SD1579	120p	2SK555	400p
2SC761	110p	2SC1568	35p	2SC2097	2300p	2SC2625	190p	2SC3157	200p	2SC3692	150p	2SD734	15p	2SD1192	90p	2SD1589	60p	2SK556	500p
2SC762	150p	2SC1569	55p	2SC2099	2500p	2SC2626	600p	2SC3158	260p	2SC3715	480p	2SD741	120p	2SD1196	150p	2SD1590	100p	2SK557	400p
2SC783	85p	2SC1570	40p	2SC2118	1100p	2SC2631	20p	2SC3159	200p	2SC3717	120p	2SD743	130p	2SD1197	150p	2SD1591	310p	2SK566	475p
2SC790	50p	2SC1571	50p	2SC2120	10p	2SC2634	10p	2SC3164	350p	2SC3729	450p	2SD756	100p	2SD1207	40p	2SD1593	125p	2SK695	550p
2SC792	380p	2SC1573	25p	2SC2131	550p	2SC2636	40p	2SC3169	150p	2SC3746	100p	2SD757	120p	2SD1210	280p	2SD1595	160p	2SK719	300p
2SC805	225p	2SC1580	600p	2SC2141	60p	2SC2637	120p	2SC3170	300p	2SC3747	120p	2SD758	140p	2SD1211	120p	2SD1608	210p	2SK724	600p
2SC828	20p	2SC1583	25p	2SC2153	40p	2SC2640	1800p	2SC3173	180p	2SC3752	250p	2SD762	100p	2SD1218	75p	2SD1609	70p	2SK725	600p
2SC829	15p	2SC1586	540p	2SC2166	80p	2SC2653	100p	2SC3175	150p	2SC3781	150p	2SD763	140p	2SD1223	75p	2SD1632	500p	2SK727	1200p
2SC839	20p	2SC1617	340p	2SC2168	120p	2SC2654	180p	2SC3178	175p	2SC3783	600p	2SD768	180p	2SD1225	120p	2SD1637	50p	2SK735	600p
2SC870	100p	2SC1623	50p	2SC2188	70p	2SC2655	75p	2SC3179	70p	2SC3787	100p	2SD772	200p	2SD1227	40p	2SD1647	40p	2SK758	300p
2SC898	275p	2SC1624	60p	2SC2200	250p	2SC2656	550p	2SC3181	200p	2SC3789	75p	2SD773	20p	2SD1229	250p	2SD1649	260p	2SK787	1100p
2SC930	15p	2SC1626	55p	2SC2221	650p	2SC2660	100p	2SC3182	120p	2SC3790	120p	2SD774	30p	2SD1237	300p	2SD1650	180p	2SK794	500p
2SC941	15p	2SC1627	15p	2SC2228A	60p	2SC2665	200p	2SC3199	40p	2SC3795	175p	2SD777	400p	2SD1246	20p	2SD1651	150p	2SK872	650p
2SC943	160p	2SC1628	75p	2SC2229	15p	2SC2668	10p	2SC3209	120p	2SC3798	220p	2SD784	650p	2SD1247	40p	2SD1663	450p	2SK903	500p
2SC944	140p	2SC1634	50p	2SC2230	80p	2SC2671	100p	2SC3210	550p	2SC3807	120p	2SD786	100p	2SD1248	270p	2SD1666	90p	2SK1057	600p
2SC945	10p	2SC1669	100p	2SC2233	100p	2SC2681	170p	2SC3211	220p	2SC3811	80p	2SD787	20p	2SD1251	180p	2SD1667	120p	2SK1058	800p
2SC950	40p	2SC1674	15p	2SC2235	60p	2SC2682	70p	2SC3212	260p	2SC3832	200p	2SD788	30p	2SD1263	90p	2SD1668	120p	2SK1117	250p
2SC959	225p	2SC1675	90p	2SC2236	20p	2SC2688	27p	2SC3233	50p	2SC3833	250p	2SD789	20p	2SD1264	55p	2SD1677	300p	2SK1118	225p
2SC980	40p	2SC1678	80p	2SC2237	540p	2SC2690	75p	2SC3244	45p	2SC3853	220p	2SD792	400p	2SD1265	75p	2SD1730	350p	3SK45	100p
2SC982	20p	2SC1683	100p	2SC2238	45p	2SC2705	50p	2SC3246	50p	2SC3854	250p	2SD794	33p	2SD1266	180p	2SD1732	400p	3SK51	100p
2SC983	120p	2SC1684	30p	2SC2240	15p	2SC2710	50p	2SC3259	350p	2SC3855	220p	2SD795A	140p	2SD1267	55p	2SD1739	275p	3SK59	100p
2SC1000	20p	2SC1685	30p	2SC2258	30p	2SC2712	20p	2SC3260	220p	2SC3857	500p	2SD811	450p	2SD1271	55p	2SD1740	125p	3SK74	50p
2SC1001	950p	2SC1729	900p	2SC2259	60p	2SC2716	50p	2SC3261	230p	2SC3858	550p	2SD819	200p	2SD1271A	225p	2SD1748	90p	3SK77	50p
						2SC2719	25p	2SC3262	280p	2SC3870	200p	2SD820	250p	2SD1272	200p	2SD1760	80p	3SK81	50p
						2SC2721	120p	2SC3263	280p	2SC3883	280p	2SD821	550p	2SD1273	50p	2SD1762	50p	3SK85	160p
						2SC2738	200p	2SC3264	390p	2SC3884A	300p	2SD822	290p	2SD1275	50p	2SD1773	160p	3SK88	70p
						2SC2740	450p	2SC3269	50p	2SC3886A	400p	2SD826	30p	2SD1276	60p	2SD1783	100p	3SK121	150p
						2SC2749	350p	2SC3270	50p	2SC3890	150p	2SD836	60p	2SD1277	190p	2SD1796	180p		

SEE OTHER PAGES FOR MORE GRANDATA BARGAINS

REPLACEMENT VIDEO HEADS

Model	Price
AIWA	
AV66/AV77	1200p
G700	1100p
G900	1500p
AKAI	
VS105, 112, 115, 116, 125, 126, 201, 202, 205, 220, 240, 244, 245, 247, 248, 250, 301, 303, 304, VSP8, VSP82	1350p
VP7100, VS9300, VS9500, VS9800	650p
VP77, VP88, VP7100, VP7200, VS9700, VS9800	1400p
VS1, VS2, VS3, VS4, VS5, VS10, VSP1	1350p
VS33, VS35, VS37, VS38, VS53, VS55, VS66, VS765, VS767, VS768	2400p
VS512, VS515, VS516	2800p
VS465	2600p
VS11, VS12	1400p
VS6, VS8, VS9	2400p
VSX9	2500p
VSF600, VSF650	3600p
VS155, VS165	2500p
VS20, 22, 24, 25, 26, 27, 422, 426, 427, VSF10, VSP9	1400p
VSR9	1500p
VS109, VS603, VS606, VS607	2500p
VS75	2500p
ALBA	
VCR4000, VCR5000, VCR6000	1650p
AMSTRAD	
VCR4500, VCR5200, VCR9000, TVR1	1100p
VCR7000	1100p
VCR6000, 6100, 6200, 8600, 8602, 8700, DD8000, 8904, TVR4	1200p
TVR2, TVR3, VCR4600, VCR4600 MKII, VCR4700	1150p
AUTHENTIC	
N850	800p
AWA	
ATVI	800p
BAIRD	
8900, 8901, 8902, 8903, 8906, 8922, 8928	650p
8904, 8923, 8924, 8925, 8929, 8935, 8943, 8944	650p
8909, 8912	800p
8930, 8931, 8933, 8940	800p
8942	2300p
8945	2000p
8947, 8948	1600p
8950	1700p
VC141L	3000p
VH582	7000p
BLAUPUNKT	
RTV100, 200, 202, 211, 214, 222, 224, RTX100, 200	800p
RTV301, RTX250, RTV333	800p
RTV306, 307, 309, 311, 315, 316, 520, 707	1650p
RTV310, 311A, 312, 317, 319, 320	1100p
RTV324, RTV325	1550p
RTV328	1850p
RTV424	3500p
RTV434, RTV444	3900p
RTX260, RTX720, RTV330	2300p
RTV454, RTV740	5000p
RTV478	3700p
RTV520, RTV530	1800p
RTV535, RTV560, RTV570	2000p
RTV635, RTV660, RTV670, RTV730	3000p
CR1000, CR1200, CR1500	4650p
CR1800	4100p
RTV321, RTV322	1700p
RTV338	2800p
RTV348	2700p
RTV404, RTV414	3000p
RTV640	3000p
RTV750, RTV800, RTV900	3500p
RTV810	4400p
RTV910	4500p
BOSCH BAUER	
VRH50	1000p
VRP20	1000p
VRP25	1000p
VRP30	3350p
CANON	
VR10	1000p
VR30A, VR30B, VR30E, VR40A	3350p
DAEWOOD	
912, VCR12, VCR30, VCR32, VCR50, VCR52	1800p
VCP11 RAF	1800p
DECCA	
8300	1000p
8400, 8500	650p
DUAL	
EVR101	2300p
VR70, VR71, VR74, VR81, VR90, VR91	650p
VR85, VR96	2300p
VR97	3300p
VR80, VR92	650p
VR93	2450p
EDISON	
VC2130, 2133, 2135, 2140, 2830, 2930, 2932, 2934, 3122	650p
VK2132, VK2512	2300p
VK2436, VK2340	650p
VK2530, VK2532, VK2631, VK2541	1600p
VK2632	1700p
VK2637	3050p
VKH2545	2450p
VKH2639, VKH2439	3300p
FUNAI	
E11, 1100, VIP1000, 1400, 3000, 5000, VCR4000, 4500, 4800, 5200, VCR5600, 6400, 6600, V1, V25	1100p
VCR4600, VCR5400, VCR5800	1200p
VCR5480, 5843, 8007, VIP2500A, 3000A, 6000, 150	2000p
VCR4530, VCR6000, VCR6100, VCR6800, VCR6803	1300p
VCR8103, VCR8107	2200p
VIP300A MKII	1900p
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	1150p
VBS3500, 7100, 7500, 7600, 9900, VBR330	2000p
VBS7000, VBS7100, VBS9000	2000p
FVHP500, 711, 715, 721, 722, 730, 830, 5100, FVHD720	1100p
FVHP725, 830, 980	2500p
FVHP990	2700p
FVHP975	2400p
FVHD40, FVHD140, FVHP1, FVHP10, FVHP20	1150p
FIDELITY	
HQS200, VCR600, VCR6100, VR900, VR9100	1500p
VCR100	1100p
VTR1000	1100p
GOLDSTAR	
8000 3HSSDB	1900p
GVH51, GVH122, VCP4000, VCP4100, VCP4200	1300p
GHV1232, 1233, 1241, 1242, 1243, 1244, 1245, 1246, 1290, 1291, 1295, 1296, 1891, 8210, 8215, GVHP1240, 1241, 1247, 1248, VCP400, VCP4130, 4300, 4301, 4305, 4306, 4310, 4311, 4315, 4316, 4320, 4321, 4326	1300p
G.E.C.	
4000H, 4001H, 4002H	1200p
V4001H, V4004	1200p
V4005H	1500p
GRANADA	
CS1, DS2	1600p
VHSAH1	1100p
VHSAH3	2400p
VHSAN3	800p
VHSAY3	1200p
VHSBH1, VHSCH1	2100p
VHSBP1	850p
VHSBY3	2600p
VHSD52	1600p
VHSEH2	1600p
VHSEY1, VHSEY2	1400p
VHSFG2, VHSFG4	1300p
VHFS1, VHSFS2	1300p
VHSTJ1, VHSTJ2, VHSTJ3, VHSWJ3, VHSYJ2	700p
VHSVH4, VHSWH1, VHSXH1, VHSYH2	1600p
VHSWJ1, VHSXJ3	700p
GRAETZ	
4312, 4605, 4905, 4912, 4913, P4833, TR4605, TR4812, TR4905, TR4912, TR4913, TR4914, TR4943	650p
4935, 4943, 4963, 4985, 4993, TR4833, TR4935, TR4985, TR4993	650p
4920, 4927, 4930	1700p
4946, TR4906, TR4916	1600p
TR4994	2300p
TR4995	3300p
GRUNDIG	
VS410, 450, 460, 500, 505, 510, 520, 521, 530, 546	1600p
BARCELONA, MVS400, 440, 500, 600, SE5100, 6100, 6110, 9100, TVR4500, 4510, 5510, VS400, 440, 500, 505, 510, 518, 600, 610, 5180, VS6190, 700, 900	1400p
MADRID, SE5140, VS540, VS5480	3000p
MVS550, 620, VS550, 620, 630, 640, 790, 930, 940	2400p
VS120	2300p
VS680	4600p
VS160, VS740	4400p
VS170	4600p
MVS660, SE6160, VERONA, VS660, VS6690	3500p
MVS710, 720, 910, SE7120, 9120, VS710, 720, 800, 810, 910, 920	1700p
HINARI	
VXL2, 3, 4, 20, 35	1150p
VXL5, V20H	1300p
VXL6	1500p
VXL7	2200p
VXL8, 9, 10, 11, 90, VCR34H, VTV200	1300p
HITACHI	
VT11, 14, 15, 16, 30, 33, 34, 330, 340, 503, 640, 5030, VTP10, 30	1000p
VT7, VT17, VT18, VT19	2200p
VT35, VT38, VT39	2400p
VT100, 110, 111, 112, 113, 115, 118, 120, 125, 128, 220, 225, 400, 405, 410, 413, 414, 415, 418, 510, 518, 520, 525, 526, VTM625, 626, 725, 726, 728	1400p
VT3000	800p
VT4000, 4200, 5000, 5500, 5600	1100p
VT77, 680, 6500, 6700, 6800, 7000, 8000, 8030, 8040, 8100, 8300, 8500, 8700, 9000, 9300, 9500, 9700, 9900	1000p
VT8, 9, 56, 57, 570, 575, 576, 580, 585, 588	3400p
VT65	2400p
VT130, 135, 138, 145, 250, 255, 258, 420, 425, 426, 428, 430, 431, 435, 438, 535, 536, VTL30, 301, VTM630, 635, 636	2000p
VT52, VT60, VT61E, VT62E, VT63, VT64, VT640	1300p
VT168, VT150, VT260, VT498 (4 HEAD)	2600p
VT530	2500p
VT522, VTM620, VTM622, VTM720, VTM722, VTM822	1900p
VT660E	2600p
H.M.V.	
HV1000, HV2000, HV3000	650p
HV4000, HV7000, HV8000p	
I.T.T.	
VR3605, 3905, 3935, 3943, 3954, 3958, 3985, 3993, 4993	650p
VR3833, 3912, 3913, 3914, 3963, 3975, 4913, VRP3833	650p
VR3986	2000p
VP3826, 3906, 3916, 3926, 3946, 3948	1550p
VR3927	1400p
VR3976	2300p
VR3977	2700p
VR3984, VR3994	2300p
VR3995, 3997	1800p
VR3917	1400p
VR3730, VR3731, VR3749	2500p
VR3918, VR3919, VR3938	1500p
VR3520, 3701, 3719, 3720, 3721, 3759, 9720	2000p
VR3907, VR3908	1600p
VR3968	700p
J.V.C. & FERGUSON	
HR2200, 3300, 3320, 3330, 3350, 3360, 3660, 3750, 3860, 4100, 3292, 8900, 8901, 8902, 8903, 8906, 8922, 8928, 3V01, 3V06, 3V22	600p
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	625p
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	1250p
HRD154, 170, 171, 210, 211, 217, 320, 321, 350, 521, 522, 525, 526, 527, 550, 8950, 8951, 3V64, 3V65, FV10, FV11, FV20, FV21, FV26	1400p
HRD565, HRD566, 3V48	2450p
HRD725, HRD755, 3V43, 3V53	3150p
8930, 8931, 8933, 8940, 3V29, 3V30	700p
8945	2400p
3V00, 8902, 8903, 8909, 8912, 8922	1000p
FV31	1500p
FV37, FV43H, HRD860	3500p
BR7000E, BR7000S	2800p
HR7200, 7300, 7350, 2650, BR6200	700p
HRD455	2000p
HRD520	1400p
HRD300, 400, 580, 600, 620, 650	2300p
HR4100	1000p
HRD750, HRD830	3300p
HRD250, HRD257	2700p
3V32, 8942, HR7655	2300p
HRD180, 190, 230, 610, 3V59, FV12L, FV20B, 26, 30, 32, 33, VC141L	2450p
HRD370, HRD430, HRD470, 3V58, FV13H	2300p
HRD530, HRD700, FV14T	3100p
GRC1, GRC2, 3V41	2800p
HRD330, 337, 440, 637, 641, 660, HRFC100, FV44L	2100p
KENWOOD	
KV901, KV903, KV905	650p
KV917	2450p
LOGIK	
VR960	1500p
VR950	1400p
LOEWE	
OC410, OC420, OC440	2400p
OC50, OC55, OC60, OC65	1500p
LUXOR	
9225, 9256	1800p
9245, 9251, 9254	1225p
9270, 9271, 9273	1800p
9272, 928217	2700p
9252	2500p
928017, 928077, 928097, 929107, 928117	1700p
9253	2500p
9281	2700p
9284, 9295, VR3701, VR3721, VR3731, VR3761	2100p
MATSUI	
VX500E, 800A, 810A, 820, 80A, 770B, 773B	1200p
VCRL3, VX730, VX750	1450p
VX735, VX755, VX990	1500p
VX735A, VX765, VX850	1750p
VX600	1100p
MITSUBISHI	
HS303, HS304, HS320, HS700	1500p
HS306, HS318, HS710	1600p
HS307	2600p
HS319	2500p
HS330	2600p
HS400	2800p
HS349, HSE31, HSE32, HSB31	2400p
HS411	2900p
HSE30, HSB30	2400p
HS338	2200p
HSE10, HSE11, HSE20, HSE21, HSE41, HSB10, HSB20	2200p
HS300, HS301, HS302, HS310, HS273	1550p
HS200	650p
HS337, HS347	1500p
HSE12, HSE22, MX1	2200p
HS411EZ, HS411GZ	2900p
HSB11, HSB21	2200p
HSE50	3300p
NATIONAL PANASONIC	
NV300, 322, 333, 390, 2000, 2010, 3000, 7000, 7500, 7800, 7850, 8170, 8200, 8400, 8600, 8610, 8620	625p
NV777, NV330	1500p
NV8050, NV8051	2800p
AG1000, AG1050, NV260, NV280, NV460, NV470, NV480	1600p
AG6010, AG6015	2500p
AG6840	2400p
NV100, NV200, NV370, NV380, NV630	725p
NVD80, NVH65	3900p
NVF65, NVH75	3200p
NVF51	4200p
NVG19	2300p
NVJ30, NVHJ33, NVL20, NVL21, NVG30, 31, 40, 130	1800p
NVJ35, NVG46	2500p
NVM1, NVM3, NVM5	4200p
AG2100, AG2200	700p
NV430	1100p
NV730, NV770 4 HEAD	1550p
NV366	1850p
NV180, NVD48	2300p
NV788	2900p
NV810, NV830	2600p
NV850, NV950	2750p
NV870, NV890, NV970	3600p
NVG33, NVG46, NVL23, NVL25, NVL28	2000p
NVG10, 11, 12, 14, 16, 120, NV250, 280, 450, 465	1650p
NVG18	2000p
NVG20, 21, 22, 25, 28, 200, NVD48	2200p
NVG50, NVG300	2650p
NVG45	2000p
NVH70	3600p
NV688	2400p
NV600	1600p
AG6800, AH6810	2600p
AG6100, AG6200, AG6300	2800p
NVG7, NVG9, NV230	1200p
NV780	2800p
NVG15, NVG400	2600p
NVM7, NVMC20	3800p
NVF70	5200p
N.E.C.	
N9011, 9012, 9013E, 9014E, 9014G, 9015, 9016, 901A, 902A, 9033, 9034, 9040, 9053, 9054, 9055, 9063, 9065, 9066, 906, DX1000, 1600	1300p
N911A, 914C, 915A, 916A, 917, 9110, 9120	2400p
PVC600, 740, 744, 754, 763E, 764, PV2300, 2400, 760, 794, 770, 774	1650p
N380, N381, N830, N831, N832, N833, N834, N835, N836	700p
8261, AH1 (for model DX3000), DX4000, N9610	3000p
N895	3150p
N9052, N9530, DX2000	3400p
VCP1	1700p
PVC2300, 2400, 740, 744, 760, 764	1400p
DS6000	3500p
NORDMENDE	
460, 9-460, V100, 140, 200, 250, 304, 341, 450, 550	700p
V1001, 1005, 1015, 1025, 1035, 1041, 1055, 1065, 1105, 2005	1250p
V110, V333	2000p
V101, 102, 103, 112, 141, 142, 200, 300, 301, 302, 350, 500, 3005	700p
V1205, V1215, V1235, V1245	1400p
V1305	2450p
V380	2300p
V502, V503, V5005	3150p
ORION	
VH3, VH555, VH600, VH700, VH844, VH900, VH1000 (ALL MODELS)	1100p
VH1, VH2A	700p
PHILIPS	
VR6460, VR6520, 64VR60, VR6420	725p
VR6711 4 HEAD	1800p
6920, VR6440	2500p
VR6441, VR6540, VR6541, VR6640, VR6642	1300p
RANK	
BV6900AS	1800p
N830EA, RV300, RV310, RV320, RV330, RV340, RV350, RV380	700p
REDSON	
MR100	1700p
SABA	
2A10, 2A70, 2B20	1400p
4A10, 4B20	2450p
6A10, 6A70	2300p
8A10, VR6038	3150p
CVR6083, VR600, 66007, 6008, 6009, 7006, 7007	1250p
PVR6068, 6070, 8070, VR2000, 6000, 6010, 6012, 7000, 9010	600p
VHR7000, VR5005	1500p
VR6004, 6005, 6011, 6013, 6014, 6020, 6022, 6023, 6024, 7004, 7011, 7014, 7720, 7730, 8011, 8014	700p
VR6018, VR7018	2450p
VR6028	2300p
VR7016	2000p
SAISHO	
VR100, 605, 705, 805, 905, 1000, 1100, 1200, 1600	1200p
VR3300X, VR3600X, VR3650, VR3800	1400p
VR3200, VR3500	1400p
VR2000, VR3300, VR3600	1400p
SALORA	
6500, 6600	1600p
SV7300, SV8200, SV8300, SV9200	1500p
SV7400, 8400	1600p
SV8100	1200p
SAMSUNG	
SVX301, VB900, 910, VVT510, VT320, 5600, VX510, 511, 520, 616, 626, 627, 717, 614, 619, 629, 710, 712, 720, 730, 970, 971, 972, SV716, 717, SVX303, 305, VB510, 520, 610, 616, 617, 619, 620, 626, 627, 629, 710, 971, V1520, 616, 621, 626, 900, 910	1350p
VB770, V1730, V1770, VK8220, VX750, VK770, VK8225	1900p
VM1560, VN1561	2200p
SANYO	
VTC5000, 5400, 6000, 6500, VPR5000, VTC1500, VTCM10, 11, 20, 21, 25, VTC2000, 5100, 5150, 5300, 5400, 5350, 5370, VTCNX10, VTCNX15, 20, 30, VPR5800	1800p
VTC5500, 5550, 9100, 9300, 9350, 9355, 9455, 9500	1900p
VHR1110, VHR1150, VHR1300, VHR1700, VHR2300	1300p
VHR3200, 3270, 3100, 3150, 3300, 3400, 3310, VHRD500	1500p
VHR1100, VHR1200	1500p
VHR1500, VHR2500	2100p
VHR2700	2450p
VHR7900	3000p
SHARP	
VC390, VC393, VC496	2750p
VC488	4200p
VC779	1800p
VC789, VC790	2900p
VC200, 220, 300, 381, 383, 384, 385, 386, 387, 388, 471, 477, 481, 482, 483, 486, 3300, 8381, 9100, 9300, 9400, 9500, 9600, 9700	1100p
VC582, 583, 651, 681, 750, 780, 781, 683, 684, 402, 500, 571, 573, 580, 584, 600, 682, 693, 700, 772, 7810, 782, 7822, 783, 8481	1100p
VC6000, 6200, 6300, 7300, 7700, 7750, 8000, 8300	1800p
VC793	3000p
VC473, 785, 786	2200p
VC699, VCA501, VCA602	2800p
VC585, VC685	2000p
VC90ET	3900p
VFH815	2800p
SIEMENS	
FM350, FM352, FM355, FM361, FM362, FM363	1300p
FM364	1350p
FM391, FM392, FM461	1800p
FM394, FM464	2800p
FM462, FM561	1600p
FM468	2450p
FM484, FM485, FM602, FM604, FM622, FM624	1800p
FM585	1425p
FM600	1900p
SONY	
DSR-19R (FOR SL-T9ME)	3100p
DSR-21R (FOR SLC8-C9)	2800p
DSR-35R (FOR C20, C30, C40, SLF1UB, SLF1E) 2 PIN SLC24PS, SLC33E, SLC44PS, SLF30PF, SLF60PS, SLK85, SLT20ME, SLT30ME	1500p
DSR-43R (FOR SLC7 RANGE, SL5000, SL5100, SL3000) 1 PIN SLC6E, SL36ES, SL37E	1300p
SL3000, 8000, 8080, SLC5E, SLT7ME	1600p
SLV201, 202	2000p
SLK95, SLT50ME	2900p
SLV373VB	2600p
TOSHIBA	
V63	1500p
V9680	3400p
V8600, V8700	3000p
V21, V31, V33, V50, V51, V53, V9600	1450p
V55, V57	700p
V71, V73, V74, V75, V77, V80, V81, V82, V83, V84, V85, V86, V87	1200p
V80, V93	1450p
V5470, V5480	1300p
V600	2350p
V880MS	2600p
V700G	3700p
V500G, V509G	2500p
V9680	2900p
V300G, V301, V305, V309G	2550p
V61, V63	1700p
V110, V120, V130, V140, V210, V220	1800p
TRIUMPH	
VR9500, VR9501, VR9525	1100p
TELEFUNKEN	
A890	2700p
A920, VR1970, 2920, 2925, 2930, 410, 7921, 7926, 7931, 7970, 970	1250p
VR400, 410, 450, 510, 519, 520, 529, 540, 610, 620, 640, 920, 1920	700p
A930, 932, 935, VR2931, 2935, 2941, 3935, 4935, 4940, 4942, 4945, 5935, 7932	1400p
A935, VR3945, VR3950, VR7959	2450p
A940, VR1925, 1930, 1940, 1950, 2960, 440, 449, 530, 535, 539, 549, 550, 630, 650, 925, 930, 940, 950	700p
VR1980, VR7980, VR980	3150p
VR2915	1100p
VR2970, VR7971, VR975	2450p
VR2979	2300p
THOMSON	
TX8000, V309, 316, 320, 321, 323, 326, 4100, 4200, 4300, VX305T, 306T, 309BL, 3301, 312T, 410T, 411T	650p
TX8500, V318, 342, 343, 351, 352, 353, 4210, 4230, 4260	1250p
V333	1100p
V340	1100p
V357, VK309LP	2300p
V360, V5500	2450p
V364, V4400	2000p
V368, V6000, V8540	3150p
V410, 510, 610, 630, 715, 4240	1400p
V430, 530, 4340	2450p
V450	2300p
VK300T, VK301T, VK302T, VK303T, VK308P	650p
VM10, VM20	2700p

PINCH ROLLERS / VCR BELT KITS

AKAI
VS10, VS9300, VS9500, VS9700, VS9800, VP7100, VP77 200p
VS1, VS2, VS3, VS4, VS5, VS6, VS8, VS9 200p
VS105, 112, 115, 116, 126, 205, 220, 240, 244, 246, 247, 248, 250, 512, 515, 516, VSX9 200p
VS201, VS301, VS303, VS304, VS603, VS606, VS607, VP58-P82 200p
VS125, VS155, VS165, VS220, VS240, VS250, VS512 200p
VS22, 23, 25, 35, 37, 38, 53, 66, 75, 422, 425, 426, 427, 462, 465, 467, 485, 965, 967, VSA77 200p
VSF260, 281, 262, 265, 270, 274, 280, 290, 410, 440, 450, 455, 480, 490, 497, 560, 599 200p

AMSTRAD
VCR4500, 4600, 4700, 5200, 6000, 6100, 8600, 8602, 8603, 8604, 8700, 8704, 8714, 8800, 8804, 9000, 9340, DD8904, TVR1, 2, 3, 4 200p
VCR7000 200p

AIWA
AV66, AV77 200p
G700, G900 200p

ALBA
VCR3000X, VCR4000 200p
VCR5000, VCR6000 200p

AUTHENTIC
N850 200p

BLAUPUNKT
RVT100, 200, 202, 222, 224, 301, 306, 307, 309, 311, 312, 315, 316, 317, 319, 320, 328, 404, 414, 434, 444, 478, 707, RTX100 200p
RTV211, 214, 321, 322, 348, RTX250, 260 200p
RTV324, 325 200p
RTV330, 454, 520, 530, 535, 560, 660, 670, 720, 730, 740, 800, 810, 900, 910, 920 200p

DAEWOOO
VCR12, VCR32, VCR52 200p
VCR30, VCR500 200

DECCA
VR8300 200p
VRH8495DK (Pressure Roller Assembly) PS403-40205 450p

FERGUSON
3V00, 3V01, 3V16, 3V22, 3V23, 3V24, 3292, 8900, 8901, 8902, 8903, 8904, 8906, 8909, 8912, 8922, 8923, 8924, 8925, 8929 200p
3V29, 3V30, 3V31, 3V32, 3V52, 8930, 8931, 8933, 8940, 8941, 8942 200p
3V35, 3V36, 3V38, 3V39, 3V42, 3V43, 3V44, 3V45, 3V48, 3V49, 3V53, 3V54, 3V55, 3V56, 3V57, 3V58, 3V59, 3V65, FV10, FV11, FV12, FV14, 8943, 8944, 8945, 8947, 8948 200p
3V52 200p
8950, 8951, FV10B, 11R, 13H, 14T, 20B, 21R, 26D, 31R, 32L, 41R, FV42L, 50B, 61R, 52L, VC141L 200p
FV44L, FV46T, FV43H 200p

FISHER
FVHP420, 520, 530 200p
FVHP615, 618, 620, 622, 710, 711, 715, 716, 720, 721, 722, 725, 730, 830, 840 200p
FVHP905, 906, 908, 910, 911, 915, 916, 918, 970, 975, 980, 990, 5000, 5005, 5050, 5075, 5100 200p
VBR330, VBS3500, 7000, 7500, 7600, 9000, 9900 200p
FVHD250, 270, 370, 2000D, FVHP3, 210, 250, 300, 310, FVSD2095 200p

FIDELITY
HQS200, VCR100, 600, 6100 200p
VTR100 200p

FUJITSU
HS760, VX715, VX720D 200p

FUNAI
V1, V2, VCR4000, 4500, 4530, 4540, 4600, 4800, 5200, 5400, 5600, 5800, 5840, 5843, 6000, 6400, 6600, 6800, 6803, 8007, 8103, VIP150, 3000, 5000, 6000 200p
VIP1000, VIP1400 200p

G.E.C.
V4004 200p

GRANADA
VHSAH1, 3, VHSVH4, VHSWH1, VHSXH1, VHSYH2 200p
VHSAN3, VHSBP1, VHSVN1, VHSVN2 200p
VHSAY3, VHSX42 200p
VHSBH1, VHSCH1, VHSFS1, VHSFS2, VHSEH2, VHSEH3 200p
VHSBY3, VHSCC1 200p
VHSDS2, VHSXN2 200p
VHSDP1, VHSFP2 (Pressure Roller Assembly) PS403-40205 450p
VHSEY1, VHSEY2, VHSFY2 200p
VHSFG2, VHSFG3, VHSFG4, VHSFH6 200p
VHSFJ2, VHSFJ4 200p
VHSF63, VBXAS1 200p

SEE OTHER PAGES FOR MORE GRANDATA BARGAINS

VHSTJ1, VHSTJ2, VHSTJ3 200p
VHSWJ1, VHSWJ3, VHSXJ3 200p
VBXYB3 200p
VHSEH3, VHSES2 200p
VHSF34 200p
VHSFP2 200p

GRUNDIG
BARCELONA, MADRID, MVS500, 510, 600, 820, 660, 710, 720, 910, 9105, SE5110, 5140, 6100, 6110, 7120, 9100, 9120, TVR4500, 4510, 5510, VERONA. VS500, 505, 510, 520, 530, 540, 550, 600, 610, 620, 630, 640, VS650, 660, 680, 700, 710, 720, 740, 790, 800, 810, 900, 910, 920, 930, VS940, 5180, 5480, 6190, 6690 200p
MVS400, 440, 400, 410, 440, 441, 450, 456, 460 200p
VS120 200p
VS150 200p
VS180, 200, 220, 226, 262, 265, 267, 300, 310, 315, 320, 326, 345, 380 200p

GOLDSTAR
GHV51, 1221, 1232, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 8000, 8200, 8210, 8215, GHVP1240, 1241, 1247, 1248, 1290, 1291, 1295, 1296, VCP4000, 4100, 4130, 4200, 4300, 4301, 4305, 4306, 4310, 4311, 4315, 4316, 4320, 4321, 4325, 4326 200p

HINARI
V20H, VXL5, VXL6, VXL7, VXL8, VXL9, VXL10, VXL11, VXL19 200p
VXL2, VXL3 200p
VXL4, VXL20, VXL35 200p

HITACHI
VT7, 11, 14, 16, 17, 19, 33, 34, 35, 38, 39, 88, 330, 680, 6500, 6800, 5000, 5500, 7000, 8000, 8300, 8500, 9300, 9500, 9700, 9900 200p
VT8, 52, 57, 61, 62, 63, 64, 65, 85, 86, 88, 100, 110, 111, 113, 115, 118, 120, 122, 125, 130, 135, 138, 145, 150, 168, 178, 220, 225, 250, 255, 258, 260, 400, 405, 410, 413, 414, 415, 418, 420, 425, 426, 428, 430, 431, 435, 438, 450, 498, 510, 518, 520, 525, 526, 576, 580, 585, 588, 640, VTD660, 665, VTF770, 775, VTL30, VTLC50, VTM620V, TM625, 626, 630, 635, 636, 640, 645, 646, 720, 722, 725, 726, 728, VTM730, 731, 735, 736, 740, 745, 746, VTS80, 85 200p
VT3000 200p

I.T.T.
VR3605, 3826, 3905, 3906, 3916, 3926, 3935, 3946, 3948, 3976, 3985, 3986, 3995, 3997, 6348 200p
VR3913, 3914, 3943, 3954, 3984, 3993, 3994 200p
VR3907 200p
VR3908 200p
VR3912, VR3963, VRP3833 200p
VR3917, VR3833 200p
VR3927, 3929, 3968 (PRESSURE ROLLER ASSEMBLY) PS403-40205 450p
SVR3799, VR3520, 3701, 3719, 3720, 3721, 3730, 3731, 3749, 3759, VR3761, 3781 200p
VR3918, 3919, 3958, 3998 200p
VR670, VR680, VR681 200p
VR3927, VR3977 200p
VR482, VR580, VR581, VR582 200p
VR9720 200p

J.V.C.
HR2200, 3300, 3330, 3360, 3660, 4100, 7700 200p
HR2650, 7200, 7300, 7350, 7600, 7610, 7650, 7655 200p
HRD110, 111, 120, 121, 140, 150, 157, 158, 160, 225, 257, 455, 565, 566, 725, 755, HRP50 200p
HRD520, 540, 550, 580, 600, 620, 637, 641, 650, 660, 830, 860, 960, HRS5800 200p
HRD170, 180, 210, 230, 300, 320, 321, 330, 337, 350, 370, 400, 430, 440, 441, 470, 500, 530, 700, 750, 950, HRS5000, 5500, 9000 200p
HRS10 200p

LOGIK
VR955 200p

LUXOR
9245, 9251 200p
8252, 8253, 8256, 8285 200p
9254 200p
9255 200p
9270, 9271, 9273, 9274 200p
9272, 928017, 928077, 928097, 928217, 929017, 929117, 929317 200p
9281, 9283, 9284, 9292, 9295, VR3701, 3721, 3731, 3761, 3781 200p

MATSUI
VX850 200p

MITSUBISHI
HS200, HS300, HS301, HS302, HS303, HS304, HS310, HS320, HS330, HS700 200p
HS306, HS307, HS318, HS319, HS337, HS338, HS347, HS349, HS400, HS410, HS411, HS412, HS421, HS710, HSB10, 20, 30, HSE10, 20, 30, 70 200p
HSE11, HSE12, HSE21, HSE22, HSE31, HSE32, HSE41, HSE51, HSE52 200p

NATIONAL PANASONIC
NV100, 180, 300, 332, 333, 340, 366, 600, 688, 777, 788, 3321, AG6010, 6015, 6100, 6200, 6400, 6800 200p
NV230, 250, 260, 280, 370, 380, 430, 431, 433, 450, 460, 465, 470, 480, 630, 650, 730, 770, 780, 810, 930, 950, 970, 990, 2000, 2010, 3000, 7000, 7200, 7800, 8050, 8150, 8200, 8300, 8400, 8600, 8610, 8620, NVG14, NVG7, 10, 12, 15, 18, 30, 130, 400, AG1000, 1050, 1200, 1500, 2100, 2200, 6810, NVH70 200p
NVG9, NVG120 200p
AG6840, NVH65, 75, NVJ30, NVL20, 23, 25, 28, NVG300, NVF65, NVF70, NVFS1, NVFS100, NVG19, 20, 25, 33, 40, 50 200p
NVD48, NVD80, NVG21, NVG45 200p

N.E.C.
N830, 831, 832, 833, 895 200p
PVC2300, 2400, 740, 744, 746, 760, 764, 766 200p
OX1000, 1600, 2000, 3000, N9012, 9013, 9014, 9016, 9033, 9034, N9053, 9054, 9055, 9066, 9110, 9120, 9510, 9520, 9530, 9610 200p

ORION
VH1, VH2 200p
VC150, 180, VH3, 33, 200, 201, 205, 212, 250, 254, 288, 300, 303, 312, VH404, 555, 700, 704, 712, 770, 780, 844, 900, 1000, 2948, 3030, 3312, VHF2A, VP2948 200p
COMBI15000, 16000, HV03, LVH50, NEVH, NEVHM, NEVHML, TVP230RC, VCP, VH04, 30, 103, 300, 358, 360, 362, 400, 416, 512, VH530, 532, 535, 536, 600, 630, 635, 640, 666, 730, 735, 744, 774, 790, 800, 820, 850, 888, 893, 900, 930, 940, 942, 974, 1012, 1040, 1050, 1060, 1070, 1100, 1120, 1204, 1440, 1500, 1660, 1800, 2004, 2151, 2308, 2204, 2400, 2500, 2600, 2700, 2960, 2970, 3050, 3060, 4000, 4008, 4010, 4012, 4015, 4020, 4300, 5020, VP10, 200, 220, 225, 245, VR821, 925, 1032, 2949, 2959, 2957, 2966, 2979, 2980, VTV300, VXL20, 25, 30 200p

PHILIPS
VR6460, VR6920 200p
VR2020, VR2021, VR2022, VR2023, VR2024 200p
VR8711 200p
VR6540 200p
DV856, 586, VR702, 703, 6485, 6589, 6785, 6880, 6948 200p
VR445, VR6442, VR6542, VR6843, VR6943 200p
DV444, VR2220, 2300, 2324, 2330, 2334, 2340, 2350, 2414, 2480, VR2485, 2486, 2489, 2490, 2498, 2840, 6462, 6463, 6464, 6560, 6660, 6860, 6861, 6862, 6863 200p
N-1700, VR2870 200p
VR2025, VR6580 200p
VR6548, VR6648 200p
PRESSURE ROLLER ASSEMBLY PS403-40205, DV186, 190, 286, 291, 292, 486, 471, 562, 582, 571, 761, VR201, 202, 203, 302, 303, 305, 6180, 6182, 6185, 6285, 6290, 6291, 6293, 6362, 6367, 6390, 6391, 6393, 6467, 6468, 6470, 6561, 6570, 6581, 6670, 6676, 6760, 6761, 6762, 6870, 6970, 6975, 86B1, 63SB7, 68SB4, 71SB4, 72SB8, 92SB31 450p

SANYO
VHR1100, 1150, 1200, 1300, 1500, 2100, 2300, 2500, 2700 200p
VTC5000, 5150, 5300, 5350, 5400, 5500, 6000, 6500, 9100, 9300, VTCM10, 20, 11, 21, 31, 50, VPR5800 200p
VHR3100, 3300, 3310, 3400, 3700, 3800, VHRD500, 700 200p
VTC3000 200p
VHR4100, 4150, 4200, 4300, 4350, 4770, 5100, 5200, 5300, 5350, 5700, 7100, 7200, 7500, 7530, 7540, 7800, 8100, 8200, 8250, 8500, VHRD4400, 4410, 4500, 4600, 4610, 4710, 4890, 6700, VHRS700 200p
VCR100 200p

SHARP
VC200, 381, 384, 385, 386, 388, 390, 393, 800, 2300, 3300, 6000, 6200, 7300, 7700, 7750, 8300, 9100, 9300, 9500 200p
VC300, 387, 402, 471, 473, 477, 481, 482, 483, 486, 488, 496, 500, 571, 573, 581, 582, 583, 584, 585, 8481, VC5F3, VC5W20E, VCA1031 200p
VC600, 651, 681, 682, 684, 685, 693, 699, 700, 772, 750, 779, 780, 781, 782, VC782MK2, 783, 785, 786, 787, 793, 800, 7810, 7822, VCT72, VC6F3, VC6V3, VCA100, 102, 104, 131, 140, 170, 202, 203, 211, 234, VCA303, 501, 602, 5011, VCD801, 802, 851, 852, 881, 882, VCM73, VCT73 200p
VC220 200p
VCA10, 30G, 60, 103, 105, 106, 211, 244, 505, 605, 615, 1031, VCD806, 810, 815, VCH80, 865, 910, VCS1000, VCT310, 410, 610, VCT1314, 5313 200p

SAISHO
VHL3, VR1000, VR2000, VR2500, VR3800 200p

SALORA
SV6500, SC6600 200p
SV7300, SV8200, SV8300, SV9200, SC9300 200p
SV7400, 8400, 8420, 8500, 8520, 8550, 8600, 8620, 8700, 8710, 8720, 8800, 8830, 9500, 9600, 9810 200p
SV8000, SV8100 200p
SV601, SV800, SV900, SV901, SV6910, SV9800, SV9900 200p
SV6700, SV8710, SV8750, SV9700 200p
SV6800, 6900, 8820, 8850, 8870, 8910, 8920, 8970 200p

SAMSUNG
SV716, 717, VB510, 520, 610, 616, 617, 619, 620, 626, 627, 629, 900, SV910, VI510, 520, 611, 616, 621, 626, 900, 910, VX510, 520, 616, 617, 619, 626, 627, 629 200p
SVX301, 303, 305, 307, 319, 322, VB710, 770, 971, 8220, 8225, V1730, 1790, 18220, 18225, VX710, 712, 720, 730, 750, 770, 790, 825, 970, 971, 972, 8220 200p

SANSUI
SVR5030 200p
SVR7010 200p

SIEMEN
FM350, FM352, FM355 200p
FM361, FM362, FM363, FM364 200p
FM391, FM392, FM394, FM461, FM462, FM464, FM468, FM561 200p
FM484, FM485 200p
FM585, FM602, FM604, FM622, FM624, FM627 200p
FM600 200p
FM204, 303, 304, 314, 325, 328, 374, 375, 376, 384, 386, 388, 404, 424, 428, 429, 488, 489 200p

FM556, FM558, FM560, FM562, FM564, FM574, FM578 200p
FM601, 603, 605, 607, 608, 617, 619, 620, 621, 623, 625, 626, 628, 630, 632, 634, 636, 638, 639 200p

SOLAVOX
NCVR1000, NCVR5000 200p

SONY
SLC5, 6, 7, SL3000, 8000, 8080, 8200, SLJ10, SLT6ME, SLT7ME 200p
SLC9, 20, 24, 30, 33, 44, SLHF100, SLF1, 11, 20, 25, 30, 60, 100, 200, SLF60PS, SLF90E, SLHF150, 850, SLK88, 95, SLT20ME, SLT30ME, SLT50ME 200p
BMC100, BMC200, BMC500 200p
SLV201, 202, 301, 302, 401, 402, 801, 802 200p
SLV210, 270, 273, 275, 300, 353, 373, 410, 415, 474, 656, 715, SLV757, 777 200p
SLV255 200p

TELEFUNKEN
A920, 930, 932, 935, 940, 960, 980, 990, 1200, VR925, 930, 940, 950, 971, 975, 980, 1920, 1925, 1930, 1940, 1950, 2920, 2925, 2930, 2931, 2935, 2941, 2960, 2970, 2671, 3935, 3945, 3950, 3965, 3975, 4935, 4940, 4942, 4945, 4970, 6000, 7921, 7926, 7929, 7931, 7932, 7970, 7971, 7979, 7980 200p
VR1935, VR2915 200p
VR1970, VR1980 200p
VR400, 410, 440, 449, 450, 510, 519, 540, 549, 610, 640 200p
VR520, 529, 530, 535, 539, 550, 620, 630, 650, 920 200p

THOMSON
SV1000, TX8500, V320, 321, 323, 326, 342, 343, 351, 352, 353, 360, 364, 368, 410, 430, 450, 510, 520, 530, 540, 620, 630, 640, 4200, 4210, 4230, 4240, 4260, 4300, 4340, 4400, 5500, 5540, 6000, 8540 200p
TX8000, V309, 316, 357, 309, 410, 411, 3801, 4100 200p
V333, V340 200p
VX300, 301, 302, 305, 306, 312, 3301 200p

TOSHIBA
DV55, 57, 61, 63, 65, 66, 67, 71, 73, 74, 75, 77, 81, 83, 85, 86, 93, 94, 80, 90, 96, 97, 200, 202, 205, 207, 300, 309, 500, 509, 700 200p
V5470, V5480 200p
V108, V109, V199, V209, V609 200p
PRESSURE ROLLER ASSEMBLY – PS403-40205, V91, V95 450p

VCR BELT KITS

AKAI
VP7100, VS9300, VS9500, V9700, VS9800 120p
VS1, VS2, VS4, VS5 100p
VS10 65p
VSX9, VS105, 112, 115, 116, 205, 220, 24, 244, 245, 247, 248, VS250, 512, 515, 516 300p
VS22, VS23, VS25, VS35, VS37, VS38, VS53, VS55, VS66 100p
V54, VS6 150p
VSA77 140p

AIWA
AV66 125p
AV77 140p
G700 160p
G900 180p

ALBA
VCR40000 130p
VCR5000, VCR6000 105p

AMSTRAD
TVR123, VCR4600, VCR4700, VCR5200 140p
VCR7000 80p
VCR6000, 6100, 8600, 8602, 8603, 8604, 8700, 8704, 8714, 8800, 8804, 9000, 9340, DD8900, DD8904, TVR4 160p

AUTHENTIC
N850 120p

BLAUPUNKT
RTV100 200p
RTV200, RTV222, RTV224 90p
RTV202, RTX200 150p
RTV322, RTV248 100p
RTV306, 307, 309, 310, 311, 312, 328, 414, 434, 444, 707 135p
RTV211, RTV214 140p
RTV324, RTV325 65p
RTV315, RTV316, RTV319, RTV320, RTV317 50p
RTV301, RTV333, RTV338, RTV404, RTV424 85p

BONDSTEC
BT100 110p
BT300, BT310 170p
BT350 140p
BT50 150p

BOSCH-BAUER
VRH50 100p
VRH60 140p
VRP20 180p

DAEWOOO
VCR12, VCR32, VCR52 110p
VCR30DAP 150p
VCR30DBD, VCR500BD, VCR50DFD, VCR50DFP 170p

DECCA
VR8300 90p
VRH8945DK 80p

DUAL
VR4430 90p
VR91, VR93, VR97 75p
VR70, VR71, VR74, VR81, VR90 85p
VR80 90p
VR96 85p

FERGUSON
3292, 3V00, 3V01, 3V16, 3V22, 8900, 8901, 8904, 8906 135p
3V23, 8923, 8924, 8929 65p
3V29, 3V30, 8930, 8931, 8933, 8940 90p
3V31, 3V32, 8941, 8942 85p
3V35, 3V36, 3V38, 3V39, 3V49, 8943, 8944 85p
3V42, 3V43, 3V44, 3V45, 3V48, 3V53, 3V54, 3V55, 3V57, 8945, 8947, 8948 65p
3V43, 3V44, 3V58, 3V65, 8950, 8951, FV10, FV11, FV12, FV13, FV14, FV20, FV21, FV22, FV26, FV32, CV141L 80p
FV31R 125p

FIDELITY
HQS200, VCR600, VCR6100 180p
VCR100 160p
VTR1000 100p

FINLUX
VR2005, VR2010, VR2020, VR2025, VR2040 105p
VR2008 160p
VR3009 140p

FISHER
VBS7000 245p
VBS9000 120p
FVHP520, FVHP530, FVHP420 60p
FVHP615, 618, 620, 622, 710, 711, 720, 721, 722, 725, 730, 840 100p
FVHP905, 906, 908, 910, 911, 915, 916, 918 100p
VBR330, VBS7500, VBS7600, VBS9900 100p
VBS3500 75p

FUJITSU
HS760, HS750, VGX715, VGX720D 160p

FUNAI
V1, V25, VCR4600, 4800, 5200, 5400, 5600, 6400, 6600, VIP3000, VIP5000 160p
VCR4530, 5840, 5843, 6800, 6803, 8007, 8103, VIP150, 6000 160p

G.E.C.
4005 100p
V4004 100p

GOLDSTAR
GHV1221, 1232, 1241, 1242, 1243, 1244, 1245, 1246, 1247, 1248, 8210, 8215, VCP4100, VCP4130 80p
GHV1290, 1291, 1295, 1296, VCP4000, 4200, 4300, 4301, 4305, 4306, 4310, 4311, 4315, 4320, 4321, 4325, 4326 120p

GRANADA
VHSAH1, VHSAH3 100p
VHSVH4, VHSWH1, VHSXH1 60p
VHSYH2 50p
VHSBH1, VHSCH1 150p
VHSBP1 135p
VHSAN3 110p
VHSDS2 125p
VHSAY3 125p
VHSBY3 100p
VHSEY1, VHSEY2 70p
VHSCC1 100p
VHSDP1, VHSFV2 80p
VHFTJ1, VHSTJ2 150p
VHSTJ3 65p
VHSWJ1, VHSWJ2 120p
VHSXJ3 85p
VHSFJ2 140p
VHSFS1, VHSFS2 130p
VHSFG1, VHSFG4, VHSF63 180p

GRUNDIG
MVS400, MVS440, VS400, 410, 440, 441, 450, 456, 460 55p
VS180, 200, 220, 226, 262, 265, 267, 2X40800, 0850, 0880, 1600, 2000, 2080, 2200, 2280, MVS200RC 90p
VS150 160p
VS310, VS315, VS320, VS326, VS340, VS345, VS380 85p

HINARI
VXL2 80p
VXL7, VXL8, VXL9, VXL10 180p
VXL4, VXL35 70p
VXL5, VXL6 160p
VXL3, VXL20 90p

HITACHI
VT11, 14, 17, 19, 33, 34, 35, 38, 39, 88, 165, 330 90p
VT5000, VT5500 120p
VT7000, VT8000, VT8300, VT8500 60p
VT680, VT6500, VT6800, VT9300, VT9500, VT9700, VT9900 80p
VT52, VT57, VT61, VT62, VT63, VT64, VT65, VT85, VT86, VT640 120p
VT3000 120p
VT100, 110, 111, 113, 115, 118, 120, 125, 128, 130, 135, 138, 145, 150, 168, 175, 220, 225, 250, 255, 258, 260, VTL30 130p

I.T.T.
VR3605, VR3905, VR3935, VR3954, VR3985 90p
VR3913, VR3914 70p
VR3826, VR3906, VR3916, VR3926, VR3946, VR3948, VR3978, VR3986, VR3995, VR3997, VR6948 65p
VR3927, VR3977 65p
VR3993, VR3994 75p
VR3963 65p
VR3912 130p
VR3917 150p
VR3929, VR3968 85p
VR3907 100p
SVR3799, VR3520, 3701, 3719, 3720, 3721, 3730, 3731, 3749, 3759, 3761, 3781 90p
VR3908 180p
VR3918, VR3919, VR3958, VR3998 115p

J.V.C.
HR3300, HR3330 HR3360, HR3660, HR4100 130p
HR7200, HR7300 70p
HR7350, HR7600, HR7610, HR7650, HR7655 75p
HR7700 75p
HRD110, HRD111, HRD120, HRD121, HRD225 90p
HRD140, 150, 157, 158, 160, 250, 257, 455, 565, 566, 725, 755, HRP50 65p
HRD170, 180, 210, 230, 300, 320, 321, 330, 337, 350, 370, 400, 430, 440, 441, 530, 700, 750, 950, HRS5000, 5500, 9000 65p

VCR BELT KITS / REPLACEMENT VIDEO LAMPS

Model	Price
HRD620, 600, 620, 637, 641, 650, 830	95p
HRD540, 550, 580, 660, 860, 960, HRS5800	130p
KENWOOD	
KV901	70p
KV903	90p
LOEWE	
OC11, OC40	95p
OC410, OC420, OC440, OC460	130p
OC50, OC55, OC60, OC65, OC70, OC75	120p
LOGIK	
VR955	180p
LUXOR	
9245, 9251	130p
9252	140p
9253	140p
9254	100p
9255	130p
9256	130p
9270, 9271, 9273, 9274	115p
9272, 9280	140p
9281, 9284, 9285, 9292, VR3701, 3721, 3731, 3761, 3781	95p
MATSUI	
VX850	75p
MITSUBISHI	
HS200	200p
HS300, 301, 302, 307, 310, 337, 338, 347, 349, 411, 412, 421, HSB10, 20, 30, HSE10, 20, 30, 70	150p
HS303, HS304, HS306, HS307, HS330, HS400, HS700	150p
HS318, HS319, HS410	130p
N.E.C.	
N830, N831, N832, N833	100p
N895	80p
PVC2300, PVC2400	180p
DX1000, 1600, 2000, 3000, N9012, 9013, 9014, 9016, 9033, 9034, 9053, 9054, 9055, 9066, 9110, 9120, 9510, 9520, 9530, 9610	95p
NATIONAL PANASONIC	
NV300, NV332, NV333, NV340, NV366	125p
NV777, NV788	100p
NV2000, NV2010, NV3000	130p
NV7000, NV7200, NV7800	95p
NV8600, NV8610, NV8620	145p
NV230, 250, 280, 430, 431, 433, 450, 460, 465, 470, 730, 770, 810, 870, 890, AG1000, 1050	125p
NV370, NV380, NV480, NV630, NV780, NV830, NV850	100p
NV600, NV688, AG6010, AG6015	110p
NVG7, 10, 12, 14, 15, 18, 30, 130, 400, NVH70	70p
NORDMENDE	
V100, V140	70p
V1000M, 1005M, 1205, 1215, 1235, 1245, 1305, 1403, 1405, V1500P, 1503, 1505K, 1805K, 2000D, 2405, 2500H, 3000H, V3405H, 3105, 4405H, 5000, 8005, 900, 905	65p
V1001, 1005, 1015, 1025, 1035, 1041, 1055, 1065, 1105, 3005, 304, 5005, 502, 503	80p
V101, V102, V103, V112, V141, V142, V301, V302	90p
V110, V333	110p
V1500T, V2000B, V2000P, V400H	95p
V250, V460, V9460, V20035542, V20035543	130p
V300, V303, V380	75p
V500	75p
ORION	
COMBI15000, 16000, NEVHM, TVP230RC, 900MVH1012, 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	30p
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	90p
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	80p
VH1, VH2A	150p
PHILIPS	
VR6460, VR8820	170p
VR6540	100
DV186, 286, 291, 292, 468, 471, 562, 571, 781, VR201, 202, VR20DV1, 20DV2, 20RW7, 25BO1, 25BO2, 302, 303, 306, VR30DV2, 35BO2, 35BO3, 635B7, 71584, 71585, 71588, VR86582, 91582, 92583, VR6180, 6185, 6285, 6290, 6291, 6293, 6367, 6390, 6391, 6393, 6467, 6468, 6470, 6561, 6570, 6581, 6670, 6676, 6760, VR68SB4, 86SB1, 92SB3	85p
VR6442, VR6542	70p
VR2025, VR2580	100p
VR44589, BR445B920, VR445B922, BR6843	100p
VR6548, VR6648, VR49SB620, VR644869S	110p
SABA	
VR6420, 6435, 6440, 6460, 6480, 6620, 6770, 7200, 8420, 2A10, 70, 2B20, 3B20, 4A10, 4B20, 6A10, 6A70, 6B20, 8B20	65p
VR6004, 6005, 6011, 6014, 7004, 7011, 7014, 8011, 8014, BERLIN	90p
VR2000, VR6000, VR6012, VR7000, VR7720, PVR6068	130p
VR5005, VHR7000	135p
VR6006, 6007, 6008, 6009, 6015, 9016, 9018, 6038, 7006, 7007, 7016, 7018, 9006	65p

Model	Price
VR6010, VR9010	70p
VR6020, VR6022, VR6023, VR6028, VR7730	75p
VR8024	75p
VR6520, VR6540, VR6560	90p
VR6710, VR6720, VR6735, VR8720	130p
VR6720, VR6730, VR6760, VR6775, VR6780	160p
SAISHO	
VR2000, VHL3	90p
VR3800	75p
SALORA	
SV6500	100p
SV6600	150p
SV8000	120p
SV8100	80p
SV8500, SV8520, SV9500	150p
SV7400, SV8400, SV8420, SV8550	120p
SV6700, SV8710, SV8750, SV9700	120p
SV6800, 6900, 8810, 8820, 8870, 8910, 8920, 8970	95p
SV8600, 8620, 8700, 8720, 8830, 9600, 9810	130p
SAMSUNG	
SV716, 717, V1616, V1621, V1626, VX616, VX617, VX619, VX626, VX627, VX629	85p
VB520, 510, 610, 616, 617, 619, 620, 626, 627, 629, VI510, 520, 611, 616, 621, 626, VX510, 520	100
V8900, VB910, V1900, V1910	110
PX980, 981, 982, SE9001, SV9001, SVX307, 319, 322, VB770, 8220, 8225, V1770, 790, 8220, 8225, VK8220, VPX31, VX750, VX790, 8220, 8225	135p
SVX301, 303, 305, SX7301, VB710, 971, V1730, 710, VX712, VX720, 730, 970, 971, 972	230p
VX9880	110p
SANYO	
VTC5000, 5150, 6000, 6500, VTCM10, 11, 20, 21, 30, 31, 50	75p
VTC5300, VTC5350, VTC5400, VPR5800	100p
VTC5500	95p
VTC9100, VTC9300	220p
VTC1100, 1300, 1500, 1100, 1150, 1200, 1300, 1500	90p
VHR2100, VHR2300, VHR2500, VHR2700	150p
VHR3100, 3300, 3310, 3400, 3700, 3800, VHRD500, 700	110p
VHR4100, 4150, 4200, 4300, 4350, 4770, 5100, 5200, 5300, 5350, 5700, 7100, 7200, 7500, 7530, 7540, 7800, 7810, 8100, 8200, 8250, 8500, VHRD4400, 4410, 4500, 4600, 4610, 4710, 4890, 6700	90p
SHARP	
VC200, 384, 385, 386, 388, 390, 9300, 9500, 9700	100p
VC7300, VC7700, VC7750, VC7800, VC8000	150p
VC8300	150p
VC300, 387, 471, 473, 481, 482, 483, 486, 488, 496, 8481	80p
VC402, 500, 571, 573, 581, 582, 583, 584, 585, VCSF3	80p
VC600, 651, 682, 684, 685, 693, 783, VC6F3, VC6V3	70
VC772, 779, 781, 782, 785, 786, 793, 800, 7810, 7822, VCA100, VCA102, 104, 131, 140, 170, 202, 203, 234, 501, 602, 5011, VCD806, 810, 815, VCH80, 865, 910, VC51000, VCT310, 410, VCT1314, VCTS312	115p
SIEMENS	
FM350, FM352, FM355	60p
FM484, FM485	55p
FM391, FM392, FM394, FM482	100p
FM461, FM464, FM468, FM561	150p
FM361, FM362, FM383, FM384	120p
SONY	
SLC6, SLJ10, SLT6ME	140p
SLC5, SLC7, SLJ7, SLJ9	140p
SLC9, SL8000, SL8080, SLT50	165p
SL8000E, SL8080E, SL8200, SL8600	175p
SLV255	95p
TELEFUNKEN	
VR400, VR410, VR440, VR449	130p
VR450, VR540, VR549, VR640	70p
VR520, VR529, VR620, VR920	70p
VR530, VR535, VR539, VR550, VR630, VR650	75p
A940, VR1925, 1930, 1940, 1950, 2960, 925, 930, 940, 950	90p
A920, VR1970, 1980, 2920, 2925, 2930, 2970, 7921, 7928, 7931, 7970, 7971, 7980, 970, 7981, 975, 980	65p
A1200, 930, 932, 936, 960, 980, 990, VR2931, 2935, 2941, 2971, 3935, 3945, 3950, 3965, 3975, 4935, 4940, 4942, 4945, 496, SVR4970, 6000, 7932, 7959, 7979	65p
VR1935	100p
VR2915	90p
THOMSON	
SV1000, V410, 430, 450, 510, 520, 530, 540, 620, 630, 640, 4240, SV5540	65p
TX8000, V309, V357, VK411	75p
TX8500, V342, 343, 351, 352, 353, 360, 364, 368, 4210, 4230, 4260, 4400, 5500, 6000, 8564	90p
V320, V321, V323, V326, V4200, V4300	90p
V333	100p
V340	90p
V4100, VK308, VK309, VK410	120p
VK300, VK301, VK302, VK303, VK305, VK3301	135p
VK312	65p
TOSHIBA	
V55, V57	85p
V33, V31, V61, V63, V9600, V9680	85p
V61, V63, V65, V66, V67	150p
DV80B, DV80D, V71, 73, 74, 75, 81, 83, 85, 86	120p
V108, V109, V199, V209, V609	120p
V91G, V95G	115p

