

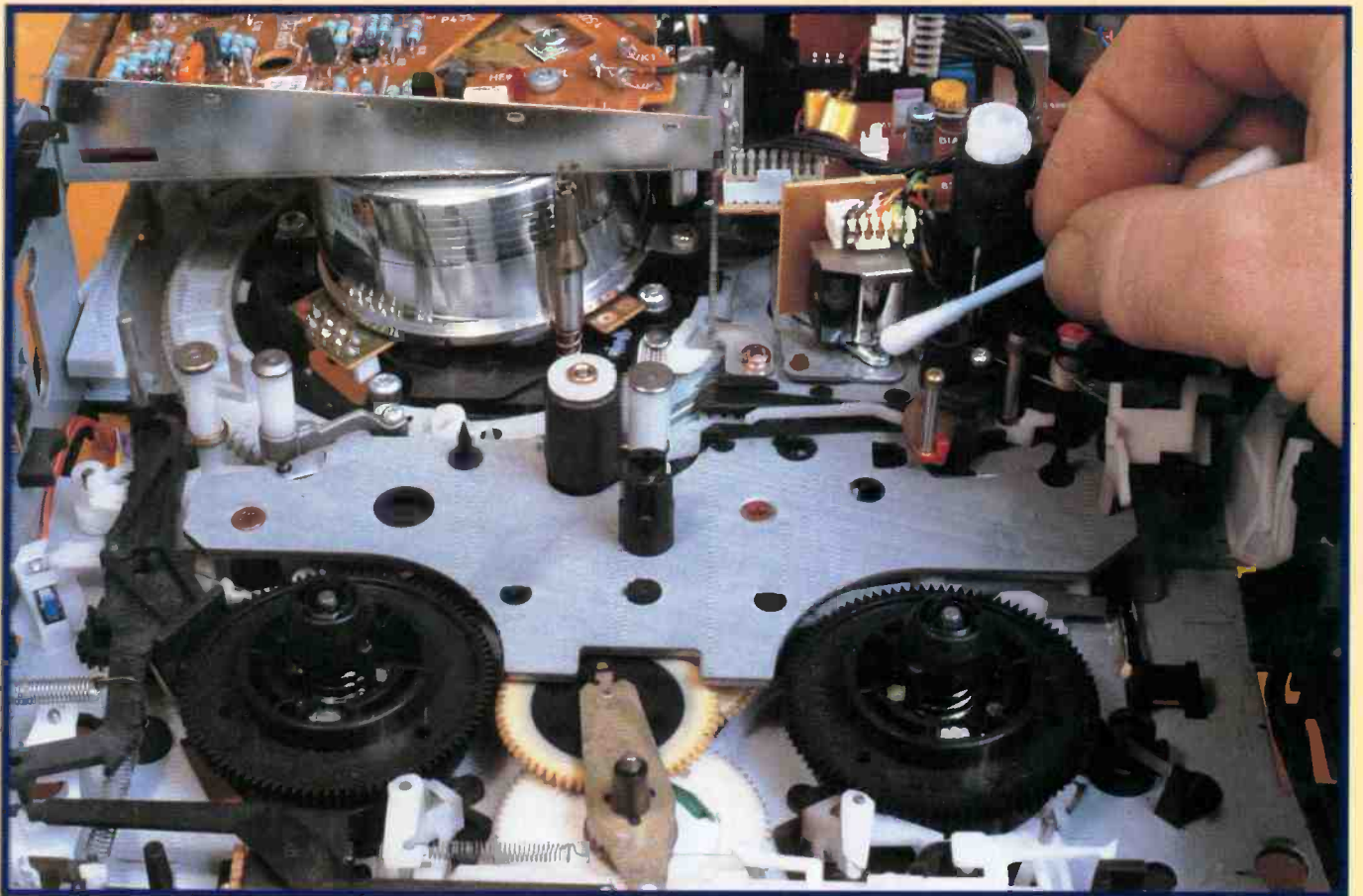
MARCH 1992

£1.95

TELEVISION

SERVICING · VIDEO · SATELLITE · DEVELOPMENTS

**WIN AN FM/MW/LW RADIO
FREE 32-PAGE CATALOGUE**



**Servicing the Philips DMP Deck
Continuity Tester/Low-R Ohmmeter
More on the Finlux 1000 Chassis
Satellite TV Notebook • DX-TV
VCR Clinic • TV Fault Finding**



REPLACEMENT REMOTE CONTROLS ?

**WE COVER MOST
BRANDS OF TELEVISION
AND VIDEOS**

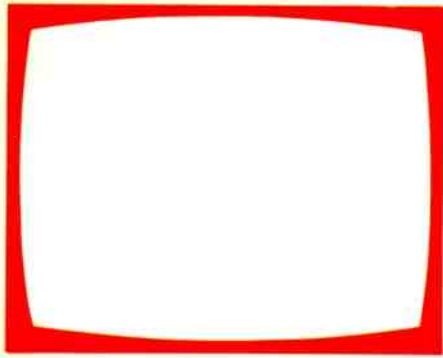


PHILEX PLC 

PHILEX PLC 841 HARROW ROAD LONDON NW10 5NH

**FOR FURTHER INFORMATION, INCLUDING
CUSTOM DESIGNED UNITS CONTACT
PHILEX OR AN AUTHORISED DISTRIBUTOR**

TEL: 081-968 9684 FAX: 081-960 0449



TELEVISION

March
1992

Vol. 42, No. 5
Issue 497

On sale February 19th

COPYRIGHT

© Reed Business Publishing Ltd., 1992. Copyright in all drawings, photographs and articles published in *Television* is fully protected and reproduction or imitation in whole or in part is expressly forbidden. All reasonable precautions are taken by *Television* to ensure that the advice and data given to readers are reliable. We cannot however guarantee it and we cannot accept legal responsibility for it.

CORRESPONDENCE

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

INDEXES AND BINDERS

Indexes to Vols. 37 and 38 are available at £1 each from the Editorial office (address above). Photostats of the indexes to Vols. 31-36 can be supplied at £1 each. Make cheques etc. payable to Reed Business Publishing Ltd.

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

SUBSCRIPTIONS

An annual subscription costs £23 in the UK, £28 overseas (by surface mail - ask for airmail quote if required). 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 number 0789 200 255.

BACK NUMBERS

Subject to availability, copies of issues published during the last 12 months are available at £2.50 each from Television Back Issues, Room L333, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. Make cheques/postal orders payable to Reed Business Publishing Ltd.

QUERIES

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

this month

- 319 Leader**
- 330 Continuity Tester/Low-R Ohmmeter** *Ian Rees*
Many DMMs have poor performance in the low-ohms range. This meter was specifically designed for the application.
- 332 Teletopics**
News, comment and developments.
- 334 What a Life!** *Donald Bullock*
- 336 Servicing Philips DMP VCR Decks** *Philip Blundell, AMIEIE*
Large numbers of Philips and other VCRs use this unique deck. Notes on common problems and servicing procedures, also some electronic faults with Philips models.
- 340 Nokia's Approach to Widescreen TV** *George Cole*
By leaving out 1,250-line operation and other features Nokia has substantially reduced the price of widescreen TV sets.
- 341 Long-distance Television** *Roger Bunney*
DX conditions and reception and news from abroad.
- 342 Photostat Service**
- 343 New Reader Service Numbers**
- 344 TV Fault Finding**
Reports from Philip Blundell, AMIEIE, Alfred Damp, Steve Cannon, Ed Rowland, John Edwards, Stephen Leatherbarrow, Brian Storm and Chris Avis.
- 347 CD Player Casebook**
Reports from Mick Leach, P.J. Roberts and Nick Beer.
- 347 Matters Arising**
- 348 Test Report: Beckman Industrial RMS225 DMM** *David Botto*
A thorough assessment of this new DMM which offers numerous features for its very reasonable price.
- 352 VCR Clinic**
Reports from Philip Blundell, AMIEIE, Eugene Trundle, John Edwards, Brian Storm, Michael Dranfield, Stephen Leatherbarrow and Brian Davidson.
- 354 Competition - Win an FM/MW/LW Radio**
- 355 Overhauling Valve Radio Receivers** *Stanley Jackson*
Many modern engineers have never dealt with valve equipment. A quick guide on how to deal with a faulty valve radio set.
- 356 Letters**
- 359 Next Month in Television**
- 360 Satellite Notebook** *Nick Beer*
Fault notes and problems that arise with satellite TV installations.
- 361 More on the Finlux 1000 Series Chassis** *Chris Watton*
Fault notes and procedures for dealing with defective sets.
- 363 Test Case 351**

OUR NEXT ISSUE DATED APRIL WILL
BE PUBLISHED ON MARCH 18

AAV32	9p	BD332	40p	BTY79	140p	PIP117	50p	OA47	10p	PCF801	110p	ANT145	195p	ICL7106	650p	LM3909	80p	STK436	490p	STK7226	800p	TA7310	100p
AC107	40p	BD361	60p	BU100A	110p	PIP120	37p	OA90	10p	PCF802	80p	ANT146	210p	ICL7107	650p	LM3911	160p	STK437	500p	STK7308	510p	TA7312	120p
AC125	30p	BD362	60p	BU104	110p	PIP121	46p	OA91	10p	PCF806	115p	ANT154	180p	ICL7108	240p	LM3914	160p	STK438	550p	STK7309	450p	TA7313	110p
AC126	30p	BD370	60p	BU105	80p	PIP122	47p	OA200	10p	PCF1200	100p	ANT156	220p	ICM7550	80p	LM3915	180p	STK439	550p	STK7310	450p	TA7314	210p
AC127	30p	BD371	60p	BU106	80p	PIP123	47p	OA201	10p	PCF1201	100p	ANT157	220p	ICM7551	80p	LM3916	180p	STK440	550p	STK7311	450p	TA7315	210p
AC128	35p	BD410	80p	BU109	80p	PIP126	56p	IN.914	22p	PCL81	80p	ANT178	270p	LM7556	80p	LM3916	270p	STK443	740p	STK7348	410p	TA7315	200p
AC128K	40p	BD433	28p	BU110	110p	PIP127	56p	IN.4001	3p	PCL84	60p	ANT222	300p	KA2101	150p	MS0115P	320p	STK459	560p	STK7358	650p	TA7324	200p
AC141K	45p	BD434	28p	BU111	140p	PIP130	56p	IN.4002	3p	PCL85	80p	ANT224	150p	KA2130	150p	MS0117P	320p	STK460	560p	STK7359	650p	TA7324	200p
AC142K	45p	BD435	28p	BU112	140p	PIP131	56p	IN.4003	3p	PCL86	80p	ANT225	150p	KA2130	150p	MS0119P	525p	STK461	620p	STK7404	400p	TA7328	200p
AC167K	22p	BD436	31p	BU126	85p	PIP131	30p	IN.4004	3p	PCL805	80p	ANT310	90p	KA2206	150p	MS0120P	650p	STK463	780p	STK7406	800p	TA7335	200p
AC176K	28p	BD437	28p	BU180	150p	PIP141	30p	IN.4005	3p	PFL200	110p	ANT311	90p	KA2209	128p	MS0128P	280p	STK465	720p	STK7408	880p	TA7336	250p
AC187	25p	BD438	36p	BU184	100p	PIP142	90p	IN.4006	3p	PL36	120p	ANT312	250p	KA2212	80p	MS0136P	500p	STK467	780p	STK7410	880p	TA7337	250p
AC187K	45p	BD439	40p	BU205	70p	PIP146	90p	IN.4148	2p	PL81	60p	AY3-1015	290p	KA2213	80p	MS0138P	500p	STK468	780p	STK7412	880p	TA7343	250p
AC188	25p	BD440	40p	BU205	70p	PIP146	90p	IN.4148	2p	PL82	60p	AY3-1015	290p	KA2213	80p	MS0138P	500p	STK468	780p	STK7412	880p	TA7343	250p
AC188K	40p	BD441	40p	BU206	100p	PIP147	100p	IN.5400	9p	PL84	60p	AY3-1270	800p	KA2214	150p	MS1355P	400p	STK469	780p	STK7414	880p	TA7358	200p
AC188K	40p	BD441	40p	BU206	100p	PIP147	100p	IN.5400	9p	PL85	180p	AY3-1350	450p	KA2214	150p	MS1355P	400p	STK469	780p	STK7414	880p	TA7358	200p
AC188K	40p	BD441	40p	BU206	100p	PIP147	100p	IN.5400	9p	PL86	180p	AY3-8910	800p	KA2263	100p	MS1381P	200p	STK470	780p	STK7416	880p	TA7608	270p
AD119	50p	BD536	38p	BU208A	80p	TIP2955	42p	IN.5403	8p	PL508	120p	AY3-8912	400p	KA2264	100p	MS1387P	900p	STK471	780p	STK7418	880p	TA7609	270p
AF125	50p	BD536	38p	BU208B	80p	TIP3055	42p	IN.5404	8p	PL508	120p	BA301	65p	KA2284	100p	MS1397P	900p	STK472	780p	STK7420	880p	TA7609	270p
AF127	50p	BD537	40p	BU209	140p	TIP3055	42p	IN.5405	11p	PL519	430p	BA311	80p	KA2284	100p	MS1546P	350p	STK473	780p	STK7422	880p	TA7610	270p
AF139	50p	BD538	40p	BU225	190p	TIP3055	42p	IN.5406	12p	PL526	430p	BA313	80p	KA2291	128p	MS1546P	350p	STK474	780p	STK7424	880p	TA7611	280p
AF239	30p	BD540	40p	BU226	190p	TIP3055	42p	IN.5407	11p	PL588	100p	BA333	100p	KA2291	128p	MS1546P	350p	STK475	780p	STK7426	880p	TA7612	280p
BA145	10p	BD645	50p	BU312	120p	TIS90	15p	IN.5408	12p	RG15	15p	BA340	150p	KA2914A	300p	MS1724P	600p	STK476	780p	STK7428	880p	TA7613	280p
BA148	10p	BD649	50p	BU325	75p	TIS93	18p	IN.5409	12p	RG15	15p	BA401	60p	LA1310	240p	MS1748P	150p	STK477	780p	STK7430	880p	TA7614	280p
BA148	10p	BD649	50p	BU325	75p	TIS93	18p	IN.5409	12p	RG15	15p	BA402	60p	LA1150	150p	MS2020P	100p	STK478	780p	STK7432	880p	TA7615	280p
BA148	10p	BD649	50p	BU325	75p	TIS93	18p	IN.5409	12p	RG15	15p	BA403	60p	LA1150	150p	MS2020P	100p	STK478	780p	STK7432	880p	TA7615	280p
BA157	12p	BD676	78p	BU406D	85p	VK1010	88p	SKE4F206	60p	SKE4F206	60p	BA404	60p	LA1150	150p	MS2020P	100p	STK479	780p	STK7434	880p	TA7616	280p
BB105B	24p	BD677	38p	BU407	55p	VN10KM	60p	SKE4F210	100p	SKE4F210	100p	BA405	60p	LA1150	150p	MS2020P	100p	STK480	780p	STK7436	880p	TA7617	280p
BB705B	18p	BD678	38p	BU408	55p	VN88AF	115p	IN.4007	7p	IN.4007	7p	BA406	60p	LA1150	150p	MS2020P	100p	STK481	780p	STK7438	880p	TA7618	280p
BC108	8p	BD680	40p	BU408D	85p	ZTX107	11p	8PIN	5p	ZTX108	11p	BA407	60p	LA1150	150p	MS2020P	100p	STK482	780p	STK7440	880p	TA7619	280p
BC109	8p	BD681	40p	BU409	85p	ZTX108	11p	14PIN	7p	ZTX109	11p	BA408	60p	LA1150	150p	MS2020P	100p	STK483	780p	STK7442	880p	TA7620	280p
BC109C	8p	BD682	40p	BU426A	70p	ZTX108	11p	16PIN	7p	ZTX110	11p	BA409	60p	LA1150	150p	MS2020P	100p	STK484	780p	STK7444	880p	TA7621	280p
BC118	10p	BD700	40p	BU508A	75p	ZTX108	11p	18PIN	10p	ZTX111	11p	BA410	60p	LA1150	150p	MS2020P	100p	STK485	780p	STK7446	880p	TA7622	280p
BC140	20p	BD707	50p	BU508A	75p	ZTX301	13p	20PIN	10p	ZTX112	11p	BA411	60p	LA1150	150p	MS2020P	100p	STK486	780p	STK7448	880p	TA7623	280p
BC141	20p	BD709	50p	BU508AF	85p	ZTX301	13p	22PIN	10p	ZTX113	11p	BA412	60p	LA1150	150p	MS2020P	100p	STK487	780p	STK7450	880p	TA7624	280p
BC142	20p	BD711	50p	BU508D	80p	ZTX301	13p	24PIN	14p	ZTX114	11p	BA413	60p	LA1150	150p	MS2020P	100p	STK488	780p	STK7452	880p	TA7625	280p
BC143	20p	BD713	50p	BU508D	80p	ZTX301	13p	26PIN	14p	ZTX115	11p	BA414	60p	LA1150	150p	MS2020P	100p	STK489	780p	STK7454	880p	TA7626	280p
BC147	8p	BD826	50p	BU536	100p	ZTX303	24p	40PIN	18p	ZTX116	11p	BA415	60p	LA1150	150p	MS2020P	100p	STK490	780p	STK7456	880p	TA7627	280p
BC148	8p	BD827	50p	BU536	100p	ZTX303	24p	40PIN	18p	ZTX117	11p	BA416	60p	LA1150	150p	MS2020P	100p	STK491	780p	STK7458	880p	TA7628	280p
BC149	8p	BD828	50p	BU536	100p	ZTX303	24p	40PIN	18p	ZTX118	11p	BA417	60p	LA1150	150p	MS2020P	100p	STK492	780p	STK7460	880p	TA7629	280p
BC157	8p	BD909	50p	BU546	140p	ZTX320	29p	40PIN	18p	ZTX119	11p	BA418	60p	LA1150	150p	MS2020P	100p	STK493	780p	STK7462	880p	TA7630	280p
BC159	8p	BD910	50p	BU546	140p	ZTX320	29p	40PIN	18p	ZTX120	11p	BA419	60p	LA1150	150p	MS2020P	100p	STK494	780p	STK7464	880p	TA7631	280p
BC160	30p	BD977	50p	BU636	150p	ZTX502	18p	400 MW	210p	ZTX121	11p	BA420	60p	LA1150	150p	MS2020P	100p	STK495	780p	STK7466	880p	TA7632	280p
BC171	10p	BDX32	100p	BU801	80p	ZTX503	18p	BZV88 RANGE	27V to 39V	ZTX122	11p	BA421	60p	LA1150	150p	MS2020P	100p	STK496	780p	STK7468	880p	TA7633	280p
BC172	10p	BDX33	100p	BU802	80p	ZTX503	18p	1.3W	9p	ZTX123	11p	BA422	60p	LA1150	150p	MS2020P	100p	STK497	780p	STK7470	880p	TA7634	280p
BC177	10p	BDX85	80p	BU807	70p	ZTX504	24p	2V7 to 39V	10p	ZTX124	11p	BA423	60p	LA1150	150p	MS2020P	100p	STK498	780p	STK7472	880p	TA7635	280p
BC178	14p	BDW23	55p	BU902	130p	ZN896	26p	AN2140	170p	ZTX125	11p	BA424	60p	LA1150	150p	MS2020P	100p	STK499	780p	STK7474	880p	TA7636	280p
BC179	14p	BDW24	55p	BU903	130p	ZN897	26p	AN2140	170p	ZTX126	11p	BA425	60p	LA1150	150p	MS2020P	100p	STK500	780p	STK7476	880p	TA7637	280p
BC182	7p	BF193	35p	BU921	130p	ZN898	40p	AN2140	170p	ZTX127	11p	BA426	60p	LA1150	150p	MS2020P	100p	STK501	780p	STK7478	880p	TA7638	280p
BC182L	7p	BF193	35p	BU921	130p	ZN898	40p	AN2140	170p	ZTX128	11p	BA427	60p	LA1150	150p	MS2020P	100p	STK502	780p	STK7480	880p	TA7639	280p
BC183	7p	BF192	35p	BU922	130p	ZN706	22p	AN258	250p	ZTX129	11p	BA428	60p	LA1150	150p	MS2020P	100p	STK503	780p	STK7482	880p	TA7640	280p
BC183L	7p	BF137	35p	BU930	130p	ZN708	22p	AN262	240p	ZTX130	11p	BA429	60p	LA1150	150p	MS2020P	100p	STK504	780p	STK7484	880p	TA7641	280p
BC184	7p	BF154	35p	BU931	130p	ZN814	28p	AN258	250p	ZTX131	11p	BA430	60p	LA1150	150p	MS2020P	100p	STK505	780p	STK7486	880p	TA7642	280p
BC184L	7p	BF157	35p	BU932	130p	ZN815	28p	AN258	250p	ZTX132	11p	BA431	60p	LA1150	150p	MS2020P	100p	STK506	780p	STK7488	880p	TA7643	280p
BC212	7p	BF183	20p	BU935	130p	ZN816	28p	AN258	250p	ZTX133	11p	BA432	60p	LA11									

LINEAR IC's
Cont.

TD41420	200p	TD4A503	300p	ZN435	340p	2SA1315	100p	2SC945	20p	2SC1855	85p	2SC2502	200p	2SC3104	1650p	2SC3787	100p	2SD-921	320p	2SD 1273	100p	2SD 1455	320p
TD41420	200p	TD4A503	300p	ZN448	510p	2SA1316	80p	2SC950	40p	2SC1860	50p	2SC2509	80p	2SC3105	3600p	2SC3789	75p	2SD-922	320p	2SD 1274	100p	2SD 1456	220p
TD41470	140p	TD4A505	300p	ZN459	190p	2SA1317	30p	2SC959	225p	2SC1861	400p	2SC2516	125p	2SC3112	35p	2SC3790	120p	2SD-946	120p	2SD 1276	200p	2SD 1457	220p
TD41510	380p	TD4A555	600p	ZN140	640p	2SA1318	30p	2SC980	120p	2SC1865	700p	2SC2519	60p	2SC3114	40p	2SC3795	200p	2SD-947	100p	2SD 1277	190p	2SD 1468	60p
TD41512	180p	TD4A560	450p	ZN141	640p	2SA1319	30p	2SC981	120p	2SC1868	500p	2SC2520	60p	2SC3115	40p	2SC3796	200p	2SD-948	100p	2SD 1278	190p	2SD 1469	60p
TD41512	180p	TD4A560	450p	ZN234E	1250p	2SA1320	200p	2SC983	120p	2SC1871	200p	2SC2527	300p	2SC3117	120p	2SC3807	120p	2SD-951	350p	2SD 1289	300p	2SD 1477	450p
TD41512	180p	TD4A600	160p			2SA1346	30p	2SC988	60p	2SC1875	260p	2SC2534	150p	2SC3122	50p	2SC3811	50p	2SD-957A	520p	2SD 1291	400p	2SD 1505	120p
TD41514	450p	TD4A600	200p			2SA1352	100p	2SC1000	60p	2SC1881	210p	2SC2535	300p	2SC3130	100p	2SC3832	200p	2SD-958	60p	2SD 1292	60p	2SD 1504	200p
TD41515	200p	TD4A602	200p			2SA1353	100p	2SC1001	60p	2SC1882	210p	2SC2536	300p	2SC3131	100p	2SC3833	200p	2SD-959	60p	2SD 1293	425p	2SD 1505	450p
TD41516	350p	TD4A605	300p			2SA1356	100p	2SC1008	50p	2SC1900	125p	2SC2539	100p	2SC3138	480p	2SC3854	220p	2SD-970	170p	2SD 1308	140p	2SD 1576	450p
TD41518	300p	TD4A610	650p			2SA1358	130p	2SC1010	225p	2SC1906	30p	2SC2540	1900p	2SC3149	410p	2SC3854	250p	2SD-973	60p	2SD 1309	140p	2SD 1577	450p
TD41520	350p	TD4A660	480p			2SA1362	100p	2SC1012	75p	2SC1907	75p	2SC2542	300p	2SC3150	200p	2SC3855	200p	2SD-973A	70p	2SD 1310	140p	2SD 1579	120p
TD41521	300p	TD4A714B	250p			2SA1371	100p	2SC1013	75p	2SC1908	170p	2SC2543	300p	2SC3151	230p	2SC3857	500p	2SD-985	200p	2SD 1326	200p	2SD 1581	310p
TD41522	200p	TD4A950	180p			2SA1371	100p	2SC1014	140p	2SC1913	190p	2SC2546	75p	2SC3152	250p	2SC3858	200p	2SD-986	120p	2SD 1328	60p	2SD 1595	160p
TD41524	350p	TD4A530T	300p			2SA1380	100p	2SC1030	190p	2SC1921	60p	2SC2547	65p	2SC3153	320p	2SC3870	200p	2SD-101	60p	2SD 1347	70p	2SD 1604	200p
TD41540	420p	TD4A500	450p			2SA1381	100p	2SC1047	60p	2SC1923	25p	2SC2550	70p	2SC3156	400p	2SC3883	280p	2SD-1021	120p	2SD 1348	85p	2SD 1608	210p
TD41541	600p	TD4A560P	250p			2SA1382	120p	2SC1048	280p	2SC1928	180p	2SC2551	90p	2SC3157	200p	2SC3890	150p	2SD-1022	400p	2SD 1350	150p	2SD 1609	100p
TD41596	260p	TD4A570	200p			2SA1383	180p	2SC1060	90p	2SC1936	150p	2SC2552	150p	2SC3158	250p	2SC3895	400p	2SD-1023	400p	2SD 1376	125p	2SD 1622	300p
TD41670A	300p	TD4A570	560p			2SA1396	40p	2SC1061	85p	2SC1940	110p	2SC2553	200p	2SC3159	200p	2SC3897	650p	2SD-1031	130p	2SD 1379	100p	2SD 1649	260p
TD41675	250p	TD4A570	560p			2SA1423	30p	2SC1070	25p	2SC1941	40p	2SC2555	150p	2SC3164	350p	2SC3907	420p	2SD-1046	200p	2SD 1380	100p	2SD 1651	270p
TD41701	320p	TD4A580	600p			2SA1442	200p	2SC1079	65p	2SC1942	190p	2SC2562	90p	2SC3169	200p	2SC3909	450p	2SD-1051	130p	2SD 1383	100p	2SD 1663	500p
TD41700A	300p	TD4A580	480p			2SA1443	250p	2SC1086	60p	2SC1944	350p	2SC2563	300p	2SC3170	300p	2SC3927	550p	2SD-1062	130p	2SD 1384	125p	2SD 1662	100p
TD41700A	300p	TD4A580	225p			2SA1463	200p	2SC1098	120p	2SC1945	250p	2SC2564	230p	2SC3173	180p	2SC3946	120p	2SD-1064	250p	2SD 1391	450p	2SD 1667	120p
TD41727A	450p	TD4A684	60p			2SA1491	300p	2SC1103A	130p	2SC1946	1500p	2SC2565	260p	2SC3175	200p	2SC3950	120p	2SD-1071	450p	2SD 1392	150p	2SD 1668	120p
TD41904	120p	TD4701T	100p			2SA1493	500p	2SC1106	180p	2SC1947	450p	2SC2568	120p	2SC3178	340p	2SC3963	120p	2SD-1073	350p	2SD 1396	150p	2SD 1677	300p
TD41905	150p	TD47273	100p			2SA1516	60p	2SC1112	45p	2SC1948	900p	2SC2569	190p	2SC3179	400p	2SC3964	120p	2SD-1074	80p	2SD 1397	220p	2SD 1678	450p
TD41906A	90p	TD47052	150p			2SA1535	175p	2SC1115	280p	2SC1957	70p	2SC2571	120p	2SC3181	240p	2SC3973	275p	2SD-1111	60p	2SD 1397	220p	2SD 1678	100p
TD41906A	90p	TD47211	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p
TD41940	280p	TD47220	150p			2SA1538	80p	2SC1116	290p	2SC1959	200p	2SC2572	125p	2SC3182	250p	2SC3975	275p	2SD-1128	200p	2SD 1398	130p	2SD 1681	100p

FISHER FVH725830 £30.00 FVH930 £32.00 GOLDSTAR 8000 3HSSDB £19.00 GVH51GVH121WCP4000VCPA100 VCP4200 £18.00 GHV1232124512468210G215GHVP1240 1241GHVP12471248VCP400 £17.50 GEAC 4000H4001H4002H V4001H4004 £18.00 GRANADA CS1052 £21.50 GRAETZ 431246054905491274913F4805 481249054912749134914943 49354943496349854993TR48334935 49854993 £6.50 492049274930 £17.00 4946TR49064916 £23.00 TR4985 £33.00 GRUNDIG VS4041044045046050050510 £17.00 HINARI VXL2VXL3VXL4VXL20VXL25VXL35 VXL5VXL20H £13.00 VXL6 £18.00 VXL8VXL9VXL10VXL11VXL10 £20.00 HITACHI VT11VT14VT16VT33VT33A/330/340/503/ 640/500 £13.00 VT17VT17AT18VT19 £25.00 VT35VT38VT39 £33.00 VT1001101111/1121113115/118/120/125/ 128/220/225 £21.00 VT3000 £10.00 VT4000/4200/5000/5000 V7177680/3000/6500/7000/8000/8030/ 80408100/8300VT16500/8700/9000/9300/ 9500/9700/9900 £13.50 VT67VT9V156V157 £34.00 V165 £35.00 VT130VVT135VVT138V1145VVT150/ VT150VVT25 £29.50 V161EVT162EVT163V164 £20.00 VT150 £35.00 VT530 H.M.V. HV100020003000 £8.50 HV400070008000 £8.50 ITT VR3605390539353943395439853993 VR3833VR3913VR3914VR3963 VR3975 £6.50 VR3975 £6.50 VR3985 £20.00 JVC 3HSS HR2204HR3300HR3320HR3330 HR3350HR3360HR3360HR3750 HR3860HR4100 £18.00 FERGUSON 3HSS 329289038900890189028903/ 89068922892830V13V083V22 £6.50 JVC 3HSSL PIN HR3960HR7600HR7610HR7650/ HR7700HR1100HR1110HR120/ HR1210HR2200HR2250HR2500 £6.50 FERGUSON 3HSSL PIN 890489248941894389443V163V23/ 3V243V13V35V36V38V39V393V49 £6.50 JVC 3HSSVA HRD140HRD141HRD143HRD150HRD157/ HRD158HRD160HRD1601HRD161 £15.76 FERGUSON 894789483V42V443V453V46/ 3V47V25V25V54V55V55V56V57 89489513V64FV10FV113V65FV20/ V12FV22FV26 £17.00 3V48 £24.00 3V43V53 £10.00 89389403V293V30 £24.00 3V40 £10.00 JVC HRD170171210211 £17.00 HRD565566 £24.50 HRD725HR755 £31.50 BR7006BR7005 £30.00 HR7200730073502650 £7.20 HRD455 £22.00 HRD520 £20.00 JVC & FERGUSON 3V238942HR7655 £33.00 HRD1803V59FV12LHRD230 £30.50 HRD3703V58FV13HHRD430HRD470 HRD250 £27.00 KENWOOD KV901KV903KV905 £8.50 KV917 £24.50 LOGIK VR960 £17.00 VR950 £21.80 LOEWE OC410/420/440 £24.00 OC50/OC55/OC60/OC65 £15.00 LUXOR 8225 £21.50 MATSUI VV600E/VX600A/VX800A/VX810A/ VX880A/VX770B/VX773B £13.50 VV600E/VX770B £15.00 VX738VX755 £18.00 VX735A/VX755A/VX765/VX850 £17.50 MITSUBISHI HS303A/HS304A/HS320A/HS300 HS306A/HS318A/HS710 £19.50 HS307 £23.00 HS315 £37.00 HS330 £40.00 HS338 £37.00 HS21 £23.50 HS200HS301HS302A/HS310 HS337A/HS347 £22.00 NATIONAL PANASONIC 4HSS-3HSSN NV3000NV3000NV7200NV333NV7500 NV7800NV7850NV7322NV332NV7340 NV3900NV2000NV2010NV7000/ NV8170NV8200NV8400 NV8800NV8610NV8620 £8.50 NATIONAL NV77NV330 £17.00 NV430 £14.25 NV480 £16.50 NATIONAL NV730NV770 4 Head £18.50 NV366 £18.50 NV180 £25.00 NV370NV380 £8.50 NV7850 £43.50 NV810NV830 NV850NV850 £35.00 NV870NV890NV970 £38.00 NV850NV950 £48.00 NV920 £38.00 NVG30NVG31NVG130 £20.00 NVG10NVG11NVG12NVG14NVG15/ NVG16NVG120NV250NV280/ NV450NV465 £16.50 NVG18 £30.00 NVG20NVG21NVG22NVG25NVG28/ NVG20NVG248 £25.00 NVG50 £23.00 NVG45NVG46 £30.00 NVH70 £60.00 NVH88 £32.00 NV800 £23.00 NVH65 £50.00 NVG7NVG9NV83 £18.00 N.E.C. N9011N9012N9013E/N9014E/N9014G/ N9015N9016N9017N9020A/N9033/ N9034N9044N9063N9065N9066 N9069 £20.00 N9033 £27.00 N911AN915AN916AN917 PCV754PV2300PV2400PV760/ PV784PV770PV774FVC763E N830AN831AN832AN833/ N834AN835AN836 £7.00 8261A/11 £45.00 NORDMENDE 4609-460V100V140V200V250 V304V34V450V550 £7.00 V100V1025V1015V1025V1035/ V104V1055V1065V1105V2005 V110V333 £18.00 V101V102V103V11V14V14V142/ V200V300V305V300V301V302/ V300V300 £7.00 V1205V1215V1235V1245 £20.00 V1305 £33.50 V580 £27.00 V520V503V5005 £37.00 ORION VH3VH55VH600VH700VH844VH300/ VH1000 (ALL MODELS) £13.00 PHILIPS VR640VR6520VR692064VR60/ VR6420 £8.50 VR6711 4 HEAD £41.00 6920VR6440 £68.00 VR6441VR6540VR6541VR6640/ VR642 £14.00 RANK BV6900AS £18.00 NB30E/V300RV310RV320RV330/ RV340RV350RV380 £7.00 REDSON MR100 £17.00 SABA 2A102A702B20 £23.00 4A104E80 £43.50 6A106A70 £33.00 8A10VR6038 £39.50 CVR6038/VR6006/VR6007/VR6008/ VR6009/VR6007/VR7007 £18.50 VR6069/VR6070/VR7007 VR6069/VR6070/VR7007/VR2000/ VR6000/VR6010/VR6012/VR7000/ VR9010 £7.00 VR7000/VR9005 £18.00 VR6004/VR6005/VR6011/VR6013/ VR6014/VR6020/VR6022/VR6014/ VR6023/VR6024/VR7004/VR7011/ VR7014/VR7015/VR7730/VR8011/ VR6018/VR7018 £7.00 VR6028 £30.00 VR7016 £27.00 SAISHO VR1000VR605VR705VR805VR905/ VR1000VR1100VR1200VR1600 VR3300XVR3600XVR3650VVR3800 VR3200VR3500 £13.50 VR3300VR3600 £15.00 VR3300VR3600 £16.00 SALORA 65006600 £21.50 SANYO SVX301VB8900VB910VVT510VVT320/ VT5500VX510VX515VX520VX616/ VV650VX620VX717 £19.00 SANYO VTC5000VTC5400VTC6000VTC6500/ VPR5000VTC1500VTCM10VTCM11/ VTCM20VTCM21VTCM25VTC2000 VTC5100VTC1500VTC5300 VTC5400VTC5800VTC5700 VTCNX10VTCNX15VTCNX20 VTCNX30 £18.50 VTC5500VTC5550VTC6100VTC9300 VTC9350VTC9355VTC9455VTC9500 VHR110VHR115VHR1300 VHR1700VHR2300 £19.00 VHR3200VHR3270VHR3100/ VHR3150VHR3300VHR3400 VHR1100VHR1200 £18.00 VHR1500VHR2500 £28.00 SHARP VC3000VC381VC383VC386VC387/ VC388VC482VC483VC485VC3300/ VC381VC3100VC3300VC3500 VC9700VC9400VC9600 £14.00 VC582VC583VC651VC681VVC750/ VC780VC781VC683VC684 VC680VC620VC6300VC7300/ VC7700VC7750VC8000VC8300 £31.00 SONY DSR-19R (FOR SL-T9ME) £39.00 DSR-35R (FOR C20C30C40) £18.00 SLF-UBSLF1E 2 PIN £42.00 DSR-42R (FOR SLCT RANGE/SL5000/ SL1500/SL3000) 1 PIN £13.00 DSR-21R (FOR SL-C8) £30.00 TOSHIBA V21A31V33V50V51V53V9600 V55V57 £14.50 V71V72V74V75V76V82V83V84/ V85V86V87 £7.00 V63 £14.00 V93 £18.00 V9800 £20.00 V5470/5480 £18.00 VR800V8700 £38.00 TRIUMPH VR9500VR9501VR9525 £13.00 AKAI VS9300, VS9500, VS9700, VS9800 £2.50 VS1, VS2, VS3, VS4, VS5, VS6, VS9, £3.20 VS10 £1.50 VS105, VS112, VS115, VS116, VS126, £2.50 VS244, VS245, VS247, VS248, VS515, £2.50 VS16 £2.50 VS201, VS301, VS303, VS304, VS603, £2.50 VS606, VS607, VS608, VS220, VS240, £2.50 VS250, VS512, VS519 AMSTRAD VCR4500, VCR4600, VCR4600 MKII, £2.50 VCR4700 £3.20 VCR7000 £3.20 FERGUSON 3V00, 3V16, 3V22, 3V23 £2.50 3V29, 3V30, 3V31, 3V32 £2.50 3V35, 3V36, 3V38, 3V39, 3V42, 3V43, £2.50 3V44, 3V45, 3V48, 3V53, 3V54, 3V55, £2.50 3V56, 3V57, 3V58, 3V59, 3V64, 3V65, £2.50 3V66, FV11, FV12, FV14 FISHER FVH900, FVH950, FVH960, FVH985 £3.20 FVH915, FVH917, FVH9715, FVH9716, £3.20 FVH972, FVH9725, FVH9830 £3.20 FVH905, FVH907, FVH980, £3.20 FVH990 HITACHI VT1 VT33 £2.50 VT61, VT82, VT63, VT64, VT65, VT86, £2.50 VT88, VT110, VT122, VT120, VT128, £2.50 VT130, VT135, VT138, VT150, VT168, £2.50 VT220, £2.50 VT5900, VT8000, VT9300, VT9500 £2.50 ITT VR3605, VR3905, VR3935, VR3985, £3.20 VR3986, VR3993, VR3994 £3.20 VR3913, VR3914, VR3943, VR3954, £3.20 VR3963, VR3984 £3.20 JVC HR3300, HR3330, HR3360, HR3660, £2.50 HR4100, HR7700 £2.50 HR7200, HR7300, HR7600, HR7610, £2.50 HR7650, HR7655 £2.50 HRD110, HRD111, HRD120, HRD121, £2.50 HRD140, HRD160, HRD160, HRD225, £2.50 HRD455, HRD565, HRD725 MITSUBISHI HS300, HS300, HS301, HS302, HS303, £2.50 HS304, HS310, HS320, HS700 £2.50 HS306, HS307, HS400, HS710 NATIONAL NV100, NV180, NV300, NV333, NV340, £2.50 NV350, NV800, NV888, NV777, NV765 NV230, NV370, NV430, NV460, £2.50 NV730, NV810, NV830, NV850, £2.50 NV870, NV890, NV2000, NV2010, £2.50 NV3000, NV7000, NV7200, NV7800, £2.50 NV8600, NV8610, NV8620, NVG14 NVG7, NVG18, NVG12, NVG18 NVG21, NVG25, NVH65 PHILIPS VR6460 £1.70 SANYO VTC5000 £0.75 VTC5300 £1.00 VTC5500 £0.95 VTC9300 £2.20 VTC1100, 1300, 1500 £1.00 SHARP VC381, VC383, VC386 £1.25 VC6300 £1.50 VC7300, 7700, 7500 £1.50 VC8300 £1.50 VC8381, VC9100 £1.25 VC9300, VC9500 £1.35 SONY SL-C5, SL-C6 £1.40 SL-C7 £1.40 SL-C9 £1.65 SL8000, SL8080 £2.00 TOSHIBA V55, V57 £0.85 V5250, V5280 £2.30 V5480 £2.10 V5475 £1.60 V5740 £1.60 V8600 £1.50 V9600 £0.85 AKAI VP7100 £1.60 VS-1 £1.60 VS2EG £1.00 VS4 £1.00 VS5EG £1.00 VS9300 £1.50 VS9500 £1.50 VS9700 £1.60 VS9800 £1.55 AMSTRAD TVR1-2.3 £2.10 VCR4600 & MKII £2.10 VCR4700 £2.10 VCR620 £2.10 VCR7000 £0.80 FERGUSON 3292, 3V00, 3V01, 3V16, 3V22 £1.50 3V23 £0.85 3V29 £1.20 3V31 £0.85 3V35, 3V36 £0.80 3V38, 3V39 £0.80 3V42, 3V43 £0.85 3V44, 3V45 £0.85 3V34, 3V54, 3V55 £1.40 3V56, 3V59, 3V64, 3V65 £1.40 8950, 8951, FV10, FV11, FV12, FV13, £1.40 FV14 FISHER VBS7000 £2.45 VBS9000 £1.20 FVH950, FVH985 £0.80 FVH970, FVH9716, FVH9722, £1.20 FVH905, FVH906 £1.20 FVH907, FVH910 £1.30 FVH915, FVH917, FVH9725, £1.20 FVH930 GEAC 4005 £1.50 HITACHI VT11, VT33 £1.00 VT5000 £1.20 VT5000 £1.30 VT8000 £0.60 VT8500 £0.80 VT9300 £0.50 VT9500 £0.50 SHARP VCR4600 £2.60p VCR4700 £0.55p SONY VCR4600 £2.60p VCR4700 £0.55p 	NATIONAL NV300NV340 £5.80p NV7000NV7200 £5.50p NV2000 £6.25p JVC & FERGUSON 3V35-36, 38-39 £5.50p 3V2930 £6.25p HRD110111120225 £5.50p HR7200 £6.25p HITACHI VT11VT33 £6.25p FISHER SERVICE KIT £5.50 HITACHI T.V. OUTPUT MODULE HM 6251 REF: 2370551 £6.50 SERVICE AIDS SERVISOL PRODUCTS V. HEAD CLEANER 125p SWITCH CLEANER 130p SILICONE GREASE 150p FREEZE IT 140p FOAM CLEANER 140p ANTI-STATIC 140p AEROKLEANE 125p AERO DUSTER 140p PLASTIC SEAL 130p GLASS CLEANER 130p If you purchase more than one Servisol product postage will be £2.00 UNIVERSAL TRIPLERS 450p SOLDERING IRON ANTEX XS25W 240V Soldering Iron 240Vac Spare Element for XS25W 240V £6.50p ANTEX C15W 240V Soldering Iron 240Vcm Spare Element for C15W 240V £3.40p DESOLDERING PUMP Desolder Pump £3.50p Spare Nozzle £0.60p SOLDER MOP £0.65p SOLDER 18 SWG 500g £5.00p 20 SWG 500g £6.50p SOLDERING IRON STAND Soldering Stand £2.60p Spare Sponge £0.55p 	FLOPPY DISCS 5 1/4 inch DSDD (10 in box) Branded Name £6.00 5 1/4 inch DSDD (bulk pack) 25 £10.00 3 1/2 inch DSDD (10 in box) Branded Name £11.00 3 inch CF2 Branded Name £2.10 3 inch CF2D Branded Name £2.50 ***** * MOD KIT TAPE CREATING * * FOR AMSTRAD * * VCR450, 4600, 4700 620p * ***** SERVICE KITS Each Kit Contains Belts Set, Pinch Roller, Tension Band & Idler Tyres NATIONAL NV300NV340 £5.80p NV7000NV7200 £5.50p NV2000 £6.25p JVC & FERGUSON 3V35-36, 38-39 £5.50p 3V2930 £6.25p HRD110111120225 £5.50p HR7200 £6.25p HITACHI VT11VT33 £6.25p FISHER SERVICE KIT £5.50 HITACHI T.V. OUTPUT MODULE HM 6251 REF: 2370551 £6.50 SERVICE AIDS SERVISOL PRODUCTS V. HEAD CLEANER 125p SWITCH CLEANER 130p SILICONE GREASE 150p FREEZE IT 140p FOAM CLEANER 140p ANTI-STATIC 140p AEROKLEANE 125p AERO DUSTER 140p PLASTIC SEAL 130p GLASS CLEANER 130p If you purchase more than one Servisol product postage will be £2.00 UNIVERSAL TRIPLERS 450p SOLDERING IRON ANTEX XS25W 240V Soldering Iron 240Vac Spare Element for XS25W 240V £6.50p ANTEX C15W 240V Soldering Iron 240Vcm Spare Element for C15W 240V £3.40p DESOLDERING PUMP Desolder Pump £3.50p Spare Nozzle £0.60p SOLDER MOP £0.65p SOLDER 18 SWG 500g £5.00p 20 SWG 500g £6.50p SOLDERING IRON STAND Soldering Stand £2.60p Spare Sponge £0.55p
---	--	--

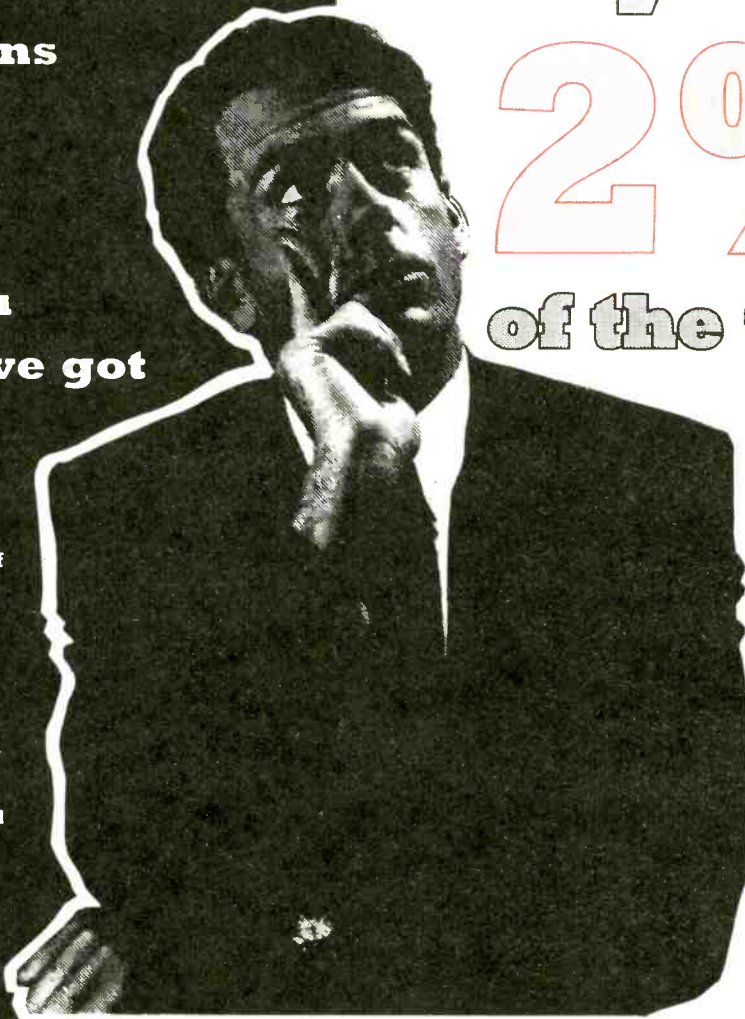
SEE PREVIOUS PAGES FOR MORE
 GRANDATA BARGAINS

**We would like
to point out
that we say no**

**This means
that no
matter
what
spare you
need we've got
it!**

**Our aim is to offer
you the customer
the widest range of
spares, service
aids and
equipment to
enable you to keep
abreast with
today's demanding
technology.**

**No order is too small
phone us now and
order your spares.
And remember you
don't have to use
part numbers, so
it's even easier to
get what you need.**



20%
of the time.

