

SEPTEMBER 1989

Australia \$3.25, New Zealand \$4.80 (inc. GST), Malaysia \$6.30,
Ireland EIR2.31 (inc. VAT)

£1.50

TELEVISION

SERVICING·PROJECTS·VIDEO·DEVELOPMENTS

*Extra: SEME-Panasonic
Video Spares Chart*



Dealing with Video Tape Chewing
Repairing Remote Control Units
More on the Panasonic NV333
The Sakura Satellite TV System
Servicing the Salora G Chassis
VCR Clinic • TV Fault Finding



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 **£70.00**
Case (10"×6"×2¼") app. **£8.60**
Optional Sound Module (6MHz or 5.5MHz) **£3.90**
Built & Tested in Case including Sound Module **£108.00**



Post/Packing **£3.00**
Add VAT 15% 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 MK 4 COLOUR BAR GENERATOR KIT £30.00. CASE £8.60. BATT HOLDERS £4.20. MAINS SUPPLY KIT £4.20 (Combined P&P £3.00).

MK 4 (BATTERY) BUILT & TESTED **£58.00 + £3.00 P & P.**
MK 4 (MAINS) BUILT & TESTED **£68.00 + £3.00 P & P.**
VHF MODULATOR (CH 1 to 4) FOR OVERSEAS **£5.75.**
EASILY ADAPTED FOR VIDEO OUTPUT & C.C.T.V.

ADD
VAT
15%

KITS & 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. £1.00.**
PAL ENCODER KIT (RGB to Video) **£18.50 p.p. £1.30.**
CROSS HATCH UNIT KIT, Aerial Input type, incl. T.V. sync. and UHF Modulator. Battery Operated, also gives Peak White & Black Levels, can be used for any set. **£13.50 p.p. 80p.** (Alum. Case **£3.20 p.p. £1.40.**)
ADDITIONAL GREY SCALE Kit **£2.90 p.p. 45p.**
UHF SIGNAL STRENGTH METER KIT **£30.00** Alum. Case **£3.20.** De Luxe Case **£8.60** (Built & Tested **£48.00**) p.p. **£2.50.**
CRT TESTER & REACTIVATOR KIT For Colour & Mono complete with Case, Panel Meter Indicator - can be adapted for latest CRTs **£35.00 p.p. £3.00.**

TV SERVICE SPARES

PHILIPS SPARES

G8 VARICAP CONTROL **£2.50** p.p. **£1.00.**
G8 PANELS (Tested) Power **£12.50.** Scan **£15.00.** Signals **£15.00** p.p. **£2.50.**
KT3. K30 PANELS, tested, exchange, sound, power, bridge rect. frame, RGB **£7.50** each. Decoder (Non-text) **£10.00** p.p. **£1.50.**
G11 TDA2600 IC HOLDER 70p p.p. **30p.**
G11 PANELS (tested), frame, IF, decoder **£12.50** each, p.p. **£2.00.** Scan **£15.00** p.p. **£2.80.** Power tested exchange **£18.00** p.p. **£2.80.**
G11 PANELS EX-RENTAL (untested) Scan, Frame, Decoder **£2.50** p.p. **£2.00.**
G11 IF PANEL (new) less Tuner **£2.50** p.p. **£1.30.**
G11 8POS Touch Tune Channel Selector (replaces old type) incl. instructions **£25.00** p.p. **£1.80.**
G9 POWER SUPPLY UNIT **£5.00** p.p. **£2.30.**
HANDSETS EX-RENTAL, TEXT UNTESTED, KT, TEXT/VIDEO TYPE **£3.50** p.p. **£1.00.**
MANUALS p.p. 80p. K35. 2A, 2B, CP90 **£3.50.** KT3 **£4.50.** CTX-E, CTX-S, CF1 **£1.50.** KT4, K40, 3A **£4.50** p.p. **£2.50.**

THORN/FERGUSON SPARES

8000, 8500, 8800, 9800 PANELS tested, exchange. **£8.80.** Frame, Decoder **£10.00** p.p. **£2.30.**
9000 Series IF/Decoder tested **£10.00.** Line/Power **£20.00.** Frame **£18.00** p.p. **£2.80.**
9500/9600 Line Scan **£25.00.** Power **£20.00** p.p. **£2.80.**
TX9 Panels complete & tested **£28.00** exchange (shop only)
TX9/TX10 Facia, control panel incl. infra-red receiver **£5.00** p.p. **£2.00.**
TX10 Focus control **£8.50** p.p. **£1.00.**
TX9/TX10 Saw filter IF panel **£5.00** p.p. **80p.**
TX9/TX10 Remote & tuning control panel 1515 (incl. SAA5012) **£7.50** 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.**
TX Sweep Tune 1509G (incl. UAA1008 + BATT.) **£3.50** p.p. **£1.80.**
TX10 Stereo Audio Board **£3.50** p.p. **£1.80.**
TX90 20" Chassis. Brand new **£25.00** p.p. **£2.80.**
TX10/TX90/TX100 Chassis complete & boxed (untested) **£20.00** p.p. **£2.80.**

IC SELECTION

LA7810	£1.80	SL1430	£1.80	TDA1170	£2.20	TDA2594	£3.80	TDA3571	£4.80
LA7811	£3.50	SL1432	£1.20	TDA1180	£2.20	TDA2595	£4.80	TDA3576	£5.80
M293B1	£5.80	SN762260N	£1.80	TDA1190Z	£2.20	TDA2600	£7.50	TDA3650	£5.80
MC13012P	£5.80	SN76705	£9.80	TDA1470	£2.80	TDA2611A	£1.90	TDA3651	£4.20
ML237	£3.80	STK5325	£6.80	TDA1670A	£3.20	TDA2640	£3.20	TDA3652	£3.20
ML238	£6.80	STK5471	£6.50	TDA1701	£3.80	TDA2653A	£3.20	TDA3653A	£5.90
ML923	£4.80	STK5481	£8.80	TDA1770	£3.20	TDA2654	£5.70	TDA3653B	£3.20
SAA1024	£5.80	STK7308	£8.80	TDA1870	£6.80	TDA2655	£6.80	TDA3654	£3.20
SAA1025	£5.80	STK7348	£10.80	TDA1908	£2.80	TDA2670	£3.20	TDA4420	£2.20
SAA1124	£3.50	STR441	£7.80	TDA1940	£3.20	TDA2680	£3.80	TDA4421	£3.21
SAA1251	£6.80	STR450	£6.80	TDA1950	£3.50	TDA2690	£3.80	TDA4442	£6.80
SAA3027	£5.80	STR451	£5.80	TDA2150	£3.20	TDA2780	£3.50	TDA4500	£5.80
SAA5000	£2.80	STR4211	£6.80	TDA2270	£2.80	TDA3190	£4.20	TDA4501	£6.80
SAA5010	£5.80	STR50103	£8.80	TDA2510	£6.80	TDA3300	£6.80	TDA4503	£5.80
SAA5012	£5.80	STR6020	£5.80	TDA2522	£3.80	TDA3301	£6.80	TDA4600	£2.80
SAA5020	£5.80	TBA120	£1.20	TDA2548	£5.80	TDA3330	£3.50	TDA4601	£2.80
SAA5030	£5.80	TBA750	£2.20	TDA2571	£3.80	TDA3500	£6.60	TDA4610	£3.80
SAA5050	£6.80	TBA920	£2.20	TDA2576A	£3.80	TDA3510	£9.80	TDA4810	£6.80
SAB3035	£7.50	TBA950	£2.20	TDA2577	£4.80	TDA3540	£2.50	TDA4810	£3.80
SAB3037	£15.80	TCA270	£1.80	TDA2577A	£4.80	TDA3541	£3.50	TDA49403	£3.80
SAB1032	£4.50	TCA800	£5.30	TDA2578	£3.80	TDA3560	£4.80	TDA9503	£3.80
SAB1039	£2.20	TDA1035T	£2.40	TDA2579	£3.80	TDA3561A	£5.80	TDA9513	£4.80
SL470471	£2.80	TDA1037	£1.90	TDA2581	£2.20	TDA3562A	£5.80	TEA1009	£2.20
SL486	£3.20	TDA1044	£2.90	TDA2582	£2.80	TDA3565	£3.80	TEA1014	£3.50
SL490	£2.80	TDA1082	£3.80	TDA2593	£2.80	TDA3566	£5.80	TEA2018A	£2.20

IC p.p. 50p

VARICAP TUNERS: Grundig 8630 series **£5.00** p.p. **£1.00.** U321, U322/ U341/NSF204, 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

SONY KV1882	£34.50	R.B.M. T20, T22 Bobbin	£5.60
SONY KV2092/2096	£34.50	DECCA Bradford (state Mod No)	£8.80
FERG., HMV, MARCONI, ULTRA		DECCA 100, 80	£8.80
1590, 1591, 1612, 1613, 1712	£4.80	FIDELITY ZX2000, 3000 (Not 22)	£15.50
FERGUSON 3787 (Normende)	£9.80	GEC 2110 series	£10.60
THORN 1600, 1615, 1690, 1691, 1790	£9.00	ITT CVC5 to 9, CVC20	£9.80
THORN 3000/3500 SCAN, EHT	£6.90	ITT CVC25, CVC30 series	£8.80
THORN 8000	£12.80	ITT CVC45	£9.80
THORN 9000 to 9600	£9.80	ITT CVC1200/1201	£12.50
THORN TX9	£12.50	PYE 725 (90°) 731 to 741	£9.20
THORN TX10	£16.50	PHILIPS G8	£8.80
		PHILIPS G9	£7.80
		PHILIPS KT3	£9.80
		PHILIPS K30, K35	£22.50
		PHILIPS G11	£22.50
		PHILIPS CTX-E-S	£22.90
		GEC 2028, 2040, 2100	£1.00
		PYE 691-7 chassis type only	£5.00
		R.B.M. T20, T22	£9.80
		PHILIPS CF1	£32.80

LOPT's p.p. **£1.50**

TRIPLERS: THORN 9000 **£8.80** p.p. **£1.50.**
UNIVERSAL (best quality) **£7.80** p.p. **£1.50.**
CONTINENTAL TVK & BG RANGE (quote exact no.) replacements **£13.80**
DECCA/TATUNG **£7.80** p.p. **£1.50.**
6-3V CRT Boost Transformers for Colour & Mono **£5.90** p.p. **£1.40.**
455 CRYSTALS for Remote Control Handsets. 4 for **£1.00** p.p. **50p.**
VHF to UHF Converters **£26.50** p.p. **£2.50.**

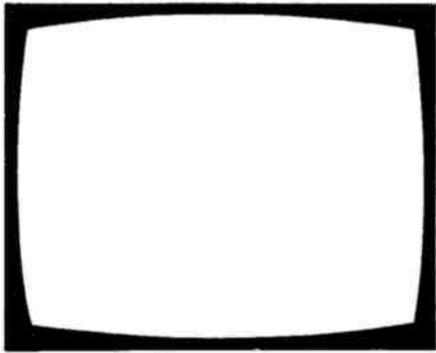
CALLERS WELCOME AT SHOP PREMISES
THOUSANDS OF ADDITIONAL ITEMS, ENQUIRIES INVITED
LARGE SELECTION TESTED COLOUR PANELS POPULAR MODELS

Telephone 01-794 8751, 794 7346



MANOR SUPPLIES
172 WEST END LANE, LONDON, NW6 1SD

PLEASE ADD VAT 15% TO ALL PRICES INCL P+P



TELEVISION

September
1989

Vol. 39, No. 11
Issue 467

On sale August 16th

COPYRIGHT

© IPC Magazines Limited, 1989. 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. Prices are those current as we go to press.

CORRESPONDENCE

All correspondence regarding advertisements should be addressed to the Advertisement Manager, "Television", King's Reach Tower, Stamford Street, London SE1 9LS. Editorial correspondence should be addressed to "Television", IPC Magazines Ltd., King's Reach Tower, Stamford Street, London SE1 9LS.

INDEXES

Indexes to Vols. 36 and 37 are available at 80p each from the Editorial Office (address above).

SUBSCRIPTIONS

An annual subscription costs £20 in the UK, £24 overseas (by surface mail). Send orders with payment to Quadrant Subscription Services Ltd., Oakfield House, Perrymount Road, Haywards Heath, Sussex, RH16 3DH.

BACK NUMBERS

Subject to availability, copies of issues published during the last 12 months are available at £1.80 each from Television, Vouchcheck Services, Unit A6, Poplar Business Park, Prestons Road, London E14 9LR. Please make cheques/postal orders payable to IPC Magazines 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 our published designs nor comment on alternative ways of using them. Correspondents should enclose a stamped addressed envelope. Requests for advice on dealing with servicing problems should be directed to our Queries Service. For details see our regular feature "Service Bureau". Send to the address given above (see "correspondence").

this month

- 825 Leader**
- 826 Repairing Remote Control Units** *Nick Beer*
You can make a reasonable return and build customer goodwill by repairing and renovating remote control units. A guide to the various types and the faults to expect with them.
- 831 You Won't Believe it . . .** *Les Lawry-Johns*
Les, HB and the menagerie have moved to the bungalow, where a strange welcome awaited.
- 832 Teletopics**
- 834 VCR Clinic**
Reports from Philip Blundell, Eng. Tech., John C. Priest, Eugene Trundle, Chris Plaice, Harvey Benson, Ian Bowden, Alfred Damp and Nick Beer.
- 836 Letters**
- 838 Servicing Salora Colour Receivers, Part 2** *Nick Beer and Ian Bowden*
A start on the G and H chassis which were the first to use the Ipsalo circuit. The initial version of this is described in detail.
- 841 An Inexpensive Orthomode Transducer** *Paul Matthews*
Orthomode transducers are used to split an incoming microwave signal and tend to be rather expensive. You can get round this with a bit of plumbing.
- 842 Long-distance Television** *Roger Bunney*
Reports on reception and conditions and news from abroad. July was an exceptional month for SpE and tropospheric signals.
- 845 Tackling Unknown Small-screen Sets** *Malcolm Burrell*
Common fault patterns in small-screen sets and how to find your way around them.
- 846 The Sakura SR800ER Satellite System** *D.J. Stephenson, B.A., I.Eng.*
A review of this modestly priced system for reception from Astra, with notes on the widely used Marconi LNB.
- 848 More on the Panasonic NV333** *David Botto*
How to tackle the power supply and the logic circuitry used in the sycon department.
- 849 Next Month in Television**
- 851 Books**
- 852 TV Fault Finding**
Reports from Nick Beer, Gerry Hoey, J.G. Grieves, Chris Orr, Alfred Damp, Ray Crookit and Ian Bowden
- 854 Dealing with Tape Chewing** *Eugene Trundle*
An examination of the tape damage will usually provide clear evidence of the cause of the trouble.
- 858 The Room at the Back** *J. LeJeune*
Workshop wisdom from Sid Bias's service department and some scheming over a scope.
- 859 Eye Protection** *David Botto*
Video/TV workshops present many hazards to the eyes. Essential precautions to take to avoid damage.
- 860 Servicing Compact Disc Players, Part 7** *Joe Cieszynski*
The information contained in the subcode and the error protection technique it uses.
- 862 Service Bureau**
- 863 Test Case 321**

OUR NEXT ISSUE DATED OCTOBER WILL
BE PUBLISHED ON SEPTEMBER 20

AA119	9p	BD245	50p	BFX29	20p	S2800D	52p	2N 5321	60p	78GUC1	190p	AN-7178	270p	LA-1130	240p	M-51514	160p	STK-4021	425p	TA-7207	150p	TA-1524	350p
AA372	9p	BD246A	50p	BFX84	20p	S2800M	72p	2N 5366	25p	79GUC1	215p	AY3-1075	290p	LA-1150	150p	M-51515B	220p	STK-4025	600p	TA-7208	145p	TA-1524	1600p
AC107	25p	BD265	45p	BFX85	15p	T2800D	52p	2N 5401	12p	79HGKC	800p	AY3-1210	290p	LA-1185	150p	M-51518	260p	STK-4026	600p	TA-7210	145p	TA-1670A	300p
AC125	25p	BD267	45p	BFX86	15p	T2800M	72p	2N 5448	14p			AY3-1350	450p	LA-1201	140p	M-51519	280p	STK-4036	500p	TA-7212	145p	TA-1701	320p
AC127	21p	BD268	45p	BFX89	60p	TIP29	15p	2N 5496	82p			AY3-1810	360p	LA-1222	80p	NE-9515	200p	STK-4038	600p	TA-7220	120p	TA-1770A	300p
AC128	21p	BD311	100p	BFY17	10p	TIP29C	15p	2N 6109	24p	DLR2	60p	BA-301	65p	LA-1230	130p	MB-3712	140p	STK-4040	500p	TA-7222	120p	TA-1870A	120p
AC128K	26p	BD312	100p	BFY24	14p	TIP30	15p	2N 6254	110p	DY86	50p	BA-311	60p	LA-1234	130p	MB-3713	130p	STK-4042	500p	TA-7224	120p	TA-1870A	120p
AC141K	26p	BD313	100p	BFY51	14p	TIP30C	15p	2N 6384	120p	DY87	50p	BA-313	60p	LA-1365	120p	MB-3714	270p	STK-4060	500p	TA-7226	290p	TA-1904	120p
AC142K	30p	BD314	100p	BFY52	14p	TIP31A	24p	2N 6385	120p	EABC80	70p	BA-333	100p	LA-1368	120p	MB-3722	310p	STK-4101	650p	TA-7227	190p	TA-1904	120p
AC176K	22p	BD315	150p	BFY54	14p	TIP31C	24p	2N 5460	160p	EB91	44p	BA-401	60p	LA-1460	220p	MB-3730	200p	STK-4112	950p	TA-7230	170p	TA-1941	300p
AC176K	22p	BD316	150p	BFY56	14p	TIP32	24p	3N 143	65p	EBF80	45p	BA-402	60p	LA-2000	160p	MB-3731	200p	STK-4121	950p	TA-7232	170p	TA-1941	300p
AC187	21p	BD317	150p	BFY90	45p	TIP32A	24p			EBF85	45p	BA-511	160p	LA-2101	270p	MB-3759	200p	STK-4122	950p	TA-7233	250p	TA-2002	80p
AC188	21p	BD331	40p	BLV46	85p	TIP32C	28p			EC82	80p	BA-514	160p	LA-2200	190p	MB-3759	200p	STK-4121	950p	TA-7239	250p	TA-2002	80p
AC188K	21p	BD332	40p	BLV49	85p	TIP33	28p			EC83	80p	BA-516	160p	LA-3101	160p	MB-8719	360p	STK-4141	650p	TA-7239	250p	TA-2002	80p
AC198K	48p	BD333	40p	BR100	37p	TIP33C	60p			EC84	80p	BA-521	160p	LA-3160	120p	MC-1319P	130p	STK-4142	800p	TA-7240	260p	TA-2004	130p
AC199	48p	BD334	40p	BR103	43p	TIP34	50p			EC85	80p	BA-524	240p	LA-3201	80p	MC-1455	45p	STK-4151	680p	TA-7241	260p	TA-2005	130p
AD161	35p	BD335	40p	BR104	43p	TIP35C	65p	AA119	9p	ECH31	70p	BA-524	240p	LA-3210	110p	MC-1456	45p	STK-4152	950p	TA-7242	290p	TA-2006	120p
AD162	35p	BD336	40p	BR105	43p	TIP36C	65p	BY100	10p	ECH84	70p	BA-527	95p	LA-3220	100p	MC-1469	290p	STK-4161	820p	TA-7243	350p	TA-2006	120p
AD162	35p	BD337	40p	BR106	43p	TIP37C	65p	BY103	32p	ECL80	80p	BA-532	140p	LA-3230	140p	MC-1488	290p	STK-4162	820p	TA-7245	350p	TA-2006	120p
AD162	35p	BD338	40p	BR107	43p	TIP38C	65p	BY126	8p	ECL84	70p	BA-534	290p	LA-3240	140p	MC-1489	290p	STK-4171	1000p	TA-7247	290p	TA-2009	200p
AD162	35p	BD339	40p	BR108	43p	TIP39C	65p	BY127	8p	ECL85	70p	BA-534	290p	LA-3250	140p	MC-1496	65p	STK-4181	820p	TA-7249	290p	TA-2010	100p
AD162	35p	BD340	40p	BR109	43p	TIP40C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD341	40p	BR110	43p	TIP41C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD342	40p	BR111	43p	TIP42C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD343	40p	BR112	43p	TIP43C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD344	40p	BR113	43p	TIP44C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD345	40p	BR114	43p	TIP45C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD346	40p	BR115	43p	TIP46C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD347	40p	BR116	43p	TIP47C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD348	40p	BR117	43p	TIP48C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD349	40p	BR118	43p	TIP49C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD350	40p	BR119	43p	TIP50C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD351	40p	BR120	43p	TIP51C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD352	40p	BR121	43p	TIP52C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD353	40p	BR122	43p	TIP53C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD354	40p	BR123	43p	TIP54C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD355	40p	BR124	43p	TIP55C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD356	40p	BR125	43p	TIP56C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD357	40p	BR126	43p	TIP57C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD358	40p	BR127	43p	TIP58C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD359	40p	BR128	43p	TIP59C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD360	40p	BR129	43p	TIP60C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD361	40p	BR130	43p	TIP61C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD362	40p	BR131	43p	TIP62C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD363	40p	BR132	43p	TIP63C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD364	40p	BR133	43p	TIP64C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD365	40p	BR134	43p	TIP65C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD366	40p	BR135	43p	TIP66C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD367	40p	BR136	43p	TIP67C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD368	40p	BR137	43p	TIP68C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD369	40p	BR138	43p	TIP69C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD370	40p	BR139	43p	TIP70C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD371	40p	BR140	43p	TIP71C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p	BD372	40p	BR141	43p	TIP72C	65p	BY133	8p	ECL86	70p	BA-546	180p	LA-3361	110p	MC-3302	70p	STK-4191	1100p	TA-7250	290p	TA-2010	100p
AD162	35p</																						

LINEAR IC'S

— Cont. —

TEA-1002 850p	2SA-979 85p	2SC-1114 415p	2SC-2228A 60p	2SC-3179 160p	2SD-789 80p	2SD-1608 210p	2SD-1941 500p
TLO-61 40p	2SA-984 50p	2SC-1115 280p	2SC-2229 25p	2SC-3181 240p	2SD-792 400p	2SD-1609 100p	2SD-1984 150p
TLO-64 80p	2SA-1006 120p	2SC-1116 290p	2SC-2230 80p	2SC-3209 120p	2SD-794 100p	2SD-1632 500p	2SD-1985 425p
TLO-71 80p	2SA-1008 125p	2SC-1117 110p	2SC-2231 110p	2SC-3212 510p	2SD-795A 140p	2SD-1649 270p	2SD-1986 425p
TLO-72 55p	2SA-1009 200p	2SC-1118 110p	2SC-2232 60p	2SC-3213 510p	2SD-796 140p	2SD-1653 260p	2SD-1987 425p
TLO-74 92p	2SA-1011 140p	2SC-1119 150p	2SC-2233 70p	2SC-3214 30p	2SD-797 140p	2SD-1656 120p	2SD-1988 425p
TLO-81 40p	2SA-1012 100p	2SC-1120 150p	2SC-2234 60p	2SC-3215 70p	2SD-798 140p	2SD-1657 120p	2SD-1989 425p
TLO-82 46p	2SA-1013 100p	2SC-1121 210p	2SC-2235 25p	2SC-3216 500p	2SD-799 140p	2SD-1658 120p	2SD-1990 425p
TLO-83 47p	2SA-1014 100p	2SC-1122 210p	2SC-2236 130p	2SC-3217 500p	2SD-800 140p	2SD-1659 120p	2SD-1991 425p
TLO-84 80p	2SA-1015 400p	2SC-1123 50p	2SC-2237 50p	2SC-3218 510p	2SD-801 140p	2SD-1660 120p	2SD-1992 425p
TUN-2002 70p	2SA-1016 100p	2SC-1124 40p	2SC-2238 60p	2SC-3219 510p	2SD-802 140p	2SD-1661 120p	2SD-1993 425p
ULN-2003 69p	2SA-1017 150p	2SC-1125 60p	2SC-2239 70p	2SC-3220 300p	2SD-803 140p	2SD-1662 120p	2SD-1994 425p
ULN-2004 89p	2SA-1018 150p	2SC-1126 200p	2SC-2240 50p	2SC-3221 300p	2SD-804 140p	2SD-1663 120p	2SD-1995 425p
ULN-2068 270p	2SA-1019 150p	2SC-1127 45p	2SC-2241 120p	2SC-3222 80p	2SD-805 140p	2SD-1664 120p	2SD-1996 425p
ULN-2803 130p	2SA-1020 100p	2SC-1128 75p	2SC-2242 120p	2SC-3223 80p	2SD-806 140p	2SD-1665 120p	2SD-1997 425p
ULN-2804 170p	2SA-1021 75p	2SC-1129 30p	2SC-2243 180p	2SC-3224 120p	2SD-807 140p	2SD-1666 120p	2SD-1998 425p
UPC-16C 160p	2SA-1022 100p	2SC-1130 90p	2SC-2244 120p	2SC-3225 170p	2SD-808 140p	2SD-1667 120p	2SD-1999 425p
UPC-20C 220p	2SA-1023 100p	2SC-1131 350p	2SC-2245 120p	2SC-3226 200p	2SD-809 140p	2SD-1668 120p	2SD-2000 425p
UPC-554 130p	2SA-1103 200p	2SC-1132 40p	2SC-2246 500p	2SC-3227 200p	2SD-810 140p	2SD-1669 120p	2SD-2001 425p
UPC-565 60p	2SA-1104 200p	2SC-1133 25p	2SC-2247 200p	2SC-3228 60p	2SD-811 140p	2SD-1670 120p	2SD-2002 425p
UPC-566 80p	2SA-1105 250p	2SC-1134 25p	2SC-2248 300p	2SC-3229 40p	2SD-812 140p	2SD-1671 120p	2SD-2003 425p
UPC-567 80p	2SA-1106 250p	2SC-1135 40p	2SC-2249 120p	2SC-3230 40p	2SD-813 140p	2SD-1672 120p	2SD-2004 425p
UPC-574 60p	2SA-1111 120p	2SC-1136 20p	2SC-2250 40p	2SC-3231 90p	2SD-814 140p	2SD-1673 120p	2SD-2005 425p
UPC-575C2 90p	2SA-1112 70p	2SC-1137 20p	2SC-2251 40p	2SC-3232 120p	2SD-815 140p	2SD-1674 120p	2SD-2006 425p
UPC-576 200p	2SA-1113 70p	2SC-1138 40p	2SC-2252 40p	2SC-3233 120p	2SD-816 140p	2SD-1675 120p	2SD-2007 425p
UPC-577 80p	2SA-1114 80p	2SC-1139 40p	2SC-2253 40p	2SC-3234 120p	2SD-817 140p	2SD-1676 120p	2SD-2008 425p
UPC-580 300p	2SA-1115 50p	2SC-1140 120p	2SC-2254 40p	2SC-3235 80p	2SD-818 140p	2SD-1677 120p	2SD-2009 425p
UPC-592 95p	2SA-1116 50p	2SC-1141 350p	2SC-2255 120p	2SC-3236 80p	2SD-819 140p	2SD-1678 120p	2SD-2010 425p
UPC-595 190p	2SA-1117 350p	2SC-1142 35p	2SC-2256 240p	2SC-3237 80p	2SD-820 140p	2SD-1679 120p	2SD-2011 425p
UPC-596 190p	2SA-1118 150p	2SC-1143 35p	2SC-2257 150p	2SC-3238 80p	2SD-821 140p	2SD-1680 120p	2SD-2012 425p
UPC-1001 220p	2SA-1152 150p	2SC-1144 150p	2SC-2258 60p	2SC-3239 80p	2SD-822 140p	2SD-1681 120p	2SD-2013 425p
UPC-1018 170p	2SA-1153 150p	2SC-1145 35p	2SC-2259 35p	2SC-3240 80p	2SD-823 140p	2SD-1682 120p	2SD-2014 425p
UPC-1020 200p	2SA-1154 150p	2SC-1146 35p	2SC-2260 35p	2SC-3241 80p	2SD-824 140p	2SD-1683 120p	2SD-2015 425p
UPC-1023 60p	2SA-1155 150p	2SC-1147 55p	2SC-2261 45p	2SC-3242 110p	2SD-825 140p	2SD-1684 120p	2SD-2016 425p
UPC-1025 230p	2SA-1156 150p	2SC-1148 240p	2SC-2262 45p	2SC-3243 110p	2SD-826 140p	2SD-1685 120p	2SD-2017 425p
UPC-1026 95p	2SA-1157 150p	2SC-1149 150p	2SC-2263 45p	2SC-3244 110p	2SD-827 140p	2SD-1686 120p	2SD-2018 425p
UPC-1028 90p	2SA-1158 150p	2SC-1150 150p	2SC-2264 45p	2SC-3245 110p	2SD-828 140p	2SD-1687 120p	2SD-2019 425p
UPC-1031H2 180p	2SA-1159 150p	2SC-1151 150p	2SC-2265 45p	2SC-3246 110p	2SD-829 140p	2SD-1688 120p	2SD-2020 425p
UPC-1032 60p	2SA-1160 150p	2SC-1152 150p	2SC-2266 45p	2SC-3247 110p	2SD-830 140p	2SD-1689 120p	2SD-2021 425p
UPC-1158H2 70p	2SA-1161 150p	2SC-1153 150p	2SC-2267 45p	2SC-3248 110p	2SD-831 140p	2SD-1690 120p	2SD-2022 425p
UPC-1167CL 170p	2SA-1162 150p	2SC-1154 150p	2SC-2268 45p	2SC-3249 110p	2SD-832 140p	2SD-1691 120p	2SD-2023 425p
UPC-1181 110p	2SA-1163 150p	2SC-1155 150p	2SC-2269 45p	2SC-3250 110p	2SD-833 140p	2SD-1692 120p	2SD-2024 425p
UPC-1182 110p	2SA-1164 150p	2SC-1156 150p	2SC-2270 110p	2SC-3251 110p	2SD-834 140p	2SD-1693 120p	2SD-2025 425p
UPC-1183 200p	2SA-1165 150p	2SC-1157 150p	2SC-2271 110p	2SC-3252 110p	2SD-835 140p	2SD-1694 120p	2SD-2026 425p
UPC-1185H2 230p	2SA-1166 150p	2SC-1158 150p	2SC-2272 110p	2SC-3253 110p	2SD-836 140p	2SD-1695 120p	2SD-2027 425p
UPC-1186 80p	2SA-1167 150p	2SC-1159 150p	2SC-2273 110p	2SC-3254 110p	2SD-837 140p	2SD-1696 120p	2SD-2028 425p
UPC-1187 150p	2SA-1168 150p	2SC-1160 150p	2SC-2274 110p	2SC-3255 110p	2SD-838 140p	2SD-1697 120p	2SD-2029 425p
UPC-1188H4 400p	2SA-1169 150p	2SC-1161 150p	2SC-2275 110p	2SC-3256 110p	2SD-839 140p	2SD-1698 120p	2SD-2030 425p
UPC-1190 140p	2SA-1170 150p	2SC-1162 150p	2SC-2276 110p	2SC-3257 110p	2SD-840 140p	2SD-1699 120p	2SD-2031 425p
UPC-1200 325p	2SA-1171 150p	2SC-1163 150p	2SC-2277 110p	2SC-3258 110p	2SD-841 140p	2SD-1700 120p	2SD-2032 425p
UPC-1212 130p	2SA-1172 150p	2SC-1164 150p	2SC-2278 110p	2SC-3259 110p	2SD-842 140p	2SD-1701 120p	2SD-2033 425p
UPC-1230 210p	2SA-1173 150p	2SC-1165 150p	2SC-2279 110p	2SC-3260 110p	2SD-843 140p	2SD-1702 120p	2SD-2034 425p
UPC-1238 120p	2SA-1174 150p	2SC-1166 150p	2SC-2280 110p	2SC-3261 110p	2SD-844 140p	2SD-1703 120p	2SD-2035 425p
UPC-1263 230p	2SA-1175 150p	2SC-1167 150p	2SC-2281 110p	2SC-3262 110p	2SD-845 140p	2SD-1704 120p	2SD-2036 425p
UPC-1277 240p	2SA-1176 150p	2SC-1168 150p	2SC-2282 110p	2SC-3263 110p	2SD-846 140p	2SD-1705 120p	2SD-2037 425p
UPC-1278 240p	2SA-1177 150p	2SC-1169 150p	2SC-2283 110p	2SC-3264 110p	2SD-847 140p	2SD-1706 120p	2SD-2038 425p
UPC-1335 320p	2SA-1178 150p	2SC-1170 150p	2SC-2284 110p	2SC-3265 110p	2SD-848 140p	2SD-1707 120p	2SD-2039 425p
UPC-1350 115p	2SA-1179 150p	2SC-1171 150p	2SC-2285 110p	2SC-3266 110p	2SD-849 140p	2SD-1708 120p	2SD-2040 425p
UPC-1353 180p	2SA-1180 150p	2SC-1172 150p	2SC-2286 110p	2SC-3267 110p	2SD-850 140p	2SD-1709 120p	2SD-2041 425p
UPC-1363 190p	2SA-1181 150p	2SC-1173 150p	2SC-2287 110p	2SC-3268 110p	2SD-851 140p	2SD-1710 120p	2SD-2042 425p
UPC-1365 320p	2SA-1182 150p	2SC-1174 150p	2SC-2288 110p	2SC-3269 110p	2SD-852 140p	2SD-1711 120p	2SD-2043 425p
UPC-1368H4 425p	2SA-1183 150p	2SC-1175 150p	2SC-2289 110p	2SC-3270 110p	2SD-853 140p	2SD-1712 120p	2SD-2044 425p
UPC-1373 180p	2SA-1184 150p	2SC-1176 150p	2SC-2290 110p	2SC-3271 110p	2SD-854 140p	2SD-1713 120p	2SD-2045 425p
UPC-1378 210p	2SA-1185 150p	2SC-1177 150p	2SC-2291 110p	2SC-3272 110p	2SD-855 140p	2SD-1714 120p	2SD-2046 425p
UPC-1382 110p	2SA-1186 150p	2SC-1178 150p	2SC-2292 110p	2SC-3273 110p	2SD-856 140p	2SD-1715 120p	2SD-2047 425p
UPC-1394 170p	2SA-1187 150p	2SC-1179 150p	2SC-2293 110p	2SC-3274 110p	2SD-857 140p	2SD-1716 120p	2SD-2048 425p
UPC-1397 450p	2SA-1188 150p	2SC-1180 150p	2SC-2294 110p	2SC-3275 110p	2SD-858 140p	2SD-1717 120p	2SD-2049 425p
1403CA 750p	2SA-1189 150p	2SC-1181 150p	2SC-2295 110p	2SC-3276 110p	2SD-859 140p	2SD-1718 120p	2SD-2050 425p
1420CA 500p	2SA-1190 150p	2SC-1182 150p	2SC-2296 110p	2SC-3277 110p	2SD-860 140p	2SD-1719 120p	2SD-2051 425p
UPC-1458 100p	2SA-1191 150p	2SC-1183 150p	2SC-2297 110p	2SC-3278 110p	2SD-861 140p	2SD-1720 120p	2SD-2052 425p
UPC-1470 200p	2SA-1192 150p	2SC-1184 150p	2SC-2298 110p	2SC-3279 110p	2SD-862 140p	2SD-1721 120p	2SD-2053 425p
UPC-1504C 400p	2SA-1193 150p	2SC-1185 150p	2SC-2299 110p	2SC-3280 110p	2SD-863 140p	2SD-1722 120p	2SD-2054 425p
UPC-1505C 400p	2SA-1194 150p	2SC-1186 150p	2SC-2300 110p	2SC-3281 110p	2SD-864 140p	2SD-1723 120p	2SD-2055 425p
UPC-1517CA 400p	2SA-1195 150p	2SC-1187 150p	2SC-2301 110p	2SC-3282 110p	2SD-865 140p	2SD-1724 120p	2SD-2056 425p
1517CA 400p	2SA-1196 150p	2SC-1188 150p	2SC-2302 110p	2SC-3283 110p	2SD-866 140p	2SD-1725 120p	2SD-2057 425p
UPC-1625C 400p	2SA-1197 150p	2SC-1189 150p	2SC-2303 110p	2SC-3284 110p	2SD-867 140p	2SD-1726 120p	2SD-2058 425p
UPC-1680C 550p	2SA-1198 150p	2SC-1190 150p	2SC-2304 110p	2SC-3285 110p	2SD-868 140p	2SD-1727 120p	2SD-2059 425p
UPC-1681C 550p	2SA-1199 150p	2SC-1191 150p	2SC-2305 110p	2SC-3286 110p	2SD-869 140p	2SD-1728 120p	2SD-2060 425p
UPC-1682C 550p	2SA-1200 150p	2SC-1192 150p	2SC-2306 110p	2SC-3287 110p	2SD-870 140p	2SD-1729 120p	2SD-2061 425p
UPC-1683C 550p	2SA-1201 150p	2SC-1193 150p	2SC-2307 110p	2SC-3288 110p	2SD-871 140p	2SD-1730 120p	2SD-2062 425p
UPC-1684C 550p	2SA-1202 150p	2SC-1194 150p	2SC-2308 110p	2SC-3289 110p	2SD-872 140p	2SD-1731 120p	2SD-2063 425p
UPC-1685C 550p	2SA-1203 150p	2SC-1195 150p	2SC-2309 110p	2SC-3290 110p	2SD-873 140p	2SD-1732 120p	2SD-2064 425p
UPC-1686C 550p	2SA-1204 150p	2SC-1196 150p	2SC-2310 110p	2SC-3291 110			

<p>VCR PINCHROLLERS</p> <p>AKAI</p> <p>VS9300, VS9500, VS9700, VS9800 280p</p> <p>VS1, VS2, VS3, VS4, VS5, VS6, VS9, VS10 380p</p> <p>AMSTRAD</p> <p>VCR4500, VCR4600, VCR4600 280p</p> <p>VCR5200 360p</p> <p>VCR7000 360p</p> <p>FERGUSON</p> <p>3V00, 3V16, 3V22, 3V23 280p</p> <p>3V29-30, 3V31-32 280p</p> <p>3V35-36, 3V38-39, 3V42-43, 3V44-45, 3V48, 280p</p> <p>3V53, 3V54-55, 3V56-57, 3V58-59, 3V64-65, FV10-11, FV12-14</p> <p>HITACHI</p> <p>VT11, VT33 280p</p> <p>VT61-62, VT63-64, VT65, VT66-68, 280p</p> <p>VT110-122, VT120-128, VT130-135, VT138-150, VT168-220, VT5000, VT8000, VT9300, VT9500 280p</p> <p>JVC</p> <p>HR3300, HR3330, HR3360, HR3660, HR4100, HR7700, HR7720, HR7730, HR7760, HR7610, HR7650, HR7655, HRD110, HRD111, HRD120, HRD121, HRD140, HRD150, HRD160, HRD225, HRD455, HRD565, HRD725</p> <p>MITSUBISHI</p> <p>HS200, HS300, HS301, HS302, HS303, HS304, HS310, HS320, HS700 280p</p> <p>NATIONAL</p> <p>NV100, NV180, NV300, NV333, NV340, NV366, NV600, NV777, NV788 280p</p> <p>NV230, NV370, NV430, NV460, NV730, NV810, NV830, NV850, NV870, NV890, NV2000, NV2010, NV3000, NV7000, NV7200, NV7800, NV8600, NV8610, NV8620, NVG14, NVG7, NVG10, NVG12, NVG18, NVG21, NVG25, NVH65 360p</p> <p>PHILIPS</p> <p>VR6460 280p</p> <p>SANYO</p> <p>VHR1100, VHR1300, VHR1500, VHR2300 360p</p> <p>VTC5000, VTC5150, VTC5500, VTC9300, VTCM10, VTCM20 280p</p> <p>SHARP</p> <p>VC381, VC386, VC2300, VC3300, VC7300, VC7700, VC8300 360p</p> <p>VC9100, VC9300, VC9500, VC9700, VC387, VC481, VC482, VC483, VC486, VC496, VC581, VC582, VC583, VC585, VC651, VC681, VC685, VC750, VC780, VC781, VC785, VC787 360p</p> <p>VC793, VCT72</p> <p>SONY</p> <p>SLC5, SLC6, SLC7 360p</p> <p>SLC9, SLC20, SLC24, SLC30, SLC33, SLC44, SLHF100 360p</p> <p>SLF1, SLF11, SLF25, SLF30, SLF60, SLF100</p> <p>***** * 75 OHM COX CABLE WITH * * SOCKETS FOR TV TO VIDEO * * BLACK COLOUR 2 METRES * * LONG, ONLY £1 EACH + VAT * *****</p>	<p>FERGUSON</p> <p>3292, 3V00, 3V01150, 3V16, 3V22, 3V23, 3V29-30, 3V31-32, 3V35-36, 3V38-39, 3V42-43, 3V44-45, 3V48, 3V53, 3V54-55, 3V56-57, 3V58-59, 3V64-65, FV10-11, FV12-14</p> <p>FISHER</p> <p>VBS-7000245, VBS-9000120</p> <p>HITACHI</p> <p>VT-11, VT-3310, VT-5000120, VT-5000130, VT-8000600, VT-8000610, VT-8000620, VT-9300050, VT-9500500, VT-9700600</p> <p>JVC</p> <p>HR-3300, HR-3330, 150, HR-3360, HR-3660, HR-4100180, HR-7200700, HR-7600800, HR-7610950, HR-7650750, HR-7655900, HR-7700770, HRD-110, HRD-111, 100, HRD-120, HRD-225, HRD-250, HRD-455, 100, HRD-565, HRD-566, HRD-725, HRD-755</p> <p>MITSUBISHI</p> <p>HS-200200</p> <p>NATIONAL</p> <p>NV-300160, NV-333135, NV-777100, NV-2000150, NV-3000160, NV-3000160, NV-7000950, NV-7200900, NV-8600160</p> <p>PHILIPS</p> <p>VR-6460170</p> <p>SANYO</p> <p>VTC-500075, VTC-5300100, VTC-5500950, VTC-9300220</p> <p>SHARP</p> <p>VC-381/383/386125, VC-6300150, VC-7300/7700/7750150, VC-8300150, VC-8381, VC-9100125, VC-9300, VC-9500135</p>	<p>VIDEO MOTORS</p> <p>AMSTRAD</p> <p>VCR-7000 REEL MOTOR1700</p> <p>FERGUSON & JVC</p> <p>CAPSTAN MOTOR2100, PU-45979, CAPSTAN MOTOR1950, PU-55371V, DRUM MOTOR1950, PU-46414, REEL MOTOR2650, PU-51381V2650</p> <p>NATIONAL</p> <p>REEL MOTOR1350, MYN-135V5L, FOR NV333, NV366</p> <p>SANYO</p> <p>REEL MOTOR700, 4-529V-10800</p> <p>SHARP</p> <p>REEL MOTOR1500, RMT0V 1008 GEZZ</p> <p>SONY</p> <p>CONSTAN MOTOR700, A-675131A FOR SLC6, CAPSTAN MOTOR2500, BHF 1100D FOR SLC7</p> <p>VIDEO LAMPS</p> <p>VIDEO LAMPS UNIVERSAL30, 12V60mA (300mm WIRES), PANASONIC VIDEO LAMPS60</p> <p>IDLERS & PULLEYS REPLACEMENTS</p> <p>HITACHI</p> <p>FF REW IDLER 6886971 190p</p> <p>PLAY IDLER V-6861482 320p</p> <p>JVC</p> <p>IDLER ASSEMBLY PU-47752 450p</p> <p>TAKE UP IDLER PU-S1402A 145p</p> <p>TAKE CLUTCH PU-S5373 225p</p> <p>IDLER ARM PU-S5373-3-B 285p</p> <p>FAST FORWARD IDLER PU-45896C 210p</p> <p>NATIONAL</p> <p>IDLER 4076 42p</p> <p>4077 42p</p> <p>4078 13p</p> <p>4081 13p</p> <p>4082 13p</p> <p>4085 36p</p> <p>4086 36p</p> <p>4089 75p</p> <p>4093 18p</p> <p>4094 44p</p> <p>4095 58p</p> <p>4098 50p</p> <p>4099 42p</p> <p>4501 27p</p> <p>4502 36p</p> <p>4503 36p</p> <p>4504 55p</p> <p>4505 180p</p> <p>4506 87p</p> <p>4507 30p</p> <p>4508 67p</p> <p>4510 32p</p> <p>4511 30p</p> <p>4512 38p</p> <p>4513 80p</p> <p>4514 65p</p> <p>4515 65p</p> <p>4516 36p</p> <p>4517 100p</p> <p>4518 36p</p> <p>4519 125p</p> <p>4520 36p</p> <p>4521 28p</p> <p>4522 43p</p> <p>4526 38p</p> <p>4527 41p</p> <p>4528 38p</p> <p>4529 65p</p> <p>4532 40p</p> <p>4533 22p</p> <p>4534 22p</p> <p>4535 29p</p> <p>4536 140p</p> <p>4537 29p</p> <p>4538 36p</p> <p>4539 150p</p> <p>4540 150p</p> <p>4541 150p</p> <p>4542 150p</p> <p>4543 150p</p> <p>4544 150p</p> <p>4545 150p</p> <p>4546 150p</p> <p>4547 150p</p> <p>4548 150p</p> <p>4549 150p</p> <p>4550 150p</p> <p>4551 150p</p> <p>4552 150p</p> <p>4553 150p</p> <p>4554 150p</p> <p>4555 150p</p> <p>4556 150p</p> <p>4557 150p</p> <p>4558 150p</p> <p>4559 150p</p> <p>4560 150p</p> <p>4561 150p</p> <p>4562 150p</p> <p>4563 150p</p> <p>4564 150p</p> <p>4565 150p</p> <p>4566 150p</p> <p>4567 150p</p> <p>4568 150p</p> <p>4569 150p</p> <p>4570 150p</p> <p>4571 150p</p> <p>4572 150p</p> <p>4573 150p</p> <p>4574 150p</p> <p>4575 150p</p> <p>4576 150p</p> <p>4577 150p</p> <p>4578 150p</p> <p>4579 150p</p> <p>4580 150p</p> <p>4581 150p</p> <p>4582 150p</p> <p>4583 150p</p> <p>4584 150p</p> <p>4585 150p</p> <p>4586 150p</p> <p>4587 150p</p> <p>4588 150p</p> <p>4589 150p</p> <p>4590 150p</p> <p>4591 150p</p> <p>4592 150p</p> <p>4593 150p</p> <p>4594 150p</p> <p>4595 150p</p> <p>4596 150p</p> <p>4597 150p</p> <p>4598 150p</p> <p>4599 150p</p> <p>4600 150p</p> <p>4601 150p</p> <p>4602 150p</p> <p>4603 150p</p> <p>4604 150p</p> <p>4605 150p</p> <p>4606 150p</p> <p>4607 150p</p> <p>4608 150p</p> <p>4609 150p</p> <p>4610 150p</p> <p>4611 150p</p> <p>4612 150p</p> <p>4613 150p</p> <p>4614 150p</p> <p>4615 150p</p> <p>4616 150p</p> <p>4617 150p</p> <p>4618 150p</p> <p>4619 150p</p> <p>4620 150p</p> <p>4621 150p</p> <p>4622 150p</p> <p>4623 150p</p> <p>4624 150p</p> <p>4625 150p</p> <p>4626 150p</p> <p>4627 150p</p> <p>4628 150p</p> <p>4629 150p</p> <p>4630 150p</p> <p>4631 150p</p> <p>4632 150p</p> <p>4633 150p</p> <p>4634 150p</p> <p>4635 150p</p> <p>4636 150p</p> <p>4637 150p</p> <p>4638 150p</p> <p>4639 150p</p> <p>4640 150p</p> <p>4641 150p</p> <p>4642 150p</p> <p>4643 150p</p> <p>4644 150p</p> <p>4645 150p</p> <p>4646 150p</p> <p>4647 150p</p> <p>4648 150p</p> <p>4649 150p</p> <p>4650 150p</p> <p>4651 150p</p> <p>4652 150p</p> <p>4653 150p</p> <p>4654 150p</p> <p>4655 150p</p> <p>4656 150p</p> <p>4657 150p</p> <p>4658 150p</p> <p>4659 150p</p> <p>4660 150p</p> <p>4661 150p</p> <p>4662 150p</p> <p>4663 150p</p> <p>4664 150p</p> <p>4665 150p</p> <p>4666 150p</p> <p>4667 150p</p> <p>4668 150p</p> <p>4669 150p</p> <p>4670 150p</p> <p>4671 150p</p> <p>4672 150p</p> <p>4673 150p</p> <p>4674 150p</p> <p>4675 150p</p> <p>4676 150p</p> <p>4677 150p</p> <p>4678 150p</p> <p>4679 150p</p> <p>4680 150p</p> <p>4681 150p</p> <p>4682 150p</p> <p>4683 150p</p> <p>4684 150p</p> <p>4685 150p</p> <p>4686 150p</p> <p>4687 150p</p> <p>4688 150p</p> <p>4689 150p</p> <p>4690 150p</p> <p>4691 150p</p> <p>4692 150p</p> <p>4693 150p</p> <p>4694 150p</p> <p>4695 150p</p> <p>4696 150p</p> <p>4697 150p</p> <p>4698 150p</p> <p>4699 150p</p> <p>4700 150p</p>	<p>4000B SERIES CMOS IC's</p> <p>7400 20p</p> <p>7401 16p</p> <p>7402 18p</p> <p>7403 20p</p> <p>7404 35p</p> <p>7405 10p</p> <p>7406 36p</p> <p>7407 36p</p> <p>7408 25p</p> <p>7409 20p</p> <p>7410 30p</p> <p>7411 30p</p> <p>7412 45p</p> <p>7413 45p</p> <p>7414 45p</p> <p>7415 45p</p> <p>7416 45p</p> <p>7417 32p</p> <p>7418 32p</p> <p>7419 28p</p> <p>7420 28p</p> <p>7421 28p</p> <p>7422 28p</p> <p>7423 28p</p> <p>7424 28p</p> <p>7425 28p</p> <p>7426 28p</p> <p>7427 28p</p> <p>7428 28p</p> <p>7429 28p</p> <p>7430 28p</p> <p>7431 28p</p> <p>7432 28p</p> <p>7433 28p</p> <p>7434 28p</p> <p>7435 28p</p> <p>7436 28p</p> <p>7437 28p</p> <p>7438 28p</p> <p>7439 28p</p> <p>7440 28p</p> <p>7441 28p</p> <p>7442 28p</p> <p>7443 28p</p> <p>7444 28p</p> <p>7445 28p</p> <p>7446 28p</p> <p>7447 28p</p> <p>7448 28p</p> <p>7449 28p</p> <p>7450 22p</p> <p>7451 10p</p> <p>7452 10p</p> <p>7453 10p</p> <p>7454 25p</p> <p>7455 30p</p> <p>7456 30p</p> <p>7457 25p</p> <p>7458 25p</p> <p>7459 25p</p> <p>7460 25p</p> <p>7461 25p</p> <p>7462 25p</p> <p>7463 25p</p> <p>7464 25p</p> <p>7465 25p</p> <p>7466 25p</p> <p>7467 25p</p> <p>7468 25p</p> <p>7469 25p</p> <p>7470 25p</p> <p>7471 25p</p> <p>7472 25p</p> <p>7473 25p</p> <p>7474 25p</p> <p>7475 25p</p> <p>7476 25p</p> <p>7477 25p</p> <p>7478 25p</p> <p>7479 25p</p> <p>7480 25p</p> <p>7481 90p</p> <p>7482 60p</p> <p>7483 60p</p> <p>7484 60p</p> <p>7485 28p</p> <p>7486 28p</p> <p>7487 28p</p> <p>7488 28p</p> <p>7489 28p</p> <p>7490 28p</p> <p>7491 28p</p> <p>7492 28p</p> <p>7493 28p</p> <p>7494 28p</p> <p>7495 28p</p> <p>7496 28p</p> <p>7497 28p</p> <p>7498 28p</p> <p>7499 28p</p> <p>7500 28p</p> <p>7501 28p</p> <p>7502 28p</p> <p>7503 28p</p> <p>7504 28p</p> <p>7505 28p</p> <p>7506 28p</p> <p>7507 28p</p> <p>7508 28p</p> <p>7509 28p</p> <p>7510 28p</p> <p>7511 28p</p> <p>7512 28p</p> <p>7513 28p</p> <p>7514 28p</p> <p>7515 28p</p> <p>7516 28p</p> <p>7517 28p</p> <p>7518 28p</p> <p>7519 28p</p> <p>7520 28p</p> <p>7521 28p</p> <p>7522 28p</p> <p>7523 28p</p> <p>7524 28p</p> <p>7525 28p</p> <p>7526 28p</p> <p>7527 28p</p> <p>7528 28p</p> <p>7529 28p</p> <p>7530 28p</p> <p>7531 28p</p> <p>7532 28p</p> <p>7533 28p</p> <p>7534 28p</p> <p>7535 28p</p> <p>7536 28p</p> <p>7537 28p</p> <p>7538 28p</p> <p>7539 28p</p> <p>7540 28p</p> <p>7541 28p</p> <p>7542 28p</p> <p>7543 28p</p> <p>7544 28p</p> <p>7545 28p</p> <p>7546 28p</p> <p>7547 28p</p> <p>7548 28p</p> <p>7549 28p</p> <p>7550 28p</p> <p>7551 28p</p> <p>7552 28p</p> <p>7553 28p</p> <p>7554 28p</p> <p>7555 28p</p> <p>7556 28p</p> <p>7557 28p</p> <p>7558 28p</p> <p>7559 28p</p> <p>7560 28p</p> <p>7561 28p</p> <p>7562 28p</p> <p>7563 28p</p> <p>7564 28p</p> <p>7565 28p</p> <p>7566 28p</p> <p>7567 28p</p> <p>7568 28p</p> <p>7569 28p</p> <p>7570 28p</p> <p>7571 28p</p> <p>7572 28p</p> <p>7573 28p</p> <p>7574 28p</p> <p>7575 28p</p> <p>7576 28p</p> <p>7577 28p</p> <p>7578 28p</p> <p>7579 28p</p> <p>7580 28p</p> <p>7581 28p</p> <p>7582 28p</p> <p>7583 28p</p> <p>7584 28p</p> <p>7585 28p</p> <p>7586 28p</p> <p>7587 28p</p> <p>7588 28p</p> <p>7589 28p</p> <p>7590 28p</p> <p>7591 28p</p> <p>7592 28p</p> <p>7593 28p</p> <p>7594 28p</p> <p>7595 28p</p> <p>7596 28p</p> <p>7597 28p</p> <p>7598 28p</p> <p>7599 28p</p> <p>7600 28p</p> <p>7601 28p</p> <p>7602 28p</p> <p>7603 28p</p> <p>7604 28p</p> <p>7605 28p</p> <p>7606 28p</p> <p>7607 28p</p> <p>7608 28p</p> <p>7609 28p</p> <p>7610 28p</p> <p>7611 28p</p> <p>7612 28p</p> <p>7613 28p</p> <p>7614 28p</p> <p>7615 28p</p> <p>7616 28p</p> <p>7617 28p</p> <p>7618 28p</p> <p>7619 28p</p> <p>7620 28p</p> <p>7621 28p</p> <p>7622 28p</p> <p>7623 28p</p> <p>7624 28p</p> <p>7625 28p</p> <p>7626 28p</p> <p>7627 28p</p> <p>7628 28p</p> <p>7629 28p</p> <p>7630 28p</p> <p>7631 28p</p> <p>7632 28p</p> <p>7633 28p</p> <p>7634 28p</p> <p>7635 28p</p> <p>7636 28p</p> <p>7637 28p</p> <p>7638 28p</p> <p>7639 28p</p> <p>7640 28p</p> <p>7641 28p</p> <p>7642 28p</p> <p>7643 28p</p> <p>7644 28p</p> <p>7645 28p</p> <p>7646 28p</p> <p>7647 28p</p> <p>7648 28p</p> <p>7649 28p</p> <p>7650 28p</p> <p>7651 28p</p> <p>7652 28p</p> <p>7653 28p</p> <p>7654 28p</p> <p>7655 28p</p> <p>7656 28p</p> <p>7657 28p</p> <p>7658 28p</p> <p>7659 28p</p> <p>7660 28p</p> <p>7661 28p</p> <p>7662 28p</p> <p>7663 28p</p> <p>7664 28p</p> <p>7665 28p</p> <p>7666 28p</p> <p>7667 28p</p> <p>7668 28p</p> <p>7669 28p</p> <p>7670 28p</p> <p>7671 28p</p> <p>7672 28p</p> <p>7673 28p</p> <p>7674 28p</p> <p>7675 28p</p> <p>7676 28p</p> <p>7677 28p</p> <p>7678 28p</p> <p>7679 28p</p> <p>7680 28p</p> <p>7681 28p</p> <p>7682 28p</p> <p>7683 28p</p> <p>7684 28p</p> <p>7685 28p</p> <p>7686 28p</p> <p>7687 28p</p> <p>7688 28p</p> <p>7689 28p</p> <p>7690 28p</p> <p>7691 28p</p> <p>7692 28p</p> <p>7693 28p</p> <p>7694 28p</p> <p>7695 28p</p> <p>7</p>
---	---	--	---

P. V. TUBES

104 ABBEY STREET, ACCRINGTON, LANCS
 Tel: 0254 36521/32611/390936
 Telex: 635562 Griffin G (For P.V.)
 Partners S. & B. Cucknell
 24hr. answering service

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



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 £3.25 P+P
 (U.K.). Export orders charged at
 cost. First Class Mail is used
 whenever possible. Add 15% VAT
 to total except where it states zero
 rate. Bulkier items will be sent by
 carrier £8.50 + VAT up to 25K
 (except tubes).
 We do not despatch on Saturdays.