Models & Description	Order Code	Price
UNIVERSAL VIDEO LAMP 9V 80mV (310mm WIRES)	VL01	25p
PANASONIC VIDEO LAMPS	VL02	35p
SHARP VIDEO LAMPS	VL02	35p
HITACHI 5381682 (VT63, VT64) VIDEO LAMPS	VL04	135p
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, ORION, NATIONAL, PHILIPS, SAISHO, SALORA, SAMSUNG, SANYO, SHARP, SIEMEN, SONY, TELEFUNKEN, THOMSON, TOSHIBA	VL05	150p
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
BLAUPUNKT, ORION (VH1, 2A) NATIONAL (NV200, 2010, 3000, 7000, 8150, 8200, 8400, 8600, 8610, 8620), SHARP (VC2300, 6000, 6200, 6300, 7300, 7700, 8000, 8300)	VL02	40p
AKAI (VS10), GRANADA (VHSXJ3), ITT (VR3993, 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
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
GRANADA (VHSAY3), SHARP (VC200, 381, 384, 385, 386, 388, 390, 393, 9300, 9500, 9700)	VL08	60p

PANASONIC MODE SWITCHES

NV2000, 2010, 7000, 7200, 7800 (VSS0048)	£2.25
NV230, 260, 430, 810, 870, 2300 4300 (VSS0110)	£2.25
NV830 (VSS0091)	£2.10
NV300, 333, 340, 366, 688, 777, 778 (VSS0060)	£3.75
NVG21, 25, NVH65, NVD80 (VSS0175A)	£2.00

ON/OFF MAIN SWITCHES

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: £3.00

ITT
PART NO: 13/1074
USED ON: CP0200, 0211F, 0323, 0323/1, 0341/14, 0345F, 0351/1, 0361, 0361/1, 9350, CT0500, 0500/1/T, 0500T
PRICE: £3.25

PART NO: LFC 005
USED ON: CVC40
PRICE: £3.00

MATSUI/SAISHO
USED ON: MATSUI-2190, SAISHO-PST2130TX
PRICE: £3.50

PHILIPS
USED ON: K30, K35, K40, KT3, KT4
PRICE: £1.00

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: £3.50

PART NO: (POWER SWITCH + REMOTE SWITCH)
USED ON: KV2022, KV2024
PRICE: £3.25

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: £2.50

PART NO: 2 PIN (FUNCTION SWITCH)
USED ON: KV1612 MK1, KV1612 MK2, KV2052, KV2056, KV2212, KV2215, KV2216, KV2252, KV2256, KV2704, KV2705, KV2706, KV275PE3, KV2756PE3
PRICE: £0.45

PART NO: (4 PIN FUNCTION SWITCH)
USED ON: VARIOUS
PRICE: £0.50

REPLACEMENT IDLER TYRES

AKAI	M132773	IT01
	MZ366960J2	IT02
GOLDSTAR	VXP0521	IT17
HITACHI	6861471	IT03
	6861482	IT04
	6886971	IT05
JVC/ FERGUSON	PU 48967B	IT06
	PU 51380	IT07
	PU 51402A	IT08
	PU 55373	IT09
	PU 55374	IT10
NATIONAL PANASONIC	VXP 0329	IT11
	VXP 0343	IT12
	VXP 0344	IT13
	VXP 0401	IT14
	VXP 0433	IT15
	VXP 0463	IT16
	VXP 0521	IT17
	VXP 0581	IT18
SANYO	1430662T15620	IT19
SHARP	NIDL005GEZZ	IT20
	NIDL0006GEZZ	IT21
	NPLY0107GEZZ	IT22

PRICE
22p EACH
18p EACH FOR A PACK OF 5 FOR EACH MODEL
15p EACH FOR A PACK OF 10 FOR EACH MODEL

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		*Economy Kit Contents*	
BELT SET. PINCH ROLLER CLUTCH MECHANISM. TENSION BAND		BELT SET. PINCH ROLLER SUPPLY CLUTCH. TAKE UP CLUTCH	
Order Code: SK37	**£17.50**	**Order Code: SK38**	**£9.50**

3V58/59/64/65
HRD170/180/210/230/300/320/370/400/430/530/700/750
HRS5000
Contents
BELT SET. PINCH ROLLER. IDELR ARM. TENSION BAND
Order Code: SK44 **£8.50**

3V29/3V30
HR7200/7300/7350
Contents
BELT SET. PINCH ROLLER. TENSION BAND. IDLER TYRES
Order Code: SK05 **£6.00**

3V35/36/38/39/49
HRD110/111/120/225
Contents
BELT SET. PINCH ROLLER. TENSION BAND. IDLER TYRES
Order Code: SK04 **£5.50**

3V31/3V42
HR7600/7610/7650/7655

Contents		*Economy Kit Contents*	
BELT SET. T/U REEL TABLE TYRE. PINCH ROLLER. REEL IDERL. T/U CLUTCH. T/U IDLER. TENSION BAND. VIDEO LAMP		BELT SET. T/U REEL TABLE TYRE. PINCH ROLLER. REEL IDLER TYRE. T/U IDERL TYRE. T/U CLUTCH	
Order Code: SK33	**£12.00**	**Order Code: SK34**	**£5.50**

3V35/36/38/39/49
HRD110/111/120/121/225

Contents		*Economy Kit Contents*	
BELT SET. T/U REEL TABLE TYRE. SUPPLY REEL TABLE TYRE. PINCH ROLLER. T/U CLUTCH. T/U IDLER. REEL IDLER. TENSION BAND		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: SK35	**£10.50**	**Order Code: SK36**	**£5.80**

3V29/3V30
HR7200/7300/7350

Contents		*Economy Kit 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		BELT SET. T/U REEL IDLER TYRE. SUPPLY REEL TABLE TYRE. PINCH ROLLER. REEL IDLE TYRE. T/U IDLER TYRE. T/U CLUTCH	
Order Code: SK31	**£11.00**	**Order Code: SK32**	**£5.10**

3V44/45/48/53/54/55/57
HRP50/HRD140/150/158/160
HRD250/257/565/566/755

Contents		*Economy Kit Contents*	
BELT SET. PINCH ROLLER. CLUTCH MECHANISM. TENSION BAND		BELT SET. PINCH ROLLER	
Order Code: SK39	**£15.00**	**Order Code: SK40**	**£9.50**

FISHER

FVHP905/906/907/908/910/911/916/918

Contents		*Economy Kit Contents*	
BELT SET. PINCH ROLLER. IDLER. GEAR IDLER UNIT. TENSION BAND		BELT SET. PINCH ROLLER. IDLER TYRE	
Order Code: SK57	**£13.00**	**Order Code: SK58**	**£5.00**

FVHP615/618/620/622/710/711/715/716/720/721/722/725/730/830/840

Contents		*Economy Kit Contents*	
BELT SET. PINCH ROLLER. IDLER. GEAR IDLER UNIT. TENSION BAND		BELT SET. PINCH ROLLER. IDLER TYRE	
Order Code: SK68	**£12.50**	**Order Code: SK69**	**£3.60**

HITACHI

VT11/VT33
Contents
BELT SET. PINCH ROLLER. TENSION BAND. IDLER TYRES
Order Code: SK08 **£6.00**

UNIVERSAL TRIPLER

Price: £4.00 each

SEE OTHER PAGES FOR MORE GRANDATA BARGAINS

VIDEO SERVICE KITS *(Cont.)*

VT11/VT33

Contents		*Economy Kit Contents*	
BELT SET. T/UP REEL TABLE TYRE. SUPPLY REEL TABLE TYRE. PINCH ROLLER. FF/REW IDLER. CLUTCH PLATE. TENSION BAND		BELT SET. PINCH ROLLER. FF/REW IDLER TYRE. T/UP REEL TABLE TYRE. SUPPLY REEL TABLE TYRE	
Order Code: SK45	**£14.00**	**Order Code: SK46**	**£4.50**

VT52/61/62/63/64/65/85/86/640

Contents		*Economy Kit Contents*	
BELT SET. PINCH ROLLER. FF/REW ARM. CLUTCH PLATE. TENSION BAND		BELT SET. PINCH ROLLER. FF/REW IDLER	
Order Code: SK49	**£14.00**	**Order Code: SK50**	**£3.25**

VT400/405/410/13/14/15/18/420/25/26/28/430/31/35/48/450/498/510/520/25/26/530/35/36/540/545/46/48/570/75/576/580/85/88
Contents
TIMING BELT. PINCH ROLLER. FF/REW ARM. CLUTCH BASE. TENSION BAND
Order Code: SK52 **£11.50**

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 **£6.25**

NV7000/NV7200/NV7800
Contents
BELT SET. PINCH ROLLER. TENSION BAND. IDLER TYRES
Order Code: SK02 **£5.50**

NV300/NV330/NV333/NV340/NV366
Contents
BELT SET. PINCH ROLLER. TENSION BAND. IDLER TYRE
Order Code: SK01 **£5.50**

NV2000/NV2010

Contents		*Economy Kit Contents*	
BELT SET. PINCH ROLLER. FF IDLER. PLAY IDLER. TENSION BAND. VIDEO LAMP		BELT SET. PINCH ROLLER. IDLER TYRE. PULLEY TYRE	
Order Code: SK13	**£8.00**	**Order Code: SK14**	**£4.50**

NV7000/NV7200/NV7800

Contents		*Economy Kit Contents*	
BELT SET. PINCH ROLLER. IDLER UNIT. PLAY IDLER. TENSION BAND		BELT SET. PINCH ROLLER. IDLER TYRE. CLUTCH TYRE	
Order Code: SK11	**£8.50**	**Order Code: SK12**	**£4.20**

NV300/NV330/NV333/NV340/NV366

Contents		*Economy Kit Contents*	
BELT SET. PINCH ROLLER. IDLER UNIT. PLAY IDLER. TENSION BAND		BELT SET. PINCH ROLLER. IDLER TYRE. PLAY IDLER TYRE	
Order Code: SK15	**£7.50**	**Order Code: SK16**	**£4.00**

NVG7/NVG9/VNG10/NVG11/NVG12/NVG14/NVG15/NVG16/NVG18/NVG30/NVG120/NVG130/NVG400/NVH65 (PX/AC)/AG1810 (P/K)

Contents		*Economy Kit Contents*	
LOADING BELT. CAPSTAN BELT. PINCH ROLLER. IDLER TENSION BAND		LOADING BELT. CAPSTAN BELT. PINCH ROLLER. IDLER TYRE	
Order Code: SK27	**£8.00**	**Order Code: SK28**	**£4.00**

NV332

Contents		*Economy Kit Contents*	
BELT SET. PINCH ROLLER. PLAY IDLER. FF/REW IDLER. TENSION BAND. FF/REW TYRE		BELT SET. PINCH ROLLER. PLAY IDLER TYRE. FF/REW IDLER TYRE	
Order Code: SK29	**£12.00**	**Order Code: SK30**	**£5.10**

NV230/250/260/280/430/450/460/470/650/810/890/AG1200PK/AG1500PK

Contents		*Economy Kit Contents*	
BELT SET. PINCH ROLLER. IDLER. TENSION BAND		BELT SET. PINCH ROLLER. IDLER TYRE	
Order Code: SK23	**£6.00**	**Order Code: SK24**	**£3.50**

NV600/NV688

Contents		*Economy Kit Contents*	
BELT SET. PINCH ROLLER. PLAY IDLER. FF/REW IDLER. TENSION BAND		BELT SET. PINCH ROLLER. PLAY IDLER TYRE. FF/REW IDLER TYRE	
Order Code: SK25	**£12.00**	**Order Code: SK26**	**£6.00**

NV730/NV770

Contents		*Economy Kit Contents*	
SLOT IN BELT. LOADING BELT. PINCH ROLLER. IDLER UNIT. TENSION BAND		SLOT IN BELT. LOADING BELT. PINCH ROLLER. IDLER TYRE	
Order Code: SK19	**£6.50**	**Order Code: SK20**	**£4.00**

NV370/NV380/480/630/780/830/850/AG2100PK/AG2200PK

Contents		*Economy Kit Contents*	
BELT SET. PINCH ROLLER IDLER. TENSION BAND		BELT SET. PINCH ROLLER. IDLER TYRE	
Order Code: SK21	**£6.00**	**Order Code: SK22**	**£3.00**

NV777/NV788

Contents		*Economy Kit Contents*	
BELT SET. PINCH ROLLER. IDLER UNIT. TENSION BAND		BELT SET. PINCH ROLLER. IDLER TYRE	
Order Code: SK17	**£7.00**	**Order Code: SK18**	**£4.00**

VIDEO SERVICE KITS *(Cont.)*

SHARP

VC381

Contents		*Economy Kit Contents*	
BELT SET. PINCH ROLLER. REEL IDLER. TENSION BAND. VIDEO LAMP		BELT SET. PINCH ROLLER. REEL IDLER TYRE	
Order Code: SK47	**£9.00**	**Order Code: SK48**	**£4.75**

VC500/VC571/VC581/VC582/VC583/VC584/VC5F3

Contents		*Economy Kit Contents*	
BELT SET. PINCH ROLLER REEL IDLER. TENSION BAND		BELT SET. PINCH ROLLER. REEL IDLER	
Order Code: SK60	**£9.50**	**Order Code: SK61**	**£6.50**

VC781/VC7810/VC7822/VC785/VC786/VC793/VC800/VCA100/VCA102/VCA104/VCA202

Contents		*Economy Kit Contents*	
BELT SET. PINCH ROLLER. REEL DRIVE UNIT. TENSION BAND		BELT SET. PINCH ROLLER. REEL DRIVE UNIT TYRE	
Order Code: SK64	**£13.50**	**Order Code: SK65**	**£6.25**

VC681/VC682/VC684/VC685/VC693/VC699/VC6F3/VC700

Contents		*Economy Kit Contents*	
BELT SET. PINCH ROLLER. REEL DRIVE UNIT. TENSION BAND		BELT SET. PINCH ROLLER REEL DRIVE UNIT TYRE	
Order Code: SK62	**£13.50**	**Order Code: SK63**	**£6.00**

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 — 120p

Replaces Philips Part No's:
138-10229. 2.4V – 90mAh — 200p

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 CVC800/1/3	1500p	LOT10
ITTD218/37 EQ	1600p	LOT11
NORMENDE 5255	1600p	LOT12
SABA 81000 200	1600p	LOT13
SALORA T236 EQ	1650p	LOT14
SABA 811-50-24	1600p	LOT15
SABA 770223500	1600p	LOT16
TELEFUNKEN AT1	1450p	LOT17
TELEFUNKEN EQ	1400p	LOT18
SALORA FM0218B	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, 41H3, 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		
HITCHI 2434274	1400p	LOT44
CPT2174, CPT2176, CPT2178, 2434274		

We stock line output transformers for over 100 different models. Please ring 081-900 2329 for more information.

IDLERS & PULLEYS REPLACEMENT

AKAI			
VS1-2, VS4-5, VS15	FF-REW IDLER	M1327773	400p
VS3, 6, 12, 56, 58, 59			
VS1-2, VS4-5, VS15	T-UP IDLER	BV327815	500p
VS3, 6, 12, 59, 59			
V9700	IDLER	BV321979	600p
VS125, 126, 155,	IDLER ASSY	MZ366960J2	900p
VS165, 240, 244, 245, 247, 248, 250, 512, 515, 516			
VS22, 38, 105, 112, 115, 116, 205, 220			
VP7100, VS9300	T-UP IDLER	PU47752	£4.50
VS9500, VS9800			
VP7100, VS9300	UNLOADING	PU46381	£4.00
VS9500, VS9800	IDLER		
VP7100, VS9300	REW IDLER	PU46380	500p
VS9500, VS9800			
VP88	IDLER	BV336067	£5.00
VS1, 3, 4, 9, 12	REEL TABLE	BR347731	450p
VS15, 58			
VS23, 35, 37, 53, 55	CLUTCH	ML373043	1100p
VS66, 75, VSA77			
VS9700	FF IDLER	BV321761	£3.20
VS9700	REW IDLER	W321762	£4.25
AMSTRAD			
VCR7000	IDLER	150280	£1.50
TVR1, VCR4500	CLUTCH	150873	£3.75
VCR4600, VC5200, VCR9000			
TVR1, VCR4500	GEAR HOLDER	151284	£3.50
VCR4600, VCR5200, VCR9000			
TVR1, VCR4600	REF CLUTCH		£3.50
VCR5200			
VCR6000, VCR6100	CLUTCH	153202	£3.80
VCR4500, VCR9000	CLUTCH		£4.00
VCR4500, VCR4600	MOD KIT	(TAPE CREASING)	300p
VCR4700			
MOD KIT TAPE CREASING FOR AMSTRAD			
VCR4500, 4600, 4700			£3.00
FERGUSON			
3V00, 3V01, 3V16	T-UP IDLER	PU47752	£4.50
3V22, 3292, 8900, 8901, 8904, 8906			
3V16, 3V22	T-UP IDLER	PU49280	£5.50
8900, 8903, 8912, 8922			
3V23, 3V29 3V30,	REEL IDLER	PU48967	175p
3V31, 3V32, 3V35, 8923, 8924, 8929, 8930, 8931, 8940, 8941, 8942			
3V23, 3V31	ROLLER ASSY	PU49042A	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
3V39, 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, VC141L			
3V42, 3V43	CLUTCH ASSY	PU55822	1200p
3V43, 3V44, 3V45	CLUTCH ASSY	PU57658	1050p
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, 3V56, 3V56, 3V57, 8947, 8948			
3V00, 3V01, 3V16	LOADING IDLER	PU43681	£4.00
3V22, 3292, 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			
FISHER			
FVHP420, 520, 530	FF-REW PULLEY	HI638531	80p
FVHP615, 618, 620	COMP. IDLER ASSY	FI1430420400300	£220p
FVHP622, 710, 711, FVHP720, 721, 722, FVHP725, 730, 830			
FVHP840,905, 906, FVHP908, 910, 911, FVHP915, 916, 918			
FVHP615, 618, 620	GEAR IDLER ASSY	FI1430430400900	380p
FVHP622, 710, 711, FVHP720, 721, 722			
FVHP725, 730, 830, FVHP840			
FVHP615, 618, 620	REEL T-UP ASSY	FI1430410400900	£5.50
FVHP622, 710, 711, FVHP720, 721, 722			
FVHP725, 730, 830, FVHP840			
FVHP905, 906, 908,	GEAR IDLER ASSY	FI1430490402400	275p
FVHP910, 911, 915, FVHP916, 918			
FVHP975, 980, 990,	IDLER	FI1430420400700	300p
FVHP999, 5000, 5005			
FVHP5050, 5075, 5100			
FVHD40, 55, 140	REEL DRIVE ROLLER		£6.00
FVHP1, 10, 20			
FVHP975, 980, 990	CLUTCH	FI2430510404200	£9.50
FVHP420, 520, 530	IDLER		£2.80
FVHP420, 520, 530	TAKE UP IDLER		280p
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,			
GHV8200, 8210, 8215, GHVP51, VCP4100, 4130			
GHV1221, 1232, 1240	IDLER		110p
GHV1241, 1242, 1243, GHV1244, 1245, 1246, GHV1247, 1248, 8000,			
GHV8200, 8210, 8215, GHVP51, VCP4100, 4130			
HINARI			
VXL3, VXL20	REEL IDLER	40000009	110p
VXL2	IDLER		110p
VXL4, VXL35	IDLER		£2.75
VXL4, VXL35	CLUTCH		£6.50
VXL4, VXL12, VXL25	LIMITER POST		£1.30
VXL30, VXL35, VTV300			
VXL5, VXL6	CLUTCH		£3.75
VXL5, VXL6	GEAR HOLDER		£3.50
VXL7, VXL8, VXL9	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, VT16S			
VT120-220, 100, 110	CLUTCH ASSY	6886824	£7.50
111, 113, 115, 118, 200		6886972	
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			
VT9300-9500, 6500	FF-REW IDLER	8681471	250p
VT680, 6800, 9700, 9900			
VT9300-9500, 6500	PLAY IDLER	6861482	230p
VT680, 6800, 9700		6861481	
VT 9900			
VT9300-9500, 9700	IDLER	681505	230p
VT9900, 6500, 680, 6800	IDLER	687043	£3.80
VT11-33, VT63-64	FF-REW IDLER	6886971	125p
VT14, 16S, 17, 19, 34, VT35, 38, 39, 52, 61, 62			
VT65, 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	6897094	£1.30
VT414, 415, 418, 420, 425, 426, 428, 430, 431, 435			
VT438, 450, 498, 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	6896961	£3.25
VT414, 415, 418, 420, 425, 426, 428, 430, 431, 435			
VT438, 450, 498, 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		£6.00
VT680, 6500, 6800	FS-BRAKE	6861505	230p
VT9700, 9900			
HITACHI TV			
OUTPUT MODULE HM 6251			£5.50
OUTPUT MODULE HM 6232			£8
JVC			
HR330, 3680, 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, 7700			
HR7600, 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, 180, 210, 230	IDLER ARM	PU58465	£2.25
HRD320, 370, 400, 430, 470, 530, 700, 750, 950, 3000			
HRS5000, HRS5500			
HRD455, HRD725	CLUTCH MECH	PU56882	1200p
HRD140, 150, 157, 158	CLUTCH MECH	PU57658	1050p
HRD160, 250, 257, 455, 566, 755, HRP50			
HR3300, HR3330	REW IDLER	PU46380	500p
HR3660, HR4100			
HRD140, 150, 157, 158	TAKE UP CLUTCH	PU56043-1-4	240p
HRD160, 250, 257, 455, 566, 566, 725, 755, HRP50			
HRD140, 150, 157, 158	TAKE UP CLUTCH	PU56044-1-5	160p
HRD160, 250, 257, 455, 565, 566, 725, 755, HRP50			
MATSUI			
VX730, 735, 750, 755,	CLUTCH	850A00005	420p
VX810, 820, 850, 880, 990			
VX730, 735, 750, 755	LIMITED POST LEVER		£1.30
VX770, 800, 810, 880	ASSY		
VX990			
VX800A, VX900	IDLER REEL		£1.50
VX800A, VX820	REEL UNIT CLUTCH		280p
MITSUBISHI			
HS306, 307, 318, 319,	GEAR ASSY	522B00201	£6.25
HS400, 410, 710			
HS337, 338, 347, 349	IDLER	552B01701	325p
HS411, 412, 421, HSB10, HSB20, HSB30, HSE10, HSE20, HSE20, HSE30,			
HSE70			
HS306, 307, 318, 319	IDLER	641C34301	£2.00
HS400, 410, 710			
HS347, 349, 412	IDLER	522902002	£3.00
HSB10, HSB20, HSB30, HSE10, HSE20, HSE30, HSE70			
HS337, 338, 411, 421	IDLER	552B01801	320p
HS200	TAKE UP IDLER (LARGE)		£4.50
HS200	UNLOADING IDLER		£4.00
HS200	REWIND IDLER		£6.00
HS306, 307, 318, 319	SUPPLY REEL	522A00101	£3.20
HS400, 410, 710	DISK		
HS306, 307, 318, 319	TAKE UP REEL	522A00102	£3.20
HS400, 410, 710	DISK		
HS320	REEL DISK	522C06301	£3.00
HS337, 338, 411, 421	REEL DISK	522P00601	£5.00
HS300, 301, 302, 310	PULLEY	522C05201	£2.25
HS306, 307, 318, 319	GEAR WHEEL	641D71101	£1.50
HS400, 410, 710			
HS306, 307, 318, 319	GEAR WHEEL	641D71001	£1.50
HS400, 410, 710			
NEC			
N830, N831, N832, N833	TAKE UP CLUTCH		150p
N830, N831, N832, N833	TAKE UP IDLER		100p
N830, N831, N832, N833	REEL IDLER		200p
N895	TAKE UP IDLER SMALL		550p
N911, N915, N916, N917	REEL DRIVE PULLEY		350p
N9012, 9013, 9014, 9016, 9033, 9034, 9054, 9055, 9066, 9110			
N9510, 9520, 9530, 9610			
NATIONAL			
NV322, NV600, NV688,	IDLER UNIT	VXP0463	£2.75
NV777, NV788, NV332, AG6100, 6200, 6800, 6810			
NV300, NV333, NV340	IDLER ARM	VXL0997	£3.60
NV366			
NV300, NV330, NV333	IDLER UNIT	VXP0401	60p
NV340, NV366			
NV300, NV330, NV333	PLAY IDLER	VXP0433	£2.75
NV340, NV366, NV8620			
NV300, NV332, NV333	ACTION GEAR	VDG0016	£0.80
NV340, NV366, NV600, NV777, NV788, NV2000, NV2010, 3000, 7000			
AG6010, AG6015			
NV333, NV688, NV2000	LOADING GEAR	VXP0325	£2.00
NV3000, NV7800			
NV300, NV332, NV333	INTERMEDIATE GEAR	VXG0017	£0.65
NV340, NV366, NV600, NV777, NV788, NV2000, NV2010, 3000, 7000			
AG6010, AG6015			
NV330, NV333, NV340	CAM GEAR	VXG0158	£1.00
NV366, NV777, NV788			
NV230, NV250, NV260	IDLER ARM	VXP0521	110p
NV280, NV370, NV380, NV430, NV450, NV460, NV465, NV470, NV480			
NV630, NV650, NV730, NV780, NV810, NV830, NV850, NV870			
NVG7, NVG9, NVG10, NVG11, NVG12, NVG 14, NVG15, NVG16, VG18			
NVG30, NVG400, AG1000, AG1200, 1500, 1610, 2100,			
AG2200, NVH65, NVH70			
NV370, NV430, NV870,	CAM GEAR	VDG0200	£1.20
NV730, NV830, NV850, NVG10, NVG12, NVG18			
NV730, NV770	IDLER UNIT	VXP0581	£2.50
NV2000, 2010 3000	IDLER UNIT	VXP0331	80p
NV2000, 2010, 3000	IDLER UNIT	VXP0329	80p
NV2000, NV3000	CAM GEAR	VDG0069	£1.00
NV7000, 7200, 7800	IDLER UNIT	VXP0344	75p
NV7000, 7200, 7800	CLUTCH	VXP0343	300p
NV8150, 8200, 8300,	IDLER UNIT	VXP0245	80p
NV8400, 8600, 8610, 8620			
NV8200, 8400, 8600	PLAY IDLER	VXP0243	80p
NV8610, 8620			
NV8620	CLUTCH	VXP0343	250p
NV332, NV600, NV688	IDLER	VXP0488	300p
NVG20, NVG21, NGV25	PULLEY UNIT	VXP0767	400p
NVG40, NVG45			
NV230, NV250, NV280	WORM WHEEL	VXP0604	160p
NV430, NV450, NV460, NV465, NV650, NV730, NV770, NV810			
NV870, NV890, AG1000			
NV370, NV380, NV630	IDLER	VXP0523	300p
NV780, NV830			
NV370	CLUTCH GEAR	VXP0595	£1.00
NVG7, NVG11, NVG12	WORM WHEEL	VXP0691	£1.50
NVG14, NVG15, NVG18, NVG30, NVG120, NVG130, NVG400, NVH70			
NV2000, 2010, 3000	LOADING GEAR	VDG0035	£0.60
NV7000, 7200, 7800, 8050			
NV230, NV250, NV370	LOADING GEAR	VXP0520	£1.50
NV430, NV450, NV460, NV630, NV730, NV770, NV780, NV810			
NV830, NV890, NVG7, NVG10, NVG12, NVG15, NVG30, NVG120			
NGV130, NVG400, NVH70, AG1000			
NV230, NV250, NV260	CLUTCH GEAR		£2.50
NV280, NV430, NV450, NV730, NV770, NV810, NV870, NV890			
NVG7, NVG10, NVG11, NVG12, NVG14, NVG15, NVG18, NVG30			
NCG120, NVG130, NVG400, NVH70, AG1000			
NV230, NV250, NV260	LIMITER ROLLER		£1.50
NV280, NV300, NV333, NV340, NV366, NV370, NV430, NV450, NV460			
NV465, NV630, NV650, NV777, NV780, NV788, NV810, NV830, NV850,			
NV870, NV890, NV2000, NV2010, 7200, 7800, NVG7, NVG10, NVG12,			
NVG14, NVG15, NVG18, NVG30, NVG120, NVG130, NVG400, NVH70,			
AG1000			
ORION			
MULTIPLE MODELS	IDLER	850A200004	280p
MULTIPLE MODELS	IDLER	850A200005	420p
VC150, VC180, VH200	IDLER		110p
VH201, VH205, VH212, VH250, VH254, VH288, VH300, CH303, VH312			
VH404, VH555, VH700, VH704, VH708, VH712, VH780, VH844, VH900, VH3,			
VH33			
SAISHO			
VR605, VR800, VR900	CLUTCH	850A20000	420p
VR1100, 1200, 1600, 2500, 3200, 3300			
VR3500, 3600, 3800	LIMITER POST		£1.30
VR1100, 1200, 1600, 2500, 3200, 3300, 3500, 3600, 3700			
VR605, VR800, VR900	IDLER		280p
VR2500, 3200, 3300, 3500, 3600, 3800			
VR705, VR805, VR905	IDLER		110p
SANYO			
VHR1110, 1150, 1200	IDLER	143-0-662T-14730	£5.00
VHR1300, 1500			
VTC5000, 5150, 6000	FF-REW IDLER	143-0-741T-20001	250p
VTC6500, VTCM10, M11, M20, M21, M30, M31, M50			
VTC9100, VTC9300	IDLER	143-0-551T-01400	95p
VTC9300	FF ROLLER ASSY	143-0-547T-00200	200p
VTCM10, M11, M20, M21	REEL DRIVE PULLEY	143-0-662T-10350	£5.00
VTCM30, M31, M50			
VHR2100, 2300, 2500	IDLER	6130374898	300p
VHR2700			
VTC5000, 5150, 6000	PULLEY	143-0-662T-01201	£5.20
VTC6500			
VTCM10, M11, M20, M21	PULLEY	143-0-662T-10350	£5.50
VTCM30, M31, M50			
VHR3100, 3300, 3310	REEL DRIVE	143-0-662T-15621	350p
VHR3400, 3700, 3800	ROLLER		
VHRD500, VHRD700			
VPR5800, VTC5300	LOADING ROLLER	143-0-661T-03800	80p
VTC5400			
VTC3000	FWD LIMITER		£3.50
VTC3000	IDLER		750p
SHARP			
	IDLER ASSY	NIDL0005GEZZ	110p
	IDLER	NIDL0006GEZZ	110p
VC800, 651, 681, 682	IDLER ASSY	NPLYV0107GEZZ	£6.15
VC684, 685, 693, 699, 700, 783, VC6FR, VC6V3			
VC7300, VC7700, 7750	PLAY IDLER KIT	NPLYV0041+ NDA1V1007	£7.50

REMOTE CONTROLS

Description	Order Code	Price
GRUNDIG		
TP160E	RC 107	900p
TP200, TP300	RC 380	800p
TP400	RC 401	800p
TP590-600	RC 600	850p
TP390,TP610	RC 610	850p
TP621	RC 621	850p
TP630, TP650	RC 650	850p
TP660	RC 660	850p
TP661	RC 661	850p
HITACHI		
CLE800-CLE830	RC 140M	850p
A617402/655602	RC 192	875p
A512120/230	RC 900	800p
A514790	RC 901	850p
A5088470	RC 902	800p
A518612	RC903	900p
SCL002	RC904	850p
C2096	RC 905	850p
A511940	RC 906	800p
655602H	RC 907	850p
ITT		
IFB13, 14, 15	RC 143	875p
FS4	RC 148	850p
RG305	RC 305	825p
RG306	RC 306	825p
FS9/1-10/1	RC 307	850p
VS5 RUK	RC 308	825p
VS4-1	RC 310	850p
MULTICONTROL (17C20)	RC 311	800p
KORTING		
18279, 18396, 18460, 18521 SE	RC 108	850p
40540 VTS	RC 108	900p
LOEWE		
DC11	RC 146	850p
MATSUI		
010270601	RC 889	850p
VX770	RC 892	850p
METZ		
JAVA COLOR (6890)	RC 166	850p
COLOR (7156)	RC 183	850p
JAVA (7180)	RC 184	850p
MITSUBISHI		
939P/03607, 939P/03609	RC 140M	850p
NOKIA		
SATELLITE	RC 550	850p
NORDMENDE		
TC2336	RC 351N	850p
CMC1, TC3519	RC 356	875p
OCEANIC		
390C9500	RC 339	900p
ORION		
RC53	RC 892	850p
PANASONIC		
EUR51200	RC 200	850p
TC2200	RC 201	850p
VSQ0357/NV730	RC 202	875p
TNQ1621	RC 203	900p
PHILCO		
CARVEL, CONCORDE, MERCURY, TELESTAR	RC 108	850p
TC10	RC 152	900p
PHILIPS		
RC5002,5154	RC 134	850p
KT3 NON TEXT	RC 135	825p
69117032	RC 178	875p
69117194	RC 180	875p
RC5991-UNIV	RC 300	850p

Description	Order Code	Price
PHILIPS (continued)		
RC38	RC 301	875p
KT3 TEXT	RC 5301	800p
RC5352	RC 5352	800p
RC5375	RC 5375	850p
RC5 STANDARD	RC 5534	850p
RC5901	RC 5901	850p
RC5903	RC 5903	800p
SABA		
T6772	RC 149	900p
TC319-320	RC 328	875p
TC356	RC 356	875p
TC358	RC 358	850p
TC360	RC 360	800p
TC365	RC 365	800p
SALORA		
SERIES L	RC 190	875p
86173	RC 882	850p
SANYO		
RC218, RC222, RC228, RC238	RC 140M	850p
JXGE	RC 878	850p
JXDE	RC 884	850p
VHR2300	RC 890	850p
RC628	RC 865	900p
SHARP		
G0121CESA, 123CESA, 204, 251	RC 140M	850p
SIEMENS		
FC616	RC 130	850p
FC631	RC 132	850p
FC742	RC 164	900p
SONY		
RM604, RM605, RM606	RC 140	850p
32 CHANNEL	RC 140M	850p
RM613	RC 141	850p
RM632, RM636	RC 160	850p
TATUNG		
FXA	RC 877	850p
RC70	RC 883	750p
FX70 FASTTEXT	RC 894	850p
TELEFUNKEN		
FB632	RC 632 ST	850p
FB639	RC 639 ST	850p
THORN/FERGUSON		
3V35-42	RC 342	850p
3V31-32	RC 344	850p
3V57-58	RC 628	900p
TX10 TEXT	RC 732	750p
TX10 STEREO TEXT	RC 738	750p
TX9-90-100	RC 740	750p
3V55, FV11	RC 783	900p
TX100 FASTTEXT	RC 785	800p
TX100 STEREO FASTTEXT	RC 789	800p
PROFESSIONAL	RC 790	800p
TOSHIBA		
CT937	RC 950	850p
CT9117	RC 951	850p
201R4B	RC 952	850p

UNIVERSAL PROGRAMMABLE REMOTE CONTROL

Controls up to 4 different devices which use infra red remote controls including TV, audio, VCR and satellite. (need original remote control TC program)

Order code: IR100R Price: 1950p

We stock Remote Controls for over 5000 different models. Ring for further details on 081-900-2329.

VCR ALIGNMENT KIT

CONTAINS:

SET OF 7 HEAD & TAPE PATH ALIGNERS	SET OF 8 ALLEN KEYS
* RCA TYPE AUDIO & CONTROL HEAD POSITIONING TOOL	* 0.77mm
* RCA ADJUSTMENT TOOL FOR TAPE GUIDE POSTS	* 0.90mm
* RCA TYPE BACK TENSION TOOL	* 1.27mm
* TENSION ADJUSTMENT TOOL FOR VARIOUS USES	* 1.50mm
* VCR ADJUSTMENT TOOL	* 1.60mm
	* 2.00mm
	* 2.40mm
	* 3.00mm

3 Reversible Screwdrivers — Circlip Pliers

Spring Hook — Micro Screwdriver

VCR Head Extractor

Order Code: TOOL10 Price: 3000p

FUSES

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

CERAMIC PLUG TOP

3A	FUSE33	100P
5A	FUSE34	100P
13A	FUSE35	100P

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

Order Code: AH02 Price: £14.50

GRANDATA LTD

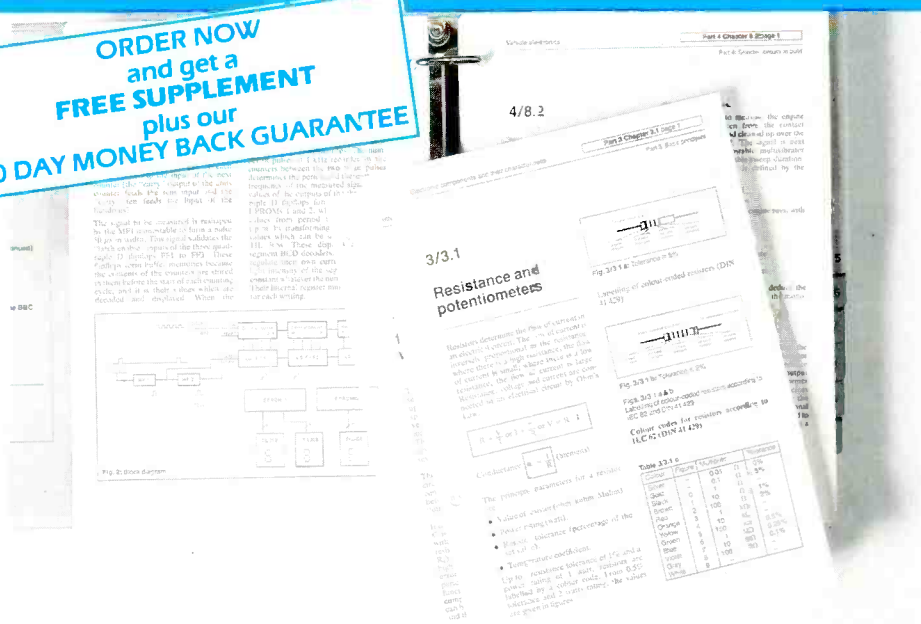
K.P. HOUSE, UNIT 15, POP IN COMMERCIAL CENTRE, SOUTHWAY, WEMBLEY, MIDDLESEX, ENGLAND HA9 0HB

Telephone: 081-900 2329 Fax: 081-903 6126

WHETHER ELECTRONICS IS YOUR HOBBY OR YOUR LIVELIHOOD . . .

YOU NEED THE MODERN ELECTRONICS MANUAL

ORDER NOW
and get a
FREE SUPPLEMENT
plus our
30 DAY MONEY BACK GUARANTEE



The essential reference Work

- Easy-to-use format
- Clear and simple layout
- Regular Supplements
- Sturdy ring-binder
- News of latest developments
- Full components checklist
- Extensive data tables
- Detailed supply information
- Ready-to-transfer PCBs
- Comprehensive subject range
- Detailed assembly instructions
- Professionally written

EVERYTHING YOU NEED TO KNOW ABOUT ELECTRONICS!

If the fascinating and fast-changing world of electronics is your livelihood, your study subject or simply your passion, the revised edition of **THE MODERN ELECTRONICS MANUAL** is the reference work for you to have at your side.

The Base Manual contains information on the following subjects:

BASIC PRINCIPLES: Symbols, components and their characteristics, passive component circuits, power supplies, acoustics and electroacoustics, the workshop, principles of metrology, measuring instruments, digital electronics, operational amplifiers, timers, physics for electronics.

CIRCUITS TO BUILD: Construction techniques, radio, telephony, microcomputing, measuring instruments, vehicle electronics, security, audio, power supplies, electronic music (over 25 different projects).

REPAIRS AND MAINTENANCE: Basic circuit operation for radio, television, audio/hi-fi, telephones.

DATA: Diodes, transistors, thyristors and triacs, digital and linear i.c.s, microprocessors.

The Manual also covers **Safety, Specialist Vocabulary with Abbreviations** and **Suppliers.**

OVER 1,000 pages, with over 900 diagrams and photographs, A4 looseleaf format weighing over 3.5kg.

ALL-IN-ONE AND EASY-TO-USE: A sturdy ring-binder allows you to use the Manual on your workbench. The looseleaf format also means you can slot in the regular supplements as they arrive – so all your information is there at a glance.

EXTENSIVE GLOSSARY: Should you come across a technical word, phrase or abbreviation you're not familiar with – simply turn to the glossary included in the Manual and you'll find a comprehensive definition in plain English.

GUARANTEE

Our 30 day money back guarantee gives you **complete peace of mind.** If you are not entirely happy with the Manual, for whatever reason, simply return it to us in good condition within 30 days and we will make **a full refund of your payment** – no small print and no questions asked. (Overseas buyers do have to pay the overseas postage charge).

Now – at last – the most comprehensive reference work ever produced at a price you can afford, the revised edition of **THE MODERN ELECTRONICS MANUAL** provides you with all the essential information you need.

Over 1,000 pages of well-organised and clearly explained information is brought to you by an expert editorial team whose combined experience ensures the widest coverage.

Regular supplements to this unique publication, each around 160 pages, mean that you will always be kept abreast of the latest developments from around the world as they occur

REGULAR SUPPLEMENTS

Unlike a book or encyclopedia, the Manual is a living work – continuously extended with new material. Recent or upcoming supplements include radio, superconductors, electric motors, basic electronic building blocks for beginners which can be joined together to construct elaborate circuits, filters, IBM PC and compatibles (including updating/expanding PCs). Supplements are sent to you approximately every two months. Each supplement contains approximately 160 pages – all for only £23.50 + £2.50 p&p. You can of course return any supplement (within 10 days) which you feel is superfluous to your needs.

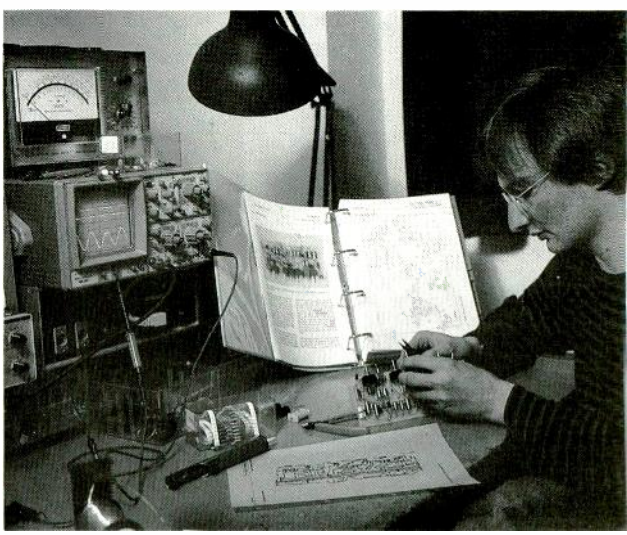
RESPONDING TO YOUR NEEDS

We are able to provide you with the most important and popular, up to the minute, articles in our supplements. Our unique system is based on readers requests for new information. Through this service you are able to let us know exactly what information you require in your Manual. You can also contact the editor directly in writing if you have a specific technical request or query relating to the Manual.

ASSEMBLING . . .

There's nothing to beat the satisfaction of creating your own project. From basic principles to circuit-building, the Manual describes clearly, with appropriate diagrams, how to assemble radios, loudspeakers, amplifiers, car projects, measuring instruments etc.
The revised edition of **The** Modern Electronics Manual contains practical, easy-to-follow instructions for building a wide range of projects. It shows you how to make fun gadgets such as a remote control door opener and a digital rev. counter for your car. It also tells you how to construct useful devices like test gear, security and baby alarms – plus – many more popular devices.

Wimborne Publishing Ltd.,
Allen House, East Borough,
Wimborne,
Dorset BH21 1PF
Tel: 0202 881749 Fax: 0202 841692



THE MODERN ELECTRONICS MANUAL

Revised Edition of Basic Work: Now contains over 1,000 pages of information.
Regular Supplements: Approximately 160-page supplements of additional information which are forwarded to you immediately on publication. These are billed separately and can be discontinued at any time.
Presentation: Durable looseleaf system in large A4 format (297mm × 210mm)
Price of the Basic Work: £39.95 + £5.50 p&p (to include a recent supplement free).

PLEASE send me **THE MODERN ELECTRONICS MANUAL** plus a **FREE SUPPLEMENT.** I enclose payment of **£45.45** (£39.95 plus £5.50 postage and packing). Should I decide **not** to keep the Manual I will return it to you in good condition within 30 days for a full refund of this payment. I shall also receive the appropriate supplements several times a year. These are billed separately and can be discontinued at any time.

FULL NAME .....
(PLEASE PRINT)

ADDRESS.....

.....

..... **POSTCODE** .....

SIGNATURE.....

☐ **I enclose cheque/PO payable to Wimborne Publishing Ltd.**

☐ **Please charge my Visa/Mastercard/Access**

Card No. ..... **Card Ex. Date** .....
Oct 1 2 3 4

ORDER FORM

Simply complete and return the order form with your payment to the following address:
Wimborne Publishing Ltd, Allen House, East Borough, Wimborne, Dorset BH21 1PH

We offer a 30 day MONEY BACK GUARANTEE – if you are not happy with the Manual simply return it to us in good condition within 30 days for a full refund.

Overseas buyers do have to pay the overseas postage – see below.

OVERSEAS ORDERS: All overseas orders **must be prepaid** and are supplied under a money-back guarantee of satisfaction. If you are not entirely happy with the Manual return it within a month for a refund of the purchase price (you do have to pay the overseas postage). **SEND £39.95 PLUS THE POSTAGE SHOWN BELOW.**

EIRE		AIR MAIL ONLY **£11**
EUROPE (E.E.C. Countries)		AIR MAIL ONLY **£20**
EUROPE (non E.E.C.)	SURFACE MAIL **£20**,	AIR MAIL **£26**
U.S.A. & CANADA	SURFACE MAIL **£25**,	AIR MAIL **£32**
FAR EAST & AUSTRALIA	SURFACE MAIL **£31**,	AIR MAIL **£33**
REST OF WORLD	SURFACE MAIL **£25**,	AIR MAIL **£44**

Note surface mail can take over 10 weeks to some parts of the world. Each manual weighs about 4·5kg including the free supplement when packed.

All payments must be made in £'s Sterling payable to Wimborne Publishing Ltd. We accept Mastercard (Access) and Visa credit cards.

WE WILL ONLY SUPPLY TOP QUALITY, BRANDED COMPONENTS. REPUTATION COUNTS WITH US

G.G.L. COMPONENTS

PO BOX 72, UNIT 7, SOUTH JOHN STREET, CARLISLE, CUMBRIA CA2 5AL.
Tel: (0228) 39693/20358 Fax: (0228) 515127.

BUY WITH

AERIAL ACCESSORIES
AL COAX PLUG 18
FLY LEAD 70
VIDEO LEAD 70
4-WAY DISTRIB. AMP 18.50
8-WAY DISTRIB AMP 20.25

BATTERIES
Philips MEMORY 1V2 1.70
MEMORY 2V4 2.50

CAPACITOR
63V
47uf at 63V 18
100uf at 63V 22
220uf at 63V 35
250V
1uf at 250V 20
4.7uf at 250V 25
10uf at 250V 35
22uf at 250V 40
47uf at 250V 65
100uf at 250V 1.25
400V
1uf at 400V 23
4.7uf at 400V 35
10uf at 400V 70
22uf at 400V 85

EHT TRAYS
CONTINENTAL 30AX 8.95
GRUNDIG CUC2400/2410 13.70
PHILIPS KT3 7.95
UNIVERSAL (5-LEAD) 5.95

FUSES
20mm A/S (10 PER PK)
500MA, 630MA/800MA/1A 1.6A
2A/2.5A/3.15A/5A 1.00
20mm Q/B (10 PER PK)
500MA/800MA/1A,2A/2.5A 80

SERVICE MANUALS
Amstrad 4600 9.95
6000 9.95
Ferguson TX85 8.50
3V59 13.50
3V65 13.50
FV11 13.50
FV37 17.25

SERVICE AIDS
CLEAR TEST TAPE 7.95
FIBRE PEN 3.50
HEATSINK COMP 1.55
SILICON GREASE 1.85
SOLDA MOP 75
SOLDER 5KG/18SWG 7.95
WELLER GUN TIPS (2) 1.65

DIODES
R2M 95
BY133 09
BY227 20
IN4007 10
IN5408 20

I.C's
CNX62A 4.25
SAA1293-02 5.95
SAA1293-03 6.95
SAA1293A-93 8.15
STK5332 4.95
STK5421 3.50
STK5422 5.50
STK5481 6.95
STK5482 4.95
STK7308 5.50
STK7348 5.50
STR4211 6.95
STR5412. 4.95
STR50103A 5.95
STR5404I 6.95
STR5804I 5.95
TDA1170S 1.95
TDA2270 2.75
TDA2576A 5.95
TDA2577A 3.50
TDA2578A 2.95
TDA2579 3.95
TDA2581 4.50
TDA2582 2.50
TDA2653AQ 2.95
TDA3560 4.95
TDA3562A(TFK) 4.65
TDA3565 3.95
TDA3571BQ 8.95
TDA3576B 10.25
TOA3650 8.95
TDA3651/3 2.95
TDA3653A 3.50
TDA3654A 2.95
TDA4500 4.50
TDA4501 5.25
TDA4503 4.95
TDA4505E 5.45
TDA4600/2 2.95
TDA4600-2D 3.95
TDA4601 2.95
TDA4601 DIL 3.75
TEA1039 1.95
TEA2018A 2.50
TMP47C434N-3414 14.95
TMP47C434N-3415 14.95
TMP47C434N-3537 14.95
TMP47C434N-3555 15.55
TMP47C434N-3559 14.95

LINE O/P TRANSFORMERS
Ferguson TX90 20" 14.85
TX100 90D 16.95
TX100 110D 13.60
TX100 FST 17.25
Ferguson A51F 17.75
Fidelity ZX2000 & MOD 13.65
ZX3000 12.75
Hinari CT4/5 15.95
Hitachi CPT1474/1476 17.75
CPT2174/76/78 15.85
CPT2276/2278 16.45
CPT2476/2478 17.95
ITT COMPACT 80R/110 14.95
CVC1200 19.95
Matsui 1410/20/40 18.75
Panasonic TLF14567F 19.25
TLF14568F 19.25
Philips CP90 17.95
2A 18.50

SWITCHES
FIDELITY CRV140 1.50
GRUNDIG CUC731 3.50
KT4/CTX SW-REMOTE 1.50
PHILIPS UNIVERSAL 4.25
SONY UNIVERSAL 4.25
TX9/10 STANDARD 1.00
TX9/10 REMOTE 1.75
TX90/100 REMOTE 1.50

TRANSISTORS
BC639 20
BC640 20
BU208D 1.80
BU426A 1.25
BU50D 1.80
BU508A 1.40
BU508AF 1.50
BU508D 1.50
BU508V 1.85
BUT11AF 1.45
BUT56A 1.60
BUX84 80
R4050 2.45
T9053/54V 1.80
T9064V 1.50
TIP29E(TO168V) 60
TIP112H(TO167V) 60
TIPL791A 1.70

REMOTE CONTROLS
Ferguson T725 8.95
T34/742 8.95
T785 F T 9.50
T789 F T 9.50
TX9/10 N/T 11.50
TX9/10 TEXT 8.95
TX100 (ST) 11.95
SRA1 13.50
Fidelity CTV14R/S 12.95
Goodmans TX1100/1200 18.95
Grundig TP400 T/T 12.90
Hitachi CPT2174 17.95
CPT2246 12.75
ITT VS4 10.75
Pace 6000 11.95
Panasonic TNQ1419 13.95
Philips KT3/30 TEXT 12.50
RC5991 10.70
RC5903 (GEN) 11.25
VR6462 11.50
VR6467 11.50
Sanyo 1100/1200 14.25
Sony RM632/636 9.70
RM670/672/67x 9.70
Tatung RC40/45 9.25
RC70 9.25
RC90 11.95
Toptel WITH FST 24.95
NON FST 17.95

VIDEO HEADS
Alba 4000/500HX 16.95
Amstrad 4500/9000 14.70
4600/4700 13.75
6000/6100 16.25
7000 14.95
Ferguson 3V0G/39 8.50
3V42/55 17.25
3V59/FV12 27.95
3V65/FV11R 16.50
FC12/32L 27.95
FV31 25.95
FV42L 48.05
Fisher FVH615/910 16.25
FVH906/916 18.50
Hitachi 8000/9700 13.50
VT11/33E 14.30
63/64E 19.25
VT65E 28.50
VT120/130E 21.25
VT130E 25.30
VT150E 36.50
Matsui VX735A 18.90
NEC 9034/905x 19.75
Panasonic NV333 8.50
NV366 19.50
NV370 9.50
NV430 13.95
NV730 18.50
NV777 18.95
NV2000/7000 8.50
NVG7/9 15.95
NVG10/12 16.25
NVG18 29.50
NVG21/25 29.50
NVG30/40 21.95
NVG45 27.80
Philips 6460/6520 9.50
6462/6520(G) 43.50
6467/6468(G) 38.75
Samsung VX5D0/970 17.00
Sanyo VHR1100/1300 18.50
VHR2300/3200 18.50
Sentra 8000/8400 16.75
Sharp VC9300 381/481 14.95
581/681 14.00
Sony C5 6/7 14.75
Toshiba V73/83B 14.25
V93B 17.50

HEADS ARE OF THE VERY HIGHEST QUALITY

AMSTRAD VIDEO SPARES
VCR4600
BELT KIT 1.95
GEAR ASSEMBLY 9.95
MODIFICATION KIT 5.25
PINCH ROLLER 3.40
VCR6000
BELT KIT 1.80
PINCH ROLLER 3.40
CLUTCH 3.95

FERGUSON VIDEO SPARES
3V29/30
BELT KIT 1.80
CASSETTE LAMP 70
LOAD BELTS (PK-5) 1.80
PINCH ROLLER 3.60
REEL IDLER 2.95
TAKE UP CLUTCH 2.95
TAKE UP IDLER 1.95
3V35/39
BELT KIT 1.80
CAPSTAN MOTOR 21.50
CASSETTE HOUSING 31.50
LOAD BELTS (PK-5) 1.80
PINCH ROLLER 3.40
REEL IDLER 2.95
TAKE UP CLUTCH 2.95
TAKE UP IDLER 1.95
MAINS TRANSFORMER 23.95
3V44/45
BELT KIT 1.50
PINCH ROLLER 3.60
CASSETTE HOUSING 31.50
3V65/FV11R
BELT KIT 1.60
PINCH ROLLER 3.60
REEL IDLER 2.60

FISHER VIDEO SPARES
FVH5000/5100
BELT KIT 1.85
REEL IDLER 4.95
PINCH ROLLER 3.60
FV615/720
BELT KIT 1.80
PINCH ROLLER 3.60
REEL IDLER 5.35
CLUTCH ASSEMBLY 5.35
FVH905/910
BELT KIT 1.85
REEL IDLER 5.35
CLUTCH ASSEMBLY 5.35

HITACHI VIDEO SPARES
VT9300/9700E
BELT KIT 1.85
PINCH ROLLER 3.60
PULLEY 95
F/F REW IDLER 2.75
PLAY IDLER 3.75
VT11/33E
BELT KIT 1.85
F/F REW IDLER (GEN) 2.50
PINCH ROLLER 3.60
CLUTCH ASSEMBLY 7.75
CAPSTAN MOTOR VT11E 27.50
CAPSTAN MOTOR VT33E 23.95
VT63/64E
BELT KIT 1.85
F/F REW IDLER (GEN) 2.50
PINCH ROLLER 3.60
CLUTCH ASSEMBLY 7.75
CAPSTAN MOTOR 27.50
VT120/130E
BELT KIT 1.85
F/F REW IDLER 2.50
PINCH ROLLER 3.60
CLUTCH ASSEMBLY 7.95
CAPSTAN MOTOR 22.50

PANASONIC VIDEO SPARES
NV333/386
BELT KIT 1.85
PINCH ROLLER 3.60
PLAY IDLER (GEN) 5.50
REEL IDLER (GEN) 1.35
BELT KIT 1.80
PINCH ROLLER 3.60
REEL IDLER (GEN) 3.50
NV730
BELT KIT 1.80
PINCH ROLLER 3.60
REEL IDLER (GEN) 4.30
NV2000/2010
BELT KIT 1.80
PINCH ROLLER 3.60
PLAY IDLER (GEN) 1.35
REEL IDLER 1.35
NV7000/7200
BELT KIT 1.80
PINCH ROLLER 3.60
PLAY CLUTCH (GEN) 6.15
REEL IDLER (GEN) 1.35

PHILIPS VIDEO SPARES
VR6480/6520
(SEE NV370 SPARES)
VR6482/6560
PINCH ROLLER 3.70
REEL IDLER 4.75
CASSETTE HOUSING 14.75
VR6487/6760
BELT KIT 1.95
PINCH ROLLER ASSM 6.75
CASSETTE HOUSING 10.95

SANYO VIDEO SPARES
VHR1100/1300
BELT KIT 1.90
REEL DRIVE ROLLER 5.25
PINCH ROLLER 3.60
VHR3100/3300
BELT KIT 1.75
REEL DRIVE ROLLER 4.95
PINCH ROLLER 3.60

SHARP VIDEO SPARES
VC9300/381
BELT KIT 1.95
PINCH ROLLER 3.60
REEL IDLER (GEN) 3.95
REEL IDLER (GEN) 19.95
VC481/482
BELT KIT 1.95
PINCH ROLLER 3.60
REEL IDLER (GEN) 3.95
VC581/582
BELT KIT 2.20
PINCH ROLLER 3.60
REEL IDLER (GEN) 3.95
VC681
BELT KIT 2.20
PINCH ROLLER 3.60
REEL PULLEY (GEN) 7.95
VCA140/VC772
BELT KIT 2.20
PINCH ROLLER 3.60
REEL PULLEY (GEN) 7.95

VIDEO LAMPS
Ferguson 3V00/22 50
3V29/30 70
Sharp 9300/381 1.50
UNIVERSAL 50

VIDEO LEADS
SCART TO SCART F/W 4.75
SCART LEAD TO 6 PHONO 4.95
SCART TO 2-SCART SKT 5.25

VIDEO REPAIR KITS
Ferguson 3V29/30 12.95
3V35/39 12.95
3V44/45 14.95
3V64/65 11.95
Hitachi VT8000 12.95
VT9300 12.95
VT11/33E 16.95
VT120/130E 16.95
Panasonic NV230 (GEN) 14.50
NV333 (GEN) 14.50
NV370 (GEN) 14.50
NV430 (GEN) 14.50
NV730 (GEN) 13.95
NV777 (GEN) 13.50
NV2000 (GEN) 23.95
NV7000 (GEN) 20.45
NVG10,12" 12.95
Philips VR6460 14.50
VR6462 12.50
VR6467 (C-KIT) 21.50

NEW CATALOGUE NOW BEING COMPLETED. PLEASE REQUEST

CELLULAR SPARES
ANTENNAE
3DB BODY MOUNT 14.25
3DB GLASS MOUNT 15.95
Motorola 8500 1/4 WVE 9.95
8800X 9.95
9800X 19.95
Nokia 101 14.95

BATTERIES
Ericson HOTLINE 23.50
Mitsubishi MT5 24.50
MT7 700MA 23.50
Motorola 8500/1000MA 23.50
8500/1500MA 29.50
8800/1000MA 23.95
8800/1500MA 29.50
9800/700MA 23.50
NEC P3 700MAH 23.50
Nokia 101 700MAH 24.50
190 23.50
Panasonic F1 700MAH 23.50
Sony CMH333 24.50
Technophone TP3 24.50
TP405 700MAH 23.50

BATTERY CHARGERS DESK TOP TRICKLE
MOTOROLA 8000/8800X 23.95
MOTOROLA MICTRATAC 24.50
NEC P3 24.95
NOKIO 101 24.95
PANASONIC F 24.50
SONY CMH333 24.95

DESK TOP RAPID/COND.
MOTOROLA 9800X 42.50
NEC P3 42.95
NOKIO 101 42.95
PANASONIC F-SERIES 42.95
SONY CMH333 44.95

P/PACKING £1.00 + VAT FOR COMPONENTS

MANUALS – £1.25 P/PACKING

EXPORT ORDERS P/PACKING AT COST

CELLULAR PARTS – £3 PER ITEM

WHEN ORDERING PLEASE ADD P/P TO THE ORDER & THEN ADD VAT AT 17.5% TO THIS TOTAL

NB. "MINIMUM ORDER VALUE £5. ALL STOCK ITEMS BY RETURN"

DUE TO MANUFACTURERS PRICE RISES WE RESERVE THE RIGHT TO CHANGE PRICES WITHOUT PRIOR NOTICE.