**SHARP
PHILIPS**

FERGUSON

GRUNDIG

NIKKAI

SANSUI

and many others

WVE

TEL: 0734 876444

Head Office: 11, Arkwright Road, Reading, Berks. RG2 0LU
Tel: 0734-876444 Fax: 0734-867188 COPS No: 0734-311969

Enterprise Park, Reliance Street, Manchester. M10 0AL
Tel: 061-682-1415 Fax: 061-682-9031 COPS No: 061-683-4411

11, Marhill Road, Carlton, Nottingham. NG4 3AJ
Tel: 0602-870789 Fax: 0602-878772

E.E.C. SATELLITE SERVICES

**"THE MAC SPECIALISTS"
ARE PROUD TO PRESENT!!**

**SENSIBLE SYSTEMS FOR SENSIBLE PEOPLE AT
SENSIBLE PRICES**

Including

**+ Pace 9200 + Cambridge 480 + Extra + Philips 801 +
+ Johansson 5000s + Chaperell Monterey 20 & 40 +
ITT Nokia SAT2200 + Philips 901 + Amstrad 600**

NEW:

**The amazing Nokia sat 200 built in D2MAC decoder with built
in EUROCRYPT decoder + SVHS output
and much more**

Please phone for specifications

STAND ALONE MAC DECODERS

THE NEW AMSTRAD 600 D2MAC SYSTEM

**STOP
PRESS!
Pace Mac
System
now in stock!**

PHILIPS STU901 MAC SYSTEM

**MAIL-ORDER SPECIALISTS
WITH FULL BACK UP SERVICE**



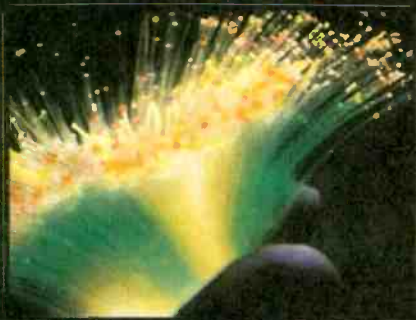
CARDS
 SKY
IN STOCK



CARDS
 SKY
IN STOCK

**CALL THE EXPERTS NOW
CALL**

**E.E.C. SATELLITE SERVICES
1426 LONDON Rd, LEIGH-ON-SEA, ESSEX SS9 2UL
TELE: 0702 480169 TELE: 0702 471321
"ALL YOU NEED TO KNOW IS US"**



**BONNES
AFFAIRES
AU SALON**



TUNE IN TO THE WHOLE OF EUROPE

No trade barriers. No red tape. Now your company can really compete. And there's no better place to plan your European marketing strategy than at Cable & Satellite 1992.

It's your chance to view the very latest technology and attend a program of topical industry seminars where leading experts will discuss the issues that affect your company's future.

Cable & Satellite 92 at Olympia London 13-15 April, is the place in Europe to see and hear about all the latest systems and most recent developments in products and technology. Retailing, engineering, investment, installing, programme making and advertising.

Whatever your interest, Cable & Satellite 1992 puts you in the picture.

A hotel reservation service has been arranged for your convenience. Please tick the box below to receive details.

To order tickets call 0203 464004 or return the coupon to: Cable & Satellite 92, Coventry Data Services, Data House, Curriers Close, Tile Hill, Coventry CV4 8AW.

Tel: 0203 464004.

Fax: 0203 694471.

Cable & Satellite 92 is organised by Reed Exhibition Companies. No under 18's admitted.

**Cable &
Satellite**
Olympia London
13-15 April 1992
92
The European Broadcasting & Communications Show

Please send me _____ tickets to the Cable & Satellite 92 Exhibition. Please send me full details and a registration application to the Cable & Satellite 92 Seminar (please tick). Please send me details of hotel packages (please tick).

Name (Mr/Mrs/Miss) _____ Job Title _____

Company _____ Company Address _____

Postcode _____ Tel. No. _____ Fax No. _____

Cable & Satellite 92, Coventry Data Services, Data House, Curriers Close, Tile Hill, Coventry CV4 8AW, UK. Tel: 0203 464004 Fax: 0203 694471.

TVN3

EURAS SYSTEM

The largest Database of CD, TV and Video
Repair Tips information in Europe
Available On-Line or in Books and now...

NEW STAND-ALONE PC VERSION

- Purchase the whole system or just one manufacturer
- It's fast and easy to use
- There are no hidden costs
- Updates available
- Suitable for any IBM compatible PC
- You can even enter all your own repair tips

"No more bits of paper"

**STILL
AVAILABLE:**
The Books
or
The On-Line System

- 73,000 Repair Tips
- 5,300 Models
- 180 Manufacturers

Tel:
0272 724475
Fax:
0272 723374

Euras International Limited
Heston House, 7/9 Emery Rd,
Brislington, Bristol BS4 5PF,
England

AIWA
AKAI
ALBA
AMSTRAD
ARISTON
ARISTONA
B & O
BAUER
BOSCH
BRANDT
BLAUPUNKT
BUSH
CANON
CHINON
DECCA
DUAL
FERGUSON
FIDELITY
FISHER
FUNAI
GEC
GRAFTZ
GRUNDIG
HANSEATIC
HITACHI
INTERFUNK
ITT
JVC
KENDO
KENWOOD
LOEWE
MARANTZ
MATSUI
METZ
MITSUBISHI
NEC
NECKERMAN
NOVA
NORDMENDE
ORION
PANASONIC
PHILIPS
PIONEER
PYE
QUELLA
QUELLE
SABA
SAMSUNG
SANYO
SCHNEIDER
SHARP
SIEMENS
SONY
TATUNG
TELEFUNKEN
THOMSON
THORN
TENSAI
TOSHIBA
TELERENT
UHER
UNIVERSUM

GENUINE

AMSTRAD

SPARES

FULL RANGE AVAILABLE

from

EPIC

Good people to deal with!

Phone now to open a Trade Account
and receive your free copy of the
most comprehensive spares
catalogue in the industry.
Over 1,100 pages packed with top
quality spares at competitive prices.

**180-200 North Road
Preston, PR1 1YP.**

TEL: 0772 555034
FAX: 0772 201905

P.V. TUBES

**104 ABBEY STREET
ACCRINGTON, LANC'S
BB5 1EE**
☎ 0254 236521/232611
FAX 0254 395361
24 Hr Answering Service
SEND LARGE S.A.E. FOR TRADE CATALOGUE

COMPLETE SECURITY
 We have a complete range of security products and sell them individually or can tailor make a package to your own requirements. E.G. this package is basic and low cost and would fit a 3 bed. house.

COST £125.00 PACK INCLUDES
 (Typical 3 bed house)

- * Two zone keyswitched panel Logic 4 *
- * Polyprop. bell box/back plate/sticker *
- * Battery/tamper switch *
- * External sander *
- * Two passive infra red detectors *
- * Five pairs window/door contacts *
- * 100m 4 core cable and clips *
- * Internal sander *
- * Buzzer for edit/entry timer *
- * Panic button.

TELL US YOUR NEEDS - WE DELIVER FAST

NEW VIDEO PLUS + NEW
 FOR RECORDING YOUR FAVOURITE PROGRAMMES - LOOKS LIKE A REMOTE CONTROL.

THIS PRODUCT MAKES VIDEO PROGRAMMING SO SIMPLE EVEN A GROWN UP CAN DO IT!! IT'S SO EASY TO USE - FROM 6 DEC. NATIONAL WEEKLY AND DAILY PAPERS INC. TV TIMES WILL PUBLISH VIDEO PLUS CODE NUMBERS NEXT TO THE PROGRAMME LISTINGS FOR TV AND SATELLITE. JUST TAP IN THE CODE LISTED NEXT TO THE PROGRAMME YOU WANT TO RECORD AND ITS DONE!! VIDEO PLUS WILL RECORD PROGRAMMES FROM ANY TV OR SATELLITE CHANNEL ON NEARLY ALL INFRA-RED CONTROLLED VIDEOS.

£45.00 + VAT

SPECIAL OFFER
WHILE STOCKS LAST
AMSTRAD SRD 400
 Satellite System

60cm Black Mesh Disc. Receiver and LNB.

£157 + VAT

HOW TO ORDER: Up to 1K ADD £1.00 per order P+P (U.K.). Heavier parcels e.g. cable, service aids, degaussing coils please allow £2.25 P+P (U.K.). Export orders charged at cost. First Class Mail is used wherever possible. Add 17.5% VAT to total except where it states zero rate. Over 3k will be sent by carrier £10.00 + VAT up to 25K (except tubes). We do not despatch on Saturdays.

NEW VALVES

Over 2000 types available and now an exciting NEW RANGE of specialist HI-FI, PRE-AMP, and POWER VALVES.

DEGAUSSING COILS
 External Stick Type Degaussing Coil for Demagnetising **£27.50**

VIDEO RABBIT
 SEND VIDEO/AUDIO SIGNAL TO ANY OF THE TV SETS IN YOUR HOUSE LIKE HAVING A VIDEO IN EVERY ROOM. TRANSMITTER AND WIRE SO THIN IT CAN HARDLY BE SEEN. ALSO WORKS FOR SATELLITE. **£47.00**

ONE FOR ALL II REMOTES
 IDEAL FOR REPLACING LOST OR DAMAGED REMOTES. WILL WORK FOR MOST INFRA-RED EQUIPMENT. **£35.00**

PERISWITCH £63.00
 LOOK AT LAST!! A Scart connecting system without loss of quality. Compatible with all TVs, satellites & VCRs which have Scart connectors. Has 3 Scart sockets and is fully automatic! Without manual or remote switching, totally reliable. Delivers stereo audio from stereo VCRs and satellite receivers to twin audio channel TVs. Delivers RGB signals. Retains function switching and maintains recording/viewing playback options.

FILMNET DECODERS
ALFASAT 1 DECODER WITH RTL/V £95.00 + VAT
 PLEASE RING FOR AVAILABILITY ON DIGITAL SOUND MODULE FOR FILMNET DECODERS.
 RTL/V IS A GENERAL ENTERTAINMENT CHANNEL (WITH SOUND) MAINLY ENGLISH WITH DUTCH SUB-TITLES.

SATELLITE SYSTEMS
 We can supply DISHES, RECEIVERS, LNB, FIXING BRACKETS, F CONNECTORS, CABLE, SAT FINDER METERS, CRIMPING TOOLS, TAPE, LEADS, MASTS ETC. FULL RANGE AVAILABLE AS LISTED IN CATALOGUE. PLEASE SEND LARGE SAE.

NEW PRODUCT
EXCITING NEW SATELLITE ACCESSORIES
 DUAL OUTPUT LNB AND MULTISWITCH
 AT LAST THE DUAL OUTPUT LNB IS AVAILABLE YOU CAN NOW WATCH DIFFERENT PROGRAMMES ON RECEIVERS ALL OVER THE HOUSE, EACH RECEIVER WILL THINK THAT IT HAS ITS OWN DISH.

DUAL OUTPUT LNB **£87.00**
 FOUR-WAY MULTISWITCH **£27.00**

1.2db LNB - THIS BRAND NEW LNB HAS BEEN DESIGNED AS A DIRECT REPLACEMENT FOR THE BLUE CAP LNB. **£45.00**

ALSO AVAILABLE: 50cm AMSTRAD BLACK MESH DISH WITH LNB (i.e. NO RECEIVER) **£70.00**

SUPER BUY
SATELLITE CABLE. EXCELLENT QUALITY.
 100m **£17.50 + VAT**

NEW PRODUCTS
 A/C D/C DIGITAL METER **£25.00**
 AMPL SET TOP TV/FM AERIAL **£21.00**
 VHS ALIGNMENT TEST TAPE **£69.00**
 HITACHI VT64 CAPSTAN MOTOR **£23.00**
 MATSUI/ORION LOPT 1410/1420 **£17.85**
 ULTIMATE SCART KIT **£8.95**
 CASSETTE HOUSING ASSY HRD 527 **£19.95**
 THORN FV11 R/C **£18.95**

SUPER BUY
4M M/M Fly Leads 10 FOR £7.00

BRAND NEW TVs AND VIDEOS

BRANDED MAKE - 12 MONTHS PARTS WARRANTY - FULL SPARES BACK UP - SERVICE INFORMATION AVAILABLE - FULL BROCHURE ON REQUEST

14" MONO TV UHF/VHF **£42.00**
 6" MONO TV WITH RADIO/CLOCK COMBINATION **£52.00**
 10" REMOTE CONTROL TV MAINS/BATTERY COLOUR TV **£140.00**
 14" REMOTE CONTROL COLOUR TV **£125.00**
 14" REMOTE CONTROL, TEXT, COLOUR TV **£155.00**
 14" MULTISYSTEM REMOTE CONTROL TV NTSC/SECAM ETC **£143.00**
 20" REMOTE CONTROL TV **£165.00**
 20" REMOTE CONTROL TEXT TV **£192.00**
 28" FST REMOTE CONTROL TEXT TWIN SPEAKERS **£359.00**
 25" STEREO NICAM FASTEXT TV **£350.00**
 28" STEREO NICAM FASTEXT TV **£387.00**

VIDEO RECORDER, TWIN SPEED, REMOTE CONTROL, VHS 8 EVENT, 30 DAY TIMER, UP TO 8 HOURS **£174.00**
 VHS VIDEO PLAYER, PLAY ONLY, MAINS/BATTERY **£128.00**
 14" COMBI VIDEO TV REMOTE (2 TUNERS) **£330.00**
 21" FST MULTISYSTEM TELEVISION **£222.00**

Will work on eleven different overseas systems, PAL/SECAM/NTSC etc. Has audio and video in & out

VIDEOCRYPT DECODER B GRADE £65.00

NIKKAI SPARES AVAILABLE
 TRANSFORMERS
 ICS SWITCHES
 TUNERS
 SERVICE MANUALS etc

JUST ASK!!

NEW TDK 8mm Video tape 60min £2.00 tape 60min £4.20
TV/Video Stand for Nikkai stereo Nicam sets £19.00

THERE IS VAT ON P+P. 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. 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 meet expiry dates for credit card orders. MIN ORDER £5.



TRADE COUNTER OPEN
 MON-FRI 9am-5pm
 SAT 9am-4pm

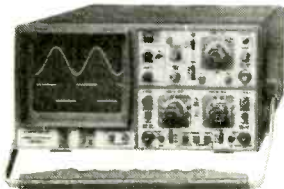
ELC EAST LONDON COMPONENTS AUDIO TELEVISION VIDEO COMPONENTS AT VERY KEEN PRICES		VIDEO SERVICE KITS FROM	
TEL: 081-472 4871 FAX: 081-503 5926		3V35/3V45 CASSETTE HOUSING	£4.99
REMOTE CONTROLS FROM £9.99		V133/V165 CASSETTE HOUSING	£4.99
VIDEO BELT KITS		VH6467 CASSETTE HOUSING	£17.99
IDLER TYRES 50p		V335 CAPSTAN MOTOR	£24.99
VIDEO HEADS FROM £6.99		VT11/V333 CAPSTAN MOTOR	£24.99
Over 200 models at very attractive prices.			
AKAI, AMSTRAD, FERGUSON, FISHER, GOLDSTAR, HINARI, HITACHI, LOGI, MATSUI, ORION, PANASONIC, SAISHO, SHARP AND MANY MORE			
VIDEO SPARES			
3V29 TAKE UP IDLER	£1.00		
3V29 F/F REW IDLER	£2.60		
3V59/65 FV10/14 IDLER	£1.50		
3V23 LOADING ROLLER BAR SHARP 0005 & 0006	£3.99		
SHARP V0651 ASSEMBLY	£6.99		
VT11/14/17 IDLER	£1.95		
VT11 CLUTCH ASSEMBLY	£2.99		
VT11 11/25/260 IDLER	£6.99		
NEC 9013 IDLER	£4.99		
SANYO VHR3300 IDLER	£3.99		
AKAI VS105/250 CLUTCH ASSEMBLY	£11.99		
SAISHO VR380 CLUTCH	£4.99		
MITSUBISHI H5337 F/F IDLER	£2.70		
ALBA BATTERY-1P/5V	£1.35p		
MATSUI LUMITER POST	£1.25p		
PANASONIC NV370 IDLER	£1.95p		
FISHER G615 IDLER	£3.50p		
FISHER GEAR ASSEMBLY	£4.50p		
AMSTRAD PINCH WHEEL MOD KIT	£5.99		
UNIVERSAL TRIPLER	£7.99		
UNIVERSAL TRIPLER WITH FOCUS	£4.99		
HITACHI MODULE HM6251	£5.99		
TENSION BAND FOR MOST MOD. FROM £1.99	TV L.O.P.T.		
CIRCUIT PROTECTOR ICP	£8.00		
TX10 FOCUS UNIT	£7.99		
PHILIPS BACK-UP BATTERY	£1.99		
ALBA BATTERY - 1F 5.0V	£2.50		
TV SWITCHES FOR MOST MODELS FROM	£1.00		
SONY FUNCTION SWITCH	£1.00		
SCART TO SCART LEAD	£3.99		

HOW TO INCREASE YOUR PROFITS, IMPROVE YOUR SERVICE, WITH COST EFFECTIVE TEST EQUIPMENT.

HAMEG OSCILLOSCOPES

HAMEG are Europe's top selling DUAL TRACE OSCILLOSCOPES. Select from four superb models. All, with the exception of the HM 1005, incorporate a useful COMPONENT TESTER. Size - all models - 285mm x 145mm x 380mm. Clear display 8cm x 10cm. Mains supply: 110/220.240V AC 50/60Hz. All supplied with 2 PROBES, a COMPREHENSIVE MANUAL and a 2 YEAR WARRANTY.

HM203-7 20MHz STANDARD



- SPECIFICATION**
- 2 Channels
 - Bandwidth: DC - 20MHz
 - Sens: Ch.1, Ch.2, 1mV/cm
 - Timebase: 0.1s - 20ns/cm
 - Triggering: DC - 40MHz
 - Active TV - Sync - Separator
 - Variable hold-off
 - Trigger LED indicator
 - Calibrator: 1KHz Square wave
 - Component tester
 - Plus many features

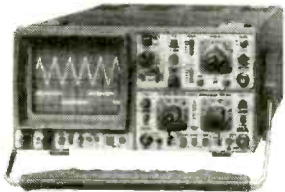
Price £338.00 + £59.15 V.A.T. FREE Specialist Carrier Delivery

SPECIFICATIONS

- 2 Channels
- Bandwidth: DC - 60 MHz
- Sens: Ch.1, Ch.2, 1mV/cm
- Timebase: 2.5s - 5ns/cm
- Triggering: DC - 80MHz
- Active TV - Sync - Separator
- After delay trigger
- Sweep delay
- Delay line
- Trigger LED indicator
- Calibrator: 1KHz & 1MHz Sq. Wave
- Component tester

Price £610.00 + £106.75 V.A.T. FREE Specialist Carrier Delivery

HM604 60MHz UNIVERSAL



HM1005 100MHz UNIVERSAL

3 CHANNELS - UP TO 6 TRACES

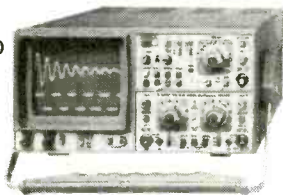
- SPECIFICATION**
- 3 Channels
 - Bandwidth: DC - 100MHz
 - Sens: Ch.1, Ch.2, Ch.3, 1mV/cm
 - Timebase A: 2.5s - 5ns/cm
 - Timebase B: 0.2s - 5ns/cm
 - Triggering DC - 130MHz
 - After delay trigger
 - Delay line
 - Trigger LED Indicator
 - Overscan LED indicator
 - Active TV - Sync - Separator
 - Calibrator: 1KHz & 1MHz Sq. Wave

Price £792.00 + £138.60 V.A.T. FREE Specialist Carrier Delivery

HM205-3 20MHz DIGITAL STORAGE

- SPECIFICATION**
- Digital Storage
 - Analogue real time (Same as 203-7)
 - Bandwidth: DC - 20MHz
 - Sens: Ch.1, Ch.2, 1mV/cm
 - Timebase Digital: 5s-1µs/cm
 - Triggering DC - 40MHz
 - Active TV - Sync - Sampling
 - Max sampling rate: 2 x 20MHz
 - Memory: 2 x 2048 x 8 Bit
 - Dot joiner
 - Printer/plotter output

Price £610.00 + £106.75 V.A.T. FREE Specialist Carrier Delivery



B.K.'s CRT TESTER REJUVENATOR

Tests and rejuvenates blue, green and red guns separately. Fitted with delta and P.I.L. sockets. Compact size 120 x 65 x 60mm. Supply 240V AC

Price £34.00 + £5.95 V.A.T.

DIGITAL CAPACITANCE METER

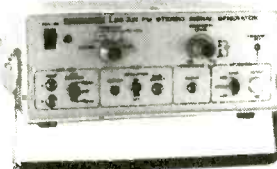
- High accuracy.
- 0.1pF-2,000µF.
- LCD display.
- 8 ranges.
- Accuracy +/- 0.5%.
- Full scale +/- 1 digit.
- Inc. protective case.

Price £39.99 + £6.99 V.A.T.

LEADER FM STEREO SIGNAL GENERATOR

At last! A generator specifically designed for testing and fault finding on FM stereo and monaural VHF receivers including stereo multiplex circuits.

- FEATURES**
- Carrier frequency 100 +/- 1MHz (adjustable).
 - Output level 0.1mV - 10mV.
 - Pilot signal 19KHz +/- 2Hz.
 - L & R separation over 50dB.
 - External Modulation 50Hz - 15KHz.
 - Pre-emphasis 50µs, 75µs & off.
 - Comprehensive test lead set included.
 - Mains powered.
 - Size: 80 x 200 x 250mm.



Price £299.00 + £52.33 V.A.T.

LEADER HIGH VOLTAGE METERED EHT PROBE

Light weight, easy-to-grip high-impact plastic handle with arc-over protection and no need of extra equipment. An indispensable item in your TV service kit. Measures up to 40kV DC with safety and the greatest of ease. Entirely self-contained. Connect the lead clip to chassis and probe tip to the check point, read the meter for voltage.

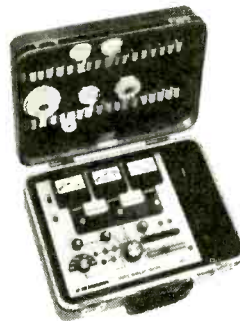
A must for the Health and Safety at Work Acts.

Price £66.00 + £11.55 V.A.T.



B & K PRECISION CRT ANALYSER-RESTORER

The number one CRT Test Instrument. Over 5000 U.K. Television engineers wouldn't be without it.



- All CRT's checked identically, including all in-line and one gun types
- Tests all three guns of colour CRT's simultaneously under actual operating conditions (model 490)
- Exclusive multiplex technique (model 490)
- Measure true dynamic beam current that actually passes through G1 aperture to screen
- Measures all shorts and leaks - preserving more CRT's
- Tests focus electrodes lead continuity finding faults that other testers miss
- Uses most powerful restoration method known with minimum danger to CRT
- Rejuvenated CRT's guaranteed as new for two years
- Obsolescence proof - perpetual set up chart updated and new adaptors developed
- Tests and rejuvenates VDU's and oscilloscope tubes
- A range of over 40 CRT base adaptors available
- Increase profit
- Pays for itself in months.

Prices

Model 490 Tri-dynamic three meter instrument inc. 6 common adaptors	£509.00 + £89.08 V.A.T.
Without adaptors	£446.00 + £78.05 V.A.T.
Model 480 Single meter instrument inc. 6 common adaptors	£375.00 + £62.63 V.A.T.
Without adaptors	£310.00 + £54.25 V.A.T.

SADELTA SIGNAL STRENGTH METERS

The Sadelta Field Strength Meters have been designed to facilitate the dish alignment of satellite TV systems and aerial alignment of VHF/UHF television and radio systems. Signal levels can be accurately measured on the TC402-C and the TC90, allowing the evaluation of signal conditions for satisfactory operation. Both models have a clear LCD direct frequency readout, coupled to a multiturn tuning control enabling precise channel identification.

TC402-C VHF & UHF

FEATURES

- Three bands:
- Low VHF: 45-110MHz
- High VHF: 110-300MHz
- UHF: 470-862MHz
- Digital display for direct frequency readout.
- Built-in monitor loudspeaker AM/FM.
- Signal measurement from 20µV to 100mV.
- Powered by eight 1.5 AA batteries.
- Fully portable with sturdy carrying case.



Price £259.00 + £45.33 V.A.T.

TC90 VHF-UHF- SAT.

FEATURES

- Five bands:
- Low VHF: 45-110MHz
- High VHF: 110-300MHz
- Hyper VHF: 300-470MHz
- VHF: 470-862MHz
- Satellite: 950-1750MHz.
- Digital display for direct frequency readout.
- Signal measurement VHF/UHF 20µV to 3V.
- Signal measurement satellite -70dBm to -10dBm.
- Audible indication of satellite signal level.
- Built-in-monitor loudspeaker AM/FM (not satellite).
- Powered by rechargeable battery (complete with charger 220/240V AC).
- Fully portable with sturdy carry case.



Price £499.80 + £87.47 V.A.T.

BLACK STAR COLOUR PATTERN GENERATOR THE 'ORION' THREE-IN-ONE PAL VHF/UHF - PAL VIDEO COMPOSITE - R.G.B.

The Orion is a compact, bench instrument offering a wide range of patterns and facilities at a truly low cost.

In addition to a switchable sound carrier facility which allows use with the majority of PAL TV systems, the Orion provides highly flexible RGB outputs, ensuring compatibility with most video monitors.

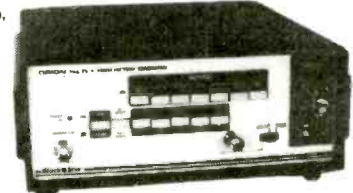
More than 50 pattern combinations can be selected, including those for testing static and dynamic divergence, video amplifier linearity, colour purity, general colour performance, focus etc.

A separate video input to modulate camera signals; fully variable RF and video output levels facilitating AGC testing; trigger output allowing easy triggering of difficult oscilloscope waveforms; external sound modulation input via DIN connector for frequency response testing of TV sound systems; adjustable wide frequency coverage of VHF and UHF TV bands.

Just some of the features making the Orion Pattern Generator an indispensable tool in the manufacture, test, and servicing of televisions, and computer and video monitors.

FEATURES

- Colour bars, purity, greyscale, crooshatch, dots, focus, etc.
- VHF/UHF Channels.
- 5.5MHz, 6.0MHz, 6.5MHz Sound Carriers.
- Internal/External Sound.
- External Video Output.
- Trigger Output.
- PAL B,D,G,H,I,K.
- Separate R, G, B and sync. O/P's.
- RGB @ TTL & 1V.
- Green + 0.3V Syncs.
- Composite Video Output.
- Variable RF/Video Output.
- Switchable Video Polarity.
- Mains powered 220/240V AC 50/60Hz.
- Size: 98 x 219 x 240mm.



Price £229.00 + £40.08 V.A.T.



U.K. POST PAID, export enquiries welcome. Visa/Access or cheque with order, payable B. K. Electronics. Official Orders welcome from Govt. Depts., colleges, P.L.C.s etc. Large (A5) S.A.E. for technical leaflets of complete range. Credit card orders are accepted by phone, fax or post. Delivery normally within seven days.



B.K. ELECTRONICS
 UNITS 1 & 5 COMET WAY, SOUTHEND-ON-SEA
 ESSEX SS26TR
 Tel.: 0702 - 527572 Fax.: 0702 - 420243

SUPREME

081 805 0122 ☎ 081 805 7312

WE SERVICE, SUPPLY, UPGRADE AND INSTALL ANY MAKE OF SATELLITE TV EQUIPMENT

SATELLITE SYSTEMS

Receivers
Dishes
Actuators
LNBS
Polorators

Decoders
Leads
Connectors
Wall Mount
Stands

Splitters
Plugs
Amplifiers
Clips
Flittings

Aerials
Masts
Cable
Brackets
Lashings

All aerial and satellite equipment supplied at best prices. All Work Guaranteed Free Estimated



COMMERCIAL INSTALLATIONS/MULTI-USER SYSTEMS, DOMESTIC INSTALLATIONS
HOTELS, FLATS, PUBS & RESIDENTIAL HOMES ETC ETC

FIXED SYSTEMS

TURKISH YUGOSLAVIAN
ITALIAN EGYPTIAN
FRENCH RUSSIAN

MOTORISED SYSTEMS

MONTEREY 40
DRAKE ESR 250E
PACE 9200

ASTRA SYSTEMS

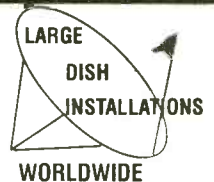
NEC 4012 IRD
PACE 9200 IRD
AMSTRAD 400 IRD

TV AERIAL SYSTEMS



TRADE MAIL ORDER

FAX: 081 804 4609



SHOWROOM 543 HERTFORD RD, ENFIELD EN3 5UQ

WE HAVE THE WIDEST CHOICE OF USED OSCILLOSCOPES IN THE COUNTRY

TEKTRONIX 2445B Four Channel 150MHz	£2000
TEKTRONIX 2445A Four Channel 150MHz Delay Sweep	£1500
TEKTRONIX 485 Dual Trace 350MHz Delay Sweep	£800
TEKTRONIX 475 Dual Trace 200MHz Delay Sweep	£550
SCHLUMBERGER 5218 Dual Trace 200MHz Delay Sweep	£350
HITACHI V650F Dual Trace 60MHz Delay Sweep	£300
TEKTRONIX 2225 Dual Trace 50MHz Delay Sweep	£450
TEKTRONIX 465 Dual Trace 100MHz	£450
PHILIPS PM3217 Dual Trace 50MHz Delay Sweep	£400
TELEQUIPMENT D75 Dual Trace 50MHz Delay Sweep	£200
TELEQUIPMENT V3 Differential Amplifier	£40
HAMAG 605 Dual Trace 60MHz Delay Sweep	£400
HAMAG 705 Dual Trace 70MHz Delay Sweep	£300
GOULD OS300 Dual Trace 20MHz	£200
HITACHI V212 Dual Trace 20MHz	£250
TRIO CS1022 Dual Trace 20MHz	£225

THIS IS JUST A SAMPLE — MANY OTHERS AVAILABLE

ELECTRON MICROSCOPES A E.I. CORNHILL 500-TRANSMISSION I.S.I. SUPER 111A-SCANNING

RACAL/DANA Wideband Level Meter 5002	£1000
RACAL/DANA (AIM) LCR Oscillator 9341	£350
TEKTRONIX 577 Curve Tracer with 277 Fixture	£3000
WAYNE KERR LCR4250 with Bining Option	£2250
RACAL/DANA (AIM) LCR Oscillator 9341	£600
WAYNE KERR LCR Meter 421D	£500
WAYNE KERR Automatic Component Bridge 8605	£1450
WAYNE KERR Universal RF Bridge 8602	£150
FARNELL Synthesized Oscillator DSC1 — 0.0001Hz-99.999kHz	£275
MARCONI TF2008 AM/FM 10KHz-510MHz Sig Gen	£300
HAMAG TF2015 AM/FM 10-520MHz Sig Gen with TF2171	£400
MARCONI TF2015 without Synchroniser TF2171	£250
MARCONI TF2016 AM/FM 10KHz-120MHz with TF2173	£350
MARCONI TF2016 without Synchroniser TF2173	£175
MARCONI TF2356/2357 Level Osc/Meter 20MHz The pair	£150
MARCONI SANDERS Sig Sources Various models covering 400MHz-0.5GHz	From £300
RACAL 3009 Mod Meter 10MHz-1.5GHz	£200
TEKTRONIX Waveform Monitor type 528	£300
RACAL Instrumentation Recorders Store 40 & 7D	From £500
KEITHLEY 224 Programmable Current Source	£1000
FERROGRAPHY RTS2 Recorder Test Set	From £150

SPECTRUM ANALYSERS

TEKTRONIX 4911 5-12.4GHz	£750
H.P. 141T with 855A & IF plug-in 10MHz-18GHz	£3000
H.P. 140 Series with 855A & IF plug-in 500KHz-1250MHz	£1500
H.P. 140 Series with 855A & IF plug-in 1KHz-110MHz	£800
H.P. 180 Series with 855B 0.1-1500MHz from	£2000
POLARAD type 6411 10MHz-18GHz	£3000

Used Equipment — With 30 days guarantee. Manuals supplied if possible.

This is a VERY SMALL SAMPLE OF STOCK. SAE or Telephone for lists. 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)



PHILIPS PM2525 MULTIFUNCTION DMM 4 1/2-3 1/2 digit with GPIB/IEEE-488 ONLY £300
THURLBY PL320T GP Bench PSU 0-30V 2 Amp Twice with GPIB ONLY £350
HANDHELD MULTIMETERS 3 1/2 digit DM105 — 14 ranges DC 2Amp ONLY £18
M2355 — 32 ranges AC/DC — 10 amps, Diode/Transistor Tester, Freq Counter etc only £32.50

THORN PSU 0-40V 0-50Amps Metered	£300
FARNELL PSU H30 100 30V 100Amps	£750
FARNELL PSU H60 25 60V 25Amps	£400
TELEQUIPMENT CT71 Curve Tracer	£250
MARCONI TF2700 Universal LCR Bridge Battery	From £125
MARCONI TF237A Auto Distort Meter 400Hz/1KHz 0.01%	£175
RACAL 9015 Freq Counter 10Hz-520MHz (Crystal/Oven)	£150
MANNESEMAN TALLY Poly 3 XY Plotter RS232	£100
PHILIPS PM5131 Function Gen 0.1Hz-2MHz	From £200
FARNELL PSU L30-5 30V 5 Amp	£150

AVO MULTIMETERS Model 8 or 9 (what's available)	£40
Test Set No. 1, 3x SSX	£35
8 Mk5 with Carrying Case	£90
8 Mk6 with Carrying Case	£120
All meters supplied with Batteries & Leads	

SOLARTRON 7045 Multimeter 4 1/2 digit 30 ranges Auto Man	£95
Large Range Bench Power Supplies	From £40
X-Y PLOTTERS Various Models	From £25

BRUEL & KJÆR Sound Level Meter 220C-1/2" mic. With carrying case	£160
Sound Level Meter 2203 with 1" mic	From £225
Mics available — 1" 4117 & 4143; 1/2" 4134	£225
Pre Amps 2613, 2615, & 2630	

OTHER B & K EQUIPMENT AVAILABLE

LEVELL TM66 Broadband Voltmeter 1Hz-450MHz, 15uV-500uV	£150
LEVELL TM3B AC Microvoltmeter 1Hz-3MHz, 30uV-500uV	£60
LEVELL TM3A AC Multivoltmeter 1Hz-3MHz; SuV-500V	£40
LEVELL TG200 range 1Hz-1MHz Sine Sq	£125
LEVELL Oscillator TG152 3Hz-300KHz Sine Sq	£75
LEVELL Decade Osc TF66A 0.2Hz-1.22MHz Low Distortion	From £35

MANY MORE ITEMS AT RIDICULOUS PRICES — List Available

NEW EQUIPMENT	
HAMEG OSCILLOSCOPE HM1005 Triple Trace 100MHz Delay Timebase	£792
HAMEG OSCILLOSCOPE HM 804 Dual Trace 60MHz Delay Sweep	£610
HAMEG OSCILLOSCOPE HM2037 Dual Trace 20MHz Component Tester	£338
HAMEG OSCILLOSCOPE HM2053 Dual Trace 20MHz Digital Storage	£510
All other models available. All oscilloscopes supplied with 2 probes	

BLACK STAR EQUIPMENT (P&P all units £5)	
APOLLO 10 — 200MHz Counter Timer Radio/Time Interval etc	£295
METER 100 FREQUENCY COUNTER 100MHz	£109
METER 800 FREQUENCY COUNTER 800MHz	£135
METER 100 FREQUENCY COUNTER 1GHz	£178
JUPITOR 500 FUNCTION GENERATOR 0.1Hz-500KHz Sine/Sq In	£110
ORION COLOUR BAR GENERATOR Pal/TV/Vide	£229
All other Black Star Equipment available	
OSCILLOSCOPE PROBES Switchable x1 x10 (P&P) £3	£11

TUBES

This month's
★ SPECIAL OFFER ★

14" and 16" narrow necked portable tubes, only

£39

Other tubes on offer

50-120 (20" mono)	£5
510VSB22	£29
51-580	£44
56-500	£29
56-701, 56-708	£49

Hundreds of tubes in stock. Ring

quoting tube number for prices Carriage and VAT extra

EXPRESS TV

The Mill, Mill Lane,
RUGELEY, Staffs WS15 2JW
Tel: 0889-577600 Fax: 0889-575600

WHATEVER YOU NEED IN SATELLITE TV EQUIPMENT, WE HAVE THE SOLUTION.



Satellite Solutions offers an unbeatable service for SMATV and all multi-viewer TV systems.

We have the best equipment at the most competitive prices. But most importantly, every item is available with our famous Installer/Contractor technical and **on-site** support. This ensures your success with TV system contracts of every size.

In fact, **Satellite Solutions** can make even the largest, most complex projects risk free for you with the following products and services:

- ★ On-Site Survey
- ★ Full Design & Installation Support
- ★ Full Range of Equipment
- ★ Leading Names in Satellite TV
- ★ Widest Range of Test Equipment
- ★ Repair & Maintenance Contracts
- ★ Regular Trade Newsletter
- ★ Pro. and Domestic LNBs
- ★ LNB Components
- ★ Wide Range of Dishes
- ★ Pro. HV Switches
- ★ Head End Equipment
- ★ UHF/VHF Products
- ★ Wide Accessory Range

So call Jo Griffiths on the **HELPLINE** for your **FREE** copy of our *Trade Only Catalogue* offering the best **Satellite Solutions** around.

HELPLINE
0604 670900

SATELLITE SOLUTIONS

35 Quarry Park Close,
Moulton Park,
Northampton NN3 1QB
Fax: (0604) 671343



IF YOU CAN'T AFFORD A JUMBO BUY THE TRISTAR

THE CONCEPT

TRISTAR MANUFACTURING is a company presently at the forefront in a new wave of Eco awareness in the highly competitive world of television manufacture and have proved this with the launch of the RCT2203. The only television that is truly "environmentally friendly" in all of its manufacturing processes.

THE TUBE

The tube has been fully recycled and carries two years full manufacturers warranty.

THE CABINET

All cabinets re-made from 30% recycled plastic and designed with the customer in mind.

THE COMPONENTS

The components obviously have to be of the highest possible standard so our technicians are trained to reject any part that cannot be wholly relied upon.

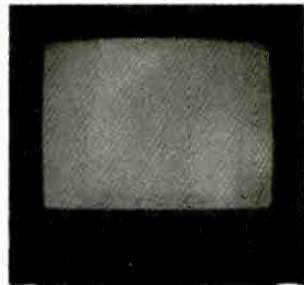
TELETEXT

All sets are equipped with the Teletext Service.

GUARANTEE

12 months Parts.


TRISTAR
 MANUFACTURING LTD



THE TRISTAR RCT2203 22" TELETEXT TELEVISION

Tristar Manufacturing
 15 Regal Road
 Weasenham Lane Industrial Estate
 Wisbech
 Tel: 0945 588123

INSURANCE

Up to 5 year insurance is available.

REMOTE CONTROL

The set comes with full remote control and has 16 electronically tuned channels.

PRICES

VALID JULY '92

SINGLE UNIT @ £148.00

5 UNITS PLUS @ £141.00

10 UNITS PLUS @ £135.00

ALL PRICES EXCLUDE V.A.T.

ACCOUNTS

All accounts must be conducted on a STRICT C.O.D. BASIS.

Although an account scheme may later be implemented.

RECOMMENDED RETAIL PRICE

of this set £249.00 although we have found £239.00 to be the average.

Should you require a visit from one of our Representatives please telephone us on the number on the back of this publication.