THERE IS VAT ON P+P.

BOOKS AND MANUALS ARE ZERO V.A.T.
 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. V.A.T. invoice on
 request. Give us a ring - we'll give you service. Please
 ask if what you need is not listed - we will try to help.
 Prices are subject to change without notice. In some
 cases we may have to supply an equivalent.
 We need expiry dates for credit card orders.
MINIMUM ORDER £5.

VIDEO HEADS
 PRICES DOWN AGAIN
 3HSSV FERG/AKAI etc 16.50
 3HSSN NAT PAN 16.50
 WE HAVE A FULL RANGE OF VIDEO HEADS IN
 STOCK FOR MOST MAKES. JUST ASK.
 NEW TYPES ADDED RECENTLY
 ALBA 3HSSOB 26.00
 GOLDSTAR 3HSSOB 26.00
 HINARI
 VXL2 3HSSR 25.00
 VXL5 3HSSR 25.00
 VXL6 PSF1 25.00
 VXL6 PSF2 25.00
 VXL35 3HSSR 25.00
 SAMSUNG UNIVERSAL 24.45

REMOTE CONTROLS
 THORN/FERG TV 13.00
 THORN/FERG VIDEO
 3V23 IR8817 14.95
 3V31 IR8945 14.95
 3V35 IR8946 14.95
 3V43 IR8947 19.12
 GRANADA UNIVERSAL
 PHILIPS
 G11 TXT IR8435 13.50
 G11 TXT US31 BUTTON 29.42
 G11 NON TXT US263 16.50
 G11 2 FUNC US8518 16.50
 KT3/30 NON TXT IR8331 15.85
 KT3/30 TXT IR8420 16.50
 RG5 REPLACEMENT 13.95
PLUS MANY MANY MORE!!!

SERVICE MANUALS

To name but a few!!!

FERGUSON
 3V00 12.00
 3V22 SUPP TO 3V00 1.00
 3V16 27.72
 3V24 35.54
 3V31 21.54
 3V35.6 29.67
 3V38 SUPP MS10 1.50
 3V39 SUPP MS10 1.50
 3V42 ABRIDGED 10.50
 3V43 ABRIDGED 10.50
 3V44.5 8.13
 3V48 9.95
 3V53 9.95
 3V54.5 10.20
 3V58 10.95
 3V59 13.50
 3V64.5 13.00
 FV108 7.95
 FV11R 3.95

SWITCHES

MTS1 Thom 1591 2.90
 MS53 Thom 1790 1.80
 MS14 Thom TX10-9 Remote 2.74
 MS48 As Above with Solenoid 3.42
 MS10 Gen Purpose 4A 0.80
 MS09 GB On/Off Metal 1.58
 MS07 GB On/Off Plastic 1.38
 MS07 G11 On/Off 1.58
 MS20 G11 On/Off Remote 1.58
 MS03 Rotary On/Off Gen 0.80
 MS02 ITT CVCS On/Off 1.24
 MS33 As Above with Solenoid 5.21
 MS20 Rank 120 On/Off 2.50
 MS21 As Above with Solenoid 4.50
 MS05 GEC 2040 0.58
 MS31 Philips KT3 3.84
 MS30 Philips K30 3.84
 MS36 Fidelity 70109 Front Mt 1.21
 MS33 Fidelity 70150 Remote 2.43
 MS43 Fidelity 70170 8.94
 MS12 Fidelity 70170 Rear Mt 0.94
 AM 170002 CPC 464 Comp. Switch 5.32
 AM 170306 CTM On/Off Switch 5.32
 AM 190714 DMP 2000 Power Switch 5.32
 AM 150442 Amstrad VCR 7000 5.32
 AM 140901G Arnstrad CTV 1401 3.56
 AM 142201T Arnstrad CTV 2200 1.87
 1-554-967-11 Sony KV14 2022.60 MS40 4.14
 1-552-115-11 Sony KVGen. Power 5.12
 1-552-820-11 Sony KVGen. Power 5.12
 1-552-836-00 Slide Rec Pack 1.82
 1-552-834-00 SL800UB Slide Rec 1.27
 3-309-418-00 Sony WM4 Stop Eject 1.27
 3-654-542-00 SLC7 Control Knob 1.27

TAKE UP IDLERS/CLUTCH ASSY

AKAI M132773 5.63
 AKAI BV327815 4.87
 AMSTRAD 7000 2.20
 VHS gen THORN/JVC 4.95
 FISHER 480400900 4.35
 FISHER 420400300/400 4.35
 FERG 3292 FF 1.46
 FERG 3V00 F 1.46
 FERG 3V00 TAKEUP 4.95
 FERG 3V00 TAKEUP late 5.85
 FERG 3V16 TAKEUP 4.95
 FERG 3V16 TAKEUP late 5.85
 FERG 3V22 TAKEUP 4.95
 FERG 3V22 TAKEUP late 5.85
 FERG 3V23 TAKEUP 2.08
 FERG 3V23 TAKEUP SPL 2.13
 FERG 3V29 TAKEUP IDL 1.44
 FERG 3V35 SPL CAR 2.55
 HITACHI F/F 6886971 2.90
 HITACHI 6413663 2.68
 HITACHI 6414221 5.04
 HITACHI 6838531 0.70
 HITACHI 6861471 2.43
 HITACHI 6861482 5.02
 HITACHI 6345173 0.40
 HITACHI 6886971 2.90
 HITACHI WIND ROLLER 0.78
 NAT PAN VXP0463 3.20
 NAT PAN VXP0243 1.10
 NAT PAN VXP0411 1.08
 NAT PAN VXP0344 1.22
 NAT PAN VXP0331 1.28
 NAT PAN VXP0521 4.08
 NAT PAN VXP0433 5.50
 SANYO BELL DRIVE PUL 5.10
 SANYO 5000 RLR ASSY 1.85
 SAMSUNG 1.75
 SHARP 0005 2.20
 SHARP 0006 2.20
 SONY SLC57/3000 1.27

SATELLITE EQUIPMENT

SAKURA ASTRA SYSTEM
 incl. DISH/LNB RECEIVER 199.00
 RG59 CABLE 100M 19.95
 RG6 CABLE 100M 29.95
 4 CORE POLAR CABLE 20.50
 F CONN RG6 0.18
 F CONN RG59 0.24
 F CONN SCREW ON 0.35
 FLINE CONN 0.45
 CRIMP TOOL 29.95
 COMPASS 6.00
 SAKURA STEREO SYSTEM 229.00
 SIGNAL STRENGTH METER 53.92
 AND A COMPLETE RANGE OF AERIALS
 AND ACCESSORIES ON PAGE 23 IN
 CATALOGUE

ANTIFERRE

UNIVERSAL No. 1 CLAMP 1.30
 SB11 SPLITTER 2.50
 CS200 COMBINER/SPLITTER 3.94
 COB11 OUTLET 0.96
 PU1240 POWER UNIT 11.65
 PU1300 MHA 9.09
 27 MHz FILTER 2.10
 DIPLEXERS 0.68
 MATCHED TRANSFORMER 2.83
 XS2 XTRASET 14.46
 XS04 4 WAY DA 22.50
 XS 4/6 43.13
 SUPER SET TOP AERIAL 6.50
 CARANTENNA AERIAL 7.20
 TRAVELLER AERIAL 11.50
 SILVER SENSOR AERIAL 7.40
 XGB HIGH GAIN AERIAL 21.00
 POWER SENSOR AERIAL WITH AMP 24.95
 MERCURY SET TOP AERIAL 2.30
 LOOP AERIALS 1.00
 COAX CABLE SS40 100m 33.70

SECURITY EQUIPMENT

CONTROL PANELS
 SHORROCK ACORN PANEL 32.50

IR DETECTOR INTERNAL
 8175 SHORROCK 22.50
 ORION 24.00
 Our new range of external security lighting/PIR is
 now in stock.
 PHANTOM 240 PIR (Mains) 41.25
 PHANTOM SC Self Contained 240 PIR/Light with low
 watt PL9 tube 34.50
 PHANTOM PC 240V Self Contained Courtesy Light
 which operates during hours of darkness 22.50
 ORION 5 PIR with built in halogen flood light 60.00

EXCELLENT VALUE
 CASTLE PETITE PANEL
 5 Zone/Keypad operated 49.95
 CASTLE OMEGA SE
 5 Zone/Keypad operated 66.00
 plus all the extras you may need to fit a complete
 security package.

WE HAVE ICs

eg STK5481 6.50
 STK7308 7.16
 STK5332 4.20
 STR50103A 5.00
 STR58041 9.30

TRANSISTORS

BU208A 0.95
 BU226A 0.85
 TIP4C 0.85
 Z5C2335 1.66

AND THOUSANDS MORE!!!

CIRCUIT PROTECTORS

ICPN10 0.98
 ICPF20 0.98
 ICPF15 0.98
 ICPF38 0.98
 ICPF10 0.98
 ICPN F25 0.98

VALVES

30FL2 1.70
 DY802 0.98
 DF86 87 0.86
 ECC82 1.50
 ECC82 0.98
 ECC83 1.23
 ECC84 0.80
 ECC85 0.98
 ECC86 1.35
 ECC87 1.20
 ECC88 1.20
 ECC89 1.20
 ECH81 1.60
 ECH84 0.66
 ECH80 0.84
 ECL82 1.30
 ECL84 0.74
 ECL86 1.98
 EFB0 0.95
 EFB6 2.20
 EFB8 0.99
 EFB8 1.09
 EFB9 0.72
 EL90 1.75
 EL34 3.50
 EL84 1.26
 EY86 7 0.68
 FY500A 2.25
 EZ801 0.56
 GY501 1.45
 GZ34 3.50
 KT66 9.75
 KT77 8.50
 K188 At. tp 12.00
 PC92 4.50
 PCP200 1.45
 PCF808 1.63

PC97

PC805 1.65
 PCF80 1.00
 PCF800 1.35
 PCF800 3.38
 PCF801 1.13
 PCF802 1.12
 PCF805 1.80
 PC182 1.20
 PC184 1.20
 PC185 1.09
 PC186 0.92
 PFL200 1.86
 PL36 1.87
 PL81 0.94
 PL84 0.78
 PL95 2.26
 PL504 1.65
 PL508 1.50
 PL509 15 5.25
 PY88 0.81
 PY500A 1.75
 PL84 0.69
 UCH81 2.25
 UCL83 1.82
 UY85 1.35
 PL802T 4.00
 40K06 5.93
 21L8 3.00
 17DWB 4.50
 3AT2A 5.00
 12BY7A 3.75
 6L6GC 3.68
 6X6GT 2.81
 12BG7 3.20
 12BH7A 5.25

INTEGRATED CIRCUITS

We have in stock all listed Commodore IC's.

COMPUTER IC'S/TRANS
 LM6121ROP 7.20
 LM888 1.75
 MAB8049 3.49
 MC1488 0.75
 MC1489AP 0.77
 Z801 4.00
 SPEC 48K ROM 5.00
 QL ROM 256K 12.43
 QL ROM 128K 7.20
 TC74HC04 3.86
 TMS1000 8.95
 TMM23128P-1951 10.66
 ULA60001E (SPEC) 6.50
 ULA1305T 2.50
 Z80A CPU 1.70
 2N7400E 11.25
 SN7438N 2.00
 74LS06 1.12
 74LS157 0.78
 74LS132 0.63
 74LS260 0.83
 251641-02 P.O.A.
 2732 4.12
 2764 3.75
 27128 4.95
 27256 5.90
 RAM 4118 2.92
 RAM 4116-4 1.10
 RAM 4116-2 1.10
 8249 3.90
 8247 3.50
 8271 60.00
 BBC ULA 15.00
 4164 4564-15 2.00
 41256-15 8.95
 6502 COMMODORE 3.50
 6522 4.00
 6264 COMMODORE 7.50
 6510 COMMODORE 7.07
 6526 COMMODORE 8.50
 6561 COMMODORE 7.74
 6569 COMMODORE 21.25
 6581 COMMODORE 12.00
 8380 COMMODORE 19.51
 8501 COMMODORE 5.96
 8701 COMMODORE 6.40
 906114 PLA COMM 3.00
 901226 CHAR ROM COMM 7.37
 901226 BAS ROM COMM 8.71
 ZTX182-BC182 0.07
 ZTX213 0.15
 ZTX214 0.17
 ZTX313 0.24
 ZTX510 0.39
 ZTX511 0.39
 ZTX650-1 0.27
 ZTX750 0.38
 IS2472 0.31
 901227 10.44

SPECIAL OFFERS

VHS E180 TAPE (10) 22.90
 13a LACO PLUGS (10) 3.75
 AUDIOLINE PHONE 201 15.00
 AUDIOLINE PHONE TEL1 9.50

LABGEAR

CM7261 P.U. 12.39
 CM7262 P.U. 13.50
 CM7065 UHF/VHF HB 16.18
 CM7066 UHF/RB 14.74
 CM7268 VHF H.GAIN A/B/C/D 17.57
 CM7253 BEHIND SET (MAINS) 15.81
 CM7243 SECOND SET AMP 14.73
 CM7093 THREE SET AMP 18.55
 CM7063 DIST AMP VHF/UHF 25.77
 CM7087/7298 8+1 DIST AMP 49.90
 CM6700 27MHz CB SUPPRESSOR 4.90
 CM6511 OUTDOOR SPLITTER 8.63
 CM9003001 FLUSH SING OUTLET 1.95
 CM9003001 FLUSH SING OUT. ISOLAT 2.36
 CM90010 FLUSH TWIN OUTLET 2.47
 CM90034 UHF FILTERS A/B/C/D 8.89
 CM90033 6 WAY PASS SPLIT 11.72
 CM7042 TV GAMES COMBINER 3.24
 CM90009 FLUSH TV/FM EMULATOR 3.88
 CM90006 VHF-UHF DIPLEXER 4.17
 CM7122 TELEVERTA UP VHF TO UHF 41.90
 CM7057 TELEVERTA DOWN UHF/VHF 49.73
 CM7294 DIST AMP UHF/VHF 21.46
 CM7274 4 WAY DIST AMP 26.15
 CM7082 UHF/VHF DIST AMP 74.15
 CM7080/10 UHF MHA 16.89
 CM7271 UHF WIDEBAND 15 db 9.09
 CM5004 4way VIDEO DIST AMP 60.26

LABGEAR SATELLITE RANGE

CM5188 If Interim Dist Pump 57.00
 CM5110 If Line Pump 17.00
 CM5112 Block Converter with PSU 143.34

TELEVISION WALL BRACKETS

PS245 TELEWIST TWIN
 Articulated TV Wall Bracket
 12"-20" White
 (Loadbearing Cap. 36Kg) 24.16

PS645 DESIGNER TWISTER
 12"-20" White
 (Loadbearing Cap. 36Kg) 27.00

PS641 LITTLE TWISTER
 Small, ideal for Bedroom, Kitchen
 14" White
 (Loadbearing Cap. 16Kg) 14.08

DISKS

GOLOSTAR 5.25" FLOPPY DISKS
 2DD DS DD (BOX 10) 5.66
 GOLOSTAR 3 1/2" DISKETTES
 HF 2DD DS DD (BOX 10) 8.30
 UNBRANDED 3 1/2" DISKETTES
 DS-DD (BOX 10) 7.70
 AMSTRAD 3" DISKS 29.50

TEST METERS

H7700 METER 20,000 R.v. 10.99
 PHILIPS METER 25.90

STATIONERY

SERVICE CALL PAD (100) 1.99
 REPAIR TICKET (100) 3.90
 JOB CARD (100) 2.50
 RENTAL PAYMENT CARD (50) 3.50
 MAINTENANCE AGREEMENTS (100) 3.50

WE WELCOME ORDERS FROM SCHOOLS, COLLEGES AND GOVERNMENT INSTITUTIONS ON OFFICIAL REQUISITION.



NEW PRODUCTS

MAINS SMOKE ALARM 19.50
 ADAPTORS TO ALLOW BATTERY SMOKE
 ALARMS TO RUN OFF MAINS 5.25
 PHILIPS BACK UP BATTERIES
 9 2.85
 2 4V 5.65
 4 WAY TRAIL SOCKET WITH
 PLUG & CABLE 6.75
 RED MK4 REMOTE 16.95
 SOCKET KIT FOR TD2600 1.35
 3V38 39 LOWER DOOR FLAP 2.58
 3V38 39 UPPER DOOR FLAP 95p

SPECIAL ALTAI C90 AUDIO TAPES (BOX 10) 1.99 ONLY

WE ARE THE MAIL ORDER SPECIALISTS AND WE TRY HARD TO STOCK ALL THAT WE ADVERTISE.
 IT IS NOT OUR POLICY TO PRINT LISTS IN CATALOGUES OF GOODS THAT WE DO NOT HOLD IN STOCK.
 PLEASE RING US SHOULD YOU HAVE ANY SPECIAL REQUIREMENTS OR IF YOU NEED QUANTITY DISCOUNTS.
 WE WILL ALWAYS TRY TO GIVE YOU PERSONAL AND FRIENDLY SERVICE.

PHONE: (0254) 36521 - 390936 - 32611

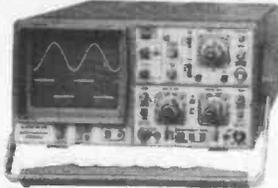
HOW TO INCREASE YOUR PROFITS, IMPROVE YOUR SERVICE, WITH COST EFFECTIVE TEST EQUIPMENT.

HAMEG OSCILLOSCOPES

HAMEG are Europe's top selling DUAL TRACE OSCILLOSCOPES. Select from four superb models. All, with the exception of the HM 1005, incorporates a useful COMPONENT TESTER. Size - all models - 285mm x 145mm x 380mm. Clear display 8 x 10cm. Mains supply: 110/125-220/240V AC 50/60Hz.

All supplied with 2 PROBES, a COMPREHENSIVE MANUAL and a 2 YEAR WARRANTY.

HM203-6 20MHz STANDARD



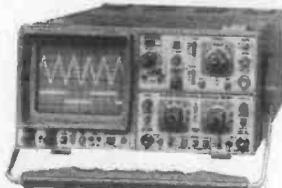
Price £314.00 + £47.10 V.A.T.

SPECIFICATION

- * 2 Channels
- * Bandwidth: DC-20MHz
- * Sens: Ch1., Ch2., 2mV/cm
- * Timebase: 0.2s-20ns/cm
- * Triggering: DC-40MHz
- * Active TV-Sync-Separator
- * Variable hold-off
- * Trigger LED indicator
- * Calibrator: 1KHz Square wave
- * Component tester
- * Plus many features

FREE Securicor Delivery

HM604 60MHz UNIVERSAL



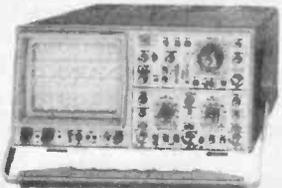
SPECIFICATION

- * 2 Channels
- * Bandwidth: DC-60MHz
- * Sens: Ch1., Ch2., 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
- * Plus many more superb features

Price £575.00 + £86.25 V.A.T.

FREE Securicor Delivery

HM1005 100MHz UNIVERSAL



Price £726.00 + £108.90 V.A.T.

3 CHANNELS-UP TO 6 TRACES

SPECIFICATION

- * 3 Channels
- * Bandwidth: DC-100MHz
- * Sens: Ch1., Ch2., Ch3., 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
- * Overrescan LED indicator
- * Active TV-Sync-Separator
- * Calibrator: 1KHz & 1MHz Sq. Wave
- * Plus many more excellent features

FREE Securicor Delivery

HM205-2 20MHz DIGITAL STORAGE



SPECIFICATION

- * Digital Storage
- * Analogue real time (Same as 203-6)
- * Bandwidth: DC-20MHz
- * Sens: Ch1., Ch2., 2mV/cm
- * Timebase Analogue: 0.2s-20ns/cm
- * Timebase Digital: 5s-2µs/cm
- * Triggering DC-40MHz
- * Active TV-Sync-Separator
- * Max sampling rate: 2x5MHz
- * Memory: 2x1024x8 Bit
- * Dot joiner
- * Printer/plotter output
- * Component tester
- * Plus many more useful features

Price £527.00 + £79.05 V.A.T.

FREE Securicor Delivery

B.K.'s CRT TESTER-REJUVENATOR



Tests and rejuvenates blue, green & red guns separately. Fitted with delta and P.I.L. sockets. Compact size 120x65x60 mm. Supply 240V AC

Price £32.00 + £4.80 V.A.T.

B.K.'s REVOLUTIONARY DYNAMIC 'LOPT' TESTER

Revolutionary L.O.P.T. tester. Operates in dynamic mode which actually tests the L.O.P.T. under high voltage conditions without de-soldering or removal. Size 75x100x40 mm. Supply 240V AC

Price £25.99 + £3.90 V.A.T.



THANDAR SC110A PORTABLE OSCILLOSCOPE



Price £195.00 + £29.25 V.A.T.

- * Full trig. fac. inc. TV frame etc.
- * Only 2 1/4" thick
- * Battery or mains adaptor
- * Fits in a brief case
- * Size 255mm x 148mm x 50mm
- * Sens. 10mV
- * Bandwidth 10MHz

ACCESSORIES

Carry Case £6.25 + £0.93 V.A.T.
Probe £7.50 + £1.30 V.A.T.
Mains Adaptor £7.30 + £1.09 V.A.T.

DIGITAL LCR METER

- * LCD Display
- * 18 Ranges
- * Inductance 1µH - 2H
- * Capacitance 1pf - 200µF
- * Resistance 1ohm - 20Mohm
- * High accuracy

Price £95.00 + £14.25 V.A.T.



INSULATION TESTER 500V

- * Electronic battery operated
- * Measuring Voltage 500V DC
- * Measuring Range 0-100Mohm
- * Centre scale 2Mohm



Price £65.00 + £9.75 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 467) * Exclusive multiplex technique (model 467) * Measures 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 up-dated and new adaptors development * Tests and rejuvenates VDU's and Oscilloscope tubes * A range of over 40 CRT base adaptors available * Increases profit * Pays for itself in months.

PRICES

Model 467 Tri-dynamic three meter instrument Inc. 6 common adaptors £395.00 + £59.25 V.A.T.
Without adaptors £344.00 + £51.60 V.A.T.
Model 470 Single meter instrument Inc. 6 common adaptors £294.00 + £44.10 V.A.T.
Without adaptors £244.00 + £36.60 V.A.T.
Technical leaflets available. GET INTO PROFIT NOW!

SADELTA FIELD STRENGTH METER TC-402

THE SADELTA FIELD STRENGTH METER TC-402 has been designed to measure the signal levels delivered by the antenna to a TV or FM receiver, in order to test the performance of the antenna and evaluate the best conditions during installation etc. To facilitate measurements, the tuning frequency readout is shown on a digital display.

FEATURES

- * Covering FM and all TV bands (UHF/VHF) including CATV freq.
- * Digital tuning display (3 digits) for direct frequency readout.
- * Accurate 10 turn tuning potentiometer.
- * Built-in loudspeaker enables monitoring of sound in AM/FM.
- * Meter measurement in voltage and dB from 20µV (26dB/µV).
- * Continuity tester 0-500 ohms.
- * Fully portable (battery).
- * Sturdy carry case.



Price £249.00 + £37.35 V.A.T.

SADELTA COLOUR PATTERN GENERATORS

THE SADELTA RANGE OF HAND HELD COLOUR PATTERN GENERATORS is intended for use in production, installation and service of both colour and monochrome TV sets, video and computer monitors. In order to control and adjust the various parameters eight switchable patterns are provided. The technician has ready access to Laboratory, workshop and field use as the Generator has been designed using the latest micro-technology to achieve truly pocket size instruments. Internal re-chargeable Ni-Cd's. Supplied with 9V power supply charger. Size 131mm x 81mm x 23mm.

T.V. PATTERN GENERATOR PAL MC11B UK

- * Band IV (21-34) * O/Put 10mV into 75ohms
- * Band III (5-12) * Sound output
- * PAL I.

Price £124.95 + £18.74 V.A.T.

PAL VIDEO COMPOSITE GENERATOR

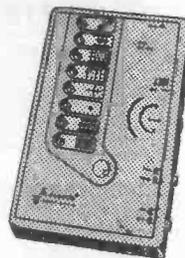
- * PAL B.G.I. * Audio O/Put 10mV
- * O/Put 1V p.p. @ 75ohms * Switching 12V @ 4K7ohms

Price £124.95 + £18.74 V.A.T.

R.G.B. PATTERN GENERATOR

- * O/Put sigs. Pos.RGB * O/Put TTL 5V P-P
- * Neg. Composite * Blank Pulse etc. CCIR

Price £111.95 + £16.79 V.A.T.



DIGITAL THERMOMETER

- * Pocket Size
- * -50°C to +750°C
- * 1°C Resolution
- * 0.5" LCD
- * Supplied with thermocouple

Price £59.50 + £8.92 V.A.T.

200MHz DIG. FREQ. METER

- * Pocket Size
- * 8 Dig. LED Display
- * Freq. Range 20Hz to 200MHz
- * Resolution 0.1Hz
- * Sensitivity 10mV

Price £75.50 + £11.32 V.A.T.

DIGITAL CAPACITANCE METER

- * High Accuracy * 8 Ranges * PRICE £38.00
- * 0-1pf-2,000µF * Accuracy ±0.5% + £5.70 VAT
- * LCD display * Full scale ±1 digit Case Included



Price £23.00 + £3.45 V.A.T. each

The THANDAR TP1 LOGIC PROBE and TP2 LOGIC PULSER are effective and economical tools for checking both TTL and CMOS circuits. TP1 can show 14 different circuit conditions and can detect pulses down to typically 10ns. TP2 can inject a signal directly into a circuit without damaging sensitive components. Together they can stimulate and monitor responses of components 'in circuit', greatly aiding fault finding.



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 S.A.E. for technical leaflets of complete range. Delivery normally within seven days.



B. K. ELECTRONICS DEPT. T

UNIT 5, COMET WAY, SOUTHEND-ON-SEA, ESSEX. SS2 6TR TEL: 0702-527572

West Midlands TV. & Video

Wholesale

GREAT CLEARANCE SALE

OVER 3000 TV's & VIDEO's IN STOCK AT UNBEATABLE PRICES - HURRY NOW.

HUGE STOCKS WORKING & GENUINE UNTESTED TV's & VIDEO's

LOTS OF SPECIAL OFFERS WHILST STOCKS LAST

WORKING CTV's

PHILIPS G11	£18
KT3/K30	£30
BUSH T20	£18
GRUNDIG	£35
TOSHIBA	£30
TX9	£30
TX TEXT	£55
STEREO TEXT	£75

WORKING
SETS FROM
£10

SPARES AVAILABLE FOR
MOST TV's & Video's
(CALLERS WELCOME)

WORKING VIDEO's

FERGUSON 3V29/3V30	£65
JVC 7200	£75
PANASONIC	£75
SHARP	£80
AMSTRAD 7000	£70
3V31/3V35	£90
HITACHI VT11	£75

TEST YOUR OWN SETS

NEW INFRA RED HAND SETS FROM £10

VHS VIDEO HEADS FROM £15

BLOCKS OF 10 SETS FROM £40

★ DELIVERY CAN BE ARRANGED ★

ALL PRICES SUBJECT TO V.A.T. AND QUANTITY

TRADE SHOWROOM

LARGE QUANTITY
OF READY
TO SELL
VIDEO's & TV's

Call in - you
will be delighted

2 MINUTES FROM JUNCT. 9-M6

WAREHOUSE IN PASSAGE

OFF LITTLE LONDON

CALDMORE, WALSALL

TEL. 0922 724542/722208

MOBILE 0860 749202

Open Mon-Sat 9am - 6pm Sunday by appointment

LONDONS NEW EX-RENTAL WAREHOUSE RELIABLE WHOLESALE TV

SALE TIME!

TV's from **£3** VIDEOS from **£30**

WE STOCK THE LOT - 10p WILL SAVE ££s

TO NAME A FEW

TV's

PHILIPS G8 - G11 - KT3 - KT30 - KT35 CTX
DORIC MK2 - MK3 - MK4 - MK5
FERGUSON TX9 - TX10 - 9600 - 8800

Plus Pye, Sony, Finlandia, GEC, Hitachi, National Panasonic,
Mitsubishi, Toshiba, Grundig, ITT & MORE, MORE, MORE

VIDEOS

3V22 - 5000 - 8000 - 3V29/35/36/37/38/39/45
SHARP 9500 - 9600 - 9700 + MORE, MORE, MORE
PANASONIC NV333/366/370/2000/7200/3000

VAT Prices exclude VAT.

HANDSETS - Handsets are included with working sets but are
charged extra in 'off the pile' sales.

WE ARE JUST OFF A406 (BARKING)
2 ROADS AWAY FROM EAST HAM TUBE
RELIABLE WHOLESALE TV
UNIT 2
2A LATHOM ROAD
EAST HAM, LONDON E6

01-471 9622
01-590 2715
TV & VIDEO PANELS
SUPPLIED

MAKE YOUR

INTERESTS PAY!!

Train at home for one of these Career Opportunities

More than 8 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 90 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 your FREE INFORMATION PACK on the course of your choice.

- GCSE/GCE/SCE
- Electronics
- Basic Electronic Engineering (City & Guilds)
- Electrical Contracting/ Installation
- TV, Video & Hi-fi Servicing
- Radio Amateur Licence Exam (City & Guilds)
- Car Mechanics
- Computer Programming
- Motorcycle Repair

SEE ORACLE PAGE 671

Course of Interest

Name

Address

P.Code

ICS

International Correspondence Schools, Dept. EGS99
312/314 High Street, Sutton, Surrey SM1 1PR.
Tel: 01-643 9568 or 041-221 2926 (both 24 hrs)

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

G.G.L. COMPONENTS

PO BOX 72, UNIT 7, SOUTH JOHN STREET, CARLISLE, CUMBRIA CA2 5AL
PHONE (0228) 39693/20358 FAX (0228) 515127

BUY WITH



CAPACITORS		INTEGRATED CIRCUITS		TYPE		PRICE (£)		TYPE		PRICE (£)		LINE O/P TRANS		TRANSISTORS		TYPE		PRICE (£)			
1UF at 250V	20			STK5421	4.95	TDA2530	2.00	DECCA 100	8.30	BC107	1.30			BU807	1.30						
4.7UF at 250V	25	TYPE	PRICE (£)	STK5481	8.95	TDA2532	2.10	BU826A	2.25	BC147	1.10	BU807	2.25	BU908	1.95	BU807	2.95	BU908	1.95	BU111AF	2.95
10UF at 250V	35	AN303	3.75	STK7308	8.95	TDA2540	1.70	BC148	1.10	BC307	1.10	BU908	1.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
22UF at 250V	40	AN305	3.50	STR4000	8.95	TDA2541	2.70	BC327	1.10	BC328	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
33UF at 250V	55	AN318	6.95	STR4030	7.95	TDA2560	1.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
47UF at 250V	65	AN5620	4.95	STR50103A	6.50	TDA2576A	3.25	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
100UF at 250V	1.25	AN1745M	2.95	STR4411	3.95	TDA2577	2.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
(All Single Ended PCB Type)		HA1339A	2.95	STR4451	4.95	TDA2578A	2.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		HA1366W	1.85	STR451	5.35	TDA2579	3.75	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		HA1366WVR	1.85	STR454	4.95	TDA2581	2.00	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		HA1374	2.45	STR5412	6.95	TDA2582	1.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		HA1377	2.95	STR5804	6.95	TDA2591/3	1.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		HA1392	2.95	STR6020(KIT)	5.75	TDA2594	2.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		HA1397	3.95	TA7193P	1.40	TDA2600	6.35	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		HA13001	4.50	TA7205AP	1.40	TDA2611A	1.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		HA13008	12.95	TA7222P	1.85	TDA2653A	3.50	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		LA1201	1.25	TA7227	2.95	TDA2655B	5.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		LA1230	2.95	TA7270	3.25	TDA3190	1.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		LA1365	2.45	TA7608	3.35	TDA3330	3.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		LA4440	2.75	TBA120AS	1.00	TDA3540	2.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		LA4445	2.45	TBA120U	1.00	TDA3541	2.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		LA4460	2.45	TBA800P	85	TDA3560	4.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		LA4461	2.45	TBA810S	1.25	TDA3561A	4.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		LA7800	1.95	TBA820I	1.50	TDA3562A	6.50	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		LA7801	2.90	TBA820M	1.25	TDA3565	4.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		MZ93B1	6.95	TBA920S	1.95	TDA3571 B/Q	3.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		MC13002	3.95	TBA950 2X	2.25	TDA3650	4.75	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		MC14497P	4.50	TBA1440G	2.25	TDA3651	1.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		SA11250	3.85	TDA440	2.95	TDA3651AQ	3.80	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		SA11251	4.95	TDA1020	2.75	TDA3652	3.80	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		SA13007	3.95	TDA1035T	2.40	TDA3652A	4.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		SA15010	4.95	TDA1037	1.95	TDA4500	3.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		SA15011	4.95	TDA1044	2.95	TDA4503	4.65	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		SA15030	5.95	TDA1170S	1.80	TDA4507	2.85	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		SA15050	6.95	TDA1180P	2.65	TDA4600/2D	3.30	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		SAF1039P	2.75	TDA1190Z	2.85	TDA7270	3.35	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		SL470/DP	2.95	TDA1470	3.25	TDA8180	6.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		SL480	2.85	TDA1506	4.35	TDA8190	2.80	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		SL490	2.90	TDA1510	4.35	TDA9503	2.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		SL1430	1.95	TDA1512	3.50	TDA9513	3.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		SL1431	1.95	TDA1515	4.50	TEA1014	3.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		SL1432	1.75	TDA1670A	4.20	UPC1031H	2.60	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		SN76660N	65	TDA1770A	3.70	UPC1181H	1.70	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		ST4471C	6.95	TDA1870	6.95	UPC1182H	1.70	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		STK077	6.95	TDA1908A	1.95	UPC1230H	4.35	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		STK1219	11.95	TDA1950A	3.95	UPC1355C	4.20	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		STK433	5.95	TDA2002	1.50	UPC1378H	3.70	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		STK4332	5.95	TDA2003	1.55	UPC1382A	4.35	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		STK435	5.95	TDA2004	1.55	UPC1394C	2.95	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		STK437	6.95	TDA2005	2.90	Z80ACPU	1.75	BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		STK439	7.50	TDA2020	3.20			BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		STK459	8.55	TDA2020	3.20			BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		STK461	9.95	TDA2030	1.90			BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		STK463	9.95	TDA2170	2.85			BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		STK465	11.95	TDA2270	2.95			BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95
		STK5332	6.95	TDA2525	2.95			BC337	1.10	BC337	1.10	BU807	2.95	BU111AF	2.95	BU908	1.95	BU111AF	2.95	BU807	1.95

FERGUSON TV SPARES</	
----------------------	--

**WORKING
VHS
FROM £60**

**WORKING
TELETEXT
FROM £56**



PHOENIX OF DONCASTER

THIS MONTH'S SPECIAL OFFER

GEC PIL STARLINES — ELECTRONIC TUNE
GOOD CABINETS — OFF THE PILE £6

K-30	£25
KT-3	£20
TX	£25

ALWAYS IN STOCK

ELECTRONIC VHS VID —
COMPLETE NON-WORKING FROM £25

PHOENIX TV WHOLESALE
UNIT 3A SANDALL LANE, KIRK SANDALL IND EST
Telephone CHERYL on 0302 890117

BITEL

SOUTH WALES

NEW DELIVERIES EVERY WEEK

COLOUR TV

DELTA	£8 WORKING
PIL	FROM £12 WORKING
R/C.....	FROM £28 WORKING
TEXT.....	FROM £40 WORKING
PORTABLE.....	FROM £50 WORKING

VIDEO

ELECTRONIC VHS FROM £70 WORKING
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**

FIRST IN TUBE REBUILDING TECHNOLOGY 30AX; 540 SERIES!

**REDUCED SERVICING COST,
FIT A DIRECT REPLACEMENT**

**AVAILABLE ONLY FROM CHROMAVAC.
PRE CONVERGED AS ORIGINAL.
EXTERNAL MULTIPOLE UNIT NOT REQUIRED.**

QUALITY REBUILDS

**SPECIAL
OFFERS
ON
INLINE**

Get on the hot-line today!

SAVE £££s

KEEP THAT OLDER SET
PURCHASE A NEW 56-410
OR 47-342/3 TUBE
FOR ONLY £5 + CARRIAGE
Also NEW 560 AKB22 £35
NEW 670 XB22 £37.50

061
681 2959

most types of
Inline Re-builds
or new ex-stock
PRICES SUBJECT TO
GLASS EXCHANGE

Delta Rebuilds

Up to 19"	£28
Up to 22"	£30
Up to 26"	£34
110° up to 22"	£34
110° up to 26"	£38
Low focus	+£2
A47 342 New	£28
17FHP New	£30
470EHB New	£30
Delta only. Less 5% 5+	

Inline Rebuilds

Up to 22" .. From	£40
Up to 26" .. From	£45
A56 - 540x	£56
A66 - 540x	£58
Bonded Coil	+£5

ALL SIZES OF NEW AND
REBUILT MONO TUBES
AT COMPETITIVE PRICES

IN LINE TYPES (NOT REBUILDS) PHONE RE STOCK POS.

Please enquire types not listed

370 HFB-A37-590	£50	AXT 56-001	£67
370 HUB	£50	670 CZB	£80
AXT 37-001	£50	A66-540	£125
420 CSB	£50	420FSB	£60
420 EDB-A42-590	£50	14" (A34); 16" (A38); 21"	
420 EZB	£50	(A51); FST now available	
420 ERB	£50	at special low prices	
470 KUB	£50		
510 UFB	£67		
510 VSB	£67		
AXT51-001	£67		
560 DYB-560 DTB	£67		
560 EGB	£67		
560 CGB	£67		
560 DMB	£67		

MIN. CARRIAGE £5
£10 if glass collected.
TERMS
Cash with order
ALL PRICES
EXCLUSIVE OF VAT

NOTE
Surcharge
without
exch. glass.

★ WE PURCHASE SURPLUS STOCKS
OF INLINE TUBES: ALSO A56/
66 - 510/540 ETC. OLD GLASS.
DELIVERY: By return on all stock items.

THE COMPANY WHO PUT HIGH STANDARDS FIRST



CHROMAVAC LTD., PUMP STREET,
HOLLINWOOD, OLDHAM OL9 7LR 
Ask for Mr Butterworth ON: 061-681 2959

METEX & TEST LAB INSTRUMENTS YOU PAY TRADE PRICES!



3 1/2 AND 4 1/2 DIGIT Dmms

ALL WITH CONTINUITY TEST (★ With Capacitance + With Hfe ○ With Freq.)

PRO SERIES METEX

3 1/2 & 4 1/2 DIGIT
All Wh Case. 20A AC/DC
17mm Display (3800 12mm)

3800 32 Range 0.5% (-)	£29.40
3610 30 Range 0.3% (+)	£38.86
3630 30 Range 0.3% (**)	£46.90
3650 30 Range 0.3% (***)	£50.90
3650B as 3650 with Bargraph	£57.60
4630B 4 1/2 Digit 30 Range Data Hold 0.05% (**)	£69.68
4650 as 4630 Plus Range Freq.	£72.36

STANDARD SERIES

3 1/2 DIGIT 12 mm DISPLAYS

2315B 17 Range 10 ADC	£19.43
2318B 23 Range 10ADC (+)	£22.78
2335 31 Range 10A AC/DC (+)	£26.80
2325 32 Range 10A AC/DC (**)	£29.40
2355 32 Range 10A AC/DC (***)	£33.50
2365 38 Range 10A AC/DC (***)	£36.00

Plus Logic Probe

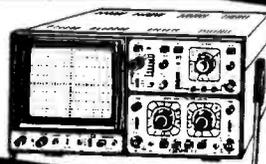
Also Metex M80 21 mm Display
3 3/4 Digit Autorange. Datahold (°) £59.92

TEST INSTRUMENTS

3000 LCR AC Bridge	£93.80	TE220 1 MHZ Audio Generator	£87.00
M3002A AC Millivolt Meter 1MHZ	£80.40	3300 Autorange Digital Cap. Meter	£64.00
2020 500 KHZ Function Generator	£85.76	6100 Signal Tracer/Injector	£52.30
4162AD 150 MHZ Fr Gen. Plus 6 Digit Counter	£154.00	5250 150 MHZ 7 Digit Frequency Counter	£64.50
2603AD 1 MHZ Af Gen. plus 6 Digit Counter	£159.00	08T5M 5 MHZ Bench Scope	£144.00
TE200 150 MHZ Rf Gen.	£80.00	243 0/24V 0/3A Variable PSU	£50.65
(350 MHZ Harmonic)		245 0/24V 0/5A Variable PSU	£63.65
		154 4/15V 0/4A Variable PSU	£36.05

"POCKET" TEST INSTRUMENTS

F20 Dual Scale Sound Level Meter 120dB	£33.87	302K LCD Temperature Two 1/P	£34.74
225V VHS Video Head Tester	£30.39	3900TD LCD Dmm With Dwell And Tach Ranges	£49.58
1066 Digital Lux Meter - 3 Ranges	£47.78	KT50 LCD 8 Range Capacitance Meter	£33.50
07 Logic Probe	£6.10	6060 LCD Digital True Power Meter 6KW 19	£64.00
M625 Logic Probe/Pulser	£14.74	2070 19 Range Multimeter 10ADC + Buzz	£11.35
300/310 AC Clamp Meter 600A/300V/Resis	£32.83	2030ET 27 Range 10A AC/DC Cap. Hfe Temp. Buzz	£35.30
M265 Add on AC Clamp Probe for Dmm's	£16.48	5050E 41 Range FET mm	£25.33
501 Electronic Insulation Tester 500V	£53.00	0M5 Wallet Autorange Dmm	£17.95
504 Electronic Insulation Tester 1000V	£65.00	YF120 Pen Type Autorange Dmm	£29.21
K0M6 TR Dip Meter 1.5 to 250 MHZ	£45.02		
1062 LCD Temperature & data hold	£35.50		



AUDIO-ELECTRONICS ARE INSTRUMENT DISTRIBUTORS FOR HAMEG • FLIGHT • BLACKSTAR • ALTAI • THURLBY • THANDAR • CROTECH • LEADER AND HITACHI
PHONE FOR BEST PRICES.

ADD 15% VAT (UK ONLY)

TELEPHONE YOUR ORDER WITH VISA/ACCESS
OPEN 6 DAYS A WEEK FOR CALLERS

AUDIO ELECTRONICS

301 Edgware Road, London W2 1BN
Tel: 01-724 3564 Fax: 01-724 0322
Sales office 01-258 1831

TRADE/EDUCATION ORDER ACCEPTED.
EDUCATION AND QUANTITY PRICES AVAILABLE

INSTRUMENT CATALOGUE WITH DISCOUNT VOUCHERS REF TG
Send A4 SAE (£1.00) or £2.00 UK for full CATALOGUE

KITVISION

* UNBEATABLE NEW WAREHOUSE *
* OPENING OFFERS *

TVs WORKING		VIDEOS WORKING	
8800	£ 9.00	3V29/30	£65.00
TX 9 BASIC	£25.00	3V23	£70.00
TX 10 TXT	£60.00	3V31	£85.00
PHILIPS	ITT	SHARP	PANASONIC
GRUNDIG	DECCA	HITACHI	AMSTRAD

* PORTABLES *
* ONLY £50.00 *

GRADE 'B'

Midis	£ 49.00
R/C 14" TV	£135.00
VHS E180	£ 1.40
MICROS	£100.00

*Pay Us a Visit
You Won't be
Disappointed
We
Guarantee!!*

Next to
FORD
CENTRAL
MOTORS

KITVISION
UNIT 1, ST MARKS WORKS
FOUNDRY LANE,
LEICESTER LE1 3WU
Tel: 516941

IBEX GLASGOW

INDEPENDENT TV and VIDEO WHOLESALEERS

GOOD SELECTION OF WORKING AND
NON WORKING SETS
ALWAYS AVAILABLE

EXAMPLES

Working	Non Working	Working Text from VHS Videos from Beta Videos	£35 £75 £8 off the pile
G11	£18		
GEC STAR	£20		
Finlandia	£15		
Rediffusion			
Mk3	£15		
TX9 & 10	£35		
KT3 & 30	£35		

All Our Prices are inclusive of VAT. The Price You See is The Price You Pay.

UNIT D/B
PROJECT 9 INDUSTRIAL ESTATE
McPHAIL STREET, GLASGOW G40 1ND
Telephone: 041-554 7637



1989 CATALOGUE, NEW, LARGER, MORE VARIED, NOW READY, OVER 200 PAGES (includes Credit Tickets (3), Special Offer sheets, Order Form & Pre-Paid envelope) only £1.00 or free on application with any order over £15. Prices in new catalogue and advertisement may vary as material for advertisement is prepared 6/8 weeks before issue of Television.
PLEASE NOTE - ALL PRICES NOW INCLUDE 15% VAT

PRIORITY CATALOGUE ORDER

Name _____
Address _____

I enclose £1.00 cheque/P.O./cash for catalogue

SEPTEMBER SPECIAL OFFER

- 1 x Antex 25W. Soldering Iron.
- 1 x Antex Soldering Stand.
- 1 x Desolder Pump.
- 1 x Reel Solder 18 gms.

ALL FOR £12.50

"CLOSED-CIRCUIT" TELEVISION SYSTEM
PRICE £160.00 CARRIAGE £12.00
Comprising: 1 x CAMERA 1 x MONITOR
1 x CAMERA BRACKET



Illustrations not to scale. For guidance only — actual items supplied may vary from those illustrated.

QUARTZ-HALOGEN SPOTLIGHT

Hand held or hanging. Heat resistant poly-carbonate housing, highly polished reflector. Protective lens cover, doubles as base stand. With On/Off switch. Produces 250,000 candle power — 5 times the intensity of average car headlights. Power: 12V d.c. 4.5A. 55W. Dims. 160 x 88 x 110mm.