MARAPET ELECTRONIC COMPONENTS

Tel: 0452-526883

For TV ★ Video ★ Audio ★ Computer Spares

PHONE for a 'PRICE & AVAILABILITY' on your requirements, or send S.A.E for more information on our service.

IC SELECTION

Ams40054	£11.69	TA8410K	£4.59
Ams40092	£9.01	TBA530	£1.25
AY3891?P	£7.74	TBA810P	£1.29
BUV48A	£4.17	TBA810S	£1.35
CA741CE	£0.25	TDA1001B	£2.39
CNY65	£3.99	TDA2595	£4.24
CDP6818AE	£7.24	TDA3562A	
C024947	£10.03	TFK	£4.99
C025913	£27.99	TDA3654	£2.89
DS1488N	£0.79	TDA4600-2	£3.70
DS1489N	£0.79	TDA8170	£3.45
DS7515UN	£1.49	TEA2000	£5.78
DS7515AN	£1.50	TIPL791A	£2.75
HI1L3	£2.99	TL431CLP	£1.99
HA12006	£7.08	TL497ACN	£3.99
LM1203N	£9.92	TMS4532NL4	£0.99
LM3909	£2.15	UC3842	£2.34
LM833	£1.95	UM6845	£8.72
MAB8461P-069	£19.04	UPD8039LC	£10.55
MB81416-12	£3.75	ZX8301	£10.17
MC1377P	£6.73	ZX8400APS	£4.79
MC74HC85	£0.85	ZX8401	£5.44
MK4564-15	£1.79	140MA76G	£14.30
MSM6242B	£9.99	2SA1706	£1.34
NE555CDP	£0.27	2SC2331	£1.35
P8255A	£2.85	27C256-200	£3.50
PC713V	£2.89	4116-2N	£1.75
R2G	£1.29	6569R5 VIC	£13.49
S2000AFI	£1.99	8565R2 VIC	£15.03
SED9420CAC	£14.93	74LS00	£0.15
TA7280P	£4.95	74LS157	£0.25
TA7281P	£4.95	74LS245	£0.39

IC Protectors – F or N Series 50p each

EQUIPMENT MANUALS

Large selection of Manufacturers Service & User information available. Original manuals supplied if possible. We only show a few Computer Equipment examples here. Contact us for TV, VCR, Audio Equip.

Amstrad PCW9512 Service	£14.53
Amstrad PC1402/D Service	£5.00
Amstrad PC12HRCD Service	£5.00
CBM C64/C64C Service	£14.99
CBM C64 User	£5.49
CBM C64C User	£4.99
CBM C + 4 User	£5.49
CBM 1084S-P	£9.87
Philips CM8833 (Mk1) Service	£7.82
Philips CM88xx Service Supp	£3.00
Philips CM8873 Service	£8.76
Philips CM11342/62 Service	£9.99

"NO VAT ON MANUALS"

SELECTED COMPUTER SPARES

AMSTRAD
PCW 9512 Armature £3.58
CPC464 Keyboard £25.52

COMMODORE
A3000 IC 8372B £29.91
C64C Modulator £15.96

PHILIPS
CM9073 On/Off Switch £5.25

MONITOR LEAD
Amiga to Scart I/P £8.29

We are unable to list all we can supply. A large range of Amstrad, CBM, Philips, parts is available – plus selected spares for Acorn, Atari, Epson, Panasonic, Sinclair Star and others.

THIS IS JUST A VERY SMALL SAMPLE OF OUR STOCK

TV/MONITOR LINE OUTPUT TRANSFORMERS

AMSTRAD, IBM, DIGITAL etc	P.O.A.
COMMODORE 1084-P/SP etc	P.O.A.
PHILIPS CM8533/CM8833 etc	£21.27
PHILIPS CM11342/62 (CM8833 MK II)	£24.49
Ferguson TX90 14" 90°	£19.75
Ferguson TX100 20" 90°	£19.82
Ferguson TX100 22"/26" 110°	£18.99
Ferguson TX100 51cm FST	£20.49
Fidelity (Please quote model)	P.O.A.
GEC C2089H/90H/C2288 to 2291H/C2294H	£21.60
Hitachi CPT1463/CPT1623/24/26/44/46	£22.13
Hitachi CPT2036/46/76/78/CPT2234/36/CPT2246/78	£21.60
Hitachi CPT2174/2176/2178	£21.43
Panasonic TC1631/2031 & TX2034/2200	£23.99
Panasonic TC2160 & TX2122/2162	£28.99
Sansho/Matsui (Supply No on L.O.T.)	P.O.A.

Many other Line O/P Transformers available

AUDIO SPARES

AMSTRAD MX200/CDX400 (FUNAI) CASSETTE DOOR	£2.90
B.T. FREEWAY TELEPHONE – REPLACEMENT AERIAL	£3.65
SHARP RGF278, 281, 284 MAIN BELT	£1.19
TOSHIBA ST12/A MAINS TRANSFORMER	£9.99

Many other specific Parts and Manuals available

TV SPARES

GEC/HITACHI FRAME MODULE HM6251	£7.94
GOLDSTAR CIS4361/4441/CIT2162X/2172X O/O SWITCH	£5.65
HITACHI CPT2188/2650 On/Off SWITCH	£4.33
SAMSUNG CI537Y/CX558W1 On/Off SWITCH	£6.05

Large range of TV Spares available for many makes

VIDEO SPARES

Large range of Video Heads, Idlers, Belt Kits, Pinch Rollers from stock – plus much, much more. Please contact us.

REMOTE CONTROLS FOR SATELLITE

AMSTRAD SRX200/SRD400 & SRD510/520/600	each type £12.75
PACE PRD800/PRD900/SS9000/SS9200	£12.95

We also stock other Remote Controls + Many General Components.

WE ARE PLEASED TO SERVE BOTH THE TRADE AND END USER.

When ordering: Please add £1.20 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

All items subject to availability – Prices can change without notice

Please send S.A.E. with all written enquiries

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

P.V. TUBES

104 ABBEY STREET, ACCRINGTON
LANCS BB5 1EE
☎ 0254 236521/232611
FAX 0254 395361
24 Hr Answering Service

WE ARE CLOSED ALL DAY WEDNESDAY

CALLERS WELCOME AT TRADE COUNTER
MON-FRI 9-5pm
SAT 9-1pm

SEND LARGE S.A.E. FOR TRADE CATALOGUE

ATTENTION CARAVAN OWNERS TOURING FRANCE? STATIC IN SILVERDALE

14" Multisystem TV	£294.00
21" Multisystem TV	£333.00
Multisystem Video	£405.00
Yes all suitable for France!	
Video Player only 12v AC/DC	
Mains/Battery	£159.95
7" MONO TV/RADIO	£70.00
Portang Caravan Aenal (W/B aenal/all fixings)	£19.50
47cm Flat Plate Satellite Dish with LNB	£77.00
Stand alone security alarm	£19.95
Traveller Set Top aenal	£16.60

LABGEAR/TELESTE AERIAL ACCESSORIES

CM7291 Multiset 1	£12.86
CM7292 Multiset 2	£13.80
CM7293 Multiset 3	£17.10
CM7294 Multiset 4	£26.10
CM7296 Multiset 6	£32.16
CM7298 Multiset 8	£38.56
CM7265 Mast Head Amp W/B UHF/VHF	£10.20
CM7266 Mast Head Amp W/B UHF	£9.30
CM7268 Mast Head Amp UHF A/B/CD	£10.88
CM7271 Mast Head UHF W/B	£8.85
CM7262 Power Unit For MHA	£11.92
CM9035 Outdoor Splitter	£8.04
CM9009 Flush TV/FM outlet	£5.76
CM9003/00 Flush single outlet	£2.23
CM9003/01 Flush single isolated	£3.60
CM9010 Flush twin outlet	£3.43
CM9700 27Mhz CB Suppressor	£6.54
CM9034 UHF Filter A/B/CD	£7.50
CM5004 4 Way Video Amp	£57.98*
CM5188 Satellite IF Dist 8 Way	£53.00*
CM5110 IF Line Amp Satellite	£18.60*
CM5112 Sat Block Conv + PSU	£125.00*
CM7222 Televerta VHF to UHF	£55.90*

*These prices while stocks last

VALVES

NEW – Branded Boxes – full range – (matched pairs available)

ECC81	£2.90	ECC82	£2.90
ECC83	£4.90	ECC85	£3.00
ECC88	£3.24	ECL82	£3.37
ECL86	£3.50	EL34	£7.00
EL84	£3.00	EL519	£6.50
GZ34	£5.00	KT66	£9.75
KT88	£18.00	PCL805	£2.70
PCL86	£3.40	PC504	£3.00
PL519	£5.90	PY500A	£2.95
12BY7A	£5.50	6L6GC	£5.31
6L6GT	£5.31	6KD6	£35.00

WIRELESS SECURITY SYSTEM

New system which can even protect your car in the drive, shed, garage all without wires linked to your house alarm. British made – Can't be jammed. Ring for Info Pack.

LOADFAST LADDERLOCK £19.99
Device which locks your ladders on to the roof rack. Stops them slipping and prevents theft, invaluable to the aerial/security and satellite engineer

SUPER FLEX STRAPS
Can be made to any length
1M £1.95
2M £2.40

FLEXISTRAP 30mm
750mm £1.76
1.5m £2.80

FLEXISTRAP 58mm
1M £2.95
2M £3.81

Ideal for securing timber, pipes, boxes, tubes, skis, dinghies surfboards or any items you wish to secure to a vehicle roof for commercial or leisure activities.

OUR NOW FAMOUS

DEGAUSSING COIL £27.50

WE CAN'T LIST EVERYTHING THAT WE STOCK. OUR RANGE IS EXTENSIVE. WE HAVE A TRADE CATALOGUE ON REQUEST. WE ARE ALSO ON LINE WITH 'MOVIES' TO ORDER ANY PHILIPS PART QUICKLY. JUST SOME OF THE THINGS WE SELL – AERIALS, BRACKETS, BATTERIES, CABLE, CONNECTORS, CMOS, CAPACITORS, COMPUTER ACCESSORIES, DISCS, DIODES, ELECTRICAL ACCESS, FUSES, ICs, LOPTX, LEADS, MANUALS, PUSH BUTTON LIGHTS, PHONES, PHONE ACCESS, POTENTIOMETERS, RELAYS, SEMICONDUCTORS, STRIPBOARD, SVHS, SMOKE DETECTORS, 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 (Inc BETA 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, degaussing 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.

ELC EAST LONDON COMPONENTS

AUDIO TELEVISION VIDEO
COMPONENTS AT VERY KEEN PRICES
TEL: 081-472 4871 FAX: 081-503 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, LOGIC, MATSUI, ORION, PANASONIC, SAISHO, SHARP AND MANY MORE

VIDEO SPARES

3V29 TAKE UP IDLER	£1.30p
3V29 F/F REW IDLER	£2.60p
3V59/65 FV10/14 IDLER	£1.50p
3V23 LOADING ROLLER BAR	£3.99p
SHARP 0005 & 0006	£1.95p
SHARP VC651 ASSEMBLY	£6.99p
VT11/14/17 IDLER	£1.95p
VT11 CLUTCH ASSEMBLY	£6.99p
VT100/225/260 IDLER	£2.75p
NEC 9013 IDLER	£4.99p
SANYO VHR3300 IDLER	£3.99p
AKAI VS105/250 CLUTCH ASSEMBLY	£11.99p
SAISHO VR380 CLUTCH	£4.99p
MITSUBISHI H5337 F/F IDLER	£2.70p
ALBA SENTRA PULLEY	£1.35p
MATSUI LIMITER POST	£1.25p
PANASONIC NV370 IDLER	£1.95p
FISHER 615 IDLER	£3.50p
FISHER GEAR ASSEMBLY	£4.50p
AMSTRAD PINCH WHEEL MOD KIT	£3.99p
UNIVERSAL TRIPLER	£4.99p
UNIVERSAL TRIPLER WITH FOCUS	£7.99p
HITACHI MODULE HM6251	£6.99p
CUC2410 TRIPLER	£16.99
TENSION BAND FOR MOST MOD. FROM	£1.99p
CIRCUIT PROTECTOR ICP	50p
TX10 FOCUS UNIT	£7.99p
PHILIPS BACK-UP BATTERY	£1.30p
ALBA BATTERY .1F 5.5V	£2.50p
TV SWITCHES FOR MOST MOD. FROM	£1.99p
SONY FUNCTION SWITCH	0.85p

VIDEO BELT KITS

AKAI	
VS1/2/5	1.75
VS22/35	2.00
VS105/250	1.50
ALBA	
VCR4000	1.50
AMSTRAD	
VCR4600	1.80
VCR6000	1.30
VCR7000	1.00
FERGUSON	
3V22	1.80
3V29/30/33	1.00
3V42/65	0.85
HRD520/830	1.20
FISHERS	
FYHP615/725	1.10
FYHP905/910	1.10
GRUNDIG	
VS180	1.45
VS300	1.90
VS380	1.75
HINARI	
VXL3-20	1.25
VXL4-35	1.50
HITACHI	
VT11/33	1.30
VT52/65	1.75
VT110/220	1.80
MITSUBISHI	
HS306/307	1.75
PHILIPS	
VR6548	2.40
VR6367	1.50
SAMSUNG	
VX510/520	1.50
SANYO	
VHR1300	2.15
VHR3300	2.05
SHARP	
VC381	1.30
VC651/681	1.25
VC9300	1.50

ELC EAST LONDON COMPONENTS
63 PLASHET GROVE, EAST HAM,
LONDON E6 1AD. TEL: 081-472 4871
two minutes walk from Upton Park Tube Station
PLEASE PHONE US IF WHAT YOU NEED IS NOT LISTED AS WE HOLD THOUSANDS OF ITEMS IN STOCK
ADD £1 P/P ADD 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**	
CT2570E	19.99	1420	16.99
CT2870	19.99	1440B	16.99
ALBA		1450	16.99
CTV14RS	19.99	1465	19.99
AMSTRAD		1480A	16.99
CTV2200	14.99	**MITSUBISHI**	
CTV2210	14.99	CT2528ETX	16.99
TVR1/2/4	16.99	CT2839ETX	16.99
BUSH		**ORION**	
2020T	10.99	14RX	16.99
2714	16.99	**PHILIPS**	
FIDELITY		KT3	13.99
ZX2000	14.50	KT4	16.99
ZX3000	12.99	KT30	16.99
FERGUSON		KT40	16.99
TX95/86	16.99	2A	16.99
TX90		3A	16.99
REDSPOT	16.99	CTX E/S	16.99
WHITE	14.99	CF1	16.99
TX98	19.99	NCR	16.99
TX99	16.99	GR1-AX	16.99
TX100		G90 AE	16.99
FST	16.99	**PANASONIC**	
BLUESPOT	16.99	TLF14520F	24.99
GREEN	14.99	TLF14521F	24.99
YELLOW	16.99	TLF14567F	24.99
GOLDSTAR		TLF14568F	24.99
CBT4282	16.99	TLF14584F	24.99
HINARI		TLF14586F	24.99
CT4/5	16.99	**SAISHO**	
CTV140	12.99	CT14R	16.99
HITACHI		CT141RB	16.99
CPT1446	16.99	**SALORA**	
CPT1455	16.99	21C60	16.99
CPT1476	16.99	25C51	16.99
CPT1493	16.99	**SANYO**	
CPT1646	16.99	CBP2146	29.99
CPT2028	16.99	CTP3246	29.99
CPT2036	16.99	CTP6262	29.99
CPT2048	16.99	CTP7130	39.99
CPT2078	16.99	CTP7132	39.99
CPT2084	16.99	CTP7135	39.99
CPT2087	16.99	**SENTRA**	
CPT2174	16.99	GX9000	16.99
CPT2176	16.99	GX9700	16.99
CPT2178	16.99	**SHARP**	
CPT2238	16.99	C1410S	29.99
CPT2248	16.99	C3700	39.99
CPT2276	16.99	CT2810S	29.99
CPT2278	16.99	**SOLAVOX**	
CPT2476	16.99	16R19	16.99
CPT2478	16.99	20R19	16.99
ITT		22R19	16.99
CT2613	16.99	26R09	16.99
CT3306	16.99	**SONY**	
CT3325	16.99	KV1442	16.99
CT3425	16.99	KV1882	16.99
CT3835	16.99	KV2052	16.99
ST3487	16.99	KV2066	16.99
ST35467	16.99	KV2096	16.99
TX2613	16.99	KV21XBTU	16.99
TX3327	16.99	KV2204	16.99
TX3447	16.99	KV2212	16.99
TX3835	16.99	KV2217	16.99
COM 80R	16.99	KV2704	16.99
COM 8	16.99	KV2705	16.99
DIGI 1-3	16.99	KV2752	16.99
MONOPRINT	16.99	KV2756	16.99
CVC25/32	9.99	**TATUNG**	
LOEWE OPTA		TN8422	19.99
ART 1	16.99	**TOSHIBA**	
CLAS M 124	16.99	150F6D	35.00
PROF S 28	16.99	**ZANUSSI**	
STUDIO 1	16.99	20SM502	19.99
STUDIO S 28	16.99	22ST502	19.99
STUDIO T 28	16.99	26ZT511	19.99

AN3822K	7.99	LA7835	1.99	STK5730	6.00	TDA1516	4.00
AN5151	6.99	MEA2901	2.60	STK6962	5.80	TDA1518	4.00
AN5435	2.50	M490BB1	8.50	STK7216	7.00	TDA1520	4.00
AN5515	2.99	M491BB1	8.50	STK7226	8.50	TDA1521	3.50
AN5521	2.99	M49481	8.50	STK7308	4.25	TDA1522	3.99
AN5900	1.50	M5840A-84	9.99	STK7348	4.50	TDA1670	3.00
AN7161	3.40	M54543L	2.99	STK7356	9.00	TDA1701	4.25
AN7171	4.25	M54544L	2.99	STK8250	8.00	TDA1770	10.00
AN7178	2.60	M54545L	2.99	STK73410	6.99	TDA1908	1.00
BA718	1.99	M54548L	4.25	STR441	6.50	TDA2003	1.00
BA3402	3.99	M54549L	4.50	STR3125	5.99	TDA2005	1.30
BA5402	2.50	M54644L	3.99	STR4211	5.99	TDA2030	1.30
BA6109	1.80	M54647L	3.99	STR5412	4.50	TDA2170	3.00
BA6121	2.99	M54648L	3.99	STR6020	4.50	TDA2270	3.25
BA6122	1.99	M54649L	3.99	STR9012	6.00	TDA2575	2.00
BA6209	2.50	MB3730	2.00	STR41090	6.00	TDA2577	4.25
BA6219	2.99	MB3731	2.99	STR44115	7.75	TDA2578	3.00
BA6222	1.99	MB3732	2.99	STR40090	5.99	TDA2579A	2.50
BA6229	2.80	MC13306T3	3.99	STR50020	6.50	TDA2581	3.00
BA6238	1.99	MDA2061	5.99	STR50103	4.99	TDA2582	3.00
BA6239	2.50	MDA2062	4.25	STR50115	6.50	TDA2600	5.75
BA6304	1.90	STK433	7.00	STR54041	5.50	TDA2653A	3.50
BA6305	1.90	STK433	4.99	STR55051	8.50	TDA3330	7.00
BA6259	2.99	STK457	6.50	STR58041	5.50	TDA3505	4.00
BA10324	1.99	STK459	5.99	STR59041	6.50	TDA3560	3.25
BA10358	1.80	STK461	7.50	STR10006	6.00	TDA3561	3.00
BA15218	2.20	STK463	10.00	STR01806	6.00	TDA3562	3.00
CNY65	4.99	STK465	7.50	STRD6008	8.00	TDA3565	3.00
CNY75	2.99	STK0029	3.99	SAA1025	6.00	TDA3576	7.00
CNX62A	2.99	STK0040	5.50	SAA1250	3.50	TDA3640	4.00
CNX82	3.99	STK0060	9.99	SAA1251	4.50	TDA3650	10.00
CNX83	2.99	STK2029	5.99	SAA1290	8.00	TDA3651	2.00
HA1377	1.99	STK2048	11.00	SAA1291	9.00	TDA3653	2.99
HA1397	2.60	STK2129	7.00	SAA1293-03	8.50	TDA3654	1.99
HA11225	1.99	STK2250	8.00	SAA1294-03	13.00	TDA3300	5.00
HA11227	2.20	STK3041	6.00	SAA5000	2.50	TDA4500	3.75
HA11235	1.99	STK3042II	6.50	SAA5010	4.30	TDA4501	4.75
HA11423	2.20	STK3062II	7.00	SAA5012	3.75	TDA4502	5.00
HA11711	6.50	STK4026	9.00	SAA5020	3.50	TDA4503	3.00
HA11717	4.75	STK4121II	7.00	SAA5030	4.99	TDA4505.3Y	4.00
HA11753	5.99	STK4122	8.00	TA7193	4.00	TDA4504	4.99
HA11758	5.00	STK4131II	6.50	TA7205	1.00	TDA4505.E	5.99
HA13001	1.95	STK4132II	7.00	TA7222	1.20	TDA4505.M	12.99
HA13008	9.99	STK4141II	6.50	TA7240	2.60	TDA4600	1.99
HA13108	3.50	STK4141V	8.00	TA7241	2.60	TDA4601	1.99
HA13117	2.99	STK4142II	7.75	TA7264	4.99	TDA4950	1.99
HA13118	2.99	STK4151II	7.00	TA7269	5.50	TDA6200	8.00
HA13119	2.99	STK4152II	9.00	TA7270	2.50	TDA7240	3.00
HA13402	3.25	STK4161II	9.99	TA7271	2.50	TDA8170	2.99
HA13403V	5.50	STK4162II	8.00	TA7273	3.50	TDA8175	2.99
LA4182	1.99	STK4171II	9.99	TA7279	4.00	TDA8178	4.25
LA4270	2.99	STK4172II	9.00	TA7280	2.99	TDA8185	5.00
LA4282	3.80	STK4181II	9.00	TA7281	2.75	TDA8190	3.00
LA4440	2.20	STK4182	9.99	TA7283	2.60	TPU2732	19.99
LA4445	2.60	STK4191II	9.99	TA7288	2.20	TMS47C432	15.00
LA4460	1.60	STK4192	9.99	TA7293	4.50	UPA81C	1.99
LA4461	1.60	STK4372	6.00	TA7299	3.99	UC3844	2.99
LA4465	2.99	STK4731	7.50	TA7680	4.00	U4646	8.50
LA4466	2.99	STK4853	9.99	TA7699	5.00	UPC1031	1.80
LA4475	2.99	STK5315	6.50	TA8200	4.99	UPC1181	1.10
LA4476	2.99	STK5325	7.00	TA8201	3.50	UPC1182	1.10
LA4495	3.95	STK5332	3.50	TA8207	3.25	UPC1185	6.00
LA4496	3.99	STK5333	5.99	TA8210	3.50	UPC1188	4.00
LA4500	2.30	STK5338	3.99	TA8214	3.50	UPC1230	2.10
LA4505	2.60	STK5342	5.99	TA8215	3.99	UPC1238	1.80
LA4508	2.60	STK5372H	5.50	TA8216	4.25	UPC1225	2.20
LA4700	3.99	STK5421	7.00	TA8220	6.75	UPC1241	3.50
LA6324	2.50	STK5422	6.50	TA8221	6.75	UPC1277	2.40
LA7330	4.99	STK5434	7.00	TA8400	3.99	UPC1278	2.40
LA7520	4.99	STK5436	8.00	TEA1039	1.99	UPC1288	4.00
LA7522	6.50	STK5451	7.00	TEA2018A	1.40	UPC1298	4.00
LA7530	3.99	STK5466	8.50	TEA2029	3.00	UPC1310	8.00
LA7800	1.80	STK5471	4.99	TEA2164	3.00	UPC1335	4.00
LA7801	1.95	STK5476	6.99	TDA1037	2.00	UPC1318	4.00
LA7802	1.95	STK5481	4.99	TDA1044	2.50	UPC1363	3.00
LA7820	3.50	STK5482	4.99	TDA1170	1.20	UPC1364	5.00
LA7830	1.99	STK5490	5.50	TDA1510	3.50	UPC1365	3.25
LA7832	1.99	STK5720	6.00	TDA 1515	2.50	UPC1377	2.50

UPC1378	2.20	2SB755	3.50	2SC828	0.25	2SC1573	0.40
UPC1394	1.90	2SB817	2.00	2SC829	0.25	2SC1670	0.85
UPC1420	5.25	2SB861	0.60	2SC867	3.75	2SC1678	1.20
UPC1470	2.00	2SB882	0.80	2SC1061	0.90	2SC1827	1.20
UPC1488	3.50	2SB891	1.40	2SC1173	0.50	2SC1922	2.75
UPC1498	3.50	2SB892	0.80	2SC1212	0.60	2SC1941	0.65
X2402P	4.25	2SB1010	0.75	2SC1399	0.60	2SC1942	1.95
SG264A THY	7.00	2SB1016	0.80	2SC1413A	2.40	2SC1969	1.60
SG613 THY	11.00	2SC828	0.25	2SC1454	3.25	2SC2078	0.80
TRANSISTORS		2SC829	0.25	2SC1573	0.40	2SC2229	0.30
BC372	0.50	2SC867	3.75	2SC1670	0.85	2SC2235	0.40
BC368	0.30	2SC1061	0.90	2SC1678	1.20	2SC2335	1.20
BF869	0.60	2SC1173	0.50	2SC1827	1.20	2SC2458	0.30
BU208A	1.10	2SC1212	0.60	2SC1922	2.75	2SC2502	0.90
BU500	0.99	2SC1399	0.60	2SC1941	0.65	2SC2564	2.40
BU508A	0.99	2SC1413A	2.40	2SC1942	1.95	2SC2565	2.75
BU508AF	1.30	2SC1454	3.25	2SC1969	1.60	2SC2577	1.20
BU508DF	1.50	2SC1573	0.40	2SC2078	0.80	2SC2579	1.30
BU508DR	1.60	2SC1670	0.85	2SC2229	0.30	2SC2580	1.80
BU903	1.60	2SC1678	1.20	2SC2235	0.40	2SC2581	2.00
BU908	1.99	2SC1827	1.20	2SC2335	1.20	2SC2791	2.60
BUT11A	0.85	2SC1922	2.75	2SC2458	0.30	2SC3156	2.60
BUT11AF	1.20	2SC1941	0.65	2SC2502	0.90	2SC3169	2.00
BUT56A	1.20	2SC1942	1.95	2SC2564	2.40	2SC3182	2.50
BUK444	2.99	2SC1969	1.60	2SC2565	2.75	2SC3281	3.00
BUX85	0.65	2SC2078	0.80	2SC2577	1.20	2SC3284	1.60
BUW11A	1.40	2SC2229	0.30	2SC2579	1.30	2SC3519	1.50
DTA114	0.70	2SC2235	0.40	2SC2580	1.80	2SC3644	1.60
DTA124	0.45	2SC2335	1.20	2SC2581	2.00	2SD315	0.80
DTA144	0.50	2SC2458	0.30	2SC2791	2.60	2SD400	0.20
DTC114	0.60	2SC2502	0.90	2SC3156	2.60	2N3055	0.75
DTC124	0.50	2SC2564	2.40	2SC3169	2.00	2N3773	1.30
DTC144	0.55	2SC2565	2.75	2SC3182	2.50	2SA769	1.30
MJ2955	0.75	2SC2577	1.20	2SC3281	3.00	2SA773	0.75
MJE340	0.40	2SC2579	1.30	2SC3284	1.60	2SA965	0.25
MJE13005	1.30	2SC2580	1.80	2SC3519	1.50	2SA985	0.65
MN650	4.00	2SC2581	2.00	2SC3644	1.60	2SA999	0.20
R4050	1.30	2SC2791	2.60	2SD315	0.80	2SA1013	0.30
R4051	1.50	2SC3156	2.60	2SD400	0.20	2SA1020	0.30
S2000AF	1.50	2SC3169	2.00	2SD401	0.50	2SA1102	1.80
S2055AF	1.50	2SC3182	2.50	2SD424	3.50	2SA1104	2.00
TIPL761A	1.75	2SC3281	3.00	2SD427	3.50	2SA1106	2.00
TIPL791A	1.30	2SC3284	1.60	2SD716	1.20	2SA1141	2.00
TIP112	0.70	2SC3519	1.50	2SD718	1.30	2SA1146	1.90
TIP3055	0.60	2SC3644	1.60	2SD725	3.50	2SA1208	1.50
2N3055	0.75	2SD315	0.80	2SD837	0.80	2SA1232	1.80
2N3773	1.30	2SD400	0.20	2SD845	2.50	2SA1265	1.50
2SA769	1.30	2SD401	0.50	2SD856	0.80	2SA1302	3.00
2SA773	0.75	2SD424	3.50	2SD869	3.25	2SA1386	2.75
2SA965	0.25	2SD427	3.50	2SD870	3.25	2SA1535	1.60
2SA985	0.65	2SD716	1.20	2SD871	3.25	2SB536	0.60
2SA999	0.20	2SD718	1.30	2SD1047	2.00	2SB554	3.50
2SA1013	0.30	2SD725	3.50	2SD1065	2.00	2SB557	3.00
2SA1020	0.30	2SD837	0.80	2SD1138	0.60	2SB558	3.00
2SA1102	1.80	2SD845	2.50	2SD1207	0.50	2SB560	0.40
2SA1104	2.00	2SD856	0.80	2SD1276	1.20	2SB562	0.40
2SA1106	2.00	2SD869	3.25	2SD1292	0.50	2SB595	0.80
2SA1141	2.00	2SD870	3.25	2SD1397	2.00	2SB632	0.40
2SA1146	1.90	2SD871	3.25	2SD1398	1.70	2SB643	0.20
2SA1208	1.50	2SD1047	2.00	2SD1426	2.75	2SB649	0.65
2SA1232	1.80	2SD1065	2.00	2SD1427	2.75	2SB686	1.20
2SA1265	1.50	2SD1138	0.60	2SD1432	2.75	2SB688	1.30
2SA1302	3.00	2SD1207	0.50	2SD1439	2.00	2SB705	2.00
2SA1386	2.75	2SD1232	1.20	2SD1453	1.70		
2SA1535	1.60	2SD1265	1.50	2SD1497-02	6.00		
2SB536	0.60	2SD1292	0.50	2SD1497-06	6.00		
2SB554	3.50	2SD1302	3.00	2SD1548	5.50		
2SB557	3.00	2SD1397	2.00	2SD1555	4.00		
2SB558	3.00	2SD1398	1.70	2SD1877	2.50		
2SB560	0.40	2SD1426	2.75	2SD1911	4.00		
2SB562	0.40	2SD1427	2.75				
2SB595	0.80	2SD1432	2.75				
2SB632	0.40	2SD1439	2.00				
2SB643	0.20	2SD1453	1.70				
2SB649	0.65	2SD1497-02	6.00				
2SB686	1.20	2SD1497-06	6.00				
2SB688	1.30	2SD1548	5.50				
2SB705	2.00	2SD1555	4.00				
		2SD1877	2.50				
		2SD1911	4.00				

Capacitance Meter 2000UF £29.99

REMOTE TESTER **£14.99** LOPT TESTER **£29.99** VIDEO HEAD TESTER **£29.99** DEGUSSING ROO **29.99**
SATELLITE FINDER KIT **£29.99** MICROWAVE LEAK DETECTOR **£14.99** DIGITAL MULTIMETER FROM **£9.99**

Marconi Solo LNB

Slim style LNB suitable for Astra reception. Suitable replacement for "Blue Cap" type Marconi LNBs

Order Code SELNBSOLO **£26.99**

Satellite Finder Kit PG-753

£29.95

VRC SERVICE TOOL KIT

£29.99

Video Repair Kit - Compatible

SPECIAL PRICE **£3.95**
Used in Amstrad VCR4500

PHILIPS

£4.40
Pressure Roller Assembly

Servi sol SOLDA-MOP

ONLY 85p

ELC – EAST LONDON COMPONENTS

VISIT OUR SHOP – OPEN MON - SAT 9AM - 7PM
100s OF TOOLS, COMPONENTS, TEST INSTRUMENTS, SPEAKERS, POWER SUPPLIES, REPAIR KITS, BOOKS & CABLES TO CHOOSE.

JVC CAPSTAN MOTOR
HRD 540, 660, 740, 860,
FV 43, FV 44, PU 61003-1-2
£14.99

NIKKAI BABY 10 REGULATOR
BL 210 N **£12.99**

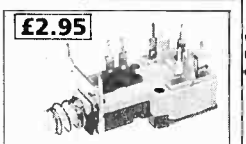
VHS ALIGNMENT TAPE
£39.99

Hitachi/Salora Mains Switch

£1.99

£0.59

Grundig Mains Switch



£2.95

ONLY **£2.99**

CAR DC/DC CONVERTER REGULATED POWER SUPPLY

STAR BUY **£5.95**

£11.99

○ 2.4mm

ALUMINIUM TOOL CASE

MEGA DEAL **£22.50** NEW

Video Head Puller **£7.95**

Tape Transport Adjustment Tool **£5.99**

Model PG015 Capacitance Meter

£29.99

£19.99

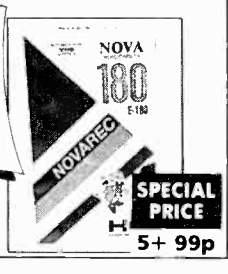
ONE FOR ALL 4
* Supplied on display card
* Control any 4 products
* Set-up is as simple as A.B.C.
* TV, Video and Text buttons

Transparent-Service/Cassette **£5.75**

Spring and Washer Repair Kits Assorted Sizes

£3.95
LIMITED OFFER

MEGA DEAL



E180 HQ VHS VIDEO TAPE
SPECIAL PRICE
5+ 99p

D-Series Panasonic, Sharp, Sony - Compatible Compact Camcorder Battery by

£19.99

TELEVISION

REED BUSINESS PUBLISHING

Rising Prices?

Could the unthinkable be about to happen? Could we for the first time in recent years find that the prices of consumer electronic products, in particular TV sets, are on the increase? This thought is prompted by reports that there is a worldwide shortage of the type of glass used for c.r.t.s. Even though tube manufacturers are at present working at full capacity, there will be an estimated shortfall of ten million c.r.t.s this year – production is expected to be around 150m tubes, demand 160m.

Only a small number of companies in the world manufacture the high-quality lead glass used for c.r.t.s. They include Philips, Schott (Germany), Videoglass (France) and several Japanese manufacturers including Nippon Electric Glass and Asahi Glass. There are two main reasons for the shortage. First manufacturers have, as a result of the recession, cut investment in the special plant required. Secondly several manufacturers have decided to take advantage of the recession to carry out routine maintenance and refurbishment. About a quarter of the industry's capacity has been closed.

These are not things that can be changed overnight. Demand for c.r.t.s is at present understood to be growing by about 25 per cent a year (think of all those computer monitors for a start). It takes considerable time to install production equipment and bring plant to full production. The effect of all this could well mean more expensive tubes and thus TV sets/monitors.

Two major investment programmes have been announced recently in this field in the UK. A Japanese-German joint venture is to invest nearly £200m in a tube glass plant at Cardiff Bay. The companies involved are Schott Glaswerke and Nippon Electric Glass. Some 750 jobs will be created and the first customer will be Sony's Bridgend plant. Installation of a fully integrated manufacturing facility for c.r.t. glass will take five years. The Welsh Office is to provide regional selective assistance. Philips has announced that it will invest "£100m before 1997" on increasing the capacity of its UK tube manufacturing plants. Almost three quarters of this will be spent on increasing the capacity of its glass-making plant in Blackburn. According to Wim de Kleuver, chief executive of Philips Components, after extensive reorganisation Philips' UK manufacturing plants are as cost-effective as any in Europe: several are world-class, with performance equal to that of the best Asian producers. That's nice to know, anyway.

There have also been worldwide chip shortages recently, again because of low manufacturing investment during the recession. All these factors taken together could mean higher retail prices. But then those who have made such suggestions in the past have usually been proved wrong. There come into the equation the economies of scale once production builds up. It seems unlikely however that the long-term decline in the prices of consumer electronics products can continue.

Right to View

The lawyers could be about to have a field day in connection with TV reception. Judge Richard Havery QC, a High Court official referee, has given residents of London's Docklands leave to take court action against the owners of Canary Wharf on the grounds that the office development interfered with their TV reception over a period of more than two years. A claim for £1·5m damages is to go ahead, though with a stay to give Canary Wharf Ltd. an opportunity to appeal against the decision. The claim, by 680 residents, is for loss of reception between 1989-1992.

The latest ruling supersedes a 1965 court decision that TV interference is not an actionable nuisance. Canary Wharf had put forward as a defence the fact that its 790ft tower was part of a government scheme to encourage redevelopment in the Docklands. This argument was rejected.

The legal profession will doubtless find plenty here to get its teeth into.

EDITOR
John A. Reddihough

PRODUCTION EDITOR
Tessa Winford

EDITORIAL OFFICE
081 652 8120
Fax 081 652 8956

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

ADVERTISEMENT MANAGER
Carol Nobbs
081 652 8327

ADVERTISEMENT SALES EXECUTIVE
Pat Bunce
081 652 8339
Fax 081 652 8931

ADVERTISING PRODUCTION
Brian Bannister
081 652 8648
Fax 081 652 8942

PUBLISHING DIRECTOR
Susan Downey

SUBSCRIPTION ENQUIRIES
0444 445 566

SUBSCRIPTION HOTLINE
24-hour subscription ordering with credit card number phone 0622 721 666 and quote reference INJ.

COVER PHOTO

This month's cover photograph shows the Ferguson ICC6 chassis. See article on pages 860-864.

Teletopics

PALplus Transmissions to Start

Channel 4 is to start transmitting programmes in PALplus form this month (October). It has agreed to broadcast at least 500 hours between October 1994 and the end of 1995. The funds required to cover the costs, estimated at around £1·5m, are being provided by the European Commission and Nokia. Granada also plans to transmit PALplus broadcasts. Nokia is to launch its 28in. Model SFN7296 with PALplus decoder to coincide with the initial Channel 4 broadcasts. The set also incorporates Dolby Pro-Logic Surround sound and will sell at around £1,300.

Channel 4's PALplus broadcasts will be in the south east initially, with nationwide transmissions starting next January. Other European broadcasters that support PALplus include the German Bayem 3 and ZDF networks and the Swiss SRG station. The BBC, which is also a member of the PALplus consortium, has no plans to offer the system to viewers at present.

PALplus uses the 16:9 aspect ratio, with 432 active lines instead of the 576 with a standard 4:3 PAL signal. Thus 4:3 aspect ratio receivers will display the programmes with a black band at the top and bottom of the picture. The PALplus decoder expands the 432-line picture, adding h.f. information transmitted during the 144 'blanked' lines to achieve a picture with a somewhat higher resolution than the standard PAL one. The signal that carries this fine picture detail – in analogue form – is referred to as the 'helper' signal.

While on the subject of transmissions, Sky Sports' live broadcasts of this season's FA Premiership will include Dolby Surround effects. The German network ZDF is also to introduce Dolby Surround with its transmissions, on a wide range of programming.

Flat Panels

Philips is to start sample production of a 10·4in colour flat panel display by the end of the year, with full production some time next year. The panel uses TFD+R (thin-film diode plus reset) technology, which involves fewer mask steps than TFT technology. Panels of up to 20in. should be possible using it.

Pixel International is setting up a plant, in the south of France, to produce its Field Emission Display (FED) flat panels. These use c.r.t. type technology.

Planar Systems, a US/Finnish company, has announced that it will soon have available commercially a solid-state, full-colour flat panel that uses electroluminescent technology. Full-scale manufacture is expected to start next year. Advantages claimed are high contrast and resolution, because colour screening does not have to be incorporated.

Video News

VideoPlus is to launch Control Plus+, a universal remote control handset and VideoPlus unit that also features CallSet. This enables users to set up their handsets via the telephone. The user calls a helpline number and after providing details of the AV equipment involved (brand and model numbers) a coded signal is sent back down the line. Control Plus+, which is priced at £60, can replace up to four RC units for VCR, TV, cable and satellite equipment. It includes Fastext and teletext functions.

Matsushita has started to supply the world's first video tape for digital VCRs. The tape is called Diamond Coat Metal (DCM): it has a polyester base that's coated with a magnetic material topped by what is described as "an amorphous diamond-like carbon film". Recording density is 105kbits/inch, enabling a single cassette to record four and a half hours of video.

A group of Japanese firms led by Sony and Matsushita is working on a standard for the next generation of video CDs, to be known as the Digital Video Disc. It will enable two hours of video and sound to be recorded on a 5in. disc. Hardware could be on the market by 1996. No technical details have been released to date.

International agreement has been reached by a number of leading companies on a rather different type of disc, a 3·5in. disc that uses magneto-optical technology. It can be used to store 600Mbytes of sound, video and/or computer data. The technique is at present expensive, with disc drives costing around £520.

Satellite TV

According to research carried out by GfK the number of satellite TV dishes installed in the UK rose by 34,000 in June to 2,666,000. The May and April figures were 20,000 and 47,000 respectively. Growth during the first six months of 1994 totalled 200,000, the lowest figure since GfK started to monitor the market in 1991. The equivalent figure for 1993 was 213,000. GfK's research shows that the market peaked in the second half of 1991, when the net increase in the number of installations was 345,000.

BSkyB's operating profit in the year to June 30th rose by 170 per cent to £170·1m. The figure includes exceptional profits of £20m, mainly the result of the sale of the second Marco Polo satellite. BSkyB plans to add four new programme services to its present twelve and is increasing its basic subscription rate by £3 a month. According to BSkyB dish sales have been running at 17,000 a week recently.

NTL is to demonstrate a digital TV system that transmits eight channels in the space occupied by a single analogue TV channel at the International Broadcasting Convention.

GEC-Marconi's LNB Division has been sold to Grundig Satellite Communications Ltd. It will be renamed Gooding Microwave Technology. The Division is understood to be the market leader in the UK and to have a third of the European market.

New from Toshiba

New TV and VCR ranges have been announced by Toshiba. The TV sets feature Toshiba's Quadryl system, which uses two pairs of speakers. The two speakers mounted at the top of the set are arranged to propagate the sound in a wide arc so that it reaches viewers' ears a fraction of a second after the sound from the main stereo speakers at each side of the screen. The technique produces more dynamic Nicam sound.

The V3 range of VCRs incorporates a number of new features including the Pro Drum system. This has the head amplifiers mounted within the drum to give improved signal-to-noise performance. The deck has thirty per cent fewer parts and incorporates a self-diagnosis system to

simplify fault finding. There are numerous other features, many aimed at increasing the machines' user friendliness – these include helpful on-screen messages.

Multimedia News

Philips has launched a new CDi player, Model CDi450. The top-loading, transportable unit is aimed at younger users, with a suggested price of £300. A version equipped with a digital video MPEG decoder will cost around £450.

There should be around one hundred Video CD titles from various companies available by this Christmas. Some from CD Vision will cost less than £10.

Panasonic has confirmed that its recently released REAL FZ1 3DO player is to sell at £400 without an MPEG video cartridge: an add-on MPEG decoder at around £150 should be available by Christmas.

IBM has developed a single-chip MPEG-2 decoder measuring 8·1 x 8·15mm. It consumes 1W and has 208 pins. Current price is around £66 in quantities of 1,000.

Motorola hopes to establish a standard for multimedia set-top boxes with its 68340 microprocessor, which is to be used by most companies that have unveiled plans to enter the market. The company is working closely with Microware, whose DAVID (Digital Audio/Video Interactive Decoder) set-top box operating software has received wide acceptance.

Acorn Computer however has set up a subsidiary, Online Media, which will produce set-top boxes based on Advanced RISC Machines' ARM processor. Online Media is part of a consortium of companies, including Cambridge Cable, that will be testing video-on-demand (VOD) services in the Cambridge area later this year. The system will use MPEG-2 video and an ATM (Asynchronous Transfer Mode) system to transmit the digital video.

The US appeals court in Washington has upheld an FCC decision to allow local telephone companies to offer 'video dial tone' services. These are not as sophisticated as VOD, simply enabling programme companies to use the telephone system to deliver video material.

In Brief

The *ERT* Brown Goods Show mentioned in this column last month is to be held at Olympia on April 2nd-4th 1995.

TV Licensing has appointed a nationwide team of TV dealer representatives to strengthen its links with dealers. The aim is to improve the reporting of addresses where new or rented TV sets have been installed. By law dealers have to inform TV Licensing about TV sets that are sold or hired.

Philex plc, Philex House, 110-124 The Broadway, West Hendon, London NW9 7BP (081 202 1919, fax 081 202 0015) has issued a substantial new catalogue detailing the company's full ranges of electronic components and electrical accessories. The 48-page catalogue is colour-coded for ease of reference to the 3,000 lines stocked by Philex.

SGS-Thomson Microelectronics has introduced a new range of line output transistors designed for use in high-definition monitors and TV receivers. The THD series is a family of h.f., 1·5kV bipolar devices that use cellular emitter planar technology. The fast turn-off switching characteristics enable the transistors to operate at up to 64kHz. Typical fall times with an inductive load are 280nsec at 32kHz for the THD410HI and 200nsec at 64kHz for the THD412HI.

What a Life!

Donald Bullock

I should have guessed that we'd be on to a loser when Mrs. Gusher first telephoned us. "Do you give free estimates on video repairs?" she trilled. "I has to arst, 'cos my husband's run away."

"We'll have a look at it and give you a good idea if you can bring it in" I replied.

"Do you think it'll go in my bag?" she asked. I looked down the 'phone, hard. "Sure to" I said.

Later she called in. She was short, squat, made up like a redskin and dressed in coloured silks and chiffons. And she laughed – all the time.

"The tape got itself jammed in" she said. "And with my husband being run away I tried to get it out, but it needs a hexpert. 'Phone me how much, so I can draw it out ready, there's a dear."

Steven's pretty good with modern recorders. I'm not too bad myself – when I can understand their cockpit dashboards. This one was a Mitsubishi HSB31. It looked new to us, but there was a tape jammed in it all right. When Steven opened it up he found a kitchen knife inside. He also found that the mechanism was in a mess. The lace-up arms were mechanically free, and the pinch roller fell about. In this model it operates together with the action of the cam – but not in this particular machine. In addition the tape guides and head were covered with tape oxide and debris, as if a wet tape had been inserted and played.

Steve spent a time dismantling the machine and making a list of the replacement bits required. Then he phoned Mrs. Gusher and told her the news and the price, about £60.

"You must be joking" laughed Mrs. Gusher, "you people are all the same. I told you about my husband running away. I can go to a tenner, no more. If you can't do it for that, put it all back together and I'll take it somewhere else."

So Steven spent another hour putting it back as it was. At nine o'clock next morning she called to collect it, laughing away as though it was all too funny. "I'll let you do it when my husband comes back" she remarked.

Comparisons

Later we had trouble with our cat and had to run her down to the vet. Steven collected her that afternoon. "How much did he charge" I asked, "fifteen quid?"

"You're not going to like this" Steven replied. "One hundred and one pounds. And that Mrs. Gusher was there with her dog. She parted with £70."

I noticed that Steven was preoccupied that evening. After a while he let me know what was on his mind.

"I wouldn't mind being a vet" he said, "how would I go about training?"

"Dunno" I replied, "but it would be worth finding out."

Mr. Oddie's Matsui

Our next caller seemed a queer old cuss. He placed a 14in. Matsui set on the counter, smiled at us and began to shape words with his lips. But no sound came out.

I returned his smile and bent my head towards him. But I still couldn't hear. "What's up?" I asked, bending closer.

"Very quiet sound" he bellowed, then laughed until his eyes were wet.

When he had gone I put the set on the bench and tried it. He was right. The sound was so quiet that you had to put your ear to the speaker to hear it.

The nearest circuit we had was for the 1420A. We checked the speaker then connected it across the output transformer's secondary winding, thus bypassing the earphone socket. No difference. As both transformer windings were intact we moved back to the output coupling capacitor C354 (6·4μF, 160V). We took it out and discovered that it was open-circuit. When a replacement had been fitted the set blared away just like its owner, Mr. Oddie.

A Visit from John Berryman

John Berryman the undertaker was our next visitor. Being fit, fat and red-faced, you'd think he was a farmer. "How's business?" I asked.

"Couldn't be better. As long as they goes on dying we can go on living. Here, come and see what I've got in the van."

I was a bit wary. John uses the van to transport his customers, but I needn't have worried. What he had to show me was a huge Hitachi, Model CPT2138 (G7P Mark 2 chassis). "Dead" he declared.

We brought it into the workshop, then he had to fly. "Gotta pick up a nice old fellah" he said.

The fuses were intact but the 3·9Ω, 7W surge limiter resistor R901 was open-circuit. After replacing it and checking the bridge rectifier D901 I started the set up gingerly with the variac. It drew a lot of current. So I wound it down and checked the BUT11AF chopper transistor Q901 and the 2SD1884 line output transistor Q702. Both were leaky. Pleased with my sagacity, I replaced them and tried again. The set still drew a heavy current. So I looked further and soon noticed that C919 (4·7nF, 1kV) in the snubber network across the chopper transistor had a black line around its edge. It was a soot sandwich. I fitted another one, checked the rest of the power supply and, as I found nothing else amiss, I tried again with the variac. This time the set sprang to life.

I'm cleverer than old John I thought to myself. Then I reflected on it. I'm certainly not richer. After a further minute's thought I amended my conclusion. I'm not clever at all, I decided.

An Hitachi VCR

Miss Lushbod clopped in with her Hitachi recorder and smiled. I stood entranced. "It goes well for a while, then seems to get exhausted" she said. I nodded understandingly. Then she went, leaving the VCR, and I was back in the hard grey world. Greeneyes brought in the tea at this point.

"What a horrible looking girl!" she said.

"I know", I replied.

The VCR was an Hitachi VT64E and sure enough its capstan slowed down and stopped after about half an hour. My fault indexes referred me to Graham Richard's note in the May 1993 issue of *Television* – page 511. This suggested replacing the CH4R7-20V VDR in the capstan servo circuit. The only trouble was that Graham didn't give the circuit reference number. I looked and looked, and eventually found it. It's a brick-coloured disc about the size of a penny, roughly in the middle of the board, with a thick black plastic sleeve slipped over it.

As we didn't have a replacement we tried, as suggested, a 4·7Ω resistor as a temporary measure. The machine then

– continued on page 878

MANOR SUPPLIES

MKV PAL COLOUR TEST GENERATOR FOR DOMESTIC TV & VCR.

TEST DEMONSTRATIONS AT 172 WEST END LANE

- ★ 40 different patterns and variations.
- ★ Fully interlaced sync 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"×6"×2¼") app	**£19.00**
Optional Sound Module (6MHz or 5.5MHz)	**£5.90**
Built & Tested in Case including Sound Module	**£129.00**

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 £5.80. BATT HOLDERS £4.20
MAINS SUPPLY KIT £5.80
(Combined P&P £4.50)

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

ADD VAT 17.5%

LINE OUTPUT TRANSFORMER TESTER

NEW

- ★ 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

NEW

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

PRICE £99.00 POST/PACKING £3.50

INFRA RED REMOTE CONTROL TESTER

★ Infra Red Remote Control Tester **£10.00** P.P. £2.50

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.
CRT TESTER & REACTIVATOR KIT For Colour & Mono complete with Case. Panel Meter Indictor – can be adapted for latest CRTs **£45.00** p.p. £4.50.

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

140N487	£15.80	SAF1032	£4.50	TA8739P	£4.50	TDA2595	£4.80	TDA5510	£12.50
AN5521	£3.80	SAF1039	£2.20	TBA120S	60p	TDA2600	£6.80	TDA5850	£2.80
AN5900	£2.20	SDA2546	£9.00	TBA750	£2.20	TDA2611A	£1.90	TDA7052	£2.50
BA6209	£3.80	SL470/471	£4.00	TBA920	£2.80	TDA2640	£3.20	TDA8140	£2.20
BA6219	£3.80	SL486	£3.20	TBA950	£2.20	TDA2653A	£2.90	TDA8153	£7.80
BA6229	£3.80	SL490	£3.80	TBA2800	£1.80	TDA2654	£5.70	TDA8170	£3.00
BA6238A	£2.80	SL1430	£2.40	TCA270	£1.80	TDA2655B	£16.60	TDA8172	£12.95
BA6239	£3.80	SL1432	£6.80	TCA800	£6.80	TDA2670	£3.20	TDA8175	£2.50
CCUFRG07	£14.40	SN76226DN	£1.80	TD6316AP	£4.80	TDA2680	£3.80	TDA8180 Kit	£7.50
CNX62	£4.00	SN76705	£9.80	TDA1035T	£2.40	TDA2690	£3.80	TDA8190	£3.80
HA11211	£2.80	STK5322	£21.80	TDA1037	£1.90	TDA2780	£6.80	TDA8305	£9.90
HA11423	£3.80	STK5325	£6.80	TDA1044	£2.90	TDA3190	£4.20	TDA8341	£4.20
HA51338SP	£21.50	STK5326	£6.80	TDA1060	£3.80	TDA3301	£6.80	TDA8372A	£8.40
LA4445	£3.00	STK5332	£4.80	TDA1082	£4.00	TDA3303	£19.80	TDA8380	£3.20
LA4270	£4.95	STK5333	£8.80	TDA1170S	£1.80	TDA3330	£12.50	TDA9403	£3.80
LA4520	£3.80	STK5337	£4.80	TDA1180	£2.20	TDA3500	£6.80	TDA9503	£3.80
LA7800	£1.80	STK5338	£6.80	TDA1185A	£3.20	TDA3505	£9.80	TDA9513	£4.80
LA7520	£2.80	STK5339	£6.80	TDA1190Z	£2.20	TDA3510	£9.80	TEA1009	£2.20
LA7801	£3.50	STK5342	£4.80	TDA1432P	£5.70	TDA3540	£2.50	TEA1014	£3.50
LA7820	£3.80	STK5372H	£7.80	TDA1512	£3.20	TDA3541	£3.50	TEA1039	£1.90
LA7830	£2.80	STK5392	£6.80	TDA1515	£4.50	TDA3561A	£5.80	TEA2018A	£2.20
M104B1	£6.80	STK5421	£5.80	TDA1524	£6.80	TDA3562A	£4.00	TEA2026	£5.80
M293B1	£15.80	STK5422	£5.30	TDA1670A	£3.20	TDA3565	£7.80	TEA2029	£5.80
M490BB1	£16.80	STK5471	£6.50	TDA1701	£3.80	TDA3566	£5.80	TEA2164	£3.95
M491BB1	£9.80	STK5481	£5.80	TDA1770A	£9.20	TDA3571B	£7.50	TEA2165A	£6.80
M494	£9.80	STK5482	£4.90	TDA1870	£6.80	TDA3576B	£10.25	TEA5115	£6.80
MC13002P	£5.80	STK5490	£7.80	TDA1872	£9.80	TDA3640	£5.20	TMS1000N21 1	£6.80
MDA2062	£3.80	STK6962	£3.80	TDA1908	£2.80	TDA3650	£7.95	TMP47C432AP-	
ML926	£4.80	STK7253	£5.80	TDA1940	£3.20	TDA3651	£2.50	8188	£21.95
MN15425	£15.80	STK7308	£4.80	TDA1950	£3.50	TDA3653A	£3.20	TMP47C432AP-	
PCD8572P	£9.00	STK7348	£5.40	TDA2004	£2.80	TDA3653B	£3.20	8189	£15.50
SAA1024	£5.80	STRD1806E	£4.80	TDA2006	£2.80	TDA3654	£1.80	TMP47C434N-	
SAA1061	£5.80	STR3125	£4.80	TDA2009A	£2.80	TDA3810	£5.50	3415	£14.90
SAA1124	£3.50	STR4090	£13.50	TDA2030	£2.80	TDA4420	£2.20	TMP47C434N-	
SAA1250	£3.80	STR5412	£4.95	TDA2030A	£3.80	TDA4426	£3.20	3555	£15.50
SAA1251	£8.40	STR40090	£6.80	TDA2040	£7.80	TDA4427	£3.20	TMP47C434N-	
SAA1293.02	£6.00	STR50020	£6.80	TDA2050	£4.80	TDA4442	£2.80	3559	£14.90
SAA1293.03	£6.80	STR50103	£4.80	TDA2150	£3.20	TDA4443	£7.80	TUA2000	£8.50
SAA5000	£6.80	STR50115	£7.50	TDA2270	£3.90	TDA4500	£4.00	U2829B	£6.50
SAA5010	£5.80	STR54041	£6.80	TDA2540	£2.20	TDA4501	£5.00	U4606	£14.80
SAA5012	£5.80	STR55041	£10.50	TDA2548	£5.80	TDA4502A	£13.50	UC3844	£1.50
SAA5020	£5.80	STR58041	£5.80	TDA2576A	£5.80	TDA4503	£7.80	UPC1363C	£5.80
SAA5030	£6.80	STR59041	£6.80	TDA2577A	£3.20	TDA4505E	£5.00	UPC1363C/A	£5.80
SAA5040	£6.80	STR60020	£7.80	TDA2578A	£2.70	TDA4555	£9.80	UPC1378	£1.90
SAA5050	£11.80	STR104420	£4.80	TDA2579A	£3.60	TDA4600	£3.85	UPC1394	£3.80
SAA5231	£7.80	STRD6108E	£5.80	TDA2581	£3.80	TDA4601	£2.80	UPC1420C/A	£12.20
SAA5243	£23.50	TA7680AP	£5.80	TDA2582	£2.50	TDA4605	£2.20	UPC1488	£3.20
SAB3035	£9.80	TA7681P	£7.80	TDA2593	£1.30	TDA4610	£6.80	UPD1397C	£4.80
SAB3037	£8.80	TA7698P	£6.80	TDA2594	£3.80	TDA4950	£1.60	IC p.p 90p	

LINE OUTPUT TRANSFORMERS p.p £1.80

ALBA CTV14RS	£23.80
B&O LX2500, 2800 AT2077/81	£23.50
BUSH AT2079/10	£34.80
DECCA/TATUNG 145,146,147 P/N853786	£21.80
FIDELITY ZX2000	£15.50
FIDELITY ZX3000	£14.50
FIDELITY ZX3000 22"	£21.80
HINARI CT4, CT5	£14.00
HITACHI CPT1455, 1456, 1476, 2434141	£17.50
HITACHI CPT1446, 1626 2432981	£18.60
HITACHI CPT2174, 2176, 2178 2434274	£17.50
HITACHI CPT2476, 2478 2434002	£18.00
HITACHI CPT2074, 2274 2433752	£16.80
ITT/NOKIA Compact B, 110°	£17.80
ITT/NOKIA Compact 80, 110°	£15.00
ITT/NOKIA Compact 80, 90°	£14.70
ITT/NOKIA Compact 80, 110° FST	£19.80
ITT/NOKIA CVC 25, 30, 32	£10.00
ITT/NOKIA CVC 800, 801, 803	£14.95
ITT/NOKIA CVC1100, Picos	£16.50
ITT/NOKIA CVC1150, 1175	£14.95
ITT/NOKIA CVC 1200, 1201, Mini 2	£21.80
ITT/NOKIA CVC1204	£11.50
ITT/NOKIA CVC1210/12/15/17	£15.80
ITT/NOKIA Digi 3, 110°	£18.45
ITT/NOKIA Core 90° 4515-03-46	£19.80
ITT/NOKIA Core 110°, 4515-03-48	£19.80
ITT/NOKIA Core 110° FST	£19.95
LOEWE Contur, Art1, Art T21, Art T28, Contur T24, T28, Profi T28	£25.90
LOEWE C8001, Classic M24, S127, S28, Contur S124, S127, S128, S24, S28, Profi S28	£22.80
LOEWE Classic M124, M27, Contur M27	£34.40
LOEWE Profi M21	£34.40
LUXOR 8810110 01	£27.60
MATSUI 1440A, 1480A, 3714002	£19.80
MATSUI 1420B, 1440B, 3214009	£19.80
MATSUI 1455	£32.20
MATSUI 1465	£21.80
PANASONIC TLF14520F, TLF14568F	£18.50
PANASONIC TLF14521F, TLF14576F	£18.50
PANASONIC TLF14584F	£21.80
PANASONIC TLF14586F	£21.80
PHILIPS KT3	£12.90
PHILIPS K30	£22.80
PHILIPS CTX-E/S	£23.80
PHILIPS KT4	£22.50
PHILIPS 2A	£22.00
PHILIPS K40	£27.50
PHILIPS 3A	£20.00
PHILIPS 2B	£20.00
PHILIPS CF1	£23.80
PHILIPS CP90	£17.80
PHILIPS CP110	£32.00
PHILIPS GR1AX	£25.90
PHILIPS NC3	£22.50
SAISHO CT14R, CT141, 3714002	£19.80
SAISHO CT141B, CT142B, 3214009	£34.80
SANYO CBP2144, 2145	£22.80
SANYO CTP7132, 7135	£39.80
SOLAVOX 14R19	£16.50
SOLAVOX 16R19	£16.50
SOLAVOX 20T19	£21.80
SOLAVOX 22R19	£15.00
SOLAVOX 22S19	£15.00
SOLAVOX 22T09	£15.00
SOLAVOX 22T19	£15.00
SONY KV1412	£21.80
SONY KV1440, 1460	£20.00
SONY KV1882	£24.80
SONY KV2056, 2062	£32.00
SONY KV2092/96	£24.80
SONY 2212, 2216, 2217	£24.80
SONY KV21XRTU	£52.00
SONY KV2252/56, 2752/56, 2762/66 PE3	£29.00
SONY KV2704	£29.00
SONY KV27XRTU	£25.00
THORN/FERG TX9	£15.50
THORN/FERG TX10 (Chopper)	£19.80
THORN/FERG TX85, 86	£19.80
THORN/FERG TX89	£23.50
THORN/FERG TX90 14", T9031, Red Spot	£16.90
THORN/FERG TX90 20", T9044, White Spot	£14.80
THORN/FERG TX100/110° T6033L, Green Spot	£14.00
THORN/FERG TX100/90° 243892, Yellow Spot	£16.90
THORN/FERG TX100/110° FST, T6045L	£16.80
THORN/FERG TX100/90°, T6031, Blue Spot	£15.00
THORN/FERG TX100 Chopper Tx	£15.80
THORN/FERG S1P7	£32.00
THORN/FERG ICC5, 44076100	£28.00
THORN/FERG ICC5, 47235901	£21.80
THORN/FERG ICC5, 47238700	£18.00
THORN/FERG ICC5, 59MS	£28.00

MANY OTHER LOPTS IN STOCK, PLEASE PHONE WITH MAKE AND MODEL NUMBER

TRIPLERS EHT MULTIPLIERS p.p. £1.80

CONTINENTAL UNIVERSAL TVK & BG
RANGE (Quote exact no.) **£13.80**
TVK 96-1 **£13.80**
TVK 96-3 **£18.00**
U.K. UNIVERSAL (best quality) **£7.80**
DECCA/TATUNG BG 200/44 TYPE **£7.80**
GRUNDIG BG 2077-642-1003/1004 **£14.80**
GRUNDIG BG 2087-642-1001/1002/1006 **£14.80**
GRUNDIG BG 2000-641 **£13.80**
THORN 9000 **£9.80**

MISCELLANEOUS p.p. £1.80

MAINS TRANSFORMERS: 6.3 Volts CRT boost **£8.80** p.p £1.80
Mains Isolating 500VA **£51.25** p.p. £5.25
455 CRYSTALS for handsets. 4 for **£2.00** p.p. 80p
DEGAUSSING ROD £33.75 p.p. £3.50
TRANSPARENT VIDEO SERVICE CASSETTE £6.80 p.p £1.80
TV FAULT FINDING GUIDE £14.80
VCR FAULT FINDING GUIDE £14.80
HITACHI FRAME MODULE HM 6251, HM6232 £12.80
HITACHI THERMISTOR TH902 £2.85
FERGUSON TX10 FOCUS UNIT £8.50 p.p. £1.80
PHILIPS BACK UP BATTERY: 2.4V **£3.00**, 1.2V **£2.00** p.p. 90p

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

Telephone 071-794 8751/794 7346
Fax 071-431 5778

MANOR SUPPLIES

172 WEST END LANE, LONDON NW6 1SD

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

Improved Carrier Take-off for Add-on Nicam

Keith Cummins

Towards the end of February 1993 Rowridge started to transmit Nicam with the BBC channels. I had been obtaining satisfactory results with ITV and Channel 4, but found that the BBC channels suffered from pops and crackles, especially on captions. I use the Maplin Nicam decoder as an add-on unit with my Sony TV receiver, as described in an article in the April 1991 issue of *Television*.