COMPONENTS For TV ★ Video Audio ★ Computer		THIS IS JUST A SMALL SAMPLE OF STOCK We can supply spares for many makes of equipment. WRITE (Encl. s.a.e. please) or PHONE FOR A PRICE & AVAILABILITY on your requirements.	
TRANSISTORS & DIODES		0452 526883	
2SA564	£1.14 2SC2331	£1.59	
2SA608	£0.98 2SC2621	£1.57	
2SA673	£0.23 2SD1150	£2.93	
2SA683	£0.83 2SC3156	£4.97	
2SA715	£1.01 2SD313	£0.49	
2SA844	£0.41 2SD325	£0.71	
2SA984	£0.49 2SD389	£1.09	
2SA1011	£1.51 2SD401A	£1.39	
2SA1015GR	£0.74 2SD468C	£0.76	
2SA11706	£1.69 2SD571	£0.94	
2SB507	£1.23 2SD800	£0.97	
2SB772	£1.49 2SD787	£0.94	
2SC388A	£1.49 2SD788	£1.18	
2SC1096	£0.71 2SD917	£3.52	
2SC1383	£0.93 2SD1111	£0.95	
2SC1384	£0.83 2SD1266	£2.11	
2SC1741	£0.53 2SD1397	£4.49	
2SC1756	£1.49 2SD1426	£4.86	
2SC1815Y	£0.28 2SD1667	£1.58	
2SC1907	£0.89 2SD1668	£1.87	
2SC2050	£0.97 8A157	£0.29	
2SC2271	£1.10 8D9, 1EB2	£1.43	
2SC2274	£0.48 1N4146	£0.04	
IC SELECTION		COMPUTER SPARES	
HA1137W	£3.61 TA7607	£4.75	
HA11235	£3.65 TA7669P	£1.99	
HA12006	£6.09 TBA530	£1.74	
HA12413	£5.05 TBA800	£1.17	
JA1385	£3.65 TBA810P	£1.16	
LA3160	£2.28 TBA810S	£1.62	
LA3361	£1.79 TBA820L	£1.67	
LA4500	£3.69 TCA940	£3.33	
LA7851	£3.95 TDA1001B	£2.86	
LM733CN	£2.27 TDA1020	£2.93	
M54548L	£5.29 TDA1908A	£2.06	
MC7805	£0.78 TDA2003	£2.84	
MC14502BCP	£0.78 TDA2541	£2.52	
SA11124	£3.89 TDA3330	£6.49	
SA1294-2	£12.99 TDA4601	£2.49	
TA7240AP	£2.96 TDA8170	£3.53	
TA7273P	£3.35 UPC1277	£4.70	
TA7292	£3.92 UPC1376H	£2.45	
TA7324	£3.21 14DN476	£19.29	
TELEPHONE ACCESSORIES		PHILIPS	
BT Plug-in Time Ringer	£6.95	£2.99	User Manual (C&A)
5m Extension Lead	£4.20	£3.80	Serv. Manual (A500)
LJ12 Secondary Skt. & Box	£2.30		
LJ13 Secondary Skt. (Flush)	£2.67		
4 Core Cable	per/m		
Cable Clips	per/10		
TOOLS & BATTERY ACCS.		OTHER COMPUTER CHIPS	
UNIROSS Plug-in Fast Charger for AA/AAA Ni-Cd's	£5.49	AM26LS31PC	£1.63 74LS00 TTL
UNIROSS C Ni-Cad. Battery	£2.09	6502 CPU	£5.05 74LS157 TTL
WELLER WM120 Microport Mini- Soldering Iron 12W/240Vac	£8.25	6522 V/A	£4.49 75154PC 4xline driver
Universal Crimping Tool	£2.45	6518 R. T. Clock	£7.24 64Kx1 DRAM (120ns)
Junior Hack Saw	£0.80	8255A PPI	£2.82 64Kx1 DRAM (150ns)
		8272A FDC	£14.09 64Kx4 DRAM (100ns)
		AUDIO, TV & VIDEO SPARES	
		AMSTRAD VCR4500, 4600, 4700, TVR1-3 BILT KIT	£2.45
		FISHER FVH-P420, 520, 530 REEL/SPOOL TYRE	£1.79
		FERGUSON/JVC 3V00, 16, 24/HR3300 PINCH ROLLER	£5.17
		FERGUSON/JVC 3V29, 30/HR7200, 7300 REEL IDLER	£3.55
		GECCSTR6020 MDO KIT	£7.61
		GECHITACHI V4004V711, 33 VIDEO HEAD	£22.99
		PANASONIC NV230, 430, 465, 630 TENSION BAND	£3.67
		PHILIPS KTAW60 SERVICE MANUAL	£10.00
		SHARP RGF278, 281, 284 MAIN BELT	£1.40
		TOSHIBA STU2L MAINS TRANSFORMER	£9.99
		TRIUMPH VR95 11S CAPSTAN MOTOR	£34.99
MAIL ORDER ONLY. PLEASE ADD 95p (UK) Post & Packing BUT NOT VAT.		PHILIPS	
Stock items normally despatched on the day we receive an order.		<p>We are pleased to serve both the Trade and End User. SEND LARGE S.A.E. FOR CATALOGUE* or ask for a free copy with your first order * Supplement available to Bona fide traders - on request. All items subject to availability - Prices can change without notice.</p>	
		MARAPET (TVC) 1 HORNBEAM MEWS GLOUCESTER GL2 0UE	

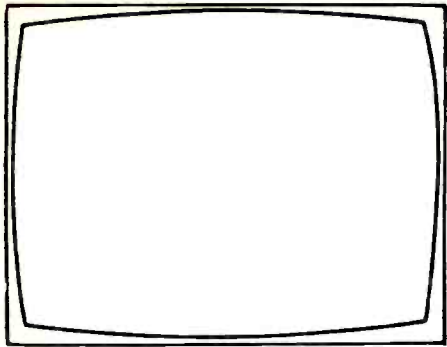
ELECTRONICS WORLD

+ WIRELESS WORLD

SIX PAGES OF ELECTRONIC CIRCUIT DESIGN EVERY MONTH

Subscribe today and save £10

Simply phone our credit card
hotline on 0789 200 255 for a
special subscription price of £20
for 12 issues*.



TELEVISION

EDITOR

John A. Reddihough

EDITORIAL ASSISTANT

Tessa Winford

Please note that the telephone numbers below are for contact with the advertisement departments only. Editorial enquiries should be sent to the editor at the address given on page 313 or faxed to 081-652 8956.

ADVERTISEMENT MANAGER

Jan Thorpe
081-652 8114

DISPLAY SALES MANAGER

Shona Finnie
081-652 8115

CLASSIFIED SALES EXECUTIVE

Pat Bunce
081-652 8339
Fax 081-652 8931

ASSISTANT CLASSIFIED MANAGER

Carol Nobbs
081-652 8327

GROUP CLASSIFIED MANAGER

Breda James
081-652 8327

ADVERTISING ADMINISTRATION

Kathy Lambert
081-652 8116

ADVERTISING PRODUCTION

Brian Chapman
081-652 8681
Fax 081-652 8917

READER HELPLINE

For help if you have difficulty obtaining *Television* phone 081-652 8620

SUBSCRIPTION ENQUIRIES

0444 440 421

SUBSCRIPTION HOTLINE

24-hour subscription ordering with credit card number phone 0789-200 255

PUBLISHER

Robert Marcus
081-652 3930

COVER PHOTO

This month's cover photograph shows the Philips DMP series VCR deck – see servicing article on pages 336-9.



Tide Change?

We have grown used to Japanese dominance of the world's consumer electronics market. By offering reliable, quality products and introducing constant innovation the Japanese have been able to drive the market during the last two decades. Not that all innovation has come from Japan. Philips stands out as a leader in the field. Think for example of the compact audio cassette, laser disc technology and now the digital compact cassette. Philips provided the initial impetus to the video market, with its N1500 and N1700 series machines, while camera tubes and the modern c.r.t. with its computer-designed yoke are other areas in which Philips has led the way. But the firm seems to have been unable to profit from its initiatives. Poor marketing of its innovative products along with the severe competition provided by the Japanese and, over the past decade, other Far Eastern consumer electronics firms have led to a dismal profits record – in fact to losses in recent times.

Could the unthinkable happen: could leading Japanese consumer electronics firms find themselves in the same plight? The markets have certainly changed, with video, except for camcorders, following TV as a saturated market in decline. In many major markets VCR sales are now falling. Couple this with the world-wide recession, intense competition and the enormous cost of research and you end up with an economic crunch. To such an extent that even research-driven Sony is planning to cut spending in its next financial year – by around thirty per cent. Both Sony and Matsushita have had to grapple recently with the results of their forays into the software markets – Sony's purchase of Columbia Pictures and Matsushita's take over of MCA a couple of years back. These have been a drain on both resources and management time. Then there have been the attempts to diversify in the electronics field. Most Japanese consumer electronics manufacturers, seeing market saturation ahead, decided some years back to venture into the IT, semiconductor and other fields, at considerable expense. But these too are suffering in the recessionary climate of the present, and if too many firms decide to follow the same course the end result is over-supplied markets.

Great hope is placed on HDTV as a possible saviour, along with other developments such as DCC, the Mini Disc and multimedia devices. The problem at present is a gap in product introduction and the enormous cost of development – such that even the largest companies are increasingly having to think in terms of joint ventures. This is having some interesting results, in particular a possible renaissance of the US consumer electronics industry. The latter would be ironical when you consider that the last indigenous US TV manufacturer, Zenith, is at present in the process of ending US production and moving its manufacturing across the border to Mexico – a course previously followed by more than a few electronics manufacturers. The intriguing thing is the joint-venture links being formed between Japanese and US firms in order to fund research and product development. US know-how in the computer and semiconductor fields could well lead to a higher profile for the USA in the consumer electronics market. In particular HDTV is proving to be enormously costly and it must be questionable whether pouring money into the Japanese HDTV system, which is based on outdated technology, is going to be worthwhile. Increasingly it looks as though the work that has been done in the USA on digital TV is the key to future development in this field. Getting there first at the right price is still crucial however. In this connection the announcement by Sharp at the beginning of February that it is to introduce a 36in. NHK/MUSE HDTV receiver to sell in Japan at the equivalent of around £4,500 is something of a breakthrough: the price is less than a third of that previously regarded as the norm in Japan. Sharp is hoping that the summer Olympics will give the market a boost. Increased production would reduce costs significantly, and Sharp claims to have developed a set of decoder chips that have made an appreciable contribution to price reduction.

High Street Shake-out

In view of the current poor trading conditions – though Dixons reported an improvement in December – the announcement by Thorn EMI that it intends to cease selling consumer electronics goods through its Rumbelows retail chain does not come as a complete surprise. Thorn had been trying to sell Rumbelows for the past three years, during which the chain has run up losses estimated at around £50m. There are some 450 shops in the Rumbelows chain, which has about six per cent of the market. The plan is to merge most of the Rumbelows outlets with the company's rental chains, saving on head office, distribution and servicing costs. It seems that around 200 of the outlets will eventually be closed. Job losses of around 800 are being talked about.

New Telephone Numbers

A new switchboard comes into operation at Quadrant House on Monday, February 24th. As a result, the exchange number for most *Television* telephone lines will change from 661 to 652. The numbers on the left have been amended accordingly. This issue is due to be published on Wednesday, February 19th however. Should you need to call us during the period 19-21st, please use the old exchange number 661.

Continuity Tester/Low-R Ohmmeter

Ian Rees

While the majority of multimeters are excellent in most respects they are often poor when it comes to measuring low resistances. The instrument described in this article was specifically designed for checking tracks on broken PCBs, measuring from 0.1 to 100Ω in a single range. It has proved to be useful in many other applications where unambiguous continuity readings are required, for example with microwave ovens. As the test voltage is only 300mV, erroneous readings due to the presence of semiconductor junctions are avoided.

An audible tone can be switched in to allow track tracing to be carried out on fine print without the need to glance at the scale – the tone frequency drops as the resistance falls.

Very sharp probes are used to break through the print resist lacquer.

Principle of Operation

Fig. 1 shows the principle used. A constant-current source supplies 30mA to 10Ω resistor. Thus the probes receive a

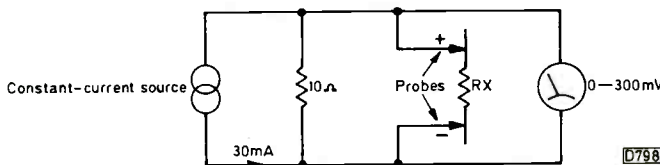


Fig. 1: Equivalent circuit to show the principle.

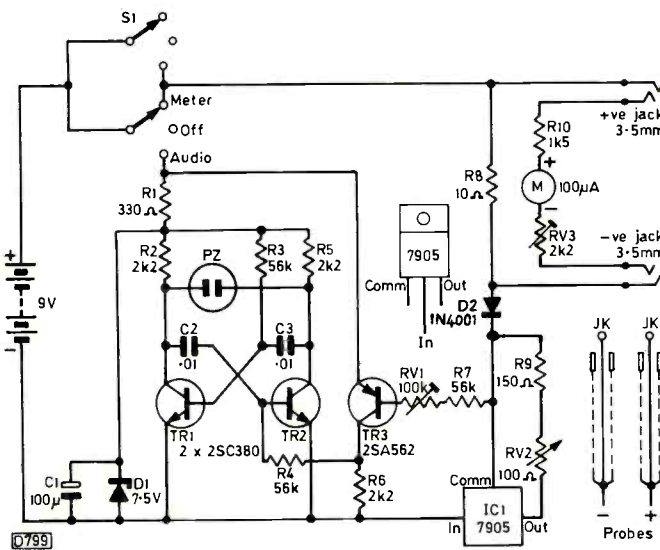


Fig. 2: Circuit diagram of the low-range ohmmeter.

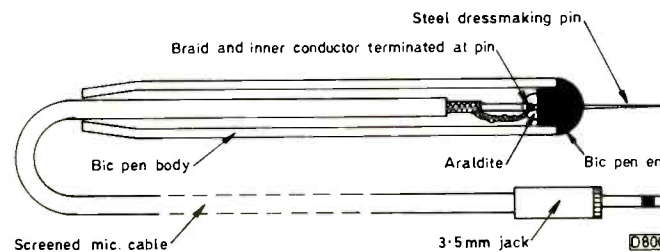


Fig. 3: Construction of the probes.

300mV supply. Monitoring is carried out by a d.c. voltmeter that's scaled 0-300mV and is connected in parallel with the probes and the unknown resistance RX. Since the unknown resistance RX is in parallel with the 10Ω resistor, the drop in voltage when the probes are connected to it is indicated by the meter, which is directly calibrated in ohms. The following simple formula enables the scale to be derived:

$$[(10 \times RX)/(10 + RX)] \times 0.03.$$

Circuit Description

Fig. 2 shows the complete circuit of the unit. IC1 is the constant-current source for the 10Ω resistor R8. RV2 sets the correct current of 30mA, which is registered as a full-scale deflection on the meter M. A 100μA meter is used, with the series resistors R10 and RV3 providing adjustment for 0.3V f.s.d.

Transistors TR1 and TR2 form an astable multivibrator which drives the piezo sounder PZ to provide the audio tone. TR3 monitors the voltage across R8 and D2. Since TR2's base bias is obtained from the collector of TR3, any changes in the voltage across R8/D2 are amplified and used to alter the tone produced by the oscillator. RV1 adjusts the basic tone. D1 stabilises the supply to the oscillator, whose frequency would otherwise vary with battery voltage. A three-position switch, S1, enables the meter to be used with or without the audio tone, which can be a bit wearing on the ear.

Probes

A problem with using a conventional multimeter to measure low resistance is that the test leads have an appreciable resistance which is in series with the item being tested. With this meter the voltage at the very tip of the probes is monitored. The supply to the item being tested is applied from the jack socket via the braid of a screened lead, the lead's inner conductor, which is terminated directly only at the probe tip, being connected to the meter.

Construction of the probes is shown in Fig. 3. The following items are required to make them: a red Bic type disposable pen; a black Bic type disposable pen; two steel (not stainless) dressmaking pins; two 1m lengths of a.f. screened cable; two 3.5mm jack plugs.

Bare the inner and outer conductors of the screened cable, twist together at one end only and solder to just below the head of the pin (active flux makes this easy).

Dispose of the pen innards, keeping the bodies and caps. Remove the pen's small end cap and pierce the pin through, making sure that it's central. Feed the screened lead through the body of the pen. With the head of the pin pushed firmly into the end cap, apply a small amount of Araldite adhesive to retain the pin and prevent pressure on the tip forcing it back. Slide the end cap back into the body of the pen. Solder the inner conductor and outer braid to their respective terminals on the 3.5mm jack, being careful that they aren't shorted inside.

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 **£75.00**
Case (10" x 6" x 2 1/4") app **£15.00**
Optional Sound Module (6MHz or 5.5MHz) **£3.90**
Built & Tested in Case including Sound Module **£122.00**
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 **£35.00. 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

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

ADD
VAT
17.5%

PRICE **£20.00**

POST/PACKING **£2.50**

KITS AND PROJECTS

SAW IF AND TUNER 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) **£18.50** p.p. £1.80.

CRT TESTER & REACTIVATOR KIT For Colour & Mono complete with Case, Panel Meter Indicator - can be adapted for latest CRTs **£40.00** p.p. £4.50.

TV & VIDEO SPARES

TELETEXT PANELS

GEC - C2285, C2287, Text Conversion Kit **£15.00**
MULLARD VM6103 **£10.00**

POST PACKING FOR ABOVE **£2.50**

PHILIPS SPARES

GI 6 POS touch tune channel selector (replaces old type) **£14.00** p.p. £1.80
MANUALS 2B, CP90 **£3.50**, CTX-E, CTX-E, CF1 **£2.50**, KT4,
K40, 3A **£4.50**, 2A **£10.50**, KT3 **£12.00** p.p. MANUALS **£1.80**
BACK UP BATT. 2.4V **£3.80**, 1.2V **£2.60** p.p. 90p.
K30, KT4, CTX-EHT Lead **£4.90** p.p. £1.00.

THORN/FERGUSON SPARES

9000 Series IF/Decoder tested **£10.00** p.p. £2.80.
TX10 Focus control **£8.50** p.p. £1.80.
TX9/10 Remote & tuning 1515N **£5.00** p.p. £1.80.
TX9/10 Remote & tuning 1508A (incl. SAA5012) **£2.50** p.p. £1.80.
TX9/10 Remote & tuning 1536 (incl. SAA5012, SL471) **£3.50** p.p. £1.80.
TX10 Stereo Audio Board **£3.50** p.p. £2.50.
TX90 Mains TX **£23.00** p.p. £2.80.
TX100 Chopper TX **£22.80** p.p. £2.50.
TX90 14" Chassis Untested complete **£20.00** p.p. £4.50.

IC SELECTION

AN5521	£3.80	SAA5050	£11.80	TA7698P	£6.80	TD2593	£1.50	TD4502A	£13.50
AN5900	£2.20	SAA5231	£5.80	TBA120	£1.20	TD2594	£3.80	TD4503	£5.80
BA6238A	£2.80	SAB3035	£6.80	TBA750	£2.20	TD2595	£4.80	TD4505	£6.80
CN862	£4.80	SAR3037	£15.80	TBA920	£2.80	TD2600	£6.80	TD4555	£9.80
FR607	£7.20	SAP1032	£4.50	TB950	£2.20	TD2611A	£1.90	TD4600	£3.85
JIA11211	£2.80	SAP1039	£2.20	TCA270	£1.80	TD2640	£3.20	TD4601	£2.80
JIA11423	£2.10	SL470471	£4.80	TCA800	£6.80	TD2654A	£3.20	TD4610	£6.80
HAS1385P	£11.80	SL486	£3.20	TD1035T	£2.40	TD2654	£5.70	TD4610	£5.80
LA4445	£3.00	SL490	£3.80	TD1037	£1.90	TD2655B	£6.60	TD4650	£2.80
LA7800	£4.80	SL1430	£1.80	TD1044	£2.90	TD2670	£3.20	TD4853	£7.80
LA7520	£2.80	SL1432	£1.40	TD1060	£3.80	TD2680	£3.80	TD4880	£6.80
LA7801	£3.50	SN76226DN	£1.80	TD1082	£4.80	TD2690	£3.80	TD4890	£3.80
LA7830	£2.80	SN76705	£9.80	TD1170	£2.20	TD2780	£6.80	TD4903	£3.80
M293B1	£7.80	STK5325	£6.80	TD1180	£2.20	TD2780	£4.20	TD4903	£3.80
M490BB1	£14.80	STK5332	£6.80	TD1190Z	£2.20	TD2780	£6.80	TD4913	£4.80
M991BB1	£9.80	STK5333	£18.40	TD1432P	£5.70	TD2780	£7.50	TD4913	£2.20
M494	£9.80	STK5338	£6.80	TD1470	£2.80	TD2780	£6.80	TD4913	£2.50
MC1302P	£5.80	STK5339	£6.80	TD1524	£6.80	TD2780	£6.80	TD4913	£2.80
MDA2061	£7.80	STK5421	£6.80	TD1670A	£3.20	TD2780	£4.50	TD4913	£2.80
MDA2062	£3.80	STK5422	£8.50	TD1701	£3.80	TD2780	£9.80	TD4913	£6.80
ML237	£3.80	STK5471	£6.50	TD1701	£3.20	TD2780	£4.20	TD4913	£6.80
ML929	£4.80	STK5481	£5.80	TD1870	£6.80	TD2780	£4.50	TD4913	£3.80
MM15425	£15.80	STK5482	£5.80	TD1870	£2.80	TD2780	£4.50	TD4913	£3.80
SAA1024	£5.80	STR7308	£6.80	TD1940	£3.20	TD2780	£4.50	TD4913	£3.80
SAA1025	£5.80	STR7348	£10.80	TD1950	£3.50	TD2780	£4.50	TD4913	£3.80
SAA1124	£3.50	STR441	£7.80	TD2040	£7.80	TD2780	£5.80	TD4913	£3.80
SAA1250	£3.80	STR450	£6.80	TD2150	£3.20	TD2780	£4.50	TD4913	£3.80
SAA1251	£8.40	STR451	£7.80	TD2270	£2.80	TD2780	£4.50	TD4913	£3.80
SAA1292	£13.20	STR454	£5.80	TD2510	£6.80	TD2780	£4.50	TD4913	£3.80
SAA1293.02	£8.80	STR4211	£1.80	TD2630	£5.80	TD2780	£4.50	TD4913	£3.80
SAA3027	£5.80	STR5412	£6.80	TD2576A	£3.80	TD2780	£4.50	TD4913	£3.80
SAA5000	£2.80	STR50103	£5.80	TD2577	£4.80	TD2780	£4.50	TD4913	£3.80
SAA5010	£5.80	STR50401	£10.80	TD2577A	£4.80	TD2780	£4.50	TD4913	£3.80
SAA5012	£5.80	STR58041	£6.80	TD2578	£3.80	TD2780	£4.50	TD4913	£3.80
SAA5020	£5.80	STR6020	£5.80	TD2579	£3.80	TD2780	£4.50	TD4913	£3.80
SAA5030	£6.80	TAT6801AP	£5.80	TD2581	£2.20	TD2780	£4.50	TD4913	£3.80
SAA5900	£6.80	TA7681P	£5.80	TD2582	£2.80	TD2780	£4.50	TD4913	£3.80

VARICAP TUNERS: Grundig 8630 series **£5.50** p.p. £1.00. U321.
U322/U341/N. ELC1043 (equiv) SC4, VHF NSF203 **£7.80** p.p. £1.80. UHF/VHF UV411
£10.80, U343 **£10.80** p.p. £1.00

LINE OUTPUT TRANSFORMERS p.p. £1.80

DECCA 100	£10.80	PHILIPS G9	£8.80
FIDELITY ZX2000/CTV140	£15.80	PHILIPS K73	£11.80
FIDELITY ZX3000	£14.50	PHILIPS K30	£11.80
HINARI CT4, CT5	£24.80	PHILIPS CTX-E S	£27.50
HITACHI CPT1455, 1456, 1476, 1491	£28.80	PHILIPS KT4	£22.40
HITACHI CPT2174/7678	£28.80	PHILIPS 2A	£25.80
HITACHI PND33752	£21.80	PHILIPS K40	£27.50
ITT Compact B 110	£19.80	PHILIPS 3A, 2B	£23.80
ITT Compact 80, 110	£17.80	PHILIPS CF1	£33.80
ITT Compact 80, 90P	£22.80	PHILIPS CP90	£28.50
ITT Compact 80, 110P FST	£19.80	PHILIPS CP110	£24.25
ITT CVC 20	£9.80	PHILIPS GR1AX	£25.90
ITT CVC 25, 30, 32	£10.80	PHILIPS NC3	£22.50
ITT CVC 45	£9.80	SAISHIMATSU 3714002	£21.80
ITT CVC 80, 801, 803	£34.00	SANYO CPT7132, 80P Chassis	£39.80
ITT CVC100, 1206, Picos	£18.50	SONY KV1882	£34.50
ITT CVC150, 1175	£22.80	SONY KV20926	£34.50
ITT CVC200, 1201, Mini 2	£18.50	SONY KV2704	£60.00
ITT CVC204	£10.80	THORN 1501, 91, 1612, 13, 1712	£4.80
ITT CVC210/215/17	£17.80	THORN 1690, 1691	£9.80
ITT Dig3, 110P	£13.80	THORN 9000	£9.80
ITT Core 110P, 90P	£19.80	THORN 9601	£9.80
ITT Core 110P FST	£19.95	THORN ICC5	£21.00
ITT TX3267	£22.80	THORN TX10 (Chopper)	£16.50
ITT TX346	£22.80	THORN TX55	£19.80
ITT Monoprint A	£21.80	THORN TX9914	£19.80
ITT Core 110P FST	£19.95	THORN TX9020	£21.80
LOEWE - Classic M124, M27	£33.00	THORN TX100, 110P Green Spot	£19.80
LOEWE - Contar M27	£33.00	THORN TX100 90P FST Yellow Spot	£21.80
LOEWE - Other (Quote model No.)	£21.80	THORN TX100 FST T6045L	£25.50
PHILIPS 320	£2.80	POST PACKING L.O.P.S.	£1.80

TRIPLERS: THORN 9000 **£9.80** p.p. £1.80.
UNIVERSAL (best quality) **£7.80** p.p. £1.80.
CONTINENTAL TVK & BG RANGE (quote exact no.) replacements **£13.80**
DECCA/TATUNG **£7.80** p.p. £1.80.
BG2087-642-1001 **£21.80**.
BG2087-642-1006 **£21.80** p.p. £1.80.
6.3V CRT Boost Transformers for Colour & Mono **£6.80** p.p. £1.80.
455 CRYSTALS for Remote Control Handsets. 4 for **£1.00** p.p. 50p.
AERIAL DISTRIBUTION AMP. 6 way **£35.00** p.p. £2.80.
VHF to UHF Converters **£35.00** p.p. £2.50.
DEGAUSSING ROD **£33.75** p.p. £2.80.
TRANSPARENT SERVICE CASSETTE **£6.80** p.p. £1.80.

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

Use the pen caps to prevent damage to the probe tips when not in use. I use similar probes with my multimeter when testing oxidised connections etc.

Construction and Setting Up

The circuit was built on a piece of matrix board fitted to the meter's terminals. Layout is not critical.

After building the ohmmeter, turn RV2 to the maximum resistance position and connect a known accurate voltmeter to the probes. Adjust RV2 for a voltmeter reading of 300mV, then set RV3 for full-scale deflection on the internal meter M.

Mark the meter's scale with a fine fibre pen, using the following table:

Scale (V)	Resistance RX (Ω)
0.014	0.5
0.027	1
0.050	2
0.100	5
0.015	10
0.018	15
0.214	25
0.250	50
0.273	100

Teletopics

APPLE GOES FOR THE CONSUMER MARKET

Apple Computer sees domestic electronics as the key to expanding its business, through innovative new items that link personal computer technology with products for consumer use. As mentioned last month, Apple is developing a "multimedia device" with Sony. John Sculley, Apple's chairman and chief executive, in giving the keynote address at the January Las Vegas Consumer Electronics Show mentioned a number of likely products, some of which will be released in the USA in time for next Christmas. These will include what Apple refers to as Personal Digital Assistant (PDA) products – personal organisers if you like – which are hand-held computer devices that can extract information from large databases and communicate with one another. There will be new, simpler versions of the Macintosh PC with built-in CD players, offering video, sound, graphics and text. Other likely products include electronic books, videophones, interactive multimedia players and wireless communicators. One aim is to exploit the possibilities of Apple-created software now that the professional PC market is nearing saturation point. Apple has been holding talks with various companies active in the consumer electronics field and expects the future products to sell under various brand names.

LAUNCH PLANS

Philips has released details of its launch plan for the digital compact cassette (DCC) system. A public awareness programme is to start in April, when the first DCC players (Model DCC900) will be available for demonstration and review purposes. This will be followed by a pre-launch phase from June-August, when prerecorded software will become available. Release of the players in quantity is to start in September. Philips hopes that a library of some five hundred prerecorded cassettes will be available by then. The first domestic players will probably be released in the USA, at a price equivalent to around £390. Within a year there should be DCC midi systems, personal stereos and in-car versions.

Philips had originally hoped for a full launch in the spring, but getting the production technology right has led to delays. In particular production of the thin-film heads has been a problem.

Philips Car Stereo International and the Japanese company Alpine Electronics have reached an agreement in

principle for the development of in-car DCC products. It's hoped that the first car DCC/radio units will be available next year.

Sony plans to launch its mini disc (MD) system at around the same time as the DCC system, this autumn. The autumn will also see the start of prerecorded MD production at the DADC (digital audio disc centre) in Austria. Initial production capacity will be 1.5 million discs a month.

PHOTO-CD FORMAT EXTENDED

Kodak and Philips have announced changes to the Photo-CD format which was initially envisaged as a means of storing photographs on compact discs. By altering the file format up to 72 minutes of sound can be added, the graphics and text can be improved, extra interactivity is introduced and more pictures, with sound, can be stored. The original format specified storage of up to a hundred 35mm photographs. Introduction of a TV resolution mode will enable up to 800 images, with sound, to be stored. The first Photo-CD players will incorporate these extra capabilities and are expected to sell at around £350. Launch in Europe is due this summer, when Philips expects that a catalogue of prerecorded Photo-CD titles (sports, art, nature etc.) will be available. The discs will be compatible with audio CD, CD-I, CD-ROM and Photo-CD players.

BROADCASTING NEWS

The Independent Television Commission has decided to postpone advertising the fifth TV channel franchise and has altered the terms. The licence was originally to be advertised in January, but the ITC has decided that more work needs to be done on the proposals for interference reduction (VCR retuning etc.) and how this is to be tackled in practice. It seems that the advertisements will now appear in March or April. The channel operator will no longer have to pay to the treasury five per cent of net advertising revenue in addition to the annual franchise fee, and the time for completing the network has been extended. The original plan was that broadcasting to at least forty per cent of the population should begin no later than December 1994, rising to sixty five per cent by the end of the fifth year. This has been reduced to thirty per cent rising to fifty five per cent. Requirements on other factors, including the level of original programming, have also been eased. The ITC is clearly concerned about attracting suitable bids and the technical problems, some of which have been aired in these pages recently.

The ITC received five applications to run the Channel 3/4 teletext service. These were from Intelfax Ltd. and

Carlton Communications plc.; Oracle Teletext Ltd.; Teletext UK Ltd.; TV-am Cable Television Ltd.; and Update Teletext Ltd.

VIDEO NEWS

JVC has introduced an S-VHS VCR with 16:9 widescreen capability. Model HR-S4700EK has a full specification including hi-fi stereo sound, a Nicam decoder, automatic head cleaning, Fastext compatibility (with an optional teletext decoder), a 48-channel tuner, a one-year/eight-event timer, an express-start mechanism that goes from stop to play in 0.3sec and a built-in video processor that offers five picture modes. AV sockets include two S terminals, twin Scart connectors (one input/output, one input only) plus an r.f. and phono audio sockets. The suggested price is £700.

JVC claims that the use of a twin-path detail enhancer, which is a non-linear emphasis system, improves the quality of the S-VHS pictures. The HR-S4700EK also has a video noise reduction circuit that uses a new signal transform theory. It's claimed that this reduces picture noise when there are subtle changes of light. A dynamic double limiter is used to prevent over-modulation. Widescreen pictures from several sources, including the future PAL Plus, D2-MAC and HD-MAC transmissions and camcorders with 16:9 video software, can be recorded. The widescreen system works via a Scart socket. When a widescreen signal source sends a 5V switching signal to pin 8 the machine automatically labels the tape with a widescreen ID code; during playback the switching voltage is sent from the VCR to the TV set which then adjusts for 16:9 pictures. Users can select the widescreen mode manually when the signal source is not accompanied by a switching signal. The widescreen ID code is a modification to the VISS (VHS index search system) coding.

Fuji's recently introduced 8mm palmcorder, Model FF60 Wide, with a suggested price of £729, scores in having a wide-angle lens system for improved indoor recording. For this purpose a slip-across wide-angle converter lens is incorporated. In use the adaptor changes the lens's normal 7-42mm zoom range to 4.9-29.4mm, effectively extending the zoom range from $\times 7$ to $\times 8.6$. Amongst the camcorder's many features are IR remote control, a detachable pistol grip that doubles as a table-top tripod, LP/SP operation, interval/time-lapsed recording, a self timer and an eight-colour, one-page title grabber with three-way scrolling. Relevant features are also common to Fuji's first Hi8 palmcorder, Model FH80.

Commodore introduced a number of additions to its CDTV system at the Las Vegas Consumer Electronics Show. Peripherals include a keyboard, two-button mouse, floppy disc drive, trackball controller, video genlock and personal memory cards (64K and 256K). There are facilities to expand a CDTV player into an Amiga computer and a CD-ROM drive that gives Amiga users CDTV/CD-ROM/audio CD capability.

The UK video rental market has been in slight decline over the past three years, falling from a peak of £569m in 1989 to £564m in 1990 and £544m in 1991. Tape sales are still increasing however, having risen to £375m in 1991.

SATELLITE TV

Dish installations have continued to increase, the December figure issued by the *Financial Times* satellite TV monitor being 116,000, bringing the total number of installations at the end of 1991 to some 2.13m. It's

expected that a further million plus dishes will be installed this year. This recent growth and an increase in subscriptions mean that BSkyB is on the point of reaching profitability at the operating level, i.e. before taking interest costs into account. Subscriptions produce eighty per cent of BSkyB's income.

Siemens has developed a range of i.c.s for satellite TV receivers. The SDA6102X PLL tuner features fast locking after channel change; f.m. demodulation in the 300-900MHz range is handled by the TDA6140X; video processing (PAL/MAC/D-MAC) is carried out by the TDA6151X; while the TDA6160X is a three-channel sound processor. The TDA5664X modulator can be used to provide an r.f. output. Future developments will include a first i.f. (950MHz-1.75GHz) mixer/oscillator chip and a version of the f.m. demodulator chip with threshold extension and digital a.f.c.

VIDEOPHONES

American Telephone and Telegraph has introduced in the USA what is claimed to be the first mass-market videotelephone that can be used with existing phone lines to provide full-colour, moving images of the caller. The image is in slow motion – variable between two and ten frames per second – and is not synchronised with the speech. During trials, users reported that these limitations were acceptable for personal calls. The VideoPhone 2500 will go on sale in May at \$1,500 (about £840) and will also be available on rent. There's no extra cost for calls. The phone has a 3.3in. fold-up LCD screen and a camera lens with shutter. A European launch is expected next year.

Amstrad is due to demonstrate a videophone that works with existing phone lines this month (February). The company, working with GEC Marconi, aims to produce phones to sell at under £500. Other companies are developing videophones for the consumer market.

MISCELLANY

B-Tech Ltd., Units 10 and 11, Meridian Centre, Vulcan Way, New Addington, Croydon, Surrey CR0 9UG (0689 848 535, fax 0689 841 087) has introduced a three-way Scart video control unit. It has three Scart input sockets, each independently switched, and a single Scart output socket which is supplemented by two phono sockets for a stereo sound output. Connections can be made to three VCRs, a satellite TV receiver plus two VCRs or a computer plus two VCRs for example and the monitoring TV set. Two sets of push-button switches enable the input to the TV set and the signal source for recording to be selected. The system enables you to record from satellite TV or another VCR while watching a different programme, the phono audio output sockets providing a link with a hi-fi system. The unit is supplied in a blister pack and has a recommended retail price of £39.95.

The National Vintage Communications Fair 1992 is to be held at the Pavilions Hall, the National Exhibition Centre, Birmingham from 11 a.m. to 5 p.m. on Sunday May 3rd. There will be stalls and demonstrations of historic equipment, including a Baird Televisor (30-line mechanical TV) and a working 1936 Marconiphone TV set. It's intended that the Fair should act as an information exchange for collectors. Details can be obtained from Jonathan Hill, 2-4 Brook Street, Bampton, Devon EX16 9LY (0398 331 532). Admission will be £2 (£1 for children aged 14 and under).

Automatic Windings, Unit 40, Woolsbridge Industrial

Estate, Three Legged Cross, Wimborne, Dorset BH21 6SZ (0202 826 888) has developed a material that can be injection moulded to make inductor cores. The new material, a soft ferrite/nylon combination, has the added advantage of having a distributed air gap as part of the finished moulding. It's also a low-loss material, as required in many power supplies. Injection moulding is less expensive than the pressing and sintering processes normally used in making cores. The new material is moulded into shaped discs, two of which form a pair or bobbin into which wire can be wound to complete an inductor. The new design enables engineers to make prototype inductors from kits rather than being forced to use the off-the-shelf product that comes closest to their needs. The process is so simple that multiple inductor arrays can be wound by hand. Automatic Windings has self-assembly kits available for use by design engineers.

Sharp has developed a 16.5in. LCD screen for use in colour portables or personal computers. It has 1.2m pixels and uses thin-film transistor technology, with three transistors for each pixel to control the RGB light output.

Philips Components Ltd., Mullard House, Torrington Place, London WC1E 7HD has introduced a multilayer line output transformer designed to meet the high brightness requirements of the latest large-screen TV sets,

including high-definition and 16:9 aspect ratio models. The AT2091 can generate e.h.t. voltages up to 35kV at power levels as high as 60W, has integral focus and first anode supply potentiometers and is suitable for operation at up to 64kHz. As it uses the Japanese style 12-pin horseshoe pinning it's interchangeable with several types of flyback transformer produced in the Far East. Multilayer construction has several advantages over the conventional slot system. These include increased reliability, while if the transformer does fail it tends to cause less damage to the set. An additional feature of the AT2091 is the lack of high-voltage a.c. on the PCB side of the transformer. This reduces corona discharge, resulting in less stress on associated components and less build up of contamination on the board.

This year's Ferguson trade show is being held at Alexandra Palace. It will feature the new B86W 36in. widescreen model with an HDTV compatible, 1,250-line chassis. Other recent models from Ferguson include two 15in. FST colour portables, the A36R and A36F. The latter has Fastext. Prices are £230 and £250 respectively.

Bath-based satellite TV equipment distributor Longreach Ltd. has opened a London depot at Unit 13, Stirling Industrial Centre, Stirling Way, Borehamwood, Herts WD6 2AN (081-953 6116, fax 081-207 0430).

What a Life!

Donald Bullock

The other day I answered a knock on the workshop door to find Greeneyes entertaining a cove who looked like the Pied Piper in a scarecrow outfit. I took an instant dislike to him – perhaps because he was carrying a Fidelity CTV14S colour portable.

"This is Mr. Flighty" she said. "He wants you to look at his set."

"Thought you'd be a younger man" he said, surveying me. I gave him a look and he minced off.

The Dead Fidelity

With his set on the bench and the back removed I saw that the 2A mains fuse had died violently. A check on the BU508A chopper transistor TR13 showed that it was dead short. So I replaced both items and tried again. The new fuse immediately departed this life. Further checks were clearly needed. It didn't take long to find that one of the bridge rectifier diodes, D19, had reverse leakage. When this had been replaced and another fuse had been fitted the set came to life. I put it on soak test.

A Monochrome Portable

A smart chariot then pulled into the drive. Its owner had long legs and long blond hair – also a Ferguson 3845 monochrome portable (1690 chassis).

"Is your son, the television engineer, in? I want this set mended."

"Just leave it with me" I said. "I'll see that it's done. Name and address please."

On investigation the set was dead with only 2.4V at the 2A fuse in the feed to the series regulator transistor. Full of prejudice, I peered nastily at the T6006V line output transistor VT17. An in situ measurement gave a base-

emitter short-circuit reading. It's difficult to get the transistor out, so I consulted the circuit diagram to see whether there was a reason for this reading. There is. The emitter is earthed and the base goes to earth via the secondary winding on the driver transformer. Furthermore there's an efficiency diode connected across the transistor. So for a certain check it had to come out. This proved that it was all right. So was the diode. Other checks were made, but no shorts could be found.

I decided to adopt a different approach and went back to the supply source. This took me to the battery input socket. Was it I wondered open-circuiting the input to the regulator? Shorting across tags 31-2 would prove the point, and when I did this the set sprang to life. A replacement socket put matters right.

As I put it all together again I glanced at myself in the bench mirror. I looked ever so young. What was getting into people?

Uncontrollable Brightness

Suddenly the picture on Flighty's Fidelity clicked off, leaving a brilliant screen. I checked the voltages around the TDA1365 colour decoder chip. They were way out. Since the chip had clearly failed, I wondered whether there was a particular reason for this, such as arcing in the line output stage. The transformer was corroded where the core projects from the windings. As I had a known good transformer I fitted it. Then, to make it easier, I slipped out the signals panel, replaced the TDA1365, refitted the panel and switched on. Would all now be well? No it wouldn't! In addition to uncontrollable brightness I now had no sound. After further tests I was no further forward and put the set to one side.

Stuck in Standby

The next set awaiting attention was a Panasonic TC2205 (U2 chassis) that was stuck in standby. I looked through the *Television* faults indexes and found a reference to the problem on page 745 of the August 1988 issue. Check

rectifier diodes D852-3 it said. The latter diode, a BY298, was very leaky. It provides the 25V supply. I fitted a replacement and got a purr of life, but there was no brightness. The BU208A line output transistor Q551 was short-circuit. A new one restored the set to full health.

Severe Patterning

Then the workshop door opened and a tubby little woman came in with a 20in. Triumph CTV8402 colour set.

"This set's faulty, I claim" she said, lifting her chin and shutting her eyes as she spoke.

When she'd gone I switched the set on and plugged in an aerial. Up came a picture that was covered with severe herringbone patterning. The sound was perfect. I spent some time checking through the r.f. and i.f. sections to no avail, then recalled a similar fault I'd had with a Toshiba set. Looking through my home-made card index (I no longer rely on my memory) I found that the set had been a Toshiba C2020, which is identical to the Triumph receiver. I'd cleared the fault by replacing the 120 μ F electrolytic C807 in the power supply. Sure enough this worked again. Why hadn't I remembered it in the first place?

It wasn't long before Mrs. Tubby returned. She walked up to me, lifted her chin, shut her eyes and spoke. "It wasn't much, I claim" she said while fumbling for her purse. "This repair is guaranteed, I claim" she said as she left.

A Toshiba V83B

I glanced at Mr. Flighty's Fidelity and quickly turned my attention to something else – a Toshiba V83B VCR. The ticket said it did what it liked. I inserted a tape and pressed the play button. Instead of a picture there was a screenful of thick, horizontal lines. Then I pressed the record button and got a screenful of mush and noise. Were there several faults or just one? I decided to start by replacing the TDA6360 processor chip IC501. Fortunately this did the trick.

Dead Ferguson TX100

Heaving a sigh of relief, I glanced again at Flighty's Fidelity and quickly picked up a Ferguson 22G3 (TX100 chassis). It was dead, and when I checked through the TDA4600-2 chopper power supply circuit I found that the charging resistor R115, connected to pin 4 of the chip, had risen in value from 270k Ω to 1.2M Ω . But a replacement failed to bring the set back to life. I next checked that the third pair of contacts on the mains on/off switch were providing the start-up pulse. They were. So I moved to the isolated part of the circuit and checked the 119V and 20V lines. Both were o.k. When I checked at the collector of the BC372 line driver transistor TR8 I found that the voltage was missing. The supply comes from the 15V regulator IC9. The voltages were o.k. here, but there was no voltage at either side of the feed resistor R143. Examination of the print between IC9 and R143 revealed an open-circuit. When this was repaired however there was still no voltage at the collector of TR8. I took it out and fitted a TIP110, which I prefer in this position. The set then came to life. For good measure I resoldered the joints around the line driver transformer T2.

Mr. Reeve's Colour Portable

It was then that Mr. Reeve brought in his Hitachi

CPT1476 colour portable. "I've got a bit of trouble with it – keeps going off. It's done it again. Gumboils and Snoddies have had a go during the last six months. Reckon it's now your turn!"

When he'd departed I soon found that the STR4211 power chip, which had been replaced before, had failed. So had the BU508A line output transistor Q703. Replacing these two items restored normal operation. The set performed perfectly on soak test before Mr. Reeve called and took it off.

Back to the Fidelity

Flushed with success, I decided to tackle Mr. Flighty's Fidelity again. Uncontrollable brightness and now no sound as well. If only I could go back to the start, when at least I had the sound.

Looking around the chassis for clues, I noticed that there was something odd about plug A and its socket on the signals board. While the female half, moulded on to a ten-core ribbon cable, was clearly a ten-pin one the male half, part of the signals panel, had eleven pins. This meant that they could be connected together in either of two positions, and in one of these positions all ten connections would be wrongly made. I'd pressed them together so that from my viewpoint they fitted snugly and properly. What would happen if I parted them and reconnected them one pin along? When I did this a perfect picture, with sound, came up.

As I boxed the set up I thought about the possibility of ending up with a severely damaged set because of this. I remembered that I had a similar scrap set in the next room and fished it out so that I could see if the plugs and sockets were the same. They were both ten-pin types. I wonder whether anyone else has come across this production quirk?

Logik VR960A

A Logik VR960A VCR was soon dealt with. It was dead except that the display lit up. I checked the voltages at the STK5332 power supply chip and found that they were all haywire. A new chip restored normal operation.

Return of Mr. Reeve

I was just thinking of calling it a day when the door opened and a disgruntled looking Mr. Reeve bowled in with his Hitachi CPT1476. "You put a faulty part in this set" he announced. "It lasted only an hour."

I waved him out, put the set on the bench and plugged it in. Up came a perfect picture. Half an hour later it failed, and no amount of heating and freezing would bring the fault under control. I eventually resorted to minute examination of the panel through my giant magnifying glass, while probing about. None of the solder joints looked dry, but one or two were sitting in little circles of brittle looking flux. While scraping at one of these with a watchmaker's screwdriver it lifted away from the panel, though it remained perfectly soldered to the component leadout wire. The connection was to the cathode of D950. Closer examination showed that there was a film of grey dust between the panel and the solder blob. I cleaned off and resoldered the joint, then similarly treated a few other nearby joints just in case. After a soak test I pronounced the set fit.

"I hope it's all right this time" Mr. Reeve said when he returned, looking at me straight in the eyes.

Servicing Philips DMP Series Decks

Philip Blundell, AMIEE

The aim of this article is to provide insight into the problems commonly encountered with VCRs that use the Philips DMP/IDM series deck. Philips VCR models include the VR202, 203, 6180, 6182, 6185, 6285, 6290, 6291, 6362, 6367, 6390, 6467, 6468, 6470, 6561, 6760, 6761 and 6870. I've seen clones in the Pye, Pioneer, Tatung, Tashiko, GEC, B and O and Finlux ranges.

Information and Spares

A circuit description for the early models (VR6760) is available from Philips under part number 4822 726 14069. It gives an in-depth description of the electronics and the mechanics. When you order a manual for a Philips model you generally get the electronics and cabinet sections: if you need information on the mechanics you have to quote the deck type number. When ordering parts it's important to look at the label between the left-hand side of the lift and the lift guides. This will tell you the deck model and the production week. Deck types in this series are as follows:

DMP2/0. Deck has two video heads only.