£5.99

12V Twin Fluorescent Lamp

12" Double Tubes
Attractive white fitting, ribbed perspex diffuser. On/off switch, 3ft cable. Transistorised circuitry. Keyhole fixing. 12V D.C. 8W Tubes. Dimensions: 368 x 67 x 43 mm.
Ideal for Caravans, Boats, Vans etc.

PRICE £5.99 10+ £4.99 50+ £4.50

12 VOLT RECHARGEABLE UNIT

10 x D x Size Ni-Cads (4 Ah) encapsulated in a black plastic case. Fuse holder. Gives 12 volt output when charged. Ex-rigment. Fully guaranteed. Dimensions: 245 x 75 x 75mm.
£9.19 each + P&P £1.85
£8.34 for 10 + P&P £4.50

CHARGING UNIT FOR ABOVE 12V UNIT

Manufactured by Salf, these chargers are suitable for the above battery packs (as advertised in the May issue of "WHAT VIDEO" — Page 6). The chargers are owned as we have modified them to a standard charger. Full charge of the packs is obtained after 10-12 hours (overnight) charging. Supplied complete with main lead and charging lead fitted with a 4-pin plug (6-pin plug version available upon request). Although ex-rigment, these chargers are fully tested and guaranteed. Dimensions: 35 x 280 x 150 mm.

4-PIN £11.50 6-PIN £11.60 + £1.85 P&P

NI-CAD BATTERY CHARGER

Universal 1+ £4.99 each
PRICE: 10+ £4.75 each
4 x AA Charger £4.99 each

NI-CAD BATTERIES

AAA £1.50 ea £1.30 ea/10
AA .95 ea .85 ea/10
C £1.00 ea £1.80 ea/10
D £2.20 ea £2.20 ea/10
PP3 £3.90 ea £3.75 ea/10

BLACK STAR FREQUENCY COUNTERS

Metrol 100-100MHz £119.99
Metrol 50-600MHz £119.99
ALL NEW Carriage £2.50

RESISTOR KITS — each value individually packed

1/4W pack 10 each value E12 — 10R to 1M 610 pieces 5.10
1/4W pack 5 each value E12 — 10R to 1M 305 pieces 3.75
1/4W pack Popular — 10R to 10M 1000 pieces 6.99
1/2W pack 10 each value E12 — 2R2 to 2M2 730 pieces 8.75
1/2W pack 5 each value E12 — 2R2 to 2M2 365 pieces 5.40
1/2W pack Popular — 2R2 to 10M 1000 pieces 10.75
1W pack 5 each value E12 — 2R2 to 1M 365 pieces 15.25
2W pack 5 each value E12 — 10R to 2M2 317 pieces 25.00

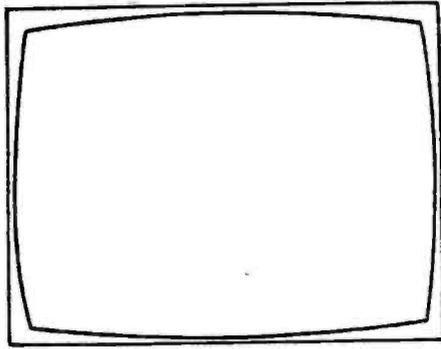
ADDITIONAL KITS

DISC CERAMIC 50V 125 pieces £3.99
ZENER DIODES 5ea 55 pieces £3.99
ELECTROLYTICS CAPS. RADIAL 80 pieces £8.50
FUSES 0.5W/20mm 80 pieces £4.75
FUSES 1W/25mm 80 pieces £8.50
PRE-SET POTS. Hor. 120 pieces £7.75
PRE-SET POTS. Vert. 120 pieces £7.75

VERO - VERO - VERO - VERO

17.5" x 33.4" £6.75
33.4" x 33.4" £2.36
5" x 33.4" £1.99
Easewire Kit £15.00
Verobloc £6.71
ATTENTION RETAILERS — Trade prices available on full Vero range — minimum order £25.

VALVES		Type		Price (E)	
DAF96	0.70	EF85	0.50		
DF96	0.72	EF86	2.65		
DK96	3.10	EF87	0.85		
DY96/87	0.80	EF183	0.52		
DY982	0.98	EF184	0.64		
EM8CC	4.75	EF186	0.45		
EA900	0.65	EL34	3.85		
LA42	1.78	EL509	1.80		
EB91	0.65	EL519	7.25		
EB41	1.16	EM80	1.30		
EB31	1.35	EM82	1.45		
EBF90	0.60	EM87	4.75		
EBF83	1.35	EY51	1.10		
EBF89	0.85	EY86/87	0.85		
EC22	1.10	EY88	0.85		
EC281	1.75	EY90A	2.55		
EC282	1.00	EZ41	3.45		
EC283	1.40	G1501	1.85		
EC284	1.85	G233	2.45		
EC285	1.20	G234	3.80		
EC286	3.25	KT88 (GEC Mullard)	4.50		
EC288	1.50	KT88 (Foreign)	10.80		
EC289	1.75	PC36	0.85		
EC290	1.00	PC38	0.50		
EC292	1.35	PC39	0.92		
EC293	2.25	PC38	0.85		
EC294	4.35	PC39	0.85		
EC295	1.75	PC189	0.85		
EC296	1.15	PC189	1.35		
EC297	0.80	PC189	0.75		
EC298	2.10	PC189	1.35		
EC299	1.00	PC189	1.35		
EC300	1.25	PC189	2.15		
EC301	1.25	PC189	2.15		
EC302	1.25	PC189	2.15		
EC303	1.25	PC189	2.15		
EC304	1.25	PC189	2.15		
EC305	1.25	PC189	2.15		
EC306	1.25	PC189	2.15		
EC307	1.25	PC189	2.15		
EC308	1.25	PC189	2.15		
EC309	1.25	PC189	2.15		
EC310	1.25	PC189	2.15		
EC311	1.25	PC189	2.15		
EC312	1.25	PC189	2.15		
EC313	1.25	PC189	2.15		
EC314	1.25	PC189	2.15		
EC315	1.25	PC189	2.15		
EC316	1.25	PC189	2.15		
EC317	1.25	PC189	2.15		
EC318	1.25	PC189	2.15		
EC319	1.25	PC189	2.15		
EC320	1.25	PC189	2.15		
EC321	1.25	PC189	2.15		
EC322	1.25	PC189	2.15		
EC323	1.25	PC189	2.15		
EC324	1.25	PC189	2.15		
EC325	1.25	PC189	2.15		
EC326	1.25	PC189	2.15		
EC327	1.25	PC189	2.15		
EC328	1.25	PC189	2.15		
EC329	1.25	PC189	2.15		
EC330	1.25	PC189	2.15		
EC331	1.25	PC189	2.15		
EC332	1.25	PC189	2.15		
EC333	1.25	PC189	2.15		
EC334	1.25	PC189	2.15		
EC335	1.25	PC189	2.15		
EC336	1.25	PC189	2.15		
EC337	1.25	PC189	2.15		
EC338	1.25	PC189	2.15		
EC339	1.25	PC189	2.15		
EC340	1.25	PC189	2.15		
EC341	1.25	PC189	2.15		
EC342	1.25	PC189	2.15		
EC343	1.25	PC189	2.15		
EC344	1.25	PC189	2.15		
EC345	1.25	PC189	2.15		
EC346	1.25	PC189	2.15		
EC347	1.25	PC189	2.15		
EC348	1.25	PC189	2.15		
EC349	1.25	PC189	2.15		
EC350	1.25	PC189	2.15		
EC351	1.25	PC189	2.15		
EC352	1.25	PC189	2.15		
EC353	1.25	PC189	2.15		
EC354	1.25	PC189	2.15		
EC355	1.25	PC189	2.15		
EC356	1.25	PC189	2.15		
EC357	1.25	PC189	2.15		
EC358	1.25	PC189	2.15		
EC359	1.25	PC189	2.15		
EC360	1.25	PC189	2.15		
EC361	1.25	PC189	2.15		
EC362	1.25	PC189	2.15		
EC363	1.25	PC189	2.15		
EC364	1.25	PC189	2.15		
EC365	1.25	PC189	2.15		
EC366	1.25	PC189	2.15		
EC367	1.25	PC189	2.15		
EC368	1.25	PC189	2.15		
EC369	1.25	PC189	2.15		
EC370	1.25	PC189	2.15		
EC371	1.25	PC189	2.15		
EC372	1.25	PC189	2.15		
EC373	1.25	PC189	2.15		
EC374	1.25	PC189	2.15		
EC375	1.25	PC189	2.15		
EC376	1.25	PC189	2.15		
EC377	1.25	PC189	2.15		
EC378	1.25	PC189	2.15		
EC379	1.25	PC189	2.15		
EC380	1.25	PC189	2.15		
EC381	1.25	PC189	2.15		
EC382	1.25	PC189	2.15		
EC383	1.25	PC189	2.15		
EC384	1.25	PC189	2.15		
EC385	1.25	PC189	2.15		
EC386	1.25	PC189	2.15		
EC387	1.25	PC189	2.15		
EC388	1.25	PC189	2.15		
EC389	1.25	PC189	2.15		
EC390	1.25	PC189	2.15		
EC391	1.25	PC189	2.15		
EC392	1.25	PC189	2.15		
EC393	1.25	PC189	2.15		
EC394	1.25	PC189	2.15		
EC395	1.25	PC189	2.15		
EC396	1.25	PC189	2.15		
EC397	1.25	PC189	2.15		
EC398	1.25	PC189	2.15		
EC399	1.25	PC189	2.15		
EC400	1.25	PC189	2.15		
EC401	1.25	PC189	2.15		
EC402	1.25	PC189	2.15		
EC403	1.25	PC189	2.15		
EC404	1.25	PC189	2.15		
EC405	1.25	PC189	2.15		
EC406	1.25	PC189	2.15		
EC407	1.25	PC189	2.15		
EC408	1.25	PC189	2.15		
EC409	1.25	PC189	2.15		
EC410	1.25	PC189	2.15		
EC411	1.25	PC189	2.15		
EC412	1.25	PC189	2.15		
EC413	1.25	PC189	2.15		
EC414	1.25	PC189	2.15		
EC415	1.25	PC189	2.15		
EC416	1.25	PC189	2.15		
EC417	1.25	PC189	2.15		
EC418	1.25	PC189	2.15		
EC419	1.25	PC189	2.15		
EC420	1.25	PC189	2.15		
EC421	1.25	PC189	2.15		
EC422	1.25	PC189	2.15		
EC423	1.25	PC189	2.15		
EC424	1.25	PC189	2.15		
EC425	1.25	PC189	2.15		
EC426	1.25	PC189	2.15		
EC427	1.25	PC189	2.15		
EC428	1.25	PC189	2.15		
EC429	1.25	PC189	2.15		
EC430	1.25	PC189	2.15		
EC431	1.25	PC189	2.15		
EC432	1.25	PC189	2.15		
EC433	1.25	PC189	2.15		
EC434	1.25	PC189	2.15		
EC435	1.25	PC189	2.15		
EC436	1.25	PC189	2.15		
EC437	1.25	PC189	2.15		
EC438	1.25	PC189	2.15		
EC439	1.25	PC189	2.15		
EC440	1.25	PC189	2.15		
EC441	1.25	PC189	2.15		
EC442	1.25	PC189	2.15		
EC443	1.25	PC189	2.15		
EC444	1.25	PC189	2.15		
EC445	1.25	PC189	2.15		
EC446	1.25	PC189	2.15		
EC447	1.25	PC189	2.15		
EC448	1.25	PC189	2.15		
EC449	1.25	PC189	2.15		
EC450	1.25	PC189	2.15		
EC451	1.25	PC189	2.15		
EC452	1.25	PC189	2.15		
EC453	1.25	PC189	2.15		
EC454	1.25	PC189	2.15		
EC455	1.25	PC189	2.15		
EC456	1.25	PC189	2.15		
EC457	1.25	PC189	2.15		
EC458	1.25	PC189	2.15		
EC459	1.25	PC189	2.15		
EC460	1.25	PC189	2.15		
EC461	1.25	PC189	2.15		
EC462	1.25	PC189	2.15		
EC463	1.25	PC189	2.15		
EC464	1.25	PC189	2.15		
EC465	1.25	PC189	2.15		
EC466	1.25	PC189	2.15		
EC467	1.25	PC189	2.15		
EC468	1.25	PC189	2.15		
EC469	1.25	PC189	2.15		
EC470	1.25	PC189	2.15		
EC471	1.25	PC189	2.15		
EC472	1.25	PC189	2.15		
EC473	1.25	PC189	2.15		
EC474	1.25	PC189	2.15		
EC475	1.25	PC189	2.15		
EC476	1.25	PC189	2.15		
EC477	1.25	PC189	2.15		
EC478	1.25	PC189	2.15		
EC479	1.25	PC189	2.15		
EC480	1.25	PC189	2.15		
EC481	1.25	PC189	2.15		
EC482	1.25	PC189	2.15		
EC483	1.25	PC189	2.15		
EC484	1.25	PC189	2.15		
EC485	1.25	PC189	2.15		
EC486	1.25	PC189	2.15		
EC487	1.25	PC189	2.15		
EC488	1.25	PC189	2.15		
EC489	1.25	PC189	2.15		
EC490	1.25	PC189	2.15		
EC491	1.25	PC189	2.15		
EC492	1.25	PC189	2.15		
EC493	1.25	PC189	2.15		
EC494	1.25	PC189	2.15		
EC495	1.25	PC189	2.15		
EC496	1.25	PC189	2.15		
EC497	1.25	PC189	2.15		



TELEVISION

Product Development

EDITOR

John A. Reddihough

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 813.

ADVERTISEMENT MANAGER

David W.B. Tilleard
01-261 6671

SECRETARY

Janet Reeve
01-261 6671

CLASSIFIED ADVERTISEMENTS

Pat Bunce
01-261 5942

ADVERTISEMENT COPY AND MAKE-UP

Ron Scorey
01-261 6035

SUBSCRIPTION ENQUIRIES

0444 440 421

CORRECTIONS

The address of Cotel Ltd. – see Computer Programmed RC System last month – is now PO Box 135, Basingstoke, Hants RG25 2HZ (telephone no. 0256 474 900).

The final item in VCR Clinic last month (page 755) relates to the Ferguson 3V29, not 3V39.

The 25KX1201 portable mentioned in TV Fault Finding last month (page 768) is a Pye model, not Philips. The Philips equivalent is the 10CX1120, also mentioned above under the heading CX1120.

COVER PHOTO

A lady video engineer for a change, shown making probe/pulsar checks on the syscon logic circuitry in the Panasonic NV333 VCR. See article on page 848.

Did you know that in 1950 the UK was the world's largest exporter of motor vehicles? That probably doesn't mean a lot, since at that time the world was still recovering from the devastation of World War Two. It does however mean that the UK's motor industry was in a strong position to develop and establish itself firmly as a world leader. It didn't. Compare the situation today. In 1988 the UK's trade deficit was a record £6.1bn, and the situation has since worsened. Yet from the early Thirties to 1955 the UK had Europe's largest motor industry. Today the indigenous industry – what's left of it – appears to be doing next to no development work on new products (the last launch, the Montego, was in 1984). From the production point of view the situation is expected to improve dramatically by the late Nineties, because of the plants being set up by Japanese manufacturers. Interesting that in 1952 Nissan was producing Austin cars under licence. It's a searing story of industry failure.

The UK's domestic electronics industry and its automobile industry have long followed similar paths. Back in 1950 there was much TV development work being done and the industry was getting into its stride. It was certainly at that time ahead of anything in Europe or Japan, and the US industry was only just restarting after war-time restrictions on production. The situation today is almost exactly as in the automobile industry, apart from the fact that the Japanese got into the act to help out a decade or so earlier, with the result that the trade balance is not nearly so bad – in fact it has been positive in recent times. But there's still almost no development work being done.

There's a saying that today's development is tomorrow's profit, or something like that. The time-scale with the sophisticated products of today is of course rather longer. However that might be, the corollary is that no development work today equals no profits tomorrow for whatever is left of the UK-owned consumer electronics products and automobile industries.

One wonders whether UK industrialists/boardrooms have ever been really serious. Things have started and stopped in half-hearted ways, sometimes in almost bizarre circumstances. There's a story that one of our once leading consumer electronics firms was started up simply as a means of getting rid of a spare line of mains transformers. That sort of thing was perhaps not uncommon in the Fifties, when many small firms started up and eventually merged or fell by the wayside. In those days you could design radio sets and suchlike from a simple data sheet. Change the values of a few resistors here and there to get the tolerances right, then get a lot of young ladies busy with soldering irons. A world quite different from today's sophisticated production engineering. A sort of spontaneous getting in when a market seemed to exist. Yet the UK's domestic electronics industry keep up with things well into the solid-state era. Some of the first transistor radios were produced in the UK, and research was being done on solid-state electronics.

The Japanese phenomenon is not something new. Most of the well-known Japanese firms have histories that go back much farther than the UK ones now bought out or merged into overseas concerns. Sony is the best-known exception, being started in the immediate post-war era. Sharp was started in the early Twenties, Matsushita dates from the first world war period, while Hitachi, Mitsubishi and Toshiba have yet longer histories, some being started up in the nineteenth century. These firms established firm roots, survived the depression years and the trauma of World War Two, then mushroomed in recent decades to assume their present dominant positions.

It takes professionalism and dedication to do this. Contrast the amateur ways of UK firms. One thinks for instance of the famed EMI body scanner, an electronic development that put the UK in the forefront of medical electronics. But having developed the thing EMI took it no farther. The later versions came from elsewhere. Why does this sort of thing happen so often? Could it perhaps be connected to the lack of engineers or those with some engineering knowledge in boardrooms? It's difficult to persuade accountants that money has to continue to be spent on development work. Like the Japanese, the Germans and others do not lack engineering knowledge in the higher echelons of industry. Our education system has a lot to answer for in this respect.

Today's mass markets are not built solely on the basis of engineering expertise however, vital though this is. The ability to produce goods inexpensively and well is no good if the market is not there. Here again the Japanese have long done the right thing in following the path of market-led development. A lot of effort is put into establishing what the public would find useful and what it would be prepared to pay. This has meant that many items are produced and tried out and are then quickly dropped. The cost of a few failures is readily covered by the major successes.

Trying to find out what the public might want is of course a time-consuming business. But it's not only a matter of new products. Have you noticed how often the Japanese come up with just the right combination of features in a particular product? It's all a matter of careful market research.

It seems that from every angle UK industry has failed. Innovation, production engineering and market research: all have been tackled in a half-hearted way, with little sense of commitment. It's not so surprising then that things have ended up in their present sorry state.

Repairing Remote Control Units

Nick Beer

Much domestic electronic equipment nowadays relies on a remote control unit – very often the equipment cannot be operated without the handset, or operation is very limited without it.

The circuits of modern remote control units can be awesome. Some have built-in screens, will talk back, and have send and receive operation. The service policy of different manufacturers varies. Spare parts for the cheaper units are very often not supplied, it being simpler to supply the complete unit. Many dealers adopt a similar policy – they advise customers to buy a new unit rather than have an old one repaired. Personally, I'm not in favour of replacing anything unless it's absolutely necessary – in my view panel and handset replacement must rate amongst the most inefficient practices in this trade. Handset repair can be profitable and straightforward, and if you can save your customer some money and make a greater profit yourself it can't be bad, can it?!

In this article we'll go through the various types and generations of handset, describe basic faults and outline the repair procedures required. Spares can very often be a problem, but we'll give some advice on this too.

Cord Types

The cord remote control units you're most likely to encounter now are those used with early VCRs. Most have a single screened lead that's terminated with a standard audio jack plug, typically 2.5 or 3.5mm in size. Push-switches bring different resistances into circuit. These represent an extension of the on-board control circuits. The other approach is to have a multicored cable with DIN plug termination and just switches (no resistors) in the handset. This arrangement is bulkier.

Likely faults, as you would expect, are breaks in the cables and plugs. With a single screened cable the break can occur anywhere along its length. It usually occurs in the screen rather than the core, presumably due to stretching. With multicored cables the breaks tend to occur at either end, particularly within the DIN plug. In either case the plug is usually moulded on, so repair involves cutting off the old one and fitting another. Repairs of this sort can be carried out using normal workshop stocks of cable and plugs. Note that with this type of fault you will often get the customer on the phone shortly after collecting his unit to say that it still doesn't work. This is invariably due to the socket in the VCR being faulty – damaged when the customer tripped over the cable! Making a simple continuity or resistance test in the workshop will confirm that the unit works without the

need to connect it to a VCR.

The only other problems you are likely to encounter are print breaks. These are usually easy to detect and repair. The switches used are generally just that, not mat and pad contacts (see later), so they are pretty reliable. Should they fail replacement is the only real answer. In most cases this is not a problem. If the manufacturer cannot supply a replacement a search through the advertisements in *Television* will usually reveal something that's suitable.

Ultrasonic Units

Though ultrasonic remote control handsets are rather old now many sets that use them are still going strong, for example some of those fitted with the Decca 100 and Philips G11 chassis and the B and O 35XX series.

There are two major types of fault, no or intermittent no results with all or some functions, and buttons doing the wrong thing. The former type of fault is caused by poor joints etc., see below. Another thing to check is the ultrasonic transducer. These tend to go open-circuit, especially after being dropped. The second type of fault is due to incorrect frequency tuning. Check any coils for damage, cracked or missing cores etc. If no reason for drift can be found realignment is the best course. If possible do it with its own set. This can be a fiddly business. Check for drift over a few days.

Infra-red Units

The infra-red remote control unit is the most common type. It succeeded the ultrasonic type with its rather limited number of functions. Although there were ultrasonic teletext units they were not common, and the advent of text led to a change over to infra-red devices. Once again there are a limited number of basic faults.

The most common symptom has to be no go. Even without a circuit diagram much can be done to establish the cause. The first thing to do is to check the battery/batteries. Always check on and off load. Many tests can be made, such as current consumption, and these can be helpful. But as such units generally have few components general tests can be more time consuming than tests on individual components. Check visually for dry-joints on the infra-red diode(s) and for broken leads on transistors and in particular the crystal. Often a solder round will cure the fault, but make sure that you keep the unit and test it for several days afterwards as a faulty i.c. can be temporarily cured by the application of heat – you may think that you've cured the trouble only to find that it comes back.

Intermittent no go can be caused by any of the faults just mentioned, but is very often due to poor battery contacts. The cause of this can be tarnishing, spillage or battery design. The latter applies particularly with Duracell batteries that have rounded/domed contact plates, see Fig. 1. When this type of battery is fitted in a handset with contacts that have a small surface area, e.g. in some Panasonic units, the result can be intermittent operation. Borderline battery output voltage is another

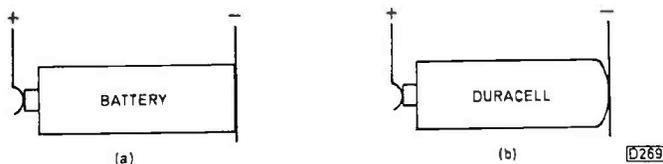


Fig. 1: Battery contact problems. (a) One hundred per cent negative plate surface area contact. (b) Reduced contact with domed negative plate.

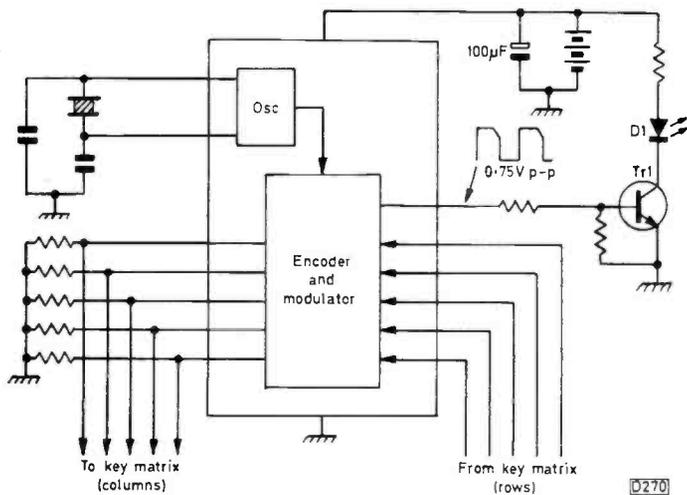


Fig. 2: Typical simple infra-red handset circuit.

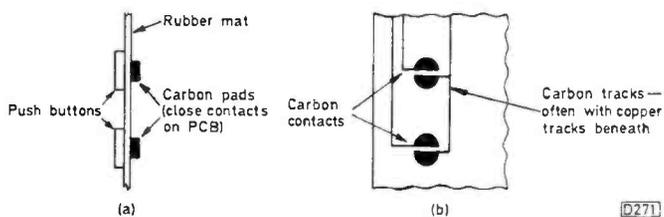


Fig. 3: Mat contact assemblies. (a) Contact mat. (b) Section of PCB.

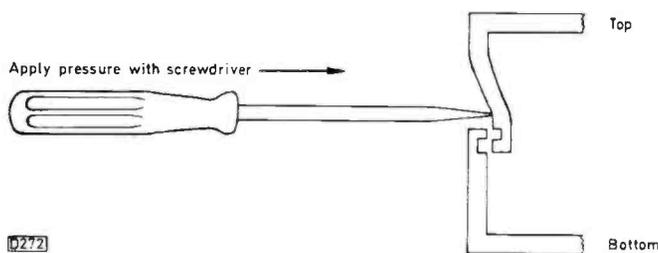


Fig. 4: Opening a click-fit case.

common cause of intermittent operation.

Fig. 2 shows a typical infra-red remote control transmitter circuit. For excessive battery drain check the electrolytic capacitor across the battery and the i.c. For no output check the IR diode, the transistor and the output from the i.c.

The keypads used in infra-red remote control units vary from the rubber pad and carbon contact type to actual copper sprung contacts and membrane/foil arrangements. With the latter, replacement is usually the only viable method of repair. These usually plug into an edge connector on the PCB and breaks in the tracks here are common. It's worth checking this before ordering a replacement as repair can be carried out with RS conductive silver paint.

PCB Faults and Repair

Breaks in PCB copper tracks are in general easy to repair, but with a handset there may be minor complications due to the limited space or infringement of contact area. The best way to deal with a break is to run a lead between the nearest soldered joints on either side, but for the two reasons just mentioned you might have to settle for scraping off the lacquer and bridging the break with tinned copper wire. If this is necessary, ensure that when the case is closed nothing is fouled and that there is

sufficient mechanical strength. Such breaks often occur where a PCB clips into the case: if the repair doesn't strengthen the board it's likely to flex, causing further failure of some functions. You can use Araldite or thin sheets of Paxolin glued on to strengthen the board. Again, you may be restricted by space. If all else fails you'll have to replace the PCB. The boards are usually available as spares minus the components. Swapping over the components doesn't take long, but if you are making an estimate don't forget to allow for this.

Another common type of PCB failure is where the carbon type contact and mat arrangement is used – see Fig. 3. The contacts on the mat or PCB wear, causing loss of one or more functions. Depending on the severity of wear and the constitution of the PCB underneath, this can usually be repaired with soft pencil lead. Either redraw the track several times or grind the lead finely and glue the powder in place. This is more likely to be required with the mat. If more than the odd contact is affected it's better to replace the whole mat. The average manufacturer unfortunately doesn't keep these in stock for long and after that it's worth trying to carry out a repair. If you do, bridge with TCW lacquer or varnish over but be very careful not to insulate any contacts used by the keypad.

Another fault that occurs, particularly with this type of PCB that has layers of carbon print over copper print, is electrical leakage. The symptom is usually transmitting all the time. You can spend ages changing components only to find that the fault persists – it can be difficult to diagnose the cause of this trouble in any other way however, unless you are familiar with the unit. The handset used with the Salora J chassis (and Hitachi equivalents) for example is prone to this trouble. When you've replaced the PCB, snap the old one in half so that if it should lie around for a while you don't use it by mistake.

If copper contacts are used and these are worn they can often be repaired by soldering over. Take care not to do any more than tin them or you could end up with a permanent contact.

Case Faults

Handset construction varies tremendously, but there are some basic patterns. The majority are PCB based with the PCB fitted in the top half of the case. The buttons, whether individual or a rubber mat, fit through the top half as well. The bottom half contains the battery compartment, the two halves clipping together. We'll look next at case dismantling and some of the faults that can arise.

The battery cover is usually clipped into the rest of the unit, being held only by its own elasticity. Not surprisingly these tend to wear out. The modern trend is to clip the case together without the use of screws. This means that to open up the unit you have to push the side of the case where the clips are situated, at the same time levering the two halves apart. This must be done very carefully – see Fig. 4. It's best to use a plastic screwdriver or to cover the metal blade. Sometimes space prohibits this and it's impossible to avoid marking the case. For this reason we keep in stock spare cases for certain Panasonic units and replace them after carrying out a repair. Minor indentations can very often be smoothed down using fine wet and dry paper.

With regard to presentation and finish, if you have to order parts to complete the repair check the case and any printed plates for signs of wear, discolouration or fading.

In view of the cost it's well worth replacing these to restore the appearance of the unit. I have in mind particularly the handsets for Ferguson VCRs such as the 3V53/5 etc. where the button functions are printed on an aluminium fascia that's stuck to the upper case. These wear, marring the appearance and losing the button information. Replacements cost around £1.50. We always replace this when doing up a VCR for re-renting or sale.

Displays

Handsets with displays are becoming more common. So far we've had very few faults in this area. Most units have LCD screens but LEDs are also used, for example with the B and O MCP5500. The main problem with LCD types is dust getting between the layers of the sandwich. This is easily remedied in a clean area. Remember to clean gently with anti-static fluid otherwise you will attract even more dust. Corrupt displays are often caused by a low battery or the driver i.c. Remember that these put a heavy demand on the battery/batteries – most incorporate an auto shut-off circuit.

Bar Scanners

Digital bar scanners are certainly very popular with our customers. Panasonic developed this system, which is also now produced under licence for Amstrad/Fidelity. By far the most common trouble is a blocked sensor. Customers let the units get filthy, the relatively small hole becoming blocked so that it can't read the codes. Such units should always be kept in their wallet, and the little brush supplied for cleaning them should be used regularly. There are now combined scanners/handsets, but these are felt to be clumsy and difficult to use – it's difficult to keep them at the right angle. The charts on which the codes are printed are plasticised but do wear. Replacements are cheap enough.

Dealing with Spillage

Spillage is a common problem. Often it's not mentioned. No go or transmitting continuously are the usual symptoms. Very often the liquid ingress is slight – around the buttons and over the contact area of the PCB. Depending on the time that has elapsed since the spillage occurred the unit may be a write off or may just require cleaning.

If the contacts are damaged and the legs of components are corroded it's best to supply a replacement unit. If cleaning will suffice this should be done with isopropyl alcohol. Don't be tempted to use something stronger, such as solvent cleaner, as this will tend to dissolve carbon print and lacquer. Wash cases and buttons in soapy water. To avoid buttons that stick, completely dismantle the case into its component parts and clean thoroughly.

Testing Cordless Handsets

The ideal way of testing a cordless remote control handset is with the unit it controls. This is seldom possible however. A number of testers which give either an audible or visual confirmation that an infra-red or ultrasonic unit is transmitting are available. I've used several over the years and have found that the Konig type from Willow Vale is the most reliable. We had two of the Planet type and they both failed continually. On one such

occasion an apprentice came up with a very useful suggestion. He fitted an IR receiving diode into the plastic black cover of a quarter-inch jack plug, added a BNC plug and connected this to a scope to check for emission. This is an alternative if you like.

Spares

Whether some/all spares are available tends to depend on the manufacturer. This is not too much of a problem when it comes to transistors and diodes – if necessary equivalents can be sought. Resistors and capacitors are even less of a problem. The only point to watch here is the physical size of capacitors. Very often low-voltage capacitors with relatively high values are used and the equivalent value with a more usual voltage rating will be too large. You will often find 100 μ F or 220 μ F capacitors rated at 6.3V for example. These are available from RS, Willow Vale and other sources however. The i.c.s tend to be common between units of different manufacture and a look through distributors' catalogues or the advertisements in *Television* should reveal a source of supply. Standard IR diodes and ultrasonic transducers are available and should be kept in stock.

If you want a non-standard part and the manufacturer cannot supply this it's worth checking whether the unit is a clone or is badge engineered. Often the other manufacturer can supply spares. For example, Salora cannot supply certain spares for handsets made by Sanyo, but Sanyo can. It's worth a look around.

Charges

If a new handset costs say £25 you can't apply the usual £15-£18 an hour labour charge. It's quite possible however to make a fixed charge of say £7 and see a decent return. Very often few if any parts are required. Few handsets should take more than half an hour to sort out. In the case of a handset costing £70 to replace (B and O for example) the customer will be pleased indeed if you repair his unit for say £12.

Many customers don't even bother when a handset fails. Others assume that they have to be replaced. Customer education in the form of a notice in the shop or in your advertising should generate a bit of business and a lot of goodwill. If you give the unit a good clean up, replace slack battery covers etc. you will restore the handset to almost new condition.

Developments

Things have developed by leaps and bounds over the years, to the stage where some handsets have looked like the flight deck of Concorde. This was the fashion for a while. We've had multi-function remote control units that control the TV set and the VCR, now we have programmable units that replace three or more units. Flaps that cover up most of the buttons are appearing, for example with the new A1 series of Panasonic colour TV sets. Extensive use is now being made of menus and on-screen displays – this means that we could soon be back with handsets that have only about six buttons but will still control everything. The home automation idea hasn't really taken off yet but it will probably come. Many customers are feeling the benefit of integrated systems such as the Bang and Olufsen Link, where the latest addition is a light controller that can be operated from the Beolink 1000 handset.

VISIONS LONDON

(Formerly BI-TECH of Leyton)
HAVE MOVED TO LARGER PREMISES at UNIT 4,
RAINSTAR IND. ESTATE, ELEY ESTATE, NOBEL ROAD,
EDMONTON N18 0AA. (Off A406)

2 minutes from Ex-Ferguson Spares/Service Depot

**VISIONS
UNBEATABLE
STOCK**

**VISIONS
UNBEATABLE
PRICES**

**WAREHOUSE PACKED WITH
FULL RANGE OF THORN &
GRANADA STOCK**

**YOU WONT BETTER
OUR PRICES, STOCK
& SERVICE IN LONDON**

PHONE NOW!!

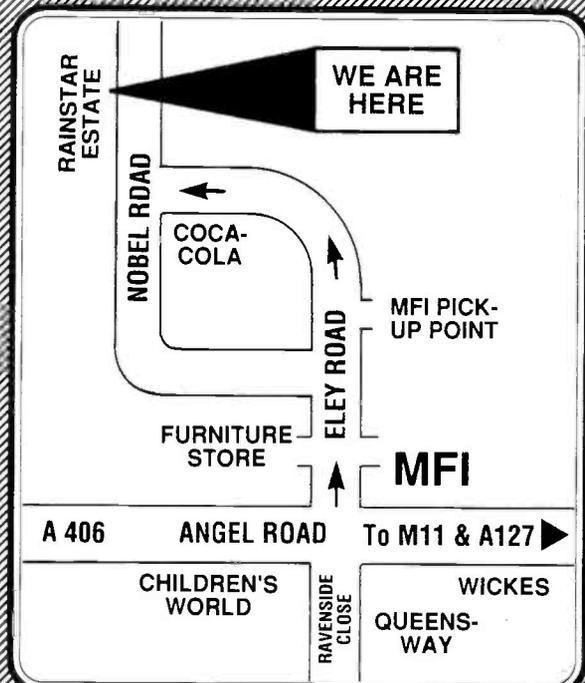
contact: TONY or NEIL

01-807 7476

OPEN MON-FRI 9-5.30 SAT 9-1 SUN 10-1

Also at:

**BI-TECH (Scotland) Ltd, Unit 9,
Colquhoun Ave, Hillington Ind.
Estate, Glasgow GS2 4BN
TELEPHONE: 041 883 2610**



SPECIAL OFFER THIS MONTH

UNIVERSAL TRIPLER, NEW TYPE.....	£4.00
VIDEO LEADS.....	80p
AMSTRAD Line O.P. Transistors with Diode.....	£1.00
BU208A.....	85p or 20 for £12.50
VIDEO LAMPS, Long Lead.....	24p
HITACHI & GEC FRAME, Thick Film.....	£6.00
FIDELITY SPLIT DIODE.....	FCC2215AE...£20 FCC2015BE...£10 FCC2215BE...£10
K30 FRONT PANEL TEL-TEX TYPE.....	£5.00
NEW G11 LINE OP PANEL.....	£9.00
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
TX9 IF.....	£2.00
THORN PANEL No. 515-353, 548.02, 564.01, 509/102, 515/173, 508/161.....	£5.00
THORN TX STEREO SOUND O.P. PANEL (I.C. TA7227P).....	£1.00
THORN VIDEO AERIAL AMP 01 M4-597-001.....	£6.00

4-6 Volts Relays.....	25p
Send for list of video spare heads.....	£15.00 to £40.00
THORN PANELS	
Thorn Panel with SAA5012 IC.....	£2.00
515/253/509/12 515/357/564/05 508/161 515/353/515/173/515/357.....	£3.50
TX9 - TX90 NEW.....	
TX9 - TX10 - TX100.....	
THORN MAIN CHASSIS	
TX9, TX90, TX100, TX925.....	£15.00 TX10 Anode Cap and Lead £1.00
TEXT DECODER TX10 £8.00	
TEXT DECODER V56101 2 TRX.....	£10.00
PANELS V56101 2 TRX.....	£6.00
AUTO RANGE	
DC and AC and Resistance Pocket 5000 Philips.....	£12.00
G11 & Touch Button with Lamps, Non-remote.....	£18.00

KT3-K30-K4-K40 CTX ETC Mains Switch.....	75p each
G8 LOPTS PHILIPS.....	£6.00
G11 LOPTS.....	£3.00
PHILIPS DESK TYPE Dual Power Calculator SBC1704.....	£7.00
K40 FOCUS POT.....	£1.00
4.7µ KT3 W/V.....	10 for £1.00
FOCUS POT HDK TPA6006.....	£2.00
KT3 Triplers.....	£6.00
K3 Tex Front Panels with 1 Cs (SAA3027P/SAB3013/HO448328).....	£5.00
G8 100K Pots on Panel & Lead for 6 Push Button Unit.....	£2.00
K30 Mains Switch remote.....	£1.00
K35 Mains Switch remote.....	£1.50
K35 Aerial Socket and Plug in Lead to Tuner.....	£1.25
KT3-K30 Slider Pots 4.7k.....	20p each
LARGE Focus Pots Fits Pvc, GEC, ITT, Decca.....	75p
8 PUSH BUTTON UNIT for CTX Chassis.....	£1.50
G8 Power Supply Panel.....	£4.00
EX DECCA 80-100 Decoder.....	£5.00
EX DECCA 80-100 Frame.....	£5.00
THORN 8000-8500-8800 Decoder.....	£6.00
GLASS BEADS Diodes 20K x 1.2A.....	50 for £1.00

CVC 40 Cabinets.....	£10.00
NEW LN - ITT BONES.....	Post £5.00
LINE TRANSFORMER Philips TX 12" and 14" Portable.....	£12.00
WANDER PHONES Key Pad and Hand Set, No Case.....	£1.00
PHILIPS UNIVERSAL BATTERY TESTER SBC 1695.....	£5.00
SCIENTIFIC CALCULATOR SBC1704 Philips, In case.....	£7.00
THORN 8500 LOFT.....	£2.00
NEW GEC 2110 LOFT.....	£2.00
DA-TUNER VHF-UHF SEND FOR DATA.....	50p
TUNER.....	75p
GEC 20AX POWER SUPPLY Mark 2.....	£10.00
THORN 9000 4.7m 400V.....	40p
G8 TUNER V/CAP on Panel.....	£3.50
G8 SPEAKER.....	75p
9,000 SPEAKER.....	£1.00
THORN 9000 Sound OP Panel.....	£30p
ONE I.C. K35 Decoder.....	£7.00
K30 IF/K35 IF.....	£2.00
THORN Loft 8500-8800.....	£4.00
TX9 THORN Tuner Panel with ICS Pots & mains trans.....	£3.00
THORN 1600 Rec & Anode Cap.....	50p
KT3-K30 Slider Pots 4.7k.....	£1.00 for 10
K35 20 Turn Pots.....	6p each
HITACHI & GEC 20k Pots and 100K and 69K Philips.....	20 for £1.00
100K POT & 20K vcap type with band switch.....	5p
KT3 K30 Speaker.....	30p
K30 Push Button Switch 6 Wax.....	£1.00
K35 Sound O/P Panel Plug in and KT3 sound o/p.....	£3.00
K35 12 way Push Button Unit.....	£1.50
K35 L.O.P.T. Split Diode.....	£6.00
RANK T20 Front Panel.....	£6.00
G8 6 Button Unit, New Type.....	£2.00
6 off LED DISPLAYS, Mixed.....	£1.00
HAND SET TESTER, Infra Red.....	£3.00
AERIAL SPLITTER with filter.....	£1.00
UNI DIRECTIONAL Dynamic Microphone.....	£2.00
20 TURN POTS with Band Switch.....	10p
PUSH BUTTON Mains Switch with Screw Holes Fixing.....	4 for £1.50
PYE 731 Line Trans.....	£3.50
PYE 731 New Power Supply.....	£4.00
800V DIODES at 3 amps, Glass Beads.....	6p each, 20 for £1.00
KT3 Line Output Transformer.....	£5.00
THORN 8500 Time Base.....	£3.00
7 SEG DISPLAYS 4 Bank Displays Z-6042T.....	25p
SPLIT DIODE FBS1245AR.....	£5.00
GEC TEXT PANEL PC895A7.....	£10
SEND FOR LIST OF VIDEO SPARES.....	£13 to £46 HEADS

G11 Tip Switch.....	£20.00
G11 IF Panel.....	£8.00
G11 Decoder Panel.....	£8.00
IVC HEADS 3455.....	£30
G11 Condenser 470/250V ITT.....	£2.00
G9 Power Panel.....	£3.50
G8 Transductor.....	£1.25
G8 Push Button Unit.....	£2.00
G8 Con/Panel New Back Type.....	£4.00
KT4-KT3-K30 Handset Replacement.....	£12.00
HT520 METER 20,000 Fuse Diode Protector Logic Test Facility.....	£15.90
HT420.....	£12.00
9000 SERIES Decoder 01 929 014 080 Thorn.....	£5.00
LATEST VIDEO.....	£6.00 NEW
For Latest Philips, GEC, Pye and Hitachi, Front panel with memory chip and push button and pots and LED's.....	
20AX GEC LOFT Panel with Split Diode.....	£4.00
RANK T20 Focus Pot.....	75p
16" LOFT Split Diode 2433481.....	£6.00
Ex Panel Split Diodes 2432871/2432981.....	£5
Split Diode 2433752.....	£6
1703A LOFT Transformer Rank with Focus Pots and Diode.....	£2.00
HITACHI Mains Switch.....	50p
HITACHI AE Socket.....	30p
-1 CONDENSER Axial Leads 450 A/C 1200 D/C.....	15p
MAINS TRANSFORMER 240v in 20v 8v.....	£1.00
GREEN FLAT, NEC, LED's.....	3p each 100 for £2
15V015V 1 Amp Print Type.....	£1
12+12V 2.8VA Print 1"x1".....	75p
8+8V 1 Amp Print.....	75p
ETS96 UHF V/CAP Tuner, small.....	£2.50
FIDELITY Panels with I.C.....	£1.00
FIDELITY LOFT Split Diode AT2076/80.....	£3.00
AT 2076/80.....	£5.00
ITT CVC20 to 45 PANELS Send for list.....	
MULLARD TEL-TEX DECODER Type VM6103.....	£7.00
WE HAVE OVER 1,000 6 DIODE TRIPLER AT £1 EACH.....	
THORN main TV chassis complete TX9-TX10-TX90-TX925-TX100.....	£15.00
TX10 8 way button unit.....	£8.00
TX900 with PRR-SR7.....	£6.00
PHILIPS VHS Tape 180.....	£2.25

TV AERIAL/VIDEO.....	50p
Combiner Switch and Sockets.....	
Lead.....	
THORN RECEIVER.....	
564/314.....	
564/323.....	
M293B1.....	
SAA5012.....	
HCF4556BE.....	
MC1493P.....	
THORN RECEIVER.....	
564/314.....	
544/301.....	
544/321.....	
544/341.....	
SAA1060.....	
MAB8440P.....	
SAB3035.....	
BRIDGES RECTIFIER.....	
BR-31 50V 2Amp.....	8 for £1.00
TX90 MOD 37141B.....	
The Sweep Tuning System.....	
TX9 139/001.....	£5.00
16070V TX9 Transistor.....	£1.00
TX9 90D4-106-004.....	£1.00
TX9 90D4-099-001.....	£1.00
Chopper Transformer.....	£1.00
TX9 06D4-025-001 choke.....	£1.00
TX9 90D4-093-001-01G.....	£1.00
20MM 1Amp A5 Fuse.....	£3.00 per 100
TX90 TX925 TX100.....	
Mains Switch with Stand-by.....	
and Lead.....	
3 for £1 or 50p each.....	
UNIVERSAL VIDEO.....	
- RECORD.....	
Mono 11 Piece Kit.....	£8.00
Stereo 14 Piece Kit.....	£8.00

2431851.....	2433952.....
2432211.....	2432984.....
2432301.....	K4 L.O.P.T.....
2432491.....	K40.....
2432871.....	2434274.....
2432981.....	
2432984.....	
2433212.....	
2433481.....	
2433581.....	
2433751.....	
243452 TX100 THORN.....	
ITT Tuner IF CMR800/3.....	£20
ITT TUNER CAN.....	
CMR 800/3 £20.00.....	
Decca 100 Loft Panel.....	
and Frame £5.00.....	
PIN DATA.....	
Min with co-ax socket UHF vcap.....	
tuner 40dB gain £1.50 or 10 for.....	
£10.....	
Can be adapted for video.....	
ITT PANEL.....	
CMC 301 CMC 113 CMC 302.....	
CMC 115 CMC 303 CMC 96/9.....	
£5.00.....	
CMR 800.....	
Power Supply Switch Mode.....	
£5.00.....	
SEL ITT.....	
IFB254F/2 Front Panel.....	
£15.00.....	
DECCA - GEC - ITT.....	
6 push button - £5.00.....	
100 BC-BF Transistor £1.00.....	
CTK Loft.....	
36212.....	
32651.....	
36672.....	
36362.....	
36385.....	
36482.....	
36761.....	
36831.....	
36832.....	
36833.....	
36921 79.....	
36922 79.....	

TRANSFORMERS.....	
AT206/00.....	AT2076/55.....
AT2048/11.....	AT2076/71T.....
AT2085.....	AT2080V15.....
AT2076/35.....	RCO ST CT3325.....
AT2076/38.....	OT2041.....
AT2076/51.....	FB165KA Orion.....
CVC 820.....	2076/51.....
CVC 800.....	2432461 2433451.....
REGULATED POWER SUPPLY.....	VIDEO MOTOR for VTS68 type.....
Size 6"x5"x2 1/2" 0.5v - 0.45v - 0.6v.....	VCS3DDM.....
Lamp. Preset 3v-0.4-12 volts, 1.....	AMP TUNER IF for VTS68 Hitachi.....
amp.....	£5.00 Post £2.00, & GEC.....
	£9.00.....

SPLIT-DIODE
£6 EACH

L.O.P.T.
SPLIT DIODE
PHILIPS
£5 EACH

I.C. Holders

DIL - DIL

40 Pin x 4.....	£1.00
42 Pin x 5.....	£1.00
28 Pin x 5.....	80p
16 Pin x 10.....	70p
24 Pin x 5.....	75p
14 Pin x 10.....	80p
18 Pin x 10.....	80p

DIL - QIL

16 Pin x 10.....	£1.00
18 Pin x 10.....	£1.00
28 Pin x 4.....	£1.00

AB Mains Switch.....

W/V.....

30p

Philips Electrodynamic Stereo Headphones N6315.....

£10

SEND FOR LIST BRITISH MADE V.H.S. VIDEO HEADS from £15 to £20. SEND FOR LIST OF VIDEO SPARES, VIDEO LEAD AND BELTS

SEND FOR DATA 20 AMP COST OVER £400. 30 VOLT TO 15 VOLTS FARNELL POWER SUPPLY 19" RACK MOUNT POST £8, IN CASE £20

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

1 OFF - NEW RHODE & SCHWARZ SBUF.E1 VISION MODULATOR A.T.V./RF 25-1000MHz T.V. TEST TRANSMITTER £8,000

1 OFF - RHODE & SCHWARZ EKZF T.V. MONITORING RECEIVER £1,200

SENDZ COMPONENTS, 63 BISHOPSTEIGNTON, SHOEBOURNESS, ESSEX SS3 8AF.

SAME DAY SERVICE

All items subject to availability. No Accounts. No Credit Cards. Postal Order/Cheque with order.

Add 15% VAT, then £1 Postage. Add Postage for Overseas.

Callers: To shop at
212 LONDON ROAD, SOUTHEND. Tel. 0702-332992. Fax. 0702 338805

Open 9-1/2.30-6. GVMT + school orders accepted on official headings. Add 10% handling charge.

SHARP MSH1FCF09 TX9 LOFT.....

£10 EACH (004-235 0032-01)

You Won't Believe This . . .

Les Lawry-Johns

We've had a wall built around the rear garden of the bungalow. Not to keep intruders out but to keep the dogs in. The rear garden has also been concreted, again for the dog's use. As repair business at the shop dried up we moved to the bungalow, with the dogs, cat and bird, hoping that the shop will sell before long.

The bungalow is in a secreted part of a housing estate built well after the war on a site previously occupied by Gravesend Airport, which was used by Fighter Command during the war. When an invasion was expected in 1940 all the runways were mined. The public was not informed of course. All these years later the Royal Engineers have been instructed to locate the long tubes of explosives and make them safe. So two days after we arrived we were told that the whole area is to be examined, using metal detectors, and eventually made safe. What a welcome!

Anyway, we've not been blown up yet and the shop telephone number has been transferred to the bungalow.

The other day a man phoned to say that the Decca TV set (80 series chassis) he bought from us some years ago suffered from field collapse after it had been on for about fifteen minutes. He said that hitting the top of the set restored the picture, so I thought it would be a dry-joint. I told him I would be at the shop in ten minutes. When I got there I waited for him to appear. He didn't. So after half an hour I drove to his house. He opened the front door and said "I thought you said ten minutes?"

"I said I'd be at the shop in ten minutes. That way you'd have avoided the call-out charge."

After removing the right-hand side timebase panel I resoldered all the field timebase connections. I then turned the set round and fitted an aerial. There was a good picture when I switched on. It was still there half an hour later.

I replaced the back and suggested a charge of £20. He flinched. "That includes the call-out charge," I explained.

He paid me and I drove off. Before I got very far I was held up by traffic. While waiting I saw the chap I'd just left chasing up the road, so I backed down to meet him.

"It's gone again."

Back to the house again. When we got there the set looked perfectly all right.

"Blast. It's come back again."

"I bet your wife was upset," I said.

"Oh no, this is my set. She's watching hers in the front room."

I took the back off again and watched for another half an hour. It was obvious that the fault was not a dry-joint as I'd assumed. It occurred only when the back was on and the temperature rose. I'd no hairdryer with me to make heat checks on the components and it struck me that this would be best done in the shop. I told him I'd call later to pick the set up.

When I got it to the shop I managed to create the fault by pulling away at the upper left plug and socket on the right side timebase panel. So I took the panel out and resoldered all the connections. There was a clear picture when I switched on again. After refitting the back I let the set run for an hour or so. Then, confident that all was well, I put it into the estate car carefully and returned it to Mr. Evans.

I was similarly gentle with the set when I got to his house. I plugged it in and connected the aerial. There was a white line until I clouted the top of the set and a picture appeared. This was too much. I returned the £20 and apologised. In fact I practically ran out of the house. But I've an idea that the set will be all right after this.