Analysing the Problem

My problem with BBC reception led me to dig out Steve Cannon's article (Problems with Nicam) in the October 1992 issue. The similarity between setting up Panasonic Nicam receivers, described by Steve, and my Maplin decoder was immediately apparent. Test points 6 and 7 in the Maplin unit correspond with pins 19 and 20 of IC2501 in the Panasonic chassis. But unfortunately Maplin doesn't mention these test points! Anyway, using Steve's article as a guide I connected my scope, in the X-Y mode, to test points 6 and 7. This produced the four-phase signal shown in Fig. 1. The alignment was not far out. I adjusted VC1 (carrier crystal frequency) to square up the pattern, then T1 and T2 to obtain the cleanest display.

As I monitored the signal however I noticed that the display became noisier when certain pictures were being transmitted. This was accompanied by the pops and crackles. So something else needed doing.

In the arrangement I described in the April 1991 issue a simple emitter-follower stage is used as a buffer between the TV set and the add-on Nicam decoder, see Fig. 2. As my Sony receiver doesn't have separate sound and vision i.f. sections, the signal at this point contains everything that's being transmitted – the luminance and chrominance signals, sync pulses, teletext, f.m. mono sound and Nicam.

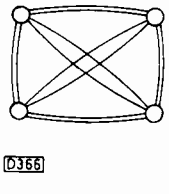


Fig. 1 (left): Correctly squared-up X-Y display. Adjustment of the carrier crystal frequency trimmer rotates the pattern about its axis.

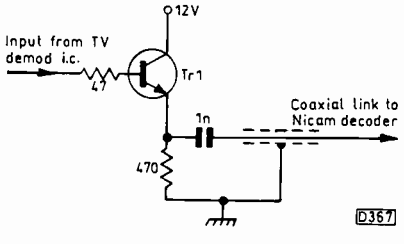


Fig. 2 (right): The Nicam take-off circuit originally used.

Careful observation of the Nicam carrier showed that on BBC-1 it was received at a lower level than on the other channels. While the intermodulation effects of the video signal on the Nicam one were present on all channels, the lower level of the BBC-1 carrier meant that this channel was more susceptible to interference than the others. With certain pictures, containing heavy print or graphics, there was sufficient interference to corrupt the data. Under these conditions Nicam would either drop out or be crackly. Certain other shots, such as crowd scenes, with a large amount of video energy at intermediate bandwidth, could produce rough-sounding or 'gravelly' audio – this is a typical effect when data corruption occurs with a digital audio signal.

My first attempt at sorting out the problem involved moving the aerial. Half a day spent "messing about", as my other half put it, certainly made an improvement. But certain pictures still caused problems. The worst was with the zebra stripes at the introduction to Wildlife on One: this always produced a barrage of crackles, even when there had been no problems for days.

Although I'd never read anything that explained why Nicam receivers have separate vision and sound i.f. strips, I felt I now knew: the Nicam signal, 19dB down with respect to the vision carrier, is vulnerable to vision harmonics and intermodulation. In addition there's no guarantee that the SAW filter in a receiver not designed for Nicam reception will allow much of the Nicam carrier through, so the signal-to-noise problems with the Nicam carrier become greater.

The Solution

I now realised that the receiver would have to be modified somehow to provide separate vision and sound i.f. routes. Could this be done easily? It seemed to be rather a daunting idea at first, but I sat down to study the Philips data on i.f. amplifier/demodulator chips and also looked at the Maplin tuner design that's intended to go with the Maplin Nicam decoder I use.

I came to the conclusion that I would have to change the Sony receiver's SAW filter to one that splits the vision and sound signals immediately after the tuner. The sound would have to be diverted to a separate i.f. amplifier/demodulator dedicated to recovering the 6MHz f.m. sound carrier and the 6·552MHz Nicam carrier. Fortunately the Sony Model KVX2521U (AE-1 chassis) has a signals panel (board A) that's not fully used and also has tracks that allow different SAW filters to be fitted.

My first move was to fit an SW166 SAW filter and check that the vision side still worked. Having proved this point I built a separate demodulator circuit on a 2 x 2in. piece of strip board – the circuit is shown in Fig. 3. The 6MHz feed to the receiver's f.m. sound section was then disconnected from its original source, the input being taken from the new circuit instead. The extra board was mounted on the screening plate that covers the track side of board A.

After checking through everything thoroughly I

A Z ELECTRICS

183 ACRE LANE, NORTHAMPTON NN2 8DX

Telephone/Fax: (0604) 841871

BELT KITS

A range of belt kits in stock from 60p to £2.40. Makes for most models available including: Alba, Akai, Amstrad, Ferguson/JVC, Fisher, Funai, GEC, Goldstar, Granada, Grundig, Hinari, Hitachi, Mitsubishi, NEC, Orion, Panasonic, Philips, Saisho, Samsung, Sanyo, Schneider, Sharp, Sony, Tensai, etc – Please state model and make.

VIDEO MOTORS

A range of Video Motors available

Sharp Reel Motor Pulley only £1.20

Replacement of plastic pulley on a number of Sharp Reel Motors with the above metal pulley gives better rewind/FF performance.

REMOTE CONTROLS

Bush, Ferguson, Grundig, ITT, Philips, Pye, Sony, Hitachi, Matsui, Logik, Panasonic, Saisho, Salora, Samsung, Tashiko, Tatung, Toshiba. Various models TV & Video ..... From £7.50

MANY HITACHI TV REMOTE CONTROLS NOW IN STOCK.

STATE MODEL FOR PRICE.

One for all Mk 3, 4, 6, ... From £18.50
Toptel Universal R/C £28.00
Fox £22.50

TRIPLERS

Universal Tripler	£6.20
Universal Tripler with focus unit	£9.50
Decca 120/130 series tripler	£8.50
Thorn TX10 Focus Unit Kit	£6.00
Grundig Trips	POA

MAINTENANCE KITS

Available for Alba, Amstrad, Ferguson, Fisher, Goldstar, Goodmans, Granada, Hinar, Hitachi, JVC, Matsui, Mitsubishi, Nikkai, Panasonic, Philips, Saisho, Salora, Schneider, Sentra, Sharp, Sony, Tashiko, Toshiba.

LINE OUTPUT TRANSFORMERS

We stock a wide range of LOPTs for Ferguson, Fidelity, GEC, Hitachi, ITT, Panasonic, Philips and Sony.

Following is a small selection.

LOPT Hitachi 2174,76,78	£17.50
LOPT Hitachi CPT1476	£18.00
LOPT Hitachi CPT2276 etc	£19.00
LOPT Matsui 1440	£18.00
LOPT Matsui 1450	£22.00
ITT CVC25/30/32	£9.50
ITT Compact 80 Series 110	£16.75
ITT Compact 80 Series 90	£19.75
ITT CVC1204	£11.50
ITT CVC800.1/3	£21.50
ITT CVC1100	£16.50
ITT CVC1150/1175	£20.00
Fidelity all models up to 20" ZX3000	£15.50
Hinari CT4/5 & TVA1	£17.50
Thorn TX100 Green Spot 110	£14.50
Ferguson TX90 LOPT specify size screen	£17.75

COMPUTER Monitors LOPTS available

VIDEO HEADS

AMSTRAD, FERGUSON, HITACHI, PANASONIC, SANYO, SHARP, FISHER, HINARI, ALBA, MITSUBISHI, ORION, SAISHO, SAMSUNG, TOSHIBA. State Model No. Price from £7.50

PINCH ROLLERS

A range of Pinch Rollers is in stock, most of them @ £2.80. Makes include Akai, Amstrad, Ferguson, Fisher, Funai, GEC, Goldstar, Grundig, Hinari, Hitachi, ITT, JVC, Marantz, Mitsubishi, NEC, Nordmende, Orion, Panasonic, Philips, Samsung, Sanyo, Schneider, Sharp, Sony, Tensai, Thomson, Toshiba etc. Please state model and make.

Philips Pinch Roller for models VR6180, 6185, 6285, 6362, 6367, 6467, 6468, 6470, 6561, 6670, 6760, 6761, 6870 ..... £6.00

BACK-UP BATTERIES

Philips 1.2V Back up Battery	£1.75
Philips 2.4V Back up Battery	£2.80
Ferguson TX10	£2.00
Ferguson TX10 1.2	£2.10
Ferguson TX10 2.4	£3.58
5.5V Back Up Cap	£1.85

TV ON/OFF SWITCHES

ITT, Philips, Decca, Thorn, Fidelity, Grundig, Sony and Hitachi. State model for price.

SONY PUSH SWITCH 80p

Limiter Post Assembly £1.75

Makes & Models: Hinari VXL4, Matsui VX730,735,735A,755, 770,800A,810,820,880,990. Saisho VR1100,1200,1200HQ, 1600,2500,3200,3300,3300X, 3500,3600,3700

OTHER SPARES

Universal Video Copying Kit	£4.25
Universal Copying Kit (Scart)	£5.20
Universal Camcorder Kit	£8.00
Video Cassette Lamps from	£0.50
CRT Anode Caps	£0.60
Video Tape Splicing Kit	£6.95
Hitachi TV Frame Module HM6251	£8.00
Hitachi TV Frame Module HM6232	£10.50
Cassette Loading Roller Assembly 3V23,3V31,3V32	£4.50
Degaussing Positor Blue	£4.00
Degaussing Positor White	£1.30
Degaussing Positor Hitachi	£3.40
Degaussing Positor Philips	£3.00
End Sensor for Hitachi VT63,64,65 (Pair)	£2.75
Cassette LED Sensor for Panasonic etc	£1.60
I.C. Circuit Protectors	£0.60
Clear Service Cassette	£5.95
Video Idlers Spring Kit	£7.50
Video Washer & E Clip Kit	£6.00
Universal Video head Puller	From £7.90
Akai VS22 Series Power Board	£28.00

PHILIPS PSU KITS IN STOCK FOR TVS AND VIDEOS

CASSETTE HOUSING

Cass. Carriage 3V35, 3V42	£30.50
Cass. Carriage 3V58, 59, FV11	£21.00
Cass. Carriage HRD 500, 30, 700, FV10, 12	£22.50
Cass. Carriage HIT. VT 64	£19.50
Cass. Carriage Philips VR6462	£16.85
Cass. Carriage Philips VR6362	£11.00
Akai Carr. Kit	£10.25
Ferguson 3V35 Kit	£5.00

MANY OTHER VIDEO AND TV SPARES IN STOCK

Back Tension Bands in Stock for Akai, Fisher, Hitachi, Ferguson, JVC, Mitsubishi, Panasonic, Sanyo and Sharp. Mode Switches in stock also.

IDLER ASSEMBLY

FERGUSON, FISHER, HITACHI PHILIPS, PANASONIC, SANYO, SHARP, AKAI, SAMSUNG, MITSUBISHI, NEC, In Stock.

Price on Application **Wide Range Available**

IDLER TYRES FOR POPULAR MAKES IN STOCK AS LITTLE AS 40p EACH

Latest TV fault finding book 1994 edition	£12.00
Video fault finding Book – Issue 3 1994	£9.50
Satellite Receivers – Guide to Faults	£15.00
NEW – SATELLITE PSU REPAIR KITS FOR PACE PRD800, 900, SS9000, 9200, 9010, 9020, 9220, AMSTRAD SRD510, 520 AND 500 ALL @	£7.50
1.2DB LNB STD/ENHANCED for ASTRA ID	£29.00

A LARGE RANGE OF SEMICONDUCTORS IN STOCK. POPULAR STKs, STRs, TAs, TDAs, 2SAs, 2SBs, 2SDs, ETC. IN STOCK. PLEASE TEL FOR PRICES ETC.

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 (MAIL ORDER ONLY)

Established over 35 years ago, Charles Hyde and Son Ltd is the oldest independent distributor of electronic components in the UK. We are distributors for Sanyo*, Hitachi*, Ferguson, Philips and König components, plus a selected range of spares for Amstrad, Samsung, Sony, Matsui, Saisho, GEC and Toshiba.

SANYO HITACHI PHILIPS FERGUSON KÖNIG ELECTRONIC

For fast, efficient service, call **(0759) 303068**

Charles Hyde and Son Ltd
Prospect House, Barmby Road, Pocklington, York YO4 2DP
24 Hour answering service (0759) 303068 Fax (0759) 303620

***Sole UK Distributor**

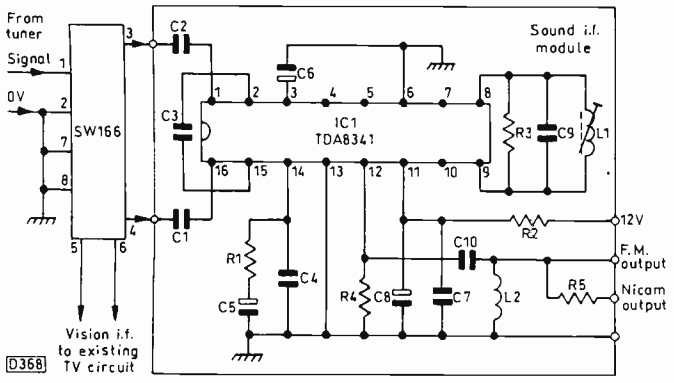


Fig. 3: The dual-output SAW filter and added sound i.f. module.

plucked up courage and switched on. To my amazement everything worked immediately! Even L1 proved to be almost exactly on tune: adjustment produced only a slight signal improvement. A check on the Nicam eye pattern showed that although some jitter was still present it was constant and no longer varied with picture content. I set up the a.f.c. carefully, and apart from reassembly the job was complete.

Details

Now for a bit more detail. Fig. 4 shows the overall responses of the two sections of the SAW filter. You will see that in both cases there is a response at the vision carrier frequency. This is to be expected with the vision signal: with the sound an intercarrier beat is required for both the f.m. and Nicam signals, so a restricted bandwidth vision signal is allowed through. Because the vision bandwidth is limited, harmonics are prevented from interfering with the Nicam signal and there is no intermodulation (note that the good old f.m. mono signal is far more tolerant in this respect, which is why separate sound take-off before the i.f. amplifier is not needed when there is no Nicam circuitry).

The main item in the added sound i.f. module (Fig. 3) is a TDA8341 chip. The connections to pins 4, 5, 7 and 10 are not used: they are associated with a.f.c. and tuner a.g.c., which are provided by the vision i.f. amplifier/demodulator chip. The TDA8341 chip has its own internal a.g.c., which is useful since it tends to 'iron-out' differential signal changes between the sound and vision. C4 is the a.g.c. reservoir capacitor, R1 with C5 forming an anti-hunt damping network. The unused tuner a.g.c. control input still needs to be decoupled: this is done by C6. The SAW filter's differential output is applied to pins 1 and 16.

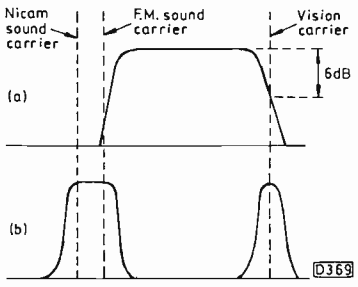


Fig. 4: Vision (a) and sound (b) responses of the SW166 SAW filter.

At the other end of the chip the reference amplifier's resonant circuit L1, C9, R3 (needed for the synchronous demodulation process) is connected to pins 8 and 9. A 12V supply, decoupled by C7 and filtered by R2, C8, is fed to pin 11. Pin 13 is the chassis connection. C7 should be mounted close to the chip. The output is taken from pin 12, being developed across R4.

C10 and L2 form a high-pass filter that removes unwanted l.f. components of the vision signal – these are present as a result of the SAW filter's narrow-band vision response, mentioned earlier. Outputs are taken to the f.m. and Nicam sound circuits. R5 is a buffer resistor: no attempt is made to match the coaxial cable link to the Nicam decoder – provided it's not much more than a foot long it can be regarded as a low-capacitance screened lead.

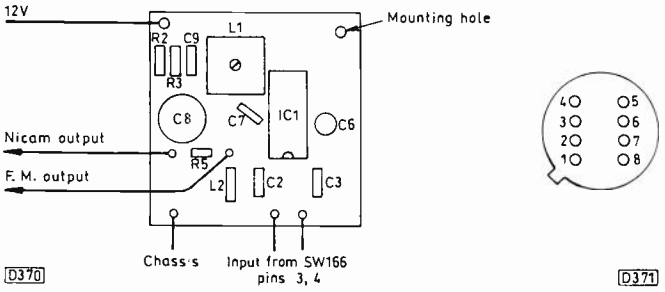


Fig. 5 (left): Basic layout on strip board. For clarity, not all components are shown. The board is 2in. square with the strips running left to right.

Fig. 6 (right): Connections to the SW166 SAW filter, viewed from beneath. Pin 1 signal input from the tuner, pin 2 earth connection to the tuner, pins 3 and 4 sound i.f. output, pins 5 and 6 vision i.f. output, pin 7 not used, pin 8 input earth return.

A basic layout, without all the detail, is shown in Fig. 5 for guidance. Fig. 6 shows the connections to the SW166 SAW filter. C3, which is used for internal decoupling at the input to the TDA8341, can be mounted on the track side of the board, directly across pins 2 and 15 of the chip.

Setting Up

The improved performance obtained by using a separate sound i.f. circuit makes Nicam decoder setting up less critical. I still consider that Maplin's setting-up instructions are too sparse however. You need a scope and knowledge of what you're doing to set up a Nicam decoder correctly. The Maplin decoder's designers must have considered that TP6 and TP7 are necessary, even though the instructions don't mention them. Since I left the TV trade sixteen years ago, I doubt whether I could have solved my DIY Nicam problems without having learnt from *Television*. What about those Maplin customers who don't read *Television*? Maplin briefly mentions the use of "more sophisticated test equipment", but gives no indication of what this would be or how to use it.

Here are my recommendations for setting up the Maplin decoder, using a double-beam scope:

(1) Monitor the signal at TP1. Adjust T1 and T2 for the best eye pattern, i.e. least noise, with the crossover points at the centre of the eye pattern completely level.

(2) Monitor TP6 and TP7, using the scope in the X-Y

mode to display the type of signal shown in Fig. 1. Adjust RV1 for the best signal. Too much gain introduces noise while too little results in the pattern shrinking as the decoder runs out of a.g.c. If necessary use VC1 to square up the display.

(3) Check on other channels to ensure that the results are consistent.

A Laugh at the End

Lastly a tale for those in the trade. I was talking to a colleague recently and asked him how things were going. Knowing about my one-time connection with the trade he immediately replied "not too bad, but I've had a bit of trouble with the telly. The cat puked into it and it blew up".

I hoped, deeply and sincerely, that he wasn't about to ask whether I could help to fix it. So it was with great relief that I heard him say "the shop reckons that it can be repaired all right – it's the power supply that blew".

Perhaps one of you intrepid guys had the job of dealing with it. By the time I'd got back to my section I was shaking with laughter. I had in my time to cope with beer, birdseed, parrot feathers, water from vases, a gin and tonic, fruit juice, cups of coffee and tea and even what seemed like the entire contents of a fish tank that collapsed, but to my mind this recent calamity takes the prize!

COMPONENTS LIST

Capacitors:

C1-C4	10nF 30V 10% ceramic
C5-C6	1µF 35V tantalum
C7	10nF 30V 10% ceramic
C8	220µF 16V electrolytic
C9	100pF 2% mica
C10	220pF 10% ceramic

Resistors:

R1	680Ω	R4	470Ω
R2	10Ω	R5	1kΩ
R3	3·3kΩ	All 0·3W 10%	

Coils:

L1	Maplin UL55K i.f. tuning coil
L2	Maplin WH33L. 4·7µH

Chip and SAWF:

IC1	TDA8341
SAWF1	SW166 – Maplin UL52G

Sundries:

Strip board, 16-pin i.c. socket, terminal pins, connecting wire etc.

Fault Notes on the JVC GR45 Camcorder

Keith T. Keeton

The following is a summary of faults we've encountered with this camcorder.

Camera Section

E-E display consists of a black screen: The iris was closed because of a faulty motor. Remedy was to replace the lens.

E-E picture dark with no colour, playback o.k.: There was loss of signal at C45 (video 1 board) due to a break in the track between the CCD and C45. A link was fitted.

E-E picture has green haze, with loss of colour, playback o.k.: This fault can be intermittent. The cause is a faulty THE175A hybrid i.c. (IC9) on the video 1 board.

E-E picture has coloured vertical lines: Connector CN304 loose (video 1/encoder boards). Fault may be intermittent.

E-E picture has coloured vertical lines, playback o.k.: Pins 13 and 14 of the CCD were not soldered together (video 1 board). Could have been because the CCD had been replaced without reference to its type.

E-E display white, playback o.k.: The MC8089A chip IC3 on the video 1 board was faulty.

E-E display has coloured lines, playback o.k.: This has been caused by several things, all on the video 1 board. A faulty horizontal driver can provide incorrect pulses to the CCD. L1 being open-circuit will affect these pulses. On one occasion the wire between pin 5 of CN102 and L1 was open-circuit.

Ghost on E-E picture, playback o.k.: IC301 on the encoder board was faulty.

No auto-focus: CP302 (ICPF10) on the encoder board was high resistance. Replacing CP302 cured the fault.

No LP record colour. SP recordings o.k. and playback of prerecorded tapes in the SP and LP modes o.k.: Track was open-circuit between LPF2 and R119 on the Y/C board. A link cured the fault.

No E-E picture, playback o.k.: The VC2041 chip IC402 on the indicator board was faulty (the fader was in operation). On another occasion the cam ext line was earthed because of a faulty jack (Y/C board).

No EVF record indication (line only): Q407 on the main board was faulty – V rec line didn't go low enough.

No E-E sound, playback o.k.: IC201 on the main board was faulty.

No colour recording, E-E and playback o.k.: The THE045A chip IC4 on the Y/C board was faulty (signal input present at pin 12, no output at pin 26).

Camera/VTR Faults

No playback/record. E-E o.k., fast forward and rewind o.k.: The BU3721K chip IC101 on the main board was faulty (no PG pulse output at pin 38).

Sound recording intermittent, E-E o.k.: Bias at pin 4 of CN12 on the main board low because R332 was dry-jointed.

Failure to record sound or erase old sound, E-E o.k.: Q306 (2SA1036K) on the main board open-circuit base-to-collector.

SP or LP recording but not both, E-E o.k.: IC103 on the main board faulty.

SP or LP recording but not both without powering down, E-E o.k.: R183 on the main board was open-circuit.

Records black screen, E-E and playback o.k.: IC2 (AN3212S) on the Y/C board faulty.

Records snowy picture: IC1 (BA7600K) on the Y/C board faulty (no f.m. at pin 29).

Records snowy picture, E-E o.k.: IC401 (HD6305Z0FCV05, HD63705Z0FCV05 or HD6305Z0FCV06) on the main board faulty (pin 67 not going high).

Warbling recorded sound, E-E and playback o.k.: IC101 (BU3721K) on the main board faulty.

Records in monochrome, E-E and playback o.k.: Vectorscope check shows that the burst phase of the camera output is incorrect. Adjust R307 (encoder board).

Mechanism Faults

Capstan error message, may be intermittent: Central pulley teeth not always catching on the take-up reel. Replace the central pulley.

Capstan motor runs fast in playback: Faulty capstan motor.

VTR Faults

Keyboard does not appear to operate: Camera/ext line earthed because of faulty jack. Replace jack board.

Keyboard operation faulty – eject produces record: R410 on the main board open-circuit (pin 2 of connector 1 at 1·7V instead of 5V).

Low playback luminance, E-E o.k.: R31 on the Y/C board open-circuit or not earthed (very high signal level at TP15).

No playback/record, E-E and FF/rewind o.k.: RA102 on the main board open-circuit (no PG pulses to main micro chip).

No playback/record/FF/rewind: IC101 (BU3721K) on the main board faulty (capstan not rotating).

No power to camcorder. Emergency shut down in operation (no 8V line): We've had several causes of this. IC2 on the main board faulty; Q4 on the main board faulty (not dropping to 4·5V); Q1 (2SB1009) on the main board faulty.

No power to camcorder: IC402 faulty (no reset at pin 3 of IC401). Alternatively the operation board faulty (no power-on signal to pin 8 of IC401).

Monochrome playback, E-E o.k.: C202 on the Y/C board leaky (X1 running at incorrect frequency). Replace C202 and reset oscillator to 4·43361MHz.

Monochrome playback, record and E-E o.k.: BPF2 (part no. PU59478) on the Y/C board faulty (not passing signal to pin 23 of IC4).

Playback picture rolls: Was cured in one case by adjusting R103 for maximum f.m. signal (f.m. envelope slightly down, f.m. tracking out). In another case IC101 (BU3721K) was faulty (not locking up). These items are on the main board.

Playback picture rolls, won't track: R108 on the main board misadjusted (head switching incorrect).

Snowy playback picture with no audio: Faulty oscillator connection at CN10 on the main board.

CD Player Casebook

Reports from Mike Leach, Ian Bowden and Nick Beer

Kenwood RXD27L

This midi system wouldn't read discs. When a disc was inserted a click could be heard and the turntable failed to rotate. There was a decided air of bodge about the machine – someone had been here before! The cover screws were missing, and the CD printed panel was loose. The laser came on and lit up, and the tracking coil came on hard – that was the clicking sound.

The cause of the trouble turned out to be obvious, though a service manual was required to put matters right. Someone had clearly replaced the focus driver transistor Q5 as there was an RCA type transistor in this position. The service manual told me that a 2SD1266, which is an npn device, is the correct type. The one fitted was a pnp transistor. When a 2SD1266 had been fitted the machine worked perfectly. And it hadn't, for a change, been tweaked! **M.L.**

Pioneer XDZ54T

The CD section was absolutely dead: there were no results at all. As Q101 in the sub power supply was faulty there was no negative output. Replacing this transistor restored the –32V supply, and I thought that this would cure the problems. It didn't: the CD player section was still dead. When I made some meter checks on the main CD panel just about everything seemed to measure –32V, so it seemed likely that an earth connection was adrift somewhere.

After spending some time getting nowhere I realised that the connecting lead between the power supply and the CD panel had been reversed at the CD end (CN1). As a result the earth connection was made at pin 5 instead of pin 2, while the –32V line was connected to pin 3 instead of pin 4. When the lead had been connected properly the CD section started to work . . . sort of.

Only tray one would open, and all the segments of the display were lit very brightly. But the machine did now play. A new microcontroller chip was required to fix the display fault, also a new connector and ribbon cable between the display board and the main CD board. Apart from that, everything seemed to be o.k.! **M.L.**

Technics SLP520

The complaint with this machine was that all the fluorescent display figures and symbols lit up: the correct ones were at full brightness, the others at half brightness. Apart from this the machine worked all right. I soon found that the –32V supply to the display driver/system control microcomputer chip had risen to –38V. Checks revealed that the small pnp regulator transistor Q13 was short-circuit collector-to-emitter and that zener diode D14, which ties the display filament supply to the –32V line, was also short-circuit. **I.B.**

Technics SLP110

The report said that the machine wouldn't play discs. When a disc was inserted the unit would focus correctly and start to spin the disc. The r.f. level seemed to be o.k., but the disc speed varied and the traverse unit moved in and out rapidly, until it moved so far that the optical unit was off the edge of the disc.

As focus was achieved and the CLV servo appeared to be trying to work we tried turning the tracking servo gain right down. The traverse unit then stayed in one place. There seemed to be instability in the tracking/traverse servo, but we then found that the tracking coils on the objective lens assembly were open-circuit. So a new optical unit was required. **I.B.**

Technics SLXP700

The complaint about this incredibly slim portable player was that it would intermittently fail to read or play a disc. If left running it would remain o.k. The cause of the problem was the spindle motor, which was tight. Unfortunately replacements are available only as a complete assembly with the optical unit etc., i.e. the traverse deck. **N.B.**

Long-distance Television

Roger Bunney

Conditions in the UK during July were hot and at times humid, though rain cooled us towards the end of the month as a low-pressure system approached from the Atlantic. While June produced excellent Sporadic E (SpE) reception, there was a tail-off during July with more mundane signals. The hot weather produced enhanced tropospheric reception however, with numerous DXers reporting intense Band III/u.h.f. signals.

A good lift occurred on July 9-11th, when signals from Germany, France, Denmark and the Benelux countries were received across much of the UK: Band I, III and u.h.f. reception from Spain was frequent in the west country. There was a smaller lift on the 19/20th, with much the same reception. The biggest lift occurred on the 22-25th, when signals from the Netherlands received by Cyril Willis at King's Lynn were so strong that tropospheric overloading occurred. There was good reception from Germany, Denmark, France and the Benelux countries, while Roger Fussell reported good reception in Cornwall from the Iberian peninsula.

The SpE log for the month is as follows:

7/7/94	RAI (Italy) chs. IA, B; TVE (Spain) ch. E2; CIS ch. R1; SLO (Slovakia) ch. R1.
8/7/94	DR (Denmark) E3; TVE E2, 3.
9/7/94	TVE E4.
11/7/94	TVE E2, 3, 4.
13/7/94	TVE E4
14/7/94	SVT (Sweden) E2; RAI IA; TVE E3.
15/7/94	TVE E3.
16/7/94	RAI IA; TVA (Italy) IA; TVE E2, 3; JUG (Yugoslavia) E3, 4.
17/7/94	RAI IA, B; TVA IA; C+ (France) L2, 3; JUG E3; TVE E2, 3, 4; +PTT (Switzerland) E2.
18/7/94	SLO R2; CZ (Czech Rep.) R1; SVT E2, 3, 4; TVP (Poland) R2; JUG E3; NRK (Norway) E2, 4; DR E3; CIS R2; RAI IA; C+ L2; TVE E2, 3, 4; SVT E2, 3, 4.
19/7/94	SVT E2, 3, 4; RUV (Iceland) E3, 4; NRK E2, 3; DR E3, 4; C+ L2; ORF (Austria) E2a; ARD (Germany) E2, 3, 4; JUG E3; TVP R2; SLO R2; YLE (Finland) E3; RAI IA; CIS R2.
20/7/94	TVE E3; RAI IA.
21/7/94	NRK E2; TVE E3.
22/7/94	CIS R2; RAI IA; SLO R1; SVT E4.
23/7/94	TVE E3.
26/7/94	TVE E2, 3, 4.
28/7/94	TVE E2, 3, 4; RAI IA; JUG E3.
29/7/94	SVT E2, 3; CIS R1, 2.
31/7/94	RAI IA; TVE E3; JUG E3; +PTT E2; ARD E2; SVT E2, 3.

Our thanks to David Oliver (Birmingham), Cyril Willis (King's Lynn), Roger Fussell (Torpoint), David Glenday (Argyle) and Tim Anderson (St. Leonards) for sending in reports on conditions and reception.

Last month I reported reception from N. America during June. Reception of US amateurs in the 50MHz band was also logged (*Six News*, July 1994) on June 9th (2100-2230 GMT) and the 15th (2200-2330 GMT). It's interesting that nearly all long/double-hop SpE reception from N. America occurs in the late evening, from 2100 onwards. This is obviously the best time to look for long-haul DX-TV.

Six News also reports that the 50-54MHz band has been allocated for various types of amateur radio operation in Estonia, at up to 400W PEP SSB maximum. The 50-52MHz band has been allocated for amateur radio operation in Latvia, at up to 50W maximum, except near the Kuldiga region ch. R1 TV transmitter. A Bermudan amateur has been heard in the UK operating in the 50MHz band at only 10W!

Satellite Sightings

Throughout July and into August the Newsforce digital SNG unit at Goma sent back pictures of the distress and suffering along the Rwandan border, both as one-way reports back to a network centre and as two-way reports. Newsforce uplinks in Band C (4GHz), using digital compression.

Left: The Spanish Telesur caption, received by Tim Anderson in St. Leonards. Centre: Romania ch. R2 received by Ryn Muntjewerff in the Netherlands via SpE propagation. Right: Another example of SpE reception by Ryn Muntjewerff, this time JTV (Jordan) ch. E3.

In a typical two-way interview between a reporter and a studio interviewer at NBC, New York the uplink from Goma arrives in Europe as a Band C signal, is distributed in Europe via (usually) Eutelsat II F4 at 7°E and is sent across the Atlantic in Band C: reverse audio is via an Immarsat phone circuit, no reverse video being used. NBC News is usually available via Sky News at 2330 hours. Feedback to Europe is via Intelsat K, uplinked from the USA in Band C, with cross-strapping in the Ku band for the Sky downlink. A further uplink via BT's London Teleport puts the NBC feed from Goma on to Astra, with European downlinking in the Ku band. At least four hops are involved, with little noticeable loss of quality.

A favoured way of receiving Newsforce is from the EBU leased 11·074GHz (V) transponder: as sound-in-syncs is used a sync restorer is required to obtain stable pictures. Use of digital compression produces interesting video effects: as a result of a fault the Goma link was lost; on its return the picture appeared in small blocks that rapidly merged into a normal shot.

Riots in the Gaza strip on July 17th received extensive coverage, with live circuits via Eutelsat II F3 at 16°E. Jerusalem Capital Studio feeding OB inserts to German TV. Studio Tel Aviv also appeared at 16°E.

The appearance of the caption "Reserved for United Artists Programming" via Intelsat 601 (11·055GHz horizontal) is something of a mystery: the long-awaited SciFi channel maybe?

The Czech Cable Plus feed has returned to Gorizont 26 (11°W) at 11·525GHz after its brief stay at 40°E.

Intelsat 702 has been seen on test at 37·5W, with data though no strong carriers or captions. After the tests the craft will move to 1°W.

BBC World Arabic Television continues to be fed to the Orbit facility in Rome: check at 11·658GHz (H) during the day and evenings for programme offerings.

Intelsat K continues to send N. American sports feeds to Europe from 21·5°W. Check at 11·499GHz (H) and 11·532GHz (V): the signals are usually 525/NTSC.

A difficult satellite for me is PAS-1 (PanAmSat) at 45°W. The NHK-leased transponder can often be seen carrying west-bound news feeds. Have a look at 11·675GHz horizontal.

News Items

Gibraltar: GBC has been allocated an additional channel, in Band III, for a GBC-2 service. No details yet of the actual channel number and the opening date, which is likely to be far ahead.

UK: Bad news for UK TV-DXers. The South Yorkshire Supertram Light Transit System is to use Philips' Band III equipment for communication between the 25 trams and HQ. Seven Band III channels will be used, with three base-station sites. Communications operator Trunked Radio Networks has been allocated nearly 200 extra Band III channels (sub-bands 1, 2): new regional networks are to operate in London/Medway/Brighton, Bristol/Cardiff, Thames Valley/M3 corridor, Bedfordshire/Wisbech, Exeter/Plymouth, Southampton/South Wilts, Birmingham central/south, Yorkshire/Humberside, Norwich/Norfolk, Borders/Edinburgh/Glasgow, Nottingham/Derby/Leics, Aberdeen and M5 via Gloucester/Cheltenham/Worcester.

Poland: Canal Plus with CKT is to transmit films, sports programmes and documentaries for 21 hours a day from terrestrial transmitters in thirteen major cities. Filmnet has entered into partnership to deliver subscription films via satellite.

Germany: A third CLT channel, RTL-Club, is due to start operating from Cologne. CLT hopes that the service will go national.

China: The first commercial station is now in operation, run by the Guangzhou (Canton) Television Company (CTV).

Bahrain: TV services are at present as follows: ch. E4/10 local Arabic service; ch. E44 Egyptian satellite TV; ch. E46 MBS satellite TV; ch. E55 a local English service; ch. E57 BBC WS TV. In addition a local MMD service supplies five channels.

Kenya: BBC WS TV is now being broadcast by the Kenya Broadcasting Corporation network.

A Bit of History

Ike Kerschner, writing in the April issue of the US magazine *Monitoring Times*, reports that "a number of years ago" he was involved with a TV repeater housed on an aerostat balloon tethered at 10,000ft in Saudi Arabia. Programmes were microwave linked up to the aerostat, which had its own generator and a ch. E3/A2 transmitter that broadcast across all of Saudi Arabia. Does any reader have any further information on this

project? I'm aware that Aramco TV has operated for years in Dhahran.

Satellite TV News

Domestic satellite dishes have now been banned in Saudi Arabia. Owners have been given a month to remove their installations.

NTL has been awarded a contract to uplink two channels from MBC's Battersea studio centre. Band C will be used despite a ruling that further uplinks in this band should be avoided because of interference problems: the rules have been relaxed as the very low-lying site provides localised screening.

The launch of Apstar 1, with 24 Band C transponders, has led to disputes between broadcasters: its orbital position at 131°E is very close to other Band C operators at 130°E (Russia's Rimsat 1 craft) and 132°E (the Japanese CS3a satellite).

Keep checking Intelsat K at 21·5°W: there are incentives that give three-months' free use of a newly leased transponder (27 or 54MHz bandwidth). Times are hard now, with digital compression!

Plans to introduce encryption with the services via Hispasat at 30°W have been put back pending agreement on a standard and on methods of marketing the programmes.

Getting Started with Satellite Reception

In response to a number of requests, here are some thoughts on getting started with satellite reception. Take the dish first. A 90cm dish is a good choice, but if you can manage a 1m or 1·2m dish the results will be that much better. Dealers now usually offer offset rather than prime-focus dishes. If buying a new one, the Lenson Heath range is competitively priced.

Always buy a feedhorn that matches the dish. Manufacturers usually provide a matching assembly, often with a ferrite polariser. This type of polariser is preferred to the mechanical type. It operates with a twin-wire control cable from the receiver to switch between vertical/horizontal polarisation and adjust the skew. If the receiver has a three-wire output (for use with a mechanical polariser) a small interface box can be used to convert this to two-wire operation. The Racal wideband ferrite polariser is a popular model which will introduce an insertion loss of about 0·15dB.

You will want to be able to move the dish to track across the satellite belt. Two types of tracking dish mount are available on the domestic market, the Horizon-to-Horizon (H-to-H) and the polar mount. The H-to-H type is generally used with dishes up to about 1·2m with their own integral motor system. Larger dishes tend to use a polar mount, with an actuator arm to move the dish. Both types of motor tend to be noisy, which can cause problems with neighbours when wall mounting is used. I understand that Swedish Microwave has introduced a quiet tracking dish: any reports on its performance would be welcome. Motor operation is controlled by either an integrated receiver/positioner or, less common these days, a stand-apart motor-control box. Control and motor (power drive) cables will have to run outdoors to the dish. They also provide feedback on dish position.

Provided the receiving site has a clear view across the sky, at least from say 16°E to 27°W, accurate tracking alignment can be achieved without too much difficulty. I had a frustrating time trying to get correct tracking but experienced installers can fit and track a dish system fairly easily.

C Band (4GHz) reception can be forgotten with a dish of this size. For Ku band reception a single triple-band LNB will give coverage of 10·9-12·7GHz with voltage switching for band changeover. Bear in mind that once Astra 1D is in operation there will be signals at down to 10·7GHz. The three bands are the FSS band, 10·95-11·7GHz, which carries most activity, the 11·7-12·5GHz DBS band which has fewer signals and the 12·5-12·7GHz Telecom band which is used mainly by French TV and telecom circuits. As an alternative to voltage band switching a mechanical diplexer (orthomode transducer) can be used with two single-band LNBs and separate feeders – a simple (A/B) changeover switch is required indoors to select the output.

The LNB should have a very low noise figure. A few years ago a Ku-band LNB with a noise figure of 2dB would have been considered acceptable: they are now available at around £60 with a noise figure of well under 1dB, 0·7dB being a common figure. The lower the noise figure the better the results with a small dish and in the presence of rain. All LNBs are fitted with an F socket. Use high-quality, double-screened coaxial cable, with watertight boots or waterproof tape at the F plug termination.

I'll touch on receivers next time. Meanwhile, I would recommend that you take a good look at John Breeds' *Satellite Television – Installation Guide*, 3rd edition, or his other compilation *The Satellite Book*. Both are available from Swift Television Publications, 17 Pittsfield, Cricklade, Swindon, Wilts SN6 6AN – telephone 0793 750 620.

Camcorner

Reports from Nick Beer and David C. Woodnott

Sony CCDF340

The customer complained about distorted recordings. Investigation showed that the inlet and outlet guide poles had become loose and had moved. Resetting them provided good recordings and playback, but a check on the tape path showed that cyclic tape curling occurred at the top of the exit guide. A new guide pole cured this. **N.B.**

Panasonic NVS1

This palmcorder, from a local school, had been dropped. There were no LCD or LED displays and none of the deck keys worked – the door eject was also very tight (there's a door as well as the carriage). Connector P6201, which is surface mounted on the VCR operation PCB, had been partially forced off. Refitting it sorted out the electronic problems – the SM connectors are always the first to suffer when these units are dropped. The door latch was tight because the cassette lever angle U across the top of the mechanism had been bent. The two levers and spring are available as an assembly (part no. VYQ0479) from Panasonic. **N.B.**

Panasonic NVMS50

Severe tape riding, especially in the cue and review modes, is not uncommon with this model. The pinch roller is naturally favourite but excess friction between the upper and lower drums is also a possibility. There is a degree of wandering when these machines are working normally (as with many C decks): this shouldn't be confused with a fault. **N.B.**

Ferguson FC27/JVC GRA1

A noisy crackle with E-E and recorded sound was traced to R605 in the audio section of the YC PCB being dry-jointed. **D.C.W.**

Chinnon VC1500

We've had several of these with a loose viewfinder. Usually all that's required is to refit the securing screws, but a little Loctite will prevent recurrence. **D.C.W.**

Sony CCDF340

E-E was o.k. but there was no playback picture. On tracing through we found that the playback r.f. luminance signal was missing at pin 60 of the YC processing chip IC360. Q409 in this signal path was open-circuit emitter-to-base. **D.C.W.**

Hitachi VM1200

This middle-aged, full-size VHS machine produced a knocking noise from within when in play or record. All was well in the fast forward and rewind modes. On inspection we found that the noise seemed to come from the capstan motor, but only when the pinch roller was in contact. The capstan bearings were suspect but proved to be o.k. The cause of the problem was the fact that the pinch roller pivot was loose where it is joined to the operating lever at its base. This lever is made from a 'soft' aluminium and had become distorted. A replacement made for a quiet life! **D.C.W.**

Samsung VC805P

Playback of good recordings was o.k., but there was no colour recording on the tape and the E-E pictures showed only 'flashes' of colour. We investigated the camera section and found that everything was functioning correctly up to the encoder chip IC302. The chroma signal was present at pin 24 of this chip. It got no farther than the 3·58MHz bandpass filter L303 which was open-circuit. Normally the filtered chroma signal passes to the YC mixer stage etc. to provide the composite AV output. **D.C.W.**

Canon A9E

A severe impact had left the cassette housing partially ejected, with a noticeable twist in its alignment with the body of the camera. After dismantling the unit and removing all the PCBs etc. we inspected the mechanism. Because of the impact, the main chassis base was curved instead of being flat. Fortunately in this model the base is made of a cast material, not the more usual plate construction. We decided to try to straighten the unit – otherwise a complete chassis would be required. In the event this proved to be highly successful, restoring the assembly to a fully working condition. **D.C.W.**

Sony CCDTR45

The reported fault was no functions with the caution symbol present in the viewfinder. We traced the cause to a small amount of oil on the lower drum. After cleaning it with the appropriate materials we noticed that playback showed signs of head wear (black and white inversion). Everything was o.k. when new heads had been fitted. Whether there was any connection between the oily drum and the head problem we don't know. **D.C.W.**

Sony CCDV8AF

These elderly camcorders are usually worth repair as they have AV inputs and can be used as a VCR for off-air recording etc. This one had no playback picture, only snow. Cleaning the video heads made hardly any difference – perhaps the slightest vestige of a picture could be discerned amongst the noise. Repeated attempts at cleaning produced no further improvement.

Checks around the playback circuits were inconclusive but seemed to suggest that the heads were worn. We finally removed them and inspected them under a microscope normally used for surface-mounted device reworking. All three heads were seen to be coated with 'globules' of oxide! We carefully removed this until the surfaces could be seen, then refitted them. The results were good. It would perhaps be worthwhile carrying out such an inspection with other apparently faulty heads. **D.C.W.**

B.K. TEST

B.K. Electronics, Suppliers of Test Equipment Excellence

B.K. *TEST*
The Test Equipment Division of
B.K. Electronics
Unit 1 Comet Way, Southend-On-Sea, Essex, SS2 6TR.
Tel.: 0702-527572 Fax: 0702-420243

FOUR-IN-ONE INSTRUMENT MODEL MX-9000

All in one bench test instrument with frequency counter, autoranging digital multimeter, 3 D.C. power supplies (2 fixed & 1 variable) and function generator, integrated into one compact and lightweight unit with full overload protection. Ideal for use in laboratories, education, production lines or research and development environments with its simple and easy operation.

FREQUENCY COUNTER
Range: 1Hz - 100MHz
Display: 8 Digit LED

FUNCTION GENERATOR
Output Waveforms:
Square, Pulse, Triangle, Skewed Pulse, Sine, TTL Level Square
Frequency: 0.02Hz - 2MHz
Output: 0.1Vpp - 20Vpp

Please Note:- It is not possible to list all of this instrument's functions and specifications above. A detailed leaflet is available on request.

Price:
£353.00 + £61.78 V.A.T.

DIGITAL MULTIMETER
3½ Digit LCD Display
Auto/Manual Ranging
Measurement:

DC V:	1000V Max
AC V:	750V Max
DC A:	10A Max
AC A	10A Max
Resistance:	2MOhm Max

POWER SUPPLY
3½ Digit LCD Display
Triple Output:
0 - 50V Variable, 0.5A Max
15V, 1A (Fixed)
5V, 2A (Fixed)
Full Over Current Protection

Multifunction Meter
PC Compatible, Metex M3850

The Metex M3850 is excellent value for money and is packed with so many features that only a few can be included here. The M3850 is an autoranging DMM, but also includes a frequency counter, thermometer, capacitance meter, logic probe, diode check and transistor hFE. Also, the M3850 can communicate with a PC using the software and leads provided. The M3850 is supplied complete with a carry case, test leads and a manual.

DC Volts	0 - 1000V
AC Volts	0 - 750V
DC Current	0 - 20A
AC Current	0 - 20A
Resistance	0 - 40M
Capacitance	0 - 400uF
Frequency	5Hz - 40MHz
Temperature	-40 - +1200 C

Price: £99.00 + £17.33 V.A.T.

OTHER HAND HELDS

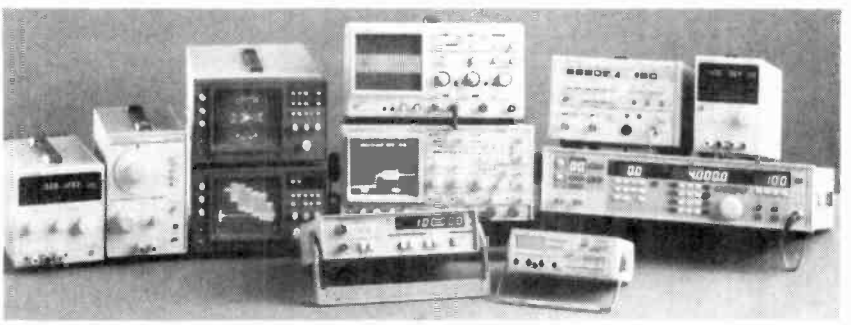
CAPACITANCE METER OM9023
9 Ranges 0pf (with set zero) to 20,000uF ★ Large, 3.5 Digit, 18mm LCD Display.
Price: £57.90 + £10.13 V.A.T.

LCR METER LCR195
3.5 Digit LCD Display ★ 7 Capacitance Ranges 0 - 200uF ★ 6 Inductance Ranges 0 - 200H ★ 7 Resistance Ranges 0 - 200MOhm
Price: £57.90 + £10.13 V.A.T.

FREQUENCY COUNTER (SAGE) SC130
5Hz - 1.3GHz ★ 8 Digit LCD ★ High Sensitivity ★ Freq.-Period-Count-RPM Min-Max-Average-Difference ★ Data Hold ★ High Accuracy
Price: £109.00 + £19.08 V.A.T.

MICROWAVE OVEN LEAKAGE DETECTOR PY-13
Complete with Probe ★ Detects microwave leakage around doors and seals ★ Positive Indication of Leak with Meter Level Indication **Price: £34.00 + £5.95 V.A.T.**

KENWOOD
TEST & MEASURING INSTRUMENTS



FM-AM Signal Generators ★ Colour Pattern Generators ★ Video Signal Analyser ★ Video Timing Analyser ★ Video Noise Meter ★ Distortion Meter ★ Waveform Monitors ★ Vectorscopes ★ Audio Generators ★ Wow and Flutter Meters ★ Electronic Voltmeters ★ Digital Multimeters ★ Function Generators ★ Frequency Counters ★ Bus Analyser ★ Resistance Attenuator ★ Oscilloscopes ★ Fully Programmable Digital Storage Oscilloscopes ★ Regulated D.C. Power Supplies

The following is just part of the vast range of Kenwood equipment, all of which is available from B.K. Electronics. A full catalogue and price list is available on request.

OSCILLOSCOPES
CS 1305 5MHz, 1 Channel, Low Cost
CS 4025 20MHz, 2 Channel, General Purpose
CS 4035 40MHz, 2 Channel, High Brightness, General Purpose
CS 5260 60MHz 3 Channel, 8 Trace, High Performance with Cursors (PAL & NTSC) Synch. Circuit
CS 6040 150MHz, 4 Channel, 10 Trace, High Performance, Multi-featured
OCS 8200 50MHz Real - 20Ms s Digital 2 Channel

WAVEFORM MONITORS & VECTORSCOPES
CV 1255 Vectorscope PAL
CV 1245 Waveform Monitor PAL
(NTSC Versions of above are available POA.)

SIGNAL GENERATOR
SG 5110 100KHz - 110MHz AM FM Standard RF Generator (FM Stereo)

COLOUR GENERATORS
CG 932 PAL Colour Pattern Generator, Video & RF O Ps, Calibrated & Adjustable Levels, Interlaced and Progressive Scanning, Full Range of Patterns
CG 922 Battery Portable PAL Pattern Generator, Video, RF and Sound Outputs, Full range of Patterns.

AUDIO GENERATORS
AG203A 10Hz to 1MHz Low Distortion (0.1%) Audio Generator, Sine & Square Wave

AUDIO GENERATORS (Cont.)
AG252 10Hz to 1MHz Ultra Low Distortion 0.004%, Full Attenuator O/P

ELECTRONIC MILLIVOLTMETERS
VT 171 AC Millivolt Meter, 1mV - 300V
VT 176 Dual AC Millivolt Meter, 0.3mV - 100V

GENERAL PURPOSE
DL 711 3.5 Digit Auto Bench Portable Multimeter, Approx 3000 hrs Battery
FG 273 Sweep Function Generator, 0.2Hz - 2MHz
FG 758 Frequency Counter 1.3GHz

POWER SUPPLIES
PD 35-10 0 to 35 Volts, 0 to 10 Amps
PR 19-3A 0 to 18 Volts, 0 to 3 Amps
PS 20-54 0 to 20 Volts, 0 to 54 Amps

KENWOOD PRICE LIST

CO 1305	£210.00 +	£36.75 V.A.T.
CS 4025	£359.00 +	£62.83 V.A.T.
CS 4035	£565.00 +	£98.88 V.A.T.
CS 5260	£1,195.00 +	£209.13 V.A.T.
CS 6040	£2,395.00 +	£419.13 V.A.T.
OCS 8200	£2,499.00 +	£437.33 V.A.T.
CV1255	£2,249.00 +	£393.58 V.A.T.
CV 1245	£1,599.00 +	£279.83 V.A.T.
SG 5110	£1,825.00 +	£319.38 V.A.T.
CG 932	£735.00 +	£128.63 V.A.T.
CG 922	£445.00 +	£77.88 V.A.T.
AG 203A	£195.00 +	£34.13 V.A.T.
AG 252	£399.00 +	£69.83 V.A.T.
VT 171	£235.00 +	£41.13 V.A.T.
VT 176	£475.00 +	£83.13 V.A.T.
DL 711	£149.00 +	£26.08 V.A.T.
FG 273	£450.00 +	£78.75 V.A.T.
FC 758	£555.00 +	£97.13 V.A.T.
PD 35-10	£645.00 +	£112.88 V.A.T.
PR 18-3A	£235.00 +	£41.13 V.A.T.
PS 20-54	£1,610.00 +	£281.75 V.A.T.

DON'T FORGET - THERE ARE OVER 100 KENWOOD MODELS

U.K. POST PAID. Export enquiries welcome. Visa / Mastercard or cheque with order, payable B.K. Electronics. Official Orders welcome form Govt. Depts., Colleges, PLCs etc. Technical leaflets and price list for the complete range are available on request. Credit card orders are accepted by post, phone and fax.
Despatch is subject to payment clearance (10 days for cheques).

VISA

Sat Mod: Uniden 7007 LNB Use

Brian William Ewan

The modification described in this article enables the Uniden UST7007 satellite receiver to be used with a standard- or bullet-type Marconi LNB. The polarisation switching required is provided by the circuit shown in Fig. 1. It can be built on stripboard or any other convenient base – there is nothing critical. Fig. 2 shows the connections to the receiver. The Uniden UST7007 has been available cheaply in recent months, generally minus LNB.

You'll need the following tools and hardware: a Phillips screwdriver (fine point is preferable), a pair of side cutters, a pair of long-nose pliers, an instrument driver (straight blade with fine point), four lengths of wire for the connections (about 15cm long), a soldering iron and a small quantity of solder. The component details are shown in the accompanying table.

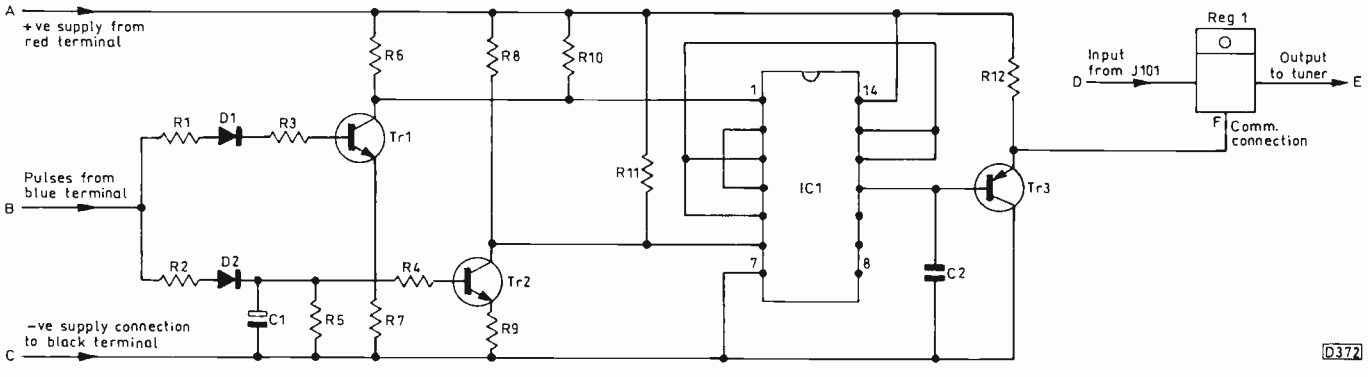


Fig. 1: The polarisation switching circuit. The voltage at point F alters the output from the regulator chip REG1.

Fitting Instructions

With the power off, remove the four screws that secure the case top – two at the left and two at the right. Take off the lid.

Locate the inside of the three LNB polarity screw terminals at the rear of the receiver, the threaded screw hole near the front of the right-hand central support as seen from the front of the receiver (this is the point where the added regulator is to be fitted), plug/socket J101 at the inside front of the case and the blue lead to plug J101. These points are illustrated in Fig. 2. Proceed as follows:

(1) Fit a mica or rubber isolator to the back of the regulator and a plastic isolator to the screw hole at the top. Fit the regulator to the central support with a screw through the hole mentioned above.

2) Cut the blue lead between plug J101 and the tuner (in the centre of the case) about mid way.

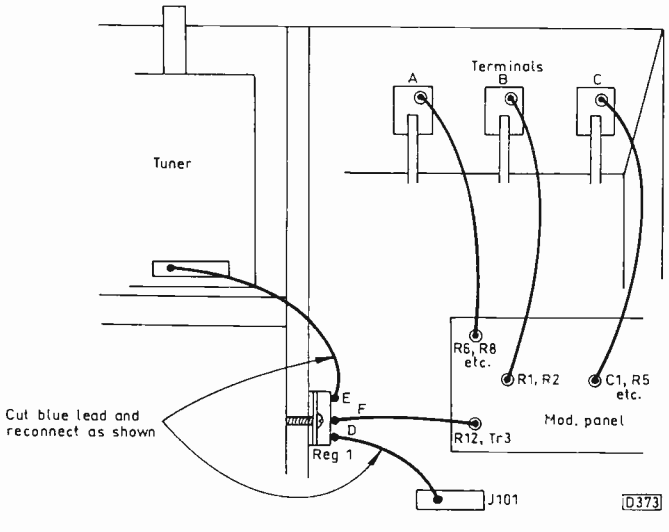


Fig. 2: Connections between the switching circuit and the rest of the receiver.