DMP2/2. Deck has two video and two hi-fi audio heads.

DMP3/0. Deck has two video and one perfect still head.

DMP3/2. Two video, one perfect still and two hi-fi audio heads.

IDM2/0. Two video heads only.

IDM3/0. Two video and one perfect still head.

The WD number is the week code.

Certain parts, particularly those in the lift mechanism, have been modified – some three times! Fitting the wrong lift causes problems with the COD3 switch not closing or the cassette door opening too late to miss the cassette on its way out. The IDM decks have strengthened lift mechanics. Although they look similar to the DMP types, not many of the parts are interchangeable.

If any of the moulded parts have broken off the chassis, a new subassembly is available. The half chassis comes complete with rack, coupling, scanner ring etc. ready to accept the original video drum, drum motor and top plate. You'll need to set up the tape path – don't forget the back tension as the assembly comes with this set at minimum. The part number for the half deck is 4822 691 20465.

Deck Design

The mechanical design of the deck is unlike anything seen before. It was designed for automated production – even the tape path alignment was automated. The deck is very simple and robust.

The chassis consists of a steel plate with the two sides bent square. Moulded guides that control the cassette lift as it is raised or lowered are located in the sides. There are three motors. The drum motor is of the direct-drive type. The combined capstan and wind motor is called the combi motor. The control motor is for threading and lift operation. The control position is sensed by three switches which Philips call code switches, or COD for short. Switch COD1 is on the left-hand side of the chassis: it senses eject mode and cassette inserted. Switch COD2 is at the rear, by the

head drum: it's closed several times during threading or unthreading. Switch COD3 senses when the lift is down. There are three mechanism states – eject, stop out (threaded out = wind/rewind) and stop in (threaded in = play, record, visual search). The microcomputer control chip monitors deck operation by sensing the inputs from the code switches, the tape beginning and end sensors, the control track output, head, capstan and take-up reel rotation and the presence of the record tab.

Figs. 1-3 illustrate various aspects of the deck.

Cassette Lift Operation

The following things should happen when the cassette lift is in operation. The cassette should slide easily into the lift, which shouldn't move forward (tripping switch COD1) until the cassette is against the stops. The threading motor is then energised, rotating the gearbox. The rack moves backwards, turning the lift lever and pulling the lift forwards and down.

As we all know however, customers can insert cassettes askew, put stickers in the wrong places and so on. As a result the lift can begin to move before the cassette is fully home. There is then a collision between the cassette and the pinch roller. This means damage to the pinch roller, the lift lever, the rack or all three. In later production the problem was solved by adding a mechanical catch to the lift: it's released only when the cassette is fully home. The parts required are available as spares, but not all chassis have holes drilled where the fixed part should fit.

Common Faults

Early racks (dated 1986) had a tendency to loose teeth. This causes a jam up, usually in the threaded position. Much used racks of any date tend to develop a wear ridge where the metal blocking lever rubs on the rack. As a result the rack jams, usually in transition from stop to eject.

A perished pinch roller is not uncommon. Problems with tape creasing, the tape path or varying sound volume could well be due to this. No visible signs of rubber cracking may

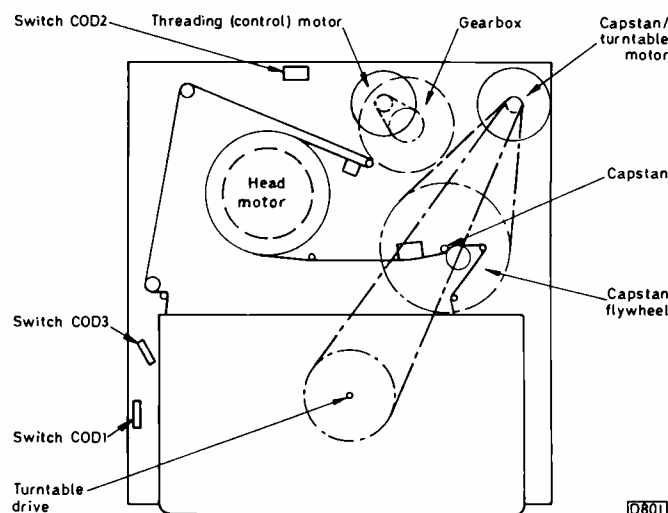


Fig. 1: Outline of the motor drive system.

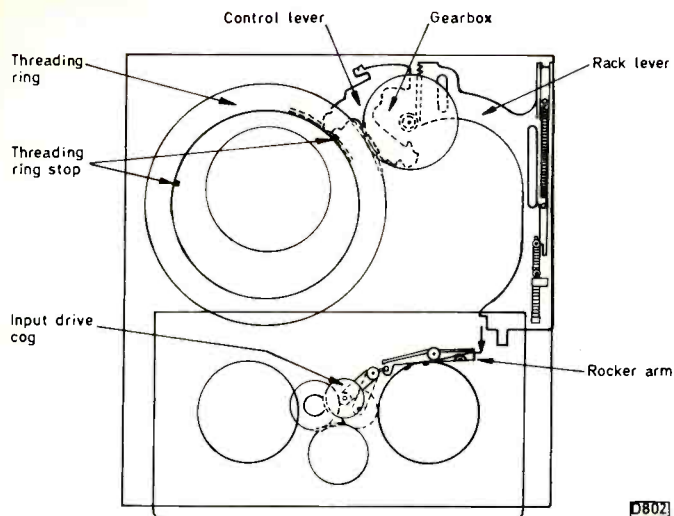


Fig. 2: Outline of the loading/threading system.

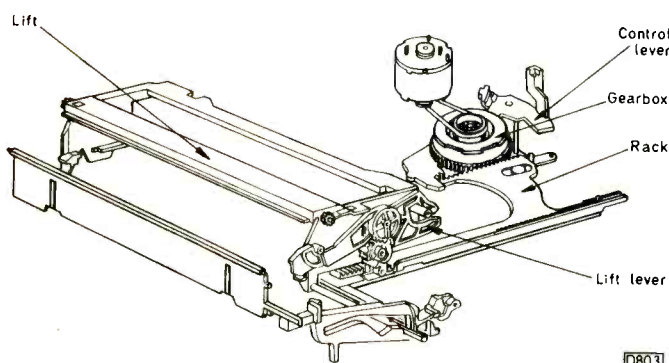


Fig. 3: The cassette lift mechanism.

be seen in the early stages of failure. One cause of a snapped off pinch roller has already been mentioned. Other things to check are that the flap opening lever operation is free and the tension of the return spring.

The wind/rewind coupling can cause problems in the search modes. The usual problems are noisy operation in reverse search or the tape suddenly becoming tight during search operation. The latter may dirty the heads or stall the drum.

If you need to dismantle the deck to replace any of these items, buy a service kit, part no. 4822 310 31803, and fit all the things it contains. It's cheaper to buy the kit than to buy any two of the previously mentioned items, and once the kit has been fitted all the main trouble spots will have been dealt with. The deck will be a lot quieter in operation because of the new gearbox and pulley design. The rack components have also been changed – so don't re-use any of the old parts.

Dismantling the Deck

The following deck dismantling description applies to Model VR6761. There are only minor differences with the other models.

To work on the deck the threading motor will have to be rotated. As access to the pulley is difficult you can't turn the mechanism by hand as you would with say a Ferguson 3V30. Instead, power the motor by connecting a 9V battery or supply to it. Don't forget to disconnect the motor from the L293 drive chip, either by disconnecting one of the motor wires or unplugging connector L2 on

board P678, to prevent damage to the chip.

Remove the three screws that secure the chassis to the cabinet. Unplug and remove the erase oscillator PCB (if fitted). Very carefully remove the plug from the erase head – use too much force and you can break the head mounting. Unplug the other connectors, take off the cross bar (if fitted) and the cassette flap and remove the chassis from the cabinet.

Removing the Lift

Next lift removal. The lift should be in the raised position. The gears on the left are under spring tension which can be retained if the plastic catch on the right-hand side is used to lock the gear teeth first.

Carefully lever the left-hand side of the lift inwards so that the projection on the lift is disconnected from the COD1 switch cam. The lift is now free to be moved towards the flap, where there are holes in the gear track to allow it to come free. To retain the spring tension, lock the gear teeth with the catch provided. Raise the left-hand side of the lift free, then the right-hand side. If the spring tension is lost you'll have to turn the gear twenty turns anticlockwise looking from the right-hand side.

Removing the Top Plate

The deck has to be partly threaded before the top plate can be removed. Power the threading motor while the lift lever goes down and the threading ring moves the tape guide (next to the pinch roller) out of the way. Stop the motor when the pinch roller begins to move. Then reverse the motor so that the pinch roller is back where it started.

The five red screws can now be removed – there are two countersunk ones, two raised-head screws and one TORX 10 screw. Bend the head amplifier's wire bracket to the left, then disconnect the loading belt and the pinch roller's tension spring. The top plate can now be removed, bringing the pinch roller with it. Hold the pinch roller in place to make reassembly easier. With the top plate removed you have access to the rest of the mechanism.

Reel Idler and Rack Removal

Reel idler and rack removal. If the reel idler gear is unclipped it can be lifted clear. Remove the long spring between the two brakes and the connecting link that goes to the back-tension arm. Unclip the right-hand brake lever and raise the right-hand side of the brake bar. The latter can now be moved to the right, along the slot in the chassis, to where the slot widens. Then lift the bar clear. The coupling can now be lifted off the shaft. The latest type is made of blue plastic – earlier types were white or pink. To test the coupling, rotate the top and bottom gears clockwise and anticlockwise: the resistance should be similar in both directions. Reassemble the coupling and the brake assembly.

To change the rack, the belt pulley and gearbox will first have to be removed. In most models the pulley is held on by plastic clips that must be prised outwards before the pulley can be lifted up. The gearbox is not fixed: provided you've put the threading ring in the correct position the gearbox can be lifted off the shaft. On very early models the pulley was not fixed but the gearbox was – by means of a plastic split ring. In this case the gearbox must be dismantled in situ by unclipping the top cover to get to the retaining ring. Later models have the gearbox and pulley free on the shaft with no fixings. If there's a plastic washer

beneath the gearbox remove this as it's not required with the latest gearbox and pulley.

The rack teeth can now be seen. If the rack is lifted clear of the metal blocking lever it can be moved towards the rear of the chassis till the lift lever is vertical. The latter can now be carefully levered inwards so that it comes off the shaft. The rack is then free to be removed. The metal blocking lever and cover can be unclipped. Put the threading ring in the fully threaded position, then remove the spring under the deck. The control lever can now be prised up and removed.

Reassembly

Next, reassembly. The new parts in the kit can now be fitted. Put a small amount of grease in the control lever's groove. Make sure that the threading ring is in the fully threaded position, then fit the control lever in place. Turn the threading ring back to the dismantling position. Fit the spring under the deck, the metal blocking lever and the plastic cover. The original covers were white, later ones were grey while the latest ones are black. The racks are date coded, with the year in a circle. The replacement can be fitted without modification. There's one exception: some very early racks didn't have the raised triangular piece on the side. With these only, you need to break off the triangular piece on the new rack.

Rack and Lift Lever Timing

The timing of the rack and the lift levers needs some care. Put the rack on the plastic ridge, but don't at this stage fit it in place at the gearbox end. Offer up the lift lever, with it in the lift down position, so that the wedge-shaped tooth on the lever sits in the space between the spring-loaded bar and the rack's plastic teeth. Push the lift lever on to the shaft. Check the timing of the gears on the lift levers by moving the rack forwards and back. The lift levers should both move through their full travel. If the timing is wrong, the rack and the two levers won't move – so remove the lift lever and try again with it in a slightly different position. When this is satisfactory, press the rack into position next to the metal blocking lever and fit the rivet, gearbox and pulley. The gearbox will be easier to fit if the rack is moved to the right by hand to make more room for the gear teeth. Put the loading belt on to the plastic pulley.

Refitting the Top Plate

Now to refit the top plate. Fit the new capstan belt, clean the capstan and lodge the new pinch roller in place on the top plate. Offer up the top plate and fit the pinch roller on to the gear (the threading gear should have been left so that the pinch roller gear is in the starting position). To help when fitting the two gears together there's a hole in the top plate so that the gears can be seen. The gears are correctly timed when the pinch roller can be moved diagonally no more than 3-4mm relative to the top plate. If it moves more than this or not at all, try altering it one tooth then try again. Fit the left-hand countersunk screw loosely to hold the pinch roller in place. At the other end of the top plate, fit the tension spring into the hole in the control lever then, using a wire hook, pull the loading belt over the motor pulley. Bend the head amplifier's metal stay back into position and fit the rest of the red screws and the long belt under the deck.

Rotate the combi motor back and forth, checking that the brakes come on and spring off again. Lastly, turn the

combi motor anticlockwise to move the back-tension arm out of the way of the moving tape guide as it returns. Power the threading motor so that the deck threads up fully, then unthread it and leave the deck in the eject position. If all is well so far the lift can now be replaced.

Refitting the Lift

Fit the right-hand side of the lift then the left, using the slots in the lift guides. Disconnect the catch from the gear while pushing the lift forward into the track. If a mechanical catch is fitted to the right-hand side of the lift this may have to be released to allow the lift to go far enough forward to enable the COD1 switch cam to be aligned with the lug on the lift. Check that the lift gears are parallel, with the same number of teeth showing at each side. Fit the cassette flap and spring, and plug the deck back in. Make sure that the cables are fitted into the plastic guides by the head drum, also that the wires to the erase head are out of the way of the tape in the play position. After fitting the deck retaining screws you should be ready for a trial run.

Dealing with a Jammed Deck

If the deck is jammed with the lift down you won't be able to dismantle it until the lift is raised. Remove the deck from the machine and look at the rear of the chassis. You'll see a slotted hole in the metal by the threading motor. Push the rack by pressing a small screwdriver through the slot: this will often release the rack, allowing the threading mechanism to turn. In difficult cases the metal blocking lever will have to be removed, though this means that the lift will be raised before unthreading is complete.

The Scanner Ring

As previously mentioned, if too much force is used when removing the erase head plug you can break off the erase head mounting. The bracket is part of the scanner ring – the plastic moulding on which the lower drum fits. If you remove the scanner ring be careful not to lose the spring beneath it. This spring raises the scanner ring off the chassis at one side, allowing the tilt of the lower drum to be adjusted when the tape path is being set up.

Lower Drum Earthing

As the lower drum is fitted on a plastic moulding it has to be separately earthed. This is done by means of a metal strap. Any problems that look like bad tracking could well be due to the lower drum not making good contact with this strap.

Service Mode

For several years now Philips VCRs have had a service mode in which, if there's a deck fault that causes the machine to stop, the front display produces an "error code" to show what the microcomputer control chip has sensed is wrong. With this range the error memory is battery backed so that the fault code is still present when the mains supply is interrupted (so long as the NiCad battery isn't flat of course...).

To call up the service mode in early models, with the video showing E-to-E press store and set clock at the same time. The channel number will go off, being replaced by the error code. The left-hand digit shows which mode the

machine was in when the fault occurred. This varies from model to model. With the VR6761 the code is as follows:

1 record; 2 play; 3 play +3; 4 rewind; 5 wind; 6 play -7; 7 play +7; 8 stop; 9 still; dark eject; C play -1.

The right-hand digit shows a number that indicates the fault, as follows: 1 loading/threading time too long; 2 capstan still; 3 head still; 4 right-hand reel not turning.

Only the last fault to occur is shown – a new fault overwrites any previous one.

On later models the reset button can be used to clear the memory, leaving it at 00. Early models are more difficult to clear. Put the machine into the service mode with a tape inserted, then press rewind or play. This puts the machine into continuous test: it plays a tape to the end, rewinds back to the start, then starts playing again automatically. As the error memory is cleared each time the machine starts to play from the start, if you switch to standby at this point the error memory is set to 00.

Newer models without a set-clock button on the front need the use of a remote control handset to get into the service mode. With these machines you press the remote control stop, then play on the VCR for four seconds or so.

I wish that Japanese manufacturers would incorporate a similar system. How many hours have you spent looking at decks waiting to find out what stops?

Some Mechanical Faults

For wow on sound, suspect a twisted capstan belt or a faulty capstan motor. The best way to check the motor is by substitution. If you don't have one to hand a rough check can be done by free-running the motor from a 9V supply. Connect a 10 Ω , 5W resistor in series with the motor and use an oscilloscope to measure the voltage across this resistor. With no load a good motor will produce regular voltage peaks of around 0.5V p-p. A faulty motor will produce pulses of much larger amplitude.

If the cassette is ejected when play or one of the wind modes is selected, the machine probably thinks that the capstan isn't rotating. The capstan tacho signal could well be missing due to a crack by plug L2 on the small P678 PCB on the top plate. To prevent this happening, be gentle when removing plug L2.

If the machine shuffles the tray but won't come on to E-to-E it hasn't initialised properly. The usual cause of this is failure of the COD1 switch to open and close as the tray moves. In this case the service mode is of no help – as you cannot get E-to-E, the machine won't go into the service mode. Often however a visual check will show that the lift isn't connecting with the COD1 switch cam or the cam has fallen off.

Electronic Faults

As with most modern VCRs, electronic faults are comparatively rare. The VR6290 and VR6291 have a chopper power supply that had a tendency for the BUT11AF chopper transistor to blow if the mains plug arced or the mains supply was faulty. Fitting the SBC7013 kit (part no. 4822 310 31817) should cure this if the power supply can has a red label. If the label is green the modification has already been carried out.

VR6870s can go dead with a clicking noise coming from the power supply. The culprit is usually C2011 (33 μ F) but to be sure I change all three of the small electrolytics on the stand-up panel.

In the earlier models (VR6362 etc.) C2329 (330 μ F) on the i.f. panel causes all sorts of trouble when it goes short-

circuit, depending on whether the overloaded supply switching transistors go open- or short-circuit. Likely faults are no test pattern, no E-to-E operation, a blank screen on play or being in record and play at the same time. This last one is tricky as it gives the impression that the video heads have failed though what's really happening is that the tape is being erased! Even more fun occurs if the engineer tries the faulty i.f. panel in another machine which fails in a different way...

Faults List

Finally, here's a list of various faults we've encountered:

No display or keyboard operation: No +13a supply as R3509 is open-circuit.

Ejects when play or wind is selected: No capstan tacho signal as R3509 is high-resistance or C2206 is short-circuit.

Head drum not rotating: T7113 open-circuit.

Bad playback dropouts: DOC offset control 3304 broken or lower drum not earthed.

Takes in cassette then ejects it again: Wire to switch COD3 broken.

Intermittent clock or keyboard stops working: Dry-joint on crystal 1001.

Take-up spool stops intermittently in play: Dry-joint on brake electromagnet.

Power supply output voltage varies: Check 6012, the optocoupler, 7001 and 7004 (Model VR6180).

Low or no power supply output: 7001 (BD436) open-circuit, D6006 or 2007 short-circuit or 1004 open-circuit.

Patterning on playback colour: Power supply screening plate missing.

No E-to-E colour: PB 10c supply still present but 7304 on board P306 leaky.

No record picture but sound o.k.: +12d supply missing. 7202 open-circuit.

No sound recorded (hi-fi models): Record level sliders at minimum!

Display shows wrong operation: Language option not set to English (later models only).

Smearly monochrome picture: Crack in track on on-screen display board by C2103 (Model VR6468).

Playback colour crosstalk: Faulty delay line 5102 (Model VR6180).

Microcomputer control chip crashes intermittently (timer or clock etc. stops intermittently): Check whether the 5V supply is low.

E-to-E fades off: U744 tuner (Model VR6185).

Smearly E-to-E picture: 7951 (4053) faulty (Model VR6362).

Intermittent failure of head to rotate: Change C2040 from 100nF to 10nF (VR6290 etc.).

Noise bar running through picture: Low control track signal due to internal leak at pin 13 of 7551.

Wow on sound: C2326 (4.7 μ F) open-circuit (Model VR6470).

BUT11AF chopper transistor keeps blowing: C2127 open-circuit (Model VR202).

Nokia's Approach to Widescreen TV

George Cole

Nokia recently demonstrated to the trade its new 16:9 widescreen TV set. Philips already has a widescreen set on the market and Thomson will be launching a Ferguson model this month (Feb.). The big surprise with the Nokia receiver is that it's a basic, 625/50Hz PAL model. The company has decided for the time being to leave aside 100Hz flicker-free operation, 1,250-line pictures and the D2-MAC system. As a result, the set will sell for around £1,000 less than the Philips model. A briefing was given by Nokia's marketing director David Silver and technical sales executive Paul England. David Silver began by outlining the present conditions in the UK's TV/video market. Around 65 per cent of UK homes have a VCR: 35 per cent have two or more. He presented some interesting figures, see Tables 1 and 2, relating to the European TV market in 1991. It's intriguing that 30 per cent of the sets sold in France have stereo sound circuitry despite the fact that there's no stereo TV service there. Large-screen sets (27in. and above) account for around six per cent of the UK market, while in Germany the figure is thirty per cent. Mr. Silver said that because of our bias towards small-screen sets the UK was regarded by some as a "low-tech., Mickey Mouse market". With its new widescreen set, Nokia will be going for that six per cent large-screen section of the UK market. According to Mr. Silver this sector of the market has been growing steadily and has not been affected to any great extent by the recession. Nokia sees widescreen TV as being an extension of an existing market sector rather than a new market in itself.

Why make the new set a 625-line PAL model? Nokia thinks it best to separate the 16:9 and MAC developments. According to Nokia's market research, consumers welcome the prospect of widescreen TV. Thus Nokia feels that it's right to go for this market now rather than to wait for the MAC issue to be resolved. The company is not convinced about the benefits of 100Hz pictures, and points out that 1,250-line transmissions are not due until 1995. What's more, a true 1,250-line receiver would, according to Nokia, have to sell for around £5,000. Nokia's set doesn't incorporate a D2-MAC decoder because there are currently no D2-MAC broadcasts in the UK. Despite all this, Nokia's new set is "future proofed": there are three

input sockets that can be used for a D2-MAC decoder, a PAL Plus decoder or various audio and video sources.

Initial Models

The first widescreen TV model from Nokia is the 36in. Salora 36F8C, which has a price tag of £2,650. The company will start test marketing a series of widescreen sets under the Nokia brand name this spring. April should see the launch of the 9291 Cinescreen 625, a 36in. set, to be followed in May by the 32in. 8291, at a price of around £1,700, and a 28in. version in June, the 7291 at some £1,000-£1,200. These sets will all be fitted with Nokia's EuroDigi chassis rather than a new design, making them easier to service and cheaper to produce.

Nokia feels that widescreen pictures represent the biggest revolution in TV since colour, and points out that twenty per cent of BBC-2 and Channel 4 films are already broadcast in the widescreen, letterbox format.

The 36F8C incorporates an on-board stereo satellite receiver, a Videocrypt decoder (as a separate box) and an outdoor unit. There's a smart-card slot at the front of the set. Nokia says that the Videocrypt decoder is separate because Eurocrypt is the favoured EC system. Thus it's possible that Videocrypt users may eventually have to convert to Eurocrypt. Other features include the ability to expand letterbox and 4:3 pictures to fill the screen, a Nicam decoder, PAL/SECAM B, G, D, K, L, L' and I compatibility, one hundred programme memories and two

Table 1: European TV market 1991 – screen sizes.

Country	Screen size (in.)						
	14	15	16/17	20-22	24/25	27/29	30+
UK	39	6	3	28	18	5	1
France	26	7	4	31	16	14	2
Germany	22	3	6	26	13	29	1
Italy	26	8	11	19	18	16	2
Spain	44	4	4	21	17	9	1

Figures in columns are percentages.

Table 2: European TV market 1991 – features.

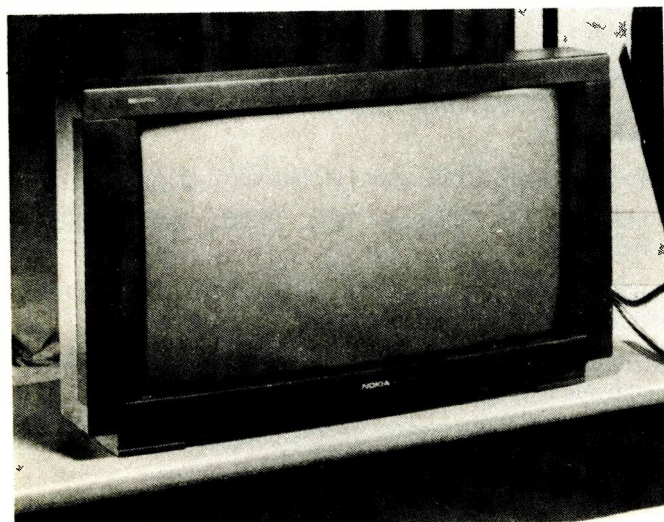
Country	Mono	Stereo	Non-text	Text
UK	84	16	53	47
France	70	30	98	2
Germany	32	68	30	70
Italy	66	34	62	38
Spain	80	20	68	32

Figures in columns are percentages.

Table 3: Nokia's forecast UK large-screen TV market shares by value.

Screen (in.)	1992	1993	1994
21/22	37	33	31
24/25	42	43	39
28/29/33	18	17	16
16:9 format	3	7	14

Figures in columns are percentages.



Nokia's 36in. widescreen TV set which retails at £2,650.

hundred preprogrammed channels, Fastex, an on-screen menu system and picture effects. AV connections include three scart sockets (one full specification, the other two composite video and Y/C switchable), three phono inputs, external loudspeaker sockets, phono audio output sockets, a DIN subwoofer/booster amplifier output and headphone sockets. Though the sound system is more basic than that in Philips' widescreen set it includes two 20W music power amplifiers and six loudspeaker drive units. The 36F8C is 89cm wide, 65.2cm high and 58.7cm deep, weighing 70kg.

The Demonstration

A variety of sources, including a VHS VCR with the Nokia ASO plus picture enhancement system, satellite and terrestrial TV transmissions, were used during the demonstration. Much to my surprise there was little flicker, despite the 50Hz pictures. When a 4:3 broadcast is zoomed out, the top and bottom of the picture are chopped off. You don't really notice this unless you are

looking for it – or you're watching subtitles that disappear off the screen. To overcome the latter problem the set has a scrolling facility to lift the subtitles back on to the screen. When watching a conventional 4:3 picture there are black bands at each side of the screen. They can be used to display pictures from three external video sources, e.g. a security camera. Nokia calls this feature Picture Out of Picture (POP) - note that it can't be used to scan through the terrestrial channels. The set also has a picture-in-picture (PIP) feature.

TV-SAT now transmits regular 16:9 pictures, though the ones shown came from a VHS VCR. Incidentally a standard VHS deck can record 16:9 pictures but doesn't have an automatic switching system that detects whether the pictures are in the 4:3 or 16:9 format. The 36F8C's on-screen menu system enables you to select the correct display mode however.

Overall I was very impressed with what I saw and can't help feeling that Nokia could be on to a winner with its "keep it simple" approach to widescreen TV.

Long-distance Television

Roger Bunney

Though long-distance TV signals were received in the UK via all propagation modes, including F2, during December, reception overall was rather thin. Tropospheric propagation was active by December standards, the prolonged, stationary high-pressure system over Western Europe doing much to give good results. The collated Sporadic E log is as follows:

- 5/12/91 SVT (Sweden) ch. E3.
- 9/12/91 SVT E3; DR (Denmark) E3.
- 10/12/91 TVE (Spain) E2, 3.
- 14/12/91 DR E3; TVE E2, 3.
- 15/12/91 TVE E2, 3, 4; TVE-2 E2; RAI (Italy) IA, B; MTV (Hungary) R1; CST (Czechoslovakia) R1.
- 21/12/91 DR E3.
- 22/12/91 SVT E3; DR E3.
- 23/12/91 TVE E2, 3, 4; DR E3.
- 24/12/91 NRK (Norway) E2.
- 25/12/91 SVT E2, 3; TVE E2.
- 26/12/91 TVE E3; DR E3.
- 28/12/91 DR E3.
- 1/1/92 RAI IA; SVT E2.

F2 layer propagation, though much reduced in comparison to previous months, produced a couple of surprises – and for once the 13th was lucky! On this day Simon Hamer at his home in North Wales logged STAR-TV ch. 0 (Australia, 46.172MHz), New Zealand ch. 1, RTM (Malaysia) ch. E2 (zero offset) and Thailand ch. E2 (-8kHz offset). The other opening occurred on the 21st, when Dubai and Iran ch. E2 and TSS-1 (Russia) ch. R1 were received.

There were several tropospheric openings, as follows:

- 5/12/91 French (TDF) and Swiss (+PTT) Band III/u.h.f. signals were received in the south/east.
- 7/12/91 More extensive reception in the south east from NRK

(Norway), SVT (Sweden), ARD (Germany) and DR/TV2 (Denmark).

14/12/91 An excellent opening with signals from ARD, ORF/ORF-2 (Austria) chs. E5, 8, 24 and 36, +PTT, CST chs. R10 and 36 – all received by Simon Hamer in North Wales.

23/12/91 +PTT received in the south.

25/12/91 TVE chs. E30, 31, 35, 37 and 39 received in the south west.

27/12/91 TVE chs. E7, 9, 21, 37, 45 and 48, TDF and the Benelux countries – reception once more by Simon Hamer.

28/12/91 Similar to the 27th.

1/1/92 West German Band III/u.h.f. stations received over much of the UK.

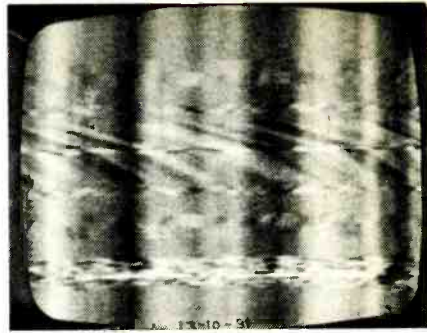
2/1/92 Similar to the 1st.

A quiet month then, but nevertheless a wide variety of signals to end a none too successful year. Let's hope that 1992 will be better! Our thanks to Tim Anderson (St. Leonards), Cyril Willis (King's Lynn), Roger Fussell (Torpoint), Mike Gaskin (Caterham), Simon Hamer (Powys) and Brian Williams (Cardiff) for sending in reception reports.

In an interesting letter Mike Gaskin (Gibraltar) says that because of growing interference problems in Bands II and III and congestion throughout the u.h.f. bands he's decided to concentrate on Band I exclusively. Impressive results are obtained using a two-element, wideband Tru-match aerial at a height of 31ft. Signal splitting is used to provide a feed for the popular AX700 scanner, a unique receiver with a panoramic display. Mike comments that the Geminids meteor shower over December 12-14th produced a lot of activity. This would seem to confirm that there's a link between MS and SpE propagation, as there was an intense SpE opening on the 15th. Mike is fortunate in having Band I clear: a mass of 49MHz baby alarms here at Romsey makes it impossible to see anything on ch. R1, the interference spreading down to ch. E2 and almost to ch. IA.

News Items

Czechoslovakia: The Czech and Slovak services have both been transmitting PAL coded signals on a test basis during programme hours. A change from the present SECAM to PAL could well occur in the near future. There has also been discussion about moving to the B/G transmission standard, i.e. with 5.5 instead of the 6.5MHz sound-vision



Left: Middle East Broadcasting test pattern, received via Eutelsat II F1 at 13°E. Frequency 11.554GHz, polarisation horizontal.
 Centre: Can anyone identify this Arabic ch. E3 signal, received by Ryn Muntjewerff in Holland on June 11th 1991 via SpE?
 Right: An example of classic F2 layer reception, again by Ryn, from Dubai ch. E2.

spacing of the present standard D, but it's felt that viewers would not be prepared to bear the cost of this in the near future. The new Czech Broadcasting Bill allows the start of commercial TV on a regional basis. Already NTV Praha, KF-Masseba TV and the Artepp company are seeking

channel allocations. It's likely that the new regional Czech broadcasters will share transmission facilities with the OK3/TA3 services. The franchises are to be awarded by June.

Sweden: Nordisk Television Ab, which owns the TV4 satellite TV channel, is to run the new Swedish terrestrial commercial service. Tests have already started from several Televerket PTT transmitter sites and the service is expected to start this month, with 60 per cent coverage by the summer and 95 per cent coverage by the end of 1993. The new Czech and Swedish networks should provide a lot of DX-TV potential during good conditions!

France: Though remaining on air for the time being the La Cinq channel has filed for bankruptcy. The Hatchette group, which has a 25 per cent stake, is to stop financing the service, which made a heavy loss last year.

Germany: The Pro 7 satellite TV service, which is intended mainly for cable distribution, is also being broadcast via a number of local terrestrial transmitters – some of them have been received in the UK. The following transmitter list has been supplied by the Benelux DX Club:

- Bayern region: Munchen E45, Augsburg E26, Bayreuth E39, Nurnberg E21, Regensburg E24, Ansbach E35.
- Bremen region: Bremen E46, Bremerhaven E8.
- Rheinland-Pfalz region: Mainz E44.
- Baden Wurtemberg region: Ravensburg E30, Friedrichshafen E35, Konstanz E60.
- Hessen region: Kassel E60.
- Saarland region: Eschberg E29, Dudweiler E35.

In addition the following stations are due to come into operation: Neu-Ulm E51, Wurzburg E41, Weilheim E57, Bamberg E30, Aschaffenburg E57, Rosenheim E38, Winterberg E56 and Deggendorf (channel allocation not yet made).

Switzerland: The movie-only Telecine Romandie channel, which uses a single transmitter at La Dole, is back in operation – it had closed down in May 1991 due to heavy losses. Programme coverage has been extended to include quiz shows, sports etc. The new owners are considering the lease of a satellite transponder to give national coverage. A new rival, the Huit Mont-Blanc regional TV service, is to start up just across the border from Geneva, in Annemasse, France.

In brief: TVE (Spain) has signed an agreement to revamp and expand the Bolivian Canal 7 service... An African

PHOTOSTATS SERVICE

Newer readers may have missed important servicing features published in *Television* over the past few years. We have therefore started a photostat service to make this information readily available. Photostats of the following servicing features, listed in alphabetical order, can be supplied at the prices shown. Please send requests to: Television Editorial Department, Room L323, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. Cheques/POs should be made payable to Reed Business Publishing Ltd. There are two standard prices, see below.

Feature	Price
B and O L/LK2500/2800 chassis	A
Decca 80/100 chassis	A
Decca 120/130 chassis	A
Ferguson FV31R VCR	A
Ferguson TX10 chassis	A
Ferguson TX100 chassis	A
Finlux 1000 series chassis	A
Fisher FVH-P520 VCR	A
Mitsubishi CT2227	A
Mitsubishi Euro-4 chassis	A
Mitsubishi HS304 VCR	A
Panasonic D1 VCR deck	A
Panasonic G VCR deck	B
Panasonic NV333/366 VCRs	A
Panasonic NV370/830/850 VCRs	A
Panasonic NV730 VCR	A
Panasonic NV777/788 VCRs	A
Panasonic NV2000/2010/3000 VCRs	A
Panasonic U3 chassis	A
Panasonic U4 chassis	A
Panasonic U5 chassis	A
Salora F chassis	A
Salora G and H chassis	B
Salora J chassis	A
Salora K and L chassis	B
Sanyo CTP7130/1/2	A
Sony KV2252/2256/2752/2762	B

Prices, A = £2.50, B = £3.50.

Canal Plus service has been started in Senegal, called Canal Horizons. It will extend operations to the Ivory Coast and Tunisia by April and Gabon by the end of the year.

Satellite TV

The Eutelsat II F3 craft is now in operation at 16°E while the French Telecom 2A craft was successfully launched in mid-December.

Intelsat is promoting a 12-month period of digital audio distribution via the Intelnet network, with discounted rates for six-month rental periods. Intelnet has been extended to Russia. Seven new Intelsat craft have been authorised for delivery starting in the autumn of 1995. They will carry 32 C Band (4GHz) transponders, with two hemispheric, four zonal and six high-power global beams with a footprint e.i.r.p. of 36dBW, also six Ku band transponders with an e.i.r.p. of 47dBW. So far no type designation has been assigned to this new series of satellites. Intelsat has approved the establishment of the following new communications networks. ASETA will provide domestic and regional communications across the Andes, between Venezuela, Peru, Ecuador, Columbia and Bolivia, with a total of 19 36MHz bandwidth transponders available later this year. The Regional African Satellite Communications project (RASCOC) is to expand transponder availability for pan-African domestic and regional communications. Launch of the new Intelsat K satellite into orbit at 21.5°W is due this month. It will be co-located with the Intelsat V F2 craft.

Filmnet is now transmitting with D2MAC via the Astra and Eutelsat II F1 craft, including test scrambling with Eurocrypt. For the present Filmnet is maintaining its D2MAC Scandinavian beam in the clear.

The Italian state broadcaster RAI has developed an experimental digital audio/video satellite news gathering unit. Tests have already proved that the results are superior to those with standard analogue PAL. It should enable substantially lower powers and smaller dish sizes to be used.

The Japanese are concerned about the increasing number of satellites whose footprints include coverage of Japan. Several new satellite networks are due to come into operation in S.E. Asia in the next two-three years, all with regional rather than national coverage.

Cyril Willis has drawn our attention to the fact that the Super Channel transponder (Eutelsat II F1 at 13°E) carries satellite news on page 270. The news is changed each Tuesday and at the weekend. Readers' letters are included.

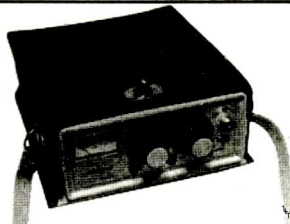
Finally some news briefs. CNN has signed a four-year deal with the Japanese broadcaster TV Asahi. The Australian government has sold the loss-making AUSSAT to Optus Communications. The final transponder on the C-Band ASIASAT-1 craft has been leased to the Chinese Ministry of Radio and TV for 32 radio channels and network distribution of the China Central Television 1 service.

Book Review

A second revised and considerably updated edition of *The Satellite Book - a Complete Guide to Satellite TV Theory and Practice*, edited by John Breeds, has been published by Swift Television Publications, 17 Pittsfield, Cricklade, Swindon, Wilts SN6 6AN (telephone/fax 0793 750 620). It starts with a clear outline of the theory - craft launch, geostationary orbiting, footprints, etc. We then come to the installation and mounting (both wall and

AERIAL TECHNIQUES

UHF Signal Strength Meter Model SSMU2



The SSMU2 is battery-powered and is for use in the setting up of aeri-als and distribution amplifier systems within the specified frequency coverage.
The unit may be run off standard HP7-type cells or from Nicad batteries, with the adaptor. Field strength is measured in either mV or dB on a meter with 3 Ga.n settings. The meter can be back-lit when required. To aid video and sound identification, a low-level sound source is built into the unit, or through external headphones.
Frequency range: Chs 21 to 69 (471 to 855 MHz)
Tuning method: Varicap tuning using decade and continuous decimal controls.
Sensitivity: 20µV to 40mV, ±4dB, in 3 ranges.
Meter indication: mV and dB, Scale accuracy, ±1dB
Power source: 12V from 8 × HP7-type cells, or 10 × AA-size Ni-Cad cells.
Current consumption: Average, 55mA
Battery life: with 2Ah alkaline cells, approx. 36hrs with 500mAh Ni-Cad cells, approx. 9 hrs.


£139.95 inclusive of Vat
Carriage & Insurance £5.00


Aerial Techniques, the company that knows the TV-DXing hobby. We stock a large range of equipment for all types of aerial installation, all detailed in our 29 page Catalogue at 75p, why not send for your copy today. We also have available Multi-standard TV's and Video recorders for all systems, PAL, SECAM & NTSC. Most makes of Satellite equipment carried, together with decoders for Canal Plus, RAI UNO, RAI DUE, PAL/D2-MAC Satellite receivers now in stock, also SECAM to PAL Transcoders (SAE details).

SPECIAL OFFER!!! ORION Multi-standard PAL/SECAM HQ video recorder with LCD infra-red remote control, covers VHF/UHF PAL System I; PAL System B/G; PAL System D/K; SECAM System B/G; SECAM System D/K **£299.00 Inc of vat & delivery**


NEW ... Now in stock 10" screen, multi standard colour TV, PAL I (for UK) PAL B/G (for Europe) SECAM L (for France) 12v DC & mains operation **£329 Inc vat (SAE details)**

ACCESS, VISA & AMERICAN EXPRESS
Mail & Telephone orders welcome (24hr service)





11, KENT ROAD, PARKSTONE, POOLE, DORSET BH12 2EH
Tel: 0202 738232 Fax: 0202 716951



stand) of equipment. The wall section includes wind loading and tensile, shear and oblique forces for safe fixing - that's how detailed the book is, it even tells you how and where to tie the ladder. Cables, scart connectors, customer care, signals, noise and f.m., energy dispersal, dish and flat-plate aerial theory and practice are all there. Numerous excellent line drawings, many illustrating practical points, are included. My test for any good satellite book is the inclusion of a section on the Polyrod lens - yes, it's there! Substantial sections cover SMATV, the Astra and Eutelsat operations, MAC and its variants and scrambling, including Eurocrypt technology (as it relates to the UK - no Filmnet here). The book ends with a good glossary of terms, an index and a very useful list of addresses. There are 26 chapters and the book is in A4 format.

It's an excellent book, well illustrated and presented. No self-respecting satellite installation engineer should be without a copy! The book is available from the publishers at £27.95 plus postage within the UK of £2.50 (£5 to continental Europe). An s.a.e. will bring a full list of other satellite publications available from Swift (address above).

READER SERVICE NUMBERS

Helpline 081 652 8620

For those having difficulty obtaining their monthly copy of *Television*.

Subscription hotline 0789 200 255

Use this number to take out a subscription using your Credit Card. For subscription rates see page 313.

343

TV Fault Finding

*Reports from Philip Blundell, AMIEIE
Alfred Damp, Steve Cannon, Ed Rowland,
John Edwards, Stephen Leatherbarrow,
Brian Storm and Chris Avis*

Philips GR1-AX Chassis/Tashiko D14GP4

This set was reluctant to start up from cold. There was 15V across zener diode 6613 and the chopper transistor had its supplies, but there was no 95V output from the chopper circuit. I turned down the set-95V preset 3625 and tried again. This time the set started, but the overvoltage crowbar fired when the circuit was set for 96V output. Zener diode 6638 (BZX79-B36) in the h.t. sensing network was leaky. **P.B.**

Grundig CUC 3400 Chassis

The colour would disappear intermittently, while at the same time the right-hand side of the picture would be blanked out. A scope check on the sandcastle pulse showed that it was misshapen when the fault was present. The TDA2579 timebase generator chip was faulty. **P.B.**

Ferguson TX100 Chassis

This set had been a long-term problem in the workshop. It blew the chopper transistor intermittently and would sometimes go dead with no chopper transistor drive. During a rare occasion when it stayed dead for some minutes I was able to establish that the TDA4600-2 chopper control chip had a supply and a reference voltage but no output was present while the voltage at pin 4 was higher than normal. This is the pin to which the famous 300k Ω (270k Ω or two separate resistors in some designs) resistor is connected. We've all in the past had trouble with this charging resistor. On this occasion however the associated charging capacitor C118 (8.2nF) had gone open-circuit. The value of the replacement capacitor should be 6.8nF as in later production. **P.B.**

Philips 2B Chassis

Due to insufficient bias at the base of the chopper transistor this set refused to start. The start-up bias is provided by R3656/7, C2658 and R3686/7. We checked all these components and though they seemed to be o.k. we replaced them. Still the set refused to start. Many hours were spent on the power supply, checking and replacing the various semiconductor devices, all to no avail. Many wonderful theories were put forward and tested, but the one thing about which we were relatively certain was that the bias was being damped by something in the chopper transistor's quite complex base circuit. Eventually, when it seemed that the best thing to do was to hide the set, pretend it no longer existed or replace every single component in the power supply, we got around to checking C2670 (68nF). It read correctly and no leakage could be detected using our component tester. We nevertheless replaced it. When the on/off switch was operated a strange noise came from within the set – it was the rustle of e.h.t. The set was working and has continued to do so. **A.D.**

Ferguson SRA1

This satellite TV receiver had a hum bar on its picture and wasn't tuning correctly. You could tune to the correct frequency to remove the sparklies from the picture, but

when the store key was pressed the tuning reverted to the previous, incorrect frequency. We took a look at the power supply section and saw that C2 (2,200 μ F, 16V) and C4 (100 μ F, 16V) appeared to be somewhat stressed. Both were leaky. Replacing them cured both faults. **A.D.**

Panasonic Z3 Chassis

A fault we've had a couple of times with this chassis is reduced height with poor linearity. In both cases the faulty component was C404 (4.7 μ F, 50V). It's used in the feedback circuit between the field output and ramp generator stages. **S.C.**

Sony KV2092

The problem with this set was that the volume would alter of its own accord or wouldn't adjust at all. Unfortunately it was an intermittent fault. While the set was playing up we carried out a check at the base of Q015, the volume buffer transistor in the line from the microcomputer and DAC chips, to see whether the d.c. level changed when the volume was adjusted. It did, so this eliminated the circuitry prior to Q015, putting us in a much better position when the fault next appeared for a reasonable time. When the set faulted again we carried out checks around Q019, Q021 and Q017, which process the volume on-screen display information. Q017 turned out to be faulty. As we didn't have a Sony replacement we fitted a BC546 which did the trick. **S.C.**

Salora H Chassis

When the aerial was disconnected the field folded over. Very odd. Mind you, the picture wasn't too good – the focus was way out and the brightness was too low. Also, a low-pitched humming noise came from the speaker. Where to start first? Well, when I was an apprentice I was told always to start at the tube. It's one of the best bits of advice I've heeded. The e.h.t. was low at about 20kV. I turned the set-e.h.t. potentiometer RTB700, only a tweak, and the meter needle went off the scale. I could picture sparks dancing from the e.h.t. cavity, up the meter and then my arm at any moment. I quickly switched the set off and checked my equipment, as you know what X-rays can do. Thankfully everything was intact. I then replaced the potentiometer itself, expecting a cure, but was disappointed. A replacement hybrid Ipsalo circuit control chip finally provided a cure. **S.C.**

Finlux 9000 Chassis

This set was brought to us because of low brightness. Curiously, when the tube's first anode voltage was increased the set developed a Hanover-bar effect then the colour-difference signals disappeared. After a great deal of head-scratching and unnecessary replacement of components the cause of the fault was found to be in the RGB output section, of all places. We disconnected the emitters of the RGB output transistors Tb5, Tb8 and Tb11 in turn. When the red channel transistor Tb5 was disconnected in

this way the brightness and chroma faults cleared. After this it was a straightforward case of checking the components in the red channel. This led us to Tb6 which was short-circuit collector-to-emitter. Normal operation was restored when a new BF881 had been fitted. The faulty transistor must, in addition to affecting the red channel, have been loading the colour decoder section chip which then shut down. S.C.