The Midday Clinic

When I got back to the bungalow the phone was ringing. A G11 I'd repaired several weeks ago had gone wrong. I asked the owner to bring it to the shop at about twelve the following day. Shortly afterwards a lady rang to say that her ITT portable had a funny fault – the sound would go off until the aerial plug was waggled about. I asked her to bring the set to the shop midday tomorrow.

So just before midday I packed my stuff into the car and sped off down to the shop. The G11 was the first one to arrive. The holder at the back didn't hold a remote control unit. I switched on and a red light appeared. Nothing happened when I pressed the button, and switching off and on again made no difference. There was life on the power supply panel, but only 50V at the fuse. I checked here, there and everywhere but couldn't get the h.t. to rise. The reservoir capacitor was of the blue welded type. I'd fitted it some time ago and it checked o.k. After spending some time checking through the power supply circuit I'd got no further and gave up. Another failure.

Shortly after the ITT portable arrived. I removed the cover and found that the sound came on and went off as the coaxial aerial lead was juggled about over the tuner and i.f. unit. No dry-joints could be seen when the chassis was taken out, but I did find that when the tuner etc. was held in one position the sound didn't go off. So I fitted a wedge. I showed the lady what I'd done and explained that in my opinion the fault was in the tuner-i.f. unit, but that I didn't have a replacement. She seemed happy enough and left me a pound for my trouble. I know that I should have removed the unit and stripped it down, but I didn't have the patience. Sorry.

Another G11

Another call had come in while I'd been away. A G11 with field collapse. When I arrived at the house I found that the owner was the best friend of an old friend of mine, so I resolved not to give up this time.

After removing the rear cover I checked that voltage was present at the TDA2600 field output chip. I then fitted a new TDA2600, with the clip under it, and refitted the heatsink. The line was still there. I told the owner I wouldn't be long and sped off to the shop, hoping to find another panel. As luck would have it I'd kept an old G11 with a duff tube. After extracting the upper left panel I hurried back to the house and fitted it. I crossed my fingers and switched on. The picture appeared and I was greatly relieved.

I felt guilty about charging them £25, but they seemed to be quite happy and I went off with the faulty panel. I'll find the fault on it when I have time. Meanwhile all the best to you all.

Teletopics

BUSINESS PROSPECTS

While sales of consumer electronics goods in the UK remain flat, the latest report from specialist market researchers BIS Mackintosh paints a hopeful picture of what trade will be like in the European Community come 1992. Its predictions, compared to 1988, are as follows:

Market	1988	1992
TV sets	£8bn	£9.15bn
VCRs	£4.12bn	£4.9bn
Camcorders	£1.2bn	£2bn
Audio	£9bn	£10bn
Overall consumer electronics	£22.3bn	£26.7bn

BIS Mackintosh suggest that thereafter the growth rate might accelerate due to the effect of the single European market. Amongst newer products, the report suggests that the market for satellite TV receiving equipment will be around £300m in 1992. Camcorders are picked out as a section of the market where considerably increased demand is expected.

Meanwhile, back to reality. Following Ferguson's retrenchment (see Teletopics last month), Tatung has announced that just over ten per cent of its workforce at Telford is to be made redundant. Most of the redundancies will be in back-up rather than production-line staff. Tatung blames the poor demand for TV sets and the failure of the satellite TV market to develop for the need to make this move. Earlier, the company had expected to take on additional production-line staff during the summer to build up satellite TV equipment output in anticipation of increased sales later in the year. In another move, Thorn EMI has announced the closure of its CTV tube plant in Sunderland. The plant was mainly involved with regunning tubes, some 85 per cent of the output going to Thorn EMI's rental chains. It was originally established in 1950 for the manufacture of monochrome TV tubes. The switch to sets with FS tubes is cited as one reason for the reduced call for regunned tubes.

SKY AND BSB

Sky Movies' transmission hours have been increased to up to sixteen a day, starting at 2 p.m. and running to approximately 5.30 a.m. The final film in each broadcasting day starts at about 4 a.m. and will usually be the main film of the previous day. Meanwhile Sky Television is planning a major move to increase its number of viewers, one aim being to take advantage of BSB's postponed service start. Sky is to offer a rental package consisting of receiving equipment and a Sky Movies subscription at a price expected to be around £4.50-£5 a week. This would mean Sky Television going into the rental market and would represent a considerable investment on top of the present cost of running the Sky TV services, around £2m a week. It's understood that the receivers would be supplied by Amstrad and that an order has been placed for "hundreds of thousands" of them. A network of installers is being established.

BSB is still suffering from the consequences of its decision to adopt the high-tech approach to satellite TV broadcasting. The difficulty over the ITT 2285 chip has led BSB to reassess the possibility of using the Philips/Plessey

MAC decoder chip set. This is understood to cost around £27, which would increase the cost of receivers. There is also continuing doubt about whether the Squarial will be made available, particularly in view of the proposal to use reduced transmitter power in order to start the service with five channels from one satellite.

SERT's one-day seminar on DBS reception, postponed from June because of the railway strikes, has been rescheduled for Friday September 15th, with an enhanced programme. It's hoped that there will be direct demonstrations from the BSB satellite, which is due to be launched at the end of August. The programme will include presentations on Ferguson, Grundig and Salora equipment. The seminar is to be held at the IBA Conference Hall, Brompton Road, London SW3. Additional tickets are available at £75 (£60 for members of SERT) inclusive of lunch and VAT. For further details apply to Consert, 57-61 Newington Causeway, London SE1 6BL (telephone 01-403 2351).

SEME TO HANDLE PANASONIC SPARES

SEME Ltd. has been appointed authorised supplier of Panasonic spares to handle, from August 1st, all orders outside the manufacturer's own franchised dealer network. This development will ensure that non-account dealers and service engineers will now have a speedy access to original Panasonic parts. A new sales office has been established at Buckingham to deal specifically with Panasonic orders. Three new sales staff and a technical liaison engineer have been trained jointly by SEME and Panasonic's head office at Bracknell. The Buckingham office is directly linked to SEME's computer at Melton Mowbray, site of the company's warehouse.

SEME's Buckingham address is Chandos House, School Lane, Buckingham MK18 1HD. The new SEME telephone number exclusively for Panasonic spares is Buckingham (0280) 823 523 or fax 0280 814 916.

SERVICE AIDS

Ferguson has issued an extremely useful pocket book to assist with fault finding in the TX90 and TX100 chassis. There are separate sections on the various parts of the chassis, with symptoms and likely causes listed. It's available under part number 10P1-552-001 from Ferguson Ltd., Service Division, PO Box 1594, Crown Road, Enfield, Middx EN1 1DY.

Robin Electronics, Hirst Hall, GEC Centre, East Lane, Wembley HA9 7YA has introduced a range of high-quality safety test probes designed to fit many instruments including multimeters and insulation testers. All models feature Robin's unique angled prod, have cable engineered in silicone for maximum flexibility and long life, gold-plated tips and terminations for minimum contact resistance, and colour coding in black and red for safe use. Price of the general-purpose SP25RA lead set for use with test equipment that has 4mm shrouded sockets is £12.95.

CD AND DAT

The price of CD players in Europe is set to rise following the decision by the EC to impose anti-dumping duties ranging from 6.4 to 33.9 per cent on imports from Japan and South Korea. This move is the outcome of a two year investigation by the European Commission following a complaint lodged by Philips, Grundig and Bang and Olufsen. In the two years to 1987 the European producers' share of the market fell from just over 50 per cent to

18 per cent. Selling prices will have to rise since under EC trade law the duties cannot be deducted from profit margins. The duties are expected to remain in force for five years.

Digital audio tape recorders are expected to be on sale in Europe and North America by Christmas, following an agreement reached between the world's recording and consumer electronics industries. Consumer electronics manufacturers have agreed to incorporate in each machine a device that will prevent it making more than one copy of each original recording.

UP-MARKET TVs

Sony has released a new top-of-the-range TV receiver, Model KV-FX29TU, with a host of features and a suggested retail price of around £2,000. It has a 29in. (68cm) tube and is compatible with S-VHS and hi-band 8mm video equipment. There are Nicam and Fastext decoders and an on-screen display for control operation. The digital circuitry incorporated includes sufficient memory to be able to produce a flicker-free display and noise reduction. Of particular interest is the fact that it will work with VCRs capable of handling NTSC and SECAM tapes.

Shortly to follow, at around £2,500, is a set with an even larger tube. The KV-DX3412U will have a 34in. (80cm) screen.

Grundig plans to launch a set using the flicker-free (100Hz) technique at this year's Berlin Audio and Video Fair.

A US company, Northwest StarScan, claims to have developed a signal compression system that enables an HD-TV transmission to be fitted into a standard bandwidth channel. Signal compression of ten times is

understood to be possible. This could significantly cut the cost of satellite TV transmissions.

TRANSMITTER PRIVATISATION

The government has decided to privatise the UK's broadcasting transmitter networks (BBC and IBA) in their present form rather than adopting the approach suggested by Price Waterhouse (see last month). The BBC will retain its transmitter network until 1996, when the corporation's royal charter expires. The issue will then be reviewed. An announcement from the IBA has welcomed the decision, and also the suggestion that a uniform transmission tariff should be retained for the Channel 3 companies.

CONFERENCES/EXHIBITIONS

The High-definition Television International 89 conference and exhibition is to be held on September 18-19th 1989 at the London Tara hotel. It's designed for those with little or no knowledge of HD-TV as well as for those working on the development of this technology. Further details can be obtained from Meckler Ltd., Grosvenor Gardens House, Grosvenor Gardens, London SW1W 0BS (telephone 01-931 9985).

The fourth International Cable and Satellite exhibition and conference will take place at the National Hall, Olympia, London from April 9-11th 1990. For further details contact Cable and Satellite 90, 11 Manchester Square, London W1M 5AB.

The fourth International Broadcasting and Telecommunications Show is to take place in Milan from October 12-18th 1989.

TAYLOR

U.H.F. TELEVISION DISTRIBUTION AMPLIFIERS



T.S. 2008 8-Way U.H.F. Distribution Amplifier

Price

£19.95 each + Carriage & VAT [Total £24.68]

10+ £17.22 + Carriage & VAT

20+ £15.84 + Carriage & VAT

Specification: Frequency: 470 - 860 MHz
Minimum Gain per outlet: 2dB
Mains: 240V A.C.

T.S. 2004 4-Way U.H.F. Distribution Amplifier

Price

£14.95 each + Carriage & VAT [Total £18.93]

10+ £13.23 + Carriage & VAT

20+ £12.17 + Carriage & VAT

Specification: Frequency: 470 - 860 MHz
Minimum Gain per outlet: 2dB
Mains: 240V A.C.



TAYLOR BROS. (OLDHAM) LIMITED
Bisley Street Works, Lee Street,
Oldham, Lancs., England. OL8 1EE

Telephone: 061-652 3221
Fax: 061-626 1736
Telex: 669911 Taylor G



VCR Clinic

Reports from Philip Blundell, Eng. Tech., John C. Priest, Eugene Trundle, Chris Plaice, Harvey Benson, Ian Bowden, Alfred Damp and Nick Beer

Philips VR6468

This machine would accept a cassette normally, but if wind or play was selected the cassette would eject. A check revealed that the microcomputer chip thought the capstan wasn't turning even though it was! The tacho pulses were missing – a new P687 amplifier module put that right. **P.B.**

Philips VR6561

If play or wind was selected this machine would eject the cassette. The error memory showed that the capstan tacho signal was missing. R3509 (15Ω) had gone high-resistance – it read about 60Ω. **P.B.**

Philips VR6462

This machine played o.k. but wouldn't tune in a signal. We found that the tuning information pin 16 of the SAB3013 chip was at a higher voltage than it should have been as T7420 (BC547) was open-circuit base-to-emitter. **P.B.**

Philips VR6468

There was no vision in E-E or play, though the test pattern worked. The +11-9b supply was missing as C2329 on the signals board was short-circuit. The short had also damaged transistors 7607 and 7304 (both type BC328). **P.B.**

Philips VR6180

This machine intermittently failed to accept a cassette. If it was put into standby before the cassette was tried the display would go bright, showing that the cassette in switch was being sensed, but the tray wouldn't move. No supply voltage reached the control motor as there was a dry-joint on plug B2. **P.B.**

Panasonic NV-G40/NV-G45

Two similar machines came in with different versions of the same fault. The first one, an NV-G40, had a reluctance to capture and lock on to channels when search tuning. It would tune all the way through the u.h.f. bands, pulling in all the local, fringe and distant channels but refusing to stop at any of them.

The manual contains no description of the search tune circuitry but did provide a clue as to the area involved. In addition to running the clock and the displays, and decoding the push-button inputs, IC7501 on the timer and operation panel provides tuning memory and digital-to-analogue conversion for the tuner and TV demodulator, via the channel select chip IC7551. During tuning search, as a signal is resolved the video from the tuner-demodulator is fed to the luminance/chrominance section and passes via the input/output CBA and emitter-follower Q3013 to pin 1 of IC3002. The sync pulses are separated and fed, together with a 15-625kHz signal, to a comparator. Presence of a signal is detected by identifying line sync pulses – this results in a low at pin 9 of IC3002. This low is fed back to pin 20 of IC7501. The

tuning scan then stops and the tuning point is locked, after which the memory button is pressed.

We found that by artificially introducing a low by momentarily shorting pin 9 of IC3002 to chassis at the point during the tuning scan when a picture was resolved it was possible to lock on to a channel. Pressing the memory button then stored the channel in the normal way. Using this technique, we were able to program all the local channels. The machine would have been usable in this state provided the user didn't move to a different area or unplug his machine long enough for the tuning memory to be lost. Resisting this temptation, also the temptation to provide an extra push-button switch to short out pin 9 during the tuning process, we pressed on.

Scoping the video waveform at the tuner-demodulator output and then tracing it along the path to pin 1 of IC3002 showed that there was no loss of signal here. Pin 9 of IC3002 should have been at 0.1V but was actually at 4.75V and didn't vary whilst tuning. Replacing IC3002 (AN5421N) cleared the fault.

The second machine, an NV-G45, had exactly the same symptoms. So after confirming channel lock by pulling down pin 9 of IC3002 we replaced this chip. This time the fault remained. Resorting to the scope we found that the video input at pin 1 of IC3002 was of very low amplitude, less than 25 per cent of that at the base of emitter-follower Q3013. Further investigation showed that one leg of C3055 (33μF, 16V) came loose from its can when moved. Replacing this capacitor finally cleared the fault. **J.C.P.**

Sanyo VHR4350

This one led us a merry dance. The head drum wouldn't turn, though voltage was present at the drum motor and it was free to turn. The cause of the problem turned out to be dry-joints at CN823 on the deck-mounted junction PCB. As a result the motor was off earth. You have to remove the deck to gain access for resoldering – do all the joints while you are at it. **E.T.**

Panasonic NV-G7

The mode switches used in various Panasonic decks can be troublesome. If you replace one in the D1 deck (NV-G7, NV-G10 etc.) don't use the VSS0110 type which you may have in stock for earlier models. It looks similar and fits perfectly, but electrically it's quite different, giving rise to some peculiar deck behaviour. The correct part number is VSS0135. **E.T.**

Mitsubishi HSB20

There was a nasty buzz on the E-E sound with this new machine. We fed the output from a colour-bar generator into the machine and found that the buzz disappeared when the generator's chroma signal was switched off. Attention was therefore turned to the 6MHz filter circuit CF151. By making comparisons with a good machine we found that although the output waveforms at pin 18 of IC101 were similar they were different at the input to

CF151. After replacing various components in this area to no avail I was getting somewhat puzzled. L153, which is connected between CF151 and chassis, had been measured but as a last resort I decided to swap it over with the coil from the good machine. This cleared the fault. Both coils were identically marked and gave exactly the same resistance reading, so I can only assume that the faulty one had a couple of shorted turns or perhaps a crack in its core. **C.P.**

Panasonic NV333

The job card said that the problem was intermittent failure to eject, also other intermittent mode failures. When I checked the machine it behaved like a video possessed. On application of power, sometimes the record LED or the pause LED would light, play was intermittent, and at other times the machine would return to stop after a few seconds. Occasionally the cassette housing would eject five seconds after the button was pressed!

My first thoughts were that perhaps the microcomputer control chip IC6001 was faulty or that maybe the mode switch was defective. With this machine however I've found that the microcomputer chip is usually innocent when there's a syscon fault. Changing it made no difference, neither did removing, cleaning, adjusting and replacing the mode switch. Detailed checks were then made in the syscon circuit. As a result I discovered that transistor Q6008 had an intermittent base-emitter open-circuit. Q6008 is driven by Q6009: they are employed by IC6001 to pulse scan its mode sensor input. **H.B.**

Salora SV6600/Sanyo VHR1300

The problem with this machine was intermittent tuning drift. As all channels appeared to be affected we checked the 33V supply, which was slightly high. We also noticed that the panel (the timer/tuning panel) in the vicinity of the 33V regulator IC6206 was brown and showed signs of overheating. The supply to this 33V regulator chip is provided by a constant-current regulator arrangement on the power supply/system control panel. Note that there are two different circuit diagrams in the manual – this was the more complex one.

The voltages around the regulator transistor Q5004 (2SA984) didn't agree with those in the manual, but the transistor, along with diode D5003 and zener diode D5004, were all o.k. Resistor checks were then carried out. The emitter resistor R5010, which is used to sense the current, was found to be only 270Ω instead of 560Ω – the wrong value had been fitted. In addition R5015 was 560Ω instead of 1.8kΩ. Both resistors were original parts and had been in the machine for around three-four years. Maybe this was a one-off occurrence, or maybe more machines with these errors will start to show up soon. **I.B.**

Panasonic NV430

The problem with this machine was that the optical tape-end detection wasn't working. As detection didn't occur at either end of the tape the infra-red emitter circuit was the most likely suspect. On these machines the infra-red LED is pulsed on and off by the system control chip IC6001 via the 2SD636 emitter-follower Q6006. Meter checks showed that the LED, transistor and two assorted

resistors all read correctly. But no light reached the end sensors. Scope checks then revealed that while 5V peak-to-peak pulses were arriving at the base of Q6006 the pulses at its emitter were of only 1V amplitude. Replacing this transistor restored normal operation, but it read o.k. on the meter's diode check when tested out of circuit. **I.B.**

Philips VR6760

There was no E-E picture and no playback picture, due to the absence of any 10V supplies on the signal board (P306). Tracing back led us to an open-circuit transistor (7607) on the main board (P606). Removing the panel to replace this transistor is no easy task. It was even more frustrating when the replacement gave an impression of Vesuvius ten seconds after switching on. Further checks revealed that there was a short to chassis on the signals panel. The +10c supply stabiliser transistor on this panel was found to be burnt up and short-circuit, but the short was still present after it was removed. It was found to be in C2329, and when this and the two transistors were replaced normal operation was restored. **A.D.**

Ferguson 3V44

This machine had no clock display though the function display worked correctly. Scope checks on the timer/display board showed that there was no output from IC401. The supply to this chip was correct, but there was no clock signal either at this chip or where it enters the board at pin 6 of CN1. The missing signal was traced back to broken print on the power supply module. Repairing this print restored the display. **A.D.**

Marantz MV762/Philips VR6860

The complaint with this machine was "lines on the picture and a whistling noise when not in use". A trial with the test tape showed that the "lines on picture" were due to the capstan motor running at full speed. Checks around the MAB8420 servo chip IC7091 revealed that it was not supplying pulses to the D-A converter chip. A new MAB8420 put matters right. **A.D.**

Hitachi VT-M622

This brand new stock machine came from the shop with the complaint of poor stills in the SP mode. This is not actually a fault with these machines, but it does catch the unwary. On this model preference is given to the LP mode. Thus functions such as picture search and still are of poorer quality in the SP than in the LP mode. **A.D.**

Panasonic NV-MC10/NV-MC6

This fault occurred on an NV-MC10 but could equally well be experienced with the NV-MC6. The customer's complaint was that the speed seemed a bit fast. The capstan was rotating at maximum speed, which meant that the reels were also running at maximum speed. The output chip is mounted on the back side of the mechanism, and the servo is on the main PCB, sandwiched across the back. All in all it's impossible to fault find in this area without a set of extension leads. We found that there was no feedback from the capstan motor. A new motor (VEM0284) put matters right. **N.B.**

Letters

POLARISERS FOR TVRO SYSTEMS

Most test reports now seem to mention the use of a magnetic polariser as an effective component in any satellite TVRO system – in one trade publication an NEC spokesman was recently quoted as saying that “if you find a so-called polariser with moving parts, have nothing to do with it”, and went on to condemn the cross-polar discrimination with Marconi LNBs, pointing out that the most effective solution is to use a magnetic polariser. Such advice is not always helpful to those in the front line, who find few such clear-cut answers to technical difficulties.

Yes, magnetic polarisers are a useful addition to the TVRO system buyers' shopping list, with their advantages of low insertion loss, no moving parts, fast polarity change etc. But we must also be aware of their weaknesses. The first problem is fundamental to the operation of such a device: for a given magnetisation of the ferrite core in the polariser, it will twist the polarisation of a plane incoming wave by an amount that varies with frequency. This leads to the need to be able to adjust the skew and store this for *each channel*. Some installers will claim that the results obtained without this facility are adequate when receiving Astra's channels – so far. Thanks to Astra's reluctance to fire up all transponders, an installer needs to adjust the skew for best cross-polar rejection only at the mid to high end of the frequency band in use (Screensport on ch. 1 has to date no adjacent signal with vertical polarity to cause cross-polar interference). Unfortunately the problem becomes worse as the required frequency range increases, creating difficulty with reception of future Astra satellites.

The second problem is more obvious – the installer cannot easily see the polariser's “viewpoint”. When a mechanical polariser is fitted he needs to look only at the probe position to know the skew setting. When a Marconi LNB is fitted the case position indicates the skew setting, although this must be done manually. The magnetic polariser has no indication of the skew setting other than from the signal level obtained. This makes a signal level measuring facility an absolute necessity. Simple peak-level units aren't suitable as they simply average the total power level of the channels received, when it's necessary to examine individual channel levels. This makes “by the book” installation a tedious job, requiring adjustment for optimum skew on each channel.

A Marconi LNB (or any LNB with two selectable receive probes 90° apart) will not require such elaborate alignment. It will require adjustment for the opposite polarity. Both these types of polariser are able to provide polarity selection with very low insertion loss and with cross-polar isolation better than that of a magnetic device. The mechanical polariser has the extra facility of skew adjustment from the receiver. Neither device will alter skew with frequency across the Ku band.

So next time you're asked to weigh up a TVRO system with a magnetic polariser, check that the receiver stores skew on each channel and be prepared for a return visit

to the system when Astra fires up the remaining transponders.

*Gordon McCrea,
Kesh Electric (Satellite Systems) Ltd.,
Kesh, Co. Fermanagh, N. Ireland.*

PHILIPS REPLY

In response to Martin Blake's letter (July) I would make the following observations which may help to enlighten Martin and your readers.

Philips, being at the forefront of electronic communications and leaders in the field of interactive communications, have translated this expertise into the area of spares distribution to provide material support for the UK's consumer electronics service industry. With the development of our Multi-option Interactive Enquiry System (MOVIES) we offer the trade the ability to gain access to our mainframe computer at Croydon in order to obtain up-to-date information on spares, technical advice and product availability. By using MOVIES the dealer can take advantage of the following facilities:

- (1) Ordering parts. (a) Identify and code parts required. (b) Check on price and availability. (c) Place orders. (d) Check the progress of an order.
- (2) Technical Information. (a) There is access to some 1,200 pages of current technical advice and service tips. (b) Technical assistance can be obtained from our Technical Support Engineer at Croydon via the messaging facility or contact made with Technical Liaison Officers throughout the UK. (c) The user can communicate with other MOVIES users in the UK via the messaging/mailbox facility.

All this is available for what is in most cases the cost of a local telephone call.

We at present have over 1,000 registered UK users (including our five major distributors) who regularly use MOVIES. In May, 67 per cent of all orders transacted at our Waddon warehouse were placed via MOVIES. Our current stock availability is 98.8 per cent of all codes required, and 93 per cent of all order items are cleared from stock. Orders placed before 18.45 hours by the trade via our MOVIES system are picked, packed and ready for despatch via mail or express carrier by 10 o'clock on the following working day (subject of course to stock availability).

Need I say more Martin? Join the MOVIES club or get closer to your Philips Appointed Distributor who will be delighted to help you.

*Max Hofmann, Major A/C Manager,
Philips Consumer Electronics,
Consumer Electronics Service,
Waddon, Croydon CR9 4DR.*

PHILIPS SPARES FROM WILLOW VALE

I read with interest Martin Blake's letter (July) regarding the distribution of Philips spares through wholesalers. According to Philips, in May Willow Vale supplied 48 per cent of all the non-account spares used in the UK. This comprised nearly 8,000 different parts with a supply ratio from our stock of 94.59 per cent. This means that half the trade ordered Philips parts from Willow Vale and received 95 per cent of their total order the next day.

I doubt whether any other manufacturer other than Sharp and Grundig (for whom we are the sole parts distributor) can boast such an impressive record.

Martin says he cannot understand our invoices. But as long as he gets his parts, why worry? Our rep will explain the paperwork and our technical people will help him order. Martin, my message is: Open an account – your problems should then be solved.

*P.J. Bartlett, Managing Director,
Willow Vale Electronics Ltd.,
Reading, Berks RG2 0LU.*

THE PVC LEAD PROBLEM

M. Bennett (Letters, August) asks why a PVC lead should attack plastic. PVC (poly vinyl chloride), whether used in mains leads or plastic macs, is somewhat different from other common plastics. Essentially it's a stiff or rigid polymer which is made softer by the addition of a colourless synthetic oil or "plasticiser". In some cases this plasticiser has an unfortunate tendency to migrate or leave its parent PVC compound under the action of heat and/or pressure. This gives rise to the observed effect, i.e. that by contact the plasticiser can migrate and soften silver paint etc. Some PVC/plasticiser combinations are worse than others in this respect. Cheap, poor quality compounds will no doubt be the worst offenders. In hopefully rare cases the plasticiser may contain other materials such as dissolved colour matter which could produce a clearly visible stain.

Although this problem doesn't always arise, it would be prudent to regard all leads as suspect and avoid conditions that would assist the process. In other words, let the leads dangle!

*J.W. Turner, Grad. P.I.,
Morecambe, Lancs.*

Editorial comment: We have received several letters on this subject and wish to thank all those who took the trouble to write. A further letter from Andy Emmerson will be published next month – he warns of the danger of using polystyrene roof insulation with PVC-covered cables.

AMSTRAD'S SATELLITE TV RECEIVER

Ian Martin's article on the Amstrad satellite TV receiver system (July) was very interesting. I too live in South Wales and experienced all the same problems as Ian, even down to the LNB packing up after the first week. Unlike Ian however I was quickly given a replacement by the local Currys branch despite my SRX200 kit being self-installed. I agree that the Amstrad system is excellent: the text, stereo sound etc. cannot be faulted. There's only one small thing that I wonder about. As Ian says, it's probable that the decoder will fit snugly in the top of the receiver. The only problem is that the receiver already runs pretty hot, so I don't know how hot the decoder will get!

*Chris Plaice,
Swansea, Glamorgan.*

THANKS!

I am writing to thank you for the excellent advice provided by your Advisory Service. This has helped me on several occasions. Here are a couple of examples.

The problem with a Philips set fitted with the G11 chassis was inconsistent line sync. Following your advice

to check out decoupling capacitors I scoped the sync signal and found a ring which was causing the mis-sync under certain signal conditions. The cause of this problem was the LT1 supply reservoir capacitor C3150 (150 μ F) on the line output panel.

The problem with a Ferguson 3V35 VCR was intermittent noise on playback of its own recordings. You suggested worn heads, so I replaced them with an economy grade drum at £18. The results were superb! No realignment was necessary and the new heads overcame poor tracking with prerecorded tapes, a fault that had been present almost from new. No guide tweaking was required.

*T.G. Borg,
Weaverham, Cheshire.*

EQUIPMENT IN SCHOOLS

I work for a local authority in the repair and maintenance of audio-visual and reprographic equipment. In 1990 this work will go out to tender at many of the schools within this county and others. Thus in future schools will be able to call in local engineers to carry out repairs and servicing. I would like to point out however that there are some safety practices to take into account, as follows:

- (1) TV sets should be in a cabinet or securely fastened.
- (2) The security of all fastenings should be checked at regular intervals. These sets are prone to working loose from their mounting screws and if not checked the set can slide off its trolley. For this reason a sticker should be attached to one end of the TV set marked "push from this end only".
- (3) It's recommended that the insulation of the TV sets, VCRs and audio equipment is flash tested at least once a year. It's the school's responsibility to ensure that all equipment is tested.
- (4) Fuses, plugs etc. should also be checked every year.
- (5) Extension cables should not be used.

*J. Fenton,
Hull, North Humberside.*

HELP WANTED

Can anyone help me obtain a TBA500 chip which I understand is no longer being made? Alternatively can anyone let me know of any chassis that used it so that I can perhaps salvage one?

*Harvey Benson, 5/11 Rehov Hatzanhanim,
Entrance B, Magdiel, Hod Hasharon, Israel.*

Can anyone supply or suggest an alternative for the hard-to-get LM373N chip?

*M. Stevenson, 124 Green Lane,
Eastwood, Essex SS9 5QJ.*

Can anyone assist with the repair of a Rank T510B ultrasonic remote control unit, used with the Bush Model AC6333? All that's wrong is that there's a missing top to a coil.

*David Jackson, Graphic Studio Ltd.,
74 Lower Camden Street, Dublin 2, Ireland.*

Servicing Salora Colour Receivers

Part 2: The G and H Chassis

Nick Beer and Ian Bowden

This month we'll start on the G and H chassis – the production of these very similar chassis overlapped. Both chassis use the Salora Ipsalo (integrated power supply and line output) circuit, which was devised as a means of reducing the power consumption. It uses a common transformer, referred to as the combi transformer, for the chopper and line output stages.

The situation is complicated by the fact that two different Ipsalo circuits were used in the G and H chassis. G sets up to serial number 300,000 and H sets up to serial number 200,000 use the Ipsalo-1 circuit while later sets use the Ipsalo-2 circuit. The two circuits are quite different. While Ipsalo-1 uses a thyristor as the chopper device, a second thyristor for protection and soft-start, and a 28-pin type LF0015 hybrid i.c. for chopper control, Ipsalo-2 uses a couple of transistors in the chopper circuit (both as switching devices) and an LF0034A 20-pin hybrid i.c. as the control device. Ipsalo-1 has two driver transformers for the two thyristors while Ipsalo-2 has a single driver transformer with two secondary windings for the two chopper transistors – the primary winding on the combi transformer is connected in series between these two devices. Both Ipsalo circuits provide mains isolation.

Ipsalo-1

Fig. 1 shows the Ipsalo-1 circuit used in the H chassis. In the following description we'll use the H chassis circuit reference numbers with the G equivalents in brackets.

The incoming mains supply is filtered and then fed to the bridge rectifier DB708-711 (DB1-4) whose output is fed via the surge limiter RB711 to the anode of the first thyristor THB700 (THB2). The mains input is also fed to transformer MB700 (MM1) which produces an output of approximately 24V a.c. This is rectified by DB700-3 (DB40-3) and fed via DB704 (DB44)/RB702 (RB127) to the start supply regulator circuit TB700/TB701/DB706 (TB15/TB16/DB14) which produces an output of about 12V. With the H chassis there's also a feed via DB704 to the MC78M18 18V regulator ICB700. On the G chassis a 32V feed from the cathode of DB44 is taken to the battery kit socket and remote control PCB if fitted.

During start-up the regulated start supply is used to power the Ipsalo chip HB1, the TBA2593 sync/line generator chip ICB501 (ICB2) and the line driver stage.

Overload Protection and Soft Start

The first thyristor THB700 (THB2), type TIC106M, is used as an electronic fuse in case of an overload and also to provide a slow start-up. Both these functions are controlled by the hybrid chip. For slow-start control a zero cross-point switch in the chip is fed via pin 27 with an integrated a.c. waveform from the secondary winding on MB700 (MM1). This circuit produces a sawtooth waveform which is used as one input to a control amplifier circuit, the other input being a clipped line flyback pulse from the combi transformer. This control amplifier's output is fed to an integrated driver transistor

whose output leaves the chip at pin 4, going to the driver transformer MB701 (MB4) which controls the gate of THB700 (THB2). The soft-start action is to switch THB700 (THB2) on during only one half of the mains input, so that the main reservoir capacitor CB721 (half CB5) receives only a half-wave rectified input. Once the set has started up THB700 (THB2) is driven on both half cycles of the mains input.

The 12V supply at pin 22 of the hybrid chip, the 20V supply at pin 6, the 28V supply at pin 5 and information on the operation of the chopper, fed in at pin 20, are sensed by the overload protection circuit. Should an overload occur the drive to THB700 (THB2) is removed, leaving this thyristor cut off. Thus the set closes down, after which it will try to start up again – with the later Ipsalo-2 circuit the set remains shut down.

Chopper Action

The second thyristor THB701 (THB1), type 18022, is used as the chopper device, controlling the amount of energy transferred from the mains supply to the combi transformer and thus all the secondary output voltages. Note that this device incorporates a reverse current (efficiency) diode. Line flyback pulses are fed back to pin 16 of the hybrid chip and are used to generate a sawtooth waveform which is applied to one input of a control amplifier. The other input is fed in at pin 18 and provides a reference voltage, developed across CB718 (CB15) at pin 10. This reference is preset by RTB700 (RTB1) which thus controls the levels of the output voltages provided by the Ipsalo circuit. This control amplifier acts as a pulse width modulator: each time the sawtooth input falls below the reference level its output changes state. This cuts off the integrated driver transistor whose output, at pin 9, drops. A drive pulse is then coupled via MB702 (MB5) and CB724 (CB20) to the gate of THB701 (THB1), switching it on. When the line flyback occurs a back-e.m.f. is generated by the combi transformer's primary winding, the reverse voltage across it switching THB701 (THB1) off. Current flows through the integral efficiency diode, putting energy back into the smoothing capacitor CB722 (part CB5). As the thyristor's switch-off point is fixed, it's the switch on point – or rather the length of time the thyristor conducts – that governs the amount of energy supplied to the set.

This switch-on point varies to provide regulation of the secondary supplies. If the amplitude of the flyback pulse or the rectified mains input increases, the reference voltage at pin 10 of the hybrid chip will fall (there's an inverting amplifier between pins 18 and 10). The driver transistor will thus switch off later and the thyristor will not remain in conduction for so long, resulting in less energy being supplied. The reverse happens when there's a drop in the mains input or the amplitude of the line flyback pulse.

Standby System

The transformer fed start-up supply is used when the set is in the standby mode. In the H chassis the 18V

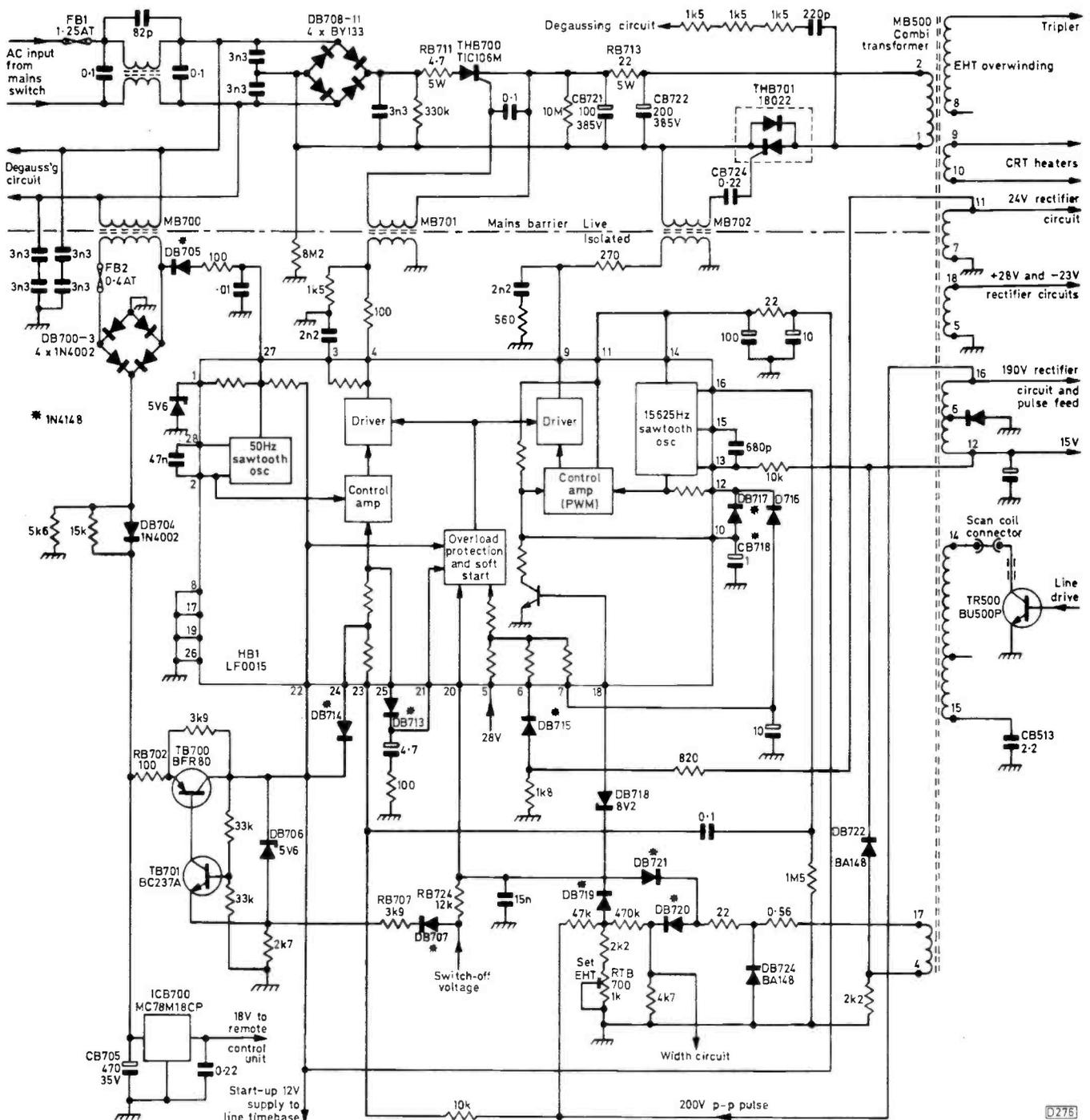


Fig. 1: The Ipsalo-1 circuit as used in the H chassis. Note that the line output transistor's supply is generated across capacitor CB513 by efficiency diode action.

output from ICB700 powers the remote control circuitry in standby, while in the G chassis the 32V output from DB40-3 is fed to the remote control panel where a similar i.c. provides regulation.

When a standby command is received, pin 19 of the SAA1251 remote control decoder chip ICC101 goes low, switching on transistor TC102. This links the 18V line back to the power supply where it passes via RB724 (RB125) to pin 20 of the hybrid chip. This shuts off both driver transistors in the chip, so that neither thyristor in the chopper circuit receives drive pulses. The 18V supply is also fed via DB707 (DB37) and RB707 (RB124) to the start-up supply regulator circuit where TB701 (TB16) switches off. As a result TB700 (TB15) is no longer conductive, removing the start-up supply to the Ipsalo chip, the line oscillator and the line driver stage. When

the set is asked to come on from standby it's simply a matter of switching off TC102 so that the 18V feed to the power supply is removed, after which the set starts up in the usual manner.

Tuning Arrangements

Earlier versions of the G and H chassis used basically the same sweep tune and control circuit. The difference is that in the H chassis the SAA1251 remote control decoder chip is on the microcomputer panel whereas the G chassis has to be fitted with a small extra PCB to perform this function. The reference numbers in the following description apply to both the H and G chassis.

The later eight-channel version of the G chassis did not have this search tuning. Instead it uses preset

APOLLO LANCASHIRE

NATIONWIDE MAIL ORDER

LOCAL DELIVERY - 2 YR GUARANTEE

A47 342/343X - 470 BCB22/CTB22/BGB22/	£39
470-ESB22/EFB22/ERB22/FTB22	£56
A51-120X/182X	£39
A51-161X/162/163/168	£56
510-JKB22/JEB22/JDB22/JGB22/ALB22/GLB22	£56
510-VLB22/DTB22/001/RFB22/RCB22/SFB22	£56
A51-590	£56
A51-570X/580/001/210/241	£56
A56-120X/123/140/410	£39
560-DZB22/HB22/AB22/TB22/AWB22	£56
560-ETB22/DTB22/CSB22/DMB22/DNB22	£56
A56-611X/615X	£56
A56-120X/A67-120X/140/150/200/410	£39
20AX - A56-500X/510X - A66-500X/510X	£56
30AX - A56-540X - A66-540X	£56

PHONE FOR QUOTE

SONY TYPES £69

470DLB22/FVB/KHB/KTB
KLB-520SB22/NB/RB/XB
A49JHT00X-570DB22/EB/HB
GB/JB-A53JBW01X/JCG00X
JB00X-680CB22/DB/EB (£79)

14" PORTABLES £59

3708UB-AXT3001
37-550/2/3/4-A37-570/580/590

CASH PAID FOR ALL SIZES SONY GLASS + PIL TYPES

66-510/540 560 DZB

PLEASE PHONE BEFORE CALLING
LOCAL DELIVERY FROM ACCRINGTON, LANCS.
Phone enquiries and letters to:
**Apollo, The Potters Wheel,
Mullion Cove, Mullion, Nr. Helston, TR12 7ET.**
0326 240781

potentiometers switched by two i.c.s (ICCP1 and ICPP2) on the lower front panel. These chips are fed with channel number data from the 74C922 channel number keypad encoder chip ICS1 on the upper front panel. This arrangement has proved to be far more reliable and we feel requires no further explanation.

In later H chassis sets with the Ipsalo-2 circuit the search tuning circuit is simplified by the use of an M193C combined microcomputer, memory and varicap supply driver chip. There are two exceptions, the 1H7 which has the same system as later G chassis sets and the 1H3 and 1H5 which have mechanical switch banks to select the channel and the appropriate tuning potentiometer. These circuits are more reliable (apart from switch contacts on the 1H3 and 1H5) than the search tuning system and do not call for any further explanation.

Search Tuning Operation

When it comes to faults in the G chassis the search tuning circuit is, after the Ipsalo circuit, the main trouble-spot. As you will see from the fault list next month, the number of faults is comparable to the power supply. When fault finding in this area it's helpful to know how the system operates, so that faults can be tracked down by making test measurements rather than

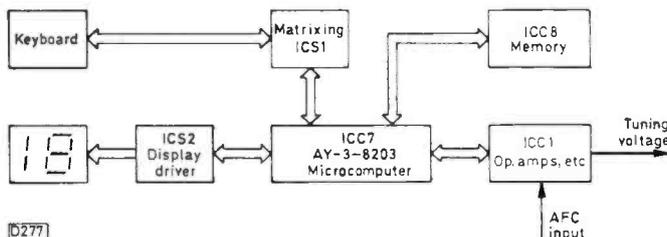


Fig. 2: Block diagram of the search tuning system.

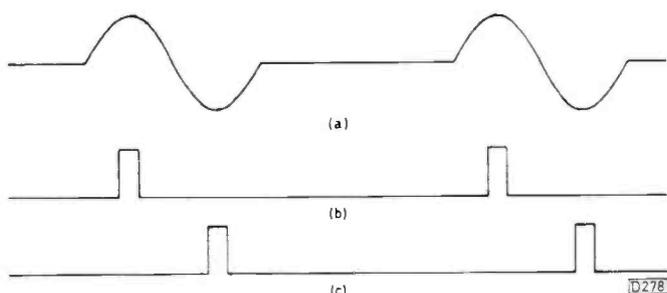


Fig. 3: Tuning up/down waveforms. (a) A.F.C. demodulator output, (b) up pulse, (c) down pulse.

by just changing the i.c.s one by one and keeping your fingers crossed that you will have cleared the fault.

The design is based around the AY-3-8203 microcomputer ICC7 whose function, in conjunction with the front control and display panel, is to provide tuning search and control of memory and channel switching. Fig. 2 shows a block diagram of the system.

Tuning is initiated by the start button, operation of which sets ICC7 in the search mode. A pulse train at approximately 3.9kHz then emerges from pin 35 - this will form the varicap supply voltage. At the same time the fine-tune voltage at pin 33 is centred to give an equal "throw" up and down. Also pin 31 goes low to mute the sound, lower the contrast level and, with the G chassis, switch on the tuning band LEDs.

The pulses from pin 35 vary in width to set the final d.c. level fed to the varicap tuner. They are adjusted to an amplitude of 5.2V by RC58/DC15/TC8/RC54 and then pass to a filter circuit consisting of RC9/10/11/13/14/15 and CC5-8 which, in conjunction with an operational amplifier in ICC1 (input pins 8 and 9), produces at pin 7 the d.c. required for the tuner. As the search continues, the a.f.c. demodulator ICC1 (TBA120A), which is mounted in a screening can on the tuner/i.f. motherboard, gives a pulse output signal - see Fig. 3(a) - which is fed to the control PCB, entering ICC1 at pin 11. When the swing of this signal is greater than $\pm 50\text{mV}$ in comparison with an internal reference voltage of 5.2V, a comparator circuit within the chip produces two output pulses that leave at pins 15 and 16 (the down and up signals respectively).

The down signal is fed directly to the 4011 chip ICC9, providing one input to a nand gate. The up pulses from pin 16 are delayed by CC35/RC66/DC18 before being fed into ICC9 as the second input to the gate. When the up and down signals are both high, the gate's output goes low. This change is coupled via RC71 and CC37 to the level-shift transistor TC12 which turns off momentarily, providing a high pulse at pin 29 of ICC7. This is the stop input. The search then pauses. After a delay of approximately 256msec, set by an internal monostable, the validate input at pin 28 is checked. If it's low, the search will continue: if it's high this indicates that a channel has been found. It can go high only when the video sync fed to pin 12 of ICC1 and the flyback pulses fed to pin 13 coincide, making the output at pin 20 go high. This output is fed via ICC9 and the level-shift transistor TC11 to pin 28 of ICC7. The search will stop and pin 31 will go high, removing the mute and restoring the contrast level. The station can now be stored in the ER1400 tuning memory chip ICC8 by pressing the store button.

ICC7's clock is set at 2MHz by RTC3 and CC26. This is divided by 128 to provide the 15.625kHz memory clock. The search speed is set by the tuning oscillator whose frequency is set at approximately 1.2kHz by RC59 and CC27. ICS2 (U143M) on the front panel drives the LED channel number display, under the control of the four-bit parallel data lines from pins 22, 23, 24 and 25 of ICC7. Channel selection is performed by the MM74C922 chip ICS1 which feeds data directly on to the same data bus. The remote control system uses an SAA1250 encoder in the handset and an SAA1251 decoder in the remote control receiver (ICC101 in the H chassis). This chip provides the same data lines with outputs at pins 8, 9, 10 and 11, via ICC103.

Next month we'll take a look at the Ipsalo-2 circuit then provide a fault guide for the G and H chassis.

An Inexpensive Orthomode Transducer

Paul Matthews

An orthomode transducer is used at the feedpoint of a dish to split the signal two ways. These devices are usually sold at about £99 plus VAT. One type known as IRTE is made in Italy and comes with two adaptor rings. They can be used in various ways. For example you could use one to feed two LNBS from a single feedhorn, one for vertical and the other for horizontal polarisation. This could be done with a fixed dish for reception from a single satellite – you can't do it with a polar-mount dish as there's no skew control. Alternatively you could use the orthomode transducer to feed an 11GHz and a 12.7GHz LNB with a polariser at the input – the 12.7GHz LNB for use with Telecom-1. There's also the possibility of covering three bands by using a dual-band LNB at one port, giving low- and mid-band reception via one port and the high band via the other.

The present article came about to meet the viewing requirements of a home with several young people. I've three sons and their friends are often here, giving rise to frequent squabbles over programme selection. The solution – multiple receivers. But we didn't want more dishes outside. We needed another LNB anyway for the Astra signals. A fairly noisy one, 2dB, is quite adequate for use with our 90cm dish. I bought a used one for £33, which didn't eat too hard into the family budget.

The price of an orthomode transducer was the hardest thing. How much?!! Surely not for a piece of pipe with three flanges?! So I went out into the garage, in thought mode, dived into the central heating bits box and had a fiddle with some 22mm pipe. A visit to the local plumbing supplier produced a Yorkshire tee and a swept elbow. The total cost of these, with VAT, came to 99p.

Construction

The next step was to cut two 50mm lengths of 22mm pipe, slit them lengthways and open them out flat. These form the LNB connecting flanges – see Fig. 1. Another two pieces were cut to 35mm and deburred. The flanges were cleaned with a piece of emery paper then soldered on to the pieces of pipe using ordinary 60:40 solder, with 1mm of pipe sticking through. If you haven't got a blow torch, a gas cooker will provide sufficient heat.

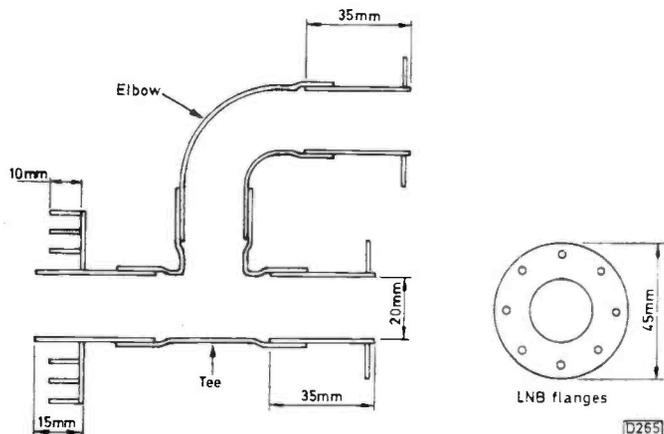


Fig. 1: Constructional details of the orthomode transducer, also a scalar feedhorn.

The inside edge of the swept elbow, which fits into the tee, was chamfered to provide a smooth entry into the socket. These two pieces were soldered together first, making sure that the output via the elbow was in line with the tee's through port output.

Similar treatment was applied to the inside edges of the flange pipes, i.e. they were chamfered to ease entry into the sockets. Mole grips were clamped to the flanges to act as heatsinks while the pipes were being soldered to the main body.

Scalar Feedhorn

After chamfering the edges to fit, a spare scalar feedhorn was fitted to the front of the tee, using two-part epoxy. If you are stuck for a feedhorn one can be made using a 35 × 22mm piece of pipe with a 55mm disc soldered 14mm from the front. Solder on to the disc three 10mm wide strips of copper made from slit pipe, fitted at 5.5mm centres, the longest strip around 175mm, the next 145mm and the smallest 105mm.

Dish Size

Because of the shadowing effect of the orthomode transducer and the extra LNB the dish should be of 85cm diameter minimum. The arrangement is mounted with the extra LNB upwards so that any water that gets past the O rings fitted on the 1mm projection between the flange and the LNB runs down and out through the holes of the spider trap cap.

Spiders

An anti-spider cap is worthwhile. Spiders seem to find this environment all too well suited to catching their lunch but play havoc with the microwaves! The Saturday morning chore is to brush spider's webs and things out of the feedhorn. I once had complete signal fade-out overnight and thought the LNB had died. Eventually I discovered that a spider had made a nest around the LNB's pick-up probe.

Transition Rings

The LNB flanges have eight holes on 45° centres. Thus if you have some spare quarter-wave circular-to-rectangular transition rings or need to fit these to minimise loss they can be fitted to retain the vertical and horizontal positioning. Their function is to match the signal to the polarity of the LNB. They consist of a 45mm diameter block of aluminium 12mm thick, with an oval hole 20 × 12mm and chamfering to a circle at the input side. I fitted some spare ones to the assembly and noticed only a very slight improvement.