COMPONENTS LIST

Resistors (all 0·5W):

R1	10kΩ	R2	10kΩ	R3	56kΩ
R4	56kΩ	R5	47kΩ	R6	10kΩ
R7	1·5kΩ	R8	10kΩ	R9	330Ω
R10	10MΩ	R11	10MΩ	R12	470Ω

Capacitors:

C1	4·7µF, 63V	C2	0·1µF

Semiconductor devices:

REG1	7812 12V regulator
IC1	CD4011B CMOS quad 2-input nand gate
D1, 2	1N4148
Tr1, 2	BC182
Tr3	BC212

(3) Strip and tin the ends of the four connection leads required.

(4) Solder the cut blue lead from the tuner to the regulator's output pin (right-hand side). This is identified as point E in Figs. 1 and 2.

(5) Solder the blue lead from plug J101 to the regulator's input pin (left-hand side), i.e. point D.

(6) Apply a small amount of solder to the inside legs of the three LNB polarity screw terminals at the right rear of the receiver's case.

(7) Solder lead A to the inside leg of the red terminal.

(8) Solder lead B to the inside leg of the blue terminal.

(9) Solder lead C to the inside leg of the black terminal.

(10) Solder the lead from R12/Tr3 on the modification panel to the regulator's central, common connection – point F in the diagrams.

(11) You'll find that the modification switch panel will sit comfortably inside the right-hand side of the case. Refit the receiver's lid and screws.

Testing

Reconnect all leads – LNB, aerial input and r.f. output. Reconnect to the mains supply and switch on. The switch next to the screw terminals at the rear of the receiver's case – marked OFF 18V CONT – should be in the centre, 18V position. Select a horizontally polarised channel and if necessary adjust the skew control. Then select a vertical channel. Channel and polarisation change should take place. Finally make any skew adjustments needed to the other horizontal channels.

Help Wanted

The Help Wanted column is 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: M51394P colour decoder chip for the Sanyo Model CTP6229. Ron Dimmock, 71 Churchfield Road, Liverpool L25 3SE. 051 487 5113.

Wanted: LOPT and e.h.t. rectifier for the Vega Model TV402D. T. Milverton, 121 Borrowdale Road, Northfield, Birmingham B31 5QL. 021 477 2044.

Wanted: Remote control unit for a Goodmans C141/Osume CTV1484R. Peter Ward, Petgra, Forest Corner, Ringwood, Hants BA24 3JW. 0425 475 445.

Wanted: TDA3568 jungle chip used in the Grundig CUC2410 chassis or a working module type 29504-107-02. Phil, Palter TV, Clare, Suffolk. 0787 278 296.

Wanted: PJX04A chip or power supply panel for the Amstrad SRD600 satellite receiver. G. Smith, 91 Arnold Street, Boldon Colliery, Tyne and Wear NE35 9BE. 091 536 6392.

Wanted: May 1991 issue of *Television*. J.T. Stuart, 2 Little Bell Hall Cotta ges, Drayton Road, Belbroughton, Nr. Stourbridge DY9 0DN. 0562 730 197.

Wanted: Circuit diagram and any other information on the Ingersol XK512B portable TV/radio receiver. E.J. Edwards, 43 Hoose Court, Market Street, Hoylake, Wirral L47 5AB. 051 632 0614.

Wanted: Any U-View servicing guides up to 1988. Justin Smith, 4 Shenstone Road, Hillsborough, Sheffield S6 1SQ. 0742 346 029.

Wanted: March 1993 issue of *Television*. A. Petch, 97 Wordsworth Avenue, Parson Cross, Sheffield S5 8NB.

Wanted: Complete chassis (Z3) for the Panasonic Model TX1786, working if possible. Also a remote control unit. Mike Levy, 19 Totternhoe Close, Kenton, Harrow, Middx HA3 0HS. 081 907 3620.

Wanted: Upright Y/C PCB for the Hitachi VTM640E VCR. P.J. Lee, 58 Greatham Road, North Bushey, Herts WD2 2HP. 0923 243 456.

Wanted: Circuit diagram for the Pioneer Model F223L tuner. Photocopy will do. G.R. Smith, 12 Hunton Court, 1-3 Gravelly Hill North, Birmingham B23 1BT.

Wanted: Leader LCT910A c.r.t. tester/rejuvenator. One needing repair might do. Or a Video Circuit Model V31A. Also circuit diagram for the TR500 c.r.t. reactivator made by New Dimension TV, Stockport, Cheshire. Pat Foran, Knockeen, Castleisland, Co. Kerry, Ireland.

Wanted: Hitachi Trimode CPT0652 receiver or tube type 150AYB22. Derek Mander, Chiltern House, Unit One, Waterside, Chesham HP5 1PS.

Wanted: Circuit diagram for the Telefunken Model DC676GB. D.R. Dunmall, 6 Brandon Road, Dartford, Kent DA1 1SD. 0322 224 975.

Wanted: NE654N chip for the JVC KD-D50B stereo cassette deck – or address of a source of supply. David Upton, 85 Clyne Court, Sketty, Swansea, W. Glamorgan SA2 8JA. 0792 207 697.

Wanted: Power supply and remote control unit for a Beovision 4402. A. Ashurst, 62 Westfield Road, Harpenden, Herts. 0582 767 990.

Wanted: AT2055/00 LOPT for the Forgestone 400 receiver. S. Kneale, 74 Cae Mair, Beaumaris, Gwynedd LL58 8YN. 0248 810 555.

Wanted: Service information or circuit diagram for the Technics three-band stereo receiver Model SA300L. Photocopy would do. A.G. Davies, 16 South Street, Crewkerne, Somerset TA18 8EL.

Wanted: Any information on the universal remote control unit type PRC54. Lance Williams, Kemerton, Ribchester Road, Blackburn BB1 9EE. 0254 249 668.

Wanted: Subpanel type PW2357 for a Toshiba chassis dated around 1982. David F. Maratos, 28 Clarendon Road, West Manchester M21 1RW. 061 881 0142.

Wanted: LOPT for the Huanyu Model 37C-3. I. Dennett, 2 Alfred Street, English Street, Hull HU3 2DF. 0482 585 270.

Wanted: Instruction book for the Uniden UST8008 satellite receiver, and a Rabbit Model R8000P. R.A. Ward, 5 Sydney Road, Marton, Middlesborough, Cleveland TS7 8HG. 0642 318 466.

Wanted: Circuit diagram/service manual for the Matsui Model 1480. Len Dyke, 19 Mursley Road, Swanbourne, Milton Keynes MK17 0SH. 0296 720 602.

Wanted: Teletext panel for the Sanyo VHR5240E/Granada VHSGS5 VCR. P.K. Osborne, 29 Shirecroft Road, Westham, Weymouth, Dorset DT4 0NH.

Wanted: Circuit diagram/service manual for the Ferguson 3V24/3V25 portable video/tuner and camera. C.M. Clements, Carl's Electrical, 1 Ingleby Road, New Ferry, Wirral, Merseyside L62 1BA.

Inside the Ferguson ICC6 Chassis

Part 1

Mark Paul

The ICC6 has evolved from previous Thomson chassis in the ICC5/7/8 series. While its basic purpose is to serve as a simple receiver aimed at the popular section of the market, it employs state-of-the-art technology and incorporates numerous features.

Basic design features are as follows: power supply to operate with an a.c. mains input over the range 180-264V; chassis to drive a range of 90° tubes with sizes from 42-50cm (17, 20 and 21in.); mono only sound output with 5W music power; single scart socket with S-video option; second loudspeaker socket; PAL/SECAM decoding. Optional features are as follows: teletext; front connectors in parallel with the rear-mounted scart socket; 16:9 format control; RGB switching by remote control; auto switching between AV and TV modes.

Basic Outline

Fig. 1 shows a simple block diagram of the chassis. The various i.c.s used in the chassis are as follows:

IA01	TEA2006	Audio output
IF01	TDA1771	Field timebase
II06	SDA3202	Frequency-synthesis tuning
IP01	TEA2261	Chopper control
IR01	ST6393	Microcontroller
IR81	TDA8139	Reset pulse generator and standby switching
IS10	LA7550	Vision and sound i.f. amplifier/demodulator
IV01	STV2110	PAL/SECAM decoder, video processor, sync separator and line drive generator
IX01	TEA2014	TV/AV switching
IX02	MC14066	RGB switching

The Power Supply Arrangements

The switch-mode power supply has two modes of operation, standby and normal. Fig. 2 shows the circuitry – the chopper transformer LP16 provides mains isolation. There are three output voltages, Usys (h.t.) which varies depending on the type of tube; UA 24V; and UStby 13V. Other supply lines (UV 200V, UL1 24V and UL2 13V) are derived from the line output transformer.

The TDA8139 chip IR81 plays a vital role in the standby mode in providing a switched 9V output (U2). When it switches this supply off, following a command from the microcontroller chip IR01, the supply to the line oscillator in IV01 (pin 5) is removed. As a result the line timebase shuts down and there are no line output transformer derived supplies.

The power supply is self-contained in terms of both operation and regulation. Thus the unloading that occurs when the line timebase shuts down is sensed by IP01 which in turn switches to its standby mode of operation. In this mode IP01 produces bursts of short-duration pulses to drive the chopper transistor. This is sufficient to keep the chopper circuit 'alive' and enable the reservoir capacitors on the secondary side to have some charge. It also means that there's no need for a separate standby power supply.

In this burst mode the UStby supply is present at IR81 which in turn provides the microcontroller chip IR01 with a reset and a 5V supply (U1). IR01 is thus able to respond to a switch-on command from the remote control unit. When this is received IR01 in turn sends a command to IR81 which produces its 9V output for the line oscillator. This starts up and the line driver stage also starts to work as it is provided with a standby supply derived from the UA line. The line output stage in turn comes into operation, producing the following outputs:

UL1	24V	Used by the line driver stage in normal operation (takes over from the UA feed via DL30/31) and by the field timebase chip.
UL2	13V	Used by the tuner and i.f. section, the field scan circuit and the watchdog circuit (more on this later).
UV	200V	Used by the RGB output stages and the c.r.t.
UH		Pulsed supply for the c.r.t. heaters.
UH1		From same tap as UH: OSD sync pulses.

Transistor TV62 delays the 9V feed to pins 1 and 41 of IV01: it doesn't switch on until the line output stage produces the 13V supply (UL2). The reason for this delay is to give the line drive a soft start: the mark-space ratio of the line drive pulses moves from about 20:80 to 40:60 once the voltage at pins 1 and 41 reaches 80 per cent of the voltage at pin 5 (line oscillator supply). Once through this soft start the receiver works normally.

Once the receiver has powered up to the normal operating state the voltages on the various lines should be as follows:

Usys 104V with 17in. sets, 113V with 20/21in. sets. Once this voltage has been set up (PP34) the other supplies are:

UA 21-27V measured at pin 5 of IA01.

UStby 13V ±1·5V measured at pin 1 of IR81.

UL1 23V ±1V measured at pin 9 of IF01.

UL2 12·7-13·6V measured at CL14.

UV 190-210V, depending on c.r.t. type, measured at CL11.

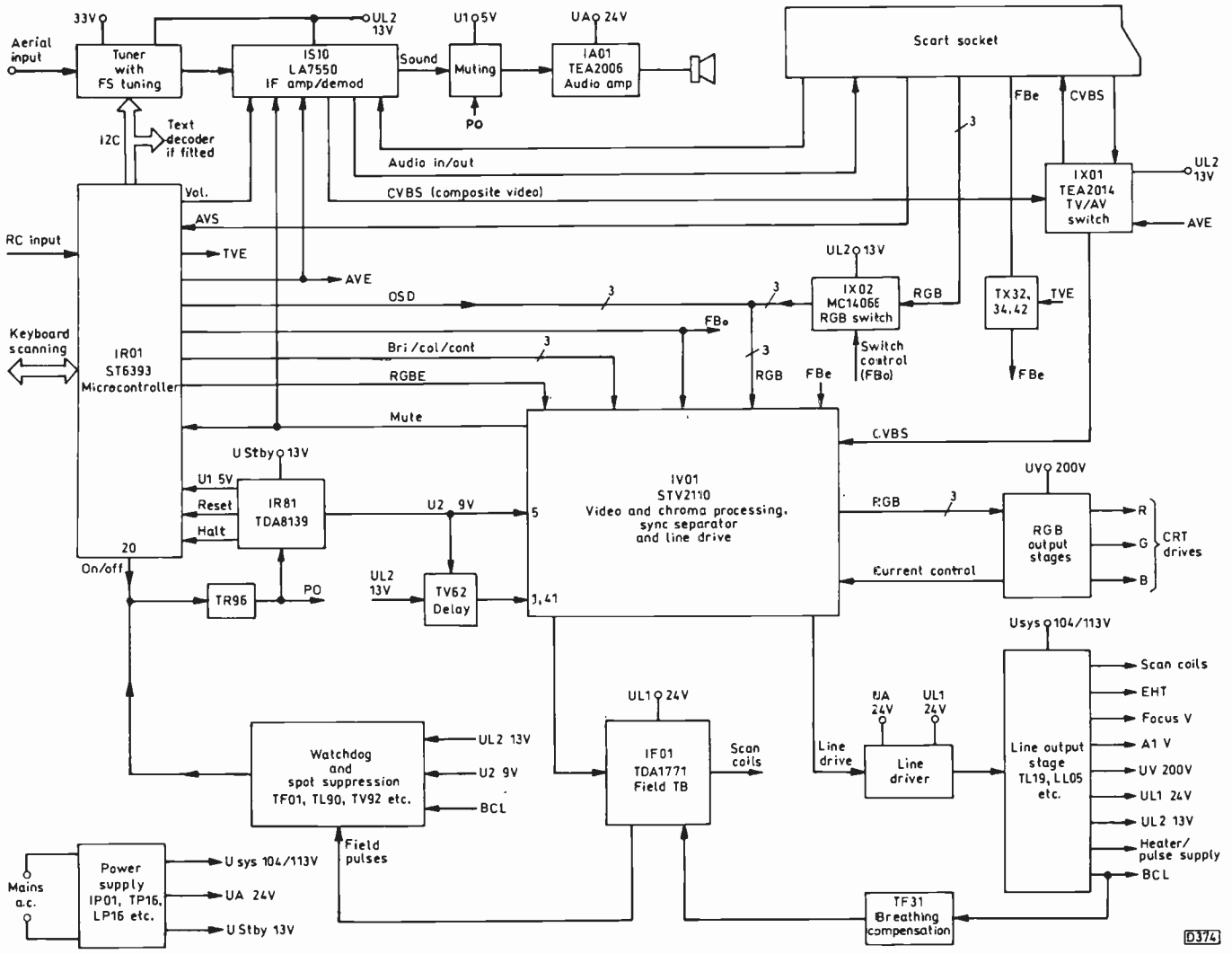


Fig. 1: Simplified block diagram of the Thomson/Ferguson ICC6 chassis. E at the end of an abbreviation stands for enable.

U-EHT 24-26kV depending on c.r.t. type.

U1 5·1V ±0·1V measured at pin 9 of IR81.

U2 9·2V ±0·2V at pin 8 of IR81.

The Usys voltage must be set up first as all the supplies obtained from the line output transformer depend on it. Always refer to the correct manual, as the Usys voltage varies with the c.r.t. Set up the Usys voltage with the volume and beam current at minimum, using PP34 and monitoring pin 5 of the line output transformer (LL05).

A return to the standby mode is achieved by disabling the 9V supply to pin 5 of IV01. In this mode Usys, UA and UStby may vary by ±15%.

Power Supply Operation

The heart of the chopper power supply is the TEA2261 chip IP01 (see Fig. 3). This device is also used in the ICC7/8 chassis but is used slightly differently here – there's no feedback from the secondary side of the circuit to pin 2. With the ICC6 chassis fault-finding should be even easier since IP01 is self-contained in having its own oscillator, regulation loop and trip circuitry.

At switch on CP22 charges via RP11. When the voltage at pin 16 of IP01 reaches 10·3V it starts to produce pulses at pin 14 to drive the chopper transistor TP16. Once the circuit gets going DP21 rectifies the pulses produced by winding 7-8 of the transformer (LP16), taking over the supply to IP01.

A soft-start arrangement within IP01 protects TP16 at switch-on. CP41 at pin 9 of the chip is the soft-start capacitor: as it charges, the mark-space ratio of the drive to TP16 is altered so that its on time is gradually increased. This soft-start operation occurs every time the power supply is started up.

The switching frequency of the output from IP01 in normal operation is 28kHz. Initially at start-up however the frequency is 2kHz, rising with time. This effect is achieved by using the circuitry connected to pin 10 to alter the time-constant of the internal oscillator connected to this pin. Initially CP33 has no charge, presenting a low impedance to the current flow via winding 7-8 on LP16 and rectifier diode DP32. Thus CP33 takes all the charge and there is no current flow via RP41. As CP33 charges, a greater current flows via RP41, charging CP40. While CP40 is charging, the time-constant at pin 10 is changing and the power supply's frequency increases until it reaches 28kHz. Once CP33 has charged, the regulation loop becomes active.

The current and voltage conditions in winding 7-8 of the transformer are directly proportional to those in the primary winding 2-5. It follows from this that winding 7-8 can be used to provide the information required for regulation, controlling in turn the on time of the chopper transistor TP16 and the energy stored in the transformer. This energy is transferred to the secondary side of the circuit when TP16 is switched off. Thus the regulation takes place in the primary side of the circuit, with no need for feedback from

the secondary side.

Regulation is carried out via a standard error amplifier within IP01, the error input being at pin 6.

The design of the chopper transformer ensures very good magnetic coupling between all its windings. This means that its efficiency is good, also its loop gain, i.e. its ability to respond quickly to sudden changes in the load conditions on the secondary side and maintain the Usys and UA voltages within the specified limits.

The power supply maintains its outputs over a mains input range of 180-264V a.c., providing regulation over a receiver power dissipation spread of 45-90W.

The value of RP32 is important as this, with the rest of the feedback circuit, sets the receiver's working parameters. RP32 also limits the peak overshoots that appear at pin 8 of LP16 when TP16 switches off. It acts as an integrator to reduce the sensitivity of the error-amplifier's input to the overshoots. PP34 acts as the set h.t. control – we've already described the correct adjustment procedure.

When the set is switched to standby the line output stage shuts down and the Usys line is left without a load. Consequently the voltage rises. This increase is sensed by the regulation circuit and eventually pin 7 of IP01 will flag up the fact that the set is in the standby mode. IP01's internal logic then switches the chip to the burst-mode operation previously mentioned: the frequency of the bursts is set at about 120Hz by the time-constant of CP34/RP33/RP34/PP34. In standby the receiver's power consumption is reduced to about 7W.

Driving the Chopper Transistor

First some general points. From the reliability point of view the critical times when a large-current switching transistor is operated with an inductive load are when it switches on and off. While the device is actually conductive, its reliability is a function of the chip size, package design and heatsinking. Steps must be taken to cater for the sensitivity of such a transistor when it switches on and off: much of the circuitry around a chopper or line output transistor is present for this purpose.

Because the base region of a chopper (or line output) transistor is large, it cannot switch off instantaneously when asked to do so. The switch-off signal may be present, but electrons are still en route through the junction. A problem now arises in that the magnetic field associated with the inductive load starts to collapse and the back-e.m.f. principle comes into operation. Thus the collector voltage rises very rapidly (think of the flyback pulse at the collector of the line output transistor). Although the current still flowing in the base region is very small, when this is multiplied by the collector voltage the wattage that has to be dissipated internally in a very short time is considerable. Without protective measures the transistor will 'punch through' and be destroyed. It's important to minimise the effect of the current carriers at switch off, and to slow down the rate at which the collector voltage rises. The measures taken in the chopper circuit in the ICC6 chassis are as follows.

Two techniques provide TP16 with an optimum negative base voltage for low-loss switching off. First DP26 with CP27 and RP26 act on the drive from pin 14 of IP01, establishing a negative voltage at TP16's base from the very first drive pulse. Secondly after several drive pulses the 'diode battery' formed by DP27-30 with CP29 will also have charged to produce a negative base voltage. A further contribution to this action, even before the first drive pulse appears, is provided by the resistor chain RP14-20 which provides CP29 with an initial charge. The effect of this negative base bias is to hasten the passage of the electrons in the base region at switch off.

Further steps slow down the rate at which TP16's collector voltage rises when it switches off. The first is the well-known snubber circuit, in this case CP13/DP13/RP13. Since CP13 has zero charge when TP16 switches off, it presents a low impedance to the rising collector voltage – you can think of it as an electronic shock absorber. The value of CP13 is chosen so that the voltage rise is slowed down sufficiently to give time for the effect of the base charge carriers to be minimised. DP13 'resets' CP13 when TP16 next switches on, so that the circuit will operate again at the next switch off.

Should TP16 fail, it's important to check the components in the snubber circuit – especially if the complaint is of random chopper transistor failure.

There's also a snubber-type circuit, CP50/DP50/RP50, on the secondary side of the circuit. It operates in exactly the same way as the circuit on the primary side but serves two purposes: to damp TP16's peak collector voltage and to improve the power supply's regulation characteristic by reducing unhelpful voltage fluctuations.

With all circuits that use switching devices of this type it's important to minimise the electrical disturbances, sometimes referred to as 'spooks', that are created and can be picked up in say the signal circuits. The two snubber circuits help, along with coils LP13/LP14/LP51 and capacitors CP14/CP53/CP56/CP58, to reduce such effects.

TP16's base drive circuit is really quite conventional: RP22 supplies the current needed, LP29 damps the current swings in TP16's base circuit caused by its switching while R25/28/29 damp the ringing introduced by LP29. Diodes DP27-30 limit the voltage across CP29.

Protection

When fault-finding in this sort of circuitry the first thing to ascertain is whether the receiver is sick downstream, damaging the power supply as a result of excessive current drain, or whether the power supply is producing excessive output voltages and thus damaging the rest of the receiver.

The protection arrangements used in the ICC6 chassis are similar to those in the ICC7/8 and are of well-established type.

If TP16 passes excessive current because of an unhealthy low impedance on the secondary side of the circuit the voltage developed across RP04 will rise. This rise will be fed back to pin 3 of IP01. Two thresholds activate different current limiting within IP01.

If the voltage at pin 3 rises to 0·6V, referred to as the first threshold, the internal logic within IP01 removes the drive to TP16. A voltage rise of this sort could be caused by a transient overload. In this case IP01 will reset itself and the power supply will then start up again. If a genuine fault is present the receiver will trip again. With each trip CP36 at pin 8 is charged to a higher level by an internal current source within IP01. If the tripping continues and the voltage at pin 8 rises to 2·55V the power supply shuts down. The receiver then has to be switched off and on again for it to try a restart.

If there's a severe short or other overload the voltage across RP04 will breach the second threshold level of 0·9V. The power supply will then produce a 'hard' shut down. Again the receiver will have to be switched off and on for a new start retry.

Fusible resistors RP53/54/56 provide protection against shorts across the secondary supplies produced by LP16.

IP01 also monitors the mains voltage. It will shut down

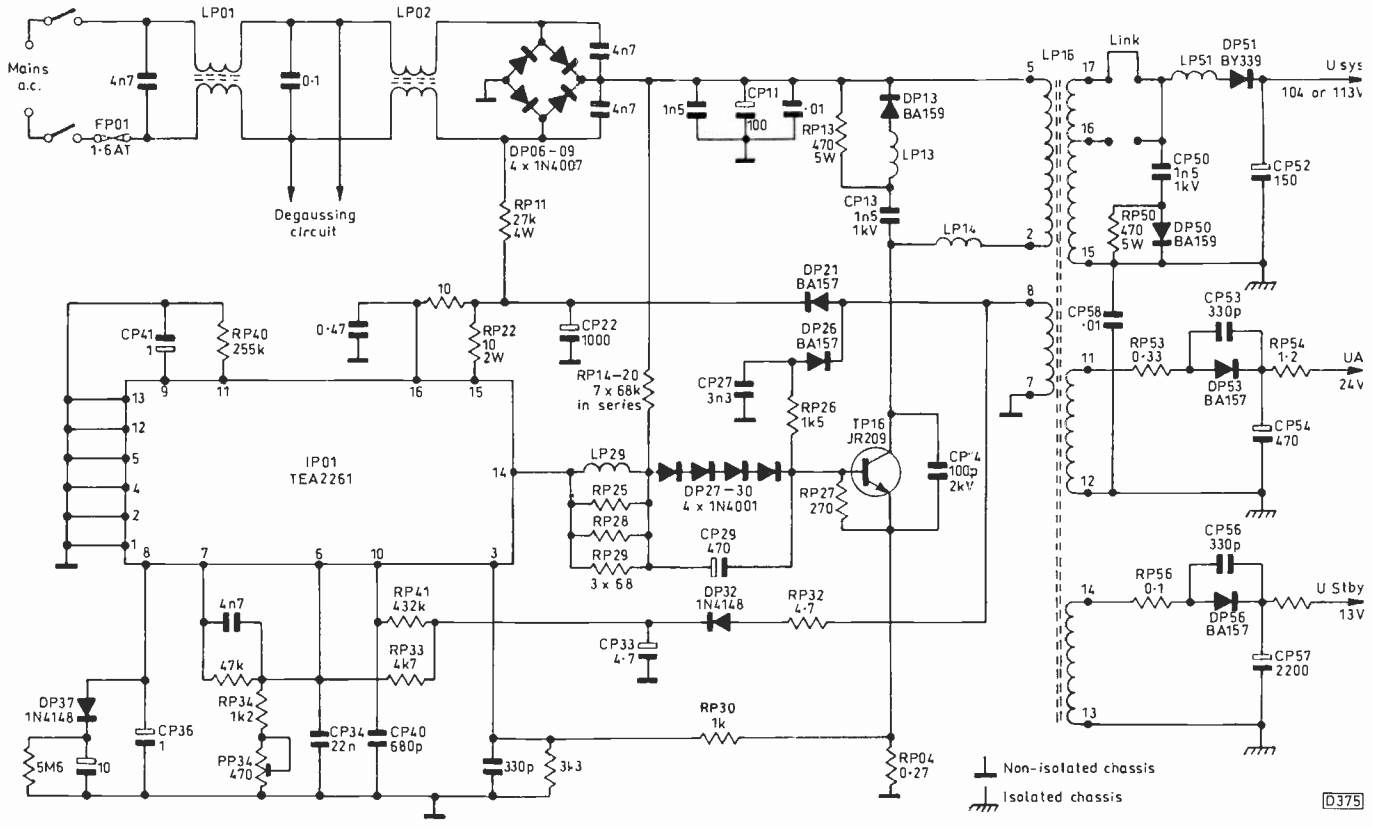


Fig. 2: The ICC6 chassis power supply circuit.

in the event of the voltage at pin 16 falling below 7·4V or rising above 15·4V.

The Microcontroller Chip

The local keyboard is linked to the microcontroller chip and the rest of the receiver via connector BR02. The keyboard is the same as that in the IKC2 and ICC7/8 chassis, though not all the pin connections may be used. The main connections are as follows:

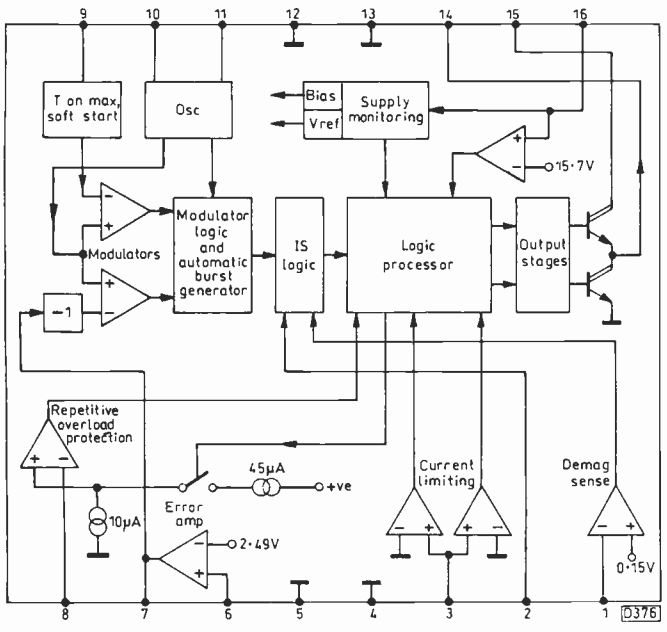


Fig. 3: Block diagram of the TEA2261 chopper control chip IP01.

Pin 1. This receives a 13V (UL2) input to operate the LED indicators when the line output stage is working.

Pin 2. This is for standby. The 10V present here is derived from the UA line via zener diode DR10.

Pin 3. This is the chassis return for the indicator lights.

Pins 4-9. These provide the matrix input to pins 16-11 of the microcontroller chip IR01.

Pin 10. This feeds the remote control commands to pin 35 of IR01.

Pin 11. This receives the 5V (U1) supply for the IR receiver.

IR01 is type ST6393. It has an internal EEPROM to store the programme selections as well as other user settings, i.e. the analogue controls etc. It's helful to be aware of the following pin connections:

Pins 2-4 are the pulse-width modulated outputs for brightness (referred to as luminance), colour, contrast and volume control.

Pin 7 operates via TR16 to switch to the RGB mode if inputs without fast blanking are present at the scart socket.

Pin 9 is connected to pin 8 of the scart socket – the AV sense input. This is used to detect the following conditions: 5V represents a 16:9 format signal; 12V represents a 4:3 format signal. After integration within IR01 an output appears at pin 1 – high for 4:3, low for 16:9.

Pin 10. A TVE (TV Enable) input (high) at this pin shifts the receiver back to the TV mode. This is used to suppress

the fast blanking (FB) information from the scart socket when RGB plus FB inputs are present.

Pin 18. This activates the S-video mode (high) when the receiver is in the AV mode and there's a signal input at the scart socket.

Pin 19. This pulses the standby indicator when childlock is activated.

Pins 22-25. These are the on-screen display (OSD) outputs, 22 red, 23 green, 24 blue and 25 fast blanking.

Pins 26 and 27. These are for line and field sync respectively for OSD operation.

Pins 28 and 29. An LC circuit connected to these pins forms a start-stop oscillator for the OSD.

Pins 31 and 32. The 8MHz clock oscillator's resonator QR01 is connected to these pins.

Pin 35 receives the remote control commands.

Pin 36 is the mute input to stop the sweep tuning once signal reception is optimised.

Pin 37. This switches the tuner between PAL L (low) and PAL B/G (high).

Pins 40 and 41 provide the I2C bus (data and clock) connections to the tuner and text (when fitted) modules.

An explanation of the links between IR01 and the power supply system is necessary. The UStby voltage (13V) produced by winding 13-14 on the chopper transformer, in conjunction with DP56/CP57, is fed to pins 1 and 2 of the TDA8139 chip IR81 (see Fig. 4). This chip contains two stabilisers, one producing a 5V and the other a 9V output.

The 5V output appears at pin 9. When, initially, the voltage at this pin rises to 4·9V pin 6, after a delay set by the charging of CR88 (connected to pin 3), goes high to provide IR01 with halt and reset information. The reset is delayed by the time-constant formed by RR75 and CR79.

When the mains supply to the receiver is switched off, the 5V supply decreases to 4·85V and the halt signal goes low. The 5V supply goes down fairly slowly; it takes at least 50msec to fall to 4·5V after the halt signal jump. This enables IR01 to store the receiver's last operating status in its EEPROM.

The 9V output at pin 8 of IR81 is set by RR81-3, which are connected to pin 7, and an internal 2·5V reference. It's used to supply the line oscillator in IV01 and is switched on by the PO (power on) input at pin 4. This comes from pin 20 of IR01 via TR96.

Troubleshooting Hints

When the receiver is first switched on IR01 waits for an answer from the tuner via the I2C bus. The tuner is powered by the line output stage sourced UL2 (13V) supply. The PLL is powered by a 5V supply which is derived from the 13V line via transistor TH02. So if the PLL supply is present the 13V supply must also be present and the line output stage must be working. If these conditions are not met IR01 will stop and wait.

IR01 must receive correct field and line pulses at pins 27 and 26 respectively for the OSD to be positioned on the screen. It waits for these pulses as an indication that the receiver is on. The pulses must be less than 1V in the low condition and more than 4V in the high condition. If these conditions aren't met IR01 will stay in a loop with no command whatever accepted and the OSD oscillator will stop.

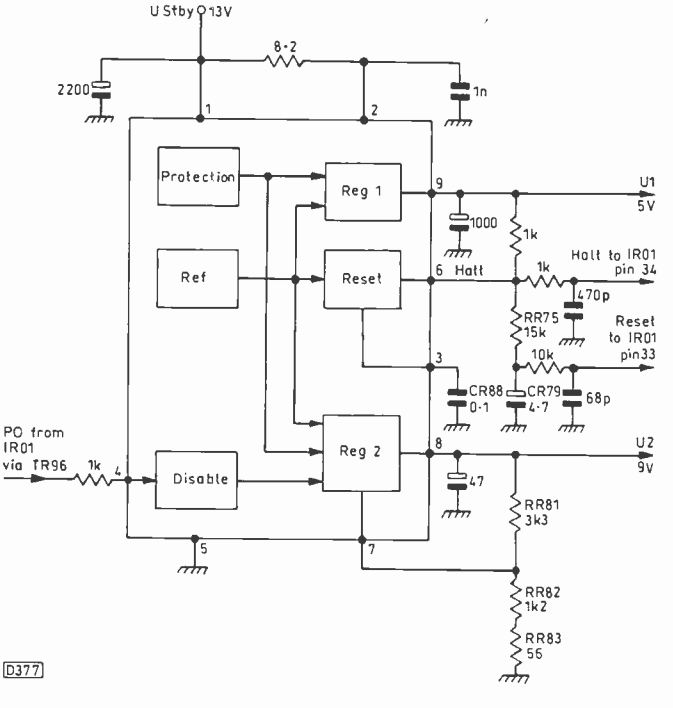


Fig. 4: Circuitry around the TDA8139 chip IR81.

TELEVISION

TV/VCR SPARES GUIDE AUTUMN 1994

The following list gives spares department addresses and telephone numbers or, where these are the same, service department or head office addresses and telephone numbers. Also included are details of various spares distributors.

Aiwa UK Ltd., Unit 5, Heathrow Summit Centre, Skyport Drive, West Drayton, Middx UB7 0LY.
081-897 2425
Fax 081-899 0055.
See also Willow Vale

Akai UK Ltd., Haslemere Heathrow Estate,12 Silver Jubilee Way, Parkway, Hounslow, Middx TW4 6NF.
081-897 6388
Fax 081-759 6118.
See also Willow Vale

Akura. Spares available from Akura Components Ltd., 44 Deerdykes View, Westfield, Cumbernauld, Glasgow G68 9HP.
0236-457 022
Fax 0236-457 333.

Alba Radio Ltd., Harvard House, 12 Thames Road, Barking, Essex.
Spares for Alba, Bush, Goodmans, some Hinari and some Brother microwave.
081-557 9085
Fax 081 507 2132
See also Willow Vale.

Ambassador. Brand name used by Sentra Electronics.

Amstrad. Spares available from CPC Ltd., Chas Hyde & Son Ltd. Willow Vale and Amstrad PLC, Brentwood House, 169 Kings Road, Brentwood, Essex CM14 4EF.
0277-228 508
Fax 0277-209 559.

Autovox. See Comet Group plc.

Benkson. B. Benkert Ltd., Benkson House, 26 Thames Road, Barking, Essex IG11 0JA.
081-594 7532
Fax 081-594 9919. Trade only.

Beon Corporation, 6-10 Badenheath Place, Westfield Industrial Estate, Cumbernauld, Glasgow G68 9HX.
0236-728 845
Fax 0236-738 477.

Beovision/Beocord. Bang and Olufsen UK Ltd., Eastbrook Road, Gloucester GL4 7DE.
0452-307 377
Fax 0452 303 859.
Trade only.

Binatone International Ltd., Binatone House, 1 Beresford Avenue, Wembley, Middx HA0 1YX.
081-903 5211
Fax 081-903 5521.Trade only.

Blaupunkt. Merrivale Television Services, 1 Lockside, Tatbank Road, Oldbury, Warley, W. Midlands.
021-544 6250
Fax 021-552 1503.Trade only.

Bush. See Alba Radio Ltd. Also HRS and Willow Vale.

Canon UK Ltd., Unit 4, Brent Trading Centre, North Circular Road, London NW10.
081-459 1266
Fax 081-459 4202.

Cathay. Spares from Diamond Television.

Commodore. Spares available from CPC.

Comet Group plc., Service Dept., Unit 5, City Park Ind. Estate, Gelderd Road, Leeds LS12 6DR.
0532-311 024
Fax 0532-311 463.

Connexions UK plc., Unit 3, Travellers Close, Travellers Lane, Welham Green, Herts AL9 7LE.
0707-272 091
Fax 0707-269 444.

Contec CTVs sold by Dixons. Spares available from Mastercare Components.

CPC Ltd., Component House, Faraday Drive, Fulwood, Preston, Lancs PR2 4PP.
0772-654 455
Fax 0772-654 466.
Official spares stockists for Alba/Bush, Amstrad, Citizen, Commodore, Epson, Ferguson, Fidelity, GEC, GoldStar, Hinari, Ingersoll, ITT, Logic, Luxor, Matsui, Nokia, Olympia, Olivetti, Orion, Osume, Pace, Philips, Pye, Saisho,Salora, Sinclair, Sony, Toshiba and Triumph. Other spares available.

Crown. Spares available from HRS.

Daewoo Electronic Sales UK Ltd., Unit 640, Winnersh Triangle, Wokingham, Berks RG11 5TP.
0734-272 272
Fax 0734-699 000.
Note: Daewoo brand products only, not OEM products. For the latter, refer to the original distributor.
See also Willow Vale.

Dansai TV and Video spares available from NEI. Audio spares available from Diamond Television,

Decca. See Tatung (UK) Ltd and Wizard Distributors. Spares for chassis up to and including the 110/115 series available from D&S Electronic Services, Building 15, Unit 4, Stanmore Industrial Estate, Bridgnorth, Salop WV15 5HR.
0746-766 641.

Definition. Spares available from Wiltsgrove Ltd.

Denon. Hayden Laboratories Ltd., Hayden House, Chiltern Hill, Chalfont St Peter, Gerrards Cross, Bucks SL9 9UG.
0753-888 447
Fax 0753-880 109.

Diamond Television,
15a Rodbourne Road, Dodbourne, Swindon, SN2 2AG
0793-497 591
Fax 0793-431 687.

Doric. Some spares availbale from Granada Rental Services.

Dynatron. Pre 1981 sets see Philips Service, post 1981 sets spares from SEME.

Elftone Electronics Ltd., 4 Beresford Avenue, Wembley, Middx HA0 1YZ
081-902 6222
Fax 081-903 5011.

Etron. Brand name used by Nikkai Imports Ltd.

Expert. Spares from Tatung, GEC, or Luxor depending on chassis.

FERGUSON
THOMSON TECHNOLOGY

Ferguson Ltd., Service Division, Crown Road, Enfield, Middx EN1 1DZ.
081-344 4412
Fax 081-344 4452. Trade only.
See also CPC, Granada Rental Services, HRS, Chas Hyde, Willow Vale and Wizard.

Fidelity. Spares available from

SEME, HRS, CPC, Wizard and Willow Vale.

Finlux. Spares available from NCS.

Finlandia. Spares available from UK Rental and Retail Ltd.

Fisher. Spares available from Sanyo UK Sales Ltd., Sanyo House, Otterspool Way, Watford, Herts.
0923-222 244
Fax 0923-818 251.

Fujitsu General. See Teleton Electro (UK) Co. Ltd. Spares available from HRS.

GEC. Spares available from CPC, HRS, SEME.

General. See Teleton Electro (UK) Ltd.

GoldStar UK Sales Ltd., Goldstar House, 264 Bath Road, Slough SL1 4DT.
0753-691 888
Fax 0753-517 445.
See also CPC, and Granada Rental Services

Goodmans. See Alba Radio Ltd.

Granada Rental Services, Unit 37, Roman Way Industrial Estate, Preston, Lancs PR2 5BD.
0772-651 551
Fax 0772-655 801.
Spares for Ferguson, Finlandia, Granada, Hitachi, Mitsubishi, Salora TV, Sanyo, Sony, Tashiko. Trade only.

Granada. Spares available from Granada Rental Services.

Grundig International Ltd., Mill Road, Rugby, Warwickshire CV21 1PR.
0788-577 155
Fax 0788-562 354. Account holders only supplied.
See also Granada Rental Services and Willow Vale.
Spares for VCR4000 and SVR4004 ranges available only from Willow Vale.

Grundig Satellite Communications Ltd., Unit 10, Llantrisant Business Park, Llantrisant, Mid Glamorgan CF7 8LF.
0443-220 220
Fax 0443-220 221.

Harwood. Spares available from HI Group, Express Way, Whitwood, Nr. Wakefield WF10 5QJ.
0977-603 333
Fax 0977 603 159.

Hinari. Spares available from CPC, Chas Hyde, SEME.

Hitachi Sales (UK) Ltd., Hitachi House, Station Road, Hayes, Middx UB3 4DR.
081-569 1975
Fax 081-569 1441.
See also Chas Hyde, Granada Rental Services, Willow Vale and Wizard.

HMV. Sets use Ferguson or Fidelity chassis.

HRS Electronics Ltd., Electron House, 100 Great Barr Street, Birmingham, B9 4BB.
021-766 6668
Freefax orderline 0800-212 179
Truedata orderline 021-753 0600.
Wide range of video, audio and television spares including Bush, Crown, Ferguson, Fidelity, GEC, Hitachi, Nikkai, Pace, Philips, Pye, Saisho, Sanyo, Sharp, Tatung, Toshiba and many more. Also all leading domestic appliance brand spares. Trade only.

Huanyu (UK) Ltd., 43 Skyline, Isle of Dogs, London E14.
071-363 0213
Fax 071-363 0214.

Chas Hyde & Son Ltd., Prospect House, Barmby Road, Pocklington, Yorks YO4 2DP.
0759-303 068
Fax 0759-303 620. Sole non-account distributor for Sanyo and Hitachi. Approved distributors for Ferguson, Matsui, Philips, Saisho and Toshiba. Some spares available for other brands. Trade only.

Indesit. Spares no longer available from manufacturers/agents.

ITT. Spares available from NCS. See also CPC and Wizard.

JVC (UK) Ltd., JVC House, JVC Business Park, Eldonwall Trading Estate, Priestley Way, Staples Corner, London NW2 7BA.
081-450 3282
Fax 081-452 2534. Trade only.

Kenwood. See Trio-Kenwood (UK) Ltd.

Konica, Plane Tree Crescent, Feltham, Middx TW13 7HD.
081-751 6121
Fax 081-755 0681.

Korting. Spares available from Telefaults, St Michael's Road, Pitts Hill, Turnstall, Stoke-on-Trent ST6 6LS.
0782-813 757
Fax 0782-835 762.

Lloytron Electronics Ltd., Service Dept., Laltex House, Matthews Street, Ardwick, Manchester M12 5DT.
061-272 8833
Fax 061-272 8844.

Logik. Brand name used by Dixons. See Mastercare Components, CPC, HRS.

Loewe-Opta. Spares available from Wizard.

Longreach Marketing Ltd., Riverside Business Park, Lower Bristol Road, Bath, Avon BA2 3DW.
0225-444 894
Fax 0225-448 676. Distributors of satellite equipment.

Luks Industrial Company UK Ltd., 1/3 Mollins Court, Westfield, Cumbernauld, Glasgow G68 9HP.
0236-457 989. Spares ext. 18.
Fax 0236-457 919.

Luxor. Spares available from NCS.

Marconiphone. See Ferguson Ltd.

Marantz Hi Fi UK Ltd., Kingsbridge House, Padbury Oaks, 575/583 Bath Road, Longford, Middx UB7 0EH.
0753-680 868
Fax 0753-680 428.

Mastercare Components Division, Maylands Court, Maylands Avenue, Hemel Hempstead, Herts HP2 7DE.
0442-888 444
Fax 0442-888 145.

Matsui. Brand name used by Currys and Dixons. Spares available from Mastercare Components, CPC, Chas Hyde and Wizard.

Metz. No UK source of spares. Manufacturers address: Metz Werke Gmbh 2 Co., D8510, Furth, Germany.

Minoka. Spares available from Luks Industrial Co. UK Ltd.

Mitsubishi Electric (UK) Ltd., Travellers Lane, Hatfield, Herts AL10 8XB.
0707-276 100
Fax 0707-278 692.
See also Granada Rental Services and Willow Vale.

Mcrphy Richards Technical Services Ltd., 6 Albany Parade, Brentford, Middx.
081-560 5331
Fax 081-569 7737.

Murphy. Spares available from Diamond Television. Some sets fitted with Fidelity chassis. Older sets fitted with Rediffusion chassis. Earlier sets fitted with Rank chassis (some spares available from HRS).

National, National Panasonic. See Panasonic.

NCS, Bridgemead Close, Westmead Industrial Estate, Westmead, Swindon, Wilts SN5 7YS.
0793-511 636
Fax 0793-485 406.
Account holders only.

NEC. Spares available from SEME.

NEI, Network Spares Division, Unit 6, Southfork Industrial Park, Dartmouth Way, Leeds LS11 5JL.
0532-774 310
Fax 0532-774 312.
Trade only.

Nikkai. See NEI. Also HRS, SEME, Willow Vale and Wizard.

Nokia. Spares available from NCS and Willow Vale.

NordMende. Spares available from Ferguson Ltd. In Ireland EID Ireland Limited, Longmile Road, Dublin 12.
010 353 145 65222.

Olympus Optical Co. (UK) Ltd., 2-8 Honduras Street, London EC1Y 0TX.
071-253 2772
Fax 071-251 6330. Trade only.

Orion. Sole UK spares distributor CPC Ltd.

Osaki. Brand name used by Rumbelows. Spares available from Granada Rental Services. Spares for models VCR31,VCR32, VCR33 and 35 available from Diamond Television.

Pace Micro Technology Ltd., Victoria Road, Saltaire, Shipley, West Yorkshire, BD18 3LF.
0274-532 000
Fax 0274-537128. Spares available from HRS, CPC, Willow Vale and Wizard.

Panasonic (UK) Ltd., Panasonic House, Willoughby Road, Bracknell, Berks RG12 4FP.
0344-860 133
Fax 0344-861 598.
Non-dealer orders handled by SEME Ltd., School Lane, Buckingham, Bucks MK18 1HD.
0280-823 523 (trade)
Fax 0280-814 916
0280-822 755 (retail).

Philips Service, P.O. Box 97, City House, 420/430 London Road, Croydon CR4 4QX.
081-686 5414
Fax 081-681 0796. Account holders only supplied. See also CPC, Granada Rental & Retail Ltd., HRS, Chas Hyde, Willow Vale, Wizard.

Pioneer High Fidelity (GB) Ltd., Pioneer House, Hollybush Hill, Stoke Poges, Slough SL2 4QP.
0753-789 789
Fax 0753-789 534.
See also SEME.

Prinz. Brand name used by Dixons. See Mastercare Components.

Proline. Brand name used by Comet Group plc.

Pye. See Philips Service.

Radionette. See Tandberg.

Roberts Radio Co. Ltd., Molesey Avenue, West Molesley, Surrey KT8 0RL.
081-979 7474
Fax 081 979 9995.
Spares available from SEME.

Saba. Spares available from Blair's Electrical Services, 13 Belgrave Road, Dresden, Stoke-on-Trent ST3 4PR.
0782-599 377
0782-599 378.

Saisho. Brand name used by Dixons. See Mastercare Components, CPC, HRS, Chas Hyde Willow Vale and Wizard.

Salora. Spares available from NCS and Granada Rental Services.

Samsung Electronics UK Ltd., Industrial Unit A, Stafford Park, Shropshire TF3 3BJ.
0952-207 171
Fax 0952-293 459.
Also Willow Vale and Wizard.
Belfast Agents Michael Black, 33 Somerton Industrial Park, Dargan Crescent, Duncrue Industrial Estate, Belfast.
0232-370 587.
Dublin Agents James Mc Connell, 13 Priory Hall, Stillorgan Road, Dublin.
010 353 128 35255.

Sansui. Spares available from Willow Vale Electronics Ltd. Also Diamond Television.

Sanyo UK Sales Ltd., Sanyo House, Otterspool Way, Watford, Herts WD2 8JF.
0923-222 244
Fax 0923-818 251.
See also Chas Hyde.

Schneider. Spares available from Wizard.

Seiko. Audio spares from Diamond Television.

Seleco. TV spares available from Mets, 37 Padgets Lane, Redditch, Worcs B98 0RB.
0527-510 785.

SEME Limited®

SEME Ltd., Units 2E and 2F, Saxby Industrial Estate, Melton Mowbray, Leics LE13 1BS.
0664-65 392
Fax 0664-63 976.
Wide range of spares including Fidelity, GEC, Hinari, NEC, Nikkai, Philips, Pioneer, Pye, Roberts Radio, Sentra and Thorn. Trade only except for Fidelity and NEC cabinet parts. Official Panasonic stockists – for separate address and telephone number see under Panasonic.

Sentra. Spares for pre-1991 models available from Electrontechnik, Mandale Mill, Beacon Road, Wibsey, Bradford BD6 3DQ.
0274-693 331.
Post-1991 spares available from Roadstar Service, Mandale Mill, Beacon Road, Wibsey, Bradford.
0734-340 073
Fax 0734-340 102.
See also SEME.

Sharp. Spares available from Willow Vale Electronics Ltd.

Siemens. Spares for Model numbers beginning FF available from Mastercare Components. Spares for Model numbers beginning FC available from John Langman Ltd., 111/117, Victoria Street, Bristol BS1 6AX.
0272-298 040
Fax 0272-251 528. Trade only.
Spares available in Ireland from Appliance Care Limited, Unit 4, Ballymount Drive, Ballymount Road Industrial Estate, Dublin 12.
010 353 145 02655.

Sinclair. Spares available from CPC.

Skantic. Spares available from NCS and Granada Rental Services.

Solavox. Brand name used by Comet Group plc.

Sonatel. Brand name used by Morphy Richards Consumer Electronics Ltd.

Sony UK Ltd., Spares Division, PO Box 58, Newbury, Berks RG13 4LX.
0635-860 000
Fax 0635-874 099.
Account holders only supplied.
Spares are available from SES at Oldbury **021-544 8818,** Dulwich **081-693 9622,** Glasgow **041-554 2751,** Leeds **0532-527 387,** Staines **0784-466 111.**
See also CPC, Chas Hyde, Granada Rental Services.

Steepletone Products Ltd., Park End Works, Croughton, Nr Brackley, Northants NN13 5RD.
0869-810 081
Fax 0869-810 784.

Sunkyong Europe Ltd., Cedar House, Vine Lane, Hillingdon, Middx UB10 0BX.
0895-272 200
Fax 0895-813 282.
Trade only.

Tandberg. R.D.E. Tandberg, Holly Tree House, The Green, Full Sutton, York YO4 1HW.
0759-372 795.

Tashiko. Brand name used by Granada. Spares available from Granada Rental and Retail Ltd.

Tatung (UK) Ltd., Service Division, Stafford Park 10, Telford, Shropshire TF3 3AB.
0952-290 111
Fax 0952-292 096.

EAST LONDON COMPONENTS
SPECIALIST IN VIDEO, TV HI FI COMPONENTS.
IC's & Japanese Transistors, Video Heads, Motors, Idlers, Tyres, Lopts, and Remote Controls.
64, Plashet Grove, Eastham, London E6 1AD.
OPEN 9AM TO 7PM.
TEL: 081-472 4871
FAX: 081-503 5926
2 Minutes from Upton Park Tube Station.

CONVEY COLOUR TUBES
Registered Office: 'Fairlands', Beckney Avenue, Hockley, Essex SS5 5NR.
Tel: Southend on Sea (0702) 201108
C.R.T.'s REPROCESSED TO ORIGINAL MANUFACTURER'S SPECIFICATION.
PHILIPS, SONY, HITACHI, etc.
POLISHING SERVICE AVAILABLE

One Million Valves in stock, including:
★ CRT for Radar, Monitors, Scopes etc – Not Domestic TV
★ Camera Tubes, Image Intensifiers, Magnetrons, Vidicons
★ Audio Valves
• We wish to purchase valve types KT66, KT77, KT88, PX4, PX25, DA100
BILLINGTON EXPORT LTD
Unit 1E Gillmans Industrial Estate, Billingshurst, Sussex RH14 9EY
Tel. (0403) 784961 Fax. (0403) 783519
Minimum order is £50 UK, £100 Export
Callers strictly by appointment only

SATELLITE TV RECEPTION

Fixed – motorised – components for domestic and commercial systems – receivers – IRDs – dishes – actuators – polarisers etc – 1.5m prime focus antenna only £110 – 1.1dB Triple band LNB only £89 – 80cm dish c/w wall mount from £29 – Dish sizes to 3.0m – LNBs of all types, custom frequency alteration service – Accessories – feedhorns, splitters – Distribution equipment – Modulators – Taps – Cable – Connectors
Prices exclude VAT & carriage – S.A.E. for list
KESH ELECTRICS (SAT SYSTEMS) LTD
Main St, Kesh, Co Fermanagh, BT93 1TF Tel (03656) 31449

NOTTINGHAM – NEW PARTS DISTRIBUTORS
TRADE COUNTER NOW OPEN – VIDEO PARTS, TELEVISION
WE SPECIALISE IN TOP QUALITY REPLACEMENT COMPONENTS. AUTHORISED KONIG DISTRIBUTOR
DISCOUNT PRICES – IE: THIS MONTH GREEN SPOT TX – ★ LOPT ONLY £12.99 ★
WE CAN SUPPLY ALMOST ANY MANUFACTURERS' PARTS
MICROTEL WHOLESALE – 0602 640472
UNIT 4 STEDFAST COURT, WATNALL ROAD, HUCKNALL, NOTTINGHAM NG15 7LD
MAIL ORDERS WELCOMED
PRICES ARE PLUS VAT. NO MINIMUM ORDER CHARGE. ADD £1 P&P
GENUINE PARTS SUBJECT TO PRICE AND AVAILABILITY

EST. COME TO THE EXPERT 1977
J.W. HARDY
NO.1 FOR AERIAL AND SATELLITE
☎ 021-784 8478
231 STATION ROAD, STECHFORD, BIRMINGHAM B33 8BB

SENDZ COMPONENTS
63 Bishopsteighton, Shoeburyness, Essex SS3 8AF.
WE REPAIR ALL TV AND VIDEO HANDSETS. FOR FURTHER DETAILS PHONE: 0702-338894

SONY SERVICE CENTRE
AN ASSOCIATE COMPANY OF SONY UNITED KINGDOM LTD
WHY COMPROMISE?
SONY SERVICE CENTRE
S.E.S. (LEEDS) LTD
UNIT J GILDERSOME SPUR
MORLEY, LEEDS LS27 7JJ
SPARES 0532 527387
REPAIRS 0532 526822

VIDEO HEADS – BELT KITS – PINCH ROLLERS – IDLERS – IDLER TYRES – AUDIO-VIDEO LEADS
CAPACITORS – REPAIR KITS – BATTERIES
CONNECTORS – ON-OFF SWITCHES – MOTORS
J.J. JJC J.J Components **COMPONENTS**
Reputation is our motto – UK's number one for:
• Quality components • Competitive prices • Cheap postage • 10,000 items in stock
• Stocked items posted on the same day • 140 page catalogue free of charge
• Free fax order line open 24 hours a day
63 THE CHASE, EDGWARE, MIDDLESEX, UK HA8 5DN
Sales Hotlines: 081-381 1700/081-952 4641. FREE Fax order line only: 0800-318498
General Fax: 081-381 1700. Answering machine: 081-952 4641
When you have been let down by the rest come and try us for fast and friendly service
LINE OUTPUT TRANSFORMERS – CASSETTE HOUSINGS – SEMICONDUCTORS – REMOTE CONTROLS

GRANDATA LTD
K.P. HOUSE, UNIT 15, POP IN COMMERCIAL CENTRE, SOUTHWAY, WEMBLEY, MIDDLESEX, ENGLAND
Tel: 081-900 2329 Telex No: 932 885 (Sunmit)
Fax: 081-903 6126
DISTRIBUTION OF ELECTRONIC COMPONENTS
CHEAPEST PRICES FOR TV & VIDEO SPARE PARTS
At the moment we are holding 20,000 different items in stock
RING FOR MORE INFORMATION

Audio ★ TV ★ Video COMPUTER SPARES
WE CAN SUPPLY PARTS FOR MANY MAKES OF EQUIPMENT & WILL BE PLEASED TO SERVE BOTH THE TRADE & END USER
ORDER BY POST OR PHONE
VISA, Access, Mastercard, DELTA & SWITCH accepted with pleasure
Please send S.A.E. for more information
MARAPET (TVS)
1 HORNBEAM MEWS, GLOUCESTER GL2 0UE
TEL: 0452 526883

Wiltsgrove Ltd
28-29 RIVER STREET, DIGBETH
BIRMINGHAM B5 5SA
TEL: 0121 772-2733 FAX: 0121 766-6100
Your first choice for quality spares in the Midlands
We specialise in:
● VIDEO HEADS
● L.O.P.T.S
● SEMICONDUCTORS
● REMOTE CONTROLS
● VIDEO SPARES
RENOWN FOR AVAILABILITY, QUALITY & PRICE

R.W.S. ELECTRONICS LTD
(MAIL ORDER)
★ QUALITY T.V., VIDEO AND SATELLITE SPARES ★
★ RAPID DELIVERY ★ COMPETITIVE PRICES ★
★ SPECIFIC NUMEROUS PARTS AVAILABLE ★
59 REDSTONE FARM ROAD, HALL GREEN, BIRMINGHAM B28 9NU
TEL: 0121 778 3609
FAX: 0121 778 3679

WE WILL ONLY SUPPLY TOP QUALITY, BRANDED COMPONENTS, REPUTATION COUNTS WITH US
G.G.L. COMPONENTS
PO BOX 72, UNIT 7, SOUTH JOHN STREET, CARLISLE, CUMBRIA CA2 5AL
TEL: (0228) 39693/20358
Fax: (0228) 515127

Trade only. Spares also available from HRS.

Technics. See Panasonic (UK) Ltd.

Telefunken. See Ferguson. Spares in Ireland available from EID Ireland Ltd. – see under NordMende.

Teleton Electro (UK) Co. Ltd., 154 Great North Road, Birchwood Industrial Estate, Hatfield, Herts AL9 5JN.
0707-272 841
Fax 0707-273 111.

Thomson. TV and VCR spares available from Willow Vale. In Ireland spares are available from EID Ireland Ltd. – see under NordMende.

Toshiba (UK) Ltd., Toshiba Technical Centre, Units 6/7 Admiralty Way, Southern Trading Centre, Camberley, Blackwater, Surrey GU15 3DT.
0276-694 000
Fax 0276-600 521.
Trade only. See also CPC, Granada Rental Services, HRS, Chas Hyde and Wizard.

Trical. Brand name used by Hinari Consumer Products Ltd.

Trio-Kenwood (UK) Ltd., Kenwood House, Dwight Road, Watford, Herts WD1 8EB.
0923-816 444
Fax 0923-819 133.

Triumph. Brand name used by Currys. See Mastercare Components, CPC.

Ultra. See Ferguson Ltd.

Uniden. Crystal Communications, 33 Baker Street, Weybridge, Surrey KT13 8AE.
0932-821 711.

Willow Vale Electronics Ltd., 11 Arkwright Road, Reading Berks RG2 0LU.
0734-876 444
Fax 0734-867 188.
Official spares stockists for Ferguson, Fidelity, GEC, Grundig, Nikkai, Nokia, Pace, Philips, Pye, Saisho, Sansui, Sharp, Thomson. Other spares available.
Also at Enterprise Park, Reliance Street, Newton Heath, Manchester M10 OAL.
061-682 1415
Fax 061-682 9031.

Wiltsgrove Ltd., 28-29 River Street, Digbeth, Birmingham B5 5SA.
021-772 2733
Fax 021 766 6100.
Sole distributor for Definition brand. Official distributor for CME, Futek, Iroda, Konig, Nikkai, Philex and Thorn.

Wintronics. Limited amount of spares available from Lloytron Electronics Ltd.

Wizard Distributors, Empress Street Works, Empress Street, Manchester M16 9EN
0161-872 5438 or
0161-848 0060
Fax 0161-873 7365.
Spares stocked include Akai, Alba, Amstrad, Decca, Ferguson, Fidelity, Hitachi, ITT, Loewe, Matsui, Mitsubishi, Nikkai, Pace, Philips, Pye, Saisho, Samsung, Schneider, Sentra, Sharp, Sony, Tatung, Toshiba. Trade only.

Yamaha Electronics (UK) Ltd., Yamaha House, 200 Rickmansworth Road, Watford, Herts WD1 7JS.
0923-233 166
Fax 0923-244 930.

Zanussi. TV spares available from Mets, 37 Padgets Lane, Redditch, Worcs B98 0RB.
0527-510 785.

General/miscellaneous parts suppliers

Allparts Distributors, 101 Rocky Lane, Tuebrook, Liverpool.
051-260 4825.

AZ Electrics, 183 Acre Lane. Northampton, NN2 8DX
Tel/Fax 0604-841 871.

Chromavision, 95 Langworthy Road, Salford, Manchester M6 5PH.
061-736 6333.