Panasonic TX21T1

This was a brand new set, straight out of the box. After working for a couple of minutes picture sync was lost then the screen went blank, the power supply shut down and the set squealed. We turned the set off and allowed it to cool. The initial symptom was the giveaway: when the fault developed we squirted the TDA2579A line generator/sync chip IC501 with freezer. This restored normal operation for a couple of minutes. A new chip provided a permanent cure. S.C.

Ferguson TX90 Chassis

This set had no picture. When the first anode control was turned up we got a faint, watery image on the screen. Voltage checks around the BC307B beam limiter transistor Tr114 showed that its base was at 0.6V instead of 5.8V. The cause was eventually traced to the 143k Ω resistor R231 which had gone open-circuit. E.R.

Fidelity CTV14S

The complaint with this set was no sound. We found that there was zero voltage at pin 14 of the TDA3190 sound chip. The source of the supply was traced back to D25 which was dry-jointed at its anode. E.R.

Network NWC1410R

There was no sound as both the sound output transistors Q652/3 had failed. We replaced them along with, for good measure, the two 1 Ω resistors R659/660 which were looking distressed. This restored the sound. E.R.

ITT CVC1210/1215 Chassis

The d.c. fuse Fu651 would blow at switch on. The culprit turned out to be C701 (10 μ F, 350V) which was short-circuit. If the problem is intermittent start up, replace C731, C733, C713, C703 and C701, also add a 1.8 Ω resistor in series with the cathode of D712. J.E.

Saisho CM16R

A dead set though with the standby indicator on was due to failure of the STK7308 chopper chip IC501. After checking all the components in the power supply – it takes only a few minutes – and also checking for shorts at the line output transistor a new chip was fitted and the set was switched on. A long soak test proved that all was o.k. J.E.

Philips CP90 Chassis

This was a tricky fault. If the set was left alone it would work faultlessly all day and every day. If it was switched off and then on while hot however it would occasionally stay in the off mode. After many, many tests and component substitutions we found that D6670 (1N4148) was the cause.

SYSTEM DECODE 92

A highly profitable 'Bolt On' or 'Start Your Own' business. Decoding Philips radio/cassettes as fitted by Vauxhall, A. Rover, Peugeot, Renault, Volvo and others. 22DC series 570/670/680/751/752/755/846/864/954.

Due to demands on our Service Dept. and technical staff (approx 1000 units in 1991) we designed a system enabling **NON TECHNICAL STAFF** to perform the decoding operation.

SYSTEM DECODE 92 requires;

- NO** technical knowledge.
- NO** specialist equipment.
- NO** soldering.
- NO** spares/parts to buy.
- NO** waiting for 'timeouts'.

All you will need in addition to '**SYSTEM DECODE 92**' is a 12Vdc power source and a few simple hand tools.

It's fast and easy, it snowballs and you start immediately to earn your share of the thousands to be made Decoding.

The demand is there. We also show you **EXACTLY** where and how to start the units rolling in, growing as required. Should you choose to expand your services, included also, are numerous fault reports, repair procedures, tips, data, suppliers etc. relating to the repair of these units.

All in all – a goldmine, and it pays for itself within the first 20 units. (Std. Charge £15 unit)

SYSTEM DECODE 92 £295. – (fully inclusive)

**T.E.M.S., Dept. TV03, 36 Springvale, Gayton,
Norfolk PE32 1QZ. (0553) 636618**

Note: Only 200 System Decode 92 to be sold.
Sorry. Not available within a 45 mile radius of E. Dereham, Norfolk.
Please allow for cheque/PO clearance.

No fault could be found with it after removal, either when cold or hot, but a replacement cured the fault. S.L.

Contec KT8135

Field cramping when hot was found to be the result of C336 (220 μ F, 50V) developing a 10k Ω leak. S.L.

Solavox 140

Field collapse was simply a case of the LA7830 output chip going short-circuit. Its 3.3 Ω feed resistor R122 had also failed. Replacements produced some scan, but with poor top linearity and some top compression. C108 (1,000 μ F) was responsible for this. We've seen these sets in Nikkai cabinets. S.L.

Saisho CT208TT

This teletext set displayed perfect text on all channels. Unfortunately when warm it would do so without being asked. We found that the culprit was the SAA5040B chip IC903. We've now had the fault several times. While it could be a batch problem, we feel that the position of the text panel could be a contributory factor. It's mounted horizontally, directly above the main chassis, at the top of the cabinet. S.L.

Hitachi G6P Chassis

Failure of the line output transformer has been a frequent fault with these sets. With this one however the symptom was red streaks that appeared at random, starting at the left-hand side of the screen. They would then merge into a

vertical red band at the left. This gradually broadened, with a ragged edge, filling the whole screen. The red raster would then brighten to the point at which flyback lines became visible. As a lot of work, with no success, had been carried out on the c.r.t. base and around the colour decoder chip, we decided to look elsewhere. The circuit diagram was consulted, and this gave us an idea. Maybe the graphics generator chip was at fault. A gentle puff of freezer on IC1104 (M50450-023P) proved the point. S.L.

Hitachi NP6CQ Chassis

This chassis, since its production many years ago, has been plagued by the intermittently dead condition. There are still many of these sets around however, giving good results. While dry-joints loom large as the likely cause of the intermittently dead fault, these days you usually have to look a little deeper. This time C919 (3.3 μ F, 25V) was going open-circuit when warm. Its associated with pin 4 of the CP901 chip. Use of freezer and a hairdryer provided a quick diagnosis. S.L.

Grundig CUC70 Chassis

These nice sets produce very good pictures and are extremely reliable. This one's discrete power supply was delivering a low output (70V) however and was twittering badly. It did the same when it was used to power a 100W bulb, proving that the power supply was the cause of the trouble. We eventually found that the 33V reference diode IC633 had a reverse leakage of around 26k Ω . S.L.

Ferguson TX10 Chassis

Here's a nice simple one for a change. A green screen was caused by the green output stage's 22k Ω load resistor R664 being open-circuit. Its replacement, along with its counterparts in the R and B output stages, has become a routine job. S.L.

Ferguson TX85 Chassis

This fault caught me the first time I came across it. The same thing happened a few weeks later. Both sets came in dead. Initial checks showed that there was normal h.t. right up to the line output transistor. But there was no 15V output from the chopper circuit. I resoldered the various dry-joints you get around the chopper transformer and was rewarded with a good picture and sound. These disappeared as quickly as they had come. The cause of the problem is that L10 in the rectifier circuit that feeds the 12V regulator has a habit of going open-circuit in an irregular manner before it fails permanently. What can sometimes be a little disconcerting is that in L10's high-resistance condition the 12V regulator still receives an input of 12-15V, yet the set remains dead. This can lead you to suspect the regulator etc. S.L.

Panasonic Alpha 2 and 3 Chassis

Faulty teletext was the complaint with a TX25A2 (Alpha 3 chassis). Sure enough the channel flag and bar graphs drifted aimlessly across the screen while the text was erratic with flashing white lines in the background. A check on the 6MHz oscillator confirmed that it was running slowly, unlocked to the transmission. As the inputs to IC3501 seemed to be in order we fitted a replacement. No difference. We then carried out checks around IC3501 and

found that the 220pF capacitor C3511 in the 6MHz phase control circuit was leaky. We've since had the same fault with a TX24A1 (Alpha 2 chassis) which has the same text circuit. B.S.

Ferguson 20E2 (TX90 Chassis)

We've had tuning problems with two of these sets. The first wouldn't search. We found that the 1k Ω safety resistor R986 in the tuning circuit on the remote control panel was open-circuit. This was in turn due to the 150V tuning regulator supply being high because R56 on the line linearity/width panel had fallen in value from 2.4k Ω to less than 1k Ω . When this had been attended to we discovered that channels could be found but not memorised. A new M293B1 memory chip (IC902) put that right.

The second 20E2 found channels up to around number thirty, but anything higher produced motorboating and again there was no memory. That's right, the voltage across the ZTK33B regulator D909 was low at 25V. But a different diode was to blame: D908, the 33V zener diode that stabilises the voltage at the base of transistor TR916, was leaky. C.A.

Hitachi CPT2260/Salora Ipsalo 2

The mains fuse had blown, the filter resistor RB713 was open-circuit and the two BUW41B chopper transistors TB700/1 were short-circuit. After replacements had been fitted and the line scan coupling capacitor CB532 had been checked for dry-joints, the set produced nothing but a faint whistle. CB712 (4.7 μ F), the coupling capacitor to the base of TB701, had dried up. We decided to replace its partner CB726 in TB700's base circuit as well to be sure.

I now make a point of changing these two capacitors whenever this type of power supply appears on the bench. As in many other contemporary TV designs that use similar electrolytics mounted near hot components in high-frequency power supplies, these little capacitors work hard and are becoming a common cause of supply failure or erratic operation. C.A.

Hitachi CPT2051

Field faults in these sets are usually caused by C608 (22 μ F, 160V) which decouples the supply to the field output stage or dry-joints on the HM6251 field output module. Not this time however. There was still field collapse after the usual checks had been carried out. A limited amount of drive could be seen when the output at pin 4 of the module was checked with the scope, but it looked as though the output was heavily loaded. C609 (4.7nF) which is connected in parallel with the field scan coils had gone short-circuit, probably because it was mounted right against the hot h.t. feed resistor R607. We mounted the replacement capacitor under the PCB. C.A.

Philips NC3 Chassis

The owner of this set had rescued it from being scrapped by a national retail/servicing company and brought it to us because he knew where to come... The problem was reduced height with vivid horizontal ripples over the picture. We noticed that a replacement Hitachi picture tube had been fitted, with scan coils that were different from the original ones. The ripples went when the missing 1.2k Ω damping resistor was fitted across the Hitachi field scan coils. Full scan was restored when the parallel-connected scan coils were rewired in series. C.A.

CD Player Casebook

Reports from Mike Leach,
P.J. Roberts and Nick Beer

Philips CD160

These machines occasionally suffer from poor or no loading drive. This particular machine would open the tray but would then refuse to close it. Usually the cause of the fault is the loading motor drive transistors, which often get very hot and have a tendency to burn up. They are mounted on the front panel and should be replaced with similar types. The circuit reference numbers are 6059, 6055 and 6056, all type BC328-40, and 6057/8, both type BC338-18. The Philips part numbers are 4822 130 41715 for the BC328-40, and 4822 130 40892 for the BC338-16. M.L.

Sony CDP-M20S

This player is part of a midi system and is powered by a separate 15V a.c. supply from the amplifier unit. The fault symptom was interesting and, luckily, its cause was easy to find. No play was the complaint. When a disc was inserted the machine seemed to focus on it all right and the TOC was read, with indication in the display. Immediately after the total track and playing time appeared however a zero came up in the display: after that there was nothing apart from the zero. When I pressed play the machine tried to find track one but gave up after a few seconds, then the disc stopped spinning. Exactly the same symptoms were present when another disc was tried.

When I removed the bottom cover I noticed that two areas of the machine suffered badly from dry-joints. Most noticeable were the areas around the a.c. supply socket and the STA341M tracking drive chip IC6. A good solder-up in these two areas provided a cure, the machine working very well afterwards. I've looked at a couple of similar machines since that first one. Both showed signs of drying up in the same two areas. One to watch out for.

M.L.

Philips FCD562

The report stated that this machine didn't work properly. When a disc was inserted, the machine would go into play. If stop was pressed after several minutes' the music would stop but the disc would continue to rotate. Furthermore open/close had no effect and the machine wouldn't open its tray. The player would work normally again for several minutes after interrupting the mains supply. The cause of the trouble was the MAB8441-T014 control/display chip on the front panel. Various component suppliers provide an MAB8441-T018 as a replacement: no modifications are required. M.L.

Sony CDP-M35

The complaints were of skipping and taking a time to find tracks. Also the drawer would come back out after a disc had been loaded and there had been failure to read the TOC. The first item we replaced was the loading belt, which was worn. This belt operates the drawer drive mechanism and also the mechanism that lifts up the CDM to clamp the disc. The new belt cured the intermittent failure to read the TOC, but the unit still skipped and took a long time to find tracks. We tried a full alignment, but this didn't provide a cure. We eventually found that the tracking-coil driver transistors Q603 (2SC3666) and Q604

(2SA1426) and the focus coil driver transistors Q607 (2SC3666) and Q608 (2SA1426) were faulty. The 2SC3666 can be replaced with a BC639 while the 2SA1426 can be replaced with a BC640.

After replacing these transistors it's necessary to carry out both the focus bias (offset) and E-F balance adjustments. The machine should then be up to specification and should play the test disc. If it doesn't, the laser assembly is suspect. The drawer belt part number is 3-653-387-00. P.J.R.

Pioneer PDM40

This six-disc multiplayer wouldn't read any of the discs – not even the TOC. On closer examination, guess what? Yes, the spindle motor was at fault. Normal operation was restored after fitting a new motor. The part number is PEA1028. Don't use a PYY1109, because the motor spindle is too short. Also make sure that you use a PD-M40 turntable height gauge, not the one for the PD-Z81M etc. P.J.R.

Denon DCD660

This brand new player came from the shop with the complaint that it wouldn't read the TOC and hence wouldn't play. The laser focused and the disc rotated, but as tracking lock wasn't achieved the disc soon stopped again. The cause of the trouble was that connector CB101 hadn't been pushed fully home. N.B.

Technics SLXP7

These early portable players are well built. This one was accused of cutting out at random whilst playing. We found that squeezing the lid down would produce the fault. The cause was the door/LD on switch. We also had to clean the copper hook on the door. One common fault with these players was also in evidence – intermittent failure to start to play due to a high-resistance traverse rest switch. Neither part is difficult to replace. N.B.

MATTERS ARISING

Correction: The l.t. rectifier diode on the live side of the circuit was omitted in Fig. 1, page 276 last month. Its anode goes to the transformer winding and its cathode to the positive side of the reservoir electrolytic.

February cover: We should have mentioned that the free signal diodes were type 1N4148.

Satellite TV receiver project (December/January issues): Several readers have experienced difficulty in obtaining the sound demodulator chip IC7. The correct type number is XR215CN. It can be obtained in one-off quantity, cash with order, from Sabre Advanced Micro, Mead House, Suit 4, London Road, Bentley, Farnham, Surrey. Telephone 0420 22 004, fax 0420 22 008. Please for latest price and delivery details before ordering.

Test Report: Beckman Industrial RMS225 DMM

David Botto

My first impression when I unpacked the recently introduced Beckman Industrial RMS225 digital multimeter was that it's a ruggedly built though slim instrument which looks as though it will stand up to hard use. The instrument fits snugly and securely into the hand. Its grey case is made of high-impact, fire-retardant thermoplastic material. I would have liked to have seen some identifying colours on the test lead sockets, the selector buttons and the meter's case. Some TV/VCR/computer engineers do however prefer the RMS225's uniform grey finish. The RMS225 measures 173 × 71 × 80mm (without its holster). It weighs 16oz. with holster and PP3 or equivalent battery.

Precision test gear should be treated with care. It's a fact of life however that DMMs are sometimes dropped. To guard against damage when this occurs, the RMS225 is supplied in a tough, rubbery protective holster. It can be removed from the holster and reinserted face down to protect the display whilst being carried around in the van. There's also a flex-strap to enable the meter to be hung from a point that's convenient for eye-level viewing.

The holster also provides test lead storage, a useful two-position tilt stand and clips to hold the probes on the meter (see the accompanying photograph) whilst making single-handed measurements. I found this holster arrangement handy for field servicing: instead of needing three hands – one to hold the meter and the other two to hold the test probes – the meter and its case together form a single probe.

Ranges

The set-up procedure with some auto-ranging DMMs is almost like programming a computer. In this respect the RMS225 is definitely user-friendly. A simple menu selection method together with a full range of function annunciators removes the need for complex switching. I found it easy to select any of the four measurement modes – range lock, probe hold, relative and auto min/max – using the three-button menu selector. A sturdy seven-position rotary switch is used for on/off and function selection. A gentle beep is heard when a function or mode is selected.

Auto-range selection for maximum resolution is fully automatic. An auto-ranging DMM with a slow response

can be maddening to use, forcing you to lock in to one range. The RMS225's range-lock facility seems almost unnecessary however, since in the auto mode the RMS225 registered the measured value faster than my new manual DMM did.

Another time-saving feature is that, unlike many auto-ranging DMMs, you don't have to switch between volts/microvolts and milliamps/microamps – the meter does it for you. To use the high-current range you simply plug the positive test lead into the 10A socket.

Digital Count

The RMS225 is a full 4-digit instrument (10,000 count) with a maximum reading of 9999 that updates every half second. Until recently a DMM with such a specification cost a lot of money. The high-contrast readout digits are 12mm high and jet black. This full 4-digit readout gives you two or three times the resolution of a conventional 3.5-digit DMM. As an example of this, if the RMS225 is being used to measure the voltage on a 418V d.c. line it's possible to see a change as small as 0.1V. This resolution would of course be of no use with a meter whose accuracy was, as with many of the cheaper 3.5-digit meters, 0.8 per cent.

The claimed accuracy for the d.c. voltage ranges except between 400V-1kV is ± 0.25 per cent. At the higher voltages it's 0.4 per cent. With a.c. voltages the accuracy is 1.5 per cent while the ohms ranges have an accuracy of 0.5 per cent (except the 40M Ω range where the accuracy is 1.5 per cent). For further details, see Table 1. Tests with precision voltage sources and accurate resistors showed that the above claims are justified.

Bar Graph

The RMS225 has, in addition to its digital display, a 41-segment, rapid-response analogue bar-graph pointer. This updates at twenty times a second, which means that it responds to measurement variations faster than a multimeter with a conventional moving-coil analogue pointer. I thought it a pity that the bar-graph scale isn't numbered. The RMS225 was tried with various peaking and nulling adjustments: no analogue meter could have done a better job.

The bar graph is also nice to use when checking diodes. It takes less than a second to get a response with

Table 1: Abridged electrical specification.

D.C. voltage ranges:	1V-1kV; resolution 0.1mV; accuracy 0.25 per cent (400V-1kV 0.4 per cent).
Current ranges – d.c.:	10mA-10A; resolution 1 μ A; accuracy 0.75 per cent.
A.C. voltage ranges (r.m.s.):	10V-750V; resolution 1mV; accuracy 1.5 per cent.
Current ranges – a.c. r.m.s.:	10mA-10A; resolution 1 μ A; accuracy 1.75 per cent.
Resistance ranges:	1k Ω -40M Ω ; resolution 0.1 Ω ; accuracy 0.5 per cent (40M Ω range 1.5 per cent).
Diode/continuity:	Accuracy 1 per cent; maximum open-circuit voltage 3.3V; response time under 1sec; audible short-circuit indication.

Right: The Beckman Industrial RMS225 digital multimeter in its holster, which provides protection, storage and enables the meter to be used single-handedly as a probe.



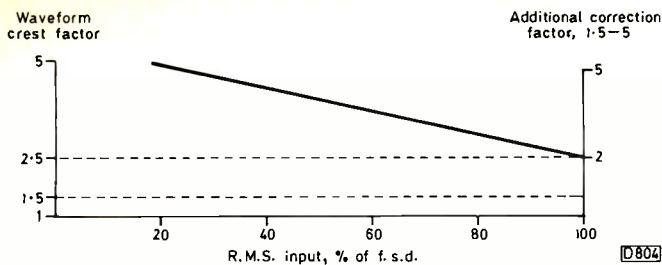


Fig. 1: Crest factor performance of the RMS225.

diode/continuity tests. In addition to the visual readout, a steady two-tone note is heard when a diode or semiconductor junction is short-circuit.

Offset Measurements

The relative mode is indicated by a function annunciator. Once this mode has been enabled, the input level signal used as the reference baseline value is displayed as 0.00. If for example the reference value is set to 50V and the meter probes are connected to a 40V supply, the value displayed is -10V. This mode is useful for zeroing out the resistance of the test leads when making low-resistance measurements and for making exact comparisons between components.

Probe Hold

The probe-hold feature enables you to freeze a measurement on the display. This is handy when it's difficult to look at the readout whilst making a measurement. A cheerful beep tells the user that a stable reading has been achieved. Only the numbers freeze – the bar graph still responds to input changes. This is useful when carrying out checks with intermittent faults.

Full-resolution Monitoring

If you suspect an intermittent voltage or voltage supply variation, you can connect the RMS225 and use its auto-ranging minimum/maximum record mode to monitor the suspect point – you can then get on with another job. If a new minimum or maximum reading is recorded, a beep note sounds to attract attention. By pressing the select button you can see both the maximum and the minimum recorded voltages. The recording period is unlimited.

Protection and Safety

All the voltage ranges are protected to 1kV and the resistance ranges to 500V. The current ranges are protected by special 600V fuses, which must not be replaced with standard fuses.

Beckman Industrial has obviously gone to a great deal of trouble regarding safety. The data says that the RMS225 meets the safety requirements of IEC348 class II and passes the strenuous IEEE587 6kV transient test.

When a measured voltage exceeds 25V, a dangerous voltage "lightning" symbol is displayed and the meter hiccups a double beep. This may not sound like a dangerous voltage. Under certain conditions however, for example if your hands are perspiring or the 25V supply is backed by a large current reserve, it could be fatal.

When the input signal exceeds the selected range limit with the range-lock mode enabled the meter displays a dOL prompt, telling you to put the meter back into the

auto-range mode. Should the input signal exceed its maximum tolerance IOL appears, together with an insistent audible tone, warning you to remove the test probes from the circuit immediately.

The test leads have right-angled plugs at the socket end and finger-protection guards at the probe end. The input sockets could be improved however. Though the metal contact pieces are recessed and cannot be touched, it seems to me that it would be possible for an odd piece of wire, solder or a component lead to touch the metal of an unused socket. It would have been nicer to have had plastic insulated sockets of the type used with the Beckman Model DM27XL DMM.

Guarantee

Check the guarantee before buying a piece of test gear. Beckman assure me that before an RMS225 leaves the factory in the USA it receives a complete "burn-in cycle and a thorough computerised testing on all ranges". The accuracy specifications are guaranteed for at least one year, and the meter itself has a three-year guarantee.

On Test

During a thorough bench test I found that the RMS225 is convenient and easy to use. The fact that it measures true r.m.s. on the a.c. voltage and current ranges is a big advantage when you have to work with the spikey or digital waveforms encountered in TV/video/computer equipment. The readout digits could have been larger and the bar-graph scale properly numbered, even if these would have involved a slight price increase. But with the high contrast of both the analogue and digital displays I had no difficulty in reading the numbers.

The open-circuit ohms voltage measured across the test probes is 0.6V. This is a little high for in-situ printed circuit resistance checking when semiconductor junctions are present. In practice however I found that in-circuit checking is possible except where the circuitry contains resistors that measure in the MΩ range.

Battery life is 500 hours provided an alkaline battery is fitted. A little battery picture appears in the display when the battery life left is approximately fifty hours. Should you forget to switch it off, the RMS225 powers down automatically after one hour. On the resistance ranges the display blanks out after six minutes. Obviously the designers know something of the habits of TV/video/computer engineers!

Conclusion

In conclusion, I really would have liked to have bought an RMS225 for myself, but as I already possess three excellent DMMs I couldn't think of an excuse to do so – not one that would convince my wife, anyway. Regretfully the meter had to be returned to Beckman.

The price of the RMS225 is £120 plus VAT, which is surprisingly low for a true r.m.s., 10,000 count instrument. The price includes the holster and test leads and a nicely printed, easy-to-understand operator's manual. It's available from Beckman Industrial Ltd., Astec Building, High Street, Wollaston, Stourbridge, West Midlands DY8 4PG – telephone 0384 442 393.

The TP850 temperature probe and a.c. and d.c. clamp-on current probes are available as extras.

My thanks are due to Sue Round of Beckman Industrial for the loan of the instrument for assessment.

VCR Clinic

Reports from Philip Blundell, AMIEE, Eugene Trundle, John Edwards, Brian Storm, Michael Dranfield, Stephen Leatherbarrow and Brian Davidson

Ferguson 3V59/JVC HRD180

The fluorescent and LCD displays would go off intermittently though the machine still worked. A look at the Ferguson fault diagnosis pocket book suggested that the timer chip IC101 was suspect in this event, so a replacement was fitted. Unfortunately the fault persisted. Interrupting the mains input would bring back the supplies, so it seemed that something was causing the timer chip to freeze – but what? A scope was left connected to the 5V supply line. This showed that the voltage dropped momentarily. We traced back to the 12V supply and found that this also dropped occasionally. The STK5481 regulator chip was faulty. I suppose I had to come across an intermittent one sometime! **P.B.**

Philips VR6670

This machine had no colour in either the E-E, play or record modes. The dealer had already changed the TDA3760 and TDA3755 chips. As the play/record switching voltages were correct I used a scope to trace the chroma signal through the TDA3760. It went in at pin 2, came out at pin 27 but was missing at pin 23. The BC548B emitter-follower transistor 7102 was open-circuit. **P.B.**

GoldStar GHV1246I

With most VCRs poor rewind means a worn idler or slack belts. With this machine however the brakes weren't coming off in the wind modes, though they did in play. They are operated by a shaped steel plate whose hook was worn. A new slide plate (AY) was required – part no. 256-218B. **P.B.**

Philips VR6870

When play was selected the drum turned only very slowly. Then, after a few attempts, the cassette would eject. The drum drive transistors all tested o.k. and the loom to the motor was intact, so another motor was connected temporarily. The drum motor was faulty. **P.B.**

JVC HRD520

There were tracking lines when prerecorded tapes were played. On inspection you could see that the tape wasn't riding along the knife edge on the lower drum. As the rotary guide locking screws were loose the guides were adjusting themselves as the tape played. All that was necessary was to reset the guides and tighten the screws. Had the phantom fiddler passed this way? **P.B.**

Akai VS23

This machine came in with a crunched tape and a rude note – rental customers very often send rude notes with their gear. Inspection showed that the mechanism was at odds: the FL cradle was in the fully-ejected position while the tape guides were in the loading complete positions. Yet they are all driven by the same motor! We rephased the deck mechanics, tested the machine and returned it. With hindsight this was a foolish act...

A week later the machine was back with another chewed

tape and an even ruder note threatening rental termination. The mechanics were in the same contradictory state as before. After much testing and head-scratching we found the cause of the trouble. On the front left-hand side of the deck there's a vertical steel plate which carries the plastic cogs and pinions that drive the FL cradle. The plate had bent to the left, the result being that the FL pinion could – maybe once in fifty loading operations – jump out of phase. **E.T.**

JVC HRD230/Ferguson FV12L

There's a well known weak spot in certain JVC VCRs. It's cured by fitting a shakeproof washer to the under-deck PCB fixing screw to ensure a good electrical earth connection. This is not relevant to the HRD230, but we had one whose play or record would be suddenly interrupted at random times, reverting to the stop mode. It was because the reel pulses disappeared. To obtain a reliable earth connection for the optocoupler we had to fit a tiny shakeproof washer to the reel sensor PCB assembly's fixing screw. **E.T.**

Hitachi VT63/64

The problem was failure of the deck functions, though cassette and tape loading worked all right. The drum motor didn't turn at all, and the capstan motor ran only during tape loading and unloading – which at least prevented the tape from being chewed! The cause of the fault was failure of the 12V regulator within the STK5451 power supply chip. Its output was down at 2.7V except when boosted during the motor-start phase (while the tape guides are on the move). **E.T.**

Ferguson 3V43/JVC HRD725

Tape playback was normal but there was no E-E audio. The cause was traced to circuit protector CP3 on the FMA board being open-circuit. It's in the 12V feed to the f.m. circuit and seems to fail for no apparent reason. **J.E.**

Osaki VCR31

No E-E, just snow, with the channel indicators working o.k. were the symptoms with this machine. Q755 was open-circuit base-to-emitter. **J.E.**

Lloyd LV44

The channel indicators were o.k. but there was no picture or sound in the E-E mode. The cause was traced to R21 (1.8k Ω) on the tuner/i.f. board being open-circuit. It supplies the 30V tuning voltage. **J.E.**

Akai VS1

In both the E-E and playback modes the monitor screen displayed a rectangular box that contained rows of letter As. The box flashed on/off at the clock rate. Outside the box there was just a blank raster. The character generator chip is IC2, type MB88303M. It's mounted on the front

clock/timer board. Voltage checks at its pins produced correct readings as per the manual except at pins 12 and 13, which were at 5V instead of 0.1V. Replacing IC2 cured the problem. **J.E.**

Panasonic NV-M7B

The complaint with this camcorder was no drum drive. All the drum drive and power supply chips had been changed by the dealer to no avail. Careful voltage checks revealed nothing unusual except that when play was selected the drum power dropped momentarily to almost nothing. Although the power chips had been changed, suspicion was heading towards them. So a bench power supply was hooked to the drum power line. The drum then sprang to life.

In this camcorder feedback from the drum and capstan drive chips to the power supplies regulates the operation. The drum feedback is applied to the regulator chip via a 150k Ω resistor which is decoupled by a 1 μ F capacitor. When I eventually managed to remove this surface-mounted capacitor from beneath a crystal and coil I found that it was leaky, reading about 30k Ω . A replacement restored normal working. **B.S.**

Panasonic NV-FS100/NV-F70

Just as I was beginning to believe in my VCR repair ability along came this all-singing, all-dancing NV-FS100. The dealer said that the power supply would intermittently shut down, though it wouldn't do so for him! So we put the machine on the soak test bench, where it worked perfectly for days, until I left a tape in it overnight. When I came to switch it on next morning, it wouldn't power up. The timer flashed its zeros as normal, but when the operate button was pressed the channel display appeared briefly, the VU meters didn't light up then the machine shut down. This happened three times, until the VU meter lit, the mechanism shuffled and the unit powered up. It then worked perfectly until next morning when the ritual was repeated. After a few days of fruitless early morning checks I realised that with no tape in it the machine seemed to work when first asked. So the fault was evidently in the sophisticated system and servo circuits, to do with the tape control.

One morning, after my usual fruitless ten minutes' checking the NV-FS100, one of its smaller brothers, an NV-F70, appeared with the comment "no rewind" on the attached label. I cautiously plugged it in, offered it a tape and pressed rewind. The machine powered down and sulkily refused to return my test tape. Though already fairly low, my heart sank. After removing the bottom cover, I wound the tape out. On next inserting the tape I pressed play. So far so good: picture, sound and locked servos. I then tried fast forward. After a few seconds the unit powered down again. Once more to the bottom cover to reclaim my tape.

Now on this more sophisticated version of the G mechanism there's a reel motor which is mounted above the deck mode switch. It's used for the instant jog-shuttle cue/review functions that these machines have. Although the normal capstan driven functions still worked, when the reel motor was called into action the syscon realised that there was a problem and powered down to prevent tape damage. So I disconnected the reel drive plug and applied a small external voltage. The supply spool rotated healthily. Checks were next made around the reel motor drive chip, where a blackened resistor gazed sorrowfully

up at me: R6035 (0.9 Ω) was in a state of some distress. Replacing this resistor restored normal operation. But why had it burnt? The unit worked perfectly for a week with R6035 not even getting warm.

On an impulse I stared accusingly at the NV-FS100. Reel drive problems? I lifted the main board and there was R6035, blackened and reading about 5 Ω on my meter. Needless to say the correct resistor restored normal operation, even first thing in the morning. Both machines were too new to have had a worn reel motor. Perhaps the motor can be intermittently stalled by the mechanism? Perhaps the reel drive chip can fail intermittently? Does anybody out there know? **B.S.**

Panasonic NV-G25

The symptoms were alarming: there was patterning on E-E, sluggish operation of the drum motor and, when the machine did play back, no colour. The dealer who brought it in said that the luminance/chrominance pack, the head amplifier module and the head drum motor had been changed. After that his technician left, suffering from nervous exhaustion... Fortunately the problem was not as bad as it seemed. C1023 (1,000 μ F), the 14V supply reservoir capacitor in the chopper circuit, was faulty. **B.S.**

Panasonic NV-M1

The request with this vintage camcorder was for an estimate for fitting a new vidicon tube and battery. Out came the dusty old connector to my monitor. On test, the camcorder produced a bright green picture. As it was clear and well focused my attention turned to IC401. It's not uncommon for this chip to fail in these machines - in the NV-M3 it's provided with a heatsink. Replacing this colour-difference matrixing chip produced more normal colours. Quick adjustment of the red/blue gain, electronic focus and beam current controls then produced a good camera picture. A new VWVBM3 battery, still available from Panasonic, completed the repair. **B.S.**

Sharp VC400/581/582/583/584

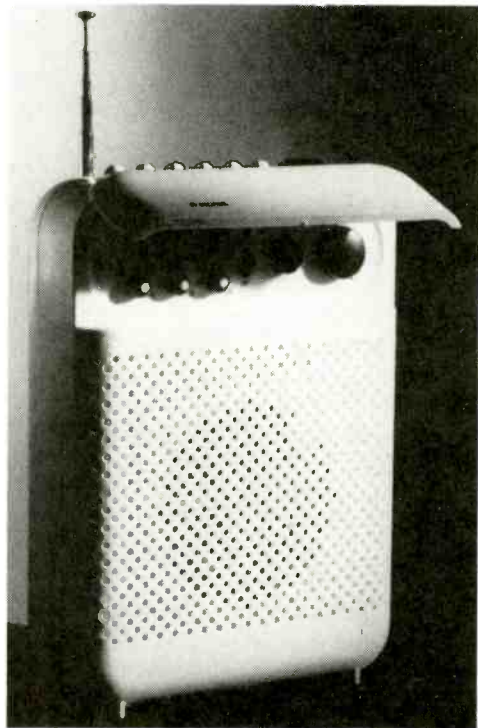
A fault we've had with a number of these machines is that the mechanics go out of sync, producing all sorts of strange symptoms. It's caused by the white plastic cog on the mode switch cracking around the spindle. As a result the cog still turns but the mode switch doesn't move. Thus the machine gets confused. The switch is part no. QSW-R0014GEZZ. It must be fitted exactly as laid down in the manual. The reason for this is that inside the switch there's a 5-to-1 reduction drive. So the cog on the outside turns five times before the switch has turned once. Although the old cam switch can be glued, a replacement is the best solution. **M.Dr.**

Ferguson FV32L

This machine came in dead. A quick check showed that the mains fuse F1 was open-circuit. As no fault could be found and the fuse wasn't blackened a replacement was fitted. At switch on the new fuse flashed violently. There was still no readable short-circuit, so the chopper transistor was removed from the board and another new fuse was tried. It again blew straight away. The only likely causes of the fuse blowing were the mains rectifier diodes and the 150 μ F, 385V reservoir capacitor CP07. The latter was our first suspect and when it was removed a new fuse held. When

WIN AN FM/MW/LW RADIO

Preset tuned (three f.m., two m.w. and one l.w. station), three-band, mains/battery radio receiver with 600mW output, also 3.5mm earphone socket.



Simply answer the following questions by ticking the appropriate box.

Fifth harmonic LOPT tuning is used

To increase the e.h.t.?

To improve e.h.t. regulation?

The luminance delay line compensates for

The extra processing in the chroma signal path?

The different luminance/chroma channel bandwidths?

Off-tape TV operation calls for

A shorter line sync time-constant?

A longer line sync time-constant?

Readers who send in the first correct sets of answers to be opened will receive the radios. Cut out this panel and send it, or a photostat of it, to:

Television Competition,
Reed Business Publishing,
Room L323, Quadrant House,
The Quadrant, Sutton,
Surrey SM2 5AS.

Print your name and address on a separate sheet.

Radios supplied by Sendz Components

tested on our capacitance meter the old capacitor seemed to be all right, but a replacement cured the fault. The old one must have been flashing over internally when the mains voltage was applied.

M.Dr.

JVC HRD400

A recent case of intermittent record and playback pictures was caused by dry-joints within the luminance module. Although it bristles with surface-mounted components, it's possible, with care, to provide a cure by resoldering.

S.L.

Samsung VI510

These are likeable, basic machines. This one was dead with a blown 2.5AT mains fuse. A replacement didn't blow until a cassette was tried in the carriage. As those familiar with these machines will know, the cassette carriage is driven directly by the loading gears, having no separate motor. When turned, the loading motor was found to be very stiff and notchy. It wouldn't operate even from a separate supply. Replacement put matters right. Incidentally, linking pins 1, 2 and 3 of the carriage plug enables the deck to be operated without the hindrance of the carriage.

S.L.

Ferguson FV11R/JVC HRD170

This machine would accept tapes and perform deck functions normally but there was no clock and no timer operation. IC1 (UPD75208CW-097) on the front panel seemed to be a logical place at which to start. Supplies arrive at CN1: the -30V and filament supplies were both

correct. Unswitched 12V was present at pin 1 of CN3 and was being converted to unswitched 5V by IC2 to feed pin 64 of IC1. The reset line at pin 39 of this chip twitched normally at switch on, and the clock oscillator across pins 30 and 31 was o.k. There was little to show by way of data output however, despite various requests being made of the chip. A new chip restored normal operation.

S.L.

Amstrad VC6100/Tashiko VVF934

The lady customer who brought in this machine said there was no playback colour. She also said "my husband thinks it's just a wire off" – that kind of comment can put a tenner on the bill! On test there was just a slight green haze on the playback picture, but the machine's recordings were o.k. when played back on a good machine. After trying all the usual things that cause this fault, i.e. the 4.43MHz crystal, various filters and the HIC101 chroma module, I retired the scope and engaged the meter. A check on the 9V supply at fuse F602 on the power supply produced a reading of 6.5V. This 9V supply goes to several i.c. regulators on the video/chroma board. Disconnecting various lines brought the voltage up slightly, but the fault wasn't being caused by shorts or leakage. What had happened was that some smart person had fitted a 200mA instead of a 500mA fuse in the F602 position. The internal resistance of a 200mA fuse is higher of course, hence the voltage drop. A new 500mA fuse restored playback in living colour. So next time one of these machines comes in with no playback colour, remember that it's not a wire off but probably just a fuse! For those interested in the charge, it was seven times more than that for the lady's comment!!

B.D.

Overhauling Valve Radio Receivers

Stanley Jackson

As time passes there's increased interest in vintage radio receivers, both because of their historical and their antique value. At the same time technology marches on relentlessly, leaving the technology of yesteryear as a specialist subject. The difference between an ancient valve wireless set and the present-day radio is so great that they could have originated on two different planets! A contemporary technician would probably have had a brief look at the theory and construction of valve radios on his way to acquainting himself with modern i.c. technology, but he wouldn't have dwelt on it for long. The purpose of this brief article is to cover the main aspects of servicing a treasured antique wireless: I hope that the advice given will be of some constructive use.

Universal Receivers

Mains-powered vintage radios fall into two categories, a.c. only and a.c./d.c. or universal. We'll deal with the universal type first. With this type of receiver the valve heaters and pilot or dial indicator lamps are wired in series. Thus in the event of the receiver not lighting up, the continuity of the series chain must be checked. Start from the live side of the mains input and continue via the on/off switch, the fuse (where fitted), the mains dropping resistor, the series valve heaters and the pilot lamps, returning via chassis to the second pole of the on/off switch. This assumes that a double-pole switch is used. The switch may be of the single-pole type: in this case the negative side of the mains supply is taken straight to chassis. One item worth mentioning here is the "line-cord" resistor used instead of a mains dropper in some earlier sets, especially of the American portable variety, in order to save space. This line-cord resistor is integral with the mains lead. It often goes open-circuit. You could replace it with a ceramic resistor fitted into the cabinet area, where space for heat dissipation allows. This must of course be of the correct calculated value and wattage. A single-pole on/off switch could be replaced with a double-pole type. Take great care to insulate all screws and fittings that are accessible at the outside of the cabinet and may reach through to a live chassis. Check the continuity of the mains dropper or line cord resistor, the switch, the valve heaters, the pilot lamps and of course the mains power lead itself, which may have corroded with the passage of time.

AC-only Receivers

With a.c. only arrangements the valve heaters and dial lamps are connected in parallel and are fed from a transformer. Thus a "no joy" condition here indicates either an open-circuit mains lead, switch, fuse (where fitted) or mains transformer primary or secondary winding. With a parallel arrangement, if the heater of one valve goes open-circuit the situation will be quite obvious because it will be the only cold valve.

Voltage Checks

Whereas the valves in a parallel system operate at a heater voltage of generally 6.3V, with a series chain the

valve heaters can operate at 12V to 35V or even 50V. The h.t. voltage is much higher, often around 250V, a rectifier valve being used to obtain this supply.

Assuming that all the valve heaters are intact and that the valves are thus warm, the next thing to do is to check that the h.t. voltage is being generated – check at the cathode of the rectifier valve – and that all the valves are receiving their anode and screen grid supplies as appropriate and developing the correct cathode voltage where a bias resistor is included. Absence of anode or screen grid voltages should lead to a check on whatever is between the relevant electrode and the h.t. line. Load resistors can go open-circuit, so can the primary winding of tuned transformers in the mixer and i.f. stages.

Signal Injection Testing

Assuming that the voltages are roughly what you'd expect but there's no sound, signal injection is a simple way of finding the faulty stage. In most sets the i.f. is 465kHz. Thus a modulated 465kHz signal injected at the i.f. amplifier's grid should produce sound from the loudspeaker. A modulated r.f. signal applied to the aerial input and the mixer stages should likewise produce an audio output. If not, there could be a discontinuity in the signal path or the oscillator might not be working.

Common Defects

Apart from dud valves and faults in the heater supply, here are some common defects. The reservoir and smoothing capacitors in the h.t. supply can go open-circuit or low in value, the result being mains hum from the loudspeaker. If they are leaky the h.t. voltage will be low. The two capacitors are often contained in a single can or, in earlier sets, sometimes in a waxed cardboard container. Coupling capacitors in the audio stage(s) can become leaky or open-circuit, causing distortion or loss of signal respectively. Anode load resistors can increase or decrease in value. Where distortion is the problem, particular attention should be paid to the condition of any cathode decoupling capacitors used in the audio stages. They have a habit of going open- or short-circuit. Alternatively, as often happens, the associated cathode bias resistor may have changed value.

Where ancient valves are suspect and replacements are not readily available, the use of a similar valve with a different base can be considered. The best course is to remove the old base and connect up the new one. The values of biasing and other components may need to be adjusted.

The oscillator triode is usually contained within the same valve envelope as the mixer. A valve voltmeter can be used to check it – check for grid current, grid voltage and oscillation at the anode.

Suspect valves should be checked for interelectrode shorts between the appropriate pins, and of course shorted or open-circuit heaters.

A valve's mutual conductance (gain) can be tested by taking a current reading from a meter connected in series

with the anode feed components and referring to the valve maker's characteristics data. This assumes that the operating conditions (electrode voltages) are correct.

has lost its sheen, treated with a light coat of clear resin varnish. Metal speaker grilles can be removed and sprayed with a suitable aerosol. Silk mesh is best replaced.

Cabinets

A word about cabinets. The wooden variety can be cleaned with a little meths to remove heavy deposits of grease, then French polished. Bakelite cases can be cleaned with warm detergent, dried and, where the surface

Source of Components

A good source of genuine vintage components is The Vintage Wireless Company Ltd., Tudor House, Cossham Street, Mangotsfield, Bristol BS17 3EN (0272 565 472). Happy renovating!

Letters

WHAT THE PUBLIC WANTS

Every week for the past two-three years we have received calls from the public requesting a service visit to set up equipment that has just been purchased. In addition, many of our customers with whom we've done business over the years have asked us to replace their new VCR/TV set with "something simpler to use". When setting up a machine in someone's home after carrying out a repair it's very common to be asked how to set up the timer, or "what does this button do?". This can happen even when the owner has had the equipment for some time - in some cases years!

On many occasions customers have decided to buy reconditioned rather than new equipment simply because of the operational complexity of the latest machines. They often come out with comments like "I'm not bothered with a 14-event, one-year timer, I just want to be able to playback or record a programme."