Mounting

The whole assembly was mounted at the dish feedpoint using a three-inch PVC pipe clip that gripped around the bottom LNB, with the tripod arms in the form of a Y. The top LNB is used for vertical and the bottom one for horizontal polarisation.

Long-distance Television

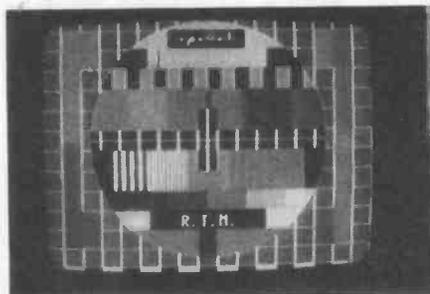
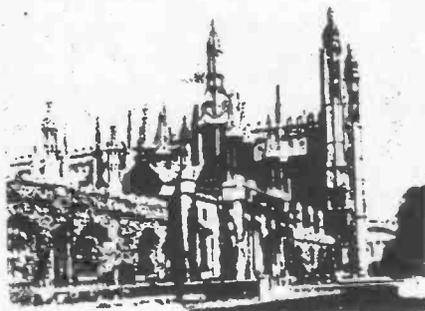
Roger Bunney

One correspondent wrote "there's something about most days - if you've the time to look for it". That sums up the conditions during June. Sporadic E signals were present on most days, though at times of short duration. On other days the openings were intense, with hours of reception and the m.u.f. reaching into Band III. The prolonged hot weather also produced good tropospheric reception. First the UK SpE log:

- 3/6/89 RAI (Italy) chs. IA, B; TVE (Spain) E2, 3, 4; TDFC+ (France Canal Plus) L2; TSS (USSR) R1, 2; TVP (Poland) R1.
- 4/6/89 TSS R1, 2, 3; C+ L2; TVE E2, 3, 4; EPT (Greece) E3; RAI IA, B; Ercalano (Telemarket) E2 and TVA IB - Italian private stations.
- 5/6/89 RAI IA, B; Teleroland E2 (Italian private); ARD (W. Germany) E2; CST (Czechoslovakia) R1, 2; TSS R2; EPT E3; TVE E2, 3, 4; TVE-2 E2; RTP E3.
- 6/6/89 TVE E2, 3, 4; RTP E3; RAI IA, B.
- 7/6/89 RAI IA; TVA IA; Telemarket E2; TVE E2, 3; TSS R1, 2; PTT (Switzerland) E3; smeary E2 video from the south at 1820, suspect ZTV (Zimbabwe).
- 8/6/89 NRK (Norway) E2; TVP R1, 2; CST R1, 2; ORF (Austria) E3, 4; JRT (Yugoslavia) E3, 4; C+ L2; RAI IA, B; TVE E3; RTP E3.
- 9/6/89 TVE E2; JRT E2; ARD E2; RTP E2.
- 10/6/89 An intensive day: JRT E3, 4; RAI IA, B; Canal-3 (Italian private) IA; Telemarket E2; C+ L2, 3, 4; TVE E2, 3, 4; RTP E3; TSS R1; MTV (Hungary) R1, 2; TVP R1, 2; CST R1, 2; RTSH (Albania) IC; JTV (Jordan) E3. An unidentified Arab station was logged on ch. E5. Low-level aurora activity from 1700.
- 11/6/89 TVE E2, 3, 4; TVE-2 E2; RTP E2, 3; SVT (Sweden) E2, 3, 4; TSS R1, 2; NRK E2; YLE (Finland) E4; PTT E2, 3; C+ L3; RAI IA; Tele Uno IA; JTV E3 (at 1940); ARD E4. At 1400 Simon Hamer logged an excellent Band III SpE opening with RTT (Tunisia) E5, 6; Libya E6; RTA (Algeria) E5, 6, 7; RTM (Morocco) M4, 5, 7. All these signals were positively identified from test patterns, captions and logos.
- 12/6/89 RAI IA, B; Telemarket E2; TVE E2, 3, 4; RTP E2; ARD E2; PTT E2; TVP R1, 2, 3; CST R1, 2; TVR R2; TSS R1, 2, 3, 4, 5; SVT E2, 4; DR (Denmark) E3; NRK E2, 3, 4; YLE E4; RUV (Iceland) E3, 4; JRT E3, 4, 7; JTV E3 (at 1925). An unidentified

- system M signal on ch. A2 was logged during the evening.
- 13/6/89 TVE E2, 3, 4; RTP E2, 3; TVE-2 E2; RAI IA, B; ARD E2, 3, 4; SVT E2, 3, 4; NRK E2, 3, 4; YLE E3; JRT E3, 4. A coloured news announcer was received on ch. E3 from due south, possibly Sokoto, Nigeria.
- 14/6/89 RTP E3; TVE E2, 3, 4; TVE-2 E2; C+ L2; RAI IA, B; Videolina IA; TVA IA; CST R1; TVP R1, 2; NRK E2; SVT E2, 3, 4; TSS R1, 2.
- 15/6/89 RAI IA; Telemarket E2; RTSH IC; MTV R1, 2; TVR R2; RTP E2, 3; TVE E2, 3; ARD E2; TVP R1; CST R2; TSS R1, 2, 3; NRK E2, 3; SVT E2, 3, 4.
- 16/6/89 TVE E2, 3, 4; TVE-2 E2; RTP E2, 3; RAI IA, B; ORF E2a, 4; CST R2; MTV R1, 2; TVR R2, 3; RTSH IC; EPT E3; DR E3, 4; JRT E3, 4; TVP R1, 2; TSS R1, 2, 3, 4, 5; YLE E3; NRK E2, 3, 4; SVT E2, 3, 4; RTM (Morocco) M4.
- 17/6/89 TSS R1, 2, 3, 4; TVP R1, 2; NRK E2, 3, 4; SVT E2, 3, 4; YLE E3, 4; ARD E2, 3, 4; ORF E2a, E4; RAI IA, B; Telemarket E2; Tele Uno E3; RTSH IC; + PTT E3, 4; C+ L2, 3, 4; DR E3; TVE E2, 3, 4; RTP E3; JRT E3, 4.
- 18/6/89 TVE E2, 3, 4; RAI IA, B; TSS R1; AFN ch.E3 reported by Bill Cotterill - likely to have been ch. A2 AFRTS Crete (American Forces Radio and TV Service).
- 19/6/89 RAI IA, B; TVA IA; Telemarket E2; TVE E2, 3, 4, 5, 6, 7; RTP E2, 3; DR E3; MTV R1; RTM Morocco M6, 7 (Roger Fussell).
- 20/6/89 TVE E2, 3, 4; RTP E2; RAI IA; TVE-2 E2.
- 21/6/89 SVT E2, 3, 4; NRK E2, 3; YLE E3, 4; TSS R1, 2; CST R2; TVE E2, 3; RAI IA, B.
- 22/6/89 TVE E2, 3, 4; RTP E2, 3; C+ L2; NRK E2; TSS R1.
- 23/6/89 RAI IA.
- 24/6/89 TVE E2, 3, 4; C+ L3; ARD E3.
- 25/6/89 SVT E2; RUV E3, 4; NRK E4; ARD E2; TVE E2, 3, 4; TVE-E2; RTP E3; Arabic ch. E3 signal from 1845-1915 possibly Jordan or Iran.
- 26/6/89 YLE E2; TSS R1, 2; CST R1, 2; JRT E3, 4; RAI IA; Telemarket E2; ORF E2a; TVE E2, 3.
- 27/6/89 RAI IA; Telemarket E2; JRT E3; TVE E2, 3, 4; RTP E3; RUV E3, 4; NRK E2, 3, 4; SVT E2; TSS R1, 2.
- 28/6/89 PTT E3; EPT E3; NRK E2, 3; TSS R1, 2.
- 29/6/89 +PTT E3.
- 30/6/89 TVP R2; TSS R2.

The 11th and 17th produced the most intense SpE openings. On the 11th radio amateurs achieved two-way contact between the UK and Guyana at 50MHz. The 17th produced a prolonged opening, with the 2m (144MHz) amateur band open for some six hours. Several TV-DXers are now monitoring Band III during intense openings - their patience has certainly been rewarded. The latest solar cycle forecast indicates that the peak will be in early 1990, with a smoothed count of



Left: Test pattern B, from a Cathodeon publication - see Vintage test cards. Centre: The PM5544 test pattern as used by RTM (Morocco), received by Ian Waller in Lincoln. Right: The standard North American 525-line test pattern displayed on a 625-line receiver, showing the reduced height when the field hold control is adjusted to lock the picture. Signal received by Ian Waller via the Gorizont 14°W satellite (global beam, C band).

189 ± 32. We have heard that Greece is to offer experimental amateur radio transmitting licences for the 50MHz band.

There were two spells of tropospheric activity during the month. The first, around the 10-11th, produced Band III/u.h.f. signals from Denmark, Norway, Sweden, W/E Germany, the Benelux countries and France, with the ch. A80 AFRTS outlet in Holland as a bonus. The second spell lasted from the 15th through to the 22nd, with a similar selection of signals but perhaps with a bias towards the south. Intense signals were received from all networks in France, and TVE was noted in the south west. Interference with local services became so severe that on the 19th, a Monday, the *Daily Telegraph* ran a page one story on the subject, including DX-TV as a hobby.

Brian Renforth reports that Tyne Tees TV has been heard on 96.6MHz, using this frequency for outside broadcast to studio links and upsetting the Biltsdale TEM radio service.

My thanks to the following for sending in reception reports: Cyril Willis (King's Lynn), Ian Beckett (Buckingham), Simon Hamer (Powys), Peter Schubert (Rainham), Ryn Muntjewerff (Holland), Brian Renforth (Newcastle), Roger Fussell (Torpoint), Tim Anderson (St. Leonards) and Bill Cotterill (Tipton).

News Items

France: Antenne-2 and FR3 viewing figures have slumped to a combined total of 35 per cent. The government feels that these services are poorly equipped to face the rising competition and is to appoint a combined head to improve matters. This may lead to a radical change in FR3's regional operation, with more alternative programming.

Italy: J.M. Communications of Luxembourg has bought Tele Monte Carlo's Italian operation. Canal Plus has an interest through programme exchange. Tele Monte Carlo can transmit programming throughout Italy and is likely to introduce a new pay-TV service. The other foreign broadcaster who has a right to transmit within Italy is the Yugoslav Tele Capodistria, which is also to become a general entertainment pay-TV service.

Kenya: A modernisation plan for the Kenya Broadcasting Service has been announced and there's to be a study on the feasibility of a second service. In addition the government is expected to approve the establishment of private radio and TV stations.

USSR: Ted Turner's CNN news channel is soon to go Russian. To start with there will be scrambled u.h.f. transmissions from Moscow and Leningrad. The Moscow service will be on ch. R24, using SECAM-K.

In brief: The commercial Tele Madrid service is now in operation . . . BBC-1 and BBC-2 are to start Nicam-728 stereo transmissions in the autumn of 1991 . . . A mystery 45.7MHz transmission logged by DX-ers in New Jersey, USA and the Netherlands turns out to be a sound link for RCN Antena Dos, Bogota . . . The Belgian RTBF service is to include advertisements.

Vintage Test Cards

In the June column we published an appeal for information on test card B. Much detailed information with a copy of "test pattern B" (see photo) has been provided by Peter Delaney of the British Amateur Television Club. At one time Cathodeon Ltd., a subsidiary of Pye, produced monoscope tubes that gave various patterns including B,

AERIAL TECHNIQUES

**MULTI-SYSTEM TV
AM/FM RADIO
DIGITAL CLOCK/ALARM**

£99.00



Featured above is the very latest black & white multi-system small screen television combination from YOKO International. Model TVC-8M is a must for every serious TV-DXing enthusiast and it's also ideal for Continental travel and home use. The YOKO 'Euro TV' features full VHF/UHF TV coverage and incorporates **SYSTEM I** (6MHz sound for UK/Eire/South Africa), **SYSTEM B/G** (5.5MHz sound for Europe, Middle East, Australasia and other parts) **AND SYSTEM L FRENCH** standard (6.5MHz sound). The 5.5/6MHz sound switching is automatic, the switching for French standard is situated on the back of the TV. This versatile model also has a high quality AM/FM radio section and a digital clock/alarm on the front panel. The alarm can be selected to switch the television or radio on or off at any given time; the clock is equipped with a 24 hour memory alarm, which can be reset instantly to sound at the exact time the following day. AC mains or 12 DC operation.

Aerial Techniques have now introduced an improved wide/narrow i.f. selectivity function-wide (6MHz) for strong signals-high quality reception; narrow (3MHz) for weak DX signal working and reduced adjacent channel interference, really lifts those elusive signals out of the noise.

The YOKO TVC-8M 4.5" screen multi-system TV combination (standard model) costs just £99.00, the model with switched selectivity is £112.00, all prices are inclusive of VAT. Carriage & insurance to any UK destination is £5.50.

Our full range of aerials, amplifiers, aerial rotators, filters, multi-standard televisions and all aerial technology is fully detailed in our new comprehensive 29 page illustrated 1989 Catalogue at 75p, send for your copy today. A customer advisory service is also available, please telephone or write (include SAE).



All prices inclusive of VAT
Delivery normally 7-10 days.
ACCESS & VISA Mail and
Telephone orders welcome. (24hr. service)



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

C, D, F and G. C was the familiar BBC test card C, D was a variation on the RETMA card (not the UK 405-line test card D). The F card was not the familiar colour card but a quite unusual display. G was the usual 625-line card used by several Continental broadcasters. B is not actually a test pattern but a view, apparently of a Cambridge college building, most likely King's College. Hopefully this at last resolves the mystery.

New EBU Listings

France: Nantes ch. E65, 50kW horizontal. M6 service.
West Germany: Hënnstedt/Itzehoe ch. E49, 100kW horizontal. Private station.

Satellite News

During the last week in June sat-zappers may have noted the various programme inserts plus complete meetings for the Billy Graham movement, via ECS at 7°E. For those with a clear take-off towards the south east and thus able to receive Intelsat 60°E, Hong Kong TV can be seen for several hours in the early afternoon on Sundays and Wednesdays carrying sport.

BBC Enterprises has signed a five-year agreement with the European Space Agency to transmit BBC European programming via a 12.0919GHz transponder (this transponder is officially allocated to Austria). The satellite is at 19°W and the signal power is 62dBW. The agreement is to last until late 1994/early 1995.

The Spanish Hispasat craft will carry eight wideband 72MHz transponders. Two 36MHz channels will be used for transatlantic traffic to the States and three DBS channels will be available for Western Europe. An X

band military frequency will also be available. TVE hopes to use the craft for ENG and EFP links.

AsiaSat hopes to reach over two billion viewers in the Far East, with coverage of Pakistan, India, Thailand, Korea and China – in fact some 35-40 per cent of the Earth's surface. Interesting that broadcasting organisations will be able to link up via this craft, bypassing Intelsat.

Radio Tele Veronique hopes to start transmissions via ECS-4 on January 1st 1990 with a new Dutch TV service. An Astra downlink is also a possibility. The main backers are CLT and three Dutch banks.

There are plans for a pair of satellites called Eurosat to be launched in the mid-1990s, each with twelve high-power transponders. Britain, France and West Germany are studying the plans which have been presented by Eutelsat.

There is to be a two-year HD-TV test of the 1125/60 standard in Canada, via Telsat, starting this autumn. The new HD-BMAC scrambled system will also be used.

Astra is to bring forward the launch date of its second satellite to October 1990. The 16 channels will use 65W instead of the present 45W transponders, but as the bandwidths will be greater the signal levels should be much the same as with Astra 1A.

The BBC is using a mobile satellite link unit for radio OBs, via ECS at 7°E, with high-quality digitally encoded stereo (system DS-1).

IBA Technical Information

The 1989 IBA pocket guide is now available free from the Engineering Information Department, Crawley Court, Winchester, Hants SO21 2QA – a self-addressed, stamped foolscap envelope would be appreciated. As usual it contains full information on the IBA networks.

The May and June issues of the IBA's *Engineering Bulletin* contain very useful articles on TV signal levels, signal-to-noise ratios and using head amplifiers. The June issue article provides detailed head amplifier data, showing how the receiving system noise levels can be calculated and the improvements that can be obtained by using head amplifiers with different noise figures, taking into account cross-modulation (overload) problems. I feel that these two bulletins are very relevant to DX work and are worth reading.

The Yoko TVC-8M Multi-standard TV

The Yoko Model TVC-8M is currently on offer at £99 from Aerial Techniques who lent us one for evaluation as a general-purpose/DX-TV receiver. It has a 4.5in. screen with alongside this a vertical tuning scale for v.h.f. high/low, u.h.f. and radio coverage of MW, LW and 88-108MHz. The tuning scale covers 6cm and is marked with chs. E2/3/4, all the Band III CCIR channels and a general u.h.f. scale for every ten channels up to 60/65/69. A bank of six buttons below the screen together with an adjacent slide switch control the clock and alarm system – the 24-hour digital clock has a bright red LED display immediately below the vertical tuning scale. The lowest panel, which is angled slightly outwards, has four pushbuttons for power on/off, v.h.f./u.h.f., Bands I/III and radio/TV. At the upper right-hand side of the cabinet there's an edge volume control and below this a radio/TV tuning control. There's also a radio band slide switch and a 3.5mm headphones socket.

At the back there's a battery compartment (the PP3 battery acts as a clock back-up supply), a permanently attached mains lead, a systems B/G and L slide switch and an aerial input socket – this consists of a 3.5mm mono audio jack! An adaptor is supplied for a Belling Lee type plug. There are contrast, brightness and field hold controls but the line hold control is an internal preset. A 12V input socket is provided and at the top of the cabinet there's an integral seven-section chromium telescopic whip aerial that can be swivelled to any angle.

The low v.h.f. band was measured as 43.1-83.5MHz, the high v.h.f. band as 136-233MHz while the u.h.f. coverage is 452-860MHz. Scale indication is accurate.

The receiver was found to be stable, locking almost instantly on weak through to strong signals with either positive- or negative-going vision. It resolved system I signals in addition to system B/G and can thus be used in the UK, Western Europe, North Africa and the Middle East. Selectivity is good: for example there was no interference between the local strong Rowridge ch. 24 signal here and weak Crystal Palace transmissions on ch. 23. Sensitivity is similarly good, typical for this type of receiver. The 24-hour clock is I feel an excellent feature to help with logging DX signals. Radio performance is satisfactory.

The alarm facility brings an in-built buzzer or radio/TV reception into operation. There's a sleep function which cuts off radio/TV reception after a set time.

I wasn't impressed by the aerial socket adaptor arrangement, particularly at u.h.f., and feel that the lack of a user line hold control is a disadvantage, though SpE, tropospheric and various French signals locked. With mains operation there was an obvious lamination buzz from the transformer, louder when "off" and falling when on load, i.e. with TV switched on. The power section runs rather warm, the rear of the cabinet being too warm for my liking – repeated warming and cooling of the nearby battery could lead to its early demise.

The v.h.f. radio section enables Band II to be checked as the m.u.f. rises, and the extended low v.h.f. band coverage including chs. R3 and IC is a decided bonus. The design of the 3.5mm mono plug/jack aerial input is such that I would recommend adding strain relief to remove stress. The mono picture is sharp and the contrast range good.

Following comments supplied to Aerial Techniques on the overheating problem we have been informed that the latest models now incorporate improved ventilation.

Programming Guide

Alexander Wiese, once noted for his DX-TV activities, has in recent times become involved in the publication of several magazines aimed at the satellite TV market. One of these, *TVI* (Television International), lists the monthly programmes for most of the satellite TV services available throughout Europe, also a number of terrestrial services. In addition feature spreads (in German) are given on programmes and technical details are provided on each satellite downlink – frequency, coding etc. This worthwhile publication is available on subscription within Europe at 77DM from TELE-audiovision Medien GmbH, Abt. Vertrieb, Postfach 801965, D-8000 Munchen 80, West Germany. For copyright reasons Sky Movies programmes are not listed – they are officially not supposed to be viewed outside the UK.

Tackling Unknown Small-screen Sets

Malcolm Burrell

Field engineers years ago were accustomed to walking into a living room to be confronted by an unknown monster – not always the customer . . . Usually, if a dead monochrome set was involved, it was a case of replacing a valve or counting the bottles in order to use Ohm's Law to work out the value of the new dropper section required. Other main sections of the set could be identified by the valve type numbers, familiar large components or by tracing along connecting cables. Much has altered since then, and particularly with the smaller sets it's often tricky to find the line output transistor. Nevertheless with monochrome portables much can be ascertained by a cursory look. Most of them use a conventional circuit arrangement.

Video Problems

You may find the video output transistor on the c.r.t. base panel, but it usually resides on the main panel and is fairly easy to locate by following the c.r.t.'s cathode lead, which is usually separated from the other connecting leads. Expect around 40V at its collector – the supply will be derived from the line output stage. If the symptoms are sound and a raster but no picture, much can be deduced by adjusting the contrast and brightness controls, and by noting any variation in the video output transistor's collector voltage when the aerial plug is withdrawn with a signal tuned in. The brightness control sets the c.r.t. bias while the contrast control adjusts its drive. The video output transistor will normally be driven by an emitter-follower video driver transistor which should not be too far away. Coupling between the two is generally by means of a resistor/capacitor network.

AGC Faults

A.G.C. faults can give similar symptoms to a video problem, but an over-contrasted picture may be resolved. Attenuating the input signal may give you an otherwise normal though noisy picture. A search should then reveal the a.g.c. circuit, probably in the vicinity of the video driver transistor. The intercarrier sound take-off is usually also in the vicinity of the video driver transistor. So the presence of sound with no vision may help to eliminate certain stages.

With line-gated a.g.c. common in solid-state sets, missing pulses from the line output stage are a possibility. Common causes of this are a dry-joint on the line output transformer or open-circuit print, which may be the result of mechanical shock – a portable TV set is likely to be bumped quite heavily at some point of its life!

Fault descriptions can be helpful. A set that was apparently operating normally and developed the fault at switch on may have one or two semiconductor devices that have failed as a result of a flashover. The video and a.g.c. circuits are particularly vulnerable to this sort of thing. A slight high-voltage click at switch on should lead to a check on whether there's a dislodged c.r.t. Aquadag earthing spring which, since the chassis of most portables

are isolated from the mains supply, may be anchored to the c.r.t.'s Rimband.

Signal Faults

With signal faults much can be discovered by using a signal injector or signal generator to trace through the i.f. stages. Older sets, particularly those that use germanium transistors, are prone to noisy semiconductors – on occasions these ultimately become corroded. More recent receivers tend to have lots of safety resistors that go open-circuit for no apparent reason.

Most of the varicap tuners used in such sets have separate power inputs for the r.f. amplifier and mixer stages, plus an a.g.c. input and the variable tuning voltage which is derived from a stabilised 30V line. If there appears to be a tuner problem, find the tuning line or the connection to the tuning buttons or potentiometer. If operating the control produces a voltage variation at the tuner check that both power inputs to the tuner are intact. On occasions the cause of no output from the tuner is simply an open-circuit resistor.

Don't Blame the Chip!

Don't blame a chip for faults unless you're certain. First check its supply voltage(s) – if known, but probably close to the l.t. rail voltage. Even with an unknown set the chips may be familiar types, and setmakers generally follow the chip manufacturer's suggested circuit. If necessary check in an i.c. data book or look at the circuit of a set of similar vintage that employs the same chip(s).

Check for faults in the associated components. Common faults are defective zener diodes or transistors, leaky or open-circuit electrolytic capacitors and missing pulse inputs. By the way, you do understand the chip's function, don't you?

O.K., so you still suspect the chip. Order a replacement and fit it, but beware of damaging the print or of careless probing that could introduce further problems.

The Power Supply

It's not difficult (usually) to locate the mains transformer. The mains rectifier diodes are particularly vulnerable items and the semiconductor devices in the series regulator circuit are also prone to failure. The regulator transistor is often bolted to the same heatsink as the line output transistor – trace the circuit to avoid being like the dentist who pulled the wrong tooth! Also suspect mains/battery switches or sockets that disconnect the mains when a battery plug is inserted.

Timebase Faults

Line output stage faults generally impose a heavy load on the power supply, with low l.t. as a symptom. E.H.T. rectifier sticks are the most common source of trouble in this area. The diodes and electrolytic capacitors in the rectifier circuits fed by the line output transformer can become short-circuited or leaky. A faulty line output

transistor or transformer or an open-circuit safety resistor are other possibilities, particularly with the sound but no e.h.t. symptom. Check suspect capacitors by replacement. Remove the line output transistor to measure between the junctions – it will usually read short-circuit in situ. A beefy audio transistor can make a useful substitute for testing purposes.

If the output stage is o.k., check its drive. A scope should reveal quite large line pulses at the base of the output transistor. Tracing the circuit back will take you, often via a little driver transformer, to the driver transistor. Look for pulses at its base then at its collector. If they are of low amplitude the transistor may be faulty. If they are absent you may have to trace back to the oscillator. Remember that most faults will be proved only when the suspect component is removed for measurement. Make sure that the l.t. feeds to these stages are intact.

The feedback required to linearise the field scanning can make fault finding in the field timebase difficult. To find the field output stage, trace back from the scan coil connections. Safety resistors often go open-circuit, and good substitute transistors such as the BD131, TIP31 and TIP32 can often work wonders. Where the fault lies earlier in the circuit a signal injector or careful probing can introduce sufficient hum to trigger action on the

screen. If a chip is used in the field timebase the previous remarks apply.

Audio Problems

Distorted sound, particularly at low volume, is usually caused by a displaced loudspeaker cone. Whilst a wad of cotton wool can be effective, the correct course of action is to replace the unit. A spare 80Ω loudspeaker should not damage any audio output circuit and can be used as a substitute for checking. A faulty chip or leaky transistors cannot be discounted, especially where the distortion is accompanied by low volume.

No audio could also be due to the speaker, this time going open-circuit, but check the supply voltages. Though many people never use it, a faulty earphone jack could be the cause – kids have to satisfy their insatiable curiosity by inserting objects into any unoccupied sockets!

In Conclusion

In conclusion, remember that even with a completely unknown set much can be ascertained by using your background knowledge, observation, measurement – and a little instinct!

The Sakura SR800ER Satellite System

D.J. Stephenson, B.A., I.Eng.

The British-made Sakura SR800ER is a budget-priced satellite TV system with remote control, designed for reception of the Astra channels. I obtained one last March from a High Street dealer. It's been used extensively for several months and is installed in the Merseyside area. A similar dish/LNB combination is supplied with certain Alba systems.

The Dish

The neat-looking dish is made of white-painted, heavy-gauge steel and is of the offset-focus type. All the mounting brackets and hardware are plated and no sign of corrosion has appeared to date. This is a point worth noting since the wall mounting brackets supplied by some manufacturers, notably those that are painted, are already beginning to show signs of corrosion. The LNB support arms are made of white-painted steel and are bolted to the dish and LNB bracket by means of stainless steel nuts and bolts. The whole assembly is quite fiddly and can be time-consuming to assemble. Two of the arms, which are marked L and R, are longer than the third one which is fixed to the bottom of the dish. After an initial finger-tight assembly it's advantageous to tighten the bolts a little at a time to avoid pulling the LNB off centre. Although this is not specifically mentioned in the instructions, for optimum results the LNB should be bolted as far back in its mounting collar as possible.

Wall Bracket

Unfortunately the wall bracket is a nightmare to assemble correctly and it's very easy to orientate it the wrong way so that the azimuth adjuster becomes the elevation

adjuster and vice versa. In the vast majority of cases this will not be a problem, but if the dish is to be mounted at nearly right angles to the wall the azimuth adjustment will be restricted due to the limited size of the elevation adjuster slots. To avoid the installation team taking on a Laurel and Hardy look it pays to get this right before any mounting holes are drilled. The instructions that come with the dish are virtually incomprehensible and do not warn adequately of this possible mistake. The two-piece wall bracket ends must be mounted horizontally and not vertically. If you find that the stay bar can be fitted only horizontally the wall brackets are mounted the wrong way.

The wall bracket provides poor stability for such a heavy dish. It's best to use half-inch Rawlbolts – any lesser fixings could be a bit risky due to the closeness of the fixing points, which are spread over only one or two brick courses. The stay bar improves the overall strength of the assembly however. To avoid cracked bricks it's important not to overtighten Rawlbolts.

Marconi LNB

The LNB is the well tried and tested Marconi unit which gives good results. Its 10.96-11.7GHz coverage is converted to a first i.f. of 960-1,700MHz, which corresponds to a local oscillator frequency of 10GHz. The gain is typically 53dB with a noise figure of 1.8dB. An industry-standard 75Ω F-type output connector is used. The solid-state polariser needs approximately 13V for vertical and 17V for horizontal polarisation. Thus a single coaxial cable is used, the polarisation threshold switching voltage sharing the same cable as the LNB's output signal. This simplifies installation significantly.

Now that these Marconi units have been up for some time a couple of problems have become apparent. Both lead to water getting into the unit. The first problem applies to early units only – they can be identified by the silver “Do not remove this cap” label on the blue cap that covers the mouth of the feedhorn. The cap tends to distort due to the sun’s rays being brought to a focus at certain times of the day. This can lead to either a gap at the edge, where water or insects can get in, or in severe cases the cap can melt, producing a large hole. Fortunately repair/prevention is easy. Replace the cap, ensuring that no insects or moisture are trapped inside. Apparently the cause of this problem was a manufacturing error – the ultra-violet stabiliser was omitted from the plastic. Later versions of the cap have “Do not remove this cap” embossed on the face side and can be regarded as being beyond suspicion. Secondly, in a small number of cases the rivets can pop or distort after a period of time. As a result water can penetrate the seam around the periphery of the unit. To prevent this, smear a small amount of sealer around the seam. This of course applies to all installations that use this LNB.

The Receiver

The receiver, optimised for the Marconi LNB, is housed in a small, neat looking black plastic case. It boasts a 20-channel non-volatile programmable memory and MAC compatibility. While it comes pretuned to Astra some of the newer channels that have come into operation recently need to be tuned. The synthesis tuning system scans rather slowly and tuning can be tediously slow. A dual seven-segment display on the front panel shows the selected channel, a pair of LEDs indicating the polarisation. Manual push-button controls provide \pm tune, store, H/V polarisation for setting up, \pm channel, parental lock and finally standby. The brief specification provided by the manufacturer is as follows:

R.F.: Input frequency range 950-1,750MHz; input noise 12dB; i.f. 479.5MHz; input impedance 75 Ω .

Video: Static threshold better than 7dB; dynamic threshold better than 8dB; frequency deviation 13.5MHz/V; output 1V at 75 Ω ; de-emphasis CCIR 405-1 (PAL); MAC output baseband, unclamped and unde-emphasised.

Audio: Carrier 6.5MHz; bandwidth 20Hz-15kHz; de-emphasis 50 μ sec; output 0.5V r.m.s. at less than 1k Ω ; harmonic distortion less than 1.5 per cent.

The unit and its remote control system are easy to use. The built-in parental lock consists of an audio jack plug with a 5.6V zener diode across the terminals. This can be removed to disable any channel that’s programmed to be locked out via the front panel controls. It’s a welcome feature that’s present in few receivers, and will defeat the vast majority of children.

Another facility that’s perhaps useful for DIY minded people is the audible satellite finder. On operating a switch on the rear panel an audible signal can be heard through the TV set’s speaker. The pitch increases with the signal strength – but the volume must be turned up very high to hear it from the top of the ladder! Another switch produces a test pattern for tuning a TV set or a VCR to the modulator’s adjustable output. The LNB connection is via an F-type socket.

The top can be lifted off after removing five screws. This reveals two boards. One is the sparsely populated

main PCB, the other one containing all the control circuitry including an M494B1 microcomputer chip. A meaty transformer on the left-hand side produces outputs that were measured at 20V and 16V. Next to this are three regulator chips mounted on a heatsink. A 7805 and a 7812 produce 5V and 12V rails for the receiver’s circuitry. The LM317T is a programmable regulator which is used to provide the switched 13/17V LNB/polarisation supply. The receiver runs fairly cool provided the ventilation slots are not obstructed.

Four metal cans house the majority of the circuitry. These include the satellite tuner module and the u.h.f. splitter/modulator module. The other two cans contain most of the rest of the signal circuits. A TBA120U is used for sound processing; the only other visible chips are an LM358M dual operational amplifier and a TC4066 logic chip. The receiver appears to be easy to service – especially if the canned modules are thought of as replacement items.

Decoders

A scart/peritel socket is provided at the back for attaching decoders etc. Fair results were obtained when I tried this with a Filmnet decoder. To do so it was necessary to pull pin 8 low to give unde-emphasised and unclamped baseband video at pin 19. Audio is present at pins 1 and 3.

Summary

Installation, apart from the assembly problems mentioned earlier with the dish, is straightforward and alignment is easy. The picture produced is, subjectively, as good if not better than much of the higher-priced competition. Neither heavy rain nor high winds noticeably degrade reception.

My only criticisms of this package are of the lack of stereo audio and the poor mounting bracket assembly. In view of the price, around £250 retail, these points are of little importance. The system is ideal for bridging the gap until the industry sorts itself out and decides on a standard transmission system. It’s unwise at the present time to spend a large amount on a “flash” system that may restrict programme choice or require the addition of large numbers of decoders for various channels in the not too distant future. Beware of claims that current receivers are compatible with the forthcoming BSB DBS transmissions since with these there will be conditional access control signals that must be decoded within the receiver to make reception possible. In other words my advice is to buy/sell a cheap basic system, such as this Sakura one, which is designed to work with the Astra signals, then wait to see how the true DBS market develops next year. Otherwise if you are a dealer you could be left holding stocks of unsaleable equipment or having to explain the situation to dissatisfied customers.

Dual-band, multi-satellite systems will be essential once the BSB transmissions and those from the medium-power Eutelsat II series craft become available – the idea of ten or more receivers and decoders stacked on top of each other is clearly absurd. BSB’s reluctance to supply chip sets to other than a handful of TV set manufacturers will only add to its marketing problems. From listening to the comments of many potential customers it’s clearly not a matter of whether they would like to receive Sky of BSB programmes. They want both.

collector of Q1001. D1009-10 provide base bias for Q1001, which thus provides a power on/off indication at pin 3 of P1003.

The 22V output from the mains transformer is taken via the safety resistor R1006 to the cathode of D1014 and the anode D1007. D1014 develops a negative voltage across C1007. This is stabilised at -13V by zener diode D1016 and is used by the front panel control board. D1007 produces about 22V across C1005, the following regulator circuit providing a stabilised 18V output. If diode D1015 fails the clock display doesn't light. The same thing happens if Q1002 goes open-circuit.

The filaments of the clock display are provided with a 2.65V a.c. supply via pins 7/8 of BJ/P1002 and pins 3/4 of BJ/P6008.

All the components in the power supply can be quickly checked using a component tester. Remember that with time the electrolytic capacitors, especially the smaller ones, can dry out or corrode, with loss of capacitance.

The Syscon Circuitry

The logic circuitry, including the MN1405VKF microcomputer chip IC6001, is extremely reliable. Some puzzling faults can occur in this circuitry however.

Table 1: Logic levels at IC6001

Pin	Reading	Function
1	0V	—
2	H	—
3	L	—
4	L	Stop: H goes to L
5	L	Pause: H
6	L	Fast forward/cue H
7	L	—
8	L	Power off: H
9	L	Record: H
10	L	—
11	H	—
12	P + H	—
13	H + P + L	—
14	H + P + L	—
15	H + P + L	—
16	H + P + L	—
17	H + P + L	—
18	H + P + L	—
19	H + P + L	—
20	H + P + L	—
21	L	Play: H
22	L	Play: H then L
23	L	Play: H then L
24	L	Play: H
25	L	Stop: H then L
26	0V	—
27	H	—
28	H	—
29	L	—
30	H + P + L	60Hz oscillator
31	L	—
32	L	Rewind: H
33	L	Fast forward: H
34	L	Pause: H
35	L	Play: H
36	L	Record: H
37	L	Pause: H
38	H	Pause: L
39	5V	—
40	H + P + L	455kHz oscillator

next month in

TELEVISION

● SERVICING THE PANASONIC U3 CHASSIS

The Panasonic U3 and U3W chassis were used in a wide range of sets including the TC208/221/225/2000/2011/2024/2211/2213/2216/2221/2223/2226/2622 and TX2284. Screen sizes are 20-26in. and the sets vary from standard to remote control and teletext versions. Nick Beer on the various faults that arise in these sets and fault-finding procedures.

● THE SALORA ASTRA PACKAGE

Continuing our series of reviews on receiving systems for the satellite TV transmissions from Astra, Ian Bowden reports on the Salora package. Being specifically designed for use with Astra the system is capable of providing very good performance.

● SERVICING CD PLAYERS

Having in recent issues described the form of the data stored on the disc, in next month's issue Joe Cieszynski outlines the basic operation of the decoder and provides guidance on fault diagnosis.

● UNIVERSAL FREQUENCY RESPONSE CURVE

Coupling and filtering networks are fundamental to electronics. Their behaviour determines the frequency response of a circuit and there are basic laws that govern this. Stan Amos shows that a universal response curve can be drawn and describes how this can be used to find the effects of particular component combinations. H.F./L.F. attenuation/boost and phase response are all considered.

● UNUSUAL CCTV FAULTS

Whilst using the usual well-known video/TV techniques, closed-circuit arrangements can introduce unexpected fault conditions. Peter Graves describes some of the more unusual problems that may be encountered in practice.

PLUS ALL THE REGULAR FEATURES

ORDER YOUR COPY ON THE FORM BELOW:

TO..... (Name of Newsagent)

Please reserve/deliver the October issue of TELEVISION (£1.50), on sale September 20th, and continue every month until further notice.

NAME.....

ADDRESS.....

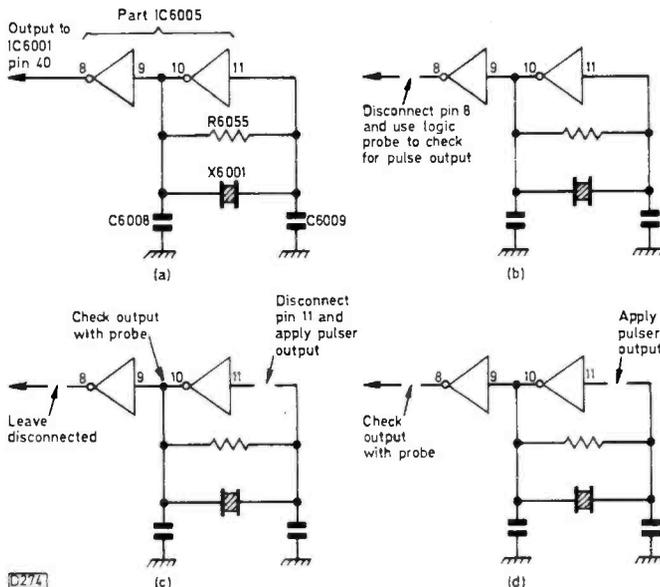


Fig. 2: Checking the 455kHz oscillator. (a) Basic Circuit. (b-d) Probe and pulser checks.

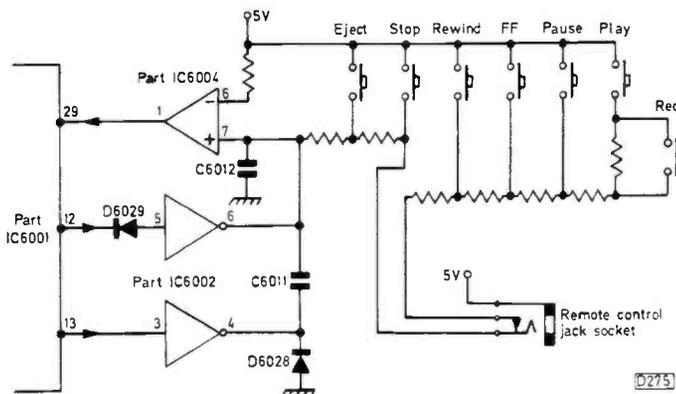


Fig. 3: Simplified analogue/digital function selector circuit (ramp circuitry).

Before you delve into the system control circuitry make sure that the problem is not a mechanical one (see *Television* November 1988). Check that the various switches such as the eject, cassette in and especially the mode switch are clean and in good order. If the drive belts are the original ones or are in any way suspect, fit a new set. You may then find that the machine works normally and that you don't need to get involved with the logic control circuitry. A slack loading belt for example will result in the capstan motor on signal remaining low when it should go high.

The usual faults in digital/microcomputer circuitry are short- and open-circuits and incorrect logic levels. Problems can also arise due to a stopped clock oscillator or, very occasionally, an off-frequency oscillator. For fast fault location you'll need a digital multimeter, a logic probe and a logic pulser. These two probes are also ideal for locating printed circuit breaks that might not be easy to detect visually. Further information on the use of these probes was given in the November 1985 and August 1987 issues of *Television*.

After making the previously mentioned mechanical checks, ensure that the d.c. supply voltages at the logic chips are present and correct. Then examine the board carefully for cracks and poor soldered joints – especially if someone else has had a go. You can then start to make checks in the logic circuitry. Table 1 shows the logic levels

associated with the various pins of the microcomputer chip IC6001. To check these, connect the probe's positive supply clip to pin 39 and the negative supply clip to pin 1.

Check the oscillator (pin 40) first. If the probe shows that oscillations are not present the most likely cause of the trouble is IC6005 (μ PD4069UBC), see Fig. 2. This chip contains six inverters, two of which with their associated components form a 455kHz crystal oscillator. IC6002 and IC6003, both type M53216P containing six inverters each, seem to be more reliable than IC6005.

Desolder pin 8 of IC6005 and ensure that it's clear of the printed track. Touching pin 8 with the logic probe should give a pulsing signal indication. If not, check C6008 and C6009 (50V ceramic, originally 100pF later 300pF) with a capacitance checker or bridge. Then measure R6055 (1M Ω). Crystal X6001 (VSX0100 or EF0A45501V) could fail but we've not had this. To check the two gates, start by desoldering pin 11 and applying the output from your pulser at this point: your probe should show an inverted output at pin 10. If so touch the probe on pin 8 where a reinverted signal should be present. It's much better to test inverter gates in this way rather than attempting to check them in circuit.

Once oscillations have been restored at pin 40 of IC6001 the logic circuitry, provided all else is well, should operate normally. If you've a frequency counter, check that the oscillator frequency is 455kHz, using a 10:1 isolating probe. It's been our experience however that X6001 keeps the oscillator locked to the correct frequency.

If a pulsating H + P + L signal is not present at pin 30 of IC6001, check transistors Q6013/4 (both 2SD636) and diode D6041 (MA165).

If all or nearly all the logic levels at IC6001 are high no matter what signals are applied to its inputs this is a sure indication that IC6001 has failed. Fortunately this seldom occurs.

If a particular function fails to work, check that the correct logic levels are present at the relevant pins of IC6001 then make sure that the logic inverters in IC6002/3/5 are working correctly – check as previously described.

Analogue/digital ramp circuitry is used to select different functions, see Fig. 3. IC6004 (AN6912/ μ PC339C) contains four operational amplifiers, with pin 1 feeding data to pin 29 of the microcomputer chip. It's possible for IC6004 to fail, though the most likely causes of trouble with the function controls are dry-joints on the front panel and faulty solder joints around the function selection buttons.

Loading/eject problems

If the loading or eject operations do not work properly though the correct logic levels are present at pins 22 and 23 of IC6001, suspect transistor failure. Check Q601, Q6025, Q6030 (all type 2SD636), Q6024 (2SD1273), Q6026/7 (both 2SB819) and Q6028/9 (both 2SD1051). Then check D6050 and D6054 (both MA165) and the 12V zener diode D6042 (RD12JB2). Use of a component tester will give you a fast check on these devices.

Reel Motor Difficulties

If the reel motor doesn't operate correctly and the logic levels at pins 24 and 25 of IC6001 are correct, check Q6016/7 (both 2SB793), Q6018/9 (2SD973) and Q6020/1 (2SD636).

Books

Servicing TV and Video Equipment by Eugene Trundle, M.S.E.R.T., published by Heinemann Newnes at £25.

What more suitable book than this for readers of *Television*? It's written by one of our best known contributors, Eugene Trundle, who also writes the regular Test Case feature. Perhaps you feel you know it all? Even so there are times when a difficult problem can have you running around in circles. At such times the help provided by consulting an authoritative source can get you back on the right path. This book is eminently suited to the provision of such guidance, being based on many years of practical fault-finding experience and presented in such a manner that quick reference to advice on particular problems is easy – this is guaranteed by the extensive symptom index. To those new to the game this book should be a godsend, providing clear guidance on the problems that arise in day-to-day video/TV servicing.

The coverage is surprisingly wide, dealing with all aspects of TV receivers (including teletext and remote control systems) and domestic video equipment. This has been achieved by cutting out lengthy exposition of theory and sticking to what goes wrong with practical circuits and mechanisms. Provided you can read a circuit diagram, this book takes you in one jump into the world of expert servicing.

A line has to be drawn somewhere. So old TV sets using valves are not covered. There are not that many sets of this type still in service. The emphasis is on the sets of the transistor and i.c. era, going back as far as thyristor line output stages in the case of TV receivers and top loaders in the case of VCRs.

While most chapters consider a particular part of the set or VCR, e.g. power supplies, line timebases, VCR system control arrangements etc., there are in addition valuable chapters on test and diagnostic equipment (not forgetting test patterns and what they tell you), intermittent faults and repair techniques (including surface-mounted components).

The book has been carefully devised to meet the needs of today's service technician. It doesn't omit such practicalities as repair viability, the prevention of call-backs and safety. We feel that it represents a very worthwhile investment, presenting as it does a wealth of information that's either not available elsewhere or is spread through back issues of technical magazines. There is a special pre-publication offer until September 23rd at £22.50 inclusive of post and packing – see advertisement on page 865.

J.A.R.

Digital Techniques by K. J. Bohlman, I.Eng., F.S.E.R.T., published by Dickson Price Publishers Ltd., Hawthorn House, Bowdell Lane, Brookland, Kent TN29 9RW at £9.95.

As we are all too well aware, more and more digital circuitry is being incorporated in TV sets and VCRs. Do you know exactly how i.c. memories, AD/DA conversion, input/output and interfacing arrangements work? I imagine that we could all do with a handy reference book on such subjects to refresh our minds from time to time.

This one is certainly clearly presented and easy to read. It covers the Digital Techniques syllabus for part three of the City and Guilds course 224 on electronics servicing. Although written to cover this particular course it should prove of help to anyone wishing to understand the basics of digital circuitry. Its coverage inclines towards VDUs, keyboard encoders and the digital control of motors rather than specifically consumer electronics applications. Compact discs, teletext and the use of digital techniques in VCRs are not mentioned.

J.A.R.

The ATV Compendium, edited by Mike Wooding, G61QM, published by the British Amateur Television Club at £3.50. Available from BATC Publications, 14 Lilac Avenue, Leicester LE5 1FN.

The BATC has produced some excellent publications over the years – including its magazine *CQ-TV* (whose distribution is restricted to members). This latest book provides details of a wide variety of video, r.f. and special projects. These have been selected on the basis that they employ up-to-date technology while not requiring the use of sophisticated test equipment. For space reasons, and because the editor feels that the time has come to place the emphasis on the higher bands, the r.f. section does not contain any details of 70cm equipment.

The extensive video section includes, amongst other items, a superimposing caption generator, an electronic ATV test pattern generator, a teletext pattern generator, a dual-standard colour coder and a video distribution amplifier. The r.f. projects consist of a GaAs f.e.t. 24cm down-converter, a 24cm f.m. ATV transmitter and a 3cm ATV transceiver. Special projects are a digital frame store, a universal sync generator and an EPROM programmer for use with the Spectrum range of computers.

The book is produced in the usual BATC style. It's a valuable source of information for those interested in building their own video/TV equipment.

BATC membership details can be obtained from Dave Lawton, G0ANO, Grenehurst, Pinewood Road, High Wycombe, Bucks HP12 4DD.

J.A.R.

Books Received

A Concise Advanced Users Guide to MS-DOS by N. Kantaris, published by Bernard Babani (Publishing) Ltd., The Grampians, Shepherds Bush Road, London W6 7NF at £2.95.

PC-DOS and MS-DOS microcomputer system users who have mastered the basics and are looking for ways to improve the efficiency and appearance of their systems will find this book useful. As with the author's previous *Concise Introduction to MS-DOS*, you can use sections that interest you without having to read through the whole book. There are 68 pages with paperback.

More Advanced Midi Projects by R.A. Penfold, published by Bernard Babani (Publishing) Ltd., The Grampians, Shepherds Bush Road, London W6 7NF at £2.95.

This book is intended mainly for electronic music enthusiasts. The projects featured are more complex than those in the earlier *MIDI Projects* book. They include a merge unit, a programmer and a channeliser. Not a book for beginners. There are 113 pages with paperback.

TV Fault Finding

*Reports from Nick Beer, Gerry Hoey,
J.G. Grieve, Chris Orr, Alfred Damp,
Ray Crockit and Ian Bowden*

Ferguson SAP1 Satellite Receiver

The customer complained that the satellite TV picture intermittently became snowy. At the house we found that the receiver unit was very sensitive to tapping virtually anywhere on the PCB. This produced vision splashing. A careful look around showed that R149 had never been soldered – the legs were bent over and were making good contact. Soldering R149 into circuit certainly seemed to cure the problem. The manual doesn't seem to be available yet, so when we got back I phoned Ferguson who kindly faxed a circuit diagram. This showed that R149 provides the 12V feed to the r.f. modulator.

While in contact with Ferguson I took the opportunity to ask about the very high running temperature of these Pace made units. An engineer said the company was perfectly happy with the situation, but I can't help thinking that the heat will eventually lead to reliability problems. Another puzzling thing is that the regulators are rivetted instead of bolted to the heatsink. This would seem to me to be unwise for two reasons. First rivets tend to work loose, causing problems with overheating. Secondly replacement is more difficult. **N.B.**

Salora/Luxor Mk II/9570 Satellite Tuner

Following a night with a lot of lightning we were inundated with the usual dead equipment calls. Amongst the casualties was a satellite TV tuner at a local tourist attraction. It had not been bought from us as the owner had obtained it when living in another part of the country, and was of the type intended for Eutelsat/Intelsat reception, with a 1.8m dish. The fault was no output and no front panel operation. This is the tell-tale sign of a blown LNB fuse, which was the case. The in-line fuseholder was chewed up as the fuse had previously been replaced. A check on the 18V rail showed that it was at about 9V: the regulator was drawing excessive current as it had a 28Ω leak to chassis. Replacement calls for a fair bit of dismantling. **N.B.**

Ferguson TX90 Chassis

One of these 14in. portables would "go off" when changing channels. We found that there were dry-joints on both the field output transistors. It looked as though the heatsink on which they were mounted had received a knock, forcing the legs of the transistors farther through the board than they ought to have gone. **N.B.**

Thorn 1615 Chassis

This set had been seen by one of our field service engineers a few days previously. The complaint had been no results and he'd repaired some dry-joints on the coils in the line output stage. This time the set had to be brought in – there was an i.f. fault, i.e. no sound and a blank white raster. A check on the voltages in the i.f. strip showed that they were haywire. Resistance checks then showed that the first i.f. amplifier transistor VT1 was leaky while the third transistor VT3 was open-circuit all ways round. Replacing them made no difference and the base of VT1

was at over 6.7V! Not much more time was wasted before we changed the TCA270SB detector/a.g.c. chip. This finally restored the signals, but there was a severe striation down the left-hand side of the picture due to the line linearity coil's damping resistor being open-circuit while the c.r.t. was, as usual, very low emission. **N.B.**

Hitachi CPT2650

Not a fault perhaps but something that could catch you out – no picture at switch on, the picture appearing up to half an hour later. The cause is incorrect grey-scale setting. My first experience of this was after replacing a c.r.t. **N.B.**

Ferguson SRA1 Satellite Receiver

Ferguson has issued the following advice on the SRA1 Astra satellite receiver system in the latest issue of *Ferguson Feedback*.