Economic Devices, 32 Temple Street, Wolverhampton WV2 4AN.
0902-712 083
Fax 0902-29 052.

East London Components, 63 Plashet Grove, East Ham, London E6 1AD.
081-472 4871.

Electromail, PO Box 33, Corby, Northants NN17 9EL.
0536-294 555
Fax 0536-405 555.

Electrovalue Ltd., Unit 3, Central Trading Estate, Staines, Middx.
0784-442 253.
Fax 0784-460 320.
Northern branch 680 Burnage Lane, Manchester M19 1NA.
061-432 4945
Fax 061-432 4127.

Express TV Supplies, The Mill, Mill Lane, Rugeley, Staffs WS15 2JW.
0889-577 600.

Farnell Electronic Components, Canal Road, Leeds LS12 2TU.
0532-636 311
Fax 0532-633 411.

GGL Components, PO Box 72, Unit 7, South John Street, Carlisle, Cumbria CA2 5AL.
0228-39 693/20 358
Fax 0228-515 127.

Grandata Ltd., KP House, Unit 15, Pop In Commercial Centre, Southway, Wembley, Middx HA9 0HB.
081-900 2329
Fax 081-903 6126.

J.W. Hardy, 231 Station Road, Stechford, Birmingham B33 8BB.
021-784 8478.

Harrison Electronics, Century Way, March. Cambs PE15 8QW.
0354-51 289
Fax 0354-51 416.

Irwin Electronics, Unit 200, JC Albyn Complex, Burton Road, Sheffield S3 8BX.
0742-739 622.

JJ Components, 63 The Chase, Edgware, Middx HA8 5DN.
081-952 4641.

KSA Wholesale Components, 582 Green Lane, Small Heath, Birmingham B9 5QG.
021-772 2834.

LRC (Spares), 3-5 Whitfield Street, London W1P 5RA.
071-323 2107.

Manor Supplies, 172 West End Lane, London NW6 1SD.
071-794 8751/7346
Fax 071-431 5578.

Marapet, 1 Hornbeam Mews, Gloucester GL2 0UE.
0452-526 883.

MPS Electronics, PO Box 777, Rayleigh, Essex SS6 8LU.
0702-554 171
Fax 0702-553 935.

Nikko Electronics, Dalbani House, 257 Burlington Road, New Malden, Surrey KT3 4NE.
081-336 0566.

T. Powell, 16 Paddington Green, London W2 1LG.
071-723 9246.

PV Tubes, 104 Abbey Street, Accrington, Lancs BB5 1EE.
0254-236 521/232 611
Fax 0254-395 361.

RS Components, PO Box 99, Corby, Northants NN17 9RS.
0536-201 201
Fax 0536-201 501.

Vista Electronics, Unit 1B, Wingate Grange Industrial Estate, Wingate, Co. Durham S28 5AH.
0429-837 100.

Test Case 382

As the nights draw in and the morning air starts to get nippy we are hoping for an upturn in trade, in both the retail and service sides of the business. Even brand-new equipment can present problems however, a point illustrated by the case of old Mr. Sutton and his newly-delivered Sony SLVE80 VCR – with hi-fi sound, Nicam, VideoPlus, dual-mode shuttle and goodness knows what else. He had bought it to replace his ageing Hitachi VT150, which had finally reached the end of the road. Now here he was on the phone complaining about the Sony machine's sound reproduction. "All weird and echoey" he said. "Not two days old and in trouble all ready" he continued. Our good lady Pam arranged to send someone along.

The man despatched was Cathode Ray (CR), whom we met for the first time in this column a couple of months ago. When he arrived at Mr. Sutton's house he listened to the sound from the new machine. It was certainly peculiar. But it was hard to discern the exact nature of the symptom let alone its cause. The sound was distorted to an extent that depended on its frequency and type: a 'nasal' effect with some speech, a slight echo effect with some types of music, and thin, tinny reproduction of certain components of both speech and music. Strange indeed!

They tried playing a recording made by the old machine. It sounded perfectly all right, allowing for the fact that it wasn't a hi-fi recording. No tinniness, no distortion. Maybe the new machine had a recording fault then? The E-E sound was fine, especially with ITV and Channel 4 – the BBC hasn't got around to Nicamising us here yet. CR's next test – a playback check with a commercially-recorded movie – totally dispelled the idea that there was a fault in the machine's record section: if anything the reproduction was even worse, with more discernible echo and distortion. Could the fault have upset both the record and playback sound? Ray had to pass the workshop on his way to the next call. So he beat a hasty retreat with a sample recording, promising to call back later that day after trying the cassette in another machine.

Once in the sanctuary of the workshop CR tried the tape with a hi-fi machine and an ordinary one with a linear/longitudinal sound system. In both cases the sound came through without distortion. The upshot was that he returned to Mr. Sutton and collected the machine so that it could be tested on the bench. As CR traversed his garden path for the fourth time that day, the old gentleman muttered about new-fangled gadgetry and the virtues of his old Hitachi VCR.

On the bench the machine performed, in the playback mode, exactly as it had in the house. This time it was of course hooked up to a different (mono-sound) TV set. Connecting its output to a stereo TV set and then to a stereo amplifier with spaced out speakers didn't improve matters: under these conditions the audio reproduction was even more confused and torn up. While the lads were listening and puzzling, Sage rolled back into the workshop from his lunch.

"Phase" he said, "that's what it is. The Beetles used a sound-phasing effect in the Sixties with Lucy in the Sky with Diamonds, and so did the Small Faces in Itchycoo Park, around 1967." What on earth was he on about? More to the point, did he know what was wrong with Mr. Sutton's video? "Oh yes" said Sage, "there's nothing wrong with his video." Within minutes the problem had been sorted out.

Over to you! The answer's on page 882

TV Fault Finding

Reports from Chris Watton, Steve Cannon, John Edwards, Nick Beer, Chris Plaice, Richard Newman and Chris Avis

Huanyu 37C2

The power supply whined and there was only about 2·7V on the h.t. line. When the base and emitter of the line output transistor had been shorted across and a dummy load had been connected across the power supply's h.t. output the voltage was restored to the correct 115V. Checks in the line output stage led us to the transformer, which had a short on the secondary side. **C.W.**

Finlux 3000 Series

Although failure of the SDA3202 chip in the tuner circuit has been reported before as a common problem, the result being loss of tuning, it's worth noting that a wet finger applied to pin 18 of this chip will usually bias Ti4 enough to display some signal being received. This will prove that the tuner is working. Not very technical, maybe, but it's effective. **C.W.**

ITT Digivision 7180

There was no audio, just a very loud buzz and a load of noise that sounded rather like a computer data tape. The ADC2310 audio processor chip IC3101 was faulty. **C.W.**

Sanyo CTP7131

This set seemed to be dead. Checks showed that the BU208A line output transistor was short-circuit. Before replacing it we decided to check the h.t. voltage, which at 185V was some 40V too high. The cause of this was traced to C314 (220µF, 25V) in the power supply. **C.W.**

Finlux 3021F

With some pictures the colour intensity seemed to be greater in different parts of the screen. The cause of the problem was hum on the 12V supply, the culprit being the 47Ω resistor Ra34 which is connected in series with the earth pin of the 7812 12V regulator chip ICa2. A check on the 12V rail with a voltmeter produced a reading of 12·4V: when the scope was brought into operation we found that about 350mV of hum was present. After replacing the resistor the voltage was correct at 12V and was as smooth as silk. **C.W.**

Amstrad CTV2200

When this set had been on for a few hours the top inch of the picture would become compressed. The cause of the fault was traced to C812 (0·018µF, 160V) which is in the feedback circuit between the TDA3652 field output chip and the LA7800 timebase generator chip. **C.W.**

Panasonic TC2195 (Z3T Chassis)

When this set was first switched on the field scan was cramped at the bottom. As the set warmed up the cramping became less. As Panasonic chassis are notorious for electrolytic capacitor faults I went on the hunt for one that might be the cause of the trouble. But the culprit eventually turned out to be the TDA3653C field output chip IC451. **C.W.**

Finlux 3621F

This set came in because there was no picture or sound. The power supply and the line output stage both worked and the tube's heaters were alight. When the text button on the remote control unit was pressed P100 appeared in the top corner of the screen and, because the text sync unmuted the audio stage, there was sound. A scope check showed that there was a video output from the SAWF so attention was turned to the TDA2450-2 vision i.f. chip ICi2. As the 11V supply was present at pin 3 we decided to fit a replacement. This restored normal operation. **C.W.**

Hitachi CPT1455 (NP84CQ-2 Chassis)

This set was dead, some strange sounds coming from the power supply. We found that the protection diode ZD953 was short-circuit. When this had been replaced a check showed that the h.t. varied between about 80V and the point where ZD953 again went short-circuit. The cause was traced to C908 (4·7µF, 160V). **C.W.**

Philips CP110 Chassis

The bottom half of the raster was missing, with the top cramped. A check on the voltages in the field output stage revealed that R3572 (1·5Ω) had failed. It's connected between the emitters of the field output transistors. **C.W.**

Harwood CTV14

The customer complained that the set was always off tune. This was hardly surprising considering the grotty little presetters and switches, but they shouldn't have needed to be retuned every five minutes. A check showed that the 33V tuning supply was spot on. I then found that presetter six had an effect on the tuning of all the others. Replacing diode D14 produced some improvement: the tuning was further stabilised when diodes D9-D16 were replaced, but it still drifted. When I removed the push-button unit I discovered some fluxy type gunge on both sides of the panel. Cleaning this off finally put matters right. **C.W.**

Philips 2A Chassis

The raster was cramped at the bottom and stretched at the top. The cure was to replace C2575 (4·7µF, 63V) in the field linearity feedback loop. **C.W.**

Philips 2B Chassis

At switch on from cold the picture would appear with the

top half completely black, or with a 3in. black band across the top half of the screen. As the set warmed up, the black area would slowly shrink until it disappeared completely. After this the fault wouldn't return until the following day.

At first a teletext fault was suspected. But a scope check at the blanking pin (28) of the TDA4580 video control chip IC7300 produced a steady zero voltage d.c. display, so we could rule out the teletext area. Over to the contrast control pin 19. Once again nothing amiss. When we checked at the sandcastle pulse input pin 10 however the field blanking section was seen to be about ten times its normal width, thus blanking off much of the picture. As the fault cleared, the width of the field blanking pulse shrank until it returned to the correct mark-space ratio.

The field blanking pulse comes from the field output chip via diode D6564. We'd already tried using a can of freezer, but not in the field output stage area. Freezer checks here brought us to D6570 and C2571, which provide the flyback boost. We replaced the capacitor first (100µF, 25V) and that put an end to an intermittent, head-scratching fault. **S.C.**

Toshiba C2636B

When this set was switched on a very loud, continuous crackle came from the speaker and there was field collapse. The customer said that the screen would return to normal after about an hour. I decided to take his word for it as I didn't want the set's agony to be prolonged. Fortunately the cause of the crackling was obvious when the print side of the PCB was examined: the screw that secures the line output transistor's heatsink to the earth print was loose. When this was tightened we had normal sound.

Although I didn't have the circuit diagram, the voltages around the two field output transistors (an npn/pnp pair) seemed about right. So I concentrated on the electrolytic capacitors in the circuit. To cut a rather long story short, a full-sized picture with good linearity was restored by replacing C448 (100µF, 160V), C316 (470µF, 50V), C317 (2·2µF, 50V) and C313 (4·7µF, 160V). They had all gone very low in value. **J.E.**

ITT Compact 80R Chassis

Excessive width was the complaint with this set. Neither the width nor the EW pincushion presets had any effect. Replacing the BD135 transistor Tr563 and slight adjustment of the presets (R556 and R565) restored a normal raster. **J.E.**

Ferguson TX9 Chassis

"It's just the switch" the customer said over the phone, "I've had a matchstick lodged in it for ages, but now it's gone for good." I'll never learn. Armed with a new switch I arrived at the customer's home. Yes the switch was duff, but so was the T9051V line output transistor. The customer eyed me with suspicion when I told him this, but agreed to the estimate. He didn't take his eyes off me for a minute while I fitted the new bits. I was praying that nothing else was wrong with the set, and wasn't helped by the customer going on about a watchdog programme he'd seen recently about TV and video con men! The gods were on my side this time however – the set worked all right. **J.E.**

Matsui 1480A

It's quite common to have to replace the R2M protection

diode D508 in the power supply: it goes short-circuit, shutting the set down with only the channel indicators working. I had a merry dance this time however: the set was still dead after replacing D508 and the STR50103 chopper chip IC501. There should be a 330V peak-to-peak waveform at pin 3 of IC501 and 103V d.c. at pin 2. Both were missing. I've had failure of one or other of the 330kΩ start-up resistors R502 and R503 in the past, but they were both intact. The culprit turned out to be the 2SB698E power switch transistor Q108, whose emitter is connected to pin 2 of IC501. A check produced a low resistance reading between its emitter and collector. I fitted a BC327 transistor and the set worked fine. **J.E.**

ITT CVC30 Chassis

This old-timer was dead with a high-pitched whistle that came from the power supply area. There was 160V across the h.t. reservoir capacitor C52 but nothing at pin 13 of the line output transformer as R96 (22Ω, 10W) had gone open-circuit. Despite the set's age, it produced a very nice picture once R96 had been replaced. **J.E.**

Panasonic TX15M1T (Z4 Chassis)

There was no video input via the scart connector or the front-mounted phono socket though the set worked fine in every other respect. The fault cleared when the back cover was removed, reappearing when the very thin PCB was flexed back to the straight plane it would assume with the back fitted. The cause of the fault was not the video path going open-circuit. A scope check at pin 20 of the scart socket showed that the video was being lost here because of a short to chassis in the fault condition. We found that the connections for the screened lead that connects the phono video input socket to the scart connection, on pillars at the front of the PCB, were shorting together. Re-spacing and resoldering cured the problem. **N.B.**

Matsui 1410

This set had come in dead some weeks previously. The usual problems had been present: the 2SC3156 chopper transistor short-circuit, the associated diode D508 short-circuit and the 3·9Ω surge limiter resistor open-circuit. Two mica washers had been fitted to the transistor, so one had been removed and of course heatsink compound had been applied, but here we were again with exactly the same fault. Very careful examination of the print showed that there was a hairline crack around one of the joints to the sub-PCB on which the chopper transistor is mounted. Resoldering this and replacing the three failed devices restored trouble-free viewing. **N.B.**

ITT Compact 80 Chassis

This set was dead with the MR856 145V rectifier D733 short-circuit and its 10µF, 450V reservoir capacitor C734 open-circuit. **N.B.**

B and O MX3000 (314X Chassis)

There was a weak picture which the customer said got worse, either fading out or washing out to white. Dry-joints on the tube base socket were common with the earlier MX2000 (31XX chassis), but there's no such weakness with these sets. There were numerous dry-joints on the main board however: resoldering those at the line output transformer cured one fault (the tube's heaters going out). The tube base socket had to be replaced to cure the other fault: the plating on the contacts was peeling, the result being intermittent high-resistance contact with the pins. **N.B.**

Sony KVM1420UB

There was a yellowy picture, i.e. no blue. I've had this before with these sets because the first anode (G2) control hasn't been set correctly. On this occasion however the voltage at the colour decoder chip's blue output pin 5 was low at 3V instead of 5·7V. The voltages at the red and green output pins 3 and 1 were o.k. The chip turned out to be faulty (IC302). **N.B.**

Philips CP110 Chassis

This set would go off after a period that varied from ten minutes to five hours. It would then stay off, coming back on again after a similarly indeterminate period. The cause was a dry-joint at the collector of the chopper transistor Tr7665. Dry-joints were also developing at the pins of the chopper and line output transformers. **N.B.**

Tatung 140 Chassis

One of these sets suffered from field bounce with teletext reception. It was an interlace fault that was soon traced to a dry-joint at pin 8 of connector M501. **N.B.**

Huanyo Model 37C3

There was no e.h.t. and the c.r.t.'s heaters were out. The cause of the trouble was traced to dry-joints at the brown plastic coated inductor that's alongside the scan-coil plug. **C.P.**

Ferguson ICC8 Chassis

This set suffered from intermittent fuse blowing. The cause was leakage in the blue protection capacitors across the bridge rectifier diodes. **C.P.**

Toshiba 2500TBT

When the EW correction is poor you may find that IC361 is hot or short-circuit. The basic cause of the fault is that the 30V zener diode D368 has gone open-circuit. **C.P.**

Philips 3A Chassis

Power supply failure in these sets is far less common than with other chassis in the series. If you do however get problems with shorted BUT12A chopper transistors and resoldering the chopper transformer doesn't provide a cure, check for cracked print around pins 2 and 11 of the transformer. You'll find that the power supply works at up to about 180V from a variac but destroys the transistor when the input voltage is slightly higher. A recent set with this problem had a hairline crack in the print about half an inch from pin 11. The transistor fails because its switch-off circuit doesn't work correctly. It's thus driven hard on with a high mains input. **R.N.**

Grundig CUC220 Chassis

Intermittent start-up was the problem with this set. The chassis uses a standard Siemens type power supply with a TDA4600 chopper control chip. The main problem was that

C631 (100µF, 40V) in the BU208A chopper transistor's base drive circuit had dried out. Replacing this item cured the intermittent start-up, but there was some ringing on verticals. This was cured by replacing C633 (220µF), C647 (1µF) and C642 (100µF) which were all in poor condition. It's also good practice to check the value of R646 (270kΩ). **R.N.**

Sharp C1410HW

This portable was brought in because the on/off switch was faulty. Fitting a replacement was no problem. The customer also complained that there was a black line down one side of the screen. When we powered the set we saw that the picture was shifted to the left. This was caused by the fact that the shift potentiometer had fallen to pieces. A new 330Ω potentiometer put that right. **R.N.**

Ferguson ICC5 Chassis

I must confess that I don't like these sets. This one made a loud tripping noise that came from the line output stage. It would trip three times then die. Apart from lots of dry-joints, I soon found that the EW correction transformer LG11 was short-circuit all round. So I ordered a new one plus a TDA4950 driver chip (IG01) as this had also suffered.

When the parts arrived I fitted them and also replaced a couple of charred resistors. At switch on I was rewarded with. . . nothing, or rather a very soft tripping noise three times before the set once again died. I cold checked all the diodes in the line output stage, also the output transistor, but could find nothing wrong. With the line output stage disconnected and a dummy load connected between the cathode of DP41 and chassis the power supply ran quite happily. So what was wrong?

For want of something better to do I replaced the line output transistor, which was type S2000A3. Not having one of these I tried a BU508AF. The set then worked normally and continued to do so. I later fitted the correct type, but couldn't find anything wrong with the original one when carrying out meter checks on it. Maybe it broke down under load. Something to bear in mind in future. **R.N.**

Orion 14ARX

This set was dead although, I was told, it hadn't had much use. Certainly it was clean inside, but it refused to start. The 330kΩ start-up resistors were o.k., also the STR50103 power supply chip. The clue was provided by R532, a large 2·2kΩ wirewound resistor, which got very hot after a few seconds. It feeds a diode and a 3·3µF, 250V capacitor, C530. This item was dead short, a replacement restoring the set to life.

It's no wonder that the capacitor had failed. It is of minuscule proportions and is mounted very close to three wirewound resistors. The original one had obviously been running very hot, as the outer plastic cover was discoloured. I used a high-grade type of larger proportions, rated at 105°. **R.N.**

Granada C51CZ7 (Salora K Chassis)

This set fought back to the last. It came in dead and the customer said that "a good thump" used to get it going but now nothing happened. First I tackled all the dry-joints in the Ipsalo circuit (power supply/line output stage) which then made some effort to run but took about half a minute to start. This was put right by replacing CB604 (1,000µF, 25V) and CB601 (1µF, 63V). But the set then produced a bright blue raster. The voltage at the tube's blue cathode was low because the blue output transistor was faulty. Once this had been replaced I got a snowy raster which gave way to intermittent picture and sound when the tuning board was moved. More dry-joints on the main panel sockets. The picture then obtained was grainy because of low gain, the tuner being defective.

The final problem was inability to store tuning and personal preference data. Replacing the MDA2061 EEPROM chip on the tuning panel cured this. I'm sure that most of these problems were caused by the constant bashing the customer had been giving the set. **R.N.**

Philips 8841 (G110 Projection Chassis)

I had been asked to look at one of these sets. Apart from their physical size they are no different, in general, from a standard TV receiver. This particular set was in the protection mode, which usually means that there's a fault with one of the c.r.t. driver stages or a field collapse. The three c.r.t.s are run at very high brightness levels and would be severely damaged under certain fault conditions, hence the elaborate protection circuitry.

I was able to isolate the cause of the fault fairly quickly by disconnecting the blue drive. I should then have been able to get a yellow picture, but all I got was a collection of very diffused, barely discernible blobs that moved about. I tried various things, like the focus control and the e.h.t. splitter, but got nowhere. Then I started to think of the expense if the c.r.t.s were faulty – all three? It seemed unlikely, but it was getting late. So the problem was left until Monday morning.

When my colleague removed the front screen to check the c.r.t. lenses the cause of the strange display was immediately apparent. The back mirror was missing! It appeared to have been broken at some time, and the bits had been removed. The set had then been stored. Replacement would still be a very expensive job, and we don't know whether the c.r.t.s are all good. Maybe I'll continue this saga at some later time. . . **R.N.**

ITT CT3835 (Compact 80 – 110° Chassis)

Another dealer had replaced the tube but then obtained no picture. Winding up the first anode control produced a blank raster, so field collapse was eliminated as the cause. The decoder chip had already been tried (twice!), so something was telling it to sulk. A check on the sandcastle pulse at pin 4 of the TDA1941 sync/line oscillator chip showed that the field pulses were absent, though the line component was present. Field pulses at 13V p-p should arrive at pin 18 but didn't. They come from an emitter-follower transistor, T401, which was open-circuit base to emitter and collector, and short-circuit collector to emitter! A new BC548 woke up the decoder and cheered up the dealer. **C.A.**

Philips CTX-E Chassis

As well as no colour, this receiver appeared to have unresolvable grey-scale tracking errors. Once the B&K tube tester had showed that all three guns were firing well our quest for the missing chroma began at pin 8 of the TDA3560 colour decoder chip, where we found that there was a nicely built sandcastle. The voltages around the chip were low however, because the 9V supply at pin 1 was low. The 10Ω feed resistor R3222 had risen in value to 41Ω! A replacement restored the colour and correct tracking. **C.A.**

Servicing the Microvitec Games Monitor

Peter Hubbard

The owner of the local games arcade has just paid us another visit, this time with a Microvitec monitor for repair. These are not quite as popular for arcade games as the Hantarex 9000 we looked at in a previous article (June 1994) but we do get quite a few of them in for repair, usually from Barcrest quiz games machines. Two versions of the chassis are used, the LCCD 02 and LCCD 03, depending on the age of the machine. There are only minor variations between them, and these notes apply to both.

LCCD apparently stands for Low Complexity Colour Display, which shows that someone at Microvitec has a sense of humour. The chassis is obviously not as complex as a modern multisync computer monitor, but it's probably the most complex one used in arcade games. It is the same chassis as the Cub monitor, which was popular for use with the BBC-B computer. You usually find that the chassis is marked either LCCD 02 or LCCD 03 at the rear edge of the PCB: the two versions of the chassis can also be identified by the colour of the PCB – blue in the 02 version, brown in the 03. Note that later versions of the Cub monitor are fitted with the series 4/5 chassis, which is not the same animal.

For an arcade games machine the Microvitec monitor is unusual in being designed to run from a 180-240V mains supply rather than the 120V isolating transformer in the game cabinet. It has a discrete component, self-oscillating switch-mode power supply of the Siemens type, the chopper transformer providing mains isolation. Do not forget that the section of the power supply on the primary side of the chopper transformer T2 is not isolated, and that the mains bridge rectifier's reservoir capacitor C11 can retain its charge for a very long time after switching the monitor off, especially when the switch-mode power supply isn't working.

Equipment Required

As we pointed out when looking at the Hatarex monitor, usually only the chassis is brought in for repair. So a tube assembly will again be required. You can use the same tube/frame set-up as for the Hantarex monitor, though the 120V transformer won't be required and the scan coils will need a different plug. I use the same set-up for all chassis: the scan coils have an array of plugs and leads to suit the various monitors I service.

Inputs

The mains input is via a three-pin plug, the innermost pin being for earth. I never connect this pin while servicing a monitor. The thought of a direct connection to earth should I accidentally touch something live, even with an isolation transformer in circuit, doesn't seem conducive to continuing health. It's not the shock that hurts, rather the sharp edge that is always there when you pull your hand away.

Remember that there is no video drive once the monitor has been disconnected from the game logic board, so you will not see a raster unless you either provide an input or turn up the first anode preset on the tube base panel slightly.

The Power Supply

There's a 2A fuse (F1 and F2) in both the line and neutral connections to the power supply to protect the bridge rectifier (D1-4) and its reservoir capacitor (C11). The output from the bridge rectifier is taken to the chopper circuit via a 1A fuse (F3).

If the monitor is dead, check for approximately 300V at F3. If there's no voltage here check fuses F1 and F2 and the bridge rectifier diodes D1-4, which are type 1N4007. If the voltage is low, check C11 which can be dry-jointed or open-circuit. It's usually a 100µF, 385V electrolytic, but the value is occasionally 220µF.

If there is power at F3 but this fuse is open-circuit, check the chopper transistor TR2. In the 02 chassis it's a BUW81A Darlington device, in the 03 chassis it's an R3213. If TR2 is not faulty check resistor R16 which provides the feedback link to its base. The value is usually 3·3kΩ, 5W but other values are fitted in some chassis and in the 03 version there are two 1kΩ resistors in parallel. If R16 is o.k., check thyristor TY1 by substitution, using a BR103. It's on the front edge of the chassis, by TR2's heatsink.

If F3 has not blown, check R15 (1·5Ω, 2W) which is in series with TR2. It can fail of its own accord or when TR2 goes short-circuit (F3 open). Can you hear the power supply tripping? If so disconnect the tripler and try again. If the power supply is then o.k., replace the tripler. If the tripping continues with the tripler disconnected replace zener diodes D18 (BZX79C7V5) and D20 (BZX79C33V) and transistor TR1 (BC307). Turn the set-h.t. control VR4 to minimum (anti-clockwise) and switch on. If the power supply still trips the chopper transformer T2 is suspect. If the power supply works, reset the h.t. for 124V at the link in the scan coil plug PL201.

If F3 is o.k. and the power supply isn't tripping, check for 124V at the link in the scan coil plug. If the voltage is o.k. the cause of the fault is probably in the line output stage. If the voltage is missing check resistor R8 and capacitor C10 in the start-up circuit. Sometimes C10 is not fitted and R8 is in the position marked C10. R8 can go high in value, inhibiting the start up. It's usually 22kΩ though 39kΩ is sometimes used. C10 is 22nF, 400V. These values apply with the BUW81A chopper transistor. With the R3213 R8 is 3·3kΩ, 1W and C10 56nF, 400V.

If R8 is o.k. check the h.t. rectifier diode D23. Replace with type MR818 if necessary. Also check the reservoir and smoothing capacitors C27 and C28, which are both 47µF, 250V.

A rider should be added at this point. The posistor TH1 in the degaussing circuit can cause various problems. It can blow the mains fuses, cause impurity or result in low voltages when it falls in value.

The Line Output Stage

A faulty tripler often kills the BU500 line output transistor TR202, though it can occasionally fail of its own accord. If TR202 is o.k., check for 124V at its collector.

Absence of this voltage probably means that the 15Ω, 3W fusible resistor R231 has sprung open. If so, resolder it and soak test the monitor. R231 sometimes goes open-circuit for no apparent reason. If it goes open again, suspect either the tripler or the line output transformer T203.

An EW control, VR328 (220Ω), is incorporated in some chassis. It's quite common to find that this and the associated 180Ω, 1W resistor R325 have burnt out with C312 (220µF, 25V) having gone open-circuit, presumably dried out by the heat from the adjacent resistors.

Sync Faults

Check capacitor C210 for dry-joints if the problem is intermittent line sync. Occasionally the TDA1180A chip IC201, which provides both line and field sync, is faulty.

Field Collapse

In the event of field collapse check for 24V at the anode of D302. If the voltage here is low, try disconnecting the cathode end of D302 and check again. When the TDA1170S field timebase chip IC301 fails it usually pulls the 24V rail down with it. If the voltage remains low when D302 has been disconnected check the 10Ω fusible surge limiter resistor R235, the BA157 rectifier diode D201 and the 1,000µF, 35V reservoir capacitor C224.

The field timebase chip can be a bit difficult to remove as it has a large heatsink soldered to the middle six pins (three on each side). It makes sense to unsolder this then remove the chip. Care is needed as the PCB is easily damaged.

No Picture

Check for 200V at the orange lead on the tube base. If it's missing, check the relevant rectifier diode which is D22, type MR818. Also check the 47µF, 250V reservoir capacitor C26.

If the 200V supply is o.k., check for 18V at the input to the 12V regulator IC1. If the 18V supply is missing the usual cause is the 4·7Ω fusible resistor R26; if the 12V supply is missing IC1 (7812) is usually to blame. The 18V rectifier D24 occasionally fails. Replace with a BA157.

See also set black adjustment below.

The RGB Output Stages

Flashing colours is a fairly frequent fault, the usual cause being dry-joints around the transistors on the tube base. The RGB output stages are of the class AB type. A permanent colour bias is also common. First check whether one of the fusible resistors R907, R922 or R936 is open-circuit. In the 02 chassis their value is 1kΩ, in the 03 chassis 100Ω. If these are all o.k. it's tempting to correct the colour by adjusting the background controls. But if you do this the problem usually returns several days later, invariably because one of the 2W resistors R904, R912 or R918 is slowly rising in value. Check them before making any adjustments. Values are 18kΩ in the 02 chassis, 15kΩ in the 03 chassis.

Set Black Adjustment

Disconnect all signal inputs then turn the brightness (VR134), contrast (VR111) and first anode (VR932) presets to minimum (anti-clockwise).

Adjust VR906 (red), VR914 (green) and VR921 (blue) in turn for 140V at each tube cathode.

Advance the first anode preset until a raster is just visible. If the colour is not neutral, reduce the setting of the appropriate control(s) to correct the balance.

Reduce the setting of the first anode preset to just extinguish the raster.

Faults in the tube's first anode supply network will cause brightness problems, including a blank screen. The preset itself (VR932, 2·2MΩ) is suspect while R236 (150kΩ), R934 (180kΩ) and R933 (150kΩ) all tend to go high in value. They are rated at 1W: 2W is better.

Colour Gain Adjustment

A d.c.-coupled scope is required for adjustment of the colour gain controls, also a suitable test pattern with approximately equal amounts of peak white and black on all colours. Set the contrast control (VR111) to maximum then remove link TL901 on the tube base.

Adjust VR903 (red), VR910 (green) and VR916 (blue) for 60V p-p at the emitters of TR901, TR903 and TR905 respectively.

Replace link TL901 and readjust the contrast control for a normal picture.

In Conclusion

Check carefully for dry-joints and replace any tired-looking components before you return the chassis to its hard life in the arcade. Most arcade operators value reliable repairs.

An article on the Cub version of the chassis, in the August 1992 issue of *Televisión*, showed some of the circuitry including the power supply and provided various fault notes. There were also several letters on the chassis in the October 1992 issue.

The Panasonic Z4 Chassis

Part 2

Ray Meadows

In this instalment we'll look at the signals sections of the chassis including the AV switching arrangements.

Tuner and IF

In common with most recent Panasonic chassis the Z4 uses an Ecom ENV series tuner, with unbalanced output. These tuners are good from the cost/performance point of view though there are sometimes selectivity and adjacent channel interference problems.

Fig. 1 shows in outline the 'front end' of the chassis. The sound and vision i.f. amplifier/demodulator chip IC101 is a Mitsubishi M51362SP, which is effectively a cut-down version of the M52020SP used in the Alpha 3 chassis. It does not have a QIF (quadrature i.f.) circuit as no stereo sound Z4 models were planned.

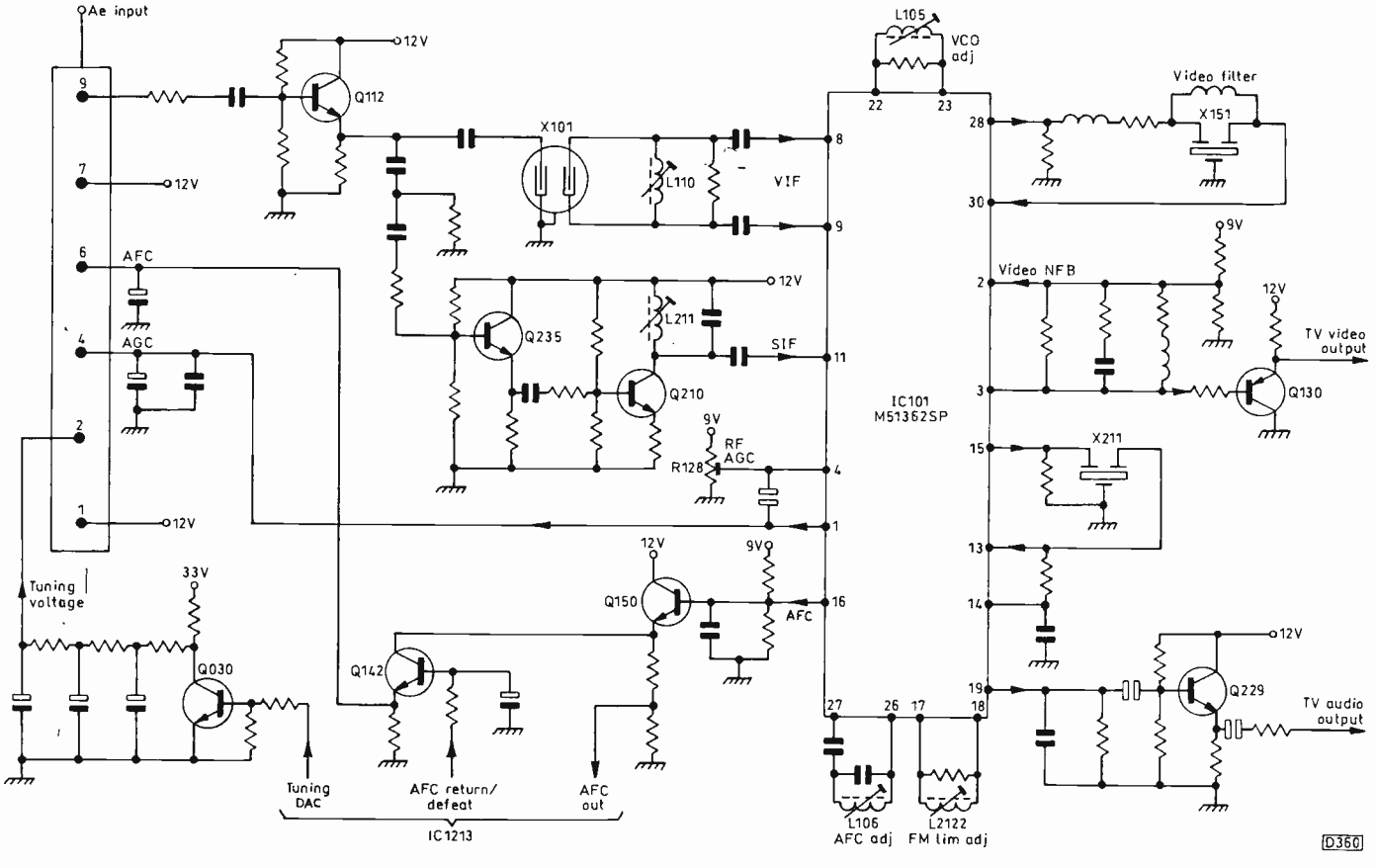


Fig. 1: Arrangement used in the Z4 chassis' front end.

Circuit operation is straightforward. For tuning the microcontroller chip produces a 'DAC' (pulse) output which is applied to Q030. This transistor along with the following CR filter network produces the analogue tuning voltage which is fed to pin 2 of the tuner. The tuner's i.f. output is buffered by Q112 and then passes via the SAW filter X101 which produces a balanced input for pins 8 and 9 of IC101. The signal is then amplified and demodulated within the chip, the output appearing at pin 28. Coil L105, connected to pins 22 and 23, enables the phase of the internal video detector oscillator to be adjusted.

Ceramic filter X151 removes the sound subcarrier, the filtered video re-entering the chip at pin 30. The input is applied to a noise inverter after which equalisation, using negative feedback, takes place. The feedback input is at pin 3, where the filtered sample is fed to the inverting input of the equalising amplifier. The video output at pin 3 is buffered by Q130 before leaving panel B.

The sound i.f. signal is tapped from the emitter of Q112 then amplified and filtered by Q235 and Q210, entering IC101 at pin 11. Detected 6MHz sound appears at pin 15 then passes via the ceramic bandpass filter X211 to pin 13 for limiting and demodulation. L2112, connected to pins 17 and 18, enables the internal three-stage limiting amplifier to be adjusted. Audio emerges at pin 19 and is buffered by Q229 before it leaves panel B.

There's internal a.g.c. within IC101, and a tuner a.g.c. output is produced at pin 1. The a.f.c. output at pin 16 is buffered by Q150 then leaves the board on its way to the main microcontroller chip. It returns and after smoothing passes via Q142 to pin 6 of the tuner. When a.f.c. is not required (whilst tuning) the microcontroller chip switches Q142 off, blocking the a.f.c. feed to the tuner.

Models equipped for SECAM reception use the M52020SP 'Alpha 3' i.f. chip, with two extra SAW filters for the high and low a.m. sound carriers. As the SECAM

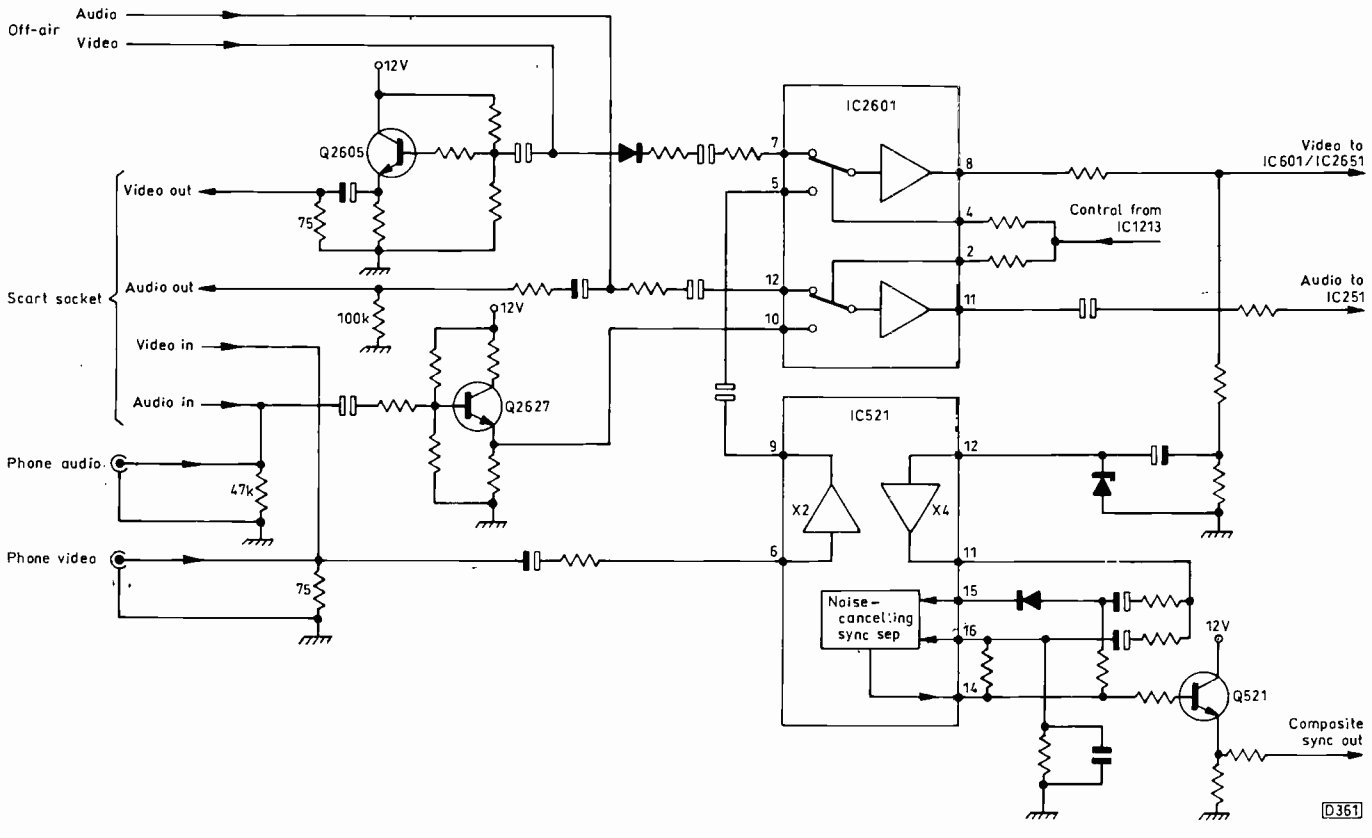


Fig. 2: The TV/AV switching system.

sound system ties up both sound i.f. channels in the chip, an additional f.m. sound demodulator must be provided to cater for PAL signals. Thus IC2101, an AN5215 as used in the Alpha 3 chassis for mono f.m. sound, is fitted. With this lot added the complete circuit becomes almost identical to that in the French version of the Alpha 3 chassis.

The AV Signal Paths

When the audio and video signals from panel B reach panel E they go two ways (see Fig. 2). One provides recording outputs at the scart socket AV1 (the sound signal connection to this socket was omitted in Fig. 2 last month). The other paths lead to the TV/AV switch chip IC2601 on panel H where they are joined by the audio and video input signals that enter from the external AV sockets. Thus source selection takes place on panel H. Note that although the chassis is fitted with a rear scart and front phono connectors these count as a single AV input, the signals from both socket arrangements being mixed together.

IC2601 is a two-pole AV switch with gain. As the external video is attenuated by the dual input socket arrangement the signal is first fed to IC521, where it passes through an amplifier with a gain of two. This restores the video signal to its original level. The external audio input is buffered by Q2627. The switching in IC2601 is controlled by an output from the microcontroller chip.

We'll mention another function of IC521 here, sync separation, for the sake of completeness. The selected video output from IC2601 returns to panel E. A feed is also taken to pin 12 of IC521, whose sync separator section contains a noise-cancelling circuit, a clamp and an amplifier. The output is buffered by Q521: it provides solid, clean field sync pulses for the 50/60Hz standards selection chip IC1301 on panel E. When these pulses are gated with a pulse derived from the line output stage a stop signal is provided for search tuning (see Fig. 4). This also enables the microcontroller chip to synchronise the on-screen displays in the absence of video signals.

S-video equipped models also have a rear-mounted S connector and audio phono socket on panel E (they were shown on panel H in error last month). When the S-video plug is inserted an internal mechanical changeover switch cuts the external composite video path to IC521 and inserts the S luminance in its place. It also passes a signal to the microcontroller chip. A simple diode switch is used for the S chroma feed. To take into account the different Y and C delays with composite and S-video signals a composite/S-video switch (IC2651 – not shown in Fig. 1 last month) is incorporated prior to the video processor chip IC601 on panel C.

The audio and video signals return from panel H to panel E. Here the audio goes to the amplifier chip IC251 while the video leaves again to go to the decoder/video processor chip on panel C.

The RGB Signal Paths

RGB signals are generated by the main microcontroller chip as on-screen display characters, come from the teletext decoder (when fitted) and also come from the scart socket. Remember that these sets were designed when BSB D-MAC receivers with RGB outputs were appearing. The RGB switching circuitry (see Fig. 3) is thus rather complicated for a small-screen chassis.

The RGB inputs from the scart socket and the teletext RGB signals meet at IC3301 whose outputs are determined by the main microcontroller chip IC1213. This receives two RGB status signals, one from the text decoder and one from pin 16 (fast blanking) of the scart socket. In sets intended for Continental markets a third status signal comes via pin 8 of the scart socket. A low level at pin 29 of IC1213 indi-

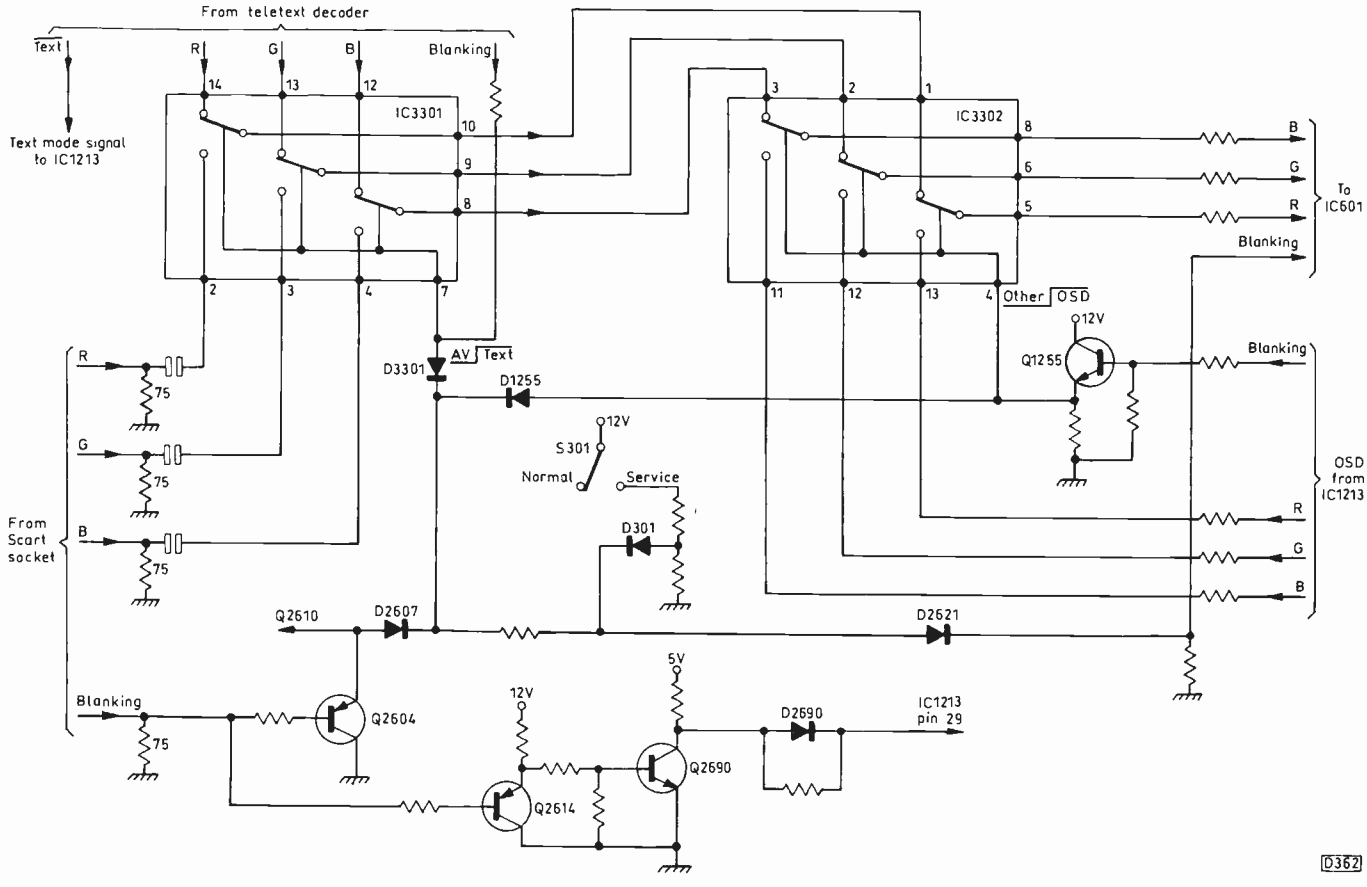


Fig. 3: The RGB signal switching system.

cates that there are external RGB inputs while a low at pin 52 indicates that the teletext decoder is active. Based on this information, IC1213 supplies a signal to pin 7 of IC3301 to select the appropriate outputs. This signal is also passed to the video processor IC601. A further input from the service switch S301 removes all the video signals when the service mode is selected.

The outputs from IC3301 pass to the second RGB switching chip IC3302, where the on-screen display signals from IC1213 are added. In this case only the active blanking OSD signal is used, so that OSD characters can be inserted into other RGB sources. In non-teletext sets the OSD signals

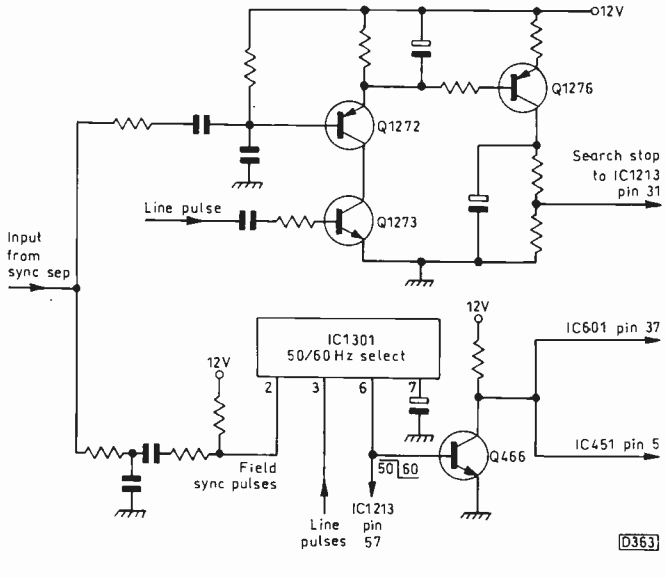


Fig. 4: The 50/60Hz system switch and search-stop circuit.

are fed to both switching chips. At one stage elimination of one of the RGB switching chips was decided upon, but the two chips were retained to maintain chassis flexibility.

The outputs from IC3302 are passed to the video processor chip IC601 which incorporates further switching.

50/60Hz Mode Selection

The circuitry that centres on IC1301 (see Fig. 4) measures the timing of the sync input from IC521 to control 50/60Hz operation. IC1301's output does several things. It switches the video processor between PAL and NTSC operation and tells the field output chip IC451 to adjust the height so that it remains the same in both the 50Hz and the 60Hz modes. It also tells IC1213 the mode in use so that the on-screen display timings can be adjusted to suit the scanning. Note that the field drive from IC601 is used as a trigger input for IC451 which contains a ramp generator.

Fig. 4 also shows the search-stop circuit.

Video Processing

UK models use a one-chip colour decoder based on the Matsushita AN5603K (IC601) which also provides field and line drive outputs. Fig. 5 shows a simplified block diagram of IC601 (video sections only) and the S-video switching arrangement.

The composite video signal from the TV/AV switching chip IC2601, coming via panel E, is buffered by Q601 then enters LC601. This combination device contains both the luminance low-pass filter and the chroma bandpass filter. Additional chroma signal rejection is provided by X301 in the luminance signal path.

With S-video equipped sets the signals pass through the composite/S-video switching chip IC2651. When an S-

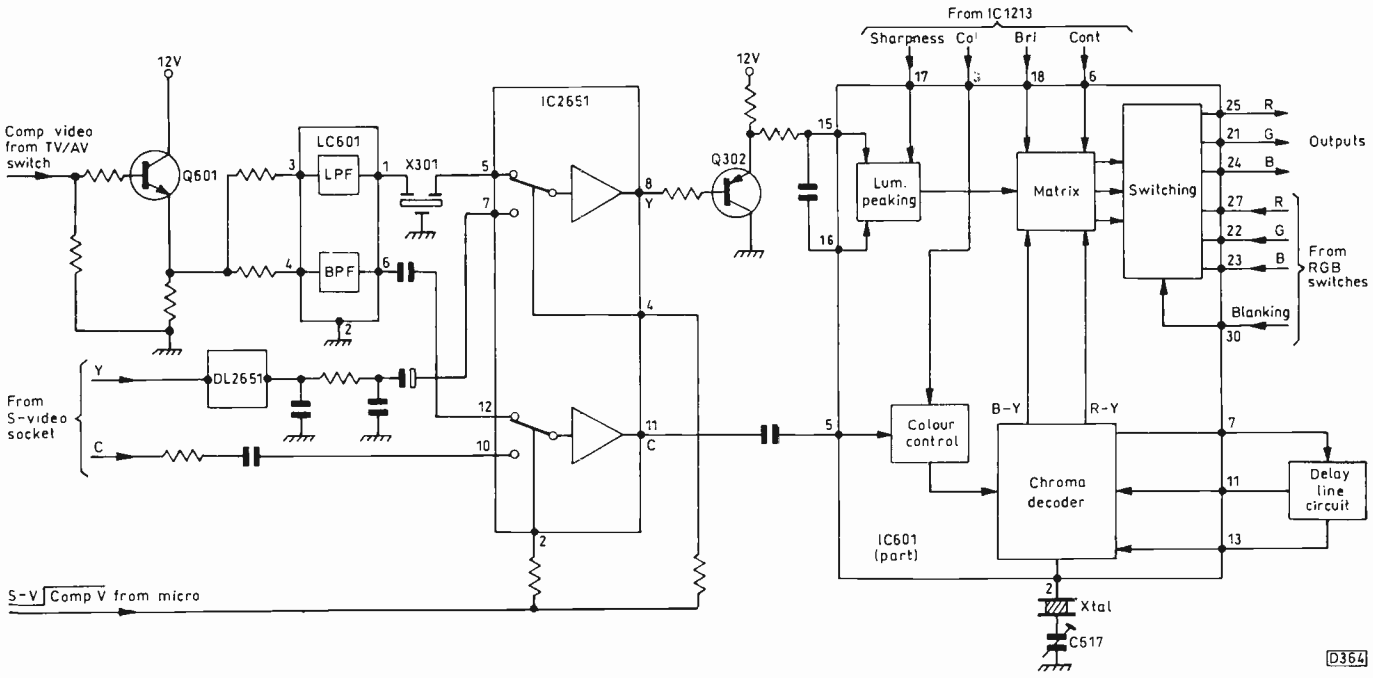


Fig. 5: Simplified block diagram of the S-video/composite-video signal decoding arrangements.

video source is plugged in, the microcontroller chip is informed of this fact by the mechanical switch in the S-video socket. It then produces a low output which is fed to pins 2 and 4 of IC2651 to produce the switch-over to S-video operation. Delay line DL2651 in the S-luminance path adjusts the Y-C delay. The outputs from IC2651 are passed to IC601.

In sets without S-video facilities IC2651 and DL2651 are omitted and a discrete-component LCR filter replaces X301.

IC601 performs all the conventional PAL or NTSC signal decoding and processing. As the chip doesn't have facilities for I2C bus control, the microcontroller chip provides pulse-width modulated digital colour, brightness, contrast and sharpness control outputs which are filtered prior to application to IC601. Presets for sub-colour, sub-brightness etc. adjustment are thus to be found on panel E, close to the microcontroller chip.

When IC1301 detects a 60Hz signal, pin 37 of IC601 is set high for NTSC operation. A limitation of this system is that 60Hz signals have to be decoded in NTSC form. Thus modified NTSC playback, available for example from some Laserdisc players and VCRs, will produce only monochrome displays.

IC601's internal functional blocks include those for chroma processing, a.p.c. and the crystal-controlled reference oscillator. Adjustments are limited to C617 (crystal oscillator, referred to as the a.p.c. trimmer), the chroma delay line preset R611 and matching coil L601. The outputs from the balanced chroma demodulators are matrixed with the processed luminance to produce RGB signals which are then fed to switches for input selection. The selected RGB outputs are fed via panel E to the RGB output stages on panel Y.

SECAM-equipped models use the same video processor chip but also have a second chroma processor IC602 (type AN5633K), a bell filter and additional delay lines.

RGB Output Stages

As in other Panasonic chassis simple class A RGB output stages are used. They nevertheless give good results. Fig. 6 shows the red channel circuit.

The emitters of the RGB output transistors are linked to the sliders of potentiometers that are connected between the 12V supply and chassis. These presets control the d.c. bias applied to the output stages, adjusting the cut-off points. In addition there's a gain adjustment in the R and G output stages to adjust the tube drives.

The collector of each output transistor is connected to the h.t. line via a peaking choke. With 15in. models the h.t. is

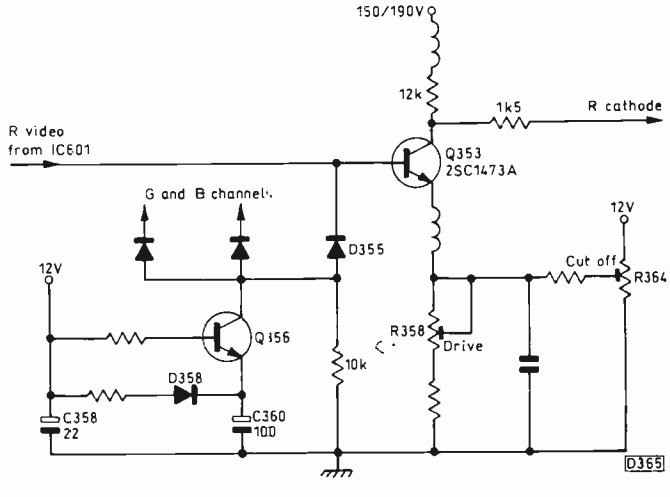


Fig. 6: The red output stage and switch-off spot suppression circuit.

150V while with 21in. models it's 190V. Cut-off and white-balance adjustments are straightforward: use the method described in the May issue of *Television* (page 482) for the Alpha 3 chassis.

Switch-off Spot Suppression

Switch-off spot suppression is provided by Q356 and its associated components. When the set is powered C360 charges via D358 to 12V. Thus the base and emitter of Q356 are held at the same voltage and the transistor is cut off. At switch-off the 12V supply, which is generated by the chopper circuit, falls rapidly. As D358 is then reverse

biased, the voltage at Q356's emitter will be higher than that at its base. Being a pnp device it conducts, blocking the drives to the output transistors.

Audio Amplifier and Muting

The audio signal from the TV/AV switching chip IC2601 (panel H) is fed to amplifier chip IC251 on panel E. This Matsushita AN5265 device contains a voltage-controlled attenuator for volume adjustment and an output stage that provides 3W (music power) with a 20V supply. The 'top-dome' speaker helps to accentuate the sound by projecting it forwards from the sealed speaker enclosure. This is a very cost-effective arrangement, the chip's peripheral circuit containing only a dozen or so components.

The pulse-width modulated digital volume control output from the microcontroller chip is smoothed by an RC network then buffered by Q1201 and fed to pin 4 of IC251. Mute transistor Q202 is also connected to this pin. It receives mute inputs from the microcontroller chip and from the power-on mute transistor Q201. The microcontroller chip switches the sound muting on when either the channel is changed, search tuning is in operation or the signal is lost. The microcontroller chip has PWM digital tone control outputs but these are not used in the Z4 chassis.

Letters

BUILDING A SERVICING BUSINESS

I quite enjoy reading the letters pages in *Television*. The carping can be a bit indigestible, but Paul Smith's letter of encouragement (September) was a nice change.

Three times I've launched out and built a servicing business from scratch. My initial qualifications were C and G Telecomms and Quality Control – not a sniff of television. I rode the range with the other after-hours cowboys, cutting the throats of established shops while holding down a day job. When I felt sufficiently confident I gave up the day job and, with two weeks' holiday pay, launched out full time.

In those 405-line, v.h.f. valve days everybody had a grub screwdriver, could tune i.f.s and locate and change 'picture valves'. When there was a shortage of engineers who could change from monochrome to colour I took a course at an evening college. I was then able to take on subcontract work for shops that either didn't have an engineer of their own or couldn't handle colour servicing. At my peak I would visit five shops in rotation, clearing the work at each one. My experience increased rapidly. I started a small TV rental business, using reconditioned sets that I happened to like (mostly Thorn and Philips). The other sets I reconditioned were sold from the small workshop premises I rented cheaply. I learnt not to flick molten solder on my socks and never to pull an aerial plug from a TV set with my backside pressed against an earthed object.

Ten years after starting I sold the business, in London, and started the whole process from scratch in Norfolk. It took me three years to get the second business off the ground, and that included another day job. I diversified and made the mistake of moving from direct servicing to trade repairs. My main work now consisted of repairing as-new products from the Far East. I eventually had fifteen people working for me. When the importers went to the wall my overheads soon saw me off. In these circumstances you'll find that banks, who are basically fine weather friends, will pull the rug in their own interests. So after nine years I returned to London and another day job.

I'm now back in Norfolk on my third rebuild, older and wiser I hope. After five years I can again say that the first two were the hardest. The gap between the second and third attempts was ten years. This time when I plugged in my soldering iron and opened the doors I found that people expected me to be able to fix their VCRs. My circuits were ten years out of date, and so were my knee-jerk repair fixes. I felt like a cowboy again, but you soon gain experience and after just twelve months I felt at home with the VCRs and TV chassis that were being brought in. With servicing it's not the interesting technical fault but the 'oh no, not another Hitachi LOPT' that pays the wage.