Now you might think that being called out to set up modern equipment must be a nice little earner. But consider this. One day the machine might come in for repair. Though of complex design, it didn't cost much to buy. Now over complexity at low price does nothing for the repair trade especially, as is sometimes the case, when the machine turns out to be beyond economic repair simply because the repair bill, though fair, represents too high a percentage of the purchase price.

How many times have you spent ages explaining to a customer how to use the machine after setting it up, only to be told "I doubt whether I'll ever use that facility - it's too complicated"? No wonder that when the cash and carry outfits deliver a sale they just dump it and run!

Manufacturers seem to believe that the only way to compete with each other is to add to their equipment more and yet more high-tech facilities. I believe that they are wrong, and that what the public mostly wants is a nice looking basic machine. One that's "just like the one we had years ago, easy to use but maybe smarter looking".

So my message to the manufacturers is simply this. We know, and the public knows, that you have the technology. But in the main the public isn't interested in how high-tech your machines are. They are more interested in easy-to-use, basic machines, which must be good news to your research teams and costs. There will always be some customers who require everything to be high-tech, but they are a minority and are prepared to pay more. Try an experiment. Commission a street poll to discover what the public wants from its video and TV equipment. I bet the result will make you scrap most of your high-tech research plans. And remember this. Every time that a customer considers a repair to be expensive in comparison with the purchase price, his next purchase will be something

different, usually a different make, "with less to go wrong".

Finally, don't think that we're a struggling service company that's frightened of tomorrow's technology. We service top of the range equipment and are doing fine thank you. My comments above are based on customer feedback, which we should all take seriously all the time.

*John Edwards,
Bromley, Kent.*

FERGUSON 3V29/BETA VCRs

With reference to Joe Cieszynski's excellent article on Ferguson 3V29 VCRs in the January issue, I find that there's no need to remove the loading motor when replacing the belt. Release the circlip and push in the spindle by quarter of an inch, making sure that the black thrust washer is retained. The nylon end plate is quite springy and can be prised away slightly to allow the belt to be removed. At this point it's easy to give the pulleys a good scrub with a small toothbrush soaked in methylated spirits. This method is quick and ensures that the alignment of the loading ring remains undisturbed.

Incidentally, is there a Beta fraternity out there? I have several good Sony machines that give excellent pictures. There must be someone who can write a few articles and give us the benefit of their experience. Any offers?

*Pete Hills,
Wembley, Middx.*

SCART INTERFACING PROBLEM

I wonder whether a problem I encountered recently is just run of the mill to those in the trade? I bought a Hitachi VT-F770E VCR that incorporates hi-fi sound and Nicam. At the same time I bought a scart lead to connect the VCR to my Sony KV-X2521U TV set. All was well until I played a prerecorded tape (Fantasia). The sound suffered from terrible ripping distortion at the lower frequencies. The bar-graph indicators on the VCR regularly went into the red.

Being somewhat disappointed, I tried connecting the VCR's audio output to my hi-fi system. The sound was good. So I decided to attenuate the VCR's output by incorporating -6dB networks (see Fig. 1) into the scart lead. This cured the problem. Now according to the specifications the TV set's audio input level at the scart socket is 500mV r.m.s., while for the Hitachi VCR an output of -3.8dBm is quoted. I don't know why Hitachi express it this way. 0dBm is the r.m.s. signal that causes 1mW to be dissipated in a terminating load of 600Ω, i.e. 775mV. A level of 3.8dBm down from this is 500mV. The use of dBm relates to 600Ω line applications, e.g. telephones, and isn't really relevant in the case of a VCR. It's better to express dB levels relative to 1V, i.e. dBV. 500mV is then -6dBV. Anyway, I would have expected the VCR and the TV set to be compatible, since 500mV and

JJ COMPONENTS NEW RANGE

ORIGINAL PANASONIC 1000 HR. MAINTENANCE KITS

NV300/330/333/366	£11.05
NV370/480/630/830/850	£10.15
NV777	£8.89
NV730-770	£9.10
NV7000	£9.10
NV2000/2010	£22.65
NV7200/7800	£16.89
NV430/450/460/650	£10.00
NVG11/12/120/130/14/16/18/30/400/7/9	£8.40

MOST MODELS AVAILABLE RING FOR PRICES

PHILIPS

VR6132/6137/6180/6182/6467/6489/VR6561/6670/6761/6870	£22.95
---	--------

AUDIO BELTS, FLAT & SQUARE IN STOCK

SHARP ORIGINAL IDLER 008 AND 005 £2.85

ECONOMY KITS

Contains Belt-set, Pinch Roller, Tension Band and Tyres

PANASONIC

NV370	£5.80
NV730	£5.95
NV300	£5.80
NV7200	£5.50
NV530	£5.80

PANASONIC VXP 0521 ORIGINAL £2.00

HITACHI

VT11/33/17	£6.15
VT8000/8500	£5.95
VT9300/9500	£6.10

JVC

3V35/36/38/HRD110	£5.75
3V29/30/HR7200	£6.10

SERVICE KIT: Contains Belt Kit Idlers, Tension Band, Pinch Roller, Cassette Lamp, E-Ring, Clutch and Spool, Tyres etc.

3V00-3V16, HR3300-HR3660	£14.35
3V29-3V30, HR7200-HR7300	£22.10
3V31-3V32, HR7600-HR7650	£22.45
3V35-3V36, HRD110-HRD121	£20.15
3V42-3V43, HRD725-HRD455	£24.99
3V44-3V55, HRD140-755	£21.00
3V58-3V64, HRD170-530-750	£17.00

HITACHI

VT11/17/33	£18.45
------------	--------

VIDEO MOTORS

CAPSTAN MOTORS

3V29/30	£27.99
3V35/HRD110	£19.00
FV10/11/HRD170	£26.99

SONY FUNCTION SWITCH 2-PIN 88p EACH

SHARP

VC9300	£34.99
--------	--------

SONY

C7	£33.95
----	--------

IDLER TYRES MOST MODELS £1.80 FOR 10 EACH TYPE RING FOR MODELS

IDLERS AND CLUTCHES ORIGINAL AND REPLACEMENT AT A COMPETITIVE PRICE

VIDEO HEADS AT A COMPETITIVE PRICE RING FOR MODELS

TRANSISTORS, ICs, STK, DA, TBA, TA, UPC, HA, ETC. RING FOR TYPE

REEL MOTOR

AMSTRAD VCR7000	£21.05
HINARI V20/VXL2/3	£22.99
HITACHI VT8000	£11.15
JVC/FERGUSON 3V29/HR7200	£36.15

UK'S NUMBER ONE MAIL ORDER COMPANY

VIDEO BELT-KITS AT A GOOD PRICE RING FOR MODELS

Please phone us for the types not listed. Please add 60p post & packing and then add 17.5% VAT to the TOTAL.

All items subject to availability, and prices can change without notice. Government, Colleges, Schools & Institutes orders accepted. All components are brand new. Best quotations given in large quantities.

EXPORT-MAIL ORDER ENQUIRIES WELCOME. ACCESS AND VISA ACCEPTED

J.J. COMPONENTS

63 THE CHASE, EDGWARE, MIDDX. HA8 5DN, ENGLAND
Tel: 081-952 4641 Fax: 081-952 4641

Callers by appointment only. Hold for telephone line to connect due to Faxline.

-3.8dBm are the same level.

Because of the modification to the scart lead, the audio level with the VCR's own recordings is lower than that from prerecorded tapes. My conclusion is that the Hitachi VCR was set up to give its specified output at a lower modulation/demodulation level than that used with prerecorded tapes. Nevertheless the results are now good, though I need to turn up the volume a bit when playing the Hitachi VCR's own recordings.

Some readers may recall my article on adding Nicam in the April 1991 issue. Although everything had worked well

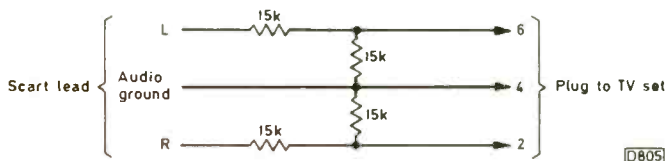


Fig. 1: Added -6dB attenuator networks.

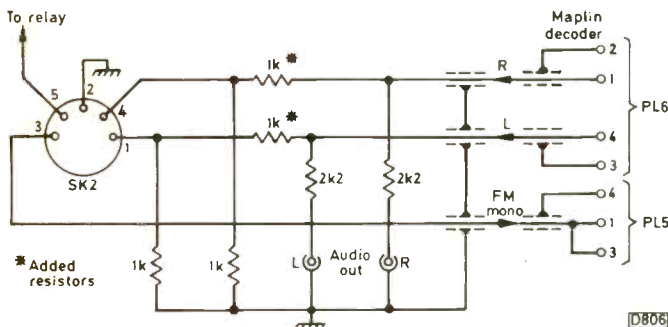


Fig. 2: The same attenuation applied to the Nicam interface circuit - compare with Fig. 1, page 413, April 1991 issue.

for nearly a year, suddenly the TV sound became distorted when there was a sustained bass note. This occurred with Ch. 4 Nicam, and the distortion was much the same as that encountered with the Hitachi VCR. I concluded that the TV set's audio input circuits were intolerant of being overdriven, lacking "headroom". As the Maplin Nicam decoder delivers a 1V r.m.s. audio output I considered it prudent to reduce this by 6dB and modified the circuit of the add-on decoder unit as shown in Fig. 2. Note that the modification - adding two 1kΩ resistors - keeps the output impedance low and doesn't attenuate the phono outputs. After making this change the volume with TV sound and the VCR's own recordings has been brought to the same level.

Thus ends this convoluted story. The sound is now fine, just needing to be turned down with prerecorded tapes. I had thought, perhaps naively, that the scart standard enabled units to be interfaced painlessly. Does it usually work all right, or was I just unfortunate?

Keith Cummins,
Holbury, Hants.

EQUIPMENT PERFORMANCE

There have been numerous references in past issues of *Television* to the fact that consumers have difficulty in operating VCRs because of the relatively high-tech way in which the controls have to be interpreted. It seems to me however that the problem of customer education goes deeper than how to operate the equipment: many consumers, and sales assistants, don't seem to know what is correct and what is incorrect performance. A recent experience of mine suggests that customers often accept

incorrect performance with cheaper equipment, even where there's an obvious fault, so long as it doesn't affect their main use of the equipment. Presumably the maxim "you get what you pay for" is assumed as long as the basic functions perform to order.

I attempted to buy a new VCR at the bottom of the high street price range – £200 or thereabouts. My attempt was thwarted because the six machines I tried all had faults that readers of *Television* would immediately spot and question. I was assured however that customers who had bought these machines had no problems. The first four machines were all Samsung SI1260s. Three had no colour in SP picture search (LP search was o.k.) while noise bars covered 60 per cent of the picture in the pause mode. These are conditions that could possibly be accepted by non-technical customers as being normal, yet the instruction book didn't refer to any loss of colour. The fourth Samsung machine had poor definition with its own recordings. This dismayed the sales assistant, so I turned my attention to two samples of the Hinari HI2V, which is also a two-head, LP/SP model. With both of these machines there were excessive noise bars and no colour in pause. One had noisy drum and reel motors while the other wouldn't function at all in rewind.

The high street multiples involved sympathetically exchanged the machines, and routinely returned my cheque, when they felt that they couldn't help me further. Feeling satisfied with the standard of customer care, I ended my technical frustration by spending an additional £60 in the high street on a JVC HRD540EK. This worked correctly first time, but has no LP mode. Well, you get what you pay for, don't you?

*Ray Porter, M.Sc., C.Eng., MIEE,
Stourbridge, West Midlands.*

LADY ENGINEERS

I read with interest the article (December, page 125) that mentions the lady in the workshop since I'm also a fully qualified engineer, with City and Guilds and qualifications at HNC standard. For the last three years I've won the Sharp Southern Region Junior Technician Award and do all repairs, though I prefer VCRs and camcorders. At the company where I worked two years ago I managed the workshop and trained apprentices. Now I'm at CRS Ltd. as a bench engineer, hoping to specialise in camcorders. I've been an engineer for five years.

*Estelle Sandford,
Weston-Super-Mare.*

GRUNDIG POLICY

In response to John Hopkins' letter (January 1992) on "setmakers' feedback", I must make the point that the policy of manufacturers' service data being provided only to a manufacturer's dealers is absolutely correct. As a manufacturer service, I'm here to support our dealer network which is out there servicing our products and has made a commitment to the brand. Those who don't have an account have made no such commitment and should not therefore expect free service data and technical support.

Non-Grundig dealers can purchase service data from our distributor Willow Vale Electronics as and when they need it. For automated reception of all service data and technical bulletins as released by us, non-Grundig dealers can apply for a Technicover account which carries an annual (1/4 – 31/3) premium of £50 for the data subsequently issued. A Technicover account holder is also

entitled to advice from our Technical Liaison engineers at Rugby. Applicants for a Technicover account should expect a visit from our TLO.

*Paul F. Goldring, General Service Manager,
Grundig International Ltd., Mill Road,
Rugby, Warwickshire CV21 1PR.*

BUILT-IN FAULTS

I find that I have coming into the workshop in ever increasing numbers TV sets and VCRs a few years old all with faults created during manufacture. I'm talking about the great big blobs of glue that seem to adorn PCBs old and new. With heat and age this glue seems to carbonise, especially when it has seeped under an i.c. or a heat producing component. The results are amazing, with unusual and illogical faults.

Two VCRs seem to come top of the list of models affected, though they are by no means the only ones. The two are the Sentra 8000 and 8400 and their clones.

The fault on the 8000 is a right weirdo, and to be honest a head-banger when first encountered. The machine just seems to do what it wants. It might accept tapes or it might not. If it accepts a tape it might lace up on its own, it might go into rewind or fast forward, or it could just power down. The machine might have all these faults or just one. The cause is glue under and around the front-load motor and loading motor drive chip IC605. Remove the chip and clean off all the burnt glue. When the chip has been reinserted you'll usually find that the fault has cleared.

The fault with the 8400 is also caused by glue but is of a different nature. The customer complains of tuning drift. Remove IC103 and clean off the glue. Also clean around the following components, Q108, C133, C134, C135, R159, R160 and R161, which form the digital-to-analogue filter for the tuning voltage.

*Graham Rees,
Walkden, Worsley.*

THE MATSUI 1440A

As a regular reader and someone who has served twenty five years in the trade I really must protest at the ham-fisted bodgery written up by Donald Bullock. His latest gaff (February) really does it. D508 in the Matsui 1440A is an SR2M avalanche diode that's used to provide protection against excessive h.t. If he uses a BY127 instead he's contravening the safety code of practice.

*Andy Norman, Harvies Service,
Tonbridge, Kent.*

SMOKING SETS

It was about 10 or 11 o'clock on a Sunday night when the phone rang and a voice said "is that the TV man?". Wondering whether it was the football pool letting me know that I'd won the first dividend I eagerly replied that it was. "Well I'm sorry to phone you so late, but my television has caught fire and I didn't know who else to call".

After making sure that the caller had unplugged the TV set and that no smoke remained, also that the caller didn't want me to take the set away that night, I arranged to make it the first call in the morning. That night my mind went back to the occasions in the past when this sort of thing had happened. There was the Pye 169 back in the Seventies that had caught fire and melted the tube, the Philips G9 sets with the capacitors that exploded on the

line timebase panel and, come to think of it, the ITT CVC5s that used to smoke a lot from the front panel. So I think I worried more that night than the customer.

First thing in the morning I was waiting outside the customer's house with the cat and the milkman. On entering I found that the TV set was in one of those large cabinets that were made for traditional sets before the FST and black became fashionable. I was told that the set had started to smoke from the right-hand side at the back, while London's burning was on! After saying that this model was not designed to watch London's burning and that it was probably the special effects, I was told "it's lucky then that I wasn't watching Rawhide, isn't it?". I know when I'm beaten, so I heaved the 26in. Philips K30 back to the shop.

With the set on the bench I removed the back and discovered, well nothing really. Just the usual dust and slight discolouration, but nothing that differed from many other sets of the same age. When I switched on the picture appeared. Field, line, colour, brightness, contrast and sound were all o.k. What to do next? Well even if we do live in Suffolk not all our customers are silly. So I cleaned the dust off the circuit boards, paying particular attention to the capacitors in the line output stage and the power supply. While doing this I found that C6291 had a small dark hole in it. The quick-thinking customer had made it more difficult for me by switching off before the smoke and burning made my job too easy.

So, all you readers, remember the CVC5 and the old monochrome sets, because this is the same old faulty filter capacitor across the mains switch. It might be coming back as a stock fault.

*John Hopkins,
Felixstowe, Suffolk.*

HELP WANTED

We are trying to restore a Bush TV22 TV set and require the following: a line output transformer; an on/off/volume knob; a photostat of the circuit diagram. If anyone can help, please phone or write with price etc. to Steve Westell, Westacre, Whiteacre Lane, Whalley, Blackburn BB6 9BJ. Telephone 0254 822 222.

Could anyone supply a quantity of Labgear Televerta CM6022 mains-operated v.h.f./u.h.f. converters with preamplifier gain, or an equivalent? G.H. Jones, Einion Electrics, Bridge Street, Llanfair Caereinion, Powys SY21 0RZ. Telephone 0938 810 539.

I have a Condor VCR8120 whose sweep tuning won't stop at stations. It's a VHS machine produced by Daewoo who are unable to help. Apparently there are equivalents in the Alba and Goodmans ranges. I'm unable to obtain the DMB5210VP chip which may be responsible. Can anyone help? M.B. Wilson, 1 Playwell Court, Glanton Alnwick, Northumberland NE66 4BL. Telephone 0665 78 437.

Can anyone supply, new or secondhand, a 10C1 valve which I require to restore an old Murphy radio? G. Upton, 10 Sycamore Close, Springfield Grange, Hull HU5 5FO. Telephone 0482 565 744.

Can anyone supply a service manual for the Hitachi Model VK-C800 colour video camera? All expenses would be met. G. Truelove, 42 Artillery Road, Guildford, Surrey GU1 4NW. Telephone 0483 505 134.

next month in

TELEVISION

● THE FERGUSON TX80 CHASSIS

The recently introduced Ferguson TX80 chassis used in small-screen colour portables could be the last incigenous UK TV design. While showing some Thomson influence, its Enfield origins are stamped plainly on it. This is particularly the case with the combined chopper/line output circuit that recalls the Syclops system used in the 9000 series chassis. The design is not old hat however: in fact it's full of innovation. There are microcomputer remote control, on-screen graphics with a simple menu system to make adjustment of the controls easy, a sleep timer and a child-lock facility. Considerable integration is present in the low-level stages, where a single l.s.i. chip combines the i.f. section (sound and vision), the PAL colour decoder and the timebase generators. J. LeJeune describes the operation of the circuitry.

● SOLDER AND FLUX

Soldering is a basic, everyday job. Probably most people give it little thought. All you need is a reel of flux-cored solder, a hot clean iron and the sense to apply them properly. That may have been the case at one time, but the demands of today's electronics have changed matters considerably. What about metals other than copper, the needs of hot-running components, satellite TV waveguides and surface-mounted assemblies? They all have different requirements, which means that there's a lot to know about solder and fluxes, their forms, applications and properties. Eugene Trundle has carried out a thorough investigation of the latest developments. Next month's feature on the subject includes a glossary that explains some of the specialist jargon in use.

● AC/DC HIGH-VOLTAGE TESTER

Microwave ovens are appearing on the workbench in ever-increasing numbers as their popularity and age increases. Faced with an oven whose light is on and the fan runs but nothing heats it would be nice to be able to check the high-voltage supplies. Ian Rees has devised a simple probe with a calibrated control and neons to do just that. Easy to build and a great time saver.

● FAULT GUIDE TO THE FERGUSON 3V38

John Coombes provides a fault run-down on the Ferguson 3V38 and associated VCRs - the 3V39, JVC HRD110, Toshiba V55 etc.

PLUS ALL THE REGULAR FEATURES

ORDER YOUR COPY ON THE FORM BELOW

TO
(Name of Newsagent)

Please reserve/deliver the April issue of TELEVISION (£1.95), on sale March 18th, and continue every month until further notice.

NAME

ADDRESS

Satellite Notebook

Nick Beer

Due to my colleagues' alleged aversion to heights and lack of technical knowledge I find that I've been attending to a lot of satellite TV service calls, especially when an outside fault is suspected. I don't mind: it gets me out of the workshop and I get a breath of fresh air. The reliability of satellite TV systems seems to vary tremendously depending on which dealer has carried out the installation, even when the equipment is the same. This can of course be attributed mainly to installation standards. Anyway, some recent experiences may be of interest.

Ferguson SAP4 System

The Ferguson SAP4 system comprises the excellent Pace made SRV1 integrated receiver-decoder (IRD), a mesh dish and compact Marconi LNB. Since Ferguson has dropped the SRV1 but not the appalling SRD4 we have to obtain the original Pace unit from elsewhere.

We've had a number of cases of sparklies with these systems. The performance of the SRV1 is, here in North Devon at any rate, much better in this respect than that of the SRD4 – in fact the difference is so great that we won't stock the latter. The complaints we've had have arisen some time after the original installation, the performance to start with being perfect. Initially I found that resetting the i.f. offset cured the problem and assumed that either the installer didn't set it or did so with a cold LNB – weight was added to this view when one installer admitted to this practice. Further calls have however had to be made to a few installations, and the cause of the problem has now definitely been identified as low output from the LNB (don't confuse it with lack of signal). To cure the problem Ferguson has introduced a higher-gain LNB – a gold spot identifies it.

I had one case where the output from one of these LNBs disappeared completely. It occurred one night when there was a very sharp frost, though whether this had anything to do with it I won't venture to guess.

Multi Systems

We've had several enquiries about running one or more extra receivers from an existing dish. When customers realise that more is involved than running a lead to the bedroom they usually settle for an r.f. feed to a second set. Others may use a second receiver with a split i.f. feed. In this case there's a polarity restriction, but at least there's a limited choice of channels. You can do this at a reasonable cost – Labgear for example can supply good i.f. splitters/combiners at a very reasonable cost.

An Interesting Installation

An interesting installation we carried out recently involved two neighbouring cottages that were both owned by the same businessman. One cottage already had a 60cm mesh dish that was being used with a Ferguson SRV1 receiver. Because of planning restrictions it was not possible to install two dishes. So a dual-output LNB with a global switch was required. We discovered that the Protel dual-

output LNB can be mounted on the black mesh dish fairly easily despite the fact that it needs an MTI type mount, which means that its viewing angle is completely wrong – unless you invert the arm so that the kink looks down instead of up. Things work pretty well when this is done. An MTI mount can be obtained from those cheap Amstrad dish kits that come with several clamps.

That's how we did this job, but our installer hit a problem. One receiver wouldn't control its own polarity. When I called to check it out I found that the global switch had had to be installed in a loft to which the only access was through a two-foot square hole in a wall with a water pipe running right across the middle! Fortunately the cause of the problem wasn't here. In the cottage affected a Georgian brass coaxial outlet was used for the i.f. connection. It was isolated of course.

Ferguson SRV1 IRD

The only stock fault we've had with the Ferguson SRV1 has been a decoding or vision problem – typically no vision on a decoded channel or no decoding (with the on-screen graphics missing). The usual cause is tarnished pins on the Videocrypt PCB connector – clean the pins and socket thoroughly. I've even had the problem with brand new units. It's a fairly crude connector and I think that things would have been done rather differently – a ribbon for example – if a traditional brown goods manufacturer had been responsible for the design.

From the servicing point of view the unit is superb, with the Videocrypt PCB entirely separate and plugged. All the connections to the receiver, across the back, are standard with plugs/sockets – this is even the case with the mains lead. So collecting a set and supplying a loan is a peach should it be necessary.

Patterning

One widespread problem we've had with Videocrypt decoders, whether in separate or IRD form, has been patterning due to radiation. With the original hump-back unit we've had complaints ranging from severe patterning to complete obliteration of the u.h.f. channels in the range 30-35. Quite a few customers in our area have been involved – there are several group A and B relay transmitters on our patch, and Channel 4 from the main Caradon Hill transmitter is on channel 32. The effects have varied with signal strength and decoder proximity to the incoming u.h.f. signals.

We took the matter up with Ferguson's Regional Technical Manager Bernie Hinton, who said he'd had great success in curing such problems by using twin screened coaxial in place of all coaxial leads and keeping them as short as possible. Whether we should get involved with such problems was at the time debatable, since the units that caused the trouble were being rented from Sky direct. A couple of cases did however prove that Bernie's approach was very effective.

The problem has altered slightly with the introduction of IRDs – it now occurs on various channels across the band, in particular on channel 55 which is used by BBC-1 from the main Huntshaw Cross transmitter. Since we supplied these units ourselves we got busy and solved all the problems with twin screened leads. When you consider the standard of the coaxial lead actually supplied with the IRDs it's no wonder that radiation occurs.

Radio Rentals have put out a fair number of these IRDs in our area and have experienced the same problems.

More on the Finlux 1000 Series Chassis

Chris Watton

The Finlux 1000 series chassis was introduced in 1985 and has proved to be very reliable. Tube life is good, and large numbers of these sets are still going strong. There are stereo versions and teletext comes in various different forms such as basic text and one-page or two-page memory – all have colour inversion capability.

There's an efficient TDA4600-type chopper power supply. Tuning is of the frequency synthesis type. The sound quality is good, with panoramic distribution – split between the two speakers. Stereo models can use satellite TV or a stereo video tape as a source or the set can be used in the audio only mode with a suitable input from, for example, a tape deck connected via the scart socket to facilitate use of the remote-controlled audio amplifier. There are full connections to the scart socket, which can therefore be used with RGB signals from BSB equipment or a computer.

In a recent article (December 1991) Steve Cannon dealt with common faults. The present article describes our approach to tackling a faulty set. One thing to note is that the set will switch off after five minutes when it's operated without an input signal.

The Power Supply

The logical thing to start with is the chopper power supply. This is the test order I follow, after checking the on/off switch, which is of a type used in many Continental sets and is made by Preh. This switch is responsible for a fair share of failures. If the switch is o.k. and the fuses are intact I put the meter clip on the TDA4600 chip's heatsink and check for 320V at the bridge rectifier's output. Next I check the voltage at the TDA4600 (actually type TDA4600-2D) chip's l.t. supply input pin 9. The voltage here should be at least 9V. If it's low, check the four 2.7k Ω resistors (Ru3/4/6/7) and the posistor (PTCu2) in the start-up circuit. If the voltage at pin 9 is high, above about 20V, you can be sure that the chip is open-circuit. In addition to a new chip replace the two resistors (Ru22 150k Ω and Ru21 120k Ω) in the charging circuit, connected to pin 4 of the chip, even if they test all right. Otherwise you'll probably be replacing the chip again soon, along with the chopper transistor. This is prudent with any TDA4600-type circuit – sometimes there's a single resistor with a value of around 270k Ω . The voltage at pin 9 of the TDA4600-2D chip should be 13V, but 9-10V will get it started. If necessary then check at pin 1, where the voltage should be 4.3V. If the reading is very low, Cu4 (100 μ F) is probably short-circuit.

In my experience the electrolytics are the most common cause of faults in the primary side of the power supply. In order of likelihood, check Cu1 (100 μ F, 35V) which couples the drive to the base of the chopper transistor, Cu2 (100 μ F, 35V) which is the l.t. supply reservoir capacitor, Cu4 (100 μ F, 16V) which is the reference voltage smoothing capacitor and Cu8 (1 μ F, 63V) which smooths the negative feedback voltage. I've never had a diode in the primary side of the supply fail. They probably do however, as with other makes that use this type of power supply it's usually the diodes rather than the electrolytics that fail.

The secondary side of the power supply is a simple

affair, consisting of four rectifiers and their associated components. The most common fault here is failure of the BY299 138V h.t. rectifier Du18, giving the dead set symptom. I like to check this by connecting the meter on the ohms range between chassis and Du18's cathode: if the resistance reading is less than 1 Ω the diode is short-circuit; if the resistance is 1.5 Ω or slightly higher the BU508A line output transistor Tz4 is short-circuit. Failure of either item produces the same symptom. Use voltage or resistance tests to check the other diodes and safety resistors as necessary.

Line Timebase

We'll consider the line output stage next. This uses a diode-split line output transformer with the focus and first anode supplies built in. As mentioned above, the line output transistor can fail. It usually does so for a reason. As with so many sets the reason is good old Mr. Dry-joint. You can find dry-joints at the line output and chopper transformers, the scan coils plug and the chopper and line output transistors. So a good solder up is called for when working in this area.

Line output transformer failure is not common. Sometimes the first anode control goes high-resistance however. Thus the tube's first anode voltage rises. The picture goes bright and the set trips. You may suspect a fault in the video section, but what is usually happening is that the first anode voltage is varying so much that the auto grey-scale system goes crazy in an attempt to keep up with the rapidly changing tube current. When the first anode voltage rises above a certain point the power supply trips due to the excessive beam current.

The scan coils plug modification in the 1000/2000 series chassis was mentioned by Steve. You solder two rivet-shaped sleeves to the pins that carry the line scan current. The reason for this is that they get hot and the solder joints deteriorate. The plug's internal contacts can deteriorate however, and I think that's why they get hot. When this trouble arises it will soon be time for a new line output transistor. The customer will probably complain about e.h.t. flashing, or line tearing at least, before the transistor fails. Removing the plug and soldering the wires direct to the panel takes a bit of beating as a cure for this trouble.

A couple of other faults in this area are not uncommon. First the BC637 line driver transistor Tz3 can go open- or short-circuit. Secondly either of its two 15 Ω feed resistors Ru42 and Ru43 can go open-circuit for no apparent reason. A clue to the no line drive fault is that when switched on the set will come on with channel one and there will be a faint hum at about 200Hz from the speakers. On more than one occasion I've found that the line output transistor was open-circuit.

Tube Base Panel

There are only a few components on the tube's base panel. The only trouble we've had here relates to the wiring to the other two panels. There are two ribbon cables. One has five wires of which only three are connected. It comes from the signals panel and can be responsible for intermittent loss of one or more colours. The other cable comes from

the power/line scan panel. It can be responsible for the same symptoms as when the first anode control goes high-resistance, i.e. the brightness increases and the set trips. So don't get caught out here. It can be embarrassing if you replace the line output transformer when all that's wrong is a wire off. Where have I heard that before? – but in this case it can be true. The wire actually breaks, but you can't see this as the other wires hold the thing in place.

Field Timebase and EW Modulator

A TDA3652 chip, ICk1, is used in the field output stage. It's powered by the line output transformer derived 26.5V line which also feeds the EW modulator drive circuit and the field hold control. The first problem here is that you'll seldom see a field fault as the sandcastle pulse that's fed to the colour decoder chip will be incorrect. You can easily overcome this problem by connecting an Avometer on the 250V range between any of the RGB outputs and chassis. You will then usually see a faint single line in the relevant colour. As an alternative you could turn up the first anode control setting to get some brightness, but the control will have to be reset properly, which calls for the use of a scope, so it's best left alone.

In the event of field collapse the first check should be for 26.5V at the junction of the two parallel-connected 1Ω surge-limiting resistors Ru11/12 and the 2,200μF, 35V reservoir capacitor Cz7. These items are just to the right of the line output transformer. Like other safety resistors, Ru11/12 can fail for no apparent reason. Often however the field output chip fails. When this has to be replaced I also change the supply decoupler Ck4 (470μF, 35V) for good measure.

The EW modulator is very reliable. I've not had a single fault in this area – not even a dirty control.

Signal Circuits

The signals panel is on the left-hand side. It contains some more power supply circuitry, the RGB output stages, the audio, colour decoder and i.f. sections and the frequency synthesizer. There are subpanels for teletext and panoramic sound, and one or two spare sockets for things like SECAM etc.

The tuner unit has the aerial socket fixed to it directly (no need for isolators with this type of power supply). It's soldered into the PCB. I had my reservations about this originally, but the whole thing is much stronger than it looks. It's a different matter inside the tuner however. The green PCB seems to come adrift with ease where it fastens to the frame of the can and the earthing struts. A good hot iron and a steady hand (I've got neither...) will soon put matters right. The usual faults caused by the tuner are one or two channels missing or the picture going off with the slightest tap on the set.

The only faults I've had in the tuner control system have been caused by the SDA2112 chip ICt1. In one case there was no tuning voltage output at pin 11. The other fault was intermittent no tuning when hot – a shot of freezer confirmed that the chip was responsible.

From the tuner the i.f. signal passes via the BF959 driver transistor Ti1 to the dual-output SAW filter Fi1. The sound and vision signals then follow separate paths. Signal separation at this early stage removes any possibility of vision buzz. The vision i.f. section is contained in ICi1, which may be a TDA4443 or a TDA3541 depending on chassis version. The output goes to the TEA2014 video switching chip ICi3, which is controlled by the microcom-

puter chip ICT2. When the AV mode is selected external video from the scart socket is routed through to the output pin 6. The video path is then via the teletext panel to the colour decoder. The arrangements vary here, later versions incorporating a colour transient improvement chip. Faults in this area are fortunately very few and are usually caused by incorrect sandcastle pulses or cracked print. The usual fault is no picture. The video signal and the brightness, contrast and colour control voltages all seem to be right but there are no outputs from the colour decoder chip. Any discrepancy in the sandcastle pulse will cut off the video. It's always worth checking the video input however as text faults in sets with a teletext panel can cause no picture in the TV mode.

The main fault on the teletext panel is dry-joints. The panel has print on both sides, the component side being connected to chassis. There are pins that go through the panel to connect various parts of the circuit to the other side. Different versions of the text panel have a different number of pins. They look like test points but they aren't. Most faults can be cured by ensuring that the pins are soldered on both sides of the panel. Poor joints can cause all sorts of faults, such as intermittent loss of picture, no text, some text lines appearing on the normal picture, and chessboard effects.

Here are some faults we've had on the signals panel. Tb1 (BC557B) being leaky will remove the raster. Failure of Da1 (1N4007) will remove the raster or switch the set to standby. Similar faults can be caused by Ta8 (TIP41), which can also make the colour vary and trip the set. When you look at the print side of the panel you'll see that various bits of the print have been cut. This is done to cater for various options. The problem is that in carrying out the cuts adjacent tracks are sometimes caught. The set can work normally but eventually tiny cracks appear. This can cause some strange faults such as the local controls not working correctly or, when text is selected, the channels change as you try to key in a page. These problems occur around the microcomputer chip at the bottom. A man-made fault can occur at the top of the panel: the chrominance delay line can become dry-jointed when the board is hinged out, or the delicate print can crack if the delay line is grasped when the board is opened. On one occasion a resistor shorted to the body of the tuner, shorting the 5V line to chassis. As a result the power supply started up without the momentary switch on (from the mains switch) or a remote control signal. The symptoms were no picture and no channel display.

Miscellaneous Points

The chassis is not too good to work on as the leads always seem to be about an inch too short. If the bottom panel has to be withdrawn to the service position, the speaker sockets on the plastic frame have to be unplugged. If they are pulled very much they will come off the speakers within the enclosures. Thus when you've repaired a power supply fault you may think that there's a sound fault. So check the speaker leads. When the bottom panel is out of the set the mains switch is easily caught and the set can come on. Beware of this – unplug from the mains if the panel is propped up.

Lastly the remote control unit, which also gives trouble occasionally. Sometimes the chip packs up or the resonator breaks away from the panel. The most common fault however is that the 1,000μF capacitor falls out. As a result the unit will be capable of only very short-range operation or won't work at all.

Trade customers can obtain spares and technical help from Lohja UK Ltd., Valley Farm Way, Stourton, Leeds LS10 1SE. Telephone 0532 716 311, fax 0532 706 622.

TEST CASE

351

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

There have been few truly British TV chassis designs in the last few years. The Ferguson TX98 and TX99 chassis are amongst the few. In terms of performance and reliability they have proved to be good, but this is not to say that they never go wrong. Sherlock had a TX99 on his bench recently. Its fault took him rather longer than it should to resolve. Could you have dealt with it quicker?

The set was a Model 51J8, which is a 20in. monitor-style set with remote control. Its problem was excessive brightness, with the brightness control having very little effect. In all other respects the picture was fine: the focus, colour and scan amplitudes were all correct. The sound too was present, correct and controllable. Not a difficult one to sort out Sherlock thought as he removed the back cover. At least the fault was a permanent one, unlike those in the soak-testing sets on the shelves that surrounded him.

He made a start by checking the tube's first anode voltage. The adjustment potentiometer on the line output transformer assembly was set at about half way. Turning it down reduced the picture's brightness, but the picture didn't look "right" and the user brightness control still had a relatively small control range. Sherlock reset the first anode preset for 830V at pin 7 of the tube, having consulted the manual for the correct voltage. The potentiometer was back where it had started. Time to look at the tube's cathode voltages then. They should be at around 116V, but were all under 100V. This would explain the excessive brightness. Since the RGB output stages have separate inputs and outputs, Sherlock reasoned that the cause of the problem must be associated with the TDA3301B colour decoder chip IC3.

The brightness level is set by the voltage applied to pin 30 of this chip. According to the circuit diagram, the normal range here is 0.8-3.6V. In fact a variation of 1.3-7.2V was measured as the user brightness control was taken from one extreme to the other, the switch-on/reset level being 2.17V. This seemed right enough to Sherlock, who saw no reason to investigate further the various items in the brightness control circuit. Could the voltage at the tube's control grid have wandered? No, pin 5 was at 0V and the only item here, the flashover protection resistor R228, was intact. Could the heater or the e.h.t. voltage be

too high? Again no – the heaters glowed normally, and the h.t. voltage at the smoothing capacitor C104 in the power supply was about right at 112V.

Advice was sought around the workshop. Television Ted suggested that the l.t. voltage should be checked, pointing out that it's critical. Sherlock confirmed that the voltage at pins 39 and 40 of the colour decoder chip was 11.7V, as specified, and that the 12V supply was correct at the tube's base panel. Low video h.t. voltage could have been responsible, but there was 180V at pin 3 of PL11 on the tube's base panel. As no more ideas were forthcoming from the workshop fraternity Sherlock decided to replace the TDA3301B chip. When he'd fitted the replacement he found that it had no effect whatsoever on the fault! Sherlock had been assuming that the cause of the problem was excessive voltage at the RGB output pins (14, 17 and 20) of the colour decoder chip. He figured that this would result in excessive current flow in the RGB output transistors, thus pulling down the c.r.t.'s cathode voltages. When he finally got round to checking the RGB outputs from IC3 – they should normally sit at around 5.5V – he was surprised to find them on the low side. It took him a while to grasp the significance of this, but once the penny had dropped the cause of the fault was soon found. What was causing the trouble? What had Sherlock missed during his initial diagnostic checks? See next month for the answer and another test case item.

ANSWER TO TEST CASE 350 – page 282 last month –

When a highly intelligent microcontroller chip is combined with a very complex collection of mechanics and something goes wrong, you need a highly intelligent technician to sort things out. Normally Sage is one of our best men, but he came to the brink of defeat when confronted with an oscillating VCR deck mechanism in a six year old Mitsubishi machine that masqueraded as a Luxor model. Poor Sage!

Within a VCR a closed loop is formed by the mode switch, the loading motor and the microcontroller chip in the mechacon department, the deck's mechanics being controlled by the inputs to this chip and the program in its ROM. Such diverse things as drive chips, plastic cogs, plugs and print tracks all form part of the loop. When the loop is complete and the setting of the mode switch agrees with the physical positions of the sliders, levers and cams, the mechanism behaves itself. All these things had been checked by Sage in his attempt to diagnose the cause of the oscillation – well, almost all.

The mode switch has four connections, /P0, /P1, /P2 and /P3, which are linked to the main PCB via plug/socket MM. They go to pins 45-8 of the microcontroller chip IC5A0. Further investigation showed that the /P3 print from MM12 to pin 45 of this chip was open-circuit due to a hair-line crack at the front right-hand side of the PCB. The crack was buried beneath a jumble of glue and components added as factory modifications. Yes, Sage should have discovered it sooner but who, hand on heart, could say that they would have gone straight to it?

Published on the third Wednesday of each month by Reed Business Publishing Ltd., Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. Filmsetting by Trutape Setting Systems, 220-228 Northdown Road, Margate, Kent. Printed in England by the Riverside Press Ltd., St Ives plc. Distributed by IPC Marketforce, Kings Reach Tower, Stamford Street, London SE1 9LS (071 261 5000). Sole Agents for Australia and New Zealand – Gordon and Gotch (A/Sia) Ltd; South Africa – Central News Agency Ltd. "Television" is sold subject to the following conditions, namely that it shall not, without the written consent of the Publishers first having been given, be lent, resold, hired out or otherwise disposed of by way of Trade at more than the recommended selling price shown on the cover, excluding Eire where the selling price is subject to currency exchange fluctuations and VAT, and that it shall not be lent, resold, hired or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever. ISSN 0032-647X.

VISTA

ELECTRONICS

Ferguson TX Handsets	£7.80p
Ferguson Fastext Handsets	£8.80p
JVC Video Heads (J.L.M.)	£7.46p
Nat Pan Video Heads (103.121)	£7.46p
A56.540X CRT	£41.00p
51cm FST	from £54.00p
Ferguson LOPT (TX100) Original	£14.75p
Ferguson 3V29 Belt Kits (Pack of 10)	£7.50p
Sharp Idlers (5 Large + 5 Small)	£10.50p
Amstrad Mod. Kit (Pack of 5)	£15.50p
Ferguson Carriage (Original)	£17.95p



Cheque with Orders
Major Credit Cards
Accepted



All prices include delivery, but exclude VAT
Stock items despatched within 48 hours

VISTA ELECTRONICS

Unit 1B, Wingate Grange Industrial Estate,
County Durham, TS28 5AH

Tel: 0429 837100

Fax: 0429 837101

AUDIO VISION (UK) LTD

BRAND NAMED ELECTRICAL GOODS

CATALOGUE RETURNS/B.E.R./GRADED/VIRGIN STOCK
AT UNBEATABLE PRICES

Full size midi system from	£10.00
Full size midi system with C.D. from	£25.00
14" TV & VCR from	£30.00
Stereo Twintape from	£5.00
Walkman from	£1.00
Keyboards from	£3.00
Portable TV from	£30.00
Flat bed cassette from	£1.50


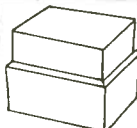

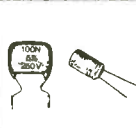
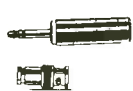





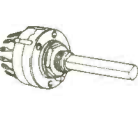

MANY LINES OF GRADED STOCK
TO INCLUDE
HOUSEHOLD ELECTRICAL & CAR AUDIO

UNIT 3, CROFT COURT,
KIRK SANDALL IND. EST.,
DONCASTER DN3 1QR
PHONE (0302) 890984/5
PLEASE PHONE JOHN McKENDRICK

(0302) 890985

CRICKLEWOOD ELECTRONICS LTD

NEW 1992 CATALOGUE

 BOOKS	 BOXES & CASES	 CABLE & WIRE	 CAPACITORS
 CONNECTORS	 KITS	 RESISTORS	 SEMICONDUCTORS
 SPEAKERS	 VIDEO HEADS	 SWITCHES	 TOOLS & TEST GEAR

SEND NOW FOR THE

**CRICKLEWOOD
ELECTRONICS LTD**

COMPONENT CATALOGUE.
ONE OF THE BEST
RANGES AVAILABLE

NAME

ADDRESS

PLEASE SEND COPIES OF CRICKLEWOOD
ELECTRONICS CATALOGUE (Free to Bona Fide Engineers &
Trade or Telephone for Free Catalogue).

CRICKLEWOOD ELECTRONICS LTD, 40 CRICKLEWOOD BROADWAY
LONDON NW2 3ET. TEL 081 450 0995, 081 452 0161 FAX 081 208 1441

TRADE ONLY

MICROWAVE OVEN PARTS

MAGNETRONS · DIODES · TRANSFORMERS
LAMPS · FUSES · MICROSWITCHES

PHONE NOW FOR PRICE LIST
A.W.I. MICROWAVE OVEN COMPONENTS

Samuel Whites Estate, Medina Road,
Cowes, Isle of Wight PO31 7LP
Telephone: 0983 296121
Fax: 0983 296122

SOUTHERN TV'S

ALL TYPES OF USED TV AND
VIDEO SPARES, PANELS, CABINET
FRONTS

DISCOUNT FOR EXCHANGE UNITS
WORKING CHASSIS ALSO
AVAILABLE

DON'T WONDER, JUST PHONE AND ASK

0843 850040

Antex Temperature Controlled Irons

... keep down the cost of soldering.

An economic range of soldering irons for the small to medium sizes assembly lines. Apart from the low cost, Antex Temperature Controlled soldering irons offer so much more. For instance, the Antex A545 controls temperature electronically, not by magnetism or changing bits. Temperature selection is in the handle. Although an Antex U500 power supply is available, Antex A545 Irons can be used with any 24V 50 watt supply. Antex irons are also earthed for extra safety. Antex also supply 'Soldip' Solder Pots in 2 sizes.

Available from leading electronic distributors or send for details of the whole Antex range.