Always disconnect the receiver from the mains supply before removing or fitting the LNB. As the cable carries power to the LNB, an accidental short-circuit is possible when making the connection, leading to power supply failure. The LNB F connector must be water-tight to avoid serious signal degradation.

As a general guide to fault finding, if any of the LEDs light but the screen is full of snow, check the LNB's output with a portable spectrum analyser or a signal strength meter. Alternatively substitute a known good receiver. If only snow is still present, suspect the LNB or the cable. Before changing the LNB, make a visual check that the dish is correctly aligned. When doing this remember that the dish focuses light, heat and sound – beware of sun glare and sound from overhead aircraft.

If only half the channels can be received, the fault is due either to the polariser or the transistor that changes the polarising voltage.

Philips CP110 Chassis

An EW fault on one of these sets was traced to R3599 (47Ω) being open-circuit. While investigating this fault we noticed that two of the transistor types have been transposed in the circuit diagram, i.e. T7600 should be shown as type BC558 instead of type BF819 while T7601 should be shown as type BF819 instead of type BC558. **G.H.**

Philips CTX-E Chassis

This one kept losing its memory. The 2.4V cell 1777 had been fixed in position but never soldered. All was o.k. after soldering. **J.G.G.**

Philips 2A Chassis

These sets can give you a bit of trouble when one comes in with a short-circuit line output transistor. C2609 (9.1nF) in the diode modulator circuit is a known offender. Sometimes we have also replaced the EW modulator diodes D6609 (BY228) and D6610 (BYW95C), the

protection capacitor C2618 (1.5nF) and the 140V h.t. reservoir/smoothing capacitors C2697 and C2701 (both 47 μ F – we use higher voltage ratings in these two positions). It has not been possible to pinpoint the primary cause of the trouble but we find that replacing these components avoids any comebacks. **J.G.G.**

Rank T20 Chassis

We find that it is often necessary to replace a number of components when the BU326 chopper transistor 7VT2 goes short-circuit. These items are as follows: 7THY1 (BR103), 7VT1 (BC252B), 7R17 (2.2 Ω), 7C4 and 7C5 (both 47 μ F) – and of course the two fuses 7FS1 and 7FS2. In addition all the diodes in the power supply module should be checked. **J.G.G.**

Fidelity ZX3000 Chassis

This set was dead with the chopper transistor TR3 short-circuit and both fuses open-circuit – the mains fuse F1 (T2A) was blackened. When these items had been replaced we still had no results as R97 (4.7 Ω , 4W) in the feed to the line output stage was open-circuit. Our experience with these sets has been that if any one of the diodes in the bridge rectifier circuit is faulty it's advisable to replace all four with the larger version of the BY127. It's tricky but it can be done. **C.O.**

Thorn 9600 Chassis

Insufficient width with the extreme verticals bowed inwards was traced to R865 (4.7 Ω) in the diode modulator stage being open-circuit. It's a flat type located behind the tripler and replacement necessitates complete removal of the scan panel.

Another of these sets tripped at switch on. We found that the T9013V line output transistor VT801 was leaky. As we didn't have one of these to hand we decided to fit an R2010B – the chopper device used in the old 3500 chassis. A week-long soak test showed that it worked quite happily in this position. **C.O.**

Hitachi NP81CQ Mk II Chassis

There were no results and a check on the 111V h.t. line revealed that it was at 20V via the start up diode D908. Checks on the STR441 chopper chip IC901 showed that there was 0V at pin 4. R904 (82k Ω , 0.5W) was open-circuit. **A.D.**

Ferguson 16A2 (TX90 Chassis)

The reported fault was "only snow when the set first comes on". When we tried the set we found that this description was correct, but the customer had neglected to tell us that the fault lasted for only about thirty seconds. We tried a new tuner, then the M923 tuning chip, but neither of these was responsible. The set started to take longer and longer to come on, and at last we were able to get some sensible readings from the test equipment. The tuner unit's tuning pin was permanently high at 31V. A check at pin 19 of IC902 (M923) with the oscilloscope then revealed that there were no tuning output pulses. At this point the set returned to normal working and had to be left for another day.

The next time the fault occurred we immediately checked the 5V supply to the chip. It was missing from

the 5V regulator which was without its 12V input. This comes from the main board and was present at the output from the 12V regulator. A check on the main board print showed that there was a hairline crack around the solder pad where the 12V supply is taken off to the tuning board. **A.D.**

ITT TX3446

This set came in with a blank raster. A quick scope check showed that a composite video signal was present at the digital video board, was of the correct size and shape and was entering the VCU2100A video codec chip. The digital signals on all the parallel data output pins were of incorrect shape and size however. Replacing the chip restored normal results. **A.D.**

Mitsubishi CT2227

This set suffered from field collapse. The old rule about looking first paid off: two electrolytics appeared to be very stressed. A check with the circuit diagram showed that they were the field scan couplers C412/3. They are both 330 μ F, 50V, and both had bulged tops. A cold check with the Avo showed that one of them was open-circuit and the other short-circuit. **A.D.**

Toshiba C2095

This set would trip and go off shortly after switching on. If you switched off, waited half a minute, then switched on again the cycle would repeat. All was well when the set was powered at 210V via a variac, and a check on the h.t. rail indicated that there were no problems here. After we ran the set for a quarter of an hour in this state we decided that the fault was probably in the fail-safe (over-voltage protection) circuit. This is centred around transistor TR471, but the voltages here were in order. Placing the meter's probe on the base connection produced a trip however, as did touching the 6.2V zener diode D472 which is connected between TR471's base and chassis. We checked TR471 out of circuit and found that it was o.k. Deciding that removal of the zener diode for a zenering test was hard work (that comes last) we removed its 1M Ω feed resistor R476 and found that it was open-circuit. A replacement cured the fault.

A number of Toshiba sets use this chassis, which was also fitted in some Bush/Murphy models (Rank T24 chassis). **R.C.**

Salora 26J40

This was an odd problem. The set had been in the workshop three weeks previously, when we had replaced a faulty LF0041 hybrid Ipsalo control chip. Its start-up regulator section had failed. This time the same part of the chip had failed and the set wouldn't come on. Examination of both the faulty chips showed that there were signs of excessive heat around the start-up regulator transistor. After fitting another chip we made some further checks around it. When running, line pulses should be present at pin 2. This is connected to the regulator's zener diode, the action of the pulses keeping the circuit off for most of the time. These pulses were not present because RB723 hadn't been fitted from new. Somehow the set had managed to work for around four years before failing. **I.B.**

Dealing with Video Tape Chewing

Eugene Trundle

Tape damage causes more customer hassle than almost any other VCR trouble. There are many ways in which a VCR can damage tapes – in spite of the built-in syscon, whose main function is to prevent this. Especially when intermittent, the fault can be difficult to trace and cure. But careful examination of the damage to the tape will give you clear evidence as to what's happening, and in many cases of which particular deck or control system component is faulty or misadjusted. If the fault is intermittent, the key to diagnosis is sight of the damaged tape – get the user to bring you a sample.

Basic Checks

When dealing with this problem, examine the surface of the tape and closely watch the behaviour of the deck during loading, unloading and normal running in the play, cue and review modes. A dental mirror is essential for this purpose, the illuminated type being ideal. Use it to examine the surface and edges of the tape as it runs across every component in its path, including the spool carriers within the cassette where relevant.

Some chewings occur only in the search modes (particularly review), which are well worth checking when the symptom appears to be intermittent – especially with Video 8 equipment. Where the tape oxide is being stripped or shredded, even on the tiniest scale, the point where the damage is occurring will almost certainly be given away by the presence of a pile of black tape debris immediately below, on the deck surface.

Types of Damage

The best starting point is the tape itself. In the following text ten typical tape damage patterns will be analysed, with notes provided on effects, causes and probable culprits.

Starting with the most dramatic cases, Fig. 1(a) represents the end of a clear leader tape that's been pulled out of its anchorage in the cassette's spool carrier. This can happen only at the end of the fast forward or rewind functions, and is normally prevented by the end sensors seeing the cassette lamp or LED. With one or two exceptions (early designs) lamp failure invokes shut down, so likely causes of this defect are incorrect position (slipped down?) of the end sensors or lamp, or possibly the fact that the lamp has been obscured by foreign material or a deposit of nicotine.

Conversely, auto-rewind or auto-stop will be unexpectedly triggered by a tape whose oxide layer has been torn off, as depicted in Fig. 1(b). To the end sensor the remaining clear backing layer looks like leader tape. The invariable cause of this one is dew – condensation on the surface of the video head drum – and corresponding black or brown patches will usually be found here. Heavy scrubbing with a solvent-moistened cotton bud will remove them. The most common cause of this symptom is use of the machine too soon after head cleaning by hand or with a wet cassette, though natural condensation, not always detected by the dew sensor, may be responsible. The operation and effect of the head heater and dew

sensor, where fitted, are worth checking. Most sensors, surprisingly perhaps, go high resistance when moist.

Severed Tape

Fig. 1(c) shows a severed tape – the break usually occurs when a badly caught-up tape is extracted from the machinery by the user or an engineer. Video tape is very tough stuff, and a VCR's motors don't usually have sufficient torque to tear across it in this way. Ring-loading VCRs are the ones most prone to this "tape caught in the machinery" effect, with the tape trapped and tangled beneath the loading ring, its drive cogs and retainers. Failure of the spool drive system (motor, idler, etc.) to retract the tape into the cassette during tape unloading is the cause.

Tape Scrunching

Similar causes lead to the severe scarring and creasing shown in Fig. 1(d). This is the sort of trouble that makes you wince as you hear the tape passing round the head and see the picture disappear into a mass of lines, dots and snow – sometimes not to return until you've cleaned the heads. The scar material and loose oxide layer often blocks the head gaps. As well as removing the picture (and sound with the Video 8 system), hi-fi sound may with other formats be affected.

The cause of this type of damage is less easy to pin down, but it always means that the tape has gone adrift in the deck, way out of its normal path. Unless the tape creeps a long way up or down due to some influence that causes excessive deflection, this sort of snarl-up takes place during cassette or tape loading/unloading.

We'll take cassette loading first. A slack tape inside the cassette will produce this symptom. The cause is usually incorrect reel behaviour when the cassette was last ejected – see later. If the guides etc. are not fully retracted as the cassette comes down, the tape is crumpled on them. Check the mechanism phasing and the mode switch setting.

Both reels should be soft braked during tape loading. Check this if the reels spin and the tape bounces during the loading process. Conversely, fully-braked reels (due to the solenoid, mechanics or syscon) will result in the tape being stretched and strained during the attempt to load.

The greatest potential for the type of scrunching de-

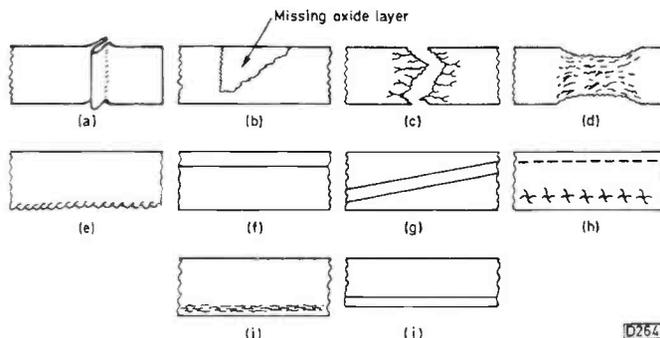


Fig. 1: Types of tape damage. See text.

picted in Fig. 1(d) is during the tape unloading phase, should one of the spools fail to take up the slack fully. Test at both ends of a three-hour tape. If a loop of tape is left hanging from the cassette's flap at eject suspect the reel idler, reel motor if separate, drive belts etc.

Tape looping, with subsequent crumpling when the cassette's flap closes, also commonly occurs at the end of fast tape transport, usually rewind. The most common cause of this is worn "hard" brakes or the levers that operate them - after rewind the right-hand brake should come on first to maintain tape tension across the front of the cassette. Check whether there are any manufacturer's modifications for this.

Some VCRs (Sharp for example) have a program for tensioning the tape as a prelude to ejecting the cassette (from the stop mode). This takes the form of a kick from the loading motor to a reel, a kick of the loading mechanism or a short fast-forward sequence. Check the mechanics involved as necessary.

Another cause of tape scrunching of the sort shown in Fig. 1(d) is failure, often intermittent, of the take-up spool to rotate in play or record. This is usually caught by the system before damage is done, but we have had a few cases where several metres of tape were wound round the capstan shaft, probably initially due to a sticky spot on one or the other. Zero or low take-up torque is typically caused by a slipping idler, clutch or belt: stop the spool and see what slips first.

Edge and Scratch Problems

Fig. 1(e) shows the serrated edge sometimes seen in tapes from old or worn machines. It's usually caused by a worn and grooved guide somewhere along the tape path, but can be the result of incorrect spool height settings, the tape scraping on the shoulder of the lower drum (tape too low) or scalloping as it passes a worn or faulty audio head stack. More than any other, this type of damage leads to a build up of oxide dust deposits or flakes on the deck, beneath the trouble spot.

A scratched or scored tape, as shown in Fig. 1(f), gives rise to a continuous horizontal line of dropout at some point across the playback picture. It can be seen best by holding the tape so that light is reflected across the whole width. The cause is an abrasive speck on one of the fixed components along the tape path - the lower drum, full erase head, audio head stack or the back-tension pole. Examine these carefully and clean the entire tape path.

If, as in Fig. 1(g), scratch lines run at an angle of about 5° to the edge of the tape there's no doubt that the damage is taking place while the tape is traversing the rotating upper drum. Foreign bodies are usually responsible, but a chipped or damaged ferrite head tip is a more expensive possibility.

Sometimes the scratching or creasing effect takes the form of regularly repeated dots, dashes or patterns on the tape, as shown in Fig. 1(h). The symptom is of rhythmically repeated dropout sequences in the playback picture. It's a sure sign of damage to or dirt on a rotating deck component - the capstan, the pinch roller and the exit/entry guide sleeves are the most likely culprits. If the cause of the trouble isn't obvious on inspection, a clue to the diameter of the offending part is given by the spacing of the pattern. Typical causes are dirty tape guides; grit, fluff or cotton on the pinch roller (replace it!); and a polluted/damaged capstan shaft.

Fig. 1(i) shows a tape with a wrinkled or corrugated edge. This may be at the top, giving rise to sound flutter

N.W. LONDON'S LEADING VIDEO SPARES DISTRIBUTOR

AKAI VS109/201/202/203/301/303	£24.95
ALBA 4000	£23.25
AMSTRAD VCR4500/4600/5200/9000	£20.95
AMSTRAD VCR7000	£20.95
FERGUSON/JVC UNIVERSAL 3HSSV	£14.50
FERGUSON 3V32/JVC HR7655	4 Head £40.99
FERGUSON 3V42/44/45/46/47/50	£21.95
FERGUSON 3V48/JVC HRD565	4 Head £40.99
FERGUSON 3V43/53/JVC HRD725	6 Head P.O.A
FISHER UNIVERSAL FVHD720/520/530 ETC	£20.95
GOLDSTAR 8000, GHV51/GVH1221, VCP4000, VCP4100	£23.25
HAIARI VXL2/4/5/6/120H/VXL35	£22.95
HITACHI VT4000/5000	£20.95
HITACHI VT6500/7000/8000/8500/8700/9000 ETC	£20.95
HITACHI VT11/14/33/34/330/340 ETC	£20.95
HITACHI VT71/719/35/38/39	4 Head £37.95
HITACHI VT120/220	£32.95
MINISUBISHI HS303/4/10/20/700	£34.95
PANASONIC NV333/2000/7000/8600 UNIVERSAL 3HSSN	£14.50
PANASONIC NV370/NV380/NV100-PHILIPS VR6480	£21.95
PANASONIC NV777/NV330 3 HEAD	£27.55
PANASONIC NV230/NV250/NV260/NV270 NVG-9/10/11	£34.50
PANASONIC NV430/NV460	£27.55
PANASONIC NV366	4 Head £29.95
PANASONIC NV730	4 Head £29.95
PANASONIC NV688/788	£45.50
PANASONIC NV810 Genuine	4 Head £48.95
PANASONIC NV870 Genuine	5 Head £35.50
PANASONIC NV870 Genuine	6 Head £59.95
PANASONIC NV180	4 Head £41.99
PANASONIC NVG-18	£42.50
PANASONIC NVG-25	£42.50
PANASONIC NVG-30/40/130	£29.99
PANASONIC NVG-33/45/46	3 Head £29.50
PANASONIC NVG-400 Genuine	£42.50
SAMSUNG VB900/910/VX510/520/616	4 Head £45.95
SENTRA 8000	£22.95
SAISHO VR605/705/805/905	£23.95
SHARP VC300/381/382/9300/9500/9600/9700/9800/ETC	£20.95
SHARP VC300/581/582/583/584/585/681/682 ETC	£20.95
SHARP VC8300	£38.95
SONY UNIVERSAL 1 PIN C5/6/7 AND 2 PIN ETC	£17.00
SONY SLT-1/C20/30/40/F40/SLT20ME/30ME	£22.95
SONY SLC-8/9/50/80/SLF60/SLT50/SLF50/SL200	£22.95
TOSHIBA V9600	£22.95
TOSHIBA V71/73/74/75/81/82/83/84/85/86/87/93	£22.55

VIDEO MOTORS

CAPSTAN MOTOR JVC/FERG PUS5371V	£19.50
DRUM MOTOR JVC/3V22 PU46414P	£19.50
REEL MOTOR SHARP RIMOTV-1009-GEZZ ORIGINAL	£15.00
REEL MOTOR SANYO VTC5000 4-529V-10800 ORIGINAL	£6.50
REEL MOTOR PANASONIC NV333-366 MYN13VSL ORIGINAL	£14.00

ALL ABOVE HEADS ARE BRAND NEW AND OF JAPANESE ORIGIN. ALL EX-STOCK ITEMS DESPATCHED SAME DAY. NO MINIMUM ORDER VALUE. PLEASE ADD £1.00 P&P PLUS V.A.T. TO ALL PRICES. ORDERS BY ACCESS AND VISA ACCEPTED.

RING US FOR THE BEST QUOTE
ON HAND PORTABLE & MOBILE CELLULAR PHONES

OMEGA ELECTRONICS

NEW ADDRESS:
OMEGA ELECTRONICS
304 CROWN HOUSE, NORTH CIRCULAR ROAD
LONDON NW10 7PN
Tel: 01-965 5748 Fax: 01-963 0351
Personal Callers are advised to telephone their orders before collecting.

ASK
FOR
OUR
CATALOGUE

and dropout, or at the bottom, in which case there will be poor control pulse transfer. This condition is often the result of excessive take-up torque, but a badly misaligned stationary guide can also be the cause. If it's confined to small areas of the tape, watch the action during and immediately after tape loading - the tape may be vertically misaligned for a brief period or stretched over a guide collar.

The same sort of defect leads to the damage shown in Fig. 1(j), where one edge of the tape is actually folded over, causing loss of sound or the control pulses (top/bottom respectively) and producing an audible sound as the video heads hit the overlap. Grossly incorrect reel height settings can also be the cause. The ultimate progression of a folded tape is a reversed one, with no sound or vision at all.

Tape Repair

At the current low price of blank-tape cassettes, attempts to repair a damaged tape are rarely worthwhile. Spending time on this is justifiable only when the software is very precious.

Tape splicers are available commercially and work well with new blades and the use of cotton gloves by the operator. Cut back to good tape and follow the instructions to the letter. Where, as is usually the case, the damage is near the end of the tape, cut back and splice to the clear leader. It's possible to dismantle a cassette to retrieve or anchor tape. Reassemble it with care and mark the cassette with its new shortened playing time.

Old video tape strung across the vegetable patch makes an excellent bird scarer. . .

ECONOMIC DEVICES PO BOX 15, WOLVERHAMPTON, WV2 4AZ

15904	2.72	25C1678	1.92	AN2140	2.40	BC207	0.14	BOX54B	0.31	BU126	1.10	HAI196	0.43	MC130P	1.98	SAS560T	5.42	STR1096	4.98	TBA970	3.06	TDA4440	3.26
15958	3.28	BC1741	1.25	AN234	5.09	BC2128	0.26	BU137	1.96	BU137	6.53	HAI3001	1.73	MC1350P	0.80	SAS570T	5.42	STR4090	9.52	TBA990	1.98	TDA4440	4.15
17052	5.51	25C1810	1.70	AN236	3.33	BC2131	0.10	BU205	1.16	BU205	1.16	HAI3006	2.28	MC1351P	1.32	SAS570S	2.51	STR440	5.37	TCA270S	1.19	TDA4450	4.75
17052	5.51	25C1810	1.70	AN236	3.33	BC2131	0.10	BU205	1.16	BU205	1.16	HAI3007	2.27	MC1351P	1.32	SAS580	2.51	STR451	4.93	TCA290A	2.19	TDA4500	2.10
17074	3.30	25C1926	0.67	AN241	1.71	BC225	0.40	BDV81	1.18	BDV207	1.65	HAI3342	2.65	MC1357P	2.15	SAS6600	1.33	STR453	8.16	TCA420A	2.36	TDA4620	6.80
17089	3.45	25C1828	2.25	AN245	4.00	BC237	0.10	BF115	0.29	BF115	0.29	HAI3365	4.00	MC1358P	1.48	SAS660	1.33	STR454	8.16	TCA420A	2.36	TDA4620	6.80
17127	2.50	25C1875	4.50	AN253	1.80	BC238	0.10	BF117	0.66	BF208A	1.08	HAI3656WR	1.78	MC1448SP	2.15	SAS6700	1.33	STR820C	5.85	TCA440	2.25	TDA5500	7.45
17136	1.58	25C1993	3.02	AN260	3.85	BC238B	0.08	BF118	0.67	BF208A	1.12	HAI3670	1.38	MC1449P	4.20	SAS670	1.33	TR605V	7.98	TCA440	2.24	TDA5500	7.45
1N4001	0.04	25C1906	0.30	AN272	7.52	BC239B	0.25	BF121	0.25	BF220D	1.43	HAI3688	2.45	MC1457	3.46	SAS6710	1.27	TG635V	0.73	TCA440	2.25	TDA5770S	2.25
1N4002	0.05	25C1921	0.20	AN276	4.86	BC240	0.13	BF123	0.13	BF220E	1.07	HAI3703	1.13	MC1458P	7.75	SAS6710	1.27	TG635V	0.73	TCA440	2.25	TDA5770S	2.25
1N4003	0.05	25C1921	0.20	AN276	4.86	BC240	0.13	BF123	0.13	BF220E	1.07	HAI3703	1.13	MC1458P	7.75	SAS6710	1.27	TG635V	0.73	TCA440	2.25	TDA5770S	2.25
1N4004	0.05	25C1929	2.25	AN302	3.00	BC300	0.25	BF137	0.29	BF226A	0.96	HAI3714	1.80	MC1459BPC	2.15	SAS6940P	1.95	TG637	0.71	TC4730	3.81	TDA5903	3.95
1N4005	0.05	25C1942	1.98	AN305	8.80	BC301	0.23	BF153	0.58	BU406	1.49	AA117	9.00	MC1712	3.08	SDA2006	1.76	TG644V	0.97	TC4730	3.81	TDA5913	2.92
1N4006	0.05	25C1956	0.26	AN315	2.46	BC302	0.53	BF154	0.23	BU406D	1.53	HAI3717	1.75	MC5192	1.90	SDA2122Z	1.28	TG645	1.20	TC4800Q	5.95	TDB1033	2.68
1N4007	0.07	25C1967	0.95	AN318	5.53	BC303	0.30	BF157	0.36	BU407	0.82	HAI3899	2.06	MC724A	3.49	SG264A	5.26	TG649	1.45	TC4800S	2.98	TDB1061	7.05
1N4148	0.03	25C1953	1.80	AN320	4.86	BC304	0.06	BF158	0.18	BU412	5.29	HAI3899	2.28	MC726	1.23	SG264V	0.87	TG652V	0.87	TC4800	5.44	TEA1002	2.98
1N4148	0.03	25C1953	1.80	AN320	4.86	BC304	0.06	BF158	0.18	BU412A	5.29	HAI392	1.38	MC727	2.28	SG269	0.27	TG658	3.08	TC4800	2.94	TEA1009	0.80
1N4540	0.11	25C1969	1.78	AN321	2.25	BC309	0.11	BF159	0.31	BU500	1.45	HAI394	2.37	MC8011	0.75	SG6533	8.21	TG659	2.71	TC4910	1.85	TEA1014	1.50
1N4540	0.11	25C1969	1.78	AN321	2.25	BC309	0.11	BF159	0.31	BU500A	1.89	HAI397	3.76	ME6002	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90
1N4540	0.18	25C1983	1.58	AN327	5.37	BC327	0.33	BF173	0.34	BU506	1.65	HAI398	2.95	ME6102	0.26	SI1630H	7.50	TG660V	1.25	TC4900	0.82	TEA1020P	4.90

★ VIDEO HEADS ★ FROM £13.95 EACH

PLUS + PLUS + PLUS GENEROUS MIXED QTY DISCOUNTS

Brand	Machine No.	Part No.	Price
AKAI	VP77 VP88 VP100 VP120 VS1 VS2 VS3 VS5	VHS A	1 +
	VS10 VS9300 VS9500 VS9700 VS-P1 VS-P5	VHS B	£16.95
		VHS M	£16.95
AMSTRAD	VCR4500 VCR5200 VCR9000	VHS T	£27.50
	VCR7000	VHS R	£34.49
	VCR4600	VHS N	£21.00
FERGUSON/JVC	3292 8903 3V00 3V01 3V06 3V16 3V22 3V23 3V24	VHS A	£19.95
	3V29 3V30 3V31 3V35 3V36 3V38 3V39 3V49	VHS X	£13.95
		VHS W	£13.95
FISHER	FVH — D520 D530 D620 D720 P420 P510 P520	VHS U	£18.75
	P530 P615 P620 P622 P710 P720 P721 P722	VHS S	£81.76
		VHS E	£75.43
GEC	Head Part Nos.: 5458161 5458165	VHS I	£21.25
	Machine Nos.: 4000H 4001H 4002H	VHS K	£21.25
	Head Part Nos.: 5458282 5458413 5458415 5458992	VHS J	£21.25
HITACHI	Machine Nos.: VT3000	VHS A	£14.75
	Head Part Nos.: 5458104	VHS H	£26.95
	Machine Nos.: VT4000 VT4200 VT5000 VT5500	VHS L	£21.00
ITT	Machine Nos.: VR3605 VR3033 VR3905 VR3913 VR3914 VR3935	VHS A	£19.95
	VR3943 VR3963 VR3993 VR3975 VR3985 VR3986 VR3833	VHS H	£20.50
		VHS I	£29.00
JVC (see also Ferguson)	Machine Nos.: HP4000 HR2200 HR3300 HR3320 HR3330 HR3350	VHS A	£21.95
	HR3360 HR3660 HR3750 HR3860 HR4100 HR7200 HR7600	VHS H	£29.00
	HR7610 HRD110 HRD111 HRD120 HRD121 HRD140 HRD150	VHS I	£21.95
MITSUBISHI	Machine No.: HS200	VHS A	£35.00
	HS700 HS303 HS304	VH700	£14.25
NATIONAL PANASONIC	Head Part Nos.: VEHO059 0103 0115 0121 0131	VHS A	£13.95
	Machine Nos.: NV300 NV322 NV332 NV333 NV340 NV390 NV2000	VHS B	£13.95
	NV3000 NV7000 NV7200 NV7500 NV7800 NV7850 NV8170	VHS M	£18.75
SHARP	Head Part Nos.: DDMMU 0002 HE17/21/27	VHS S	£81.76
	Machine No.: VC581/2/3 651 681/2/3/5 659 699	VHS E	£75.43
	Head Part Nos.: DDMU 0001 HE00 0002 HE02 04 05 06	VHS I	£21.25
SANYO	Head Part Nos.: 1430242 T01700 1430242 T22300	VHS A	£13.95
	Machine No.: VTC5000 VTC5150 VTC5300 VTC5400	VHS H	£13.95
	Head Part Nos.: 1430242 T02200	VHS L	£18.75
SONY	Head Part Nos.: A6762 044A, 044B, 054A, 147A	VHS A	£13.95
	Machine No.: SL3000, 8000, 8080, SLT 6Me, 7, 7E, 7ME	VHS H	£13.95
	Head Part Nos.: A6762 012A, 038A, 055A, 129A	VHS I	£13.95
PHILIPS	Machine No.: SL5W, 5000 5100 SLC5, C6, C7	VHS A	£13.95
	Head Part Nos.: A6762 072A, 122A, 136A, 139A, 213A	VHS H	£13.95
	Machine No.: SLC20, C30, C33, C40, C44	VHS I	£13.95
ORIGINAL FERGUSON	Head Part Nos.: 143072 T02000	BETA D	£31.35
	Machine No.: VTC9300 VTC9455 VTC9500	BETA D	£46.02
	Head Part Nos.: 143072 T02100	BETA X	£47.05
PHILIPS	Machine No.: SLC200, C30, C33, C40, C44	BETA X	£48.32
	Head Part Nos.: 143072 T02100	BETA X	£48.32
	Machine No.: VTC9300 VTC9455 VTC9500	BETA X	£48.32

Brand	Machine No.	Part No.	Price	
FERGUSON/JVC	VID1	01X0-003-381	2.55	
	VID2	01X0-018-024	5.00	
	VID3	01X0-018-025	6.20	
	VID4	01X0-018-729	6.95	
	VID5	01X0-040-006	0.26	
	VID6	01X0-033-454	4.50	
	VID7	01X0-040-007	2.90	
	VID8	01X0-040-017	27.95	
	VID9	01X0-065-009	22.10	
	VID10	01X0-065-016	22.00	
	GEC/HITACHI	VID11	V5577355	23.50
		VID12	V6413663	2.75
VID13		V6861471	1.95	
VID14		V6861482	4.20	
VID15		V6869971	1.80	
VID16		V2423461	6.00	
NATIONAL PANASONIC	VID17	VXP0329	0.85	
	VID18	VXP0344	0.85	
	VID19	VXZ0078	3.50	
	VID20	VXP0521	2.65	
	VID21	VXP0463	3.40	
	VID22	VXP0432	3.30	
SANYO/FISHER	VID24	4529V10800	9.50	
	VID25	1430662T01201	4.95	
	VID26	PR2758	3.85	
	VID27	1430490400900	4.50	
	VID28	1430420400300	2.95	
	SHARP	VID29	RMOTP1029	33.55
VID30		RMOTV1008	17.95	
VID31		NIDL0006	1.75	
VID32		NIDL0005	1.85	
VID33		NIDL0004	2.15	
VIDEO LAMPS/BULBS		VID34	LA9295	0.45
	VID35	LA9210S	0.50	
	VID36	NAT/PAN.	0.50	
	VID37	SHARP 9300	2.53	

**PLEASE NOTE
ALL VIDEO SPARES
HANDLING
£1.25 + VAT**

Brand	Machine No.	Part No.	Price	
DRIVE BELTS	VP 77	DBK135	£0.86	
	VP 66	DBK135	£0.86	
	VP 7100	DBK103	£1.42	
	VS 1	DBK134	£1.76	
	VS 2 EG	DBK121	£1.42	
	VS 3	DBK134	£1.76	
	VS 5 EG	DBK101	£0.68	
	VS 10	DBK136	£0.68	
	VS 3300	DBK103	£1.42	
	VS 9500	DBK103	£1.42	
	VS 9700	DBK102	£1.96	
	VS 9800	DBK103	£1.42	
AKAI	HR 2200	DBK137	£0.68	
	HR 3500	DBK107	£1.65	
	HR 3330	DBK126	£1.65	
	HR 3360	DBK103	£1.42	
	HR 3600	DBK107	£2.66	
	HR 3660	DBK103	£1.42	
	HR 4100	DBK127	£2.25	
	HR 7200	DBK139	£0.86	
	HR 7600	DBK138	£0.86	
	HR 7650	DBK132	£0.86	
	HR 7700	DBK108	£1.76	
	JVC	311 274 44	POA	
691 200 54		£49.68		
691 200 98		£62.02		
691 201 12		£61.66		
691 201 66		£61.93		
691 201 78		£49.96		
691 202 87		£55.37		
FERGUSON		3292	DBK103	£1.42
		3 V 01/16	DBK103	£1.42
		3 V 22	DBK103	£1.42
		3 V 23	DBK108	£0.83
		3 V 24	DBK137	£0.68
	3 V 31 32	VID7806	£0.94	
	3 V 35 36	DBK150	£0.88	
	3 V 38 39	DBK150	£0.88	
	3 V 42+43/44	VID7540	£0.70	
	3 V 45 48 54	VID7540	£0.70	
	3 V 55/57	VID7540	£0.70	
	FISHER	VBS 7000	DBK146	£2.66
VBS 7600		DBK105	£2.34	
VBS 9300		DBK105	£2.34	
VBS 9000		DBK10	£1.76	
VHVP 4777		VID7532	£1.62	
V 4000 H		DBK129	£0.68	
V 4001 H		DBK129	£0.68	
V 4002 H		DBK129	£0.68	
V 4100 H		DBK128	£1.35	
HITACHI		VT 11-VT 88	DBK128	£1.96
		VT 3000	DBK103	£1.42
		VT 5000	DBK125	£1.46
	VT 6500	DBK142	£0.77	
	VT 7000	DBK143	£0.68	
	VT 8000	DBK129	£0.68	
	VT 8500	DBK144	£0.68	
	VT 9300	DBK129	£0.50	
	VT 9500	DBK129	£0.50	
	SANYO	VTC 5000.5150	VID7807	£1.19
		VTC 6000	VID7807	£0.70
		VTC 6300	DBK105	£0.70
VTC 5400		DBK105	£0.70	
VTC 5500		DBK106	£1.76	
VTC 6500		VID7533	£2.66	
VTC 9300		DBK104	£0.78	
VTC 9350		DBK145	£2.66	
VTC M10.11.20		VID7809	£0.61	
VTC M21.30.31		VID7809	£0.61	
VTC M50		VID7809	£0.61	
SHARP		VC 381-383	DBK116	£1.52
	VC 385-386	DBK116	£1.52	
	VC 2300	VID7545	£1.03	
	VC 6000 6300	DBK117	£1.76	
	VC 6500	DBK117	£1.76	
	VC 7300	DBK118	£1.76	
	VC 8300	DBK119	£1.76	
	VC 8300/9500	DBK120	£1.52	
	VC 9700	DBK121	£3.18	
	SONY	SL 8000	DBK115	£2.66
		SL 8500	DBK115	£2.66
		SL 8600	DBK115	£2.66
SLC 5		DBK100	£1.55	
SLC 6		VID7519	£1.36	
SLC 7		DBK100	£1.55	
SLC 8		DBK100	£1.55	
SLC 9		DBK130	£1.76	
SLT 7		DBK100	£1.55	
SLT 7 MER		DBK100	£1.55	
SLT 7 MER		DBK100	£1.55	
TOSHIBA		V 55-57	VID7543	£0.91
	V 66-67	VID7540	£1.76	
	V 7540	DBK123	£1.76	
	V 8600	DBK124	£1.76	
	V 9600	VID7810	£0.91	
	V 5250	DBK148	£2.66	
	V 5280	DBK148	£2.66	
	V 5475	DBK122	£1.76	

NEW IN STOCK, A LARGE RANGE OF SLIMLINE REMOTES. JUST SUPPLY MAKE, MODEL & PART No. IF POSSIBLE FOR AN IMMEDIATE QUOTE. AVERAGE PRICE £18.00

NEW FAX NUMBER 0902-29052

Full list available with order or SAE please 9" x 4" Telephone 0902 - 712083 (24hr. answering machine for Access & Barclaycard users)

Prices subject to alteration without notice. Stock queries by post only. For quantities of 100+ per line - Please ask for special quote. Orders from Govt. Institutions, Schools, Nationals etc., accepted with official order. All goods should be delivered within 4 working days.

The Room at the Back

J. LeJeune

Summer had settled at Milldale and a new name had been decided upon for Topcut's Discount Store – "Electric Dreams". There had been a hot debate about this. Ralph Topcut had wanted "The Milldale Home Entertainment Centre", but Sid Bias had argued that this was not a complete description of the business since the store also sold washing machines and refrigerators. "I know that some of our customers are mad" he'd said, "but I doubt whether many of them get much entertainment out of watching their front-loaders in action with the dirty linen." So he'd won, and Electric Dreams in Terry Green's pink and green neon tubes was attracting scores of younger people into the store. It had proved to be a great success, and as a result Ralph Topcut was in a good mood.

Peace reigned in the service department. Norman Gates was deep in the bowels of a Toshiba V8600 VCR, while Andy sighed resignedly over an anonymous-looking VCR that turned out to closely resemble the Ferguson 3V35. It was probably an ex-rental job and was plagued by head speed hunting. Andy was terrified of servo systems – even though CD players, about which he was supposed to be an authority, have four of them.

Loss of Line Drive

Young Gareth's job was a Sony KV1810 that no one else had wanted to repair. Its line driver transistor Q509 had failed. Fitting another one got the set going again but all was not well – the replacement seemed to run hot. Gareth probed around the area with a scope and found that the transistor's drive was too low. A dab with a wet finger confirmed the problem. There was ample drive on the far side of the coupling capacitor C538 (0.47 μ F). Gareth didn't like the idea of an electrolytic being run at line frequency, so he replaced it with a low-inductance Mylar type. The effect was immediate: Q509 now ran happily and was cool. He put everything back together and mercifully had no screws left over.

Modulator Problem

Meanwhile Norman had established the cause of the Toshiba's lack of output signal and was busy changing Q661 in the modulator. He spent a few minutes with the equivalent book looking for a more powerful replacement but the terminology used was not helpful. So the Toshiba type was fitted. This restored the r.f. output and the machine was put on soak test in the E-E mode.

Scheming

Sid sauntered over to Norman's bench and pulled a drawer open, resting his foot on it. "What do you think of this scope?" he said, showing Norman an advertisement in a popular trade magazine.

Norman briefly scanned the advertisement and looked up at Sid. "I suppose your idea is to catch Ralph T. while he's in a good mood and get us a new scope" he suggested.

"You could put it like that" replied Sid.

"In that case go for the most expensive one and haggle as long as you can. We badly need a sixty-meg scope

around here what with all the high-tech goods he's putting on the shelves out front" said Norman.

"A good point" Sid agreed. "They make extravagant claims about our service and then expect us to operate on a shoestring. It's time they backed their claims with some extravagant test equipment."

A Couple of VCRs

Andy was not feeling too happy. He'd let his meter probe slip and the 3V35 lookalike now had two faults, the original one plus the consequences of his inattentive moment. The head drum still didn't revolve. While Sid and Norman continued to whisper together Gareth was immersed in his next job, a Sanyo VTC5000 VCR. Andy took the opportunity to nip across into the stores for a replacement IC404.

Gareth had a fierce, unreasoning hatred of the VTC5000 but was determined not to let this one get the better of him. Its capstan motor ran at top speed and Gareth concluded that the problem shouldn't be too difficult. He checked around the central control chip IC3001 and to his horror found that the 5V rail was at nearly 9V. Out came the 5V regulator transistor Q3001 but there was no spare in the stores. It looked as though a BFY50 or a 2N3053 would do. Gareth tried the former and the machine then worked normally. Very satisfactory, he thought. And time for a stroll.

Sid had gone through to the shop, waving a magazine in his hand and saying over his shoulder to Norman "I'll try him on it now – won't be long!" Norman picked up his toolbox and departed to make some outside calls.

3V35 Problem Solved

Gareth stopped alongside Andy and asked about his problem. "Why not take a look at Norman's 3V35 manual?" he suggested. "Norman notes every fault in his manuals and puts the correct voltages on the diagrams." As Norman was out they borrowed his 3V35 manual and found the drum speed control part of the circuit. There was a circle around R446, which should be 270k Ω . When it was removed and checked the reading was around 800k Ω ! A replacement restored normal operation and Andy remarked that making such notes seemed worthwhile.

Sid's Return

Sid looked pleased with himself when he returned to the workshop. "Ralphie boy has just agreed to buy us a sixty-meg scope" he announced. "Trouble is, he says it should enable us to find faults in half the time."

"He can't really believe that" commented Andy.

"Oh yes he does" said Sid. "He'll expect to see it used for everything, even mending kettles. Seriously, the time will come when one won't be enough. We'll need one each."

"We'll have to prove that this one, when it comes, earns its keep" added Andy somewhat gloomily.

"That's right" replied Sid, "and the only proof Ralph Topcut understands is our output figures."

Eye Protection

David Botto

We tend to take the precious gift of sight for granted. But if proper care is not taken it's all too easy to suffer eye damage in a TV/VCR workshop. The precautions required are quite well known but are not always observed as conscientiously as they should be.

The TV/VCR workshop can be full of hazards to your eyes. These are considerably reduced if the workshop is well organised, tidy and spotlessly clean. For guidance on this, see my article in the December 1988 issue.

Sections of aerials jutting out, TV sets left with their backs off so that the end of the picture tube sticks out, and various sharp objects left dangerously exposed are potential eye accidents waiting to happen. The insides of delivery vans can also present plenty of hazards if not kept in a tidy state.

Glasses

Many people need to wear glasses in order to see clearly. In a workshop it's possible to shatter a glass lens accidentally on a sharp corner of the TV/VCR chassis on which you are working, with possibly disastrous consequences for the eye behind the lens. It's far safer – ask any optician – to have the lenses made of plastic that doesn't shatter so easily. Modern plastic lenses are as hard as glass ones and don't suffer from the scratching and other problems that affected older types.

Eye Tests

It's worth having your eyes checked regularly – despite the current fee. If you don't normally wear glasses you may nevertheless find that you need them as you get older. With the passing of the years the lens of the eye loses some of its elasticity and is thus not able to focus as accurately as it once did at close range. As an example, a twenty-year-old person with normal eyesight can see objects clearly at a near range of about 250mm. A forty-year old person will have difficulty in seeing clearly at a range of less than 500mm. Fortunately it's easy to correct for this by obtaining glasses from a *qualified* optician. Make sure you find one who really knows his job and is prepared to take time and trouble with your lens prescriptions. Ask for the best frames and plastic lenses that are available. Money spent in this way is a wise investment.

Safety Goggles and Spectacles

A pair of safety goggles is an essential item of equipment for the TV/VCR engineer. Each engineer should have his own personal pair – using goggles that someone else has worn can easily spread eye infections.

Suitable goggles can be obtained from RS Components for less than £3 plus VAT. They incorporate a soft PVC frame and polycarbonate lens, are easily adjusted to suit different head sizes, and are "Kitemarked" to BS2092. They can be worn over most spectacles without loss of protection. The RS order no. is 551-980. Halfords and B & Q also supply suitable goggles. Make sure that the goggles you buy have the Kitemark and the number BS2092.

If your eyesight does not require optical correction,

obtain a pair of safety spectacles (RS order no. 551-996, price about £4.85 plus VAT) in addition to your safety goggles. Safety spectacles look like ordinary ones with protective side pieces. They are easier to wear if you wish to keep them on all day. For some jobs however safety goggles give your eyes better all-round protection.

Always keep your goggles and safety spectacles spotlessly clean. Goggles can be washed in hot (not boiling) water. A proper lens-cleaning fluid is best for safety spectacles.

Chassis Cleaning

When a TV set or a VCR is cleaned out with a vacuum cleaner and brush the dust and fine particles can, if they reach the eyes, cause infection. Furthermore dust can scratch the cornea of the eye. It's wise to wear safety goggles during the cleaning process.

CRT Replacement

We all know that we ought to wear safety spectacles or goggles when replacing cathode-ray tubes. In the workshops I visit however only a few TV/VCR engineers now seem to take this necessary precaution. The modern c.r.t. is soundly constructed of course and seldom implodes, but don't get over-confident. Accidents can still happen and it's simply not worth taking chances.

Soldering

Soldering and desoldering present a constant risk to the eyes – a risk we seldom consider. Solder can splutter and if it hits your eye the result can be permanent damage. If you wear optical spectacles with plastic lenses you've a degree of protection. If you don't, always wear safety spectacles when handling a soldering iron, and avoid shaking the iron to remove surplus solder. Instead, carefully wipe your soldering iron on a proper cleaning pad.

Lifting Heavy Objects

Lifting extremely heavy objects can not only cause back troubles but can also result in a burst blood vessel in the eye. This can lead to partial or complete blindness. This is an important warning – I've talked to a man who lost his sight in this way. Ask your own doctor.

Glues and Sprays

Fibreglass body-filler is sometimes used to repair damaged TV cabinets. The danger here is the hardening catalyst that's mixed in with the filler paste. This catalyst is an organic peroxide (methyl-ethyl-ketone peroxide – MEKP). A bodyfiller kit I have to hand contains only an incomplete warning in extremely small print.

A spot of this MEKP catalyst in the eye will at once begin to destroy the sensitive eye tissue, causing either immediate or eventual blindness. The recommended procedure if you have such an accident is to wash the eye with copious amounts of water for at least ten minutes. This must be done within *three to four seconds* otherwise permanent eye damage will occur. There is no known chemical neutraliser. Thus it makes sense *always* to wear a pair of properly fitting safety goggles and to have plenty of water to hand whenever you use fibreglass fillers.

In fact it cannot be too strongly emphasised that you should wear your safety goggles when using any kind of

glue, especially those that need added hardeners and super glue.

Aerosol cleaning fluids, freezers, circuit varnish and special fluids to clean audio and video heads are found in virtually all TV/VCR workshops. None of these will do your eyes any good if the spray or liquid reaches them. Safety goggles are essential protection when using these products.

Lasers

Some domestic electronic equipment, such as the CD player, incorporates a laser. A stick-on label on the chassis – it should never be removed – warns the TV/video engineer. Provided the manufacturer's service procedures

are followed all should be well. But take care when servicing such equipment. The laser beam should never be viewed directly – it will cause eye damage.

In Conclusion

Finally, if you should be unfortunate enough to suffer any kind of eye injury, or get some foreign body in your eye, immediate qualified medical attention should be sought.

The information provided in this article is not intended to alarm or scare readers but perhaps to prevent someone from suffering some injury or accident to his eye(s). If it succeeds in this aim, the article will have been well worth the research and writing.

Servicing Compact Disc Players

Part 7

Joe Cieszynski

This month we continue our account of the data frame format used with the compact disc system. The next item to consider is the eight-bit subcode word that's added to each frame following the sync word. Just to refresh your memory, the data recorded on the disc consists of a succession of frames each of which have 588 data bits. Each frame contains six left/right audio samples, P and Q parity check words, the frame sync and one subcode word. The composition of the frame was shown in Fig. 11, Part 5 (page 694, July).

The subcode contains data to control the player's LC display. It also contains the cyclic redundancy check code (CRCC) data, which is used to detect and correct any errors within the subcode. Before we go any farther, let's see how the subcode data is processed.

Processing the Subcode

Although the subcode section of each frame consists of eight bits it's not in fact an eight-bit word. Each of the eight bits is one part of a much longer (96-bit) word that's spread over a number of frames. Thus as the subcode data is detected by the player it must be stored until enough data is available to recreate the 96-bit words. During playback the decoder locates the eight-bit subcode in each frame, extracts it and stores it in a RAM. When 98 frames have been played, this RAM will hold 98 subcodes – see Fig. 1. As shown, each word has a length of 98 bits, but as the first two eight-bit subcode symbols are subcode sync the usable word consists of 96 bits. The subcode sync is required because, with the subcode symbols being continuously extracted during playback, something has to tell the decoder when a new word is about to start. The two sync symbols are of a particular pattern that's recognised by the decoder. As a result the decoder clears the RAM and begins to load new data at the start of the third subcode symbol.

The rate at which these words are formed and processed is very fast. With 7,350 frames per second and 98 frames per subcode block, there are $7,350/98 = 75$ blocks per second. So the central processor is receiving 75 data blocks per second, each one containing eight 96-bit words.

What do these words say? In the CD specification the

letters P, Q, R, S, T, U, V and W have been allocated to each bit of the subcode. When 96 eight-bit symbols have been collected in the RAM we have words that are labelled P, Q, R etc. At the present time only the P and Q words contain any data. The others are reserved for future developments in the system. A word of warning: don't confuse the P and Q subcode words with the P and Q parity words discussed last month. They are quite different and the name similarity is unfortunate.

The P Word

The P word informs the microcomputer chip when a music track is about to start or end, enabling it to take the appropriate action such as mute on/off. The word has two statements: when music is playing $P = 0$, whereas when music is about to start or end $P = 1$. Thus when a music track is about to end P goes to one for about two seconds. The end of this one period marks the start of the next music track. During the lead-in track (table of contents) P goes to one, the end of this one indicating the start of

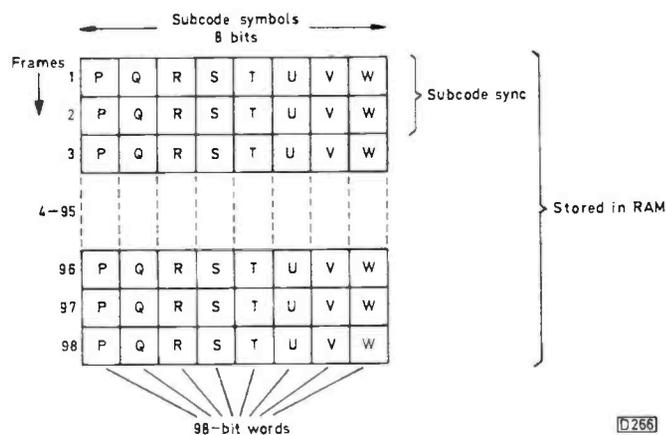


Fig. 1: A subcode block stored in RAM.

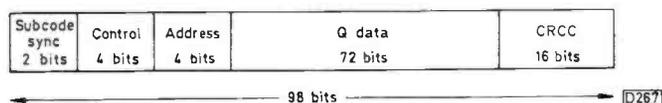


Fig. 2: Q word composition.

music. During the lead-out track P toggles between zero and one at about 2Hz, telling the microcomputer to initiate the stop mode (unless it has been programmed otherwise).

The ones between tracks can be used for track search, enabling the player to locate a particular track of the user's choice. If for example you wish to skip two tracks the microcomputer will look for the one signals and begin playing when it reaches the third one. Although this is a feasible approach it's not often used because the microcomputer may not realise which part of the disc it's actually dealing with, making track search in this way rather limited. Any player of even modest quality employs a more sophisticated search technique that makes use of the Q subcode data – we'll consider this later in the series.

The music start flag can be inserted between pieces of music that fade into one another. In this case the P subcode will carry the flag two seconds before the end of one track, enabling you to miss the following track in the search mode if you so wish. As the subcode is not part of the audio data there's no audible interference.

The Q Word

The Q word consists of a number of sections as shown in Fig. 2. These are as follows:

(1) Subcode sync. We've already explained the function of this.

(2) Control. This tells the microcomputer chip if the disc player has (a) two audio channels without pre-emphasis, (b) four audio channels without pre-emphasis, (c) two audio channels with 50µsec pre-emphasis or (d) four audio channels with 50µsec pre-emphasis.

(3) Address. This carries the data required by the microcomputer to enable it to function.

(4) Q data (see Fig. 3). The make-up of this is highly complex. When decoded by the microcomputer it gives:

(a) Track number – the number of the music track being played.

(b) Index. This is required only when more than one disc is being used to form an album. The disc's number in the album is displayed on the LCD.

(c) Playing time. This is the time that has elapsed during a particular track. It's reset to zero at the start of the next track.

(d) Separation – this section contains no usable data.

(e) Running time. This is the elapsed time from the start of the disc. If a track has been skipped the running time displayed will be the time that would have elapsed if the skip had not taken place. This data can also indicate the number of tracks that have passed up to the present time, including any that have been skipped.

Table of Contents

The table of contents information is also contained in the Q data. As you may recall, this track appears at the start of the disc and is automatically read by the player as

Track number	Index	Min	Sec	Frame	Sep	Min	Sec	Frame
Playing time				Running time				

Fig. 3: Make-up of the 72-bit Q data.

soon as the disc is inserted. Its information tells the control microcomputer the number of tracks on the disc and the length of each one. This information is used in the track search mode to enable the player to locate a track of the user's choice quickly.