I generate letterheads on a PC, and fax orders with a credit card number for spares that are received by return of post. A modem is used to order spares from MPS Electronics or Willow Vale. This has the added advantage of instant price and availability information and (as with fax) can be done after normal working hours. With parts being readily available you don't need to keep an expensive stock of spares. Get an answerphone, which will pay for itself in no time. Some callers will hang up, but people are becoming used to talking to these machines. Be prompt in calling them back.

I can highly recommend Irwin Electronics for the fast and reliable supply of VCR refurbishment kits at reasonable prices – I regularly place orders as late as four o'clock in the afternoon and receive them the next day. Willow Vale is very fast and friendly. I opened an account with them for £100 without references (it's not always easy to open an account without a track record).

CPC has a large catalogue but it's advisable to check on prices which can vary widely, affecting your profit margins. Delivery can be quick but can also take several days. Even with a new catalogue it seems to be my luck that wanted items have been discontinued. Some of their prices are hard to beat however.

Don't be afraid to use pattern spares when they come from reputable manufacturers such as Konig. They can be a fraction of the price of an original and can be fitted with confidence. Being competitive with your labour charges can be a waste of time should the cost of spares push the economics through the roof. Check out Grandata and Sendz, who both offer bargain spares. Grandata will respond by return if faxed but Sendz can be approached only by snail mail.

My experience with firms like CHS, SEME and HRS can only be described as inscrutable. Requests for catalogues may be met with a call for payment or a banker's form. RS Components will supply only account holders but can be approached through Electromail, which is fast and efficient: you'll need to buy the catalogue.

I have been building up a library of manuals for the chassis more commonly encountered. On the odd occasion I've been helped out by getting a copy of a circuit from the local technical college.

Have a go, but keep the day job until your reputation and customer base grows sufficiently. Keep your overheads low, otherwise they will crush you during the quiet summer spell. If you are any good you'll succeed. And if you start to make a fortune let the rest of us know how you do it.

Never stop learning and keeping up with developments.

Don't let technofear stop you entering unchartered waters. Total knowledge of a system is wonderful, but the majority of repairs can be carried out with common sense and good working practice. Expertise is learnt, in a very short time, not in a classroom but on the bench. I expect callback rates to be less than one per cent.

Not every job that's brought along is worth doing. If you can't guarantee a reliable repair for the money spent, pass the job over. Many things are repaired and put back into service when a replacement would be a better bet. But don't write off something that could give good service. Give a no-quibble, money-back guarantee to avoid problems with customers who will never be pleased with whatever you do.

I've found that over thirty years working in and around this business have been rewarding: often frustrating, but always interesting and varied.

Ian Rees,
Wisbech, Cambs.

DECLINE OF THE TRADE

I've been an avid reader of *Television* for some twenty five years. During this time there has been much comment on the decline of our once great trade. It's time to analyse the reasons for this decline.

Despite inflation, there has been an almost continuous decrease in the price of new products. For example, a large-screen colour TV set can be bought at less than the price quoted twenty five years ago. It will have remote control, and possibly teletext and Nicam stereo sound. Once a trend towards lower prices becomes established, the public finds it hard to accept that there should ever be an increase in the price of any of our products. Who can blame them when the multiples every week find any excuse to advertise yet another 'sale'? But it's not easy to be sure about who exactly is to blame for this crazy situation. Is it the retailers; or is it the manufacturers, who fail to ensure that the price of their new products reflects the added value of improved technology and the rise in the price of other consumer goods and the cost of living?

A typical new family car cost about £1,000 on the road in 1970. A similar car, though with improvements, will today cost you around £12,000. On a pound-for-pound basis, your average 20in. colour set with teletext etc. should cost around £2,500! It seems that manufacturers and importers concentrate on price alone in a desperate though misguided attempt to increase market share.

I vividly recall a visit from the local Sharp area manager in 1987. He told me that the price of a certain portable CD/twin cassette/radio model that had previously retailed for typically £349 was to be reduced to £249, i.e. by almost thirty per cent! He tried to convince me that this would be to my benefit as the product would be easier to sell. The point he conveniently overlooked was that we would have to sell virtually fifty per cent more in product volume to maintain the same gross profit level.

The problem is not just with new equipment. Those of us who have benefited from the higher gross profit generated by used equipment are finding that the trade price of typical ex-rental VCRs for example is now disproportionately high. If you have to pay £50-60 plus VAT for a 3V35 it can be very difficult to justify a price tag of say £99 when prospective customers know that they can buy a brand new two-speed machine at the local discount store for as little as £159. They don't worry about the fact that it's a little known brand.

I sympathise with your correspondents who have complained about manufacturers' failure to provide technical support to non-account holders. If the manufacturers were to return to the real world and give priority to reasonable profit margins rather than market share at any cost they might be able to provide such support for their customers through retail outlets.

When it comes to servicing, the price of spare parts has not fallen in the same ratio as that of new products. Yet the cost of living and hence that of skilled labour is forever rising. Because of this, any product with a price tag of less than £50 is no longer economical to repair – either in or out of warranty.

Your correspondent ('Less Gloom Please' August) is right about one thing – servicing as we know it is surely on the way out. He is also correct in saying that large profits and an easy time cannot be expected. But he must appreciate that in the commercial world you cannot survive on job satisfaction alone. I do however know of two local businesses that have, in my area (Gloucestershire), been unusually successful in our trade. Could the reasons be that in both cases the owners have an admirable grasp of the importance of maintaining profit margins and fund their operations themselves – in other words they work for themselves and not for the bank manager!

The mind boggles at where it's all going to end. How soon will it be before we see Nicam CTV sets at under £200 with a six-year guarantee, twelve months' interest-free credit and nothing to pay for six months? Will the manufacturers, retailers and the public ever wake up to the fact that without profit our situation can and surely will get only worse?

S. Cook,
Gloucestershire.

TECHNICAL SUPPORT

It was with great interest – and not a little sympathy – that I read John Edwards' letter headed the "need for technical support" in your August issue. He can take some comfort from the fact that his is not a lone voice in the wilderness. The problems he experiences with manufacturers who restrict access to technical information have become more and more widespread in recent years, to the detriment of the consumer, the retailer and the trade in general.

While I appreciate the tough times that manufacturers have faced over the last few years, I have always believed that by cutting back on technical support they are digging themselves deeper into the hole. As John Edwards says, why should he bother to recommend a manufacturer's products to his customers when he knows that he won't receive an iota of technical help should a piece of equipment cause difficulties?

Willow Vale has been attempting, in its own way, to step into the breach with the introduction of our Techline. This began as a fairly low-key telephone advice service in the spring of 1993 but now has a staff of six who deal with upwards of 800 calls a month from retailers and technicians needing assistance in repairing TV sets, VCRs, audio, satellite and ICE equipment, microwave ovens and business equipment. It has become a major feature of our operation and, being currently free to all Willow Vale account holders, needs its own substantial budget.

Unlike most manufacturers however we don't regard this service as a troublesome loss-maker. While we pride ourselves on our corporate policy of putting the customer first, we also recognise that a service such as Techline creates a great deal of goodwill which indirectly boosts our business. Many manufacturers would be well advised to do likewise.

Techline is fully supported by three manufacturers at present – Grundig International, Sharp and Pace – though the scope of our service embraces all major brands. We hope that others will join them, especially those who at present could be accused of doing their customers, the industry and their shareholders something of a disservice.
Max Hofmann, Marketing Director,
Willow Vale Electronics Ltd.,
11 Arkwright Road, Reading RG2 0LU.

MOTORISED DISH NOISE

A few points with reference to motorised dish noise, which has come up in the DX-TV column recently. A very good book called *Noise and Vibration in Buildings* was published by a company called Sound Services (I'm not sure of the exact title): it's now possible to have a radio studio next door to a plant room. The fact that actuators are noisy is probably because the gears are not machined to the theoretically optimum tooth shape, which varies with the gears' diameter: as a result the teeth behave as cogs.

With regard to airborne noise reduction, check whether the dish rings or pings when tapped. A good thick layer of car body underseal applied to the rear of the dish is a help in this case. A good brand is Adup Bronze (adup = anti-drumming under protection). Comma also does a good product.

Structurally transmitted noise can be troublesome. For example a hammer-action drill can often be heard several houses along a terrace. The answer is rubber. Price up four Leyland Mini exhaust mounts at a motor factors. The type with a round plate at each end and a five-sixteenth stud is good. They cost only about £1·50. If they are placed in a large enough square, wind deflection won't be a problem. One possible fixing method is to obtain some round steel bar – concrete reinforcing bar is good – and get a friend with a lathe to drill and tap the ends to suit the mounts. Screw the mounts to the bars, drill the wall and cement the bars in. Resin is quicker but messier. Isopon or fibreglass resin mixed with sand are also useful fixatives. Araldite is too slow and costly for this purpose.

If tracking speed isn't vital, try reducing the voltage applied to the drive motor. The positioners I've seen seem to apply voltage to the motor until the correct jack count is reached: the jacks will run happily at 18V, 24V or 36V.

It should be possible to get the materials for the job for less than £15, including five litres of underseal – a thin coat is no use. It may even be possible to use 'sandwich' sound deadening, as in Lexus cars. Do ensure that any bits glued on can't fall off and cause injury.

Finally, exploding switch-mode power supplies – there have been several references to catastrophic failure with this type of circuit. Spikes on the mains supply is a likely cause, so I fit VDRs in the mains plugs of all my prized electronic possessions. At 50p a time it pays!
D. Benyon, I.Eng.,
Bude, Cornwall.

MATTERS ARISING

It seems that capstan motor drive chips frequently fail long before the rest of the motor assembly wears out. Perhaps this is due to lack of lubrication, or maybe because these motors are often used to drive everything from the tape transport to tape and cassette loading via various ingenious linkages. Whatever the cause, these i.c.s now fail with monotonous regularity. But few manufacturers supply this i.c. as a separate part. This is a short-sighted waste of resources that makes many an otherwise healthy machine beyond economic repair.

We have written to several manufacturers for an explanation. Hitachi told us – we wrote about the VT520 – that these parts are not manufactured separately from the motor! Similarly silly excuses have been received from other manufacturers. In our experience the only helpful manufacturer in this respect is Panasonic, who will at least supply the circuit board with stator and i.c. at a reasonable price (about the third of a new motor). Because of their superior design qualities however these parts hardly ever fail in Panasonic machines.

When are some manufacturers going to realise that this difficult attitude to the supply of discrete parts will affect the future sales of their products? They should supply the parts that engineers need rather than offering only what is more convenient to themselves.

On another subject I feel compelled to complain again about your thoughtless front cover photography. The August front cover shows a technician (?) reaching into a set with both hands: one hand is grasping the metal chassis while the other one seems to be adjusting the purity/convergence ring magnets. There are high voltages in this area. They can give you a nasty belt even when you have one hand behind your back. With an earth path through the heart muscle (via the other hand attached to the chassis) a shock could be lethal.

Finally it would be interesting to know what proportion of faults is caused by 'a large pair of unqualified hands' delving into the circuit before it reaches the technician (Ray Porter's article, September). In my experience this is a factor in over half of the faulty equipment brought in.
L. Mackenzie, T.Eng.,
Edinburgh.

What a Life!

– continued from page 844

worked well and went on and on. Later we connected a meter across the VDR and warmed it. Its value rose until it was virtually open-circuit. Then we froze it and the value came back down. Our thanks, Graham.

Walter Wingnut's KT4

Walter Wingnut brought in his Pye TV, one fitted with the Philips KT4 chassis. "Smells of burning" he said, "and it whines and the picture's milky."

"Poor thing" I said. Off he went and we dismantled the set. Our noses directed us to the line output stage panel, where we found that R3166 (1·5kΩ) was little more than a tube of soot. This resistor is in series with the earthy end of the diode-split e.h.t. section of the line output transformer, and is linked to chassis by the bulky 47nF decoupling capacitor C2167 – the network provides a sensing point for the beam limiter. There is also a feed from this point to the EW correction circuit, to stabilise the width when large beam current variations occur. The obvious thing to do was to check the capacitor. It tested all right, but we decided to replace it along with the resistor.

When we tried the set again there was a good picture and the whining had stopped. The resistor ran cool during a soak test lasting several hours. So we pronounced the set fit and put it aside awaiting Walter's return.

VCR Clinic

Reports from John Edwards, Brian Storm, David Belmont, Chris Watton, Simon Bodgitt, Gerald White, John C. Priest, John Pitt-Francis, Richard J. Avis, Mike Leach and Gerald Smith

Akai VS23

The loading arms were in the fully laced-up position but the carriage (loading block as Akai calls it) was in the eject position. I've had this fault before, so it was simply a matter of removing the carriage, resetting the timing and fitting a new mode switch. **J.E.**

Panasonic NV366

When this VCR was switched on the take-up spool rotated, even without a cassette loaded. With a cassette inserted all tape modes worked but there was no auto-stop when the tape had been fully rewound. The cause of all this was dry-joints at plug/socket PL6010 on the main PCB. Because of its position at the rear edge of the board it is subjected to physical stress when the board is hinged down, there being very little slack in the wiring to the socket. **J.E.**

Panasonic NVL25

There were power supply problems, with D1113 on the secondary side of the supply short-circuit. This device is present to protect the machine from excessive supply voltages. If the supply lines rise above a certain level it goes short-circuit and brings the excess-current trip into operation until the power supply is reset. Unfortunately when D1113 had been replaced there was still no power – until C1109 (1µF, 400V) in the start-up circuit was replaced. But there was still a problem: C1114 (47µF, 63V) was also open-circuit, and D1113 again blew. When D1113 and C1114 had been replaced the machine worked normally. **B.S.**

Panasonic NVFS88

This S-VHS machine refused to record, despite the display indicating that it would. All it did was to erase the previous recording, which showed that the full-width erase head was working. After thumbing through many pages of circuit diagrams it became evident that IC6003, working with the main systems control chip IC6001, provides the various record switching signals – or, in this case, didn't. A new BU5863F chip restored the machine to its former glory. **B.S.**

Panasonic NV180

This portable didn't like being portable! Any attempt to move it would be like pressing the stop button, but leave it alone and it would operate perfectly. When the cabinet was removed the fault disappeared. Every plug, connector and lead was checked and tightened, but the fault returned upon reassembly. With a certain amount of language not normally heard in the workshop I removed the casings again. After some time the cause of the fault was traced to the five-pin edit socket connections on the front panel: two of them would short together when the unit was tilted. I cured the problem by fitting sleeving over the exposed solder connections. **B.S.**

JVC HRD750

The complaint with this machine was that it kept switching from hi-fi to normal, being almost always in the normal mode, when a prerecorded tape was being played. The cause was a slightly misaligned exit guide. I'm getting a few of these machines with loose entry/exit guides. **D.B.**

Philips VR6462

When reverse or play/search reverse was selected the supply reel would rotate slightly then the machine would go into the standby mode, with the tape still laced. If any key was pressed the machine would power up and unthread the tape. All the other functions worked perfectly.

The cause of the fault was eventually traced to the control disc (large gear) on the underside of the deck. When we removed this we found that a small piece of plastic was stuck in the groove that operates the back-tension arm. The debris made the control disc jam before reaching its destination. The control system saw this as heavy running of the threading motor and thus shut down to standby. **C.W.**

Ferguson 3V35/JVC HRD120

The problem with this machine was intermittent loss of the signals. We found that the 33V tuning supply disappeared intermittently, the cause being C21 (100µF, 50V) on the power supply panel. It's part of a voltage doubling circuit. **C.W.**

Sanyo VHR4160

Fast forward and rewind would sometimes operate, at other times the machine would wind only very slowly. The cause of the trouble was the fact that the brakes stayed on: after a few revolutions the deck stopped. All this was in turn because the loading belt was worn, though it was not immediately apparent. **C.W.**

Sony SLV401 (Hitachi 520 deck)

The customer said that he had had a lot of trouble with this deck, which had been looked at by others. As the fault persisted it was a challenge – though not much of one as it turned out. The complaint was that the machine would rewind for only eight-ten seconds, then stop: after its visit to the last repairer the machine now had the same trouble in the forward/play direction.

I looked in the top and selected the various transport modes. The deck worked fine but stopped after a few seconds. So I checked at the deck connector, where the reel pulses should be. There was only a minute waveform with the tape moving in either direction. A look at the sensors then proved useful. As I removed the bottom I saw a piece of green wire that joined the outputs from the supply and take-up sensors. I presume that this had been done in a bid to steal some pulses from one side to make up for those missing on the other side. Tut, tut, whatever next?! Well, after removing the wire the deck worked perfectly in the forward direction, but reverse still stopped after a few seconds. A check at the relevant sensor showed that there was no output. When the reel disc was removed the reason

for this was instantly apparent: the magnetic ring that operates the Hall device had fallen off and was stuck to the steel deck. When this had been refitted to the disc all the problems had been cured. We now had beautiful, square take-up and supply side pulses.

The curious thing for me is that if someone had sufficient knowledge to realise that the deck stopped because of lack of reel pulses (hence the wire link), why didn't he look at the sensor? Come on Bill Bodgey, at least have a look first before adding extra bits! I was so pleased with the outcome that I almost didn't charge for the job. Thankfully I returned to my senses before the customer came back to collect his machine. **C.W.**

Sanyo VHR3300

The deck functioned in all modes but would stop intermittently in play or record. The tape counter showed that the tape was moving steadily, so the reel pulses were initially discounted. They were in fact intermittent: cleaning the opto unit cleared the fault. Don't be misled, as I was, by thinking that the reel pulses drive the counter. It's driven by the output from the audio/control head. **C.W.**

Panasonic NVJ35

The deck made its usual whirry noises when the machine was plugged in but after two seconds it was dead, with no display or deck functions. Checks in the power supply department showed that all the output voltages were present and that during the brief period after connection to the mains the switched supply lines were also correct. So why no display? Over to the display section to check around IC7501. Its 5V supply was correct and the resets were o.k., but there was no waveform at the osc. 1 pins 2 and 3: one pin was at 5V, the other at zero. Replacing crystal X7501 restored normal operation. **C.W.**

Panasonic NVFS90

As the owner copied tapes from his camcorder he was concerned about the overall picture quality. There was pulling and colour phase shift at the top of his copies, and horizontal tearing. In this situation it's highly probable that there has been head and tape path wear – the VCR had been in use for a couple of years.

So the owner agreed to replacement of the video heads, the tension band and the pinch roller. The resultant tape path improvement made the horizontal tearing much worse however. We discovered that the vertical sync pulses had noise at the bottom: so too, on closer inspection, did the horizontal sync pulses. This noise turned out to be some type of carrier signal. It took a couple of hours one evening to trace the cause of the fault to a CCD delay line circuit on the subluminance board – in fact it took some time to find the board! The culprit was C1 (1µF) which couples the video signal into the CCD delay line chip. Once this capacitor had been replaced the picture was greatly improved. **S.B.**

JVC HRD880

When cold this machine would power off in fast forward or rewind. It was o.k. when hot and played all right. When stop and fast forward were selected during play the machine unthreaded and then started in fast forward slowly for a few seconds, but at the point where the fast forward system would normally accelerate the power unit shut down and all the displays went out.

Checks showed that the 17V motor power supply was switched to the capstan motor by the micro chip and Q601 for 8msec before the power supply shut down. The capstan motor current rose to approximately 250mA, which was normal, so the capstan motor was o.k. The trouble was that the power supply couldn't provide the current. A substitute power supply solved the problem, and we subsequently found that C19 (270µF) was down to about 6µF. **S.B.**

JVC HRD455

"Won't accept a tape" the note said. The cause was failure of one or both of the cassette detect microswitches on the cassette housing. We replaced them both. **S.B.**

Mitsubishi HSB10/20/30

Streaking on the picture can be a problem with these machines: the effect consists of black streaks after white, noticeable with the machine's own recordings and particularly in the LP mode with the HSB30. The symptom looks like that produced by head wear, and in fact a replacement head will provide a temporary cure, as I found to my cost. The solution is to readjust the carrier set control VR2A3 as follows: (1) Ensure that the white and dark clip controls VR2A2 and VR2A1 are correctly set as per the manual. (2) Connect a frequency counter to TP2M. Select external input but don't connect any input to the VCR. (3) Adjust the carrier set control VR2A3 for 3·8MHz. **G.W.**

Sony SLVX50DH

This machine was an absolute pig! When it was first put on test on the bench there was a cyclic disturbance to the playback picture. You could see, below the deck, that there was a definite jerk from the capstan with each rotation. There was a momentary 'throw' in the reel belt at the same time; also a faint audible click from the capstan motor.

The capstan assembly and belt were both removed and examined, but no fault with either of them could be found. The capstan itself rotated smoothly with no roughness or catching, and neither the belt nor the gearing were misshaped in any way. Some time was spent checking around the FG/PG amplifier chip IC402 on the MA44 servo board. Eventually we ordered and fitted a new capstan motor (part no. 8-835-382-01). On test the capstan ran smoothly, with no jerk or tick, but on playback there was now a different (previously hidden?) cyclic interference. This was loss of capstan servo control, so that bands of interference drifted through the picture.

The same area of board MA44 was examined. Because of incorrect conditions at pins 47, 59 and 62, the CXP80116 system control chip IC501 became suspect. We ordered a replacement (part no. 8-752-813-37) but on receipt it had a different suffix (660Q) from the one in the machine (673Q). As it's an 80-pin flatpack device we decided to double check before fitting it. A long chat with my namesake at SES produced the information that this machine is actually a Hong Kong model, and that IC501 is different – and critical. The correct type (CXP80116-673Q, part no. 8-752-815-66) was ordered and when fitted provided a complete cure. But it had taken several weeks and much head scratching to resolve the problem. **J.C.P.**

Saisho VR805S/Hinari VXL2

There was a spurious white liney pattern on the E-E video output. We tackled the fault by breaking into the E-E circuit

at various points leading to the record/playback switching chip to establish where the interference was being generated. In fact we worked back until we were off the main board! The cause of the trouble lay in the u.h.f. module – and was fully cured by those nice people at MCES. **J.P-F.**

GEC V4004H/Hitachi VT33

The various front panel controls produced the wrong responses – for example if you pressed play you got pause. The cure was to replace the multi-resistor unit, circuit reference RA701. **J.P-F.**

Akai VS105EK

The complaint was of intermittent stopping with the tape not relacing. So a new idler was fitted, and this seemed to provide a complete cure. For good measure we fitted a new pinch roller as the old one was quite shiny and couldn't be cleaned to produce a nice matt finish. The original fault returned however after the machine had been sent back to the customer. A permanent cure was achieved only when the entire idler/clutch/gear assembly (part no. MZ36696012) had been replaced. We couldn't find anything amiss with the old one! **J.P-F.**

Saisho VR1200HQ/Matsui VX820/Hinari VXL35

The take-up spool worked very sluggishly, leading to stopping and/or tape spillage. Usually with this deck you find that the idler belt is broken or slack, but a replacement made no difference. Close inspection around the take-up spool showed that the secondary brake pad was not properly attached to the metal lever. To prove the point we used Evostick to reattach it. A new brake was then ordered to complete the repair. **J.P-F.**

ITT VR3919

The electronic circuitry used in this model is much the same as that in the Sanyo VHR3100E, but the microcontroller chip and deck are different. This one arrived with no front display. So we checked through the various supply lines and found that the 5V and 12V supplies were missing. Circuit protector F5001 had gone open-circuit. When this had been replaced the display lit up and the machine accepted a cassette and laced up. But there was still a long way to go!

Playback was perfect, but after two seconds the machine unlaced. This was just long enough to establish that the correct squarewave was reaching pin 38 of the microcontroller chip (IC3001). This left only the mode switch information at pins 20, 21 and 22. The conditions here were correct for the cassette down and play conditions so we concluded, correctly, that the capstan servo was not responding because IC4001 was faulty. The correct replacement is type LC7412-8017 – the suffix is important, indicating that the software is correct. **J.P-F.**

Amstrad UF20

I've had several of these fairly new machines in. The first one had no wind/rewind. Those helpful guys at Amstrad told me to replace the M lever, which did the trick. It's available from CPC under part no. AM255034 and is mounted under the cam and the loading motor – replacement is quite easy however.

The problem with another one was that it refused to accept a cassette. A faulty cassette push switch (CPC part no. AM255151) was the cause. It's not easy to replace this – the whole machine, including the PCB, has to come out. **R.J.A.**

Amstrad VCR4600

I don't get many machines with erase faults. A quick waveform and voltage check revealed that R405 (22Ω) was open-circuit. Note that it's a safety component. **R.J.A.**

Ferguson 3V24/JVC HR2200

This elderly portable wouldn't power up properly. The capstan motor would spin slowly when power was applied, but nothing else would happen. Then, after about ten minutes, the unit would spring to life of its own accord. This gave normal operation until the machine was switched off for several minutes, when the whole business would be repeated.

We initially thought that one of the supplies had failed, but this was not the case. The 12V, 9V and 10V supplies were all present. Wondering where to go next, we decided to check the voltages around the microcontroller chip IC4. This proved to be a good idea, as several of them were somewhat adrift. The problem was associated with the reset, at pin 7. As the voltage here was permanently high, at 7·5V, the chip was locking up. The cause of the fault was C70 (10μF, 16V) which was leaky. **M.L.**

Toshiba V300

After about five minutes in the E-E/record mode this machine would produce what looked like a tuner fault – the picture would flicker. This could be rectified for a short time by slight tapping on the main PCB, then the fault would return. We removed the tuner and did some resoldering, but no dry-joints were evident. Other soldering jobs were then done in various parts of the machine, all to no avail.

We found that gently tapping the power supply produced very profound effects, so this time we did some resoldering in the power supply circuit. Again no dry-joints were evident. I eventually noticed that the power supply is partly held in position by a short screw that passes through the bottom of the machine. It makes a connection between the metal bottom cover and the earthy side of the power supply. This screw was missing. After fitting a replacement the problem had been cured. It took about two hours to find out what was wrong, and about half a pound of solder. Grrrr! **M.L.**

GoldStar GHV1296

In play, pause or search this machine would intermittently loose the picture. If you changed mode however the picture would usually come back. We found that the 5V supply to the head amplifier disappeared intermittently. It's supplied via the mode switch – replacing this item cured the problem. **G.S.**

JVC HRS4700

There were no functions and CP2 was open-circuit. After replacing CP2 and running the machine on test the protector again blew. This time I monitored the capstan current in the play mode and found that it intermittently peaked. Replacing the capstan motor and CP2 cured the problem – confirmed by a couple of days' soak test. **G.S.**

Review: Video Training Tape

Eugene Trundle

A newly established business, Visions Video Productions, is in the business of making training and educational video tapes for service technicians and retail sales staff. The subject of this review is the company's technical training tape on Akai 'home deck' VCRs produced during the past five years. The tape runs for one hour and ten minutes, and is aimed squarely at the bench technician who services these machines.

What's on the tape

The tape is very much a hands-on affair throughout. The first twenty five minutes are given over to dismantling and reassembling the deck, paying particular attention to phasing and mechanical alignment. Many useful servicing tips are included. Some very good production techniques have been used in this section, with diagrams melting into actual moving pictures and a good commentary throughout.

The next twenty five minutes are devoted to mechanical and electrical adjustments. All the important deck setting-up procedures and the alignment of the electrical presets are covered. The presentation here involves a picture-in-picture technique: the main picture shows the adjustment being carried out by hand while a small insert picture shows the resulting waveform displayed on an oscilloscope screen. In conjunction with the spoken description this works very well for instructional purposes – in some ways it's better than actually being there!

The final twenty five minutes provide various hints and tips relating to over a dozen models in the Akai VCR range produced over the past five years. It's reminiscent of an experienced technical liaison officer's visit to the workshop. The most common faults, failings and foibles of the machines are described, including the various modifications and the service kits produced to alleviate them. Part numbers and hands-on demonstrations of fitting and setting up are provided. A useful, practical demonstration shows you how to get into the remote control zapper and the problems you may find when you do. This section also has off-TV-screen pictures of the symptoms produced by certain known faults. Some of these could save you from buying a new upper or lower drum only to find that your diagnosis was wrong!

Conclusion

Having been puzzled a time or ten when servicing Akai VCRs I found this tape a great help and would welcome one like it for each model that finds its way to my bench. This could happen too – I'm told that other training, educational and demonstration tapes are in the pipeline from the same company.

One of the great advantages of this type of instructional tape is that you can run it while you are actually doing the job, and use the search, slow-motion and freeze-frame facilities of the playback VCR to capture the detail of things like the mechanical alignment and phasing of the deck mechanism.

I can recommend this tape to anyone who is involved in servicing and repairing Akai VCRs.

Availability

The tape is available to the trade at £19.95 plus VAT, or £21.95 plus VAT per single copy by mail order, including post and packing, from Visions Video Productions, Technology House, 23 Spring Lane, London SE25 4SP. Telephone 081 654 1379, fax 081 654 8492. The tape is also available from Willow Vale Electronics.

Answer to Test Case 382

– see page 865 –

The Beatles. The Small Faces and Itchycoo Park. If you listen to these pop-music tracks from the era of Sage's long-lost youth you can hear a similar effect to the playback produced by Mr. Sutton's wrongly-programmed Sony VCR. Wrongly programmed because the old gent had somehow got himself into his wonder-machine's menu system and locked the audio playback into the MIX mode. With this you get a mixture of the hi-fi and the longitudinal sound tracks. It's intended for use only with audio-dubbed tracks.

When both tracks reproduce the same material strange effects and distortion will occur. One reason for this is the fact that the frequency response of the tape's longitudinal, edge track falls far short of its hi-fi counterpart. In addition there are phase and timing differences between the signals recorded on the two types of sound track. These differences add, cancel, jangle and echo when the signals are mixed together, though the tracks sound fine when they are listened to individually. Hence the good playback when the Sony machine's recordings were tried in another machine, and the much worse reproduction when the 'library' cassette recorded by another machine was played back by the Sony VCR – the spacing between the other machine's rotary and stationary audio heads differed slightly from that in the Sony machine, adding to the problem.

Use of the remote control handset and the set-up menu quickly restored the Sony VCR's good sound playback.

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 (071 261 5555). **Sole Agents** for Australia and New Zealand, Gordon and Gotch (Asia) Ltd.; South Africa, Central News Agency Ltd. ***Television*** is sold subject to the following conditions, namely that it shall not, without the written consent of the Publishers first having been given, be lent, resold, hired out or otherwise disposed by way of Trade at more than the recommended selling price shown on the cover, excluding Eire where the selling price is subject to currency exchange fluctuations and VAT, and that it shall not be lent, resold, hired or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever.

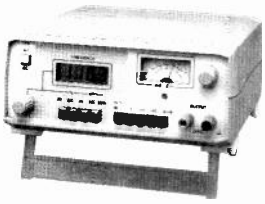
ELECTRONIC TEST EQUIPMENT

Audio - Video- Television - Satellite TV - Telecommunications

The manufacturer who cares about quality & features rather than being lowest in price !

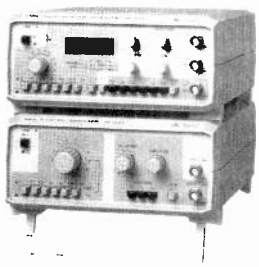
Audio Analyser
Model AA-930

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. £ 490



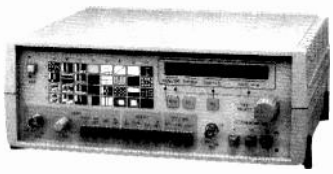
Low Distortion Low Frequency Generator
Model GB-212

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. £ 219



Function Generators
Models GF-230 & GF-232

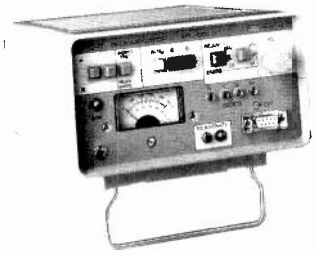
Two versions available: 0.1 Hz to 1 MHz and 0.2 Hz to 2 MHz. Producing sine, triangular and square waveforms, with variable symmetry. Excellent performance. £ 153 & £ 206



Television Pattern Generator
Model GV-698/11

32 patterns, 32 internal memories. PAL/NTSC/SECAM standards, with I, B, G, H, M, N, D & K, NICAM, teletext all in one instrument.

Optional on screen logotype. (Other pattern generators available from £ 210). £ 1428

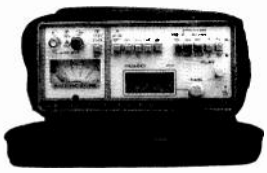


CRT Rejuvenator
Model RT-501 B

An essential tool for every TV workshop. Promax have made many thousands. Supplied complete with a set of base adaptors. £ 235

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

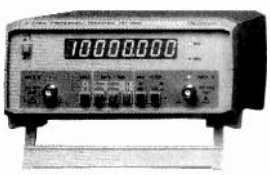
Ideal instrument for the professional installer of FM/TV aerials and satellite TV dishes. Covers 48 to 856 MHz and 950 to 2050 MHz. Lighweight, compact and rechargeable battery operated. £ 654

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 attache style case, for easy field and workshop use. £ 498

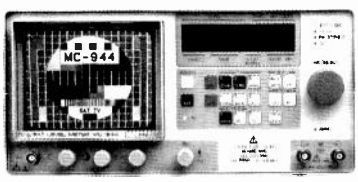
TV/FM Level Meter
Model MC-160 B

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. £ 354



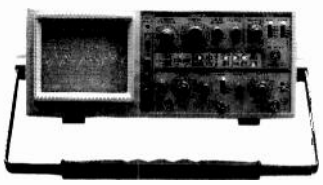
Frequency counters
Models FD-250 & FD-252

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



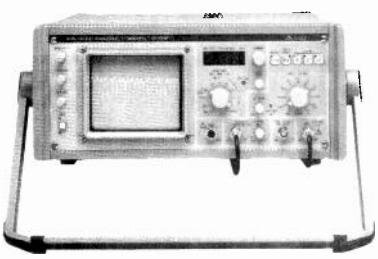
TV & Satellite Level Meter
Model MC-944

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, tuneable audio subcarriers, etc. Full autocorrection for superb, unequalled accuracyl. RS-232 as standard. £ 1895



R.F. Spectrum Analyser
Model AE-566

1 to 1000 MHz, with 950 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



Oscilloscopes

We are able to supply a complete range of oscilloscopes. These include both analog and digital types, covering bandwidths of 20 MHz to 100 MHz. We are able to prepare quotations for a specified quantity.

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 and enquiries.

VISA

Prices shown exclude VAT, but includes UK delivery.
Most items available for immediate despatch.

Access

ALBAN ELECTRONICS LIMITED
4U - St Albans Enterprise Centre - Long Spring
Porters Wood - St Albans - Hertfordshire - AL3 6EN
Tel: 0727 832266 - Fax: 0727 810546

AMSTRAD HANDSETS

VCR4500	18.08
VCR4600, 4600MkII	11.75
VCR4700 (Not long play)	17.63
VC5200	11.75
VCR6100 (Indexer)	25.85
VCR6100 (Barcode Indexer)	32.44
VCR6200 Barcode	32.44
VCR9000 (Old type)	11.75
TVR 2	8.46
TVR 3	14.10
SRD400	18.15
SRD400 (Equivalent)	11.05
SRD500	11.75
SRD510/520	13.81
TS90/99 Tower System	11.75
GOODMANS VCR102	11.75
PROLINE 5100TX	17.63

AMSTRAD LOPTS

CTV1000 FB182K	12.93
CTV1400 FB165KA	23.50
CTV1401/9 3714002	22.33
CTV2000 FB171	10.58
CTV2200 FB171K	10.58
CTV2200 3722002	15.28
CTV2210 3722002	15.28
TVR3 181297	14.69
PCW9512,8256,8512	7.05

AMSTRAD TUNERS

UE33-B01 VCR4600/4700	9.40
UE2-B31F CTV2200/2210	5.88
1810829 VCR5200	7.05
ENV87509F2 CTV1400	5.88
UVE33-F01 VHF-UHF	14.10
UVE33-F02 VHF-UHF	14.10
1813766 VHF-UHF	14.10

AMSTRAD IF UNITS

TPS7-B0006 VCR4600/4700	9.40
TPS7-L0002	14.10
1813766	14.10

AMSTRAD MODULATORS

18108221 VCR5200	7.05
ENP-E730-2 VCR7000	5.88
VCR4600MkII,4700	7.05
SRD100/200/400	7.05

AMSTRAD SERVICE MANUALS

VCR4600	9.00
VCR4600MkII,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	11.50
SRD510/520	6.50
PC1512	11.50
PC2086	12.00
PC2286	12.00
PC2386	15.00
PC3086	11.00
FX9600 FAX	15.00

AMSTRAD COMPUTER OPERATORS MANUAL

PC1640	11.75
PC2286/2386	11.75
PPC512/640	11.75
PC1512 (Tech. Ref.)	6.00

AMSTRAD VCR CABINET PARTS

VCR4500 Cabinet Front	15.28
VCR4700 Cabinet Front	12.93

VMC100 – Various parts available, please phone for prices.

AMSTRAD VCR DECK 4500

CASSETTE HOUSING ASSY.	17.63
CYLINDER ASSY. (incl. Video heads)	26.44
CYLINDER LOWER DRUM ASSY. (Excl Motor)	10.28

4600, 4700, TVR1,2,3

Head Base Assy. (Audio)	5.88

AMSTRAD MOTORS

Loading Motor MCB9B02	3.53
Drum Motor E20EL05	10.87
Capstan Motor LLA4B02	10.28
Capstan Motor JLN4B02	10.28
Tape Loading MCF9B02	9.99
Cassette Housing RF280R	9.99

AMSTRAD PCB's

(Complete, fully populated)

4500 Timer	12.93
4500 Systems Control	10.58
4600 Systems Control/Servo, Display & Control PCB's	31.73
4600 Display	12.93
4600 Control	6.46
4600 Video & Audio	19.98
4600 Power Supply	16.98
4600MkII Main PCB Assy.	43.17
4600MkII Timer	15.28
4600MkII Control	6.46
4600MkII Head Amp	5.88
4600MkII Power Supply	6.46
4600MkII Hybrid, Luminance	9.40
4700 Main PCB Assy.	43.17
4700 Timer	15.28
4700 Control	6.46
4700 Head Amp Assy.	5.88
4700 Power Supply	6.46
5200 Timer & Channel Disp.	18.81

10.95-11.7GHz LNB

2.3dB NF. 'N' CONNECTOR (DRAKE, NO FEED HORN)	17.63
5200 Video	15.28
5200 Switch Panel	5.88
6000 Power Supply	8.81
6100 Main PCB	31.73
6100 Audio PCB	7.05
6100 Power Supply	8.81
6100 Hybrid, Chrominance	9.40
6100 Hybrid, Luminance	9.40
7000 Switch PCB no:7	2.35
CTV1400 MkII Main TV PCB	31.73
CTV1400 Switches, Presets & Tuner (ENV87509F2)	9.70
CTV2200 PCB no:3	3.53
CTV2200 PCB no:4	4.70
TVR 2 Main TV PCB	41.13
TVR2 Video Front Display PCB	15.88
TVR 3 Main TV PCB	47.00
TVR 3 Head Amp Assy.	5.88
TVR 3 Video Power Supply	6.46

AMSTRAD PC12MD VGA MONO MONITOR

Suitable for use with 2000/3000 series and any other VGA compatible PC (Carr. at Cost) 64.63

AMSTRAD SOFTWARE

ACCOUNTSMASTER (Full accounts program for running small business on any PC)	19.98
LINKMASTER (For copying files between PCs)	12.33

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: (0354) 51416. TEL: (0354) 51289

WE HAVE THE WIDEST CHOICE OF USED OSCILLOSCOPES IN THE COUNTRY

TEKTRONIX 7000 SERIES OSCILLOSCOPES
AVAILABLE FROM £200 Plug-ins sold separately

TEKTRONIX 2465 4 Channel 300MHz Delay Sweep etc £1750
TEKTRONIX 2236 Dual Trace 100MHz Delay Sweep Counter/Timer/DMM £850
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 TM503B as new £500
IWATSU SS5711C Channel 100MHz Delay Sweep/DMM £500
TRIO CS2070 4 Channel 70MHz Delay Sweep £450
TEKTRONIX 2215 Dual Trace 60MHz Delay Sweep £450
KIKUSUI CCSS060TM 3 Channel 60 MHz Delay Sweep £450
PHILIPS PM3217 Dual Trace 50MHz Delay Sweep £400
GOULD OS1100 Dual Trace 30MHz £160
GOULD OS300 Dual Trace 20MHz £200
IWATSU SS5702 Dual Trace 20MHz £200
TRIO CS1566A Dual Trace 20MHz £200
GOULD OS2508 Dual Trace 15MHz £125
THIS IS JUST A SAMPLE MANY OTHERS AVAILABLE

HEWLETT PACKARD 1740A OSCILLOSCOPES
100MHz Dual Trace, Delay Sweep For only £350

MARCONI 2018 Synth AM/FM Sig Gen 80KHz-520MHz £700
H P 8640B Sig Gen 20Hz 1024MHz £1000
H P 8620C Sweep Oscillator with 86245A S 9-12 4GHz £400
SYSTRON DONNER 1702 Syn Sig Gen 100Hz-1GHz £600
RACAL 9081 Synthesized AM/FM Sig Gen S 520MHz £500
FARNELL SSG520 Synth AM/FM Sig Gen 10-520MHz £400
MARCONI TF2008 AM/FM Sig Gen 10KHz510MHz Sweep £200
MARCONI TF2015 AM/FM Sig Gen 10-520MHz £200
MARCONI TF2015 with Synch TF2171 (Lock box) £350
PHILIPS PM5326 AM/FM Sig Gen 100KHz100MHz £300
H P 8690B Microwave Sweep Osc 26 S 40GHz £300
H R SMITH ANTENNA type 12-602-4 £2000
MARCONI 6500 Automatic Amplitude Analyser £1500
H P 436A Power Meter with sensor £1000
RACAL INSTRUMENTATION REORDER type Store 4DN £500
H P 3575A Gain Phase Meter 1Hz13MHz £400
H P 3312A Func Gen 0 1Hz 13MHz AM/FM, Sweep, Sin/Sq/Tri £400
MARCONI TF2337 Automatic Distortion Meter £200
SAYROSA Automatic Modulation Meter type 252B £125
TEKTRONIX CPS250 Triper Output PSU 2x20V0 5A Var, 5V2A Fixed £225
TEKTRONIX CFG250 Func Gen 0 2Hz2MHz Sine/Sq/Tri/TTL £180
TEKTRONIX CDM250 Digital Multimeter 3½ digit Led £180

SPECTRUM ANALYSERS

H.P. 8565A 0.0122GHz £5000
H.P. 853 with 8559A 0.012 1GHz £4500
H.P. 3580A Led 5Hz50KHz £1000
ANRITSU MS62B with Trac Gen 10KHz-1700MHz £1500
POLARAD 641I 10MHz-18GHz £1500
ANDO AC8281 with AC8211 1700MHz £1500
H.P. 182 with 8558B 100KHz1500MHz £1500
H.P. 141T with 8558 & 8552B 500KHz-1250MHz £1200
H P 141T with 8553B & 8552A 1KHz 110MHz £800
MARCONI TF2370 30Hz-110MHz £1000
H.P 8444 & 8443 Tracking Generators. Available from £300
HP 141T Main Frames only Good Tubes £225

H.P 3456A DVM 6½ digit. DC/True RMS AC/Res. HPIB £600
EIP/DANA 351D M/wave Freq Counter 20Hz-18GHz £500
H.P 5341A Frequency Counter 50MHz-1.5GHz LED £300
MARCONI 2435 Digital Frequency Meter 2GHz £400
RACAL 1998 Freq Counter 1.3GHz (Opts GPIB & High Stab £900
RACAL/DANA 1991 Counter/Timer 160MHz 9 digit. £800
MARCONI 2437 Counter/Timer DC – 100MHz 8 digit £175
MARCONI 2431A Freq Counter 10Hz 200MHz 8 digit £150
MARCONI 2430A Frequency Counter 10Hz-80MHz 8 digit £125
RACAL 9918 Frequency Counter 10Hz-520MHz 9 digit £200
RACAL 9913 Frequency Meter 10Hz-200MHz 8 digit £125
RACAL 9911 Frequency Meter 10Hz- 120MHz 7 digit. £100
RACAL 9905 Universal Counter/Timer DC-200MHz 8 digit £150
RACAL 9904 Universal Counter/Timer DC-50MHz 7 digit £175
RACAL 9901 Universal Counter/Timer DC-50MHz 6 digit £100
DATRON 1061A 6½ digit Autocal Multimeter True RMS AC/Current £850
H.P. 3490A 5 digit Multimeter AC/DC/Ohms £200
H P 3435A 3½ digit M/M AC/DC/Ohms/Current. Led £100
PHILIPS PM2534 Multi Func DMM 3½-4½ digit GPIB/EEE £450
SOLARTRON 7150 6½-2-3½ digit DMM with IEEE £400
SOLARTRON 7045 4½ digit Multimeter Volts/Amps/Ohms £80
WAYNE KERR B905 Automatic Precision Bridge 0.05% £900
MARCONI TF2700 Universal Bridge. Bat Op from £150
MARCONI TF1313A Universal LCR Bridge 0 1% £125
WAYNE KERR B424 Digital Component Meter LCR £200
HEATHKIT IB RLC Bridge £60
BRADLEY 192 Oscilloscope Calibrator £600
WILTRON 560 Scaler Network Analyser with Detectors £1000
H P 5005A Signature Multimeter £250
FARNELL H30/100 0-30V, 0-100A. Metered £800
FARNELL TVS70Mk2 70V 5A/35V 10A. Metered £300
FARNELL B30/10 30V 10A. Variable £200
FARNELL L30E 0-30V, 0-5A. Metered £125
MARCONI (WBR) TF2154 0.30V 1A 0.15V 2A 0.75V 4A Metered £60
H.P 0516A 0-3Kv, 0-6MA. Metered £150
BRANDENBURG Model 472R ± 2KV Metered. £200
FEEDBACK FG600 Sine/Sq/Tri 0.01Hz-100KHz. £60
LYONS PG71N Pulse Gen PRF 1Hz-5MHz 10 nanosecs £75
FARNELL PG101 Pulse Gen 100nSecs 10MHz (1Sec 1Hz) £125
LINDOS LA1 Mk2B Audio Analyser £500
UNAOHM EP501 Audio Analyser £350
PHILIPS PM5518 Colour TV Pattern Generator £1250
RADFORD LD04 Low FDistortion Oscillator £300
RADFORD LDMS2 Low Distortion Measuring Set £300

NEW EQUIPMENT

HAMEG OSCOPE HM1005 Triple Trace 100MHz Delay Tbase £847
HAMEG OSCOPE HM604 Dual Trace 60MHz Delay Sweep £653
HAMEG OSCOPE HM203 7 Dual Trace 20MHz Comp Tester £362
HAMEG OSCOPE HM205 3 Dual Trace 20MHz Digital Storage £653
All other models available – all oscilloscopes supplied with 2 probes

BLACK STAR EQUIPMENT (P&P all units £5)

APOLLO 10 – 100MHz Counter Timer Ratio/Period/Time interval etc £222
APOLLO 100 100MHz (As above with more funcuons). £325
METEOR 100 FREQUENCY COUNTER 100MHz £119
METEOR 600 FREQUENCY COUNTER 600MHz £145
METEOR 1000 FREQUENCY COUNTER 1 GHz £189
JUPITOR 500 FUNCTION GEN 0 1Hz-500kHz Sine/Sq/Tri £119
ORION COLOUR BAR GENERATOR Pal/TV/Video £229
All other Black Star Equipment available

OSCILLOSCOPE PROBES

Switchable × 1 × 10 (P&P £3) £12

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: 0734 268041 Fax: (0734) 351696
Callers Welcome 9am-5.30pm Mon-Fri (until 8pm Thurs)

'A' & 'B' GRADE BROWN & WHITE GOODS AT GENUINE DISCOUNT PRICES

LEADING BRANDS TESTED, BOXED & COMPLETE
STOCK ITEMS INC. 14" to 33" CTV
VCR ALL MODELS
PORTABLE AUDIO - MINI & MIDI SYSTEMS
MICROWAVE OVENS A SPECIALITY
THIS MONTHS SPECIAL OFFER
FRIDGES & FREEZERS, GAS AND ELECTRIC COOKERS, INTERACTIVE CDis

TEL KEVIN GARDNER NOW FOR CURRENT AVAILABILITY AND SPECIAL PRICES

KG PURCHASING LTD
1043 LEEDS RD, THORNBURY, BRADFORD BD3 7DB
TEL: (0274) 660196/665670
FAX NOW FOR PRICE LISTS (0274) 665246
REGULAR DELIVERIES TO IRELAND

PC PAL VGA TO TV CONVERTER Converts a colour TV into a basic VGA screen. Complete with built in psu, lead and s/ware. £49.95. Ideal for laptops or a cheap upgrade

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.

GUIDED MISSILE WIRE. 4,200 metre reel of ultra thin 4 core insulated cable. 28lbs breaking strain, less than 1mm thick! Ideal alarms, intercoms, fishing, dolls house's etc. £14.99 ref MAG15P5

SINCLAIR C5 13" WHEELS Complete with centre bearing (cycle type), tyre and inner tube. £6 ea ref MAG 6P10. Ideal go kart

300v PANEL METER 70X60X50MM, AC. 90 degree scale. Good quality meter. £5.99 ref MAG 6P14. Ideal for monitoring mains etc

ASTEC SWITCHED MODE PSU BM41012 Gives +5 @ 3.75A, +12@1.5A, -12@.4A. 230/110, cased, BM41012. £5.99 ref AUG6P3.

TORRODIAL TX 30-0-30 480VA, Perfect for Mosfet amplifiers etc. 120mm dia 55mm thick. £18.99 ref APR19.

AUTO SUNCHARGER 155x300mm solar panel with diode and 3 metre lead fitted with a cigar plug. 12v 2watt £9.99 ea ref AUG10P3.

FLOPPY DISCS DSDD Top quality 5.25" discs, these have been written to once and are unused. Pack of 20 is £4 ref AUG4P1.

MOD WIRE Perfect for repairing PCB's, wire wrap etc. Thin insulated wire on 500m reels. Our price just £9.99 ref APR10P8.

12v MOVING LIGHT Controller. Made by Hella, 6 channels rated at 90watts each. Speed control, cased. £34.99 ref APR35.

ECLATRON FLASH TUBE As used in police car flashing lights etc, full spec supplied, 60-100 flashes a min. £9.99 ref APR10P5.

24v AC 96WATT Cased power supply. New £13.99 ref APR14.

MILITARY SPEC GEIGER COUNTERS Unused and straight from Her majesty's forces. £50 ref MAG 50P3

STETHOSCOPE Fully functioning stethoscope, ideal for listening to hearts, pipes, motors etc. £6 ref MAR6P6

OUTDOOR SOLAR PATH LIGHT Captures sunlight during the day and automatically switches on a built in lamp at dusk. Complete with seales lead acid battery etc. £19.99 ref MAR20P1.

ALARM VERSION Of above unit comes with built in alarm and pir to deter intruders. Good value at just £24.99 ref MAR25P4.

CLOCKMAKER KIT Hours of fun making your own clock, complete instructions and everything you need. £7.99 ref MAR8P2.

CARETAKER VOLUMETRIC Alarm, will cover the whole of the ground floor against forcred entry. Includes mains power supply and integral battery backup. Powerful internal sounder, will take external bell if req'd. Retail £150+, ours? £49.99 ref MAR50P1.

TELEPHONE CABLE White 6 core 100m reel complete with a pack of 100 clips. Ideal 'phone extns etc. £7.99 ref MAR8P3.

IBM PC CASE AND PSU Ideal base for building your own PC. Ex equipment but OK. £9.99 each **REF: JUN10P2.**

MICRODRIVE STRIPPER Small cased tape drives ideal for stripping, lots of useful goodies including a smart case, and lots of components. £2 each ref JUN2P3

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 just £5.99 REF. MAG6P8

SOLID STATE RELAYS Will switch 25A mains. Input 3.5-26v DC 57x43x21mm with terminal screws £3.99 REF MAG4P10

300DPI A4 DTP MONITOR Brand new but shop soiled so hence bargain price! TTL/ECL inputs, 15" landscape, 1200x1664 pixel complete with circuit diag to help you interface with your projects JUST £14.99. REF JUN15P2.

MULTICORE CABLE 300 metre reel of grey 8 core cable Ideal for 'phones, intercomms, computers, alarms etc. Comes in specialdispensing container to avoid tangles. £15 ref AUG15.

BUGGING TAPE RECORDER Small voice activated recorder, uses micro cassette complete with headphones £28.99 ref MAR29P1.

ULTRAMINI BUG MIC 6m mx3 5mm made by AKG, 5-12v electret condenser. Cost £12 ea, Our? four for £9.99 REF MAG10P2

RGB/CGA/EGA/TTL COLOUR MONITORS 12" in good condition. Back anodised metal case £79 each REF JUN79

GX4000 GAMES MACHINES returns so ok for spares or repair £9 each (no games). REF MAG9P1

C64 COMPUTERS Returns, so ok for spares etc £9 ref MAG9P2

FUSELAGE LIGHTS 3 foot by 4" panel 1/8" thick with 3 panels that glow green when a voltage is applied. Good for night lights, front panels, signs, disco etc. 50-100v per strip. £25 ref MAG25P2

ANSWER PHONES Returns with 2 faults, we give you the bits for 1 fault, you have to find the other yourself. BT Response 200's £18 ea REF MAG18P1. PSU £5 ref MAG6P12.

SWITCHED MODE PSU ex equip, 60w +5v @5A, -5v@ 5A, +12v@2A, -12v@.5A 120/220v cased 245x88x55mm IEC input socket £6.99 REF MAG7P1

PLUG IN PSU 9V 200mA DC £2.99 each REF MAG3P9

PLUG IN ACORN PSU 19v AC 14w, £2.99 REF MAG3P10

POWER SUPPLY fully cased with mains and o/p leads 17v DC 900mA output. Bargain price £5.99 ref MAG6P9

ACORN ARCHIMEDES PSU +5v @ 4 4A on/off sw uncased, selectable mains input, 145x100x45mm £7 REF MAG7P2

GEIGER COUNTER KIT Low cost professional twin tube, complete with PCB and components. Now only £19 REF AUG19

9v DC POWER SUPPLY Standard plug in type 150ma 9v DC with lead and DC power plug. price for two is £2.99 ref AUG3P4

AA NICAD PACK encapsulated pack of 8 AA nicad batteries (tagged) ex equip. 55x32x32mm. £3 a pack REF MAG3P11

13.8V 1.9A psu cased with leads. Just £9.99 REF MAG10P3

360K 5.25 brand new half height floppy drives IBM compatible industry standard. Just £6.99 REF MAG7P3

PPC MODEM CARDS These are high spec plug in cards made for the Amstrad laptop computers. 2400 baud dial up unit complete with leads. Clearance price is £5 **REF: MAG5P1**

INFRA RED REMOTE CONTROLLERS Originally made for hi spec satellite equipment but perfect for all sorts of remote control projects. Our clearance price is just £2 **REF: MAG2**

TOWERS INTERNATIONAL TRANSISTOR GUIDE. A very useful book for finding equivalent transistors, leadouts, specs etc £20 **REF: MAG20P1**

SINCLAIR C5 MOTORS We have a few left without gearboxes

NEW BULL ELECTRONICS STORE IN
WOLVERHAMPTON
55A WORCESTER ST TEL 0902 22039

Spec is 12v DC 3,300rpm £25 ref **MAG25.**

••••••••••••••••NEW PRODUCT••••••••••••••••••

200 WATT INVERTER Converts 10-15v DC into either 110v or 240v AC. Fully cased 115x36x156mm, complete with heavy duty power lead, cigar plug, AC outlet socket. Auto overload shutdown, auto short circuit shut down, auto input over voltage shutdown, auto input under voltage shut down (with audible alarm), auto temp control, unit shuts down if overheated and sounds audible alarm. Fused reversed polarity protected. output frequency within 2%, voltage within 10%. A extremely well built unit at a very advantageous price!!! Price is £64.99 ref AUG65.

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**

MAINSCABLE Precut black 2 core 2 metre lengths ideal for repairs, projects etc. 50 metres for £1.99 ref AUG2P7.

COMPUTER COMMUNICATIONS PACK Kit contains 100m of 6 core cable, 100 cable clips, 2 line drivers with RS232 interfaces and all connectors etc. Ideal low cost method of communicating between PC's over a long distance. Complete kit £15.99 Ref MAR16P2.

MINI CYCLOPS PIR 52x62x40mm runs on PP3 battery complete with shrill sounder. Cheap protection at only £5.99 ref MAR6P4.

ELECTRIC MOTOR KIT Comprehensive educational kit includes all you need to build an electric motor £9.99 ref MAR10P4.

VIDEO SENDER UNIT. Transmits both audio and video signals from either a video camera, video recorder, 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**

***FM CORDLESS MICROPHONE** Small hand held unit with a 500' range! 2 transmit power levels. Reqs PP3 9v battery. Tuneable to any FM receiver. Price is £15 **REF: MAG15P1**

LOW COST WALKIE TALKIES Pair of battery operated units with a range of about 200'. Ideal for garden use or as an educational toy. Price is £8 a pair **REF: MAG 8P1** 2 x PP3 req'd

***MINATURE RADIO TRANSCEIVERS** A pair of walkie talkies with a range of up to 2 kilometres in open country. Units measure 22x52x155mm. Complete with cases and earpieces. 2xPP3 req'd. £30.00 pair **REF: MAG30.**

COMPOSITE VIDEO KIT. Converts composite video into separate H sync, V sync, and video. 12v DC. £8.00 **REF: MAG8P2.**

LQ3500 PRINTER ASSEMBLIES Made by Amstrad they are entire mechanical printer assemblies including printhead, stepper motors etc etc. In fact everything bar the case and electronics, a good stripper! £5 **REF: MAG5P3** or 2 for £8 **REF: MAG8P3**

SPEAKER WIRE Brown 2 core 100 foot hank £2 REF: MAG2P1

LED PACK of 100 standard red 5m leds £5 **REF MAG5P4**

UNIVERSAL PC POWER SUPPLY complete with flyleads, switch, fan etc. Two types available 150w at £15 REF:MAG15P2 (23x23x23mm) and 200w at £20 REF: MAG20P3 (23x23x23mm)

***FM TRANSMITTER** housed in a standard working 13A adapter! the bug runs directly off the mains so lasts forever! why pay £700? or price is £26 REF: MAG26 Transmits to any FM radio

***FM BUG KIT** New design with PCB embedded coil for extra stability. Works to any FM radio. 9v battery req'd £5 REF: MAG5P5

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

TALKING COIN BOX STRIPPER originally made to retail at £79 each, these units are designed to convert and 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?? Price is just £3 **REF: MAG3P1**

100 WATT MOSFET PAIR Same spec as 2SK343 and 2SJ413 (8A, 140v, 100w) 1 N channel, 1 P channel, £3 a pair **REF: MAG3P2**

TOP QUALITY SPEAKERS Made for HI FI televisions these are 10 watt 4R Jap made 4" round with large shielded magnets. Good quality. £2 each **REF: MAG2P4** or 4 for £6 **REF: MAG6P2**

TWEETERS 2" diameter good quality tweeter 140R (ok with the above speaker) 2 for £2 **REF: MAG2P5** or 4 for £3 **REF: MAG3P4**

AT KEYBOARDS Made by Apricot these quality keyboards need just a small mod to run on any AT, they work perfectly but you will have to put up with 1 or 2 foreign keycaps! Price £6 **REF: MAG6P3**

PC CASES Again mixed types so you take a chance next one off the pile £12 **REF: MAG12** or two the same for £20 **REF: MAG20P4**

HEADPHONES Ex Virgin Atlantic. 8 pairs for £2 **REF: MAG2P8**

PROXIMITY SENSORS These are small PCB's with what look like a source and sensor LED on one end and lots of components on the rest of the PCB. Complete with fly leads. Pack of 5 £3 **REF: MAG 3P5** or 20 for £8 **REF: MAG8P4**

*SOME OF OUR PRODUCTS MAY BE UNLICENSABLE IN THE UK

BULL ELECTRICAL
250 PORTLAND ROAD HOVE SUSSEX BN3 5QT

MAIL ORDER TERMS: CASH PO OR CHEQUE WITH ORDER PLUS £3.00 POST PLUS VAT.

PLEASE ALLOW 7 - 10 DAYS FOR DELIVERY

TELEPHONE ORDERS WELCOME

TEL: 0273 203500

FAX: 0273 323077

VISA

SNOOPERS EAR? Original made to clip over the earpiece of telephone to amplify the sound-it also works quite well on the cable running along the wall! Price is £5 **REF: MAG5P7**

DOS PACKS Microsoft version 3.3 or higher complete with all manuals at price just £5 **REF: MAG5P8** Worth it just for the very comprehensive manual! 5.25" only.