Simple
Temperature
Adjustment in handle



ANTEX

Antex Electronics 2 Westbridge Industrial Estate, Tavistock, Devon PL19 8DE Telephone: (0822) 613565 Fax: (0822) 617598

TV LINE OUTPUT TRANSFORMERS

PHONE 081-948 3702 FAX: 081-332 0583

ALBA . AMSTRAD . BUSH . DECCA . DORIC . ETRON .
FERGUSON . FIDELITY . GEC . GRUNDIG . GRANADA .
HITACHI . HINARI . INDESIT . ITT . KIMARA . NIKKAI .
MATSUI . MURPHY . OSAKI . NORDMENDE . LOEWE-OPTA .
REDIFFUSION PYE . PHILIPS . SANYO . SAISHO . SHARP .
SONY . SOLOVOX . SUSUMU . TANDBURG . TELEFUNKEN .
THORN . TRIUMPH . HUANYU . GOLDSTAR . BINATONE .

**COMPUTER MONITOR
TRANSFORMERS STOCKED
CALLERS WELCOME AT SHOP**

TIDMAN MAIL ORDER LTD . 236 SANDYCOMBE ROAD .
RICHMOND . SURREY . TW9 2EQ . Mon-Fri 9 am to 12.30 pm &
1.30-4.30 pm
Sat 10 am to 12 noon
Approx. 1 mile from Kew Bridge.

BITEL SOUTH WALES

NEW DELIVERIES EVERY WEEK
COLOUR TV

PIL FROM £15 WORKING
R/C FROM £28 WORKING
TEXT FROM £40 WORKING
PORTABLE FROM £50 WORKING

VIDEO'S

FROM £45 UNTESTED JVC HEADS £15

RANGE OF NEW HANDSETS
ALL PRICES INCLUSIVE OF VAT

Units 11 & 12 Taverner Estate, Caerleon, Newport, Gwent
(3 miles from M4, Junction 25)

Ring BOB on 0633 430040

MAKE YOUR INTERESTS PAY!

Train at home for one of these Career Opportunities

Over the past 100 years more than 10 million students throughout the world have found it worth their while! An ICS home-study course can help you get a better job, make more money and have more fun out of life! ICS has over 100 years experience in home-study courses and is the largest correspondence school in the world. You learn at your own pace, when and where you want under the guidance of expert 'personal' tutors. Find out how we can help YOU. Post or phone today for **FREE INFORMATION** on the course of your choice. (Tick one box only!)

Electronics <input type="checkbox"/>	TV, Video & Hi-Fi Servicing <input type="checkbox"/>
Basic Electronic Engineering (City & Guilds) <input type="checkbox"/>	Refrigeration & Air Conditioning <input type="checkbox"/>
Electrical Engineering <input type="checkbox"/>	Car Mechanics <input type="checkbox"/>
Elec. Contracting/Installation <input type="checkbox"/>	Computer Programming <input type="checkbox"/>
GCSE/GCE/SCE over 40 examination subjects to choose from <input type="checkbox"/>	

Name: _____

Address: _____

P. Code _____

ICS International Correspondence Schools, Dept. EG32
312/314 High Street, Sutton, Surrey SM1 1PR. or
041-221 7373 (24 hours).



REDUCE YOUR COSTS

Join the thousands of companies who have increased their profits by adding the credibility of the Guild of Master Craftsmen to their sales message; and reduced their costs by taking part in the Guild's many money-saving schemes.

For full information:

**CALL (24 hours a day)
FREEPHONE 0800 525285**

Or send for details to:

The Secretary, The Guild of Master Craftsmen,
166 High Street, Lewes, East Sussex BN7 1XU

Company Name

Address

Postcode Tel. No.

Craft/Trade

Number of Employees TZ

HOCKLEY DISCOUNT TELEVISIONS

THIS MONTH'S SPECIAL OFFERS — BUY NOW —

VIDEO HEADS
From **£6.25**
FERG. 3V29/30

T.V. REMOTE CONTROLS

STAR BUY → **FERGUSON TX10**
TELETEXT £6.75

FERGUSON 3V35
CASSETTE HOUSING
Only **£16.95**

E180 V.H.S. VIDEO TAPES — ONLY 95p

SEMICONDUCTORS
BU208A → OUR PRICE **99p**
BU508A — **69p**

VIDEO RECORDERS
MAINTENANCE KITS

At low, low prices
1000's OF MORE SPARES IN STOCK

PANASONIC
BATTERIES
only **39p**
PER PACK

R.F. FLYLEADS ONLY 28p
Y-SPLITTERS ONLY 45p

ALSO → NOW IN STOCK 'B' GRADE

WALKMANS, MIDI-SYSTEMS, RADIO/CASSETTE RECORDERS,
ANSWERING MACHINES, TELEPHONES, KETTLES, JUGS
AND COMPLETE RANGE OF TELEVISIONS AND VIDEOS

★ PLUS MANY MORE!! 'BRAND NEW'
PRODUCTS ARRIVING DAILY

OPENING HOURS
MON-SAT 9-1pm
SUN 10-2pm

WE HAVE MOVED TO
A NEW ADDRESS

GIVE JAZZ A BUZZ
ON 021-515-2003

140 Hockley Hill, Hockley,
Birmingham B18 5AN
Tel: 021-515 2003
Fax: 021-515 2004

ALL PRICES SUBJECT
TO VAT PLUS
CARRIAGE

CAR PARKING ON SITE
TRY US — YOU'LL
LIKE US

How to design your own satellite TV system and get it right ...



... with the **SATMASTER** program
by DJ Stephenson, you can!

requires
IBM PC compatible with
MS DOS 3.0 or higher

- Design your own system and test its performance before you install it!
- Quickly find essential dish setup angles: elevation, azimuth, polarisation offset for any satellite from any location in the World!
- Easy-to-use pop-up menu interface makes tedious tasks simple for everyone!
- Complete with User Manual!
- 20,000 word on-screen technical guide and context-sensitive help!
- Calculates full link budget including dish size optimisation ensures the best quality picture!
- Plot beamwidths and lobe patterns and judge potential interference from neighbouring satellites!
- Results and graphs can be output to screen or printer!

Take out the guesswork ... order **SATMASTER** today.

Swift Television Publications

17 Pittsfield, Cricklade, Swindon SN6 6AN Tel or Fax 0793 750620

ORDER FORM

Please send me **SATMASTER**
program(s) (3.5" disk) @ £35 each, postage
FREE in UK, Europe add £2, Other add £4.

Name: _____

Address: _____

I enclose cheque/PO for £ _____ made
payable to Swift Television Publications, or
please debit my Access/Visa credit card.

No. _____

Expires: _____



Postcode: _____

SALVAGED SPARES AND PCBs FOR:

HINARI CT18/TVA1

BUSH 2020/2020T/2114/2114T/2321/2321T

ALBA SAT 200/300

MARCONI BLUE CAP LNB ONLY

roadstar **SENTRA**
EXCLUSIVE SERVICE & SPARES
asj Electrotechnik

Mandale Mill, Beacon Road, Wibsey,
Bradford, West Yorkshire BD6 3DQ

Telephone: 0274 690241

Fax: 0274 602701

User Friendly

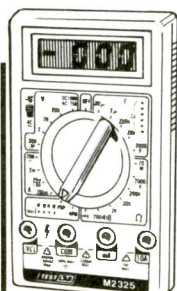
SOFTWARE

FOR IBM COMPATIBLE PC'S RUNNING ON MSDOS
FOR THE BUSY TV/VCR SHOP/SERVICE DEPT
RECEIPT/INVOICE PROGRAM **£89** + VAT + P&P

OUR TV/VCR RENTAL PROGRAMME
IS NOW AVAILABLE

Phone or write for details:

TBR Software 369 Chepstow Road
Newport, Gwent. NP9 8HJ
Tel. 0633 282556



32 Range 3 1/2 digit mm
12mm Display

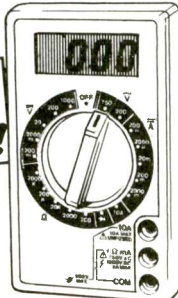
FEATURES: 5 Capacitance ranges,
6 resistance ranges to 20M ohm,
Diode and transistor test, AC/DC
volts ranges, 5 ranges AC/DC
current to 10 amps. Also continuity
buzzer. With leads, battery and
instructions

£23.95 UK post etc £2.00 Post free when you Buy Two!

Instrument stockists for **Hameg Scopes**
Black Star **Thurby** **Thandar** **Test Lab**
Always special offers for callers.

HENRY'S
EXCITING
SPECIAL OFFERS!!

BIG, BIG SAVINGS
HURRY LIMITED STOCKS



19 range 3 1/2 digit mm

FEATURES: Pocket Dmm with
12mm display, AC/DC volts, 6
ranges DC current to 10 amps, 5
resistance ranges, Diode test.
With leads, battery and
instructions

ONLY £10.95

UK post etc £2.00 Post free when you Buy Two!

Further Special Instruments Offers - while stocks last
ST300 AC Clamp meter with case Q/600, Q/300A, 0-1K
ohm **£29.95** M265 Add on Clamp meter for Dmm's
Q/1000A **£12.95** DW6060.

SPEAKERS FOR PA, DISCO AND HIGH POWER CAR SYSTEMS
All models available 4 ohms or 8 ohms
Cant/packings extra
10" 150watt H/D
Bass Speakers
34Hz Res. Ideal Bass
or Subwoofer. Huge
magnet **£35.95**
8" 75 watt Bass/mid
vented coil **£15.95**
12" 90/120 watt
Bass/mid vented coil **£21.95**
15" 250 watt (400w max) H/D Bass
Huge magnet 28Hz Res. 102 dB **£81.95**
LARGE RANGE OF AMPLIFIERS, GRAPHICS,
SPEAKERS AND SYSTEMS IN STOCK FOR
PA - DISCO AND IN-CAR

OPEN 6 DAYS A WEEK FOR CALLERS OR TELEPHONE ORDERS

ALL PRICES INCLUDE UK VAT

Brand new ASTEC SW mode power supply
Three pin
mains socket input on/off switch, Output +5
volt 3.75 amp, +12 volt 1.5 amp, -12 volt
0.4 amp, 115-230 V A/C Input Size 7.0 x 5.3
x 2.5 ins
ONLY £12.95 (UK Carr etc £2.05)

HENRY'S
AUDIO ELECTRONICS

404 EDGWARE ROAD, LONDON W2 1ED
Tel: 071-724 3564/071-258 1831 Fax: 071-724 0322
DISCOUNTS FOR QUANTITY AND EDUCATIONAL

COLOUR CATALOGUE WITH SUPPLEMENTS
SEND £4 PO/CHQ
Callers £2.00
FREE to
Trade/Education
(Written Request)

AERIALS

FOR TV & FM RADIO, PLUS
1000's OF MASTS,
BRACKETS, LASHING KITS,
CLAMPS, PLUGS, CABLES,
OUTLETS, DIPLEXERS ETC.

AMPLIFIERS

FOR DISTRIBUTION
SYSTEMS AND DOMESTIC,
MAST HEAD OR SET BACK.
WE HAVE ONE OF THE
LARGEST RANGES,
AVAILABLE FROM STOCK

MAIN DISTRIBUTORS

FOR ANTIFERENCE,
LABGEAR, WOLSEY
FRINGE, TRIAX, TELEVES,
VOLEX-RAYDEX, KUBLER
+ MANY MORE

COASTAL AERIAL SUPPLIES

UNIT X2 Rudford Industrial Estate
Ford, Arundel

0903 723726

NO MINIMUM ORDER VALUE
NEXT DAY DELIVERY ACROSS UK
CARRIAGE FREE ON ORDERS £100+



CAMPION WHOLESALE LTD.

QUALITY USED T.V. & VIDEO

COMPLETE RANGE OF
T.V.'s AND VIDEOS
MOST MAKES AND
MODELS AVAILABLE

STOCK ARRIVING DAILY

T.V.'s from £3.00
Videos from £30.00
Prices Ex-VAT

Free Delivery Service
to most areas of the U.K.

UNIT 80, BARRACKS ROAD,
SANDY LANE INDUSTRIAL ESTATE,
STOURPORT-ON-SEVERN,
WORCESTERSHIRE DY13 9QB

Just 10 Mins from
M5 Junct. 6 Worc's North

For your export
requirements contact us.

02993-79642 or 79643

FAX: 0299 827984

A&D

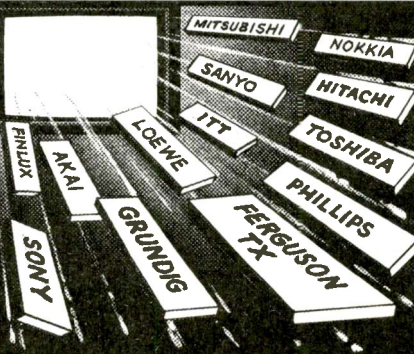
W.T. ELECTRONICS

Now! You can
Offer...

N I C A M S T E R E O

INTEGRAL CIRCUITS

For
**ALMOST ANY
TWIN SPEAKER
TV or VCR**



- Simple installation—fully assembled and pre-aligned circuits.
- Personality modules for individual TV sets, when required.
- Full fitting instructions—plus technical support, if needed.
- Twelve months warranty for components.
- Can be fitted to many VCRs.
- Suitable for Scandinavian PAL B.
- Immediate despatch from stock.
- Trade Prices: 1 off £78.00, 5 off £68.00, 10 off £65.00, plus VAT.

UNIT 2,
TONBRIDGE WORKS,
TONBRIDGE ROAD, HAROLD HILL,
ROMFORD, ESSEX RM3 8XJ
Telephone: 04023 81863
Fax: 04023 81243

**ARE YOU HAVING
TROUBLE GETTING
HOLD OF YOUR
REGULAR COPY OF
TELEVISION?**

**IF SO, WHAT
ABOUT TAKING
OUT A
SUBSCRIPTION?**

**FOR MORE
DETAILS, PLEASE
RING OUR
SUBSCRIPTIONS
DEPT. ON:**

**0444 441212
Ext. 5320**

CREWE WHOLESALE TV LTD.

UNIT 1

OUR SPECIALITY IS SUPPLYING TRADE
CUSTOMERS WITH TOP NAME WORKING TV'S
AND VIDEOS. OUR LARGE SELECTION OF EX-
RENTAL TV'S & VIDEOS ARE OF EXCELLENT
QUALITY. WITH DISCOUNT FOR QUANTITY, YOU
WILL FIND OUR KEEN PRICES HARD TO BEAT.
WE HAVE NEW STOCK ARRIVING EVERY WEEK.
RING NOW FOR A PRICE LIST. WITH OUR
FRIENDLY STAFF AND PERSONAL SERVICE, YOU
CAN'T MISS THE CHANCE TO COME AND SEE FOR
YOURSELVES.

TEL: 0270 582924
WILLIAM STREET CREWE,
CHESHIRE

UNIT 2

WHY NOT COME AND SEE OUR EXCELLENT
SELECTION OF UNTESTED TOP NAME, TV'S AND
VIDEOS. NEW STOCK ARRIVING EVERY WEEK.
COMPETITIVE PRICES AND DISCOUNT FOR
QUANTITY. PHONE NOW FOR CURRENT STOCK
LIST, AND PRICES.

TEL: 0254 64489
SCHOOL LANE GUIDE,
BLACKBURN

DELIVERIES CAN BE ARRANGED



Sonic House
Abberley Street Smethwick
Birmingham B66
Tel: 021-565 1727
Fax: 021-555 5367



Sonic TV Distributors Ltd

Preston Branch:
34 Roman Way, Longridge Road
Ribbleton, Preston PR2 5BB, Lancashire
Tel: 0772 655011

EXCELLENT RANGE OF TV & VIDEOS

PHONE NOW

*Buy what you can sell, just don't decorate
your shop with expensive sets*

T.V.
FROM **£15**

PHONE NOW
BE SENSIBLE
PHONE NOW

VIDEO
FROM **£50**

021-565 1727

0772-655011

EXPORT ENQUIRIES WELCOME

**ALL PRICES ARE SUBJECT
TO 17½% VAT**

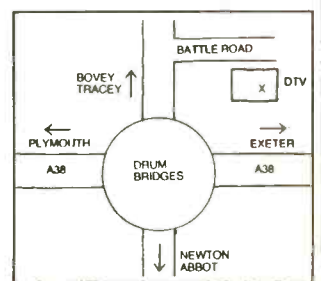
**DEVON
TV &
VIDEO**

UNIT 7, ANCHOR BUILDING,
BATTLE ROAD,
HEATHFIELD IND. EST.,
NEWTON ABBOT
PHONE 0626 835900

IT'S HERE!

A TRADE WAREHOUSE WITH
CLEAN STOCK, SENSIBLE PRICES,
FRIENDLY, HELPFUL SERVICE **AND IT'S**
RIGHT NEXT TO THE MAIN A38 AT
HEATHFIELD INDUSTRIAL ESTATE.

LESS TRAVELLING TIME MEANS
MORE SELLING TIME FOR YOU!
POP IN AND SEE US
— YOU WON'T BE DISAPPOINTED!



VCR
GRADE B
GOOD AS NEW
BOX AND INSTRUCTION
BOOK - GOOD
ONLY £119
TELETEXT VCR £185



THIS MONTH'S SPECIAL OFFERS (DON'T MISS OUT!!!)

SPARES

Giving you the Edge in Sales!

LOPTS

FERGUSON TX100 Series (any LOPT) (Green Spot), (Blue Spot), (Red Spot), (White Spot)	£13.95
FIDELITY 14" up to 20" (FC201SBE)	£9.50
HINARI CT45TVA1	£13.95
TX10 Cropper Transformer	£4.50

SEMICONDUCTOR

BU 508A	70p
TDA 3654	£1.85
STK 5481	£4.20
STR 50103A	£3.10
TDA 4600-3	£1.90
TDA 2600	£3.95

SERVICE MANUALS

TV	
PHILIPS 2A Provisional Technical Data	£3.00
PHILIPS KT3	£3.00
ITT/NOKIA FX4030CT5110 (Solara 21C60)	£3.00
TOSHIBA CT2020B1	£3.00
FERGUSON 51LB I.C. C5 Service Information	£2.00
SONY CAMERA CCD-V8AF Service Manual	£15.00

VIDEO

JVC HRD-180E	£6.00
SANYO VCR VHR2300	£6.00
OSAKI VCR 33	£6.00
ITT VR3938	£6.00
ITT VR3929	£6.00
TOSHIBA V83B	£6.00
SONY EV-S600	£6.00
JVC HRD725	£6.00
JVC HRD225K	£6.00
JVC HRD755EK	£6.00
JVC HRD7655EK	£6.00
LOEWE CIC 420	£6.00
THORN 8930 (3V30)	£6.00
THORN 8941 (3V31)	£6.00
THORN 8942 (3V32)	£6.00
THORN 8943 (3V36)	£6.00
THORN 8944 (3V35)	£6.00
THORN 8945	£6.00
FERGUSON 3V24	£6.00
FERGUSON 3V48	£6.00
FERGUSON 3V53	£6.00
FERGUSON 3V5455	£6.00
FERGUSON 3V59	£6.00
FERGUSON 3V65	£6.00
FERGUSON FV11	£6.00
FERGUSON FV12	£6.00
FERGUSON FV20B	£6.00
FERGUSON FV30B	£6.00
FERGUSON FV3311	£6.00
GRUNDIG VS400	£6.00

SATELLITE MANUALS

AMSTRAD SRD400	£4.00
FERGUSON SRA1	£4.00
ITT/NOKIA SAT1100	£4.00

Why Us?

Wiltsgrove Ltd has 14000sq ft of wholesale floor area which includes TV, video spares counter. Engineering dept & test bench facilities with showroom area of brand new & used stock of TV's & video's on display. So from direct loads of ex rental & B grade & new branded stock of TV's & video's.

Backed by UK's largest importers Philix & Konig, we are now firmly established as the main outlet in the Midlands for TV & video spares.

Also mailing list to keep you posted.

Stock orders can be allocated & processed at your request.

Fast delivery on spares.

VIDEO HEADS

FERGUSON 3V2930	
THORN 8930/40	
VHD-2511	
FERGUSON 3V353638	
THORN 89438944	
VHD-2647	£6.50

SERVICE AIDS

BLACK VINYL 15 Metre long 45cm wide ... Only	£13.50
SPRAY PAINT	
MATT BLACK	£2.95 each
ROLLS ROYCE SILVER	£2.95 each
SOLDER 500g 1.2mm PRIMA	£4.75
VIDEO HEAD PULLER	£14.95

VIDEO SPARES

FERGUSON 3V35 CASSETTE HOUSING	£19.50
FERGUSON 3V35 CAPSTAN MOTOR	£16.50
HITACHI VT11, VT33 CAPSTAN MOTOR	£18.95
SHARP VC383 FRONT FACIA	£14.95
FERGUSON 3V24 FRONT FACIA	£9.50
THORN 8930 FRONT FACIA	£14.95
THORN 8940 FRONT FACIA	£14.95
THORN VC121 FRONT FACIA	£9.50
THORN VT430 FRONT FACIA	£9.50
HITACHI VT8000E FRONT FACIA	£9.50

TV REMOTE CONTROLS	
PHILIPS RC5 UNIVERSAL IR9005	£11.50
FERGUSON TX10 TEXT TR-RC732	£7.50

1,000s OF MORE SPARES AVAILABLE IN STOCK

EX-RENTAL

RE-GUN T.V. TUBE K56-540X	£40
TELETEXT WORKING COLOUR TV	From £35
PORTABLE WORKING COLOUR TV 14"	From £39
VCR TOP LOADER Working	From £45
VCR FRONT LOADER Working with RC	From £60
HRD 750 EK with hand set	£180

EX-RENTAL FST TV IN STOCK

NOW IN STOCK BRAND NEW TV's - VCR AND PORTABLE 14" COLOUR RC AT A VERY SPECIAL PRICE!!!

NOTE: ALL REMOTES ARE EXTRA. STOCK SUBJECT TO AVAILABILITY. ALL PRICES SUBJECT TO VAT PLUS CARRIAGE

WE WOULD ALSO LIKE TO ANNOUNCE THE APPOINTMENT OF MR. RICHARD SHAW AS OUR NATIONAL SALES MANAGER FOR SPARES

KONIG

Wiltsgrove Ltd

PHILEX PLC

28/29 RIVER STREET, DIGBETH, BIRMINGHAM B5 5SA

Tel: 021-772-2733

Fax: 021-766-6100



WE ARE SPECIALISTS IN EXPORT

BRITAIN'S LARGEST INDEPENDENT

PRESTON

439 Oakshott Place,
Walton Summit Ind. Estate
Preston (M6 Junc. 29)
Tel: 0772-312101



BIRMINGHAM

208 BROMFORD LANE
ERDINGTON,
BIRMINGHAM B24 8DL
Tel: 021-327 3273
Fax: 021-322 2011

TV & VIDEO WHOLESALERS

CARDIFF

Unit J7,
Colchester Trading Estate
Colchester Avenue
Cardiff CF3 7AP
Tel: 0222-471485

THIS MONTH'S SPECIAL
FERGUSON FST From £90.00

(ALL PRICES SUBJECT TO VAT)

LONDON

The Royal London Estate,
Unit 2, 29-35 North Acton Rd
London NW10
Tel: 081-961 5005



**WE ARE OPENING A
NEW WAREHOUSE IN
SOUTHAMPTON, SO
WATCH THIS SPACE
FOR MORE DETAILS,
TOGETHER WITH
SPECIAL OPENING
OFFERS**



**CALL IN AT YOUR LOCAL BRANCH TODAY AND SEE OUR RANGE
OF EX-RENTAL AND B GRADE STOCK**

EXPORT ENQUIRIES WELCOME



Suppliers of Surplus TVs & Videos to the Trade
 CENTREVISION HOUSE · SLOPER ROAD · LECKWITH · CARDIFF · CF1 8AB

ALL SIZES, ALL MAKES
TELETEXT INCLUDED – NON FST £38

Phone: 0222 344754

WE WON'T BE BEATEN ON TV AND VIDEO . . .
CALL IN PERSON FOR THE BEST DEAL AROUND.

REPO TV AND VIDEO TRADE SUPPLIES

DAISY WORKS, 345 STOCKPORT ROAD, LONGSIGHT, MANCHESTER M13 0LF

GOOD CHEAP STOCK – OFF THE VAN

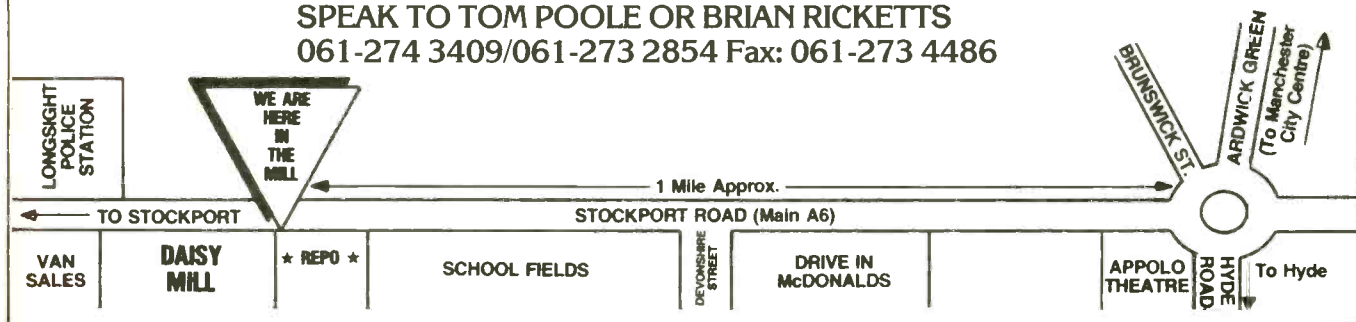
IF THE ABOVE INTERESTS YOU PLEASE MAKE CONTACT – WE HAVE A NEW CONTRACT AND REQUIRE TO ESTABLISH TRADING RELATIONS WITH A FEW REGULAR DEALERS BEFORE THE WINTER TRADING SEASON.

WE CAN SUPPLY A SELECTION OF MAKES, MODELS AND PRICES FOR YOUR SHOP

PANASONIC Etc TV & VIDEO

WE CONTINUE TO SUPPLY OUR HIGH QUALITY WORKING STOCK SUITABLE FOR SALE OR RENTAL – GOOD PROFIT, LESS HEADACHES.

SPEAK TO TOM POOLE OR BRIAN RICKETTS
 061-274 3409/061-273 2854 Fax: 061-273 4486





CENTRAL TV

CENTRAL TV WHOLESALE
DISTRIBUTION LTD
369 Stratford Road, Sparkhill
Birmingham B11
TEL 021-772 1591
FAX 021-766 6383
CTV LONDON
Eley Estate, Nobel Road
Edmonton N18
TEL 081-807 4090
FAX 081-884 1314

EX-RENTAL

- SUPERB RANGE OF TV'S & VCR'S
 - THORN & GRANADA
 - DIRECT LOADS AVAILABLE FROM SOURCE
- EXPORT ENQUIRIES WELCOME

B' GRADE

TV'S • VIDEOS • AUDIO
MICROWAVES • HIFI
PORTABLES • FSTS • NICAM • FASTEXT

☆☆☆ STOP PRESS ☆☆☆ STOP PRESS ☆☆☆ STOP PRESS ☆☆☆

NOW IN STOCK QUANTITY OF BRANDED
TWIN SPEED VHS VIDEO'S

SATELLITE

AMSTRAD & TRISTAR

FULL SYSTEMS AVAILABLE PLUS ALL USUAL ACCESSORIES



C.T.V.

UNIT 5, THE PHOENIX BUILDING, RUSHOCK TRADING ESTATE,
DROITWICH ROAD, NEAR KIDDERMINSTER

TELEPHONE: 0299-251522 0836-585829/0860-809673 (24 HR)

**SUPPLIERS OF HIGH QUALITY EX-RENTAL
TELEVISIONS AND VIDEOS**

LARGE STOCKS ALWAYS AVAILABLE

ALL AT COMPETITIVE PRICES

**Also available: 'B' Grade Products, Audio, Microwaves
and Complete Range of Televisions and Videos**

OPEN: MON-FRI - 9.30-5.30

TEL: 0299-251522
0836-585829/0860-809673 (24 HR)

Fax: 0299-251543

EXPORT ENQUIRIES WELCOME

TELEPRICE

LIMITED

SWITCH ON!
TO QUALITY
EX-RENTAL TV
& VCR. PLEASE
RING FOR DETAILS

AINTREE

UNIT 2, RACECOURSE IND. EST.
ORMSKIRK ROAD, AINTREE
LIVERPOOL L9 5AL. TEL:
051 530 1285 IAN MAC

LEEDS

UNIT F2, COPLEY HILL
TRADING EST., WHITEHALL
RD, LEEDS LS12 1HS. TEL:
0532 422774 LES CORKE

AVONMOUTH

5 PORTVIEW ROAD
AVONMOUTH, BRISTOL
BS11 7LQ. TEL:
0272 235093 KARLA REALE

GLASGOW

9 COLQUHOUN AVENUE
HILLINGTON IND. EST.
GLASGOW G52. TEL:
041 883 2610 IAN DORAN

NOTTINGHAM

UNIT 8, ASCOT PARK
INDUSTRIAL ESTATE
SANDIACRE, NOTTINGHAM. TEL:
0602 491385 JOHN JEYS

SUNDERLAND

9A/B, 94 CARRMERE RD
LEECHMERE IND. EST.
SUNDERLAND SR2 9TE. TEL:
091 523 5554 BRIAN CADE

SOUTH LONDON

22 FRANTHORNE WAY,
OFF RANDESDOWN ROAD, BELLINGHAM,
LONDON SE6 3BS. TEL:
081-695 0877 JAMES MAYE

FARNBOROUGH

7/8 KINGSGROVE IND. EST.
INVINCIBLE RD, FARNBOROUGH
HANTS. GU14 7QS. TEL:
0252 540814 COLIN GORDON

**BRAND NEW NIKKAI STOCK
IN STOCK NOW**

VCR SP/LP From £165.00
 25", 28" FST Nicam Fast Text POA
 14" Portable, Remote POA
 10" Colour Main/Battery, Remote POA

NIKKAİ MULTISYSTEM TV IN STOCK

14", 20", 21" FST (VHF/UHF) PAL, Secam, NTSC

AMSTRAD DD8900 Double Deck £279.00
**AMSTRAD STV20 CTV with Stereo Satellite Receiver
 and Decoder £279.00**

NEW (B) GRADED FERGUSON STOCK

NEW 59P7 FAST TEXT POA
41P3 FAST TEXT POA
68K4BQ FAST TEXT WITH NICAM..... POA
59L5Q Nicam Fast Text POA

**EXCELLENT RANGE OF EX-RENTAL
TVs & VCRs THORN**

THORN TX9 Basic POA	THORN FST Stereo/Text POA
THORN TX9 R/C POA	THORN (FRG ????) POA
THORN TX9 Text POA	THORN 8940 (3V9) (Stereo) POA
THORN TX10 Basic POA	THORN 8941 (3V31) POA
THORN TX10 R/C POA	THORN 8942 (3V32) POA
THORN TX10 Text POA	THORN 8943 (3V36) POA
THORN TX10 Stereo/Text POA	THORN 8944 (3V35) POA
THORN FST Basic POA	THORN 8945 POA
THORN FST Basic R/C POA	THORN 8947 POA
THORN FST Text POA	

NON-THORN VCRs FROM £35.00

FRESH STOCK ARRIVING DAILY — RING FOR UPDATE ON STOCK

**PORTABLES ★ LATE FST
IN STOCK
TOO MANY TO LIST**

**LARGE STOCKS ALWAYS
AVAILABLE**

**Brand New Handsets for TVs & Videos
from only £7.50**

★ ALL PRICES ARE SUBJECT TO VAT ★ (OFFERS APPLY WHILE STOCKS LAST) ★
 OPEN MON.-FRI. 9 a.m. - 5.30 p.m. SAT. 9 a.m. - 1.00 p.m.

**WHY TRAVEL THE WHOLE COUNTRY?
RING OFF OR AMIN NOW ON DIRECT LINE TO
TV WAREHOUSE**

**LEEDS (0532) 444200 FAX: (0532) 425777
MOBILE PHONE — 0850 326866 — 24HRS**

EXPORT ENQUIRIES WELCOME

SUPERVISION

**UNIT 1b, TOWER WORKS, 2 GLOBE ROAD, LEEDS LS11 5QG
OFF WATER LANE, NEAR HILTON HOTEL. EASY ACCESS FROM M1 & M62 (2 Mins)**

**NEW FOR
EAST ANGLIA**

Save time and
travelling costs

EX RENTAL TV'S
& VCRS

*Most makes available
Best possible prices*

**ANGLIAN T.V.
WHOLESALE**

Rashes Green Industrial Estate
Dereham, Norfolk.
Telephone: (0362) 691611

PLEASE NOTE: ADVERT APPEARING IN FEBRUARY ISSUE OF
TELEVISION SHOWED INCORRECT TELEPHONE NUMBER.
OUR CORRECT NUMBER IS SHOWN ABOVE.

WESTERN
TRADE
SERVICES

**TV & VIDEO
WHOLESALE
FOR
DEVON & CORNWALL**

EST 14 YEARS

SUPPLIERS OF EX-RENTAL TV & VIDEO'S
THORN & NON THORN
REMOTE TEXT & VIDEO HAND UNITS
SUPPLIED WHERE NECESSARY
ALL PRICES SUBJECT TO VAT

**DELIVERIES THROUGHOUT DEVON
CORNWALL TWICE WEEKLY**

GIVE US A RING OR CALL IN
**2A BARTON HILL ROAD,
TORQUAY, DEVON**
TEL: 0803 312222 FAX: 326767

FAX: 0274
722229

BESCO LTD

EX-RENTAL TV's & VIDEOS

Huge selections. Complete range.
All makes and models available.

★ New Stocks Every Day ★

VHS Video from £30

Television from £3

PICK YOUR OWN VHS VIDEOS

Lots of 10 £20.00 each (*mostly complete*)

Working Ex-Equipment Panels

IF	Converger	Decoder	Line Scan	Power	Frame
T20//22X	5	14	18	17	14
T26 X	5	16	20	17	X
Philips G11 14.505	5	12	20	20	11.50

All prices include Postage & Packing. But + VAT

★ IF THE PANEL YOU REQUIRE IS NOT LISTED PLEASE ASK ★

BRADFORD

Springmill St
Manchester Rd, BD5 7RL
Ring Tony (0274) 308186

MANCHESTER

Unit 3, Mersey Rd.
North Ind Est., Failsworth
Ring David (061) 683 4612

Visa/Access welcome

Prices are Plus VAT & Based on Quantity

OPEN 6 DAYS 9-5

COLOUR TRADE

ESTABLISHED 1973 - WHOLESALE ONLY

NEW 'B' GRADE

ONLY

LATEST
NICAM
FASTEXT
F.S.T.

MAJOR BRANDS
TV - VIDEO - HIFI
SATELLITE

COMPLETE BOXED - WITH STAND
- HANDSET - BOOK - ETC - MINT

Phone 021-359 7020

FAX 021-359 6344

221-222 BRIDGE ST WEST, HOCKLEY,
BIRMINGHAM B19 2HU

West Midlands T.V. & Video Wholesale

Have now moved to their new warehouse
SPECIAL OPENING OFFERS NOW
on full range of ex-rental TVs and Videos, working and un-tested



**JUST ARRIVED NEW B-GRADE SAMSUNG
LONG PLAY VIDEOS ONLY £129**
20" TELETEXT TVs £139 14" RC PORTABLES £95
MICROWAVE OVENS FROM £55
AND FULL RANGE OF MIDI HI-FI RADIO CASSETTE CDs IN STOCK
ALL TESTED AND BOXED
GOOD AS NEW WITH INSTRUCTION BOOKS

½ mile of Junction 10 M6.

Easy Parking facilities.

UNIT 3, BENTLEY LANE INDUSTRIAL PARK

BENTLEY LANE

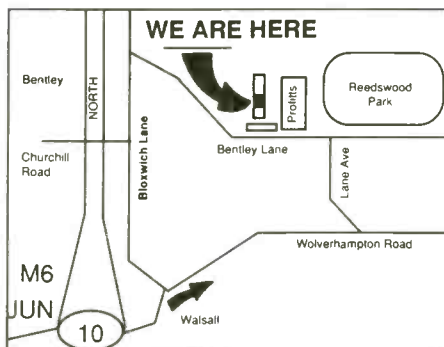
WALSALL WS2 8TL

Tel: 0922 724542

Fax: 0922 722208

OPEN: Monday to Friday, 9-6pm

Saturday, 9-2pm. Sunday by appointment



NATIONAL TV DISTRIBUTORS

TEL: 021-505 2619

19 LOWER HIGH STREET,
WEDNESBURY, WS10 7JX

SELECTED RANGE OF STOCK AT UNBEATABLE PRICES

3V29
£55

FRONT
LOADER
£75

TX9-10
£25

CHEAP
COLOUR
£15

3V35
£80

PRICE IS
RIGHT COME
DOWN
NOW!

TX TEXT
£45

ALL PRICES
ARE SUBJECTED
TO V.A.T.

Only 10 Minutes Away from M5 Junction 1

SEMPLE SERVICE

THE ONLY APPROVED THORN TELEPRICE DISTRIBUTOR FOR E. ENGLAND

SIMPLY THE BEST

BEST PRICES

BEST QUALITY

IN EX-RENTAL TV & VIDEO EQUIPMENT

RING LUKE ON

Tel: 0945 476319

FOR YOUR BEST DEAL YET!

SEMPLE SERVICE

15 REGAL ROAD
WEASENHAM LANE
WISBECH
PE30 2RQ



TRADE MARK OF
QUALITY

VISIONS • LONDON

Suppliers of THORN ex-rental TVs and Videos Working or Off-the-pile

Unit 4, Rainstar Ind. Estate, Eley Estate, Nobel Rd, Edmonton N18 0AA (just off the A406)

Phone Now!! 081-807 7476/7579

OPEN
9 - 5.30 MON to FRI
9 - 1 SATURDAY

EXPORT
ENQUIRIES:
Fax 081-345 6597



ELECTRONICS

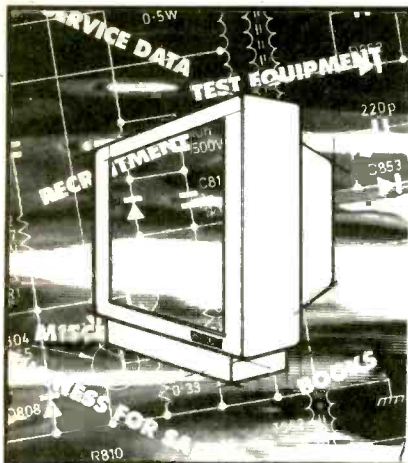


Main Distributor in London

OPEN SUNDAYS BY APPOINTMENT ONLY

APPROVED
THORN TELEPRICE
DISTRIBUTOR

CLASSIFIED CLASSIFIED CLASSIFIED CLASSIFIED CLASSIFIED



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 £10.35 per single column centimetre (minimum 3 cm). Classified advertisements 70p per word (minimum £12), box number £4.00 extra. All prices plus 17½% VAT. All cheques, postal orders etc., to be made payable to Reed Business Publishing Group. Advertisements, together with remittance, should be sent to the Television Classified Room L327, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.



PHONE 081-661 8339 FAX 081-661 8931



LINEAGE

AVO MULTIMETER MODEL 8, £45.00. 500 volt meggers £30.00. Prices plus VAT and p&p. Send SAE for lists of Surplus Instruments & Scopes etc. A.C. Electronics, 17 Apleton Grove, Leeds LS9 9EN. Tel: 0532 496048.

TELEQUIPMENT COMPONENT TESTER, Marconi 'Q' meter, modern oscillograph, frequency standard potentiometric recorder, working. No instructions. Offers and details. Tel: 051 523 3174.

TV/VIDEO SERVICE SALES SHOP. Living accommodation. Stock. S. London/Surrey borders. Selling lease £5,000 ono. Tel: 081 640 3155. Rent £40 wk.

SKY VIDEOCRYPT DECODER SERVICE SHEETS with colour decoding tracks, £15. Amstrad Satellite tuneable audio, £18. E.M.O. Ramsbottom, Lancashire BL0 9AG. Tel: 0706 823036.

VIDEO TECHNICIAN WANTED. Good pay rates. Apply Jomill Enterprises, 173 Dalston Lane, E8. Tel: 081-533 2229.

C.R.T. for oscilloscopes, monitors etc. Regret no domestic TV types. Possibly biggest stock of scope type in England! Big stocks of DG7-5/6/32, M31-184W. Billington Export, Unit F2 Oakendene Industrial Estate, Near Horsham, West Sussex RH13 8AZ. Callers strictly by appointment only. Phone 0403 865105, Fax 0403 856106, Telex 923492 TRA G.

PRIVATE RETAILER has excellent part exchange colour televisions and videos to clear. Tel: 0494 814317.

BUSINESS FOR SALE, well established reputation, TV/video, audio sales and repairs. Freehold shop and living accommodation, £67,500. SAV. Tel. 0270 214284.

EVERY ISSUE OF TELEVISION Magazine from January 1982 to December 1991 £150 plus postage. (0225) 790057.

6 COLOUR PORTABLES, inc. Teletext. 5 VHS Video, inc NVG12. 10 CTV's. £200 lot, no offers. 0298 71689.

WANTED: KT66, KT88, PX4, PX25 transistors etc. If possible send a written list. Prompt reply and payment. Billington Export, Unit F2 Oakendene Ind Est, Near Horsham, West Sussex RH13 8AZ. Callers strictly by appointment only. Phone 0403 865105, Fax 0403 856106, Telex 923492 TRA G.

BUSINESS FOR SALE. TV, video sales and repair. Very profitable, long lease. S/E London. Rent £7,000 acc available. Price £25,950. Part finance/ownership a possibility. Tel: 071-274 8669 (mornings). No time-wasters please.

WANTED REGULAR SUPPLIES of large & small quantities television & VHS videos, best prices paid. Tel. (0934) 641742 (daytime), 516483 (evening).

EX EQUIPMENT Television and Video spares available. Panels, Lopt, Tuners, Handsets etc. JH Services. Tel. 0243-820311.

VALVES, HUGE STOCKS, credit cards accepted. Full 45 page valve catalogue now available £2.00 post paid. VNC, 20a Cossham Street, Mangotsfield, Bristol BS17 3EN. Telephone: 0272 565472 (24 hours). Fax: 0272 575442 (24 hours).

OCHRE MILL TECHNICAL SERVICES. Grundig TV spares for most models to 1985, fast, friendly, helpful, sensible prices. Gr Lype Farm, Charlton, Nr. Malmesbury, Wilts SN16 9DR. Tel. 0666 823228.

HAMEG OSCILLOSCOPE HM203-7 20 MHz dual trace. Brand new in box, unused. Complete with probes, manual etc. Still under guarantee. Bargain £325 ono. Tel. 0925 753157.

WANTED GOODMAN'S 20RC5160TT chassis, Sony 2705 L/T/B. For sale new Thorn 9000, 9600 psu. 0474 365782.

SMALLHOLDING FOR SALE, N. Wales, 10 miles Betws-y-Coed, fully modernised house, excellent potential TV servicing. Only £98K. Send for full details: Rick, 23 Russell Avenue, Colwyn Bay, Clwyd LL29 7TR. (0490) 82672, a.s.a.p.

CONTINENTAL NICAM DECODER boards, (Toshiba). Same chip set as Maplin. Some data. £18. Call 0752 405201 evenings.

WANTED

WANTED

Regular Supply of Ex-Rental Colour TVs and Videos.

Cash on Collection - Quick Service

Tel. 0742 312832

ALLPARTS DISTRIBUTORS

SATELLITE SPARES

TV & VIDEO SPARES FOR THE TRADE AND PUBLIC
BELT KITS, TRANSISTORS, ICs, REMOTES,
FERGUSON, PANASONIC, SHARP, GRUNDIG, SONY,
KONIG, PHILEX, AMSTRAD

ALLPARTS DISTRIBUTORS

101 ROCKY LANE, TUEBROOK, LIVERPOOL 6 4BB

051-260 4825

SURPLUS/REDUNDANT ELECTRONIC COMPONENTS WANTED

I/Cs - Tuners - Transistors - Valves - Diodes etc. any quantity considered - immediate payment.

ADM Electronic Supplies

Tel. 0827 873311.

Fax 0827 874835

TELEVISION CLASSIFIED LINEAGE

advertisements can be submitted on this coupon with a cheque made payable to Reed Business Publishing Group. Television Classified Room L327, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. The charge per word is 70p plus 17½% (minimum £12.00 + VAT.)

For Issue Dated or next available. Total insertions Total of Cheque £.....
Name Address.....
Post Code Tel Num Signature



Debit my Access/
Visa Card (delete)



--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Expiry Date VAT Reg. No. 238 8937 10

CLASSIFIED CLASSIFIED CLASSIFIED CLASSIFIED CLASSIFIED

MARCH MADNESS!

**DON'T GET CAUGHT OUT BY RUNNING OUT OF POPULAR SPARES.
BUY OUR KITS NOW! FANTASTIC SAVINGS!**

KIT 1.

- 5 x BU 208A
- 1 x STK 5481
- 1 x STK 5333
- 1 x STR 50103A

Price when bought separately — £37.20

- 10 x 3.15 A.S. FUSES
- 1 x SHARP IDLER 0005
- 1 x SHARP IDLER 0006
- 1 x HITACHI IDLER UT11 ETC
- 5 x VIDEO LAMPS

KIT 1 PRICE — £30.00!