CRCC

Last month we considered the problem of incorrect data during music passages, describing the ways in which errors can be detected and corrected. Errors can also occur in the subcode of course. The cyclic redundancy check code data included in the subcode enables these to be corrected.

The way in which this is done is highly mathematical and makes the CIRC principle we looked at last month appear simple! Basically what happens is that the Q data bits are multiplied by another binary number during encoding. Dividing the Q data in the microcomputer by the same number during playback should restore the original information. If there's enough data for the microcomputer to decipher what the original basically was, it can correct the Q subcode when errors occur. Like CIRC, CRCC is effective until a large amount of data has been corrupted.

Other Subcode Words

As previously mentioned the R-W subcode words don't at present contain any useful data. The designers have left the space provided by these words for system expansion, and will use it as and when necessary – one hopes after international agreement, which is likely since Sony and Philips have a tight control over the system. Whenever I have the opportunity I ask manufacturers whether there are any concrete proposals for the use of these subcode words. They usually look at the floor and mutter something like "nothing definite yet". At the time of writing it seems that the most likely use is for controlling a VDU, but it's not clear what the VDU would display!

What Next?

In these last three instalments we've looked at the theory of compact disc data encoding. This provides a good introduction to the operation of the decoder, which will be our next subject. Looking further ahead, this basic theory will be relevant when we come to filters, over-sampling, the disc servo, track search and central control processing. Furthermore as conversion of the familiar analogue TV signal to digital form for processing in various ways becomes more common, this theory will be seen to have wider relevance. Finally a word of comfort for those who may be finding all this theory a bit overwhelming. Didn't PAL colour seem very complex when it first came on the scene? Didn't you go hot and cold the first time a VCR came in for repair? Yet nowadays all this is commonplace. Likewise sampling, quantisation, A-D conversion, eight-to-fourteen modulation and CIRC will before long all be part of the day-to-day job. It's not as bad as it sounds!

Service Bureau

Requests for advice in dealing with servicing problems must be accompanied by a £2 cheque or postal order (made out to IPC Magazines Ltd.), the query coupon and a stamped addressed envelope. We can deal with only one query at a time. We regret that we cannot supply service sheets nor answer queries over the telephone.

SONY SLC20

The initial problem was a regular sudden increase in take-up tension at a rate of about three-four times a second. This produced wow on music though speech was just acceptable. With the top cover removed the tape loop between the capstan and take-up spool could be seen jerking. The problem has got worse and now the take-up fails completely towards the end of a cassette.

There are two possibilities here. First check whether the take-up turntable spins freely by hand with the brakes off. If not, check whether its nylon bearing is loose in the brass tube. Where necessary the bearing can be pushed down and the tube squeezed. Alternatively the cause of the trouble may lie in the drive system. Replacement of the pendulum arm assembly X-367-911-43 and rotor X-262-220-13 often cures the problem. After the repair has been carried out RV309 on board SS16 must be set for 80g/cm. This is difficult without torque test cassette SL-0003C.

PIONEER SV2801

The problem is with the teletext function. If the teletext is mixed with the picture it works except that the text is black. By itself you get only a bright green screen. Selecting subtitles (page 888) locks up the teletext.

First check transistor TV36 (BC548B) on the decoder panel. Then if necessary transpose the connections to pins 7 and 8 of BV06 on the text panel. If the fault now appears in red, the SAA5040 chip is the most likely culprit. If there's no difference the U4606B chip is suspect.

HITACHI VT64

There's no mention of lubrication in the service manual. I'd welcome guidance on this.

The manufacturers consider routine greasing or oiling of the deck to be unnecessary. In practice we find that one small drop of light machine oil is permissible on any shaft that squeaks while a touch of light (we use graphited) grease is often required at the bottom tip of the capstan shaft.

FERGUSON TX90 CHASSIS

This set works perfectly apart from the presence of teletext lines at the top of the picture.

First check that the 95V supply is correct at pin 5 of the line output transformer. If so check D106, D107 and C171 before suspecting the field output transistors TR104 and TR105. If the latter have to be replaced they must be of

exactly the correct type, preferably sourced from Ferguson.

GRUNDIG CUC2401 CHASSIS

This set goes into the standby mode after about half an hour. Operating the on/off switch or the remote control unit will restore normal results for about a quarter of an hour, then it's back to standby. Use of heat and freezer has failed to reveal any cause of the fault.

There are several possibilities for this fault in these sets. First check R641 (100k Ω) and the condition of and connections to R631 and R632. If these items are in order the next suspects are R661 (1.5 Ω) and C661, then the TDA3640 chip IC665.

FERGUSON 3V23

The problem is overloading when prerecorded tapes and tapes recorded on other machines and cameras are played back, i.e. whites tend to go negative and there's hum on sound that varies with the intensity of the negative whites. The playback level control in the video circuit has been set as low as possible and the odd thing is that the machine records and plays back its own tapes normally.

It's likely, but check, that the signal level at the video output socket is correct (1V pk-pk) or low. If so the problem is in the u.h.f. modulator and can be cured by very careful adjustment of the small preset potentiometer inside. No details of the modulator are given in the manual.

AMSTRAD VCR4700

This machine seems to work quite well but is rather noisy on playback – best described as a cyclic clattering in the cassette region. The noise is no longer present to any extent with the cassette removed and the sensors disabled. Rewind is also a bit noisy but fast forward is reasonable.

There are two reasons why the VCR4700 is noisier than many VCRs. First it's a "cost effective" design, and secondly it uses pinion rather than idler drive to the reels. Ensure that the cassette cradle bottom plate is not bent or damaged and that the reel turntables are perfectly free to rotate. Grease the reel drive pinions with a light graphite grease.

PHILIPS G11 CHASSIS

This set can be tuned in correctly using the pushbuttons on the front panel but when the remote control handset is used to change channels all the stations go off tune, some of them quite considerably.

We suggest that you check the alignment of the a.f.c. coil L5630 in the U5600 vision detector module, then if necessary check the operation of transistor T5060, ensuring that field sync is being received via R5062.

SAMSUNG CI514F

The problem with this set is that R428 (1.3k Ω , 2W) and the starter transistor Q403 (KTC2229) burn out after a few weeks. We've been unable to find fault with any of the associated components.

It's almost certain that the set is trying to run continuously on its start-up system. Normally Q403 works for only a second or two at switch on, i.e. until the 16.5V line is established. Confirm that 16.5V is developed at the anode of D405, then suspect D405 and D401. The latter should be reverse-biased after start-up, relieving Q403.

TEST CASE

321

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.

The causes of intermittent faults in VCRs can be very difficult to trace. Given an adequate fault description however such problems can often be sorted out without the technician actually seeing the symptoms. This applies particularly to "borderline" conditions like excessive back tension, insufficient take-up torque and tape path problems.

It was with reasonable confidence then that John confronted a Sharp VCR, Model VC7700, that arrived on the bench with a ticket bearing the comment "sometimes goes to stop during play or record, depends on make of tape". A very common cause of this problem is low take-up torque, so this was the first check made. It came out at 110g/cm, which is within the maker's tolerance. The machine was then set to run on soak test while other repairs were attended to.

An hour later a click and whirr of machinery signalled that the fault had appeared. John set the machine to playback again and settled down to watch the mechanism. After a minute or two the reels stopped and a few seconds later unthreading occurred. Clearly the control microcomputer chip was responding to a lack of reel sensor pulses. What might stop the reels turning? The take-up torque was checked again and found to be over 100g/cm. So the machine was once more returned to the playback mode. After a run the tape again stopped moving and the machine went into the stop mode. This time however the deck was being closely watched. As a result, two important clues were obtained. First, the head drum continued to rotate until the unthreading was complete. Secondly no slack loop of tape developed downstream from the capstan. Indeed all the tape throughout the deck stopped moving.

By the time these points had been noted the deck was back in the stop mode of course. The first possibility that occurred to John was that the capstan motor was stopping sporadically, perhaps due to a dead spot in its commutator. In fact this was highly unlikely once the motor was up and running, and further tests and observation from below showed that the capstan motor continued to run after the tape had stopped. So did the belt and capstan flywheel.

Thus the capstan was turning while the tape stood still. When he asked around the workshop fraternity John learnt that excessive back-tension could cause this, as could too much friction around the lower drum. He inserted a back-tension gauge cassette into the machine and watched the dial. It registered 27g/cm, which is within

the range specified in the service manual. Then a funny thing happened: the tape stopped moving and the gauge actually dropped back. Certainly the fault was not due to an excessive back-tension setting.

How do you check for friction around the lower drum? By now the machine had started to behave itself for long periods (don't they always?). A rough check on before-and-after drum tension was carried out by deflecting the tape with a plastic rod just upstream of the entry guide and just downstream of the exit guide. Certainly the tape was tauter after the exit guide, but to some degree this is to be expected.

In view of this another possibility occurred to John – that the pinch-roller pressure was insufficient. To check this you have to fool the machine into thinking that it's got a cassette in then select play and heave on a spring-type tension gauge, looking for a force of about 1kg at the lift-off point. As he set up this test John saw what the trouble was – not the pinch-roller spring pressure! Any ideas? See next month for the answer.

ANSWER TO TEST CASE 320 – page 778 last month –

Last month's test case concerned a Sanyo VHR3100 whose tuning memory didn't work. The seek process operated correctly, but as soon as an attempt was made to store the tuning point data this was lost. Much time was also lost in unnecessarily changing chips and panels to arrive at a diagnosis that was perhaps obvious.

The type of EAROM used in this and many similar designs operates with serial data fed via a single bidirectional port, the addresses being defined and the operation synchronised by the main microcomputer chip. The memory chip is non-volatile and requires a negative supply of about -30V to erase (over-write) the data it already holds. Under all other circumstances, including complete loss of operating power, the data is held securely and without corruption.

The fault lay with the -30V line of course – as was clear from the dimness of the fluorescent display, which is operated from the same negative voltage source. In fact the line was at only -15V. It comes from the series regulator transistor Q5003 in the power supply section, all three of whose electrodes were found to be at around -15V. The associated resistor R5008 (47Ω) was open-circuit, the voltage that was getting through arriving via Q5003's base-emitter junction and R5006/7.

QUERY COUPON

**Available until 20th September 1989.
One coupon, plus a £2 (inc. VAT)
cheque or postal order, must accompany EACH PROBLEM sent in accordance with the notice on page 862.**

TELEVISION SEPTEMBER 1989

Published on approximately the 22nd of each month by IPC Magazines Limited, King's Reach Tower, Stamford Street, London SE1 9LS. Filmsetting by Trutape Setting Systems, 220-228 Northdown Road, Margate, Kent. Printed in England by the The Riverside Press Ltd., Thanet Way Whitstable, Kent. Sole Agents for Australia and New Zealand – Gordon and Gotch (A/sia) Ltd.; South Africa – Central News Agency Ltd. Subscriptions: Inland £20, overseas (surface mail) £24 per annum, payable to Quadrant Subscription Services Ltd., Oakfield House, Perrymount Road, Haywards Heath, Sussex RH16 3DH. "Television" is sold subject to the following conditions, namely that it shall not, without the written consent of the Publishers first having been given, be lent, resold, hired out or otherwise disposed by way of Trade at more than the recommended selling price shown on the cover, excluding Eire where the selling price is subject to currency exchange fluctuations and VAT, and that it shall not be lent, resold, hired out 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.

TELEPRICE

LIMITED

**SIMPLY THE BIGGEST
WHOLESALE SUPPLIER
OF THE BEST EX-RENTAL
T.V.'s & VIDEO RECORDERS
IN THE UNITED KINGDOM**

RING OUR LOCAL MANAGER FOR DETAILS

FARNBOROUGH WAREHOUSE



CLIFF PARSONS
0252 540814

7/8 KINGSGROVE INDUSTRIAL EST.
INVINCIBLE ROAD
FARNBOROUGH
HANTS. GU14 7QS

NOTTINGHAM WAREHOUSE



JOHN JEYES
0602 491385

REAR ENTRANCE, UNIT 7
ORCHARD BUSINESS PARK
SANDIACRE
NOTTINGHAM NG10 5BP

AVONMOUTH WAREHOUSE



KARLA HEATH
0272 235093

5 PORTVIEW ROAD
AVONMOUTH
BRISTOL BS11 7LQ

AINTREE WAREHOUSE



IAN McCLELLAND
051 530 1285

UNIT 2, RACECOURSE IND. EST.
ORMSKIRK ROAD
AINTREE
LIVERPOOL L9 5AL

LINWOOD WAREHOUSE



IAN DORAN
0505 29284

1a LYON ROAD
LINWOOD INDUSTRIAL ESTATE
LINWOOD
RENFREWSHIRE PA3 3BQ

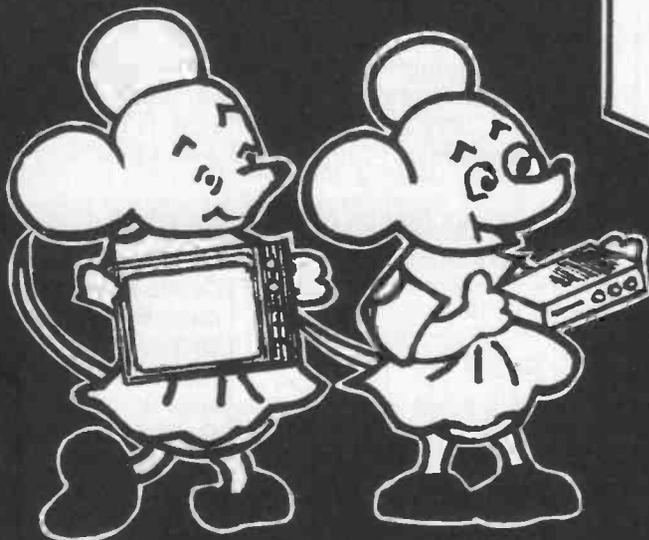
SUNDERLAND WAREHOUSE



BRIAN CADE
091 523 5554

9A/B
94 CARRMERE ROAD
LEECHMERE INDUSTRIAL EST.
SUNDERLAND SR2 9TE

**WHILE THE CATS
AWAY
THE MICE WILL PLAY
AT T.E.S.D. LTD.
WE CELL AT BARGAIN PRICES**



**T.E.S.D. LTD
UNIT 6, 68 BAYTON ROAD
EXHALL, COVENTRY CV7
RING US ON 0203 368437**

NO ORDER TOO LARGE OR TOO SMALL



Eugene Trundle

NEW "HANDS ON" SERVICING BOOK

**SAVE £4 ON PUBLISHER'S
PRICE FOR LIMITED PERIOD**

This practical servicing book is specifically aimed at repair and service technicians and engineers; students and enthusiasts should also find it useful. It guides its readers in test and diagnostic procedures for quick fault-finding in domestic video products: TVs, VCRs, cameras and camcorders.

Based on many years of practical bench and field experience, the book has little regard for theory and circuit explanation, well covered elsewhere: Here the emphasis is on the practical, nuts-and-bolts business of fault diagnosis and repair.

Seventeen chapters are individually targeted on separate aspects of the equipment, dwelling longest on the most troublesome sections: TV power supplies, line timebases, and video deck mechanics. Other chapters look at test gear, intermittent faults and repair techniques. Of the 225 illustrations, fifty four are off-screen photographs and thirteen are fault-finding charts.

A symptom index is included for easy reference to this storehouse of practical advice straight from the repair bench.

EUGENE TRUNDLE is a full time practising TV and video engineer. His articles appear regularly in *Television* and several other magazines. He is the author of the best-selling *Newnes TV and Video Engineers Pocket Book* and *Newnes Guide to TV and Video Technology*.

TO ORDER SEND £21 PLUS £1.50 P&P

TO: PAUL RICHARDS BOOKS

28 BOSCOBEL ROAD NORTH, ST LEONARDS-ON-SEA, E. SUSSEX TN38 0NZ

OFFER ENDS 23 SEPT

PRICE THEREAFTER £25.00

X HOTEL

COLOUR TELEVISIONS
Small Screen Sizes up to 20ins
EXCELLENT CONDITION

IN STOCK NOW

PLUS

TELEPHONES - HEADPHONES

ATARI VIDEO SYSTEMS
MIDI SYSTEM AUDIO UNITS

LOW - LOW - PRICES

IN STOCK NOW

TELEPHONE LEEDS 0532 - 638804 HOT LINE

IN STOCK NOW

COMPACT DISC SYSTEMS
PERSONAL STEREO'S
RADIO CASSETTES - GHETTO'S
CAR-RADIO CASSETTES

PLUS

Designer and Stereo Text
BRAND NAME 'B' GRADE
COLOUR TVS - VIDEOS
AND AUDIO SEPARATES

IN STOCK NOW

SUMMER BARGAINS
W. TREE TRADE TV
Unit 1, Sunshine Mills
Wortley Road
Leeds 12

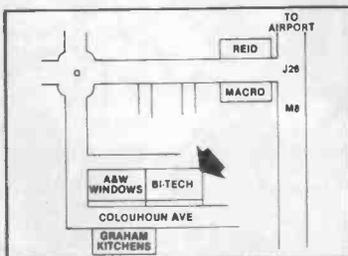
INCREASE YOUR PROFIT
(NOT YOUR TEMPERATURE)
DON'T MISS THESE BARGAINS

EX-RENTAL VIDEO & TV WHOLESALE

BI-TECH

SCOTLAND'S LARGEST WHOLESALE

- ★ A good range of text working and off the pile including Decca 80's and 100's, Doric 3's, 3A's and 4's, Finlandia, GEC, K30, KT3, G11's, Grundig, Hitachi, ITT, JVC, Panasonic, Philips KT30-3-45 stand and text.
- ★ Various makes of video always in stock
- ★ Working TVs from £20



Contact:
Jack Swan
BI-Tech
(Scotland) Ltd
Unit 9
Colquhoun Ave
Hillington
Industrial Estate
Glasgow GS2 4BN

TEL: 041-883 2610

TV LINE OUTPUT TRANSFORMERS

PRICES INCLUDE VAT & CARRIAGE

VIDEO HEADS, TRANSISTORS, IC's, ALSO STOCKED.		
BAIRD: 8290, 8752, 8773, 8180	12.00	ITT: VC200 to VC402 9.20 CVC1, CVC2 (FORGESTONE) 11.50 CVC5, CVC7, CVC8, CVC9, CVC20 10.35 CVC25, CVC30, CVC32, CVC45 9.20 CVC800, 1100, 1150, CVC40 P.O.A. CVC1200, 1204, 1210, 1215, 2600 P.O.A.
RANK BUSH MURPHY A774 with stick rectifier 9.78 A816, T16, T18, Z712, Z715 10.35 T20, T22, T26, Z179, A823 11.50		PYE: 169, 173, 569, 368 9.20 CT200, CT200/1, CT213 10.35 725-731, 735, 737, 741 9.78
DECCA: 1210, 1211, 1511 11.50 1700, 2001, 2020, 2401, 2404 9.20 CS1730, 1733, 1830, 1835 9.20 30, 70, 80, 90, 100 9.20 120, 130, 140, 160 P.O.A.		PHILIPS: 170, 210, 300 9.20 320 series 9.78 TX, T8, TX2, TX3 mono P.O.A. G8 and G9 Series 9.20 KT2, KT3 series 9.20 CTX G11, K30, K4, K40, split diode P.O.A. K12, CF1, 2A, 2B, 3A, NC3 P.O.A.
FERGUSON, THORN: 1590, 1591 9.20 1690, 1691, built in rect. 9.78 1600, 1615, 1700, 1790 P.O.A. 3000, 3500, 8000, 8500, 8800 P.O.A. 9000, 9200, 9300 series 12.00 9500, 9600, 9650 series 12.00 TX9, TX10, TX90, TX100, TXP5 P.O.A. MOVIESTAR 3781, 3787, 8180 12.00 TX10 focus unit 10.87		REDIFUSION Mk1 to 5 P.O.A. DORIC Mk3, Mk1 11.50 SONY KV 1400, 1612, 2000 P.O.A. GRUNDIG, G.E.C. P.O.A. NORDMENDE: 8290, 8180, Z306 P.O.A. SANYO: 5101, 5103, 7118, 7130 P.O.A. SHARP: C1851H, C2051H, 1405 P.O.A. HINARI: CT4, CT5 P.O.A. TANDBURG: 190, CTV2, CTV3 P.O.A. TELEFUNKEN: most models in stock HITACHI: 1471, CPB260, 2501 P.O.A. SAISHO MATSUI SENTRA P.O.A.
FIDELITY: FTV12 mono 10.35 ZX2000 ZX3000 14", 16", 20" 16.43 ZX3000 22" 27.28		Delivery by return of post.
CASED AUTO TRANSFORMERS 240V to 115V USA 2 PIN SOCKET Size Price 1000 watt 48.30 500 watt 28.75 300 watt 25.30		Tidman Mail Order Ltd., 236 Sandycombe Road, Richmond, Surrey TW9 2EQ. Approx. 1 mile from Kew Bridge. Phone: 01-948 3702 Mon-Fri 9 am to 12.30 pm & 1.30-4.30 pm Sat 10 am to 12 noon.
TOROIDAL TRANSFORMERS WOUND		

All Idlers are Manufacturers Original.

VIDEO "REFURB" KITS

FERGUSON 3V29/30 Take Up Idler 1.85 Reel Idler 2.75 Take Up Clutch 2.75 Belt Kit 1.95 Pinch Roller 3.95 £13.25	FERGUSON 3V35/39 Take Up Idler 1.85 Reel Idler 3.25 Take Up Clutch 2.80 Belt Kit 1.75 Pinch Roller 3.95 £13.50	FISHER FVH-P615 Idler 4.95 Belt Kit 1.95 Pinch Roller 3.95 £10.85	HITACHI VT8000 Series F/F Rewind Idl. 3.95 Wind Roller 0.80 Reel Table 2.45 Belt Kit 1.50 Pinch Roller 3.95 £12.65	HITACHI VT9000 Series Play Idler 4.35 Play Pulley 0.90 Belt Kit 1.50 Pinch Roller 3.95 £10.70
KIT 1 £10.75	KIT 2 £10.85	KIT 3 £8.95	KIT 4 £10.85	KIT 5 £9.45
HITACHI VT11/17/19/33 F/F Rewind Idl. 2.75 Belt Kit 2.95 Pinch Roller 3.95 £9.65	PANASONIC NV300/333 VXP 0433 Idler 4.95 VXP 0401 Idler 1.05 Belt Kit 2.95 Pinch Roller 3.95 £12.90	PANASONIC NV370/830/850 VXP 0521 Idler 3.95 Belt Kit 1.95 Pinch Roller 3.95 £9.85	PANASONIC NV2000 2010 VXP 0329 Idler 0.95 VXP 0331 Idler 0.95 Belt Kit 2.25 Pinch Roller 3.95 £9.10	PANASONIC NV7000 Series VXP 0343 Idler 4.95 VXP 0344 Idler 0.95 Belt Kit 1.95 Pinch Roller 3.95 £11.80
KIT 6A £7.95	KIT 7 £10.75	KIT 8 £7.95	KIT 9 £6.95	KIT 10 £9.15
As above but including Clutch Mechanism	SANYO VTC5000 Reel Drive 5.95 Reel Motor 6.95 Belt Kit 0.95 £13.85	SHARP VC9300/9500 Idler 0005 3.50 Belt Kit 2.50 Pinch Roller 3.95 £9.95	SHARP VC381-390 Idler 0005 3.50 Belt Kit 1.95 Pinch Roller 3.95 £9.40	ORDERING: Please add 50p Post & Packing Then add 15% VAT C.W.O ONLY Sorry! Trade Only
KIT 6B £17.50	KIT 11 £11.95	KIT 12 £8.50	KIT 17 £8.25	

VOLTAGE REGULATOR ICs

VIDEO HEADS ===== VIDEO HEADS

AKAI Each STK 5332 3.95 STK 5421 3.95 STK 5481 5.95 STK 5482 5.95 STK 7348 4.95 STR 441 5.95 STR 451 5.95 STR 454 5.95 STR 4211 4.50 STR 5412 5.95 STR 6020 (kit) 5.95 STR 50103 * 5.95 STR 58041 6.95 * R2M AVALANCHE DIODE £1.00 Pk of 5	ALBA 4000 24.25 AMSTRAD 4500/5200 22.00 4600/4700 23.75 7000 23.00 9000 23.75 FERGUSON 3V00-3V22 14.50 3V29 (P.C.B. or "L") 14.50 3V23/35-39 14.50 3V32 38.00 3V48 38.00 3V44/45/54/55 24.50 FIDELITY 1000 24.00 FISHER FVHP 420-910 (inc.) 24.00 GEC/HITACHI 5000 23.50 VT6500/8000/9300 22.50 VT11/33 22.50 VT17/19 39.00 VT35/38/39 39.00 GOLDSTAR 4000 Series 24.25 8000 24.25	HINARI Each VXL2 23.00 VXL4 23.00 VXL5 22.00 VXL6 23.75 VXL35 23.00 V20H 22.00 MATSUI VX500-773 inc 22.00 MITSUBISHI HS303/304 28.00 HS320 28.00 HS700 28.00 HS300/1/2 32.50 ORION VH 2500-2948 inc. 23.00 VR 2949-821 inc. 23.00 PANASONIC NV2000/3000/7000/8000 14.50 NV300/332/33 14.50 NV230/260/270/280 21.50 NV470/480/NV100 21.50 NV370 NV380 21.50 NV330 27.95 NV366 31.50 NV430/460 23.50 NV730 31.50 NV777 27.95 NV788 46.00 NVG10/12/14 23.50 NVG18 41.75 NVG21 46.00 NVG30 30.00 NVG40 30.00	PHILIPS Each VR6420/6460 21.50 VR6462/3/4 35.00 SAISHO VR705-805-905 23.00 VR1000-1600 23.00 SAMSUNG VB900-910 24.00 VX510/20 24.00 VX616/626/627 24.00 VX717 24.00 SHARP VC200/VC300/3300 21.50 381/4/5/7/VC388 21.50 477/481 21.50 VC220 21.50 VC581/3/5 21.50 VC9300/9500/9700 21.50 DDR MU 0001 39.50 SANYO VTC9100/9300 35.00 VTC5000/6500 29.50 VTCM10/11/20/21 29.50 HR 1100/1300 39.95 SENTRA 8000 24.25	SOLAVOX Each 1000 24.25 SONY C5/6/7 18.95 SLC 20/24/30/33/44 21.50 TOSHIBA V31/33 9600 22.50 V55-57 14.50 V71-87 23.00 V93 23.00 TRIUMPH VR9500 23.00 VR9501 23.00 VR9592 23.00
---	---	--	---	--

REEL MOTOR
Suitable for

AMSTRAD
VR7000
SAISHO
VR705-805-905
SHARP
VC381/3/6
VC2300/3300/9100
9300/9500/9700

£13.95 each

ANY 3 HEADS LESS 5%

IRWIN ELECTRONICS

UNIT 200, J.C. ALBYN COMPLEX,
BURTON RD., SHEFFIELD S3 8BX.

Telephone Sheffield (0742) 739622

V.A.T. Reg. No. 127 2207 01

(Est. 1973)

**QUALITY
QUALITY
QUALITY**

HIGHSURGE

**IN THE HEART
OF THE SOUTH
JUST OFF A24
NEAR HORSHAM**

ALL TRADE GOODS GUARANTEED AND EXCHANGED IF REQUIRED.

ALL GOODS READY FOR SHOWROOM.

- ★ WORKING P.I.L. TYPE TVs FROM £15 ★ ELECTRONIC TYPE VIDEO RECORDERS FROM £70
★ TELETEXT TVs INC. HANDSETS FROM £65.

LOW PRICES FOR MARKED STOCK

NON-GRANADA STOCK

THORN, SHARP, HITACHI

EXAMPLES

8300	£70
9300	£80
381H	£85
VT11	£75

NORMAL GRANADA STOCK ALSO AVAILABLE
Mk 3's, 3A's, 4's etc

ADVANCE ORDERS TAKEN ON ALL STOCK

HIGHSURGE

T20's/22's **£20.00**

CRT's GUARANTEED OK
LOADS IN STOCK

MANY MANY MORE MAKES & TYPES IN STOCK
FREE SPARES PACKAGE WITH 20+ UNITS

**Reconditioned
Micro Wave Ovens
from £30 + VAT**

Telephone Dave or Alan between 9 & 5.30 Weekdays,
9 till 1 Saturdays

0403 732966

OR MOBILE 0860 227995
24 HOUR ANSWERPHONE

**Rear of UNIT 31, STATION ROAD INDUSTRIAL ESTATE, SOUTHWATER,
NEAR HORSHAM, WEST SUSSEX**

CREWE WHOLESALE TELEVISION

CHESHIRE'S LARGEST WHOLESALERS – OVER 18,000 SQ. FT.

15 MINUTES FROM JUNCTION 17, M6

(Including hundreds of text working and off the pile) G11's, G11 Text, Bush T-20 upwards, Finlandia, G.E.C., K30, KT3, Grundigs, ITT's, Trimlines, 800, CVC 40 and 30's, Decca 80's and 100's, Doric 3's, 3A's and 4's, and cable with translators. Philips KT30 – 3 – 45 stand & text.

LORRY LOADS DIRECT FROM SOURCE

VIDEOS

VHS – Mechanical Hitachi
Electronic Nat/pan, Hitachi
Sharp and Thorn

BETAMAX – Sony, Sanyo,
Toshiba, etc.
(Working or untouched)

50 Mixed of your
choice ITT30/32
Decca 80's and 100's
Doric series 3
GEC 2110/2111

AT £250.00 + VAT
GUARANTEED UNTOUCHED

RING NOW FOR THE LATEST PRICES ON TV's & VIDEOS

CREWE WHOLESALE TELEVISION

(2 lines)

Williams Street Warehouse, Crewe, Cheshire. ☎ 0270 582924



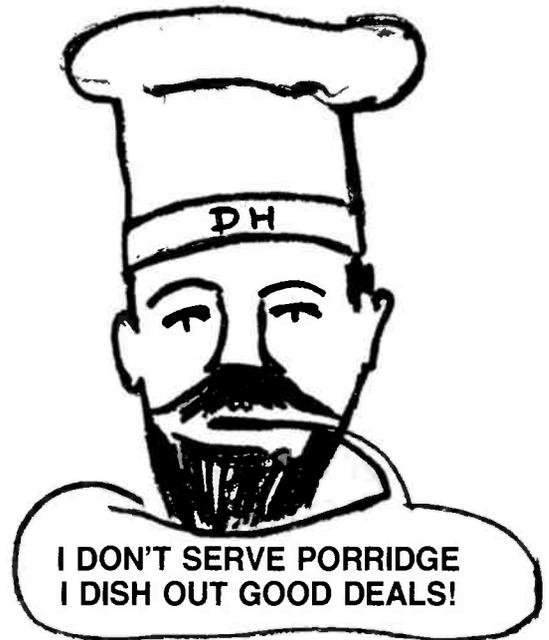
THE A.V.S. GROUP

AUDIO VISUAL SERVICES

HERE'S JUST A SELECTION OF OUR SUMMER PRICES!

UN-SERVICED	SERVICED	UN-SERVICED	SERVICED
9000 ETC £8	9000 ETC £12	MECH VCR's £25	MECH VCR's £40
TX9/10 £20	TX9/10 £29	3V30 £45	3V30 £65
TX9/10 TEXT £39	TX9/10 TEXT £49	F/LOAD £50	F/LOAD £65
TX9/10 STEREO £59	TX9/10 STEREO £69	STEREO VCR's £60	STEREO VCR's £80
NON THORN TV's FROM £10	NON THORN TV's FROM £15	NON THORN TV's FROM £40	NON THORN TV's FROM £50

TRY US ONCE AND YOU
WILL BE HOOKED —
THAT'S A PROMISE!



SAMSUNG VIDEO PLAYERS
NEW WORKING GRADE 'B'
£80 ea. (£75 ea in lots of 10)

ALL PRICES ARE SUBJECT TO 15% VAT. PRICES ARE ALSO BASED ON
QUANTITY AND AVAILABILITY — HANDSETS CHARGED EXTRA.

HEAD OFFICE



08444 3226 08444 2995

36 WYCOMBE ROAD, PRINCES RISBOROUGH, BUCKS.

HUMBERSIDE OFFICE



0652 660242 0652 660243

UNIT 8, ST. MARY'S WORKS, MARSH LANE, BARTON-ON-HUMBER, SOUTH HUMBERSIDE

NGK ELECTRONICS

UNIT 18,
TILE CROSS TRADING EST.
TILE CROSS ROAD, MARSTON GREEN,
BIRMINGHAM B33 0NW.

**THORN EX-RENTAL SETS FULLY RECONDITIONED & GUARANTEED
GOOD RANGE HELD AT KEEN PRICES — PHONE FOR DETAILS**

**!!! TRADE SERVICE AVAILABLE !!!
on all makes**

**NEW & GRADE 'B'
STOCK**

GUARANTEED VIDEOS

SATELLITE IN STOCK

AUDIO MIDI SYSTEMS

**ALL ENQUIRIES
WELCOME**

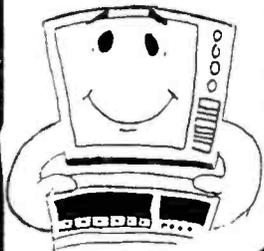
EXPORT ENQUIRIES WELCOME

RING: NORMAN, GLORIA OR PAUL
021 779 5734
021 779 5465
021 779 5466
FAX: 021 779 4701

TRADE ONLY



SuperTronics



TEST FACILITIES
SPECIAL DEALS
ON NEW
STOCK

JUST RECEIVED LARGE STOCK OF GOOD

QUALITY TEXT & BASIC COLOUR TVs

WORKING ELECTRONIC VHS From £60

WORKING COLOUR TVs From £15

**TOP
BRAND NAMES
JVC, HITACHI,
PANASONIC, PHILIPS,
FERGUSON, GRUNDIG etc.**

OFF THE PILE STOCK AVAILABLE



**247-249 HIGH ROAD,
SEVEN SISTERS
TOTTENHAM,
LONDON
N15 5BT**

**CONTACT
PAUL ANDREAS
01-809 4866
OPEN 9.00 AM - 7.00 PM
MONDAY-SATURDAY
ALL PRICES SUBJECT TO V.A.T.**



STAY
INTUNE

with *Wiltsgrove Ltd*
TV and Video Trade Centre

28/29 RIVER STREET DIGBETH BIRMINGHAM B5 5SA

TEL: 021 772 2733
FAX: 021 766 6100

Everything under one roof in Birmingham's largest TV & Video Warehouse

Ex Rental TV's

all working stock

Bush T20	£15.00
Bush T24	£25.00
Doric Mk1	£5.00
Doric Mk3	£10.00
Doric Mk4 Text	£45.00
Finlandia Basic	£10.00
Finlandia R/C	£18.00
Finlandia Text	£40.00
Grundig Basic	£35.00
Grundig R/C	£50.00
Grundig Text	£70.00
JAPANESE	
Hitachi, Sony, Panas.	£30.00
Korting	£10.00
Philips G11 Basic	£10.00
Philips G11 R/C	£20.00
Philips G11 Text	£35.00
Philips KT3/30B	£25.00
Philips KT3 R/C	£35.00
Philips KT3 Text	£55.00
Thorn 9K	£12.00
Thorn 96K	£18.00
Thorn TX9 Basic	£25.00
Thorn TX9 Text	£55.00
Thorn TX10 Basic	£25.00
Thorn TX10 R/C	£35.00
Thorn TX10 Text	£55.00
Thorn TX9/10 Stertext	£75.00

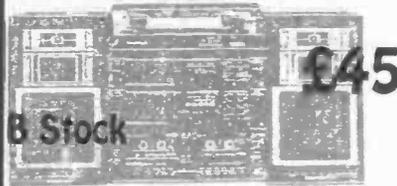
Ex Rental Video's

Amstrad 7000	£65.00
Thorn 8930 (3V29/	£65.00
Thorn 8924 (3V23/	£65.00
Thorn 8940	£70.00
Thorn 8941 (3V31)	£90.00
Thorn 8942 (3V32)	£100.00
Ferguson longplay	£150.00
Sharp UC9100/9300	£80.00
Sharp UC 381/383	£85.00
Hitachi VT8000/8500	£60.00
Panasonic NU333	£65.00
Panasonic NU366	£75.00
Panasonic NU7000	£75.00
Panasonic NU 7200	£85.00
Panasonic NU370	£95.00

Portable Radio Cassette



B Stock
MIDI Systems



14" R/C Portable
£98

Autofocus
Autozoom

£425



Ferguson 3001

Ex Rental Ferguson
Video



£150

Longplay

3043 HiFi Video

Box 50 £1.35

Huanyu
E180 Videotapes

Lifetime Guarantee

3V29/30
£65



Microwaves

B Stock

£69.00

Spares Listing

New Quality Videoheads
Special Opening Offers
from £14.50

FRICION COMPONENTS
VIDEO BELTS, IDLERS, CLUTCHES,
PULLEYS, FEELS
AKAI, FISHER, GEC/HITACHI,
PANASONIC, PHILLIPS, SANYO,
JVC, THORN

Semi Conductors
STR, STK, TDA s, TA etc.

GENERAL

Remote Control Handsets, TV Mains
Switch, Tubers, Traps, Video lamps,
Cosmetic Trim, Lamps, Leads, Audio Video
Leads, Fuses, etc.

VIDEO'S FOR SPARES
PRICES FROM £20

**UNBEATABLE
P.O.A.**

Thorn TX10 Brand New Chassis from
£20.00

*We also have many more
Specialised Items*

28/29, RIVER STREET,
DIGBETH, BIRMINGHAM
TEL: 021 772 2733



R/C Handsets are Extra
All prices are exclusive of VAT

**ASK ABOUT OUR
FREE DELIVERY**

AV AMRICK VISIONS WHOLESALE AV

THE WORKING SET WHOLESALE YOU CAN RELY ON

WE SPECIALISE IN SUPPLYING TRADE CUSTOMERS WITH TOP QUALITY WORKING EX-RENTAL TV's & VIDEO's. WE OFFER GOOD PRODUCT, FRIENDLY SERVICE & KEEN PRICES

TV'S

PHILIPS G11	£18
PHILIPS G11 TEXT	£45
PHILIPS KT3/30	£35
PHILIPS KT3/30 TEXT	£65
THORN TX9/10	£35
THORN TX9/10 TEXT	£65
THORN STEREO TEXT	£85
BUSH T20/22/26	£18

NEW
HANDSETS
FROM £10

NEW
VIDEO
HEADS
FROM £15

VIDEOS

THORN 3V23	£75
THORN 3V29/30	£70
THORN 3V31	£90
JVC 7200/7300	£70
HITACHI 8500/9300	£70
HITACHI VT11	£75
HITACHI VT33	£90
SHARP 9300/381	£80
AMSTRAD 7000	£70

We also stock Hitachi, Sony, Panasonic, Sanyo, Toshiba, etc.

SPECIAL DISCOUNTS & DELIVERY ON LARGE QUANTITIES

OFF THE PILE! COMPETITIVELY PRICED OFF THE PILE EQUIPMENT AVAILABLE FOR TRADERS WHO REQUIRE IT
PRICES All prices subject to VAT, but include handsets where appropriate

AMRICK VISIONS WHOLESALE

☎ **0533 551711**

113 NARBOROUGH ROAD, LEICESTER

APPROX 5 MINS
FROM JUNC 21 M.1.

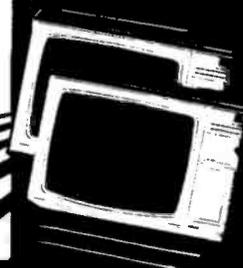
(OPEN MON-SAT
9AM-6PM)

ONE AND ONLY APPROVED THORN WHOLESALE IN MANCHESTER

FOR THE NORTH WEST
TRAILER LOADS DIRECT FROM SOURCE ARRIVING EVERY WEEK!
RING FOR THE BEST DEAL IN TOWN



Chromavision



NOW OPEN

Electricvision
29 Lonsdale Street
Stoke
ST4 4DT
Tel 0782 48153/744105

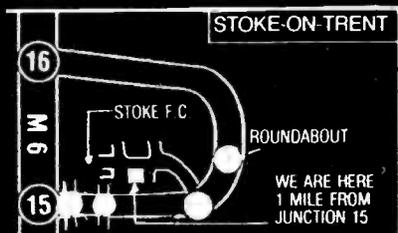
EXPORT ENQUIRIES WELCOME

ALL PRICES SUBJECT TO VAT & QUANTITY

95 Langworthy Rd
Salford
Manchester
M6 5PH
Tel 061 736 6333
061 745 8048

HUGE STOCKS
WORKING & GENUINE
UNTESTED TV'S & VCR'S

YOU'LL HAVE TO SEE US TO BELIEVE US !!



FAST VIDEO SPARES FAST

ALL STOCK ITEMS ARE DESPATCHED BY RETURN OF POST

VIDEO HEADS

REPLACEMENTS

All our replacement heads are brand new precision Japanese heads not refurbished.

Panasonic	
3HSS(N).....	£16.00
Fits model numbers:	
NV2000, NV2010, NV7000, NV7200,	
NV333, NV8600, NV8610.	
3HSS-UI(N).....	£19.90
Fits model numbers: NV370 & Philips	
VR6460.	
3HSS(4N).....	£38.50
Fits model number: NV366	
3HSS(4NB).....	£38.50
Fits model number: NV730	
Ferguson	
3HSS(V).....	£16.00
Fits model numbers: 3V00, 3V16, 3V22,	
3V29, 3V30, 3V31, 3V35, 3V36, 3V38, 3V39,	
HR2200, HR3300, HR3360, HR3366,	
HR7200, HR7300, HRD120, HRD130.	
3HSS4VB.....	£44.50
Fits model numbers: 3V32.	
Sharp	
3HSS(SF).....	£26.50
Fits model numbers: VC9100, VC9300,	
VC9500, VC9700, VC381, VC8381, VC383,	
VC388, VC482.	
Toshiba	
PS3B(T).....	£26.50
Fits model numbers: V9600, V31B, V33B.	
Hitachi	
3HSS(H).....	£26.50
Fits model numbers: VT8000, VT9300 etc.	
Sony	
PS3B(S).....	£19.95
Fits model numbers: SLC5, SLC6, SLC7,	
SL3000 also various NEC models.	
P84B(2S).....	£26.50
Fits model numbers: SLC20, SLC30, SLC40,	
SLF1.	
P55B(3S).....	£44.20
Fits model numbers: SLC9, SLT50, SLC8,	
SLF60.	
Amstrad/Saisho	
3HSS(F).....	£28.50
Fits model numbers: VCR7000 and all models	
using Orion chassis.	
3HSS(F).....	£28.50
Fits model numbers: VCR4500, VCR5200,	
VCR9000 etc.	
Fisher/Fidelity	
3HSS(SF).....	£29.90
Fits model numbers: FVHP615, FVHP710,	
V1000.	

GENUINE HEADS

Panasonic	
NV2000, NV2010.....	£44.00
NV7000, NV7200.....	£44.00
NV333, NV370.....	£44.00
NV366.....	£64.50
NV688, NV777, NV788.....	£64.50
NV730.....	£67.50
All others available P.O.A.	
Ferguson	
3V00, 3V16, 3V22.....	£59.90
3V29, 3V30.....	£59.90
3V32.....	£66.90
3V35, 3V36, 3V38, 3V39.....	£59.90
Sharp	
VC7300, VC7700, VC7750.....	£69.90
VC8300.....	£69.90
VC9300, VC9500, VC9700.....	£82.00
VC381, VC383, VC386.....	£82.00
VC482.....	£82.00
All others available P.O.A.	
Sanyo	
VTC5000, VTC5150.....	£39.90
VTC5300, VTC5400.....	£39.90
VTC9300.....	£39.90
Sony	
SLC5, SLC6, SLC7.....	£49.50
SL8000, SL8080.....	£49.50
SLC20, SLC30.....	£54.50
SLC9.....	£54.50
Toshiba	
V9600.....	£59.90
V8600.....	£69.90
V31, V33.....	£59.90
V55, V56.....	£59.90
Hitachi	
VT5000, VT5500.....	£49.50
VT6500, VT8000, VT8300.....	£49.50
VT8500, VT8700.....	£49.50
VT9300, VT9500, VT9700.....	£49.50
VT11E, VT14E.....	£45.50
VT17E, VT19E.....	£54.60
VT33E.....	£49.50
Philips	
VR6460.....	£44.00
VR6462, VR6467.....	£42.90

Please call if your model is not listed.

GENUINE

Panasonic	
NV2000, NV2010.....	£6.50
NV7000, NV7200.....	£6.50
NV333, NV366.....	£6.50
NV370, NV830, NV850.....	£2.80
NV688.....	£6.50
NV777, NV788.....	£4.70
NV8600, NV8610.....	£6.50
NV730.....	£1.90
NV230, NV430, NV870.....	£2.80
NV870, NV810.....	£2.80
Ferguson	
3V00, 3V16, 3V22.....	£6.50
3V23.....	£3.90
3V29, 3V30.....	£4.90
3V35, 3V36, 3V38, 3V39.....	£2.90
Sanyo	
VTC5000, VTC5150.....	£1.99
VTC5300, VTC5400.....	£4.50
VTC9300.....	£6.50
Sony	
SLC5, SLC7.....	£6.50
SLC6.....	£7.50
SL8000, SL8080.....	£6.50
Sharp	
VC7300, VC7700, VC7750.....	£6.50
VC8300.....	£6.50
VC9100, VC9300, VC9500.....	£6.50
VC381, VC383, VC386.....	£6.50
Hitachi	
VT5000, VT5500.....	£6.50
VT8000, VT8300, VT8500.....	£2.90
VT9300, VT9500, VT9700.....	£3.30
VT11E, VT14E, VT17E, VT19.....	£6.50
VT33E.....	£6.50
Akai	
VS9700.....	£6.50
VS2, VS3, VS4, VS5.....	£4.90
VS9300, VS9500, VS9700.....	£6.50

Many others available

BELT KITS

REPLACEMENTS

Panasonic	
NV2000, NV2010.....	£3.50
NV7000, NV7200.....	£3.00
NV333, NV366.....	£3.00
NV8600, NV8610.....	£3.95
Ferguson	
3V00, 3V16, 3V22.....	£3.50
3V23.....	£2.90
3V29, 3V30.....	£3.50
3V35, 3V36, 3V38, 3V39.....	£2.90
Sanyo	
VTC5000, VTC5150.....	£1.00
VTC5300, VTC5400.....	£2.50
VTC9300.....	£4.25
Sony	
SLC5, SLC7.....	£3.60
SLC6.....	£4.95
SL8000, SL8080.....	£4.25
Sharp	
VC7300, VC7700, VC7780.....	£3.50
VC8300.....	£3.90
VC9100, VC9300, VC9500.....	£3.90
VC381, VC383, VC386.....	£3.90
Hitachi	
VT5000, VT5500.....	£4.50
VT8000, VT8300, VT8500.....	£1.50
VT9300, VT9500, VT9700.....	£1.50
VT11E, VT14E, VT17E, VT19.....	£3.90
VT33E.....	£3.90
Akai	
VS9700.....	£3.90
VS2, VS3, VS4, VS5.....	£3.95
VS9300, VS9500, VS9800.....	£3.50

SENSOR LAMPS

All Panasonic.....	£1.80
All Ferguson/JVC.....	£0.65
Sharp VC9300 etc.....	£2.90
Sharp VC7300 etc.....	£1.80
Amstrad 7000.....	£2.30
All Hitachi.....	£1.80

SENSOR L.E.D.'s

All Panasonic.....	£2.90
All Ferguson/JVC.....	£2.90
All Hitachi.....	£5.75

END SENSORS

Hitachi VT64E.....	£1.20 each
--------------------	------------

REEL MOTORS

Sharp VC9300, VC81 etc.....	£18.20
Amstrad/Saisho etc.....	£18.20
Panasonic NV333, NV366.....	£16.80
Sanyo VTC5000, 5300, 5400.....	£9.90
Panasonic NV7000, 7200.....	£19.80

DRUM MOTORS

Ferguson/JVC 3V00, 3V22, etc.....	£29.90
Sharp VC7300, VC7700.....	£26.40
Sharp VC8300.....	£26.40
Hitachi VT5000.....	£24.80

CAPSTAN MOTORS

Sharp VC8300.....	£39.90
Sharp VC7300, VC7700.....	£29.30
Ferguson/JVC 3V00, 3V16, 3V22.....	£24.75
Ferguson/JVC 3V29, 3V30.....	£34.50
Ferguson/JVC 3V35, 3V36, etc.....	£25.80
Hitachi VT5000.....	£25.80
Hitachi VT8000, 8500, etc.....	£34.50
Hitachi VT9300, 9500, etc.....	£34.50
Hitachi VT11, VT14, VT17.....	£28.80
Sony C5, C7.....	£42.90
Akai VS1-VS5.....	£29.90

Many, many more!

IDLER WHEELS

Panasonic	
NV2000, NV2010..... (Genuine).....	£2.90
NV7000, NV7200..... (Genuine).....	£2.90
NV333, NV366..... (Genuine).....	£2.90
NV370, NV230, NV430..... (Genuine).....	£4.50
NV777, NV788..... (Genuine).....	£4.50
NV730..... (Genuine).....	£4.50
Ferguson/JVC	
3V00, 3V16, 3V22 (Large clutch).....	£5.95
3V00, 3V16, 3V22 (Small clutch).....	£6.95
3V29, 3V30, HR7200, HR7300.....	£3.90
3V35, 3V36, 3V38, 3V39, HRD120.....	£3.90
Sanyo	
VTC9100, VTC9300.....	£1.90
VTC5000 Reel drive pulley.....	£6.50
VTCM10 Reel drive pulley.....	£9.90
Sony	
SLC5, SLC7..... Rewind kit.....	£4.95
SLC6..... Rewind kit.....	£4.95
Sharp	
VC9100, VC9300, VC9500 (Genuine).....	£3.90
VC381, VC383, VC386 (Genuine).....	£3.90
VC482, VC483, VC581 (also Saisho) (Genuine).....	£3.90
VC482 etc. (Equivalent).....	£2.98
VC9300, 381 etc. (Equivalent).....	£2.98
Hitachi	
VT8000, VT8300, VT8500.....	£4.72
VT9300, VT9500, VT9700.....	£4.75
VT11E, VT14E, VT17E, VT19.....	£3.96
VT33, VT63, VT64, VT65.....	£3.96
Akai	
VS2, VS3, VS4, VS5.....	£4.50
Fisher	
FVHP615, FVHP710, FVHP725, etc.....	£6.90

We also carry all play idlers and clutches etc. for models listed plus many more.