DOS PACK Microsoft version 5 Original software but no manuals hence only £3 **REF: MAG3P8** 5.25" only

PIR DETECTOR Made by famous UK alarm manufacturer these are hi spec, long range internal units. 12v operation. Slight marks on case and unboxed (although brand new) £8 **REF: MAG8P5**

WINDUP SOLAR POWERED RADIO AM/FM radio complete with hand charger and solar panel! £14 REF: MAG14P1

MOBILE CAR PHONE £5.99 Well almost! complete in car phone excluding the box of electronics normally hidden under seat. Can be made to illuminate with 12v also has built in light sensor so display only illuminates when dark. Totally convincing! REF: MAG6P6

ALARM BEACONS Zenon strobe made to mount on an external bell box but could be used for caravans etc. 12v operation. Just connect up and it flashes regularly) £5 REF: MAG5P11

FIRE ALARM CONTROL PANEL High quality metal cased alarm panel 350x165x80mm. With key. Comes with electronics but no information. sale price 7.99 REF: MAG8P6

REMOTE CONTROL PCB These are receiver boards for garage door opening systems. Another use? £4 ea REF: MAG4P5

6"X12" AMORPHOUS SOLAR PANEL 12v 155x310mm 130mA. Bargain price just £5.99 ea REF MAG6P12.

FIBRE OPTIC CABLE BUMPER PACK 10 metres for £4.99 ref MAG5P13 ideal for experimenters! 30 m for £12.99 ref MAG13P1

LOPTX Line output transformers believed to be for IBM hi res colour monitors but useful for getting high voltages from low ones! £2 each REF. MAG2P12 bumper pack of 10 for £12 REF: MAG12P3.

HEATSINKS (finned) TO220, designed to mount vertically on a pcb 50x40x25mm you can have a pack of 4 for £1 ref JUN1P11.

WATERPROOF JUNCTION BOX 65mm dia 33mm deep. Four cable entry exit points (adjustable for any size cable) snap fit lid. Ideal for TV, satellite use. £2 ea ref APR2 or 6 for £10 ref APR10P7.

BOTH SHOPS OPEN 9-5.30 SIX DAYS A WEEK

INFRARED LASER NIGHT SCOPES

Second generation image intensifier complete with hand grip attachment with built in adjustable laser lamp for zero light conditions. Supplied with Pentax 42mm camera mount and normal eye piece. 1.6kg, uses 1xPP3, 3xAA's (all supplied) £245+Vat

NEW HIGH POWER LASERS

15mW, Helium neon, 3 switchable wave lengths .63um, 1.15um, 3.39um (2 of them are infrared) 500:1 polarizer built in so good for holography. Supplied complete with mains power supply. 790x65mm. Use with EXTREME CAUTION AND UNDER QUALIFIED GUIDANCE. £349+Vat.

£££££££WE BUY SURPLUS STOCK£££££££

TURN YOUR SURPLUS STOCK INTO CASH
IMMEDIATE SETTLEMENT. WE WILL ALSO QUOTE FOR COMPLETE FACTORY CLEARANCE

1994 CATALOGUE.

MINIMUM GOODS ORDER £5.00 TRADE ORDERS FROM GOVERNMENT SCHOOLS UNIVERSITIES & LOCAL AUTHORITIES WELCOME ALL GOODS SUPPLIED SUBJECT TO OUR CONDITIONS OF SALE AND UNLESS OTHERWISE STATED GUARANTEED FOR 30 DAYS. RIGHTS RESERVED TO CHANGE PRICES & SPECIFICATIONS WITHOUT PRIOR NOTICE. ORDERS SUBJECT TO STOCK. QUOTATIONS WILLINGLY GIVEN FOR QUANTITIES HIGHER THAN THOSE STATED

3FT X 1FT 10WATT SOLAR PANELS
14.5v/700mA
£33.95

(PLUS £2.00 SPECIAL PACKAGING CHARGE)

TOP QUALITY **AMORPHOUS SILICON CELLS** HAVE ALMOST A TIMELESS LIFE SPAN WITH AN INFINITE NUMBER OF POSSIBLE APPLICATIONS, SOME OF WHICH MAY BE CAR BATTERY CHARGING, FOR USE ON BOATS OR CARAVANS, OR ANYWHERE A PORTABLE 12V SUPPLY IS REQUIRED. **REF: MAG34**

PORTABLE RADIATION DETECTOR
£49.99

A Hand held personal Gamma and X Ray detector. This unit contains two Geiger Tubes, has a 4 digit LCD display with a Piezo speaker, giving an audio visual indication. The unit detects high energy electromagnetic quanta with an energy from 30K eV to over 1.2M eV and a measuring range of 5-9999 UR/h or 10-99990 Nr/h. Supplied complete with handbook. Ref MAG50.

ADVERTISERS' INDEX

C.T.V. (NORTH EAST)

9A/B, 94 Carrmere Road
Leechmere Ind. Est.
Sunderland
SR2 9TE

No. 1 in the North East
for all makes and models
of high quality ex-rental
televisions and video recorders
at very competitive prices

091-523 5554
Fax: 091-523 8035

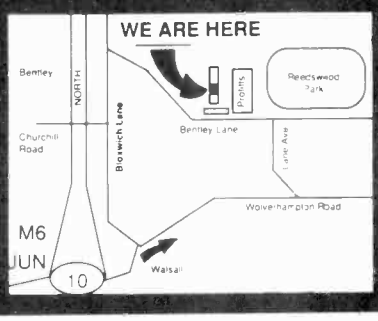
Export Enquiries Welcome.

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
½ Mile o Junction 10 M6. *Easy Parking Facilities*

UNIT 3, BENTLEY LANE BUSINESS PARK
BENTLEY LANE, WALSALL WS2 8TL
Tel: 0922-724542. Fax: 0922-722208
Mobile: 0831-246622 (24 Hours)

OPEN:
MON-FRI,
9-6pm
SAT 9-2pm
SUNDAY BY
APPOINTMENT
DELIVERY
SERVICE
THROUGHOUT
THE COUNTRY



CENTRAL TV

WHOLESALE DISTRIBUTOR

SUPERB RANGE OF TVS AND VIDEOS

STOCK ARRIVING DAILY from THORN AND GRANADA

HIGH STREET TRADE IN HOTEL DISPLAY AND EX-DEMO STOCK

EX-RENTAL TVS FROM **£3.00**

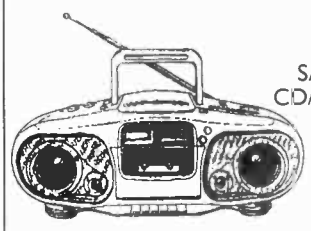
Established 1979

EX-RENTAL VIDEOS FROM **£25.00**

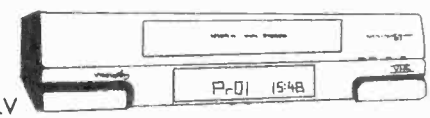
PHONE TODAY FOR BEST RESULTS

DIRECT LOADS AVAILABLE FOR QTY BUYERS

SANYO CAMCORDER NOW IN STOCK SPECIAL PRICE AT **£269.99**



SAMSUNG GHETTOBLASTER
CD/STEREO RADIO CASSETE REC
Single £44.99 Qty 10 £39.99



FERGUSON FV61LV
VIDEO PLUS LP/SP
Single £169 Qty 5 £159

FERGUSON B59N NICAM STEREO TV special price at ~~£329.00~~ **£279.99**

EXPORT ENQUIRIES WELCOME

NATIONWIDE DELIVERY

QUANTITY BUYERS
PLEASE CONTACT
ASH IN B'HAM

Microwave	1+£69.00	5+£65.00	Special TDK D90 Audio Tape		£0.48
Ferguson Stereo	1+£19.99	5+£14.99	Special TDK E180 Video Tape		£1.50
TV Speakers	1+ £5.00	10+£3.00	Special Sony E180 Video Tape		£1.35
TV/Video Stands	1+ £5.00	10+£3.00	Special E180 Video Tape		£0.75

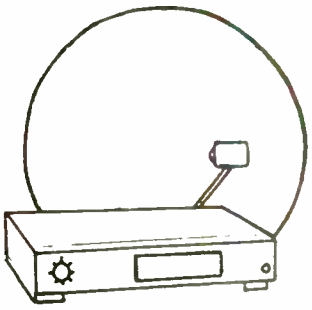
WE NOW STOCK AUDIO & VIDEO ACCESSORIES, BATTERIES, REMOTES, SATELLITE EQUIPMENT

CENTRAL TV WHOLESALE DISTRIBUTION LTD

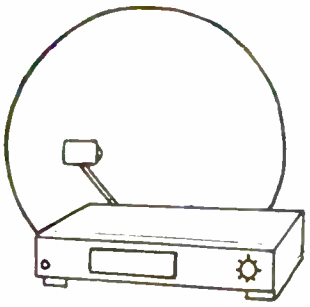
London contact: Joshi
Eley Estate, Nobel Road
Edmonton N18
Tel: 081-807 4090
Fax: 081-884 1314

Birmingham contact: Mick
369 Stratford Road, Sparkhill
Birmingham B11
Tel: 021-772 1591
Fax: 021-766 6383

BRITAIN'S LARGEST INDEPENDENT



HC TV
TV & VIDEO WHOLESALERS
LTD



LOOK

WE EXPORT

FAX THE BIGGEST WHOLESALER FOR THE BEST DEALS

AUTUMN SPECTACULAR

Stock Up NOW

Fantastic Deals on Ex-Rental Stock

REMOTE CONTROL TV's FROM £85

GRADED STOCK

NICAM TV's AND VCR's AT RIDICULOUS PRICES
PHILIPS CDI ALSO AVAILABLE

LONG PLAY VCR's FROM £85

– BRAND NEW –

21" FST FASTEXT WITH ON-SCREEN GRAPHICS

12 MONTHS MANUFACTURER'S GUARANTEE – 950 AVAILABLE

PRESTON
139 Oakshott Place
Walton Summit
Ind Est
Preston (M6 Junc 29)
Tel: 0772 312101

BIRMINGHAM
208 Bromford Lane
Erdington
Birmingham B24 8DL
Tel: 021-327 3273 Fax: 021-322 2011

LONDON
Unit 2
The Royal London Est
29/35 North Acton Road
London NW10
Tel: 081-961 5005

CentreVision

CENTREVISION HOUSE · SLOPER ROAD · LECKWITH
CARDIFF · CF1 8AB

FOR QUALITY STOCK

LARGE SELECTION OF REFURBISHED STOCK READY FOR DIRECT RE-SALE
Complete with Instruction Book & Handset

LARGE DISPLAY OF FST, TELETEXT, FASTEXT, NICAM STEREO

100s OF VCRs NOW IN STOCK

WORKING HI-FI INCLUDING SPEAKERS FROM £20.00
Above price + VAT

PHONE 0222 344754
FOR OUR UNBEATABLE PRICES
Fax No: 0222 344218

VISA

WILTSGROVE LTD

28-29 RIVER STREET, DIGBETH
BIRMINGHAM B5 5SA
TEL: 021 772-2733 FAX: 021 766-6100

VISA

HIGH QUALITY EX-RENTAL THORN AND GRANADA STOCK *PLUS* GRADED STOCK
AUDIO, TVs, VCR etc.
RING IN FOR PRICES

FREE DELIVERY FOR MOST AREAS OF UK

NOW AVAILABLE
GRADED STOCK — MAJOR BRAND
Complete with original boxed, handset and instruction book — Good as new
Latest Nicam, Fastext, Prologic
ALMOST HALF PRICE OF RETAIL

★★★ STAR BUY ★★★
FERGUSON 59L5 SPEAKERS (with stands) £14.95 per pair

NEW *Definition* BRAND
PORTABLE 14' REMOTE TV
ON SCREEN DISPLAY,
VHF/UHF TUNER,
12 MONTHS (Parts) GUARANTEE etc.
GUARANTEED LOWEST PRICE
1,000s of TV & Video Spares also available
SPECIAL PRICE £99.95

EXPORT ENQUIRIES WELCOME
ALL STOCK SUBJECT TO AVAILABILITY, VAT & CARRIAGE

B-grade Stock All Boxed, working
If you require one item please read on:

10" R/C Portable	£95
14" Basic Portable	£85
14" R/C Portable	£95
20" R/C	£119
20" Text	£139
21" FST R/C	£145
21" Fastext FST	£165
21" Nicam	£219
25" Nicam	£259
L/P Videos	£99
Stereo Midi System	£110
Microwave Oven	£50
TV & Video Stands	£3

DISCOUNT ON QUANTITY

THIS MONTHS SPECIAL
20" Fastext TV's £125 & 20" NICAM £145

EX RENTAL TVs
Direct from source. Untouched
Basic TVs £5, £10 and £15, R/C £20
Teletext £30. Videos from £25

Customer returns in block.
Example. Untested 3x21" FST 3x25" FST
6xF/L Videos £40 each. Total £480+VAT
This price does not include handsets.
Some in need of repair. Some working.

W TREE WAREHOUSE
UNIT 1, SUNSHINE MILLS, WORTLEY RD, LEEDS 12
TEL: 0532 638804 FAX: 0532 310275

VISION CARE

RECONDITIONED WORKING STOCK

VIDEO

Top Loading VCR	£35.00
Front Loaders with R/C	£45.00
Twin Speed VCR with R/C	£55.00
Ferguson FV11R/3V55	£65.00

TELEVISION

Basic CTVs	from £15.00
Remote CTVs	from £25.00
Teletext CTVs	from £35.00
FSTs	from £65.00

"B" GRADE WORKING STOCK

T.V.

20" Remote	£125.00
20" Nicam Fast Text	£159.00
21" Nicam Fast Text	£179.00
14" Teletext	£109.00

Now Available
Graded Stock
Major Brand
Latest Nicam,
Fastext, Prologic

NEW 14" Remote Control Portable CTV 12 months (Parts) Guarantee £99.95

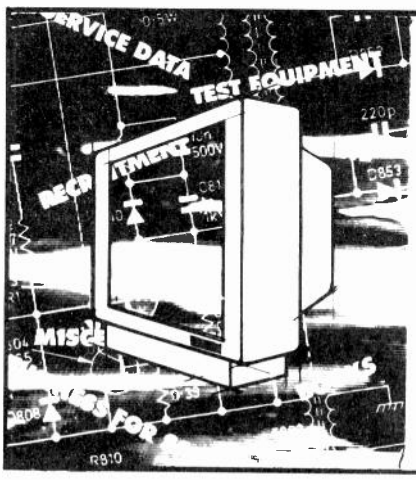
E-180 EXTRA GRADE VIDEO TAPE (min 50) £0.79

Self adhesive black ash vinyl 15m x 450mm for TV cabinets etc £14.50

Branded 'B' grade now available
SHARP, GOLDSTAR, HITACHI, AKURA, TOSHIBA, etc
★★ CAMCORDERS NOW AVAILABLE ★★

40 Invincible Road, Farnborough,
Hampshire GU14 7QU
(Ex Teleprice Unit)
Tel: 0252-512161 Fax: 0252-524388

Please note new address:
Unit 21, Deacon Way, Reading, Berkshire
OPEN MONDAY TO FRIDAY 9am-5.30pm
EXPORT ENQUIRIES WELCOME
We will be moving to the new premises – please ring
All stock subject to availability, VAT & carriage



TELEVISION CLASSIFIED

No other consumer magazine in the country can reach so effectively those readers who are wholly engaged in the television and affiliated electronic industries. They have a need to know of your products and services.

The prepaid rate for semi display setting is £12.00 per single column centimetre (minimum 3 cm). Classified advertisements £8.40 per line, box number £22.00 extra. All prices plus 17½% VAT. All cheques, postal orders etc., to be made payable to Reed Business Publishing. Advertisements, together with remittance, should be sent to The Television Classified, 11th Floor, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

Access

PHONE 081-652 8339 FAX 081-652 8931

BARCLAYCARD VISA

SERVICE MANUALS

For most U.K. European, Far East & USA makes

Thousands of different models available

Prices (Stock Items):–

VCR, VCP, Camcorder, TV/Vid –	£13.50
CTV, Colour Monitor, Camera –	£8.50
MTV, Mono Monitor, SAT, MWV –	£6.00

Add P/P £1.50 for first item then 50p for each additional item – no VAT

Cheque/PO with order only please.

D-TEC

PO BOX 1171, FERNDOWN, DORSET BH22 9YG

Tel: 0202 870656

SERVICE MANUALS

We have what is probably the largest range of Service Information available anywhere.

From the Earliest Valve Wireless to the Latest Video Recorders. Colour Televisions, Test Gear, Audio, Computers, Amateur Radio, in fact practically anything.

Originals or Photostats as available.

Also available. Our FREE catalogue detailing Hundreds of Technical Books and Repair Guides available.

STOP PRESS

Now Available. Our Service Manuals Index on P.C. Disc (3.5") for use on your Computer. Just £3.50 with FREE everlasting Updates. Order MP-285.

Mauritron Technical Services (5TV),

47A High Street, Chinnor, Oxon OX9 4DJ

Tel: 0844 351694 Fax: 0844 352554.

Please forward your latest catalogue for which I enclose 2 x 1st Class Stamps. or £3.50 for the Technical Books Catalogue plus Manuals Index on PC Disc(s).

NAME_____

Address_____

_____

_____

_____POSTCODE_____

FIX IT KWIK!!!

After many requests for further servicing information **E.C.S.** has now produced the **KWIK TIPS** range of technical publications for the TV & video engineer.

KWIK TIPS TELEVISION covering a broad range of makes, models & chassis & containing a unique collection of over **2500** television fault solutions.

ISBN 1 898394 00 8 First edition now available – **only £13.95**

KWIK TIPS VIDEO is ideal for dealing with those video "nasties", a superb collection of over **2000** video faults from a wide spectrum of manufacturers.

ISBN 1 898394 01 6 First edition now available – **only £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 brought together in 1 book.

ISBN 1 898394 02 4 First edition now available – **only £4.95**

Now in their 12th Edition with thousands of copies sold worldwide the **E.C.S. Television, Video, CD satellite & camcorder indexes** contain over **9200** references listed in 12 years of television magazine.

Price **per full set** (indexes listed above) – **only £14.75**

E.C.S.
Technical publishing

31 PRENTON ROAD WEST, PRENTON, BIRKENHEAD, MERSEYSIDE L42 9PY

Please add **£1.75** p&p to total (europe **£2.75**, r.o.w please enquire).

FAST FIX
Fault Index
containing over 150 pages

Are you making full use of the wealth of fault finding and technical information available to you in your back copies of Television? But how do I locate it all you may ask? Simple, let the FAST FIX FAULT INDEX find it for you. Containing approximately 8000 fault symptoms and also indexing hundreds of technical references, FAST FIX could pay for itself after just one repair. References are arranged alphabetically listing make, model, fault symptom and page reference and cover the years 1982-1993 inclusive. Regular updating takes place and all customers will be notified.

Complete FAST FIX index £16.00 inclusive. Overseas orders please add £3.00.

MONEY BACK GUARANTEE IF YOU ARE NOT COMPLETELY SATISFIED

Send Cheques/Postal Orders, payable to:
J. Humphreys, 13 Mansfield Avenue, St. Johns Park Hawarden, Clwyd CH5 3SB N Wales

For further details, tel. 0244 532961

TV/VIDEO/SATELLITE/HI-FI FAULT GUIDES & SERVICE SHEETS

FRYERNS

Most makes covered old and new.
This service offers technical advice and cure plus Schematic diagram all for the price of £3.50

Add £1.50 Post/Packing & Handling for 1 Item. 2 Items or More Post & Packing Free

Access and Visa Fax Service

Phone **01268 558938**
Anytime 7 days a week
4 Pincey Mead, Basildon Essex SS13 3EW

SERVICE MANUALS

– Have you turned work away for want of a Service Manual?
– Have you ever bought a Service Manual and never use it more than once?
– Then why not join

"THE MANUALS LIBRARY"

For details and Membership Application Form Write, Phone or Fax

HARVEY ELECTRONICS
43 Loop Road, Beachley, Chepstow, Gwent. NP6 7HE
Tel: 0291-623086 Fax: 0291-628786
VISA, ACCESS accepted

SERVICE MANUALS

1930's TO 1994 BRITISH - FOREIGN

We Have the worlds Largest Selection of Manuals

SOME SELECTED TIS TITLES

CTV SERVICING BY KING
G.King's 2nd Edn. Trade Standard £16.95
NEW DATA REF GUIDE 5th Edn.
Chassis guide for TV, VCR & Audio £9.95
GIANT FAULT-FINDING GUIDE
Covering faults from Amstrad - Zanussi £9.95
BUY/SELL & SERVICING USED
TV's, VCR's OR CD'S £9.95 each
FOR FULL LIST OF TITLES, SEND AN SAE

DATA LIBRARY

HOW IT WORKS IN 3 EASY STEPS:-

STEP 1: You pay a joining fee of £69.95 (the annual renewal charge is £25). & tell us what service manual you want. We'll send it to you, usually by return.
STEP 2: When you want another manual, just return your current one with £4.95, for exchange & handling, and tell us what manual you want in exchange.
STEP 3: Repeat "Step 2" as often as required!

Your joining fee of £69.95 also includes:-

Your First 12 Months Membership
Technical Help Line
All STREE Newsletters
Data Reference Guide

We also offer any 20 manuals for £190
Order them as required, there is no time-limit & postage is included
This offer is open to non-Library members

TECHNICAL INFORMATION SERVICES
76 CHURCH STREET, LARKHALL, LANARKSHIRE, ML9 1HE
TEL. (0698) 883334/888343
FAX. (0698) 884825
SEND A LARGE S.A.E. FOR YOUR FREE CATALOGUE
PLEASE ADD £2.00 POST & PACKING TO ANY ORDER

COMPLETE CTV CIRCUIT COLLECTIONS (INCLUDING 1994 MODELS)

ALBA GROUP	£29	AMSTRAD-FIDELITY	£25
B&O	£25	BAIRD-FERGUSON	£60
DECCA-TATUNG	£29	GRUNDIG	£45
HINARI	£20	HITACHI	£55
ITT-NOKIA	£45	JVC	£25
MITSUBISHI	£45	PANASONIC	£60
PHILIPS	£89	SONY	£74
TOSHIBA	£45	ZANUSSI	£20

SEE CATALOGUE FOR FULL LISTINGS

NEW EUROPEAN SCRAMBLING SYSTEMS 4th Edn. £32.00

John McCormac's latest update of his best selling book, showing how to beat the Videocrypt and build your own decoder!

PRACTICAL TV REPAIRS 2nd Edn. £16.95

FC Tunbridge's update on the most successful general repair guide in the world.
Now includes Nicam & Fastext.

PLEDGE TO THE BUYER

SOLEMNLY, WE PLEDGE & GUARANTEE, THAT WHEN ERE' WE CANNOT, SUPPLY AN ORIGINAL MANUAL, WE SHALL NOT STINT IN OUR EFFORTS, TO SUPPLY A 100% READABLE COPY, FURTHER; THESE COPIES ARE ON PAPER, STRETCHING UNTO 2 FEET IN LENGTH. SHOULD WE FALTER, A FULL REFUND OR REPLACEMENT, SHALL BE DELIVERED UNTO YOU.

TECHNICAL BOOKS

A selection from our range of books for the repair trade

TELEVISION CHASSIS GUIDE
Full cross reference for all models.
Order MP-18. $6.00
TELEVISION EQUIVALENTS
Lists models which are the same.
Order MP-150. $6.00
FAULT LISTS FOR TELEVISIONS
Hundreds of specific faults for dozens of different makes and models.
Order MP-205. $7.00
TELETEXT REPAIR MANUAL
Covers SAA range of boards.
Order MP-38. $7.00
TELEVISION REMOTE CONTROL CIRCUITS
Dozens of Diagrams on many remotes.
Order MP-167. $10.00
TV POWER SUPPLY CIRCUITS
Dozens of P.S. circuit stages.
Order MP-219. $10.00
SCART EUROCONNECTOR SYSTEM
Comprehensive details of the system.
Order MP-21. $3.00
P.C. HARD DISC DRIVE REFERENCE MANUAL
Comprehensive Drive Details.
Order MP-84. $6.00
P.C. DIAGNOSTICS SOFTWARE
Dozens of programs to aid you in diagnostics of PC's and Drives etc. 2 sets of 7 x 3.5" Discs per set.
Set 1. Order MP-250. $12.50
Set 2. Order MP-251. $12.50
VIDEO RECORDER AND CAMCORDER EQUIVALENTS
Full Cross-reference guides.
Makes A-J. Order MP-218. $6.00
Makes K-Z. Order MP-219. $6.00
FAULT LISTINGS FOR VIDEO
Lists Hundreds of Faults for dozens of makes and models.
Volume 1. MP-206. $7.00
Volume 2. MP-228. $7.00
VHS VIDEO RECORDER PRINCIPLES
Detailed guide on how it works.
Order MP-58. $4.00
VIDEO TEST JIG
Special cassette lets you operate the machine in test mode.
Order VTJ. $15.00
VIDEO HEAD CLEANING KIT
Special kit with comprehensive instructions on how to service heads.
Order VHCK. $5.00
VIDEO RECORDER FAULTS
Unique repair guide for beginners
Order MP-5. $3.00

WIRE ANTENNAS FOR H.F. OPERATORS
THE Aerial book for Amateurs.
Order MP-243. $5.95
REEL TO REEL TAPE RECORDER SERVICING
Theory and circuits for repairs.
Order MP-201. $4.95
TRANSISTOR RADIO REPAIR GUIDE
Comprehensive servicing charts.
Order MP-7. $1.95
RECORDER PLAYER SPEED DISC
Get your phonograph up to speed.
Order MP-8. $0.95
SWITCH MODE POWER SUPPLY I.C. TYPE TDA-4600
Circuitry and operation explained.
Order MP-37. $6.00
VOLTAGE REGULATORS, STABILISERS & POWER SUPPLIES
Identification and specifications.
Order MP-9. $3.00
CMOS DATABOOK
Pinouts and circuits for 4000 series.
Order MP-10. $5.00
TTL DATABOOK
Pinouts and circuits for 7400 series.
Order MP-34. $5.00
TRANSISTOR EQUIVALENTS
Includes details on testing them.
Order MP-24. $3.00
OFFICE EQUIPMENT EQUIVALENTS
Photocopiers & Fax machines covered.
Order MP-200. $6.00
TELEPHONE CODE LOCATION GUIDE
Find the Town from the Phone Code.
Order MP-19. $4.00
MANUFACTURERS EQUIVALENTS
What makes are the same.
Order MP-220. $3.00

The above selection are just a few of the Hundreds of Unique Repair and Data Guides shown in our FREE catalogue – Yours for the asking. Sent FREE with all orders or send 2 x 1st class stamps for your copy TODAY!

Order TODAY using Access/Visa for immediate despatch.
All order plus £2.94 Post and Packing. (Overseas £5.00)

MAURITRON TECHNICAL SERVICES (6TV1)
47A High Street, Chinnor, Oxfordshire OX9 4DJ.
Tel: 0844-351694. Fax: 0844-352554

SERVICE INFORMATION

CIRCUITS & SERVICE MANUALS FROM 1930s – 1990s. radios, amps, radiograms, tuners, CDs, TVs, videos, cassette radios. ICE etc. LARGE QUANTITY USED TV PANELS. BACK COPIES PW, TV MAG.
Give details of your needs to.
DAVE WILLIAMS
Tel & Fax 0302 857526
23 Florence Ave, Balby.
Doncaster, South Yorkshire DN4 0QB

TRAINING

Looking for a home study course, in the fundamentals of electronics? Whether you are a beginner, or an old hand requiring a refresher, the
DIRECT PERSONAL LEARNING
course, could be right for you. Contact: K.Sparrow, 11 Claydon Green, Whitchurch, Bristol, Avon BS14 0NG
Telephone. (0275) 835669

WANTED

WANTED
Ex Rental TV & Videos,
fast collection,
fair prices paid.
Tel; 0742 312832.

LINEAGE

AVO MULTIMETER Model 8, £45.00. 500 volt megers £30. Prices plus VAT and p&p. Send SAE for lists of Surplus Instrumer ts & scopes etc. A. C. Electronics, 17 Apleton Grove, Leeds LS9 9EN. Tel: 0532 496048

COLLECTOR OF TV , Radio, Audio, Video test equipment and parts (1940's to 1980's). 0993 771373.

OCHRE MILL Technical Services, Gruncig TV spares for most models to 1985, fast, friendly, helpful, sensible prices. Gt Lype Farm, Charlton, Nr. Malmesbury, Wilts SN16 9DR. Tel: 0666 823228.

VIDEOCRYPT DECODER Service sheet with smartcard contact details Eurocrypt card interlace £12.00. E.M.O., Ramsbottom, Lancs BL0 9AG. Tel: 0706 823036.

BUSINESS FOR SALE

FOR SALE
IN
GREENWICH AREA
Lock-Up TV/VCR SALES REPAIR SHOP
Spacious aluminium fronted shutters
Situated on the main road, easy parking
Located in parade of shops
Also on main bus routes
Long lease, low rent
£17,500 o.n.o. SAV
Ring Paul on
081-293 3474
Mobil: 0956 552368

MISCELLANEOUS

CAR RADIO SECURITY DECODING SOFTWARE

The most comprehensive software package ever from only £275+VAT

This package is fully upgradeable to any model of radio currently on our radio decoding list. Please phone for comprehensive radio decoding list and free demonstration disc (3½")

Upgrades will even cover the latest radio's on the market. We can supply/design a package to decode any radio that you choose. Updated software available absolutely free.

Package comprises models including:–
Ford, Philips, Blaupunkt, Clarion, Pioneer, Panasonic, Grundig, Hitachi, Volvo, J.V.C. In fact over 50 models covered including Ford RDS V1 & V2, Grundig SC303

Interface & all necessary probes for connection to the radios are also supplied. Installed in seconds, no modification to your computer required.

Features:–
Fully IBM or compatible, to run on all computers including lap tops, note books and even palm tops. Requires graphics capability for P.C.B. layouts. Runs from parallel port of LPT1.

1. Full user friendly menu's
2. Help screens with P.C.B. layouts for exact positioning of probes
3. Help screens to show you exactly how to enter the codes after decoding the radio
4. Error messages to advise possible fault occurrences (e.g. incorrectly fitted probe)
5. Adjustable for either b&w or colour monitors (Useful for notebooks, laptops etc.)
6. Fully reprograms blank or corrupted eeproms (using internal database)
7. Customised with your company details
8. Security coded with your choice of code to stop unauthorised access
9. Runs from C drive
10. Keeps a record of all codes (date, time, make, model)
11. Fully upgradeable

Upgrades:– Check this out?
Memphis SQR 88, CDP09, Bremen, Atlanta, Montreux, Symphony, Koln, Philadelphia, Toronto, Montreal, Paris, Peugeot PF3, Vauxhall CD300, SC202, Berlin, Frankfurt, Barcelona, Stockholm, Kingston, Nashville, Woodstock, and many many more. POA.

RADIO DECODING SERVICE:–
WE COVER ALL MODELS STARTING FROM £10.00 + CARRIAGE (£4.20 EACH WAY) + VAT. That's only £16.69 or £21.62. If we arrange collection, all you have to do is make sure its boxed and adequately protected.

Eeprom re-programming service:–
All eeproms are decoded for as little as £5.00 including VAT.
Please send all eeproms in a padded envelope, to stop damage.

CDH ELECTRONICS, leading the way – not following

3 Common Walk, Huntington, Cannock, Staffs. WS12 4NB
Tel: 0543 572 523 VAT Reg No 636 876 011

Microwave Oven Component Parts

Guaranteed Quality | Guaranteed Products | Competitive Price

AWI Ltd, 29 Mariners View, Dodnor Ind Estate, Newport, Isle of Wight, PO30 5FA
Tel (0983) 520121 Fax: (0983) 520122

TUBES

REBUILT CRTs

VDU – MONITOR – TV

Image Burn-In Removed From Screen Phosphors

N.G.T. ELECTRONICS LTD
Unit 116, 62 Tritton Road, London SE21 8DE

PHONE: 081-766 0114

Britain's Oldest Established Tube Rebuilder

JOULE A-400

ADVANCED CAR RADIO DECODER/RE-PROGRAMMER

Features:

Plugs directly into your IBM or compatible computer. Remove the baseplate from the radio, place the probe onto the PCB and the security code is instantly displayed. Changing the code or even fully re-programming is just as easy.

ABSOLUTELY NO MODIFICATIONS TO YOUR COMPUTER ARE REQUIRED

The A-400 can use either Comms 1 or Comms 2, connected via the serial lead supplied.
Two levels of password protection (user selectable) to prevent unauthorised use.
Each decode is recorded and may be accessed at any time, again, to prevent unauthorised use.
Operates from 12 volts, either from mains (via any mains adapter) for bench use or, via vehicle cigarette lighter socket, for on site use.
Easy to use software includes on-screen PCB layouts for probe location, very detailed help screens and information on how to enter codes into the radio once the set has been decoded.
Supplied complete with connecting lead, purpose designed probes and a comprehensive instruction manual.

Technical help line available to all registered users.

We will supply a starter kit, ready for use, that will decode most Philips, Ford, Blaupunkt, JVC, Hitachi, Volvo and Toyota radios for £375.00 + VAT.

We also write software to decode the more sophisticated RDS models and can supply at very competitive prices.
Currently the A-400 can decode most makes of radio, covering 166 models with more being added weekly.

PHONE NOW FOR OUR FREE DEMONSTRATION DISK AND INFORMATION PACK, OR WHY NOT VISIT US AT OUR BRAND NEW 4000 sq. ft. FACTORY

ELECTRONIC SOUND SYSTEMS

Hilton Road, Aycliffe Industrial Estate, Newton Aycliffe, Co. Durham DL5 6EN.
Tel. Sales: 0325 301007 Fax: 0325 300189 Mobile: 0860 221 099

TRANSFORMERS

TV LINE OUTPUT TRANSFORMERS

PHONE 081-948 3702 FAX: 081-332 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 ·

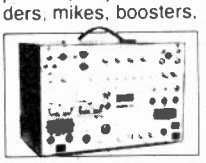
FULL RANGE OF KONIG: VIDEO HEADS, BELT KITS, IDLERS, PINCH ROLLERS, TENSION BANDS. LARGE RANGE OF REMOTE CONTROLS IN STOCK

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

TEST EQUIPMENT

MÜTER · AT2 · BMR95 · BMR700

AT 2, Audi-Multi-Tester, 16 test-circuits for loudspeakers, tuners, amplifiers, headphones, tape recorders, mikes, boosters,



car radios, CD-players; measurment of millivolt, drift, watt, performance; with generator, radio, signal tracer/injector, 13 volt supply etc.

BMR 95

BMR 700

Regenerating Computers & Measurers for CRT's with cathode protection, gas clean-up aid, short repair; exhausted CRT's becomes bright and sharp again even if all other machines do not succeed.

United Kingdom: P & E Services, Llandudno, Tel. (0492) 549246, Fax 547880.
Ireland: Dönberg Electronics, Ranafast, Co. Donegal. Tel: 353 75 48275 and 48532. Fax: 353 75 71031.
New Zealand: TDON Ltd., Onehunga, Auckland. Tel. 6 68-9 07, Fax 668-4 99.
Germany: Ulrich Müter, Oer-Erkenschwick, Fax (0 23 68) 5 70 17.

FOR SALE

Superb Opportunity!

to Expand & Diversify Your Business in Security

Installing an international award winning wirefree alarm system.

Buy direct from UK manufacturer at the lowest possible prices.

Massive demand - over 17 million untapped customers.

Very high profit margins available.

Excellent Free Factory Training

TELEPHONE FOR YOUR FREE INFORMATION PACK

Tel: 061 257 3175
or Fax: 061 256 3024 or write to PAS, Bankley House, Bankley Street, Levenshulme, Manchester, M19 3PQ.

TV & VIDEO RENTAL

Massive Stocks of Graded TV's, Video's & Hi-Fi's direct from the manufacturers at Unbelievable Prices

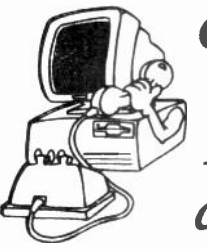
MS Products
Tel: 061 773 0085
Fax: 061 773 0084

SPARES & COMPS

SURPLUS/REDUNDANT ELECTRONIC COMPONENTS WANTED

I/Cs - Tuners - Transistors - Valves - Diodes etc. any quantity considered - immediate payment.

ADM General Trading
Tel. 0827 873311. Fax. 0827 874835



CALL VDC FIRST !

FOR COMPUTER

FLYBACKS and CRTs

WE SPECIALISE IN THE SUPPLY OF CRTS AND FLYBACKS FOR ALL APPLICATIONS, AND ARE PROUD TO HAVE BECOME THE RECOGNISED INDUSTRY LEADING SUPPLIER BY THE MOST PREMIER EUROPEAN SERVICE COMPANIES.

FROM EXTENSIVE INVENTORY IN THE U.K.WE CAN SUPPLY MOST TYPES OF MONITOR DISPLAY CRT, EITHER COLOUR OR MONO.

THIS INVENTORY IS CONSTANTLY UPDATED BY OUR HUGE WAREHOUSE AND OWN CRT PRODUCTION IN NORTH AMERICA.

DELIVERIES FROM US ARE FAST AND OUR RANGE IS UNBEATABLE !.

VIDEO DISPLAY CORPORATION LIMITED
UNIT 2, AVENUE FARM IND.ESTATE
STRATFORD-UPON-AVON,
WARKS. CV37 0HU ENGLAND
Phones; 0789.298510 or 295883
Faxes ; 0789.415243 or 294026

WE MEAN BUSINESS

RECRUITMENT

ELECTRONIC SERVICE TECHNICIANS

NEW ZEALAND

An opportunity has arisen for Qualified Service Technicians in a number of North & South Island locations.
TISCO is New Zealand's leading Electronic Service Company and has a network of 28 Service Centres throughout N.Z.

The ideal candidate will:

- Be qualified to City & Guilds III level, and have a minimum of 3 years post training experience.
- Be able to Service to component level a wide range of domestic Electronic products including C/TV, Video Recorders, Audio products, Camcorders, M/W Ovens, Computers.
- Have a high level of energy and commitment to achieving performance goals.
- Excellent communication skills both written and oral, plus the ability to liaise with clients.
- Be used to providing outstanding customer service.

Applications should be faxed to:
The Regional Manager
TISCO LIMITED
PO Box 8217
Christchurch, New Zealand
Fax 064 03 379 1452 Phone 064 03 379 5288

SENDZ COMPONENTS

0702 338894

(To order see inside back page)

PANASONIC LOPT
TLF14568F £15
TLF14567F £15

PANASONIC – TV
Hand set for models:
TC1632, TC1642, TC2232, TX2034, TX2044, TX2200, TX2234, TX2244, TX2300, TX2636, TX3300, RC201 replaces TNQ141U2
£8 EACH

TX100
FERGUSON hand set T 780 **£3**

PANASONIC T/V Video hand set
1993 models with door – 3 types
£7 EACH

FERGUSON VIDEOSTAR TRIPOD
Model VA304
Large **£20** Small **£10**

1A/1600V 10p
DG3P EQV – BY228 10 for £1.00
2 amp bridge rec. wire end 15p
SKE4G2/02 15p
Eqv. BYX71/600 500ns.

6 Push button switch ITT GEC CVC45 ETC £3.00

Hitachi T/V IC HA51338SP/3 £3.00

TATUNG AND DECCA TT14 GEC TEX-DECODER
13 IC Panel with cable form £9.50

PHILIPS
Decoder SAA IC 5020-5030 5040B-5050
K40 Text Panel £8.00

ICC5 TUBE BASE ON PANEL £5.00
ICC5 DECODER PANEL £15.00
ICC5 TEXT PANEL £15

K35 Decoder £8.00
K35 Sound OP £4.00

TX10 Tube Base on Panel £3.00

PHILIPS HAND SET
K35-K4-K40, etc £10

Universal Tripler
with small focus pot. Green type £7.00

THORN CASSETTE HOUSING
PAS26805U £18.00

LITHIUM BATTERY
BR-2/3 Volts 20p

TUNER. SAT 2000 KHC £8

HITACHI, IC
D1514C 036 £3
D1514C 046 E
MN1250BJC A
ST6393 B1/1Y C
HD6140805A90 H
TMP47C1637N
M50442-553SP

SATELLITE DECODER PANEL, NEW, NO DATA £5

ASTRA SATELLITE RECEIVER PANEL, NEW, INCOMPLETE, NO DATA £6

MARCONI LNB'S BLUE CAP EX RENTAL NOT GUARANTEED – £4 each

FERGUSON
Camera Hard Case VA277 **£10**
and
Camera Hard Case VA361 **£10**

FERGUSON
Video Lamp VA215
hand type **£20**

FERGUSON VIDEOSTAR
AC adaptor VA235
Camera **£5**

2400V – IMFD Condenser
£3

GEC
Telephone Type T1033 **£7**

Polarizer Control Unit
Salora **£15**

Battery 22AV5591
Video Camera Type **£10**

Regulated Power Supply 1200 MA
3V – 6V – 9V – 12V D.C. **£10**

Mullard Video Modular. Application, video tape recorders. TV cameras, video games, closed circuit TV, C.C.I.R. system. Data supplied £10.00
T85 250/ AC mains filter 0.1+(03x2)11" leader & earth clip 25p
NEW U321 Mullard £4.00

Astec UM1623 VHF £2.00
VHF/UHF Tuner S Band £3.00
ENV-5765G2 VHF/UHF £5.00
UF744 BAV £3
UF745 BAV
UHF Tuner and IF in one can (small) £5.00
Co-Ax Belling Lee Plug 14p
Co-Ax Splitter £1.00
Infra Red Emitting Diode 20p
NE2861 Small Neon Lamps
GEC & Phillips 5p

WE HAVE OVER 250 TYPES OF STK AND STR I.C.S. SEND FOR LIST

85-4538-3 Tatung GEC 8 Button Unit Print Type 1990 to 1992 £5.00

Philips Handset IC £3.00
SAA3010P £3.00
MAB8461/WO63 £3.00

BG 2087 – 642 – 1005 Tripler Grundig £7

Ferguson Hand Set for IK 2000 and IK 7000 £8

Ferguson 00V3 – 913 IC AM748D3 £5

FERGUSON ICs
Ferg-TX982 £3.00
TMP47C 634N 2685 £3.00
ST6391B1/B2 1CC7 £4.00

VIDEO PLUS HAND SET £15.50

THORN TA35 9 VOLT POWER SUPPLY £4

Microtext PC Teletext card with DOS software to save, print and download £16.50. Microtext for Windows software option £79.95

International Rectifier EHT Diodes G770/HV34 6KV 3 for 8p
6A/600V Stud Diodes 20p
6A/1000V Stud Diodes 20p
BTW 92/800R £3.00
24A473 PNP C/P 10p
DL 701 50p
DL 711 Mullard 50p

MATSUMI MINIATURE INFRA RED RECEIVER £1

Turntable Satelite Modulator TV £1
Sound 5.5MHz MPM 1000T £1
Sound 6.0MHz MPM 1040 £1

FEROX Cost £2.50
RF Filter Clamp for CoAx Cable
Circuit for detecting R.F. Send for circuit using clamp (25p each)

Ferguson Switch Mode Transformer
TX85, TX86, TX100 £3.50 each

ICC5 Ferguson Switch Mod Trans
3112-338-32642 £4.00

12v DC and 24v DC power supply regulated £2
ICC5 L.O.P.T.
DST 88B243
DST 85B243 £10.00 each
Thorn Mixed £10.00

Ferguson Hand Set
ICC5
IK2000 **£5**
IK7000

KT3/K30 T/Text £12.50
KT3/K30 Full remote £15.00
Pye & Philips handset KT3-K30 chassis No RC5150-RC5176-RC5071-RC5177.
Special Price £13.00
RC4001 KT3 and Teletex £14.00
TX10 Hand Set Text £12.50
TX9 with Text £12.50
TX9 & TX10 button print £1.00
TX10 Focus Pots £5.50

Mains Stand By Switch with Coil £1.00

PHILIPS
UNIVERSAL HAND SET £12.00 RC5 KT3 – K45 – £10.00

We have all parts for Philips Handsets

RC5353
RC5300
RC5176 **£10** EACH
RC5177

TEXT-TYPE
Replace Hand Set for Philips KT3-K30, K4 etc £8

THORN HAND SETS
9000 – 9600 – TX9 – TX10 – TX100
Text and Non-Text £10.00

PHILIPS
RC5171 (HAND SET) £8

SANYO MAGMTRON
Type 2M218H £10

B SKY B
VHF TO IF **£1**
BLOCK CONVERTER

10 Panels Ferguson
Mixed from TX9 to ICC5 £20

TV Aerial Ring Type 40p

TX100 Remote Hand Sets £6

ITT-Nokia Tuner IF
RF-IF-Module 5829 02 58 £6

SEL-ITT IIF-Module 2 UK 5828-04-10 £6

01 M4- 412-001-RU1 £3
8 Way Pre sets for TX10-TX100

01 V6-251-002 Text Panel ICC5
Ferguson £10

Sharp Tuner and IF 1810587 PAL1 UK £3

Tuner IF UE30-BO 3 Amstrad £3

10 Mixed Tube Bases all New Types £1

6 MEG SOUND MODULATOR (COST £10) 50p

PHILIPS RC5410P £8
HAND SET

ICC5 E/W COIL £2

EARLY BIRD SAT TUNER WITH 950–1750 MHz
BASE BAND £6 WITH DATA

FERGUSON LOPT FST 24" TX100 – 260482
£13

LOPTS AMSTRAD 3714016 £5 3216001 £5

TOSHIBA REMOTE CT9123 £4

8600 AMSTRAD DISPLAY PANEL £5

AMSTRAD SANKYO
CAPSTAN MOTOR 6,000 £3
AMSTRAD LOADING MOTOR 6,000 £1

GRUNDIG TRIPLER BG-2032-642-3002 £5

HAND SETS FOR 8600 SERIES AMSTRAD FOREIGN ORIGIN WITH L.C.D. £3

FERGUSON PAY HAND SET 4 FOR £1

TOSHIBA REMOTE CT9233 AND CT938 £3

TOSHIBA T/V TUNER. IF ENV 57836 G2F
£3

HITACHI STAND BY MAIN TRANS £10 2213881 AND L210049

PHILIPS K35 ETC 12 WAY SWITCH
WITH KNOBS 50p

60.40 SOLDER 500G £4

HIGH GAIN T/V ANTENNA UHF-VHF BUILT IN
32DB AMP 12V DC/220 AC
£9.25

AMSTRAD VIDEO FRONTS WITH FLAP
LONG CHASSIS ALL MODELS MADE IN 1991 TO 1992 AND DECCA PRO LINE AND DOUBLE DECKER £3

(ATAD) £20
AUTOMATIC TELEPHONE ALARM DIALER
SEND FOR DATA

AMSTRAD 6000 HEAD WITH MOTOR LP
£10 GOOD LOWER DRUM £3

AMSTRAD – LONG CHASSIS AND SHORT CHASSIS
POWER SUPPLY £4
MODELS 1991 TO 1992

AMSTRAD – DOUBLE DECKER SWITCH MODE
£5 POWER SUPPLY

AMSTRAD – DOUBLE DECKER PANELS £5 each.
DOUBLE DECKER FRONT £3
with flaps

AMSTRAD LONG CHASSIS DISPLAY PANEL
1992 TO 1993 £4

AMSTRAD TUNER UE33-B01 £3 IF £2

6 FOR £10 TX10 FOCUS UNIT

CONVERSION KIT ITT TELETEX £8
BURGLAR ALARM SIREN 12 VOLT 50p

HANDSETS AMSTRAD EASY CONTROL
MODELS 4600 TO 8600 £3 each

FERGUSON THOMSON SAT HANDSET SRD1 TO SRD4 £2 each

8 MIXED VIDEO PLASTIC FRONTS WITH FLAPS FOR DECCA, AMSTRAD ETC £8, £4 Post

1993 TOSHIBA FAST TEXT HAND SET £3.50

AMSTRAD IC FOR VIDEOS 6206 TO 8600
DISPLAY IC I4 DN 728 AND I4 DN 513 £3 each

AMSTRAD 6000 MODULES IC MN616 3AS AND 6367S £6 each

TOSHIBA HEAT SYNC COMPOUND £6 FOR KILO DRUM

MARCONI COMPACT L.N.B.
1.DB £25
10.7 TO 11.7GHZ

60cm BACK MESH DISH
£20, £5 post

12v Satellite Receiver with hand set £30
Switched Mode Trans 3112. 338. 32642 Ferguson £1
Philips switched mode tranformers for K40 £5

VIDEO AMSTRAD (L,C,D Types) HANDSETS
(HOME MARKET) £7.00
(EXPORT) £2.50
WILL WORK IN HOME MARKET

SEND FOR DATA
D2 MAC SATELLITE RECEIVER
£35
(£10 Post)

SATELLITE RECEIVERS — New Ferguson BSB Chassis with Tuner, Modulator etc £10
Hand Set £1.50 £4 Post

SAT RECEIVER EARLY BIRD £25
33V33, 3V37 BATTERY £10
Postage £5

TX100 HAND SRT (785) £10
Power Supply 0-15 Volts 0-30 Volts 3 Amps with Meters £34
Post £5

SMALL SATELLITE TUNERS (950 to 1750 MHz), I.F. frequency 4000MH ..... £9.00 each
VHF/UHF S.BAND TUNER £3.00
DAM MAINS CHASSIS AMSTRAD MONITOR C £10
UNIVERSAL TRIPLER. NEW TYPE £4.00
VIDEO LEADS 80p
AMSTRAD Line O.P. Transistors with Diode 2SD/453 ..... £3.00
VIDEO LAMPS. Long Lead 24p
HITACHI & GEC FRAME. Thick Film £6.00
FIDELITY SPLIT DIODE ..... FCC2215AE....£20 FCC2015BE....£10 FCC2215BE....£10
K30 FRONT PANEL TEL-TEX TYPE £5.00
NEW G11 LINE OP PANEL £8.00
PHILIPS YEARS AHEAD
THE CREDIT CARD CALCULATOR Solar Powered £3.75
NEW PHILIPS SBC 1833 Solar & Battery Powered Calculator £8.00
THORN PANEL TX9 REC & REMOTE PANELS with Mains Trans £5.00
TX10 REC & REMOTE PANELS with Mains Trans £5.00
TX100 FRONT PANEL £5.00
TX10 TUBE BASE ON PANEL £3.00
TX91F £2.00
THORN PANEL No.515-353, 548.02, 565-01. 509/102, 515/173. 508/161 ..... £5.00
THORN TX STEREO SOUND O.P. PANEL (I.C. TA7227P) £1.00
THORN VIDEO AERIAL AMP 01 M4-597-001 ..... £6.00
ULTRASONIC TRANSDUCER 15p

CAMCORDER SANYO NP22
6v 1300mah Rechargeable Battery Pack
£6.00

SATELLITE UNIT
Video Out/Audio Out, L and R Polariser ± 35M/A and Decoder Socket
£10

6.000 and 4.600 4.700 £3

PB500 Panic and Button Transmitter 180MHz £1.80
G11 CAP 250V, 470M £1.35

LEADS
Scart to Scart all pin connected £2.00

New Eprom for converting Ferguson BSB Receivers to D2 MAC and PAL – 99 channel is tunable and each one can be put into memory – also has menu.
£20
PAL panel (to convert to PAL)
£20
SEND FOR DATA

TELEPHONE BATTERY SANYO 3.6V 250/MA – £2

VARTA 3.5V 280 M/A £3.00

FEEDHORN FOR OFFSET ANTENNA £8.00

HITACHI U/V HAND SET VIDEO £10

Gas Soldering Irons New Type £10.00
Variety Nickel Cadmium Batteries from Telephone Type to Sub-C.50p per cell Mainly in packs of 6 to 8.

HITACHI UHF-VHF SMALL TUNER
ET598A £5.00
ET595A £5.00

GREY OR BLACK £1.50 5AMP MAINS LEAD WITH PLUG SOCKET FOR TEST EQUIPMENT ETC.

06D4-025-001 Mains input choke for TX9 £4

THORN M494B1 on Remote Panel £5

THORN FRAME IC TX100 etc IC TDA 3652 IS OBSOLETE REPLACEMENT TDA 3654 £2.00

TX100 REMOTE PANEL No.56413IC M293B/and SAA5012 £10 etc

TX100 REMOTE PANEL IC £10

NICAM UNIT — Ferguson made for ICC5 Chassis — home market and export — has circuit diagram and can be converted to most sets — £15.
TOSHIBA Nicam panel & IF export only has the Toshiba chip set £7.00

LARGE Foxes pots. Fits Pye, GEC, ITT, Decca 75p

144MHz Changed Over Relay Aerial 50p

6251 FRAME O/P THICK FILM HITACHI GEC £9.00

THICK FILM HITACHI HM9205A £4.00

TX10 REMOTE PANEL £5

TX9-TX100 FRONT PANEL £5 WITH REMOTE £10 NON REMOTE 8 push button £10

PHILIPS UNIVERSAL BATTERY TESTER SBC 1695 £3.00

NEW DETECTOR £10.00
PHONE HOME TO CHECK WHETHER YOU HAVE AN INTRUDER
SEND FOR DATA
WITH TELEPHONE £20.00

REGULATED PWR SUP. 500M/A 1.5V-12V DC switched + & − £5.00

MADE BY PLESSEY – MADE IN ENGLAND
New public telephone exchange original price cost £299.00
Network exchange line
(at home or in a small business) has two telephones and cables and NS5107 control unit
SPECIAL PRICE
£40
Send for data

TX100 SWITCH MODE TRANS 5157/48 £5 AND 06D4252001 06D3082001

STEREO SOLAR RADIO VHF AND MW £10.00

G11 470 MFD 250v £1.35

3V33 HAND SET £10

12 Volt Relays 20p with D/P changeover

BSB SAT/REC NEW. CHASSIS, TUNER AND MOD £5 + Post £3

PHILIPS NEW TYPE U/V HANDSET £10

G11 LOPT Panel £4.00
G11 Tip Switch £20.00
G11 IF Panel £3.00
G8 Push Button Unit £2.00
G8 Con/Panel New Back Type £4.00

MIXED TOSHIBA HAND SETS FIVE FOR £12

Have you got Acid Rain in your garden?
PH METER £5.00

Post £5 Actuator Antennmotor £15.00

LATEST VIDEO
For Latest Philips, GEC, Pye and Hitachi, Front panel with memory chip and push button and pots and LED's £6.00 NEW

PHONO TO LEADS 3 Metre 30p

LEAD SCART TO D PLUG 50p

BRIDGES RECTIFIER
Mixed BR-31 to 34
2 Amp to 5 Amp ..... 8 for £1.00

1 METRE SCART LEAD £1.00

FERGUSON CHASSIS
IKC-2000 £15 TX86 Chassis £14
NEW TX100 CHASSIS
TX90 CHASSIS WHITE SPOT £20
Post each, £6
TX80 CHASSIS £15

TX100 FRONT PANEL £5
8 Button

SALORA SAT RECEIVER CONVERSION KIT
For models 24M60, 25M90, 28M90, SB1206E, SB1365
£15

LNC 11GHZ NOKIA – LNB FOR OFFSET DISH £13.00
ELECTROMAGNETIC POLARIZER 10.95 – 12.75 GHZ £9.00
11GHZ LOW NOISE BLOCK DOWN CONVERTER SCE 975 MADE BY MASPRO £14.00

5 Mixed AMSTRAD VIDEO MOTORS £5.00

SATELLITE TUNER UNIT 2427611 with Base Band, Video Out £8.00

TX10 8 way button unit £8.00
24v O 24v 3Amp MAINS TRANSFORMER £3.00
MSH1FCF09 £2.??

TX90 TO TX100 8 BUTTON UNIT £4.00

PHILIPS UNIVERSAL BATTERY TESTER SBC 1695 £3.00

PULSE CAPACITOR 20 for a £1 mixed (1500V to 2KV)

56420A 20A/600V THYRISTOR £1.75

ITT BG2032-642A TRIPLER £5.00

ITT/KOKIA HF IF MODULE 24K No 5828-04-10 £15.00

TERE 7-008A – 115-B-2010
FCC-2885PLE TEEF 1-030A
UHF, VHF TUNER – SMALL TYPE
£4 EACH

BRIDGE RECTIFIERS – MIXED 10 FOR £1

TVK 186-5 TRIPLER TVK 76-5
£1.50 EACH

BURGLAR ALARM
USE INFRA RED DETECTOR
WIDE AND SHORT ANGLE
WALL MOUNT £8
WITH RELAY

TUNER U/V 616 ..... £10

POWER SUPPLY
KIT 0.28 volts 1½ amps with 2 meters £12
Printed circuit board and components

MODULATOR KIT £5
5v to 12v for all cameras etc

2433752 £20
2432984
2432871
2432301
2435016
2433952
2434393
2432211
T9048A
DST858243
TFB3069D
K41 O.P.T
K40
2433452
2432934
2434451 £14

£15 EACH

SPLIT-DIODE
2433752 £15
TX100 Green Spot £15.00
TX100 Yellow Spot
L.O.P.T. £10.00
TX90 White Spot
L.O.P.T. £15.00
Split Diode 110° £12.50
Orion 65-3M
GEC 85-9793-6
TX9 Thorn 2432101-2 £5
2434141 EACH
2434492 £10
2434493

DST 81N243
TFB4023AD £10.00
MSH1FPT131 £12.00
MSH1FBW27 £12.00
DST186N243 £10.00
3220029 £10.00

TOSHIBA
DST 186N243 £10
TFB 4023AD £10
CP90 Philips Split Diode £10.00
2435341 £15
2432491 £10
2435065 £15

36761
36881
2692120/10
37051
CTK Lopt
36212
33651
36072
36362
36482
36761
36831
36832
36833
36921/79
36922/79

TX85
2435701
2434393
2435016
2435014
£10
2436797
2434494
£15

TRANSFORMERS
24357/01 £10
2435012 £10
FERGUSON
47003481 £10
AMSTRAD TVR3
LPTS £10
TFB3069D EQU
TFB4009AN

AT2036/00 AT2076/55
AT2048/11 AT2076/71T
AT2055 RGO ST CT3325
AT2076/35 OT2041
AT2076/38 FB165KA Orion
AT2076/51 2076/51
CVC 820 2432461 2433451
CVC 800

TUNER UNITS
Small V/Cap Mitsumi
– UHF £4.00
– VHF £3.00
Portable & Rotary Tuners Sanyo & Mitsumi UHF £5.00
Mosfit UHF/VHF (new type) £8.00
UF2-B31 Fidelity V/Cap T/Unit £6.00
UHF-VHF V/Caps on panel £3.00
HITACHI 20 Turn Pot 40p
U321 ca panel £6.00
U/V 615 £10.00
U/V 616 £10.00

SHARP MSH1FCH09
£10 EACH
FIT MOST SETS New Thorn Hand Set Type u/v (£10)
0004-235
002-01

VIDEO MOTOR for VT568 type VC62DD8 £8.00
AMP TUNER IF for VT568 Hitachi & GEC £9.00

U/V 6, DIODE TRIPLERS £2.00

4600 TO 8600 AMSTRAD VIDEO HAND SET WITH LCD £10

SATELLITE TUNER
950MHz-1750MHz £5.00

TTT PANEL
CMC 301 CMC 113 CMC 302
CMC 115 CMC £5.00 303 CMC 96/4

BRIDGE RECTIFIERS
10 FOR £1.00
4 Amp for Video Power Supply

SEL ITT
IFB254F/2 Front Panel
£15.00

DECCA — GEC — ITT
6 push button £5.00

BURGLAR ALARM £2.00 with siren 9 VOLT

25 Way Plug and Socket with Case £1.50

TRV3 Amstrad Cassette Mechanisms. New with 2 motors and sound head. £15
£5. Amstrad Television Tuner UHF. Small, Fits most Amstrads. £6.

SENDZ COMPONENTS
63 BISHOPSTEIGNTON, SHOEBURYNESS, 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 17½% 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: 0702 332992 • Fax 0702 338805 •
GVMT School orders on official headings

INFRA RED DETECTOR
(for outside use) with Time Control & Distance Control £12
Sensitivity Adjustment Control High Adjustment Time Delay Adjustment

PHILIPS HAND SET
G11 TEXT ULTRASONIC £10
G11 HAND SET ULTRASONIC £10
PHILIPS RC5 EASY CONTROL £10

FERGUSON SAT HAND SET
SR D1
SR D2 £2
SR D3
SR D4

FERGUSON ICC5 STEREO O.P. PANEL
ICS TDA8405
TDA8421
TBA1204 £10

NICAM MKII KIT MODULE
£20.00 with data

Burglar Alarm
Has time delay to set £2

Mains Transformer £4.00
240v in 110V to 120v out
1 amp post £3

NEW! NEW! NEW!

"SECTION 2"

from SENDZ

After years of regular advertising in this magazine SENDZ ANNOUNCE an EXCITING NEW DEVELOPMENT in our mail-order . . . "SECTION 2". "SECTION 2" will give you information on many NEW and EXCLUSIVE BARGAINS. "SECTION 2" will give you advance information about SPECIAL PURCHASES and DISCOUNT OFFERS.

In addition "SECTION 2" will keep you up to date with our many standard and rapidly moving ELECTRONIC STOCKS.

SEND AN S.A.E. now and make sure you don't miss out.

Whether you are a serviceman, in education or a hobbyist there will always be something of interest in "SECTION 2" . . . and at a price which will not break the bank!

SENDZ
214 LONDON ROAD
SOUTHEND, ESSEX SS1 1PJ
Tel: 0702 338894