KIT 2. As above, but including the ever-popular 3HSS Head and 2 Back-up Batteries (1.2 Volt & 2.4 Volt)

Normal price — £57.50

KIT 2 PRICE — £40.00!

P/P ON ABOVE KITS £2.00. ALL PLUS VAT.

WE ALSO STOCK A FULL RANGE OF TRANSISTORS, ICs, REMOTES, HEADS ETC.
HUNDREDS OF USED BOARDS, DECKS, CABINET PARTS ETC. WHY BUY NEW?
CATALOGUE OUT SOON! SEND BUSINESS CARD/LETTERHEAD FOR MAILING LIST.
IMMEDIATE CREDIT TO BONA FIDE TRADERS.



MAIL ORDER



STOCKS AND SPARES

UNITS D1/D2, VICTORIA MILL ESTATE

MANCHESTER ROAD, DROYLSDEN

MANCHESTER M35 6EQ

PHONE 061 370 7959 FAX 061 371 8398

P.S. ASK FOR TRADE COUNTER WHEN YOU RING 'COS IF THE BOSS FINDS OUT ABOUT THESE PRICES WE'RE SACKED!!

INTEGRATED CIRCUITS

PRICES INCLUDE VAT. Add £1.18 POSTAGE

TV & VIDEO I.C.s	LA7033	3.29	
AN262	1.12	LA7210	1.47
AN304	2.96	LA7505	2.06
AN5015K	2.94	LA7910	1.23
AN5612	1.81	LU11417A	4.23
AN5620X	3.11	LU52511A	4.23
AN6306	6.46	LVA508	1.65
AN6320N	2.47	LM1889N	3.29
AN6326N	2.88	M51393AP	2.94
AN6328	2.88	MC1408P8	1.18
AN6346N	3.08	MN15823FVG	12.69
AN6347	2.47	OEC0001B	5.23
AN6350	5.02	OEC0005	5.23
AN6360	2.14	OEC2001	3.35
AN6362	3.47	SONY CX134A	4.99
AN6881	2.70	TD62105P	1.18
BA618	1.35	ULA1H035E2	1.82
BA6301	1.65	UPA53C	4.05
BA7001	1.23	UPC1382C	.90
BA7004	1.65	UPC1397C	3.70
BA8500	11.69	14DN156	5.29
HA17458PS	.86	14DN157	5.29
LA7031	2.06	14DN244C	5.70
LA7032	2.42		

HANDSETS

VCR4600/4600MkII	£11.75	
VCR4700	£17.63	
VCR5200	£11.75	
VCR6100 Barcode	£29.38	
TS90/99 Tower System	£11.75	
VCR9000 Handset	£11.75	
L.O.P.T.		
CTV1000	FB182K	£11.75
CTV1400	FB165KA	£11.75
C1V200	FB171	£9.40
CTV2000	FB171K	£9.40
TVR2	1810951	£13.51
TVR3	181297	£13.51
PC12-HRCD/D	MSH1FCT31	£14.10

CONVERTERS

4700 RF CONVERTER	£5.88
5200 RF CONVERTER	£7.05

SATELLITE EQUIPMENT

DISHES, FEEDS, LNB'S ETC.
AVAILABLE. PHONE FOR LIST.

Harrison Electronics

CENTURY WAY, MARCH, CAMBS PE15 8QW.
FAX: (0354) 51416. TEL: (0354) 51289

AMSTRAD

PRICES INCLUDE VAT, POST AND PACKING EXTRA.

P.C.B.'s	4600 Video and Audio PCB	£17.63
4600 Systems Control/Servo PCB,		£29.38
Display and Control PCBs		
4600 MkII Video and		
Audio/Timer/Control PCB Assy.		£40.82
4700 Video and Audio/		
Timer/Control PCB Assy.		£40.82
VCR100 Video and Audio/Timer/		
Control PCB Assy.		£40.82
5200 Timer and Channel Display		
PCB Assy.		£17.63
5200 Audio Tuner PCB		£15.28
5200 Video PCB		£14.10
5200 Syscon. Servo Power PCB		£23.50
4600 Mk II/4700 Power Supply		£4.70
CTV1400 Main PCB		£29.38
CTV2200 PCB No:3 (Part 270087)		£3.53
CTV2200 PCB No:4 (Part 270088)		£4.70
TVR1 Control Panel/Presets PCB		£7.05
TVR2 Main TV PCB		£37.60
TVR3 Main TV PCB		£43.48

MECHANISMS

4600 Video Cassette complete		
mechanism (no drum or video		
heads)		£29.38
4600 Video Cassette complete		
mechanism (with drum no video		
heads)		£35.25
9000 Cassette Housing Assy.		£15.28

MOTORS

4000/4700 Capstan Motor		£11.75
7000 Loading Motor MCB2B01		£3.53
9000 Loading Motor MCB9B02		£3.53

TUNERS

5200 Varicap Tuner Type 1810829		£7.05
7000 Tuner CNV87358C2		£7.05
CTV1400 Tuner CNV87509F2		£5.88
CTV2200 Tuner UF2-831F		£5.88

PARTS OFF PCB'S AND MECHANISM.
PHONE FOR PRICING

ALL ITEMS ARE BRAND NEW AND GUARANTEED
** SAME DAY DESPATCH **

Write or Phone for FULL catalogue.



INFOTECH



76 CHURCH ST, LARKHALL, LANARKS ML9 1HE

Tel. (0698) 884585 Mon-Fri 8.30 am-5.00pm

Tel. (0698) 883334 Outwith business hours

FAX available all day, Mon-Sat, either line

Large SAE for FREE catalogue of other publications

PRACTICAL GUIDE TO BUY, SELL, REPAIR & SERVICE USED VCRs

NEW

At last! Everything you need for handling VCRs

How to buy ex-rental lots or single recorders
More stock faults for the commonest ex-rental models
than elsewhere at many times the cost
Brilliant practical repair and service system.

Introductory price £6.99

PRACTICAL GUIDE TO BUY, SELL, REPAIR & SERVICE USED TVs

More real data than books at three times the price

Only £9.95

BOTH GUIDES for only £13.90

COMPREHENSIVE ELECTRONIC DATA REFERENCE MANUAL

Still only £5.95

Thousands of models, CTV, VCR, Camera, CD, Satellites,
Audio, etc. All known equivalents & identification shown
with all types of available data for each at latest prices.

CLASSIFIED CLASSIFIED CLASSIFIED CLASSIFIED CLASSIFIED

**WIZARD DISTRIBUTORS
MANCHESTER**
TV, VIDEO & SATELLITE SPARES

**LOEWE, SCHNEIDER,
FERGUSON, HITACHI**

and many other always in stock -

Video Heads for over 500 models
Service Manuals for over 200 models
Handsets for over 200 models
Spares for over 20 manufacturers

Plus huge range of IC's, Semiconductors and Service Aids, etc. etc.

WIZARD OFFER A GREAT DEAL

Counter open Monday-Friday 9am-4.45pm
Mail Order-Access/Visa

TRADE ONLY

**EMPRESS STREET WORKS,
EMPRESS STREET,
MANCHESTER M16 9EN.**
Tel: 061-872 5438; 061-848 0060.

For further details
on classified
please contact
PAT BUNCE
on
081-661 8339

RCS VARIABLE VOTAGE D.C. BENCH POWER SUPPLY
1 to 24 volts up to 1/2 amp. 1 to 20 volts up to 1 amp. 1 to 15 volts up to 1 1/2 amps D.C. Fully stabilised. Twin panel meters for instant voltage and current reading. Overload protection.
Fully variable. Operates from 240V A.C.
Compact Unit: size 9 x 5 1/2 x 3 ins.
£45 inc. VAT + Post & Ins. £4

NEW MODEL. Up to 38 volts DC at 6 amp. 10 amps peak. Fully variable. Twin panel meters. Size 14 1/2" x 11" x 4 1/2". £96 inc. VAT. Carr. £6.

RADIO COMPONENT SPECIALISTS

ACCESS 337 WHITEHORSE ROAD, CROYDON SURREY, U.K. Tel: 081 684 1665 VISA

List, Large S.A.E. Delivery 7 days Callers Welcome Closed Wednesday

VIDEOS TRADE:
ALL MAJOR BRANDS
PRICES START FROM
£45 SERVICED
£25 NON SERVICED
USED SPARES NOW AVAILABLE
VHF/UHF CONVERTERS IN STOCK

WE ARE EXPORT SUPPLIER
JOMILL ENTERPRISES
173 Dalston Lane, Hackney E8
TEL/FAX 081-533 2229
081-986 4710

RECRUITMENT

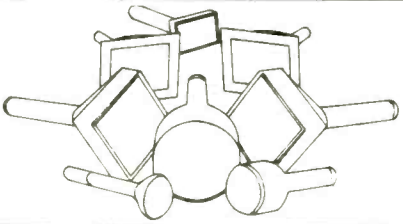
VIDEO & TELEVISION ENGINEERS

2 First Class Bench/Field Engineers required to service industrial and domestic AV equipment. First class salary and working conditions. Applicants must be experienced, energetic and fit. Be of smart appearance, have a good manner with people and be prepared to help develop and promote our service image. Excellent prospects for the right people. References will be required. Apply to L. Williams

Audio Visual Maintenance Ltd.
28 Windmill Road, Hampton Hill, Middlesex.
Telephone: 081-979 9573

TUBES

NEW CENTURY ELECTRONICS LTD.
UNIT 3, SWAN WHARF, WATERLOO ROAD,
UXBRIDGE, MIDDLESEX UB8 2RA.



MANUFACTURERS OF HIGH PRECISION, HIGH RESOLUTION PHOTOQUALITY CATHODE RAY TUBES

Applications:—

- Scanning Electron Microscopes
- Medical Imaging
- Telecine
- Camera Viewfinders etc

Remanufacture Service also available

Why not telephone Dave Dyson on (0895) 255800 to discuss your requirements?
Fax No.: 0895 255619

INFOTECH

76 CHURCH ST, LARKHALL, LANARKS ML9 1HE
Tel. (0698) 884585 Mon-Fri 8.30 am-5.00pm
Tel. (0698) 883334 Outwith business hours
FAX available all day, Mon-Sat, either line
Large SAE for FREE catalogue of other publications

VIDEO RECORDERS
Save a fortune buying data

CIRCUIT COLLECTIONS £219
All JVC/Ferguson/Baird as 3V00-3V01-3V16-3V22-3V23-3V29-3V30-3V31-3V35-3V36-3V38-3V39-3V43-3V44-3V45-3V48-3V53-3V58-3V59-3V64-3V65-FV11-FV12 plus all the main models from AMSTRAD FIDELITY GRUNDIG HINARI HITACHI PANASONIC PHILIPS PYE SANYO SHARP SONY TOSHIBA plus all clones, modifications and other brands in 7 huge binders.

FAULT GUIDES £79.95
35 guides covering the stock and standard faults for every model included in the above collection.

COMPLETE SYSTEM £399
Enough data to set anyone up in the business of servicing and repairing VCRs. Includes all the above circuits, layouts and repair guides plus over £350 worth of Service Manuals plus many other VCR publications.

**VIDEO CASSETTE RECORDERS
A SERVICING GUIDE**
3rd Ed. by S. Beeching Price £30.00
FREE WITH CIRCUITS COLLECTION

SONY TUBES REPROCESSED WITH ORIGINAL SONY GUNS

HIGH TEMPERATURE RE-PROCESSING of Sony, Mullard 45AX, 30AX, In-line, PiL, Mini (22.5mm) Neck and FST Tubes.

370KR22 £48.00	A51-231X £46.00	A51EAL00X £58.00
370LH22 £48.00	A51-570X £46.00	A51EBS00X £58.00
400EF22 £58.00	A51-580X £46.00	A51JAR00X £54.00
510YX22 £58.00	A51-590X £46.00	A53JBW00X £64.00
520SB22 £64.00	A56-540X £48.00	A59EAK00X £64.00
560GB22 £54.00	A56-701X £48.00	AXM37-001 £44.00
560DY22 £54.00	A66-540X £56.00	ACT37-001 £44.00
570HB22 £64.00	A67-701X £56.00	AXM51-001 £46.00
680DB22 £85.00	A34JBU10X £74.00	AXT56-001 £52.00
680EB22 £85.00	A49JHT00X £64.00	

For tube types not listed please enquire. All prices quoted are excluding VAT. Exchange CRT is required. Callers welcome. Please phone first. Nationwide Delivery Available.

Your local stockists are:

WEST ONE Distributors Ltd. Chesham, Bucks. Tel. 0494 776197

WELL VIEW 114734 Midland Road, Luton, Beds. LU2 0BL Tel. 0562-402499

WELL VIEW Southampton, Hants. Tel. 0703 449783

THRIFTY SPARES (WALES)
Centrevision House, Sloper Road, Leckwith, Cardiff CF1 8AB

INCREASE YOUR PROFITS WITH USED SPARES
MANY MAKES OF USED VIDEO AND TV PANELS - GUARANTEED WORKING HUNDREDS NOT LISTED - PHONE OUR HOTLINE

0222 344218

VIDEO THORN, HITACHI, TOSHIBA, I.T.T. SHARP, AMSTRAD, PANASONIC ETC.

USED WORKING VIDEO SPARES	From	WORKING DORIC MK3, MK4, MK4A BOARDS	
MIXED BOOSTER	£12.80	MK3A LINE SCAN (STATE TUBE)	£10.00
SERV0 PANEL	£15.50	MK3A POWER PANEL	£12.50
LOADING MOTOR ASS	£10.50	MK3A IF VIDEO ETC	£8.00
BOTTOM BOARD	£20.50	MK4 LINE SCAN	£22.50
MODULATOR	£15.50	MK4 POWER PANEL 90 OR 110	£15.50
MECHACON	£15.50	MK4 IF PANEL	£12.50
DRUM ASS	£12.80	MK4 VIDEO	£5.00
CAPSTAN MOTOR	£15.50	MK4 MANUAL TUNER HEAD ASS	£12.50
POWER PANEL	£15.50	MK4 REMOTE BOARD	£10.00
TUNING BOARD	£18.00	MK4 TEXT BOARDS	£10.00
IR100 PROGRAMMABLE REMOTE	£20.50	MK4 FRONT ASSEMBLY	£10.00
CONTROL	£15.50	MK4 TRIPLERS	£5.50
RC5301 KT330	£10.50	MK4 CRT TUBE CALLERS ONLY	£23.00
RC306 I.T.T.	£10.50	MK4 TEXT HANDSET	£11.50
MANY MORE AVAILABLE - ALL HANDSETS + VAT ALSO SPECIAL RATES FOR P&P		MK4A TEXT HANDSET	£11.50

ALL ABOVE PRICES VAT INC. MANY MAKES OF TV USED - SPARES ALSO IN STOCK

OPENING HOURS 9am-1pm - 2pm-5.30pm

POSTAGE & PACKING FROM £2.50 ORDERS OVER £50 P&P FREE

DON'T DELAY PHONE 0222 344218 TODAY **24 HOUR ANSWER PHONE**

CLASSIFIED CLASSIFIED CLASSIFIED CLASSIFIED CLASSIFIED

FOR SALE



MICRO-LAB

Save TIME and MONEY
by speeding up fault diagnosis.

Our MICRO-LAB instruments will
help you find faults faster.

The improvements can be dramatic.

We know! We use them!

Write or phone for a free brochure.

COLEBOURN ELECTRONICS

Dept TV, 20 Folly Lane, Telephone
St Albans, AL3 5JT 0727 44785

BUSINESS FOR SALE

TV VIDEO AUDIO SALES/REPAIR

Large double shop, main road position.

LOW RENT - LONG LEASE

TAKINGS £125,000 PA AND RISING

VERY PROFITABLE BUSINESS

£55,000 inclusive

Tel: Brighton 0273 623254

BASIC ELECTRONICS TUITION

Do you have an interest in electronics, either
as a future career or to pursue as a leisure
activity? Do you have trouble locating faults
in equipment, or safely adapting circuits to
meet your specific needs? If so, and want to
do something about it, send for details of the:-

Direct Personal Learning course

K. Sparrow etc 11 Claydon Green
Whitchurch BRISTOL Avon BS14 0NG
Telephone: (0275) 835669

REPAIRS

LOEWE OPTA TV REPAIRS

FAST EFFICIENT SERVICE

Factory Trained Engineers

Competitive Rates

MARWETECH,

Unit A7B, Aladdin Workspace,

426 Longdrive, Greenford,

Middlesex UB6 8UH.

Tel: 081-575 0434 Fax: 081-575 0468



MANUALS

1. WHY TURN WORK AWAY BECAUSE YOU HAVEN'T GOT THE MANUAL?

2. WHY BUY A MANUAL YOU MAY NEVER USE AGAIN?

JOIN "THE LIBRARY!"

A one off annual fee of £40.00 + VAT gives you
access to our vast library of manuals covering the
full range of brown and white goods. Up to
two manuals at any one time for up to two weeks.
Have as many as you like during the year!! The
best idea to hit the servicing trade in years!

Don't be the one that turns work away -
be the one that counts the money!!

**LOTS OF SPARES AVAILABLE -
SEE OUR OTHER AD!**

STOCKS AND SPARES

Electronic Component Distributors,
Unit 2, Victoria Mill Estate, Manchester Road,
Droylsden, Manchester M35 6EQ.

TEL: 061-370 7959 FAX: 061-371 8398

ACCESS MAIL ORDER VISA

SERVICE DATA

A GUIDE TO SERVICING DOMESTIC VIDEO CASSETTE RECORDERS

A fully comprehensive series consisting
of 7 separate videos, with additional
illustrated teaching booklets.

This set of teaching programmes is a
must to anyone concerned with the
understanding and repair of video
cassette machines.

Programmes also available
separately.

Microforge Limited, 339 Clifton Drive South
St. Annes, Lancashire FY8 1LP

Tel: 0253 725499

Please send me further information on
'SERVICING DOMESTIC VIDEO CASSETTE RECORDERS'

Name

Address

Post Code

Please note new
telephone number from
25th February 1992

081-652 8339

Commercial & Trade Technical suppliers for over 20 years Technical Information Services



76 CHURCH STREET, LARKHALL, LANARKSHIRE, ML9 1HE

Tel.(0698) 884585 Mon-Fri 8.30am - 5.00pm or (0698) 883334 Outwith business hours

FAX facility available all day on both lines

Write now with an SAE for your FREE QUOTE, FREE CATALOGUE & FREE NEWSLETTERS

ALL TRADE ADDRESSES GIVEN !FREE! JUST PHONE TO FIND THE NUMBER/ADDRESS YOU NEED



Some Selected titles (Taken from over 150)

Practical TV Repairs 2nd Ed.	£16.95	S.Beeching's VCR Servicing	£25.00	Refrigeration Pocket Book	£14.95
CTV Servicing by G.King	£16.95	Servicing Mono TV's	£17.95	Spectrum Repair Guide	£5.00
The PAL System	£8.50	VHS Common Faults	£3.50	Spectrum Complete (+,128k,etc)	£35.00
TV & Video Technology	£12.95	Microwave Servicing	£9.95	Europ'n Scrambling Sys's *New Sections	£29.00
TV & Video Engineers P/Book	£12.95	Hi-Fi Servicing Guide	£9.95	Data Reference Manual	£5.95
Practical Radio Serv' & Repair	£12.95	Servicing Audio & Hi-Fi	£25.00	Principles of Compact Disc	£3.50

Remember, not only do we have EVERY service sheet ever produced, but we also have
THE WORLDS LARGEST COLLECTION OF

SERVICE MANUALS



& WE ARE SOLE SUPPLIERS OF VARIOUS FAULT-FINDING GUIDES, REPAIR MANUALS & TECHNICAL MANUALS



INTEGRATED SYSTEMS from TIS

10 Giant binders of CTV Circuits, Schematics, PCB's, Waveforms, etc.	£265.00
6 Giant binders of VCR Circuits, Schematics, PCB's, Waveforms, etc.	£190.00
All 6 VCR binders PLUS 30 Fault-Finding Guides for ALL models covered	£230.00
The 10 CTV Binders PLUS over 20 CTV Repair Guides & lots, lots more	£399.00
All the CTV & Repair Guides PLUS VCR binders PLUS fault finding, etc.	£599.00
TVAR complete, Two books & two binders of Giant diagrams (upto A2)	£89.45

SERVICE MANUALS

Available for most equipment. TV, Video, Audio, Test, Amateur Radio, Military Surplus, Kitchen, Vintage Valve, Computers etc.

Over 100,000 manuals available for equipment from 1920's to the present. Originals or photostats supplied as available.

FREE Repair and Data Guide Catalogue with all orders or send SAE for your copy today.



MAURITRON(TV)



8 Cherry Tree Road, Chinnor, Oxfordshire, OX9 4QY.

Tel: (0844) 51694 Fax: (0844) 52554

EST. **COMETO THE** 1977
EXPERT
J.W. HARDY 021-784 8478

FOR MORE CHOICE + VALUE + KNOW-HOW

SEE PREVIOUS ADVERTISEMENT FOR COMPREHENSIVE PRICE LIST

<p>J.W. HARDY 8-WAY AMPLIFIER FOR TV DISTRIBUTION</p> <p>High quality - top value. Frequency: 470-860 MHz Gain: 2dB per outlet Power: 240v AC 4.8 Watts Rugged, screened case. £18.95</p>	<p>New For 1992 * AMSTRAD 600 RECEIVER Videocrypt Decoder D2 Mac Decoder Eurocrypt Decoder P.O.A.</p>	<p>NEW - X10 POWERMID Uses your existing remote controls to control your TV, VCR, stereo, CD, Satellite or Cable Converter from anywhere in your house. Just plug in - no wires £39.95 D.T.I. Approved</p>
<p>VIDEO SENDER RF 280 For ultra-clear satellite or video pictures in any room. No need for cables. Just plug in to sat receiver or video. £19.95 Non-certificated for UK</p>	<p>STOP "SPARKLIES" WITH NEW 1.2dB LNB Easy to fit - just a simple replacement. STC - 23mm collar £36.00 Continental Microwave - 40mm collar £36.00</p>	<p>"The Satellite Book" by John Breeds A complete guide to Satellite TV theory and practice. £27.95</p>
<p>TWIN OUTPUT LNB - 2 receivers from 1 dish! Revolutionary Twin Output LNB allows you to watch different programmes all over the house. Will serve up to 2 receivers. £39.00 The system can be extended up to 32 receivers from the 1 dish, in multiples of four. 4-Way Switching Box. £29.95</p>	<p>PRESENTING PACE 9200 IRD 90 channels, Wegener stereo, on-screen graphics, enhanced frequency scan mode. Access to all receiver features. NOW WITH NEW 1.2dB LNB £195.00</p>	<p>WE SUPPLY EVERYTHING IN ACCESSORIES Trade Distributors for Pace, Palcom, Promax, Amstrad, Volex, Raydex, Wolsey, Labgear, Telesat, Trax, Lenson Health, Continental Microwave. TRADE ONLY Minimum trade order £60.00 All prices quoted are plus carriage plus VAT</p>
<p>AMSTRAD SRD 400 Built-in Sky Decoder 48 channel receiver New 1.2dB LNB Black 60cm mesh dish. £146.00</p>	<p>SKY DECODERS NEW - £65.00 with 12 months' warranty SECONDHAND - £45.00 with 6 months' warranty</p>	<p>J.W. HARDY, 231 Station Rd, Stechford, Birmingham B33 8BB</p>
	<p>PALCOM RECEIVERS SL650 P.O.A £335.00 SL4000RP</p>	

TEST EQUIPMENT

P & E SERVICES

SUPPLIERS OF ALL MUTER REPAIR AND TEST EQUIPMENT.

- | | |
|---------|--------------------------------|
| BMR 95 | TUBE REGENERATOR |
| BMR 700 | TUBE REGENERATOR |
| CBE | DEGAUSSER |
| RTT 2 | VARIABLE ISOLATING TRANSFORMER |
| CSG 4 | PATTERN GENERATOR |
| AT 2 | AUDIO SERVICING UNIT |
| ION 2 | IONISER |

ASK FOR FREE BROCHURE

34 GLAN-Y-MOR ROAD, PENRHYN BAY, LLANDUDNO, GWYNEDD LL30 3PF.

TEL: 0492 549246 FAX: 0492 547880

RECENT READER RESEARCH indicates that 91% of readers responded to advertisements in Television last year.

MUTER · AT2 · BMR95 · BMR700

AT 2, Audi-Multi-Tester, 16 test-circuits for loudspeakers, tuners, amplifiers, headphones, tape recorders, mikes, boosters.

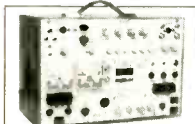


BMR 95



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.



car radios, CD-players, measurement of millivolt, drift, watt, performance; with generator, radio, signal tracer/injector, 13 volt supply etc.

United Kingdom: P & E Services, Llandudno, Tel. (0492) 549246, Fax 547880.

Ireland: Dönberg Electronics, Ranafast, Co. Donegal, Tel./Fax (0 75) 4 82 75.

New Zealand: TDON Ltd., Onehunga, Auckland, Tel. 6 68-9 07, Fax 6 68-4 99.

Germany: Ulrich Müter, Oer-Erkenschwick, Fax (0 23 68) 5 70 17.

TV & VIDEO TRADE REFERENCE MANUALS

UNIQUE REFERENCE DATA FOR THE TV AND VIDEO SERVICING TRADE.

- **TELEVISION CHASSIS GUIDE**
Listing thousands of Models (Colour & Mono) and their Chassis Designations. Enables you to identify any chassis for any TV from the model number. Order Code MTP-18.
- **VIDEO RECORDER EQUIVALENTS**
Lists all known models and their alternatives. Fully cross referenced for fast and easy use. Order Code MTP-143.
- **TRADE ADDRESSES**
Hundreds listed including TV, Video, Test and Computers. Includes all the obscure and hard to find suppliers of the unusual brand names. Order Code MTP-23.

THESE 3 BOOKS CONTAIN THE MOST COMPREHENSIVE REFERENCE DATA AVAILABLE ANYWHERE FOR THE TV AND VIDEO TRADE.

ONLY £5.00 EACH BOOK PLUS £2.00 POST/PACKING PER ORDER.

Phone your order with Access or Visa for immediate despatch. Hundreds of other Repair and Data Guides available from our Catalogue available FREE upon receipt of a stamped envelope.

MAURITRON TECHNICAL SERVICES

8 CHERRY TREE ROAD CHINNOR OXFORDSHIRE OX9 4QY



Tel:- (0844) 51694. Fax:- (0844) 52554

Service manuals available - See our other advert elsewhere in the magazine.

CLASSIFIED CLASSIFIED CLASSIFIED CLASSIFIED CLASSIFIED

Sony Music Entertainment (UK) Limited

AUDIO/VIDEO ENGINEERS CIRCA £21,000

Sony Music Operations is a leading manufacturer and distributor of audio and video products throughout the U.K.

Due to the recent introduction of a state-of-the-art Video Plant, applications are invited from people with relevant experience in the audio and video engineering fields.

The job involves the setting and routine maintenance of high speed audio and video duplicating equipment to the highest quality standards and some project work will also be involved. Ideally, you will be qualified to a minimum of HNC level, or equivalent, and possess a good electronics background with fault finding to component level.

For the above staff positions, we are offering an excellent salary. In addition, you can expect to receive a range of Company benefits, including 25 days annual holiday, subsidised restaurant and generous discount on Company product.

The Company is currently considering a number of options to ensure 7 days, 24 hours cover.

To apply, please telephone Linda Russell on (0296) 26151 for an application form. Alternatively, write to her enclosing full details to:

**The Personnel Department,
SONY MUSIC OPERATIONS,
Robans Lane, Aylesbury HP19 3BX.**

MAURITRON TECHNICAL PUBLICATIONS

The following is a selection from our vast range of Technical Manuals for the TV and Video Servicing Trade. Order some today.

Order Code	Title	Price
MTP-5	Video Recorder Faults – Repair Guide	£1.95
MTP-58	VHS Video Recorder Principles	£1.95
MTP-7	Transistor Radio Repair Guide	£1.00
MTP-9	TTL Integrated Circuits Databook	£4.95
MTP-10	CMOS Integrated Circuits Databook	£4.50
VHCK	Video Head Cleaning Kit	£3.50
MTP-9	Power Supplies & Voltage Regulators	£2.95
MTP-24	Transistor Equivalents and Testing Manual	£4.50
MTP-8	Record Player Speed Disc	£0.95
MTP-19	Telephone STD Code Location Guide	£3.95

SPECIAL OFFER: Order the full set of the above for only £25.00, a saving of £5.20 over the individual price of £30.20. Use Order code MTP-189.

Phone your order today using Access or Visa for immediate despatch.

All orders plus £2.35 post and packing.

Hundreds of other Repair and Data Guides available from our Catalogue available FREE upon receipt of a stamped envelope and sent with all orders.

MAURITRON PUBLICATIONS (TV3)

**8 Cherry Tree Road,
Chinnor, Oxfordshire
OX9 4QY**



Tel: (0844) 51694 Fax: (0844) 52554

Service Manuals available: See our other advert for details

NEW PRODUCT!!

How many wasted hours have you spent on servicing?

E.C.S. offers you complete index of approx. 5,000 TV and video faults listed in 10 years of TV mag.

Index's are alphabetically listed by make, model, fault and are now available for just:

£7.50 for Television Faults

£7.50 for Video Faults

or **£15.00** for both sets complete with protective ring binder. Regular updates are also available. But one of the above index's must be purchased in order to qualify for this service. To secure your order please make Cheques/Postal Orders payable to:

E.C.S.

**31 Prenton Road West,
Prenton, Birkenhead,
Merseyside L42 9PY.**

Please add £1.50 per order for P&P

CLASSIFIED CLASSIFIED CLASSIFIED CLASSIFIED CLASSIFIED

STANDARDS CONVERSION

AMERICAN/CANADIAN/CARIB(NTSC) VIDEO

Tapes converted to UK standard (PAL) at reasonable rates. Secam conversions and tape copying also available. We now also convert Sony 8mm from NTSC to PAL or visa versa. Private and company work welcomed.

Send material with requirements or phone/Fax 0444 400 091, 9am-9pm

AVIATION VIDEO (Gatwick), Alexanders, High Street, Handcross, W. Sussex RH17 6BS.



SATELLITE TV RECEPTION

DRAKE Receiver/Positioners from £299
Waveband Magnetic Polarisers from £29
60cm to 3m Antennas, polar mounts
11/12/4Ghz LNBs - feeds, accessories
SAE for Leaflets

KESH ELECTRICS LTD

Main Street, Kesh, Co Fermanagh BT93 1TF
Tel. 03656 31449 Fax. 39250 Tlx 747412

TRAINING

DAY COURSES

Nicam Digital Stereo

March 20th Fee £50.00

Computerised TV Receivers

April 6th Fee £65.00

*For Details Contact
Sharron Watkins,*

NORTH WEST LONDON
TRAINING CONSULTANCY
Denzil Road, London
NW10 2XD

GERMAN SERVICE SHEET SPECIALISTS

Our connections are world-wide. We furnish any kind of German, European and Japanese service sheet or manual. Thousands of different sheets and manuals in stock. For any enquiries:

DÖNBERG ELECTRONICS

Schoolmasters House, Rannafast,
Co. Donegal, Republic of Ireland.
Phone: 075 48275

TEXSCAN CATV DECODER

Tuner FX range 54MHz-450MHz. Features: full 60 channel capability. High performance. 611 MHz IF. Built-in prescaler. Uses advanced ECL. Integrated circuits and dual gate MOSFETS. Output on channel 48 UHF-PAL synthesiser controlled. Brand new, boxed, with circuits and information. Not tested.

TELFORD ELECTRONICS

Tel: 0952 605451. Fax: 0952 677978

**ARE YOU HAVING
TROUBLE GETTING
HOLD OF YOUR
REGULAR COPY OF
TELEVISION?
IF SO, WHAT
ABOUT TAKING
OUT A
SUBSCRIPTION?
FOR MORE
DETAILS, PLEASE
RING OUR
SUBSCRIPTIONS
DEPT. ON:
0444 441212
Ext. 5320**

INDEX TO ADVERTISERS

Aerial Techniques	343	Hockley Discount Televisions	366
Antex Electronics Ltd	365	Hussain Central TV Ltd	374
ASJ Electrotechnik	366	ICS-Intertext Group Ltd	365
Audio Electronics	366	JJ Components	357
Audio Vision (UK) Ltd	364	KSA Wholesale Components	370
AWI Ltd	364	Manor Supplies	331
A-Z Electric	368-369	Marapet	328
Beechwood Electronics	366	NGT Electronics	368
Bi-Tel	365	Philex plc	IBC
BK Electronics	325	PV Tubes	324
Broughfame Ltd	368	Reed Exhibitions	321
Bull Electrical	367	Satellite Solutions (UK) Ltd	327
Campion Wholesale Ltd	391	Semple Service	380
Central TV Wholesale Distribution Ltd	376	Sendz Components	388, IBC, OBC
Centrevision	375	Southern TV	364
Chromavision	370	Stewart of Reading	326
Coastal Aerial Supplies	371	Supervision	378
Colourtrade of Birmingham	379	Supreme Satellite	326
CPC Ltd	323	Swift TV Publications	366
Crewe Wholesale TV Ltd	391	Swiftpark Components	368
Cricklewood Electronics Ltd	364	Teleprice Ltd	377
Devon TV & Video	372	Thunderbird Electron Management	345
East London Components	324	Tidman Mail Order Ltd	365
Economic Devices	350-351	Tristar Manufacturing	328
EEC Satellite Services	320	Visions (GB) Ltd	380
Electronics World	328	Vista Electronics	364
Euras International Ltd	323	W T Shipping	371
Express TV Supplies	326	West Midlands TV & Video Wholesale	379
GGL Components	322	Willow Vale Electronics	319
Grandata Ltd	314-318	Wiltsgrove Ltd	373
Guild of Master Craftsmen	365		

TX90 REMOTE PANEL IC TMS1000 AND M293 £12 LNB's WITH FEED HORN AND POLARIZER 10GHz TO 12.75GHz 1.5 db s.n. £35. SEND FOR DATA.		SATELLITE RECEIVERS 19 C.H. with Hand Set £40 32 C.H. Postage £5.00		THORN FRAME IC TX100 etc JC TDA 3652 IS OBSOLETE REPLACEMENT TDA 3654 £2.00	
JUST SPRAY AND IT IS CLEAN. PHILIPS' NEW VIDEO HEAD SPRAY CLEANER: £2.10 OR 10 FOR £1.50 EACH		60cm SATELLITE DISH £35 Postage £5.00		Replaces 90% of Philips Handsets Philips Video R/T/V Handset AV5661 with LCD AV5659 display £6	
SMALL SATELLITE TUNERS (950 to 1750 MHz), L.F. frequency 400MHz..... £9.00 each VHF/UHF S.BAND TUNER..... £3.00 NEW PLASTIC CASE 32 C.H. SAT-RECEIVER (no hand set)..... £35 (Post £5) NEW METAL CASE SAT-RECEIVER, 32 C.H. WITH DOLBY & CHANNEL C (no hand set)..... £35 (Post £5) DAM MAINS CHASSIS AMSTRAD MONITOR C..... £10 UNIVERSAL TRIPLER, NEW TYPE..... £10 VIDEO LEADS..... £8.00 AMSTRAD Line O.P. Transformers with Diode ZS19453..... £4.00 BU208A..... £1.00 VIDEO LAMPS, Long Lead..... £2.00 HITACHI & GEC FRAME, Thick Film..... £6.00 FIDELITY SPLIT DIODE..... FCC2215AE..... £20 FCC2015BE..... £10 FCC2215BE..... £10 K30 FRONT PANEL TEL-TX TYPE..... £10 NEW G11 LINE OP PANEL..... £3.00		CAMCORDER SANYO NP22 6v 1300mah Rechargeable Battery Pack £6.00		PHILIPS STEREO MAGNETRON 2M172 AH £20 PHILIPS STEREO HEADPHONE £4.00 PHILIPS C.D. MECH. 691-30212 £19.00	
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 TX9IF..... £2.00 THORN PANEL NoS15-353, 548.02, 564.01, 509/102, 515/173, 508/161..... £5.00 THORN TX STEREO SOUND O.P. PANEL (I.C. TA2722)..... £1.00 THORN VIDEO AERIAL AMP O1 M4-597-001..... £6.00 ULTRASONIC TRANSDUCER..... 15p IN LINE 12-35 VOLT SUPPRESSOR 4,000 MRD..... 20p		ELECTRICAL TEST METER £3 No Leads Cost £50 COMPUFILTER £12 4 13 Amp Sockets on Distribution Box with filters, plug and box lead (3 amp per socket)		Gas Soldering Irons Variety Nickel Cadmium Batteries from Telephone Type to Sub-C.50p per cell. Mainly in packs of 6 to 8. Special Price £8.00 AUTO RANGE DC and AC and Resistance Pocket 3000 Philips £12.00 G11 8 Touch Button with Lamps, Non-remote £18.00 Philips New Hand Set Digital RC5991 fit all Text Sets after G11 £12.50	
KT3-K30-K4-K40 CTK ETC Mains Switch 75p each G11 LOPTS £3.00 PHILIPS DESK TYPE Dual Power Calculator SBC1704 £7.00 K40 FOCUS POT £1.00 4.7u K73 W/W 10 for £1.00 FOCUS POT HDK TPA6006 £2.00 K73 Triplers £5.00 K3 Tex Front Panels with I.C.s (SAA 3027/PSAB3013 H0448320) £5.00 G8 100K Pots on Panel & Lead for 6 Push Button Unit K30 Mains Switch remote £1.00 K35 Mains Switch remote 75p K35 Aerial Socket and Plug in Lead to Tuner £1.50 KT3-K30 Slider Pots 4.7ku 20p each LARGE Focus Pots Fits Pye, GEC, IFT, Decca 75p		Philips Stereo Headphones No. SBC 3140 £4.00 Stereo Headphones cost £7.50 £1.00 Philips SBC3040 Mono Unit Directional Condenser Microphone £9.00 Microphone Philip Dynamic £6.00 1mm THICKNESS SOLAR POWER RADIO WITH EARPHONES £2.00 TX9-TX100 FRONT PANEL £5 WITH REMOTE £10 NON REMOTE 8 push button £10		PHILIPS Desk Calculator £7.00 PHILIPS UNIVERSAL BATTERY TESTER SBC 1695 £5.00 GEC 20AX POWER SUPPLY Mark 1 and 2 £10.00 ONE I.C. K35 Decoder £10.00 REGULATED PWR. SUP. 500MA 1.5V-12V DC switched + & - £5.00 IFT Tuner & IF. Can HF-module 2 UK £20.00 KT3-K30 IF £5.00 TX100 Push Button Unit 16 CH £10.00 WIRE PIPE stud detector £4.00 MICROWAVE leak detector £4.00 WIRE & PIPE detector £4.00	
L.C.D DISPLAY LANGUAGE TRANSLATOR — ENGLISH, FRANCAIS, DEUTSCH, ESPANOL, ITALIANO — £15 GLASS BEADS Diodes 200/1.2A 50 for £1.00		PHILIPS NEW TYPE U/V HAND SET £10		BLACK MESH DISH RECEIVER AND LNB £80 post £10	
G11 Tip Switch £20.00 G11 Panel £8.00 G11 Decoder Panel £8.00 G9 Power Panel £3.50 G8 Push Button Unit £2.00 G8 Con Panel New Back Type £4.00 50% OFF ALL G11 PANELS Have you got Acid Rain in your garden? PH METER Video Power Supply for Amstrad, Last year mod. £5.00 Mains Transformer for Amstrad Video 25p (£1 post)		MIXED TOSHIBA HAND SETS FIVE FOR £12		SECURITY FLASHING LIGHT WITH RED & AMBER LENSES & MAGNETIC FACILITIES £1.00 EACH DAMAGED AMSTRAD 1640 Colour Monitor Chassis £6 + Post £3	
LATEST VIDEO For Latest Philips, GEC, Pye and Hitachi. Front panel with memory chip and bush button and pots and 1 LED's £6.00 NEW		TX100 FRONT PANEL £5 8 Button		DECODER C-CAM PHILIP MADE FOR K40 CHASSIS IC No. TDA 3590 £8.00 FIDELITY NON TEXT HAND SET for 3000 chassis, 8 button £5.00 56420A 20A/600V THYRISTOR £1.75	
20AX GEC 1 OPT Panel with Split Diode RANK 120 Focus Pot £4.00 RANK 718 Focus Pot 75p 16 L OPT Split Diode 2433481 £1.00 E3 Panel Split Diode 2432871/2432981 £6.00 Split Diode 2433752 £6.00 T703A1 OPT Transformer Rank with Focus Pots and Diodes £2.00		100 Off 20p Each S.W. Filters 1 Off 50p Each SW 153 SW 334 SW 154 SW 179 SW 514 SW 514 SW 505C SY 179 SY 153 SY 153 SW 270 SL 178 SW 303 SY 710 SW 503 SY 177 SW 203 SY 453 SW 185A SY 630 SW 505 SY 1453 SW 146 SY 260 SW 453 SY 2153 SW 174A		LCD VIDEO AMSTRAD HANDSET for models 1990 £8 each NEW MAIN PANEL Damaged Video Panels, Amstrad Taton For parts £3.00 each BACK-UP CAPACITOR 5.5 volt. Cap. 0.047F 75p A M S T R A D 8600 VIDEO MAIN PANEL MODULATOR IF TUNER and ICs Damaged Panels £5.00 Model A1 to A33 SALORA & LUXOR 32 CH SATELLITE RECEIVERS No hand set £30.00 post £5	
MAINS TRANSFORMER 240v in/20v/8v £1.00 GREEN FLAT, NEC, LED's 3p each 100 for 12 15V015V 1 Amp Print Type £1.00 12+12V 2.8VA Print 1"x1" 75p 8+8V 1 Amp Print 75p ET596 UHF V/CAP Tuner, small £2.50 FIDELITY Panels with L.C. £5.00 FIDELITY L OPT Split Diode AT2076/80 £3.00 AT 2076/280 £5.00		SATELLITE TUNER UNIT 2427611 £15.00 TX10 8 way button unit £8.00 THORN TX90 Remote chassis 14" Complete £12.00 MSH1FCF09 £7.77		TX90 MOD 3714B The Sweep Tuning System TX9139/001 £12.00 T6070V TX9 Transistor £1.00 TX9 90D4-106-004 £1.00 TX9 90D4-009-001 £1.00 Chopper Transformer £1.00 VIDEO SCART TO SCART ALL PIN, LONG LEAD £3.00 ALL PINS TX90 TX925 TX100 Mains Switch with Stand-by and Lead 3 for £1 or 50p each UNIVERSAL VIDEO-RECORD KIT STEREO This kit may also be used to connect a mono to stereo. £10.	
2433752 £20 2432864 2432871 2432801 2435016 2433952 2434393 2432211 179648A DST1830/243 TFB3269D K4 L.O.P.T. K35 L.O.P.T. K40 2433452 2432884		SPLIT-DIODE 2433752 £20 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 110P £12.50 Orion MS-3M GEC AS-9793-4		TRANSFORMERS AT2064/0 AT2076/55 AT2068/11 AT2076/71T AT2065 AT2076/71T AT2066/35 RCO ST CT3325 AT2076/38 OT3341 AT2076/51 FBH/6SKA Orion CVC 820 2076/51 CVC 800 2432461 2433451 FIT MOST SETS New Thorn Hand Set Type uv (£10)	
ITT TUNER CAN CMR 800/3 £20.00 TTT PANEL CMC301 CMC 113 CMC302 CMC115 CMC 303 CMC964 £5.00 VIDEO LEADS 4 for £1 SEL IFT 1FB254F/2 Front Panel £15.00 DECCA — GEC — IFT 6 push button £5.00		BURGLAR ALARM £2.00 with siren 9 VOLT RELAYS 35p 5V, 12V-24V 48V Large and Small BUZZER 6 VOLT, Small 10P EACH		20 MHz OSCILLOSCOPE (5020) £200 40 MHz OSCILLOSCOPE (5042) £250 60 MHz OSCILLOSCOPE (7060A) £1000 12V/1 AMP POWER SUPPLY WITH MAINS PLUG £4 PHILIPS HALOGEN LIGHT. NEW. NO ON/OFF SWITCH. NO HANDLE WITH CORD. BLACK IN COLOUR £5 PHILIPS HAND SET G11 TEXT ULTRASONIC £10 G11 TEXT IN RED HAND SET £12.50 G11 HAND SET ULTRASONIC £10 PHILIPS RC5 EASY CONTROL £10 TRV3 Amstrad Cassette Mechanisms. New with 2 motors and sound head. £15. TRV3 Power Supply. £5. Amstrad Television Tuner UHF. Small. Fits most Amstrads. £6.	
SENDZ SEE BACK PAGE		PHILIPS SBC 521 RF SIGNAL GENERATOR £95 PHILIPS SBC 522 RGB1 GENERATOR £90 PHILIPS SBC 850 ANALOG MULTIMETER £11.50 PHILIPS SBC 520 L.F. FUNCTION £75.00 THORN TX 85 AND TX 96 CHASSIS £20.00 EACH		BRIDGE RECTIFIERS 10 FOR £1.00 4 Amp for Video Power Supply VIDEO MOTOR for VT568 type VCR2DD AMPUTNER IF for VT568 Hitachi & GEC £9.00	
NEW 12" 90% MONO TUBES £10 Fit most sets AMSTRAD VIDEO HAND SET WITH LCD £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					