LARGE RANGE OF REMOTE CONTROL'S FOR TV AND VIDEO

THIS MONTH'S SPECIAL

VIDEO HEADS 3HSS(V)

FITS FERGUSON & JVC

3V00 - 3V16 - 3V22
3V29 - 3V30 - 3V31
3V35 - 3V36 - 3V38 etc

3HSS (N)

FITS PANASONIC

NV2000 - NV2010 - NV3000
NV7000 - NV7200 - NV333

BOTH AT
£16 + VAT
ADD 70p POST & PACKING

WE CARRY HUNDREDS OF VIDEO SPARES INC. PLAY IDLERS, CLUTCHES, MOTORS, SERVICE MANUALS, TENSION BANDS, BELTS AUDIO/CONTROL HEADS, ALIGNMENT TOOLS AND TAPES ETC. **SPECIAL ORDER FACILITIES **FOR NON-STOCK ITEMS****

PINCH ROLLERS

Panasonic	
NV2000, NV2010, NV7000, NV7200.....	£4.95
NV333, NV366, NV370, NV430.....	£4.95
NV730.....	£7.95
Ferguson/JVC	
3V00, 3V16, 3V22, 3V23, 3V24.....	£4.95
HR3300, HR3360, HR3660, HR2200.....	£4.95
3V29, 3V30, HR7200, HR7300.....	£4.95
3V35, 3V36, 3V38, 3V39 HRD120.....	£4.95
Sanyo	
VTC9100, VTC9300.....	£4.95
VTC5000, VTC5150, VTC5300, VTC5400.....	£4.95
Sony	
SLC5, SLC7.....	£5.95
SLC6.....	£5.95
SL8000, SL8080.....	£5.95
Sharp	
VC7300, VC7700, VC7750.....	£4.95
VC8300.....	£4.95
VC9100, VC9300, VC9500.....	£4.95
VC381, VC383, VC386.....	£4.95
VC651 etc.....	£4.95
Hitachi	
VT5000, VT5500.....	£5.95
VT8000, VT8300, VT8500.....	£4.95
VT9300, VT9500, VT9700.....	£4.95
VT11E, VT14E, VT17E, VT19.....	£4.95
VT33E.....	£5.95
Akai	
VS9700.....	£6.95
VS2, VS3, VS4, VS5.....	£6.95
VS9300, VS9500, VS9700.....	£4.95

LARGE RANGE OF IC'S & SEMI-CONDUCTORS AVAILABLE FOR TV, AUDIO & VIDEO

TELEVIDEO SERVICES

UNIT 3, PLESSEY BUSINESS PARK, TECHNOLOGY DRIVE, BEESTON, NOTTINGHAM NG9 2ND

TEL: 0602-226070 FAX LINE: 0602-431097

24HR ANSWERING SERVICE FOR ORDERS PLACED AFTER 5.30 p.m.

Please add 70p post & packing and then add 15% VAT to total

OFFICIAL ORDERS ACCEPTED FROM SCHOOLS, COLLEGES, ETC. EXPORT ENQUIRIES WELCOME.

ALL PRICE ENQUIRIES SHOULD BE ACCOMPANIED BY STAMPED ADDRESSED ENVELOPE

ATTENTION ATTENTION

JOHN CARTER ELECTRICAL LTD
ANNOUNCES A

MASSIVE CLEARANCE SALE

TVs FROM £5 ONLY

**OVER 2,000 SETS
MUST GO**

TO MAKE WAY FOR
OTHER STOCK

HUGE RANGE OF VIDEOS
AT

**RIDICULOUSLY LOW
PRICES**

ENQUIRIES CONCERNING
B GRADE STOCK WELCOME
DIRECT LOADS DELIVERED
FROM SOURCE

ALL SETS UNTESTED

**JOHN CARTER
(Electrical) LTD
FURNACE ROAD,
GALLOWES INN,
ILKESTON**

Phone: 0602 303124

TELEVISIONS - VIDEOS - TELEVISIONS

VIEW-TEL

CO DURHAM

A NEW NAME IN

TRADE SURPLUS TVs

Large selection mainly
THORN — GRANADA STOCK

Discount ten or over

ALL SIZES AVAILABLE

Thousands in stock. Good quality.
Fresh stock every week.

Portables, Teletext, VHS Videos, STD 20", 22", 26"

Complete loads at discount prices

All stock collected from source by our transport and
handled with care.

 **VIEW-TEL TELEVISIONS**
(0388) SWAN STREET, EVENWOOD,
832832 Nr. BISHOP AUCKLAND, CO. DURHAM.

BLOCK DISCOUNTING



£2500 UPWARD

T.V./Video Recorders Rental Agreements
Hire Purchase/Credit Sale Agreements

For details and quotations contact:



BROUGHFAME LTD

Colonnade House, High Street
Worthing, Sussex BN11 1NZ
Tel: (0903) 821020

SEMPL



SERVICE

THE ONLY APPROVED THORN TELEPRICE DISTRIBUTOR FOR E. ENGLAND

GREAT SUMMERTIME

SALE

★★★★★★★★★★★★

DON'T DELAY
PHONE TODAY

GUARANTEED & WORKING EX-RENTAL STOCK

0553 766766

59 HALL RD
CLENCHWARTON
KINGS LYNN
NORFOLK



TRADE MARK OF
QUALITY

ALL PRICES QUOTED ARE FOR LOTS OF 10 OFF

TV's

VIDEOS

9K	£12.00	3V30	£62.00
TX BASIC ...	£32.00	3V23	£65.00
TX TEXT	£60.00	3V36	£75.00
STEREO.....	£90.00	TOP/L.....	£65.00
	(WITH BRAND NEW H/SET)		(NON THORN TYPE)
F.S.T.....	P.O.A.	3V42	P.O.A.

ALL WORKING EQUIPMENT IS SOLD WITH OUR UNIQUE 7 DAY GUARANTEE

ALL PRICES QUOTED ARE
EXCLUSIVE OF VAT

★★★★★★★★★★★★

A.Z. ELECTRICS

Stock items despatched by return

VIDEO HEADS SPECIAL OFFER

FERGUSON AND PANASONIC
UNIVERSAL HEADS (3HSSV
AND 3HSSN) AT £13.25

FOR MOST OTHER MODELS ASK
FOR PRICE

Video Heads for Amstrad, Fisher, Hitachi, Orion,
Saisho, Sharp, Sony and Toshiba also in stock

IDLER ASSEMBLIES

Sharp	
VC9300/9500 etc.	£1.75
VC481/581 etc.	£1.90
VC9300/9500/481/581 etc. Original	£3.50
Hitachi	
VT11/33/14/17/19/63 etc.	£1.75
VT9300/9500 etc. Play Idler	£3.65
VT9300/9500 FF Idler	£1.50
VT8000/8300/8500/8700 F/F Rew Idler	£1.90
VT8000/8500 etc. Play Idler Assembly	£2.85
VT8000/8500 etc. FF/Rew Pulley	£0.70
Ferguson	
Take up Clutch (Mechanical models)	£4.95
3V29/30 Take up Idler	£1.20
3V29/30 Take up Clutch	£2.10
3V29/30 Reel Idler	£2.50
3V35 Reel Idler	£2.40
3V35/36/38/39 Take up Clutch	£2.00
Sanyo	
VTCS000/5150/6500 Idler Roller Assembly	£1.95
VTCS000/5150/6500 Reel Drive Pulley Unit	£5.00
Panasonic	
NV370 Idler Arm Unit (VXP0521) Gen.	£2.25
NV8600/8610 Play Idler (VXP0243)	£0.95
NV332/777/788 Idler Unit (VXP0463)	£3.95

NV600/688 Idler (VXP0515)	£3.75
NV333/366 Idler Arm (VXL0997)	£3.10
NV8400/8600/8610/8620 (VXP0245)	£0.70
NV333/366 etc. (VXP0401) NV700 7200/7800	
(VXP0344) etc. (VXP0401) NV2000/3000	(VXP0331)
(VXP0329)	£0.70
Bank Tension Bands	From £1.50
Fisher	
FVHP615 Idler Assembly, Genuine	£5.00
FVHP615 Gear Idler Assembly	£4.35
FVHP905 910 Gear Idler Assembly	£4.35
FVHP520/530 Idler	£2.85
FVHP520/530 Pulley	£0.70
Sony	
SILC5/7 Rewind Kit	£4.20

VIDEO MOTORS

Reel Motors	
Sanyo VTC5000 5150/5300/5400/6500	£7.90
Sharp VC9300/9500 etc. Genuine	£15.90
Panasonic NV333/366. Genuine	£13.20
Ferguson 3V29/30 JVC HR7200/300 Gen.	£22.70
Drum Motors	
Ferguson/JVC (Mechanical models)	£21.45
Sharp VC7300/7700/7750/8300. Genuine	£24.63
Capstan Motors	
Ferguson/JVC (Mechanical models)	£21.45
Ferguson 3V35	£22.50
Sony SLC7/C5 (BHF1100D)	£28.50
Sharp VC7300/770/7750. Genuine	£30.50
Hitachi VT33	£30.00

REMOTE CONTROLS

Ferguson, Grundig, ITT, Philips, Pye, Sony and Hitachi. Various models TV & Video. From £13.50
Sony remote control rubber pads. State model.

LINE OUTPUT TRANSFORMERS

Decca 100	£8.50
ITT CVC20	£9.75
ITT CVC25, 30, 32	£8.50
ITT Compact 80 series	£16.75
Rank Bush T20A	£9.25
Philips KT3	£12.50
Thorn 1690, 1691, 1694, 1615	£7.10
All Sony. Please ask for quotation.	

TV ON/OFF SWITCHES

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

BELT KITS

Most models. Prices start from 55p

PINCH ROLLERS

Prices from £2.80

TRANSISTORS	
BC107B	£0.10 BF970 use BF472
BC108B	£0.10 BU105
BC147A	£0.07 BU126
BC172C	£0.07 BU208
BC214A	£0.07 BU208A
BC214B	£0.07 BU208 (Toshiba)
BC227	£0.07 BU208D
BC238	£0.07 BU325A
BC308A	£0.07 BU407
BC327-25	£0.07 BU426A
BC328-40	£0.05 BU500
BC337	£0.07 BU508A
BC547A	£0.07 BU509D
BC548	£0.07 BU806
BC549	£0.07 BU807
BC559B	£0.07 BU111
BD137	£0.30 BU834
BD237	£0.22 SG284A
BD238	£0.22 TIP29
BD243B	£0.15 TIP31
BD243C	£0.30 TIP32
BD244	£0.30 TIP41
BD244C	£0.30 TIP42
BF195	£0.07 TIP42C
BF198	£0.15 TIP112
BF197	£0.15 2SC1413A
BF198	£0.07 2SC2958
BF259	£0.22 2SC1553
BF458	£0.22 2SD639
BF459	£0.22 2SD1397
BF471	£0.25 2SD1398
BF472	£0.25 2SD1497-02
BF669 use BF471	£0.25 2SD1497-06

INTEGRATED CIRCUITS

AN305	£3.10 HA11715	£3.20
AN3821K	£5.75 LA4460	£1.70
AN3822	£7.50 LA4461	£1.80
AN3310	£4.25 LA7801	£1.25
AN3225	£4.00 M5454	£1.85
AN3360	£3.75 M51393	£4.25
AN3362	£4.25 M54543	£1.75
AN3367	£5.50 MC1458 - use UPC1458	£3.75
AN5671K	£5.50 STA401A	£3.75
AN5677	£5.25 STA441C	£3.00
AN7169	£3.50 STK5325	£5.50
BA8109	£1.80 STK5332	£3.50
BA8209	£1.75 ST5422	£5.00
BA8236A	£1.95 STK5451	£5.50
BA8302A	£1.80 STK7348	£5.00
BA8304	£1.70 STR441	£4.75
BA8305	£1.75 STR1096	£3.60
HA1377	£2.00 STR4211	£5.95
HA13001	£1.80 STR620DS	£4.30
HA13008	£4.50 TA727P	£2.95
HA11714	£3.50 TA7280	£2.50

Access & Visa Accepted

INTEGRATED CIRCUITS (Cont)

TA7241	£2.50	TD2581/2581Q	£1.55
TA7267P	£2.80	TD2590	£2.00
TA7629	£4.00	TD2653A	£2.75
TBA1205	£0.50	TD2600	£5.80
TBA530	£1.00	TD2611A	£1.80
TBA560	£1.00	TD26190	£0.95
TBA800	£0.85	TD26341	£2.25
TBA820M	£0.45	TD26360	£3.40
TBA9205	£1.00	TD26361	£2.50
TD11035	£1.90	TD2652A	£2.80
TD1035T	£1.90	TD26550	£2.50
TD1044	£1.50	TD26551	£2.50
TD1082	£3.20	TD26552	£2.50
TD1170S	£1.20	TD26553	£3.00
TD1190	£1.90	TD26554	£3.80
TD1112	£1.00	TD26555	£2.60
TD1510	£4.50	TD26556	£2.00
TD1515A	£2.50	TD26557	£2.55
TD1770	£3.00	TD26558	£2.00
TD1940	£1.80	UPC339C	£0.70
TD1950	£2.50	UPC1230	£1.75
TD2003	£1.30	UPC1363	£1.90
TD2005	£1.70	UPC1365	£2.50
TD2030	£1.40	UPC1372	£2.20
TD2270	£2.20	UPC1387C	£1.50
TD2510	£4.30	UPC1394C	£1.70
TD2521-d	£3.65	UPC1458	£1.95
TD2550D	£1.10	ASK FOR ICs NOT LISTED	

OTHER SPARES

Universal Video Copying Kit	£3.60
Universal Tripler	£5.20
Video Cassette Lamp - Ferguson/JVC with/without plug	£0.50
Video Cassette Lamp - Sharp/Panasonic/Amstrad/Hitachi	£0.50
Video Cassette Lamp - Sharp 9300 etc. complete with plastic moulding	£0.75
Universal Cassette Lamps 40ma/60ma	£0.50
CRT Anode Caps	£0.60
Universal Tripler	£4.50
Universal Tripler with Focus Pot	£5.00
Thorn TX10 Focus Unit	£8.50
Video Tape Splicing Kit	£8.95
Hitachi TV Frame Module HM6251	£4.60
Cassette Housing Assembly for Ferguson 3V35/36/38/39/42/43/44/45	£25.25

SERVICE AIDS - SWITCH CLEANERS, HEAD
CLEANERS, FOAM CLEANERS, SILICON GREASE,
DESOLDERING BRAID ETC. NOW AVAILABLE. ASK
FOR PRICES.

VIDEO AND AUDIO PLUGS, CONNECTORS, LEADS
ETC. IN STOCK.

RESISTORS, CAPACITORS, FUSES ETC. NOW
AVAILABLE.

FOR SONY AND PANASONIC AUDIO, T.V. AND
VIDEO SPARES, QUOTE PART NO.
SEND FOR NEW PRICE LIST.



183 Acre Lane, Northampton NN2 8DX. Telephone: (0604) 847800



ZonePort TV & VIDEO WAREHOUSE

ONE OF SOUTHERN ENGLAND'S FOREMOST TRADE SUPPLIERS

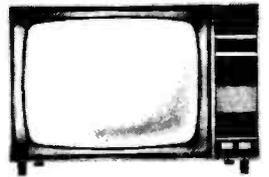
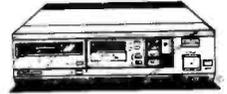
We are one of the South's leading Trade suppliers of top quality ex-rental TV and Videos. A good range held in Philips, JVC, Sony, Toshiba, Hitachi and National Panasonic colour TVs including portables, teletext and remote control models. Now In Stock: Ex-Granada Models, Finlandia/Rediffusion Mk 3, 4 & 4A. Basic, remote & teletext versions.

NEW B GRADE

**ASSORTED STOCK
FST TEXT MODELS,
MIDI SYSTEMS, VCR's
(Single & dual speed)
PHONE WHILE
STOCKS LAST**

CUSTOMER READY STOCK

We specialise in supplying working stock that has been professionally refurbished to a high standard. Our engineers pay special attention to the cosmetics as well as the electronics, so come to us for competitively priced stock that is *genuinely* ready for your showroom and your customers.



RING OUR HOT LINES NOW!

SPECIAL OFFER
REDIFFUSION TRANSLATOR
NO. 847038
£2.00 plus £3 P&P inc. VAT

**BRIGHTON
CUSTOMERS**
CONTACT SIMON HEALY

ZONEPORT
UNIT N2, LONDON ROAD TRADING ESTATE,
SITTINGBOURNE, KENT
CONTACT BRIAN MOLLETT

**NORTH EAST AND
NORTH WEST ENGLAND**
CONTACT HANIF PATEL

☎ (0273) 571672

☎ (0795) 28166

☎ (0524) 61122

NOTICE

TO ESSEX TV TRADERS

NEW WAREHOUSE
Ex-rental TVs and VCRs plus
new manufacturers 'B' graded
goods available now!

- ★ Fully serviced, ready for the showroom
- ★ VCR toploaders/front loaders
- ★ TVs — Ferguson, Philips Professionals, TX stereo, National Panasonic, Grundig, Decca, Toshiba, JVC, Samsung and a lot more



Phone Paul on 0375 640800
(2 lines)

GRAB SOME ACTION NOW —
Strictly TRADE ONLY

CLEARVISION

30A CORRINGHAM RD.
STANFORD-LE-HOPE, ESSEX
OPEN MON-SAT 9AM-6PM

APPROX. 5 MINS FROM
DARTFORD TUNNEL
TAKE A13 TILBURY ROAD
FROM JUNCTION 30/31, M25

DECCA • ITT • **TELTECH** • SHARP • AKAI

TELTECH

OVER 5,000 SQ. FT. OF QUALITY EX-RENTAL TV + VIDEO

**QUALITY EX-RENTAL
TV & VIDEO**

WORKING — NON-WORKING — BASIC —
REMOTE OR TEXT

G11 — K-T3 — K-T30 — GEC —
DORIC — FINLANDIA

OUR PRICES WILL NOT BE BEAT

TELETEXT FROM ONLY £25
COLOUR PORTABLES
FROM ONLY £30

WHAT YOU DONT BUY
YOUR COMPETITORS
WILL!

**OLDER
TV's £3**

CALL BRIAN ON THE HOTLINE
051-922 4163 051-220 4680

UNIT 5, ROBLEY HOUSE
ORWELL ROAD,
KIRKDALE, LIVERPOOL 4

• FINLANDIA • **TELTECH** • SONY • GEC •

NAT PAN
• PYE •
• TELTECH •
• FERGUSON •
• SANYO •

GRUNDIG • DORIC •
• TELTECH •
• HITACHI • PHILIPS •

THE UK'S No.1 IS AIMING EVEN HIGHER!

THE BEST BRANDS ★ THE BEST PRICES ★ THE BEST SERVICE

WORKING CTV'S

FINLANDIA £8 G11 BASIC £15
TX BASIC (8311) £25
TX STEREO £75

HUSSAIN CENTRAL TV

WORKING VCR'S

MECHANICAL FROM £35
HITACHI T/L FROM £50
HITACHI I/R REMOTE FROM £65

★ ★ ★ ★ ★ ★ ★ ★ ★ ★
★ **FST's &** ★
★ **LATE VCR's** ★
★ **AVAILABLE** ★
★ **NOW!** ★
★ ★ ★ ★ ★ ★ ★ ★ ★ ★



★ **DIRECT LORRY LOADS AVAILABLE AT DISCOUNT RATES** ★

MOST MAKES OF EX-THORN & EX-GRANADA

RING NEAREST BRANCH FOR FULL DETAILS. EXPORT ENQUIRIES WELCOME.

HEAD OFFICE: 48-52 PERSHORE STREET, BIRMINGHAM ☎ (021) 622 1023/1517

LONDON: ROYAL LONDON ESTATE, NORTH ACTON ROAD ☎ (01) 961 5005

PRESTON: UNIT 439, WALTON SUMMIT (M6 JUNCTION 29) ☎ (0772) 312101

LEEDS: UNIT 2, COPLEY HILL ESTATE, WHITEHALL ROAD ☎ (0532) 422774

CHEPSTOW: BULLWARK INDUSTRIAL ESTATE ☎ (0291) 271 000

SOUTHAMPTON: 500 MILLBROOK ROAD, MILLBROOK ☎ (0703) 777254

Note: Above prices subject to VAT & quantity — Handsets extra

★ TRADE WAREHOUSE ★

(TERRIFIC SELECTION)

TV's AND VIDEOS

(UNBEATABLE PRICES)



FULLY RE-CONDITIONED EX-RENTAL
READY FOR RETAIL OUTLETS



TV's

GOOD VARIANTS; BASIC; TX9s; TX10s;
NON-TEXT; TEXT; STEREO SUPER SOUND;
PORTABLES; ETC.

VIDEOS

3V23s; 3V30s; 8941/8944; 3V32/8942;
NON-THORN; THORN; REMOTE CONTROL;
MECHANICAL; ETC.

★ **GOOD DISCOUNT FOR QUANTITIES** ★

CONTACT

YORKSHIRE

KEN COXON TVs

UNIT 10,
SHAW LANE INDUSTRIAL ESTATE,
DONCASTER DN2 4SE
Telephone: (0302) 342932

NORTH EAST

DONNELLY'S TVs

THE CHAPEL
FRONT STREET, TANTOBIE
COUNTY DURHAM DH9 9RE
Telephone: (0207) 282435

VIEW VISION

PAGERS

○ — ○
TONE PAGER

○ — ○
WORD PAGER



○ — ○
NUMBER PAGER

○ — ○
VOICE MESSAGING

ENGINEERS DON'T
LOSE YOUR MESSAGES
WHILE ON THE MOVE
WE SUPPLY ACTIVATED
PAGERS FROM

TO BUY = £99 + VAT
TO LEASE = £10 + VAT
p. month

Air service charge: £4.95 +
VAT p. month
NATIONWIDE COVERAGE

SIEMENS FAX

FROM £650 + VAT
(16 Grey Levels, Portable,
and Fotocopy facility)

EX-RENTAL
TVs & VIDEOS
*Competitive
Prices*

TX10, TX9, STEREO
TEXT, 3V29, 3V30,
3V31, etc

○ — ○
WE CAN SUPPLY
YOU TRADE PRICED
COMPUTERS &
ACCESSORIES

○ — ○
ALTAI AERIAL AMPs
SINGLE OUTPUT
£5.50 + VAT
TWO OUTPUTS
£6.80 + VAT

(With mains on/off
switch, 7dB Gain
470-860 MHz UHF)

If interested, please write to:
458A WEST GREEN ROAD,
LONDON N15 3PT.

TEL:
01-365 1620
Mobile:
0836 329886

ARE YOU FED UP OF BUYING WORKING STOCK THAT DOESN'T WORK PROPERLY?

If so come to Teletraders

We believe we have the best range and display
of working stock that you are likely to see
anywhere.

Why not come along and see for yourself
You won't be disappointed

★ **Guarantee's available on all sets** ★

TELETRADERS

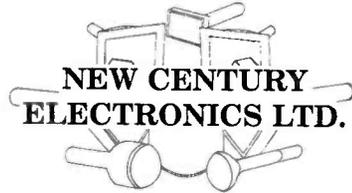
Brunel Industrial Estate
Newton Abbot, Devon
Tel. 0626 60154

IMPORTANT ANNOUNCEMENT BY THE DISPLAY ELECTRONICS GROUP

The Directors of the Display Electronics Group are pleased to announce that we have acquired the business and assets of the CRT manufacturing unit of Centronic Ltd. Centronic Ltd. have been established as CRT manufacturers for more than 40 years and the business will be continued by a new company New Century Electronics Ltd.

Display Electronics Ltd. have been established as CRT Regunners/Remanufacturers for more than 20 years.

As a result of the experience thus consolidated into the one group we are able to offer, uniquely, a total CRT engineering capability. Although the two companies' activities are complementary they will be run as separate enterprises. Manufacturing/product development will be undertaken by New Century Electronics at our Uxbridge (near London Airport) head office. Regunning/remanufacturing will be continued at our Iver (Bucks.) factory.

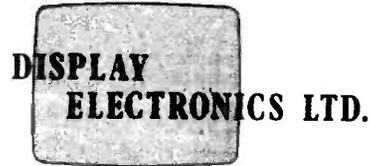


**NEW CENTURY
ELECTRONICS LTD.**
Manufacturers of CRTs for
Data - Telecine - Avionic - Radar - Head Up/Down
and many other applications.

Proven performance from a standard product range and a custom capability make New Century Electronics the obvious choice for your cathode ray tube needs.

NEW CENTURY ELECTRONICS LTD

SWAN WHARF, WATERLOO ROAD, UXBRIDGE UB8 2RA
TELEPHONE 0895 55800 • FAX 0895 55619



- ★ Do you use cathode ray tubes?
- ★ Can't find a replacement or shocked by the cost?
- ★ It may well be that a rebuilt tube will solve your problem.

Come to one of the most experienced firms in the business. We have been rebuilding cathode ray tubes for industry, broadcasting authorities, major airlines, M.O.D., universities, and, of course, the TV trade in general since the '60's.

DISPLAY ELECTRONICS LTD

ELIZABETH WORKS, THORNEY LANE NORTH, IVER, BUCKS.
TELEPHONE 0753 630137 • FAX 0895 55619

Customers are requested to despatch correspondence/inward goods to our head office facility at Swan Wharf, Waterloo Road, Uxbridge UB8 2RA.

AN103	£1.95	AN6610	£1.95	BA1320	£1.25	HA11749	£4.75	LA4440	£2.75	STK082	£7.75	STR620	£6.75	TD3540	£3.80
AN127Q	£2.20	AN6676	£7.50	BA1330	£1.75	HA11750	£5.00	LA4445	£2.75	STK084	£7.60	TA7063P	£1.50	TD3541	£3.60
AN203	£2.20	AN6677	£6.30	BA1360	£1.80	HA11753	£8.95	LA4460	£1.80	STK430	£5.50	TA7066P	£1.50	TD3560	£4.50
AN210	£1.75	AN6790	£2.30	BA5102A	£2.75	HA11758	£8.50	LA4461	£1.80	STK431	£5.95	TA7073AP	£2.75	TD3561A	£4.00
AN211A	£1.50	AN6811	£1.50	BA5204	£2.75	HA11768	£4.50	LA4500	£2.50	STK433	£5.25	TA7074P	£1.95	TD3562A	£6.00
AN217B	£2.20	AN6873	£4.50	BA5402A	£2.75	HA11788	£4.50	LA4505	£2.50	STK435	£5.00	TA7120P	£1.00	TD3651	£2.70
AN228W	£2.50	AN6875	£3.50	BA5406	£2.20	HA11788	£4.50	LA4507	£4.25	STK436	£5.25	TA7136P	£1.00	TD3652	£2.30
AN236	£2.50	AN6884	£2.75	BA5408	£2.75	HA11816	£6.50	LA4508	£2.85	STK437	£6.50	TA7140P	£1.75	TD3652	£2.30
AN240P	£1.50	AN7105	£2.50	BA6104	£2.80	HA11826	£9.50	LA4520	£2.50	STK439	£3.95	TA7145P	£2.50	TD4420	£3.75
AN241P	£1.50	AN7106K	£2.95	BA6124	£2.80	HA12002	£6.50	LA4570	£3.75	STK441	£7.95	TA7193P	£4.00	TD4450	£3.95
AN259	£2.75	AN7110	£1.50	BA6204	£2.75	HA12002	£6.50	LA5112	£1.95	STK443	£7.95	TA7205AP	£1.00	TD4450-2D	£2.95
AN260P	£2.20	AN7111	£1.50	BA6209	£3.75	HA12035	£9.50	LA527	£1.95	STK447	£4.95	TA7225P	£1.75	TD4450-2D	£2.95
AN262	£1.60	AN7112E	£2.95	BA6304	£2.20	HA12038	£6.75	LA6324	£2.95	STK459	£6.75	TA7208P	£1.75	TD4450-2D	£2.95
AN264	£3.75	AN7114E	£2.50	BK342	£5.00	HA12402	£2.95	LA6358S	£1.20	STK461	£7.50	TA7217AP	£1.60	UPC575C	£1.00
AN271A	£2.50	AN7115E	£1.60	HA1124A	£2.75	HA12413	£2.75	LA6458D	£1.20	STK463	£8.40	TA7220P	£1.60	UPC1001H	£2.00
AN274	£2.75	AN7116	£1.50	HA1124DS	£3.50	HA13001	£2.95	LA7016	£2.75	STK465	£8.50	TA7222AP	£1.30	UPC1018C	£1.95
AN277	£2.50	AN7120	£1.50	HA1125	£1.75	HA13007	£4.95	LA7031	£2.75	STK465	£8.50	TA7228P	£2.30	UPC1025H	£2.00
AN295	£3.80	AN7130	£1.50	HA1137W	£1.75	HA13402	£4.95	LA7032	£4.50	STK0025	£4.95	TA7229P	£2.20	UPC1031H	£1.95
AN301	£3.50	AN7131	£2.75	HA1144	£4.25	HA13432	£4.50	LA7215	£2.75	STK0029	£4.75	TA7229P	£3.25	UPC1032H	£2.00
AN303	£2.50	AN7143	£2.95	HA1156W	£1.20	LA1111	£2.75	LA7224	£2.95	STK0039	£4.75	TA7230P	£1.95	UPC1158H	£1.10
AN303	£2.50	AN7145M	£2.50	HA1167	£3.75	LA1140	£2.20	LA7505	£2.95	STK0048	£6.25	TA7230P	£2.95	UPC1181H	£1.95
AN303	£2.50	AN7146M	£2.50	HA1195	£1.75	LA1222	£1.00	LA7507	£2.95	STK0049	£6.25	TA7232P	£2.95	UPC1182H	£1.95
AN305	£3.50	AN7149N	£2.95	HA1197	£3.70	LA1230	£1.50	LA7521	£1.50	STK0051	£7.00	TA7233P	£2.95	UPC1185H	£2.50
AN313U	£2.95	AN7154	£1.90	HA1199	£1.85	LA1231	£2.00	LA7571	£4.75	STK0080	£4.95	TA7240AP	£2.95	UPC1188H	£2.00
AN315	£2.30	AN7156N	£2.50	HA1319	£2.50	LA1240	£1.95	LA7755	£3.20	STK1060	£7.95	TA7269P	£5.50	UPC1225H	£2.75
AN316	£3.75	AN7158N	£3.25	HA1366W	£1.80	LA1260	£2.95	LA7800	£1.95	STK2025	£7.50	TA7270P	£2.75	UPC1230H	£2.50
AN318	£4.95	AN7160	£3.75	HA1366WR	£1.85	LA1353	£2.50	LA7801	£2.95	STK2028	£7.50	TA7271P	£2.75	UPC1263C	£2.75
AN337	£2.25	AN7166	£3.95	HA1377	£1.90	LA1355	£2.50	LA7808	£2.75	STK2029	£5.75	TA7272P	£2.95	UPC1277H	£2.50
AN340P	£1.50	AN7168	£2.75	HA1368R	£1.95	LA1368	£2.50	LA7808	£2.95	STK2038III	£9.50	TA7274AP	£2.95	UPC1278H	£2.75
AN360	£1.30	AN7178	£2.95	HA1370	£3.70	LA1387	£3.60	LA7910	£2.20	STK2129	£6.75	TA7280P	£3.50	UPC1363C	£2.75
AN362L	£1.60	AN7213	£1.95	HA1372	£2.50	LA1460	£3.20	LA7920	£1.75	STK2230	£6.50	TA7281P	£2.95	UPC1364C	£4.75
AN363N	£3.50	AN7218	£1.75	HA1374	£2.50	LA1464	£3.20	LB1405	£2.20	STK2240	£9.50	TA7282AP	£2.95	UPC1365C	£3.60
AN366P	£1.70	AN7222N	£3.50	HA1377	£2.20	LA1460	£2.95	LA7928	£2.95	STK2025	£9.50	TA7283AP	£2.95	UPC1384C	£3.50
AN374P	£2.20	AN7223	£3.95	HA1384	£3.95	LA1201	£3.00	LA7968	£2.95	STK2038III	£9.50	TA7288P	£2.95	UPC1387C	£2.50
AN377	£2.00	AN7224	£3.50	HA1388	£3.50	LA1360	£1.50	LA7970	£2.20	STK3042	£6.50	TA7295P	£2.95	UPC1391H	£1.95
AN610P	£1.80	AN7256	£3.50	HA1389	£2.20	LA3201	£0.95	LA7970	£2.20	STK3044	£5.95	TA7317P	£2.75	UPC1394C	£1.95
AN612	£1.80	AN7273	£3.95	HA1389R	£2.20	LA3210	£0.75	LA7970	£2.20	STK3062II	£6.75	TA7328P	£2.20	UPC2002	£1.80
AN630	£4.75	AN7310	£1.20	HA1392	£2.50	LA3220	£2.95	LA7970	£2.20	STK4026	£5.75	TA7343AP	£2.95	UPC4558C	£2.50
AN6315N	£3.50	AN7322N	£3.50	HA1394	£2.95	LA3306	£1.65	LA7970	£2.20	STK4060	£6.50	TA7355P	£2.80	UPC516	£3.00
AN637	£2.20	AN7323	£3.95	HA1395	£3.75	LA3301	£1.30	C7800	£1.95	STK4151II	£6.75	TA7367AP	£2.95	UPC516	£3.00
AN6377	£2.00	AN7224	£3.50	HA1397	£2.75	LA3310	£2.75	M5134P	£1.25	STK4151II	£7.50	TA7608CP	£3.95	UPC640	£0.22
AN610P	£1.80	AN7256	£3.50	HA1398	£2.20	LA3201	£0.95	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN612	£1.80	AN7273	£3.95	HA1389R	£2.20	LA3210	£0.75	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN630	£4.75	AN7310	£1.20	HA1392	£2.50	LA3220	£2.95	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN6315N	£3.50	AN7322N	£3.50	HA1394	£2.95	LA3306	£1.65	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN637	£2.20	AN7323	£3.95	HA1395	£3.75	LA3301	£1.30	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN6377	£2.00	AN7224	£3.50	HA1397	£2.75	LA3310	£2.75	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN610P	£1.80	AN7256	£3.50	HA1398	£2.20	LA3201	£0.95	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN612	£1.80	AN7273	£3.95	HA1389R	£2.20	LA3210	£0.75	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN630	£4.75	AN7310	£1.20	HA1392	£2.50	LA3220	£2.95	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN6315N	£3.50	AN7322N	£3.50	HA1394	£2.95	LA3306	£1.65	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN637	£2.20	AN7323	£3.95	HA1395	£3.75	LA3301	£1.30	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN6377	£2.00	AN7224	£3.50	HA1397	£2.75	LA3310	£2.75	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN610P	£1.80	AN7256	£3.50	HA1398	£2.20	LA3201	£0.95	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN612	£1.80	AN7273	£3.95	HA1389R	£2.20	LA3210	£0.75	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN630	£4.75	AN7310	£1.20	HA1392	£2.50	LA3220	£2.95	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN6315N	£3.50	AN7322N	£3.50	HA1394	£2.95	LA3306	£1.65	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN637	£2.20	AN7323	£3.95	HA1395	£3.75	LA3301	£1.30	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN6377	£2.00	AN7224	£3.50	HA1397	£2.75	LA3310	£2.75	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN610P	£1.80	AN7256	£3.50	HA1398	£2.20	LA3201	£0.95	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN612	£1.80	AN7273	£3.95	HA1389R	£2.20	LA3210	£0.75	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN630	£4.75	AN7310	£1.20	HA1392	£2.50	LA3220	£2.95	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN6315N	£3.50	AN7322N	£3.50	HA1394	£2.95	LA3306	£1.65	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN637	£2.20	AN7323	£3.95	HA1395	£3.75	LA3301	£1.30	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN6377	£2.00	AN7224	£3.50	HA1397	£2.75	LA3310	£2.75	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN610P	£1.80	AN7256	£3.50	HA1398	£2.20	LA3201	£0.95	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75	UPC640	£0.22
AN612	£1.80	AN7273	£3.95	HA1389R	£2.20	LA3210	£0.75	M5155P	£1.30	STK4151II	£7.50	TA7609P	£3.75		

LRC (SPARES)

VIDEO SPARES FAST ex-stock!

ORDERS BEFORE 4.00 P.M. - SAME DAY DESPATCH!
LIST PRICES EXCLUSIVE OF VAT
ORDERS UNDER £50 ADD £1.00 P&P

01-388 1714



90B CLEVELAND STREET, LONDON W1P 5DR

VIDEO HEADS REPLACEMENT HEADS

JVC/FERGUSON ETC. 3HS-V	15.75
TOSHIBA 9600	25.10
PANASONIC NV-366 (4 HEAD)	40.20
PANASONIC NV-330 777	38.45
PANASONIC NV-333 2000/7000 ETC.	15.75
SHARP UNIVERSAL	22.40
SONY SLC5 6/7/8000	17.25
SONY SLC9	39.42
SONY SLC20 30/40/F1	22.25
FISHER FVH-615 ETC	34.10
FISHER FVH-615 ETC	34.10
SANYO VTC5000/5150/5300	31.80
VHR1100/1110/1150/1300/2300	30.44

Many More Replacement Heads in Stock

HITACHI ORIGINAL HEADS

VT5000	5458109	41.65
MT8000/9000	5458161	41.65
VT1114/33	5458415	44.71
VT63 64	5458152	41.65
VT65	5458282	60.84
VT120	5457471	48.15
VT130	5457472	48.15
VT150	5457473	48.15

PANASONIC ORIGINAL HEADS

NV100/200	VEH0171	41.40
NV180	VEH0292	62.10
NV230	VEH0296	41.40
NV333	VEH0103	41.40
NV366	VEH0174	62.10
NV580	VEH0210	62.10
NV370	VEH0218	44.10
NV430	VEH0286	41.40
NV370	VEH0267	62.10
NV777	VEH0177	62.10
NV788	VEH0201	70.38
NV810	VEH0294	69.11
NV830	VEH0296	70.38
NV850	VEH0285	70.38
NV870	VEH0288	93.84
NV2000/2010/3000/7000/7200/8500/8610	VEH0121	41.40
NV67	VEH0296	62.10
NV610	VEH0287	62.10

All other Panasonic heads in stock

SONY ORIGINAL HEADS

V01810/2630/5030 ETC.	RVS	89.46
EV4300/EV5700 (RED DR BLUE)	DVR-04R	88.82
EV4300/EV5700 (GREEN DR BLACK)	DVR-04R(0)	88.82
SL-HF950	DSR-48R	132.26
SL-HF100	DSR-95R	52.95
SL-F1/C20/30/40	DSR-36R	48.50
SL-C9	DSR-21R	48.50
SL-C5/6/7/8000	DSR-36R	48.50

SONY '5' SERIES

UMAT SERVICE KIT 127.60

ORIGINAL PANASONIC VIDEO SPARES

NV333 366 IDLER	VXP0401	1.24
NV333 366 (PLAY TAKE UP)	VXP0433	3.06
NV370 430 IDLER	VXP0521	2.56
NV810 30 50 70 IDLER	VXP0521	2.56
NV600 588 IDLER	VXP0515	3.18
NV730 IDLER	VXP0561	3.18
NV777 778 IDLER	VXP0463	3.18
NV2000 SERIES IDLER	VXP0329	1.24
NV2000 (PLAY TAKE UP)	VXP0331	1.24
NV7000 SERIES IDLER	VXP0344	1.24
NV7000 (PLAY TAKE UP)	VXP0343	5.76
NV67 610 IDLER	VXP0521	2.56
P. ROLLER NV333 366	VXP0492	8.31
P. ROLLER NV730	VXL1154	7.93
P. ROLLER BV730	VXL1209	7.58
P. ROLLER NV2000	VXP0330	10.66
P. ROLLER NV7000	VXL0776	7.85
TENS. BAND NV333 366 777	VZ02029	2.08
TENS. BAND NV370 730	VZ01065	1.95
TENS. BAND NV2000 2020	VQ20076	5.92
TENS. BAND NV7000 7200	VZ02078	3.08
REEL MOTOR NV333 366	MYN19V9L	15.93

ORIGINAL SONY VIDEO SPARES

F.F. & REW. ASSY. SLC20 30 40 HF100	5.40
GUIDE PIN KIT SFL1 C9 C20 30 40	6.65
DC DC CONVERTOR SLC9	22.53
CARRIAGE MOD KIT SLC9	6.40
CARRIAGE COMPLETE SLC9	69.10
UPPER DRUM UNIT SLC9 SFL1	22.75
CAPSTAN MOTOR SLC5 7	33.56
IDLER KIT SLC5 7	4.80
IDLER KIT SLC6	3.86
FWO LIMITER ASSY. SLC5 7	2.72
FRW LIMITER ASSY. SLC6	3.68
PINCH ROLLER SLC5 6 7	2.48
PINCH ROLLER SLC5 20 F1 F25 HF100 ETC.	7.85
TENSION BAND ASSY. SLC5 6 7	3.48
LOADING PULLEY SLC6	1.80

PLEASE ASK FOR ANY PARTS NOT LISTED

OTHER MANUFACTURER'S ORIGINAL PARTS

SANYO REEL MOTOR VTC5000	8.97
SANYO REEL DRIVE PULLEY VTC5000	6.50
FISHER IDLER ASSY. VXP0515	8.97
HITACHI FF REW. ARM VT11 33	2.85
HITACHI HM6251 FRAME 0 P MOD.	4.50
SHARP REEL MOTOR VQ3300 ETC.	17.70
SHARP REEL DR. IDLER VQ3300 ETC.	2.55
SHARP REEL DR. IDLER VQ481 ETC.	2.85

ORIGINAL JVC VIDEO SPARES

CAPSTAN MOTOR HR3660 3V22	24.75
CAPSTAN MOTOR HRD120 3V35	24.75
DRUM MOTOR HR3660 3V22	24.75
TUP IDLER (LARGE) HR3660	5.50
TUP IDLER (SMALL) HR3660	5.50
TUP IDLER HR7200 3V29	1.30
TUP CLUTCH HR7200 3V29	2.20
REEL IDLER HR7200 3V29	2.96
REEL IDLER HRD120 3V35	2.80
TUP CLUTCH HRD110 120 125	2.20
CASSETTE CARRIAGE 3V45 ETC.	25.11
PINCH ROLLER (ALL MODELS)	3.90

VIDEO BELT KITS (ORIGINAL)

PANASONIC NV333 366	3.85
PANASONIC NV777 738	2.32
PANASONIC NV230 430 670	2.62
PANASONIC NV370 630 850	2.62
PANASONIC NV688	4.18
PANASONIC NV-2000 SERIES	3.85
PANASONIC NV-7000 SERIES	3.85

VIDEO BELT KITS (REPLACEMENT)

SANYO VTC-5000	1.65
SANYO VTC-5300	2.20
SANYO VTC-5500	2.20
JVC HR-3330 3360 3660 3V16 22	1.78
JVC HR-7650	2.10
JVC HR-7700	2.10
HITACHI VT11	1.70
HITACHI VT5000	2.50
HITACHI VT8000	1.31
SHARP VC7300	2.20
SHARP VC8300	2.20
SHARP VQ3300	2.20
TOSHIBA 7540	2.50
TOSHIBA 9600	1.50
SONY SLC6	1.85
SONY SLC5 7	2.25

REMOTE CONTROL UNITS (SONY)

RM5048 KV1612 MKI/2204	28.59
RM159 KV2096 2219 2705 ETC.	37.50
RM532 KV2062 56 2216 17 ETC.	28.59
RM641A KV2092 2096	28.59
RM651 KV1447	19.36
RM651A KV1447	28.59
RMT211 SFL1	37.50
RMT213 SFL9	32.88
RMT216 SLC20 30 40 HF100 GREY	30.44
RMT216 SLC20 30 40 HF100 SILVER	32.43
RMT230 SFL30	37.50
RMT405 EV5600 700	37.50

ALL OTHER SONY REMOTES AVAILABLE

REMOTE CONTROL UNITS

PANASONIC		
NV333 370	BLACK DR SILVER	10.39
NV366	VSD0257	11.21
NV730	VS00357	30.58
NV777	NV-A17E	30.58
NV7000	VS00178	59.51
NV7200	BLACK OR SILVER	40.86

ALL OTHER PAN. REMOTES AVAILABLE

GOODIES SELECTION

SONY BETAMAX ALIGNMENT TAPE	36.55
PANASONIC VHS ALIGNMENT TAPE	88.10
SONY V 8 BATTERY PACKS NP22H	33.28
SONY ECCENTRICITY GAUGE + JIGS	69.51
SONY OPK203B TEXT BOARD	50.64
OPK113 TBOARD + LEADS - KV1442	60.64
OPK202A SECAM ADAPTOR	53.20
SONY REM. RUBBER PAD-RM632 6	6.40
TELESCOPIC AERIAL KV1400/1612	7.85
TELESCOPIC AERIAL KV1412/1430	9.34
VIDEO COPYING KIT (UNIV.)	4.25
SCART KIT (UNIV.)	5.60

STYL AVAILABLE FOR MOST MODELS

MANUALS (0 VAT RATED)

SONY TV MANUALS	6.30
SONY VIDEO MANUALS	10.86
PANASONIC & JVC MANUALS	P.O.A.

SONY SWITCHES

POWER TV REMOTE (QUOTE MODEL)	3.98
POWER TV NO-REMOTE (QUOTE MODEL)	3.35
POWER KV1442 1882 SOLENOID	21.64
TIMER SWITCH C57	1.03
RELAY SOUND SLC5 7 AUDIO CASSETTE 5V/12V	4.98

SONY SEMICONDUCTORS

SG613/SG6533	9.95
SG281A	4.98
PSU KIT SLC7	10.96
25C387A	4.15
25C1114 = 25C1454	6.40
25C1316 TRS. ASSY	7.85
25C1413A	7.47
25C3153	5.20
25D1996-25D1397	4.15
25D1398	5.20
25D1497-02/25D1497-06	5.20
SI1225	17.46
SI1K2129	17.46
TD24578A	3.98
TD24552	4.58
TD43500	6.40
UCP1385C	10.96
UCP1394C	3.98

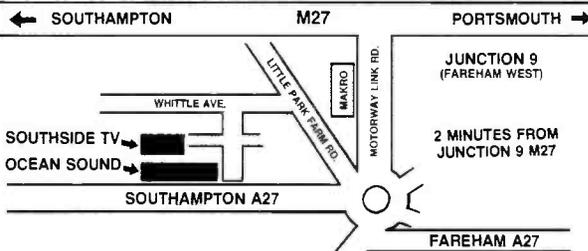
SOUTHSIDE TV

UNIT 8, APPLE IND. EST.,
WHITTLE AVE.,
SEGENSWORTH WEST,
FAREHAM OFF JUNCTION 9, M27
HANTS. TEL. (0489) 577251 24HR

SIMPLY THE WHOLESALE SUPPLIER
OF THE BEST WORKING EX-RENTAL
TV'S AND VIDEO RECORDERS.

* FREE HOLIDAY VOUCHERS OR DISCOUNTS *

Opening times: Mon-Fri 10am-5.30pm.
Sat Mornings 10am-1pm.



GAMMA U.K. LTD

1750/1754 Pershore Rd., Cotteridge,
Birmingham, B30 3BH
Telephone 021-458 4093

VIDEOS! VIDEOS!

Fully serviced video recorders with bulbs, belt & idlers changed and cabinets resprayed ready for retail. Example 3V29 £70. 3V30 £70. 3V40 £75. 3V35s £100 + many more P.O.A.

Export enquiries welcome especially to AFRICA

We're only a phone call away so ring today and place your order.

Many different types of TVs also available.

All prices plus VAT.

RELAY

OMAGH LTD

COMPUTER SOFTWARE

DO YOU RENT TELEVISIONS?

DO YOU STILL USE A CARD SYSTEM?

DO YOU FIND IT DIFFICULT TO KNOW YOUR ARREARS TOTAL AT ANY GIVEN TIME?

If you do then we recommend our new computer TV and Video Rental package. This package includes

- * automatic updating of each customer's record
- * alphabetical print-out of each customer's arrears and payments missed
- * total arrears immediately available
- * easy to use and operate.

Operates on all IBM compatibles running under MS-DOS. Free demonstration disc available.

CONTACT

WILLIAM J THOMPSON
Donaghian Post Office
Beragh Co. Tyrone
Telephone Beragh 214 (0662 72)

OSCILLOSCOPES		
TEKTRONIX 2215 Dual Trace 50MHz Delay Sweep Dual TB	£475	
TEKTRONIX 465 Dual Trace 100MHz Delay Sweep	£500	
TEKTRONIX 454 Dual Trace 150MHz Delay Sweep	£400	
TELEQUIPMENT DB3 Dual Trace 50MHz Delay Sweep	£300	
GOULD ADVANCE DS200A Dual Trace 40MHz Delay Sweep	£250	
TRIO CS1566A Dual Trace 20MHz	£200	
PHILIPS PM3233 Dual Trace 10MHz	£200	
TELEQUIPMENT D755 Dual Trace 50MHz Delay Sweep	£275	
KIRKUSI S530A Dual Trace 20MHz	£250	
HAMEG 203.4 Dual Trace 20MHz	£240	
H.P. 1220A Dual Trace 15MHz	£200	
GOULD ADVANCE DS1100 Dual Trace 30MHz	£210	
GOULD ADVANCE DS255 Dual Trace 15MHz	£210	
COSSOR CDU150 Dual Trace 35MHz Delay Sweep Solid State Portable 8 x 10cm Display	£180	
Optional front cover containing 2 probes etc.	£10	
SE LABS SM111 Dual Trace 10MHz Solid State Portable AC or external DC operation 8 x 10cm Display	£150	
SCOPE 4D10B Dual Trace 10MHz	£150	
TELEQUIPMENT TS44 Single Trace 10MHz Solid State	£90	
TELEQUIPMENT DT1 Dual Trace 10MHz Solid State	£150	
MARCONI TF2209 AM/FM 10MHz - 1GHz Sig Gen	£300	
MARCONI TF2208 AM/FM 10MHz - 510MHz Sig Gen	£375	
MARCONI TF2015 AM/FM 10 - 50MHz Sig Gen with Synchroniser TF2171	£550	
MARCONI TF2015 without Synchroniser	£425	
MARCONI TF2016 AM/FM 10MHz - 120MHz with Synchroniser TF2173	£400	
MARCONI TF2016 without Synchroniser	£300	
MARCONI SANDERS SIG SOURCE 605SR 850 - 2150MHz	£200	
DYMAR 1525 AM/FM 0.1 - 184MHz Sig Gen	£125	
H.P. 694 SWEET OSCILLATOR 7 - 12.4GHz	£500	
H.P. 620 Signal Generator 7 - 11GHz	£400	
H.P. 614 Signal Generator 800 - 2100MHz	£425	
FERROGRAPH RTS2 Recorder Test Set	£275	
WDELKE Wov & Flutter Meter ME108	£100	
LEADER LMV165A Two channel Millivoltmeter 5Hz - 500kHz 100V - 300V	£130	
LEVEL L2200DM 1Hz - 1MHz Sine Square	£125	
MARCONI Automatic Distortion Meter TF2337A 400Hz or 1KHz Measures down to 0.01%	£150	
MARCONI TF7200 UNIVERSAL LCR Bridge Battery Operated	From £140	
PHILIPS PM0456 FM Stereo Generator	£95	
PHILIPS COLOUR BAR GENERATOR PM5519 UHF/VHF Video Over 20 Test Patterns	£400	
SADETA MC321 COLOUR BAR GENERATOR RF Bands 1.34 & Video 8 Functions Sound Carrier Unused (P&P £7)	£75	
SADETA COLOUR BAR GENERATOR PAL MC101 8 Patterns Pocket Size Rechargeable Batteries Complete with Battery Charger Adapter Unused (P&P £4)	£75	
DECKAKORTING Colour Bar Generator type 82514	£125	
Labgear Colour Bar Generator KGT 8 Test Patterns (P&P £4)	ONLY £40 each	
LABGEAR FIELD STRENGTH METERS	£30 (P&P £7)	
LABGEAR CROSSHATCH GENERATOR Type CM6030 DB Cross-hatch Grey Scale/Blank Raster Mains or BATTERY Unused £18. Used £12 (P&P £3)		
TRIO RF SIGNAL GENERATOR Type SG402 100kHz-30MHz Unused (P&P £7)	ONLY £75	
ADVANCE SG28B AM 150kHz-220MHz	£45 (P&P £7)	
ISOLATING TRANSFORMERS		
240V in - 24V 200VA	£5 (P&P £4)	
240V in - 24V Out 100VA	£4 (P&P £4)	
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 & Carriage.		
SPECIAL OFFER		
HEWLETT PACKARD OSCILLOSCOPE		
TYPE 1740A - Dual Trace 100MHz Delay Sweep Trigger View.		
£575		
HAMEG MODULAR SYSTEM ONLY £400		
HM8001 Main Frame with HM8032 Sine Wave Generator 20Hz - 20MHz; HM8030 2 Function Generator 0.1 - 1MHz Sine Sq; Triangle; and HM8011 2 Digital Multimeter 4 1/2 digit.		
FARNELL SWITCHED MODE PSU 5V 40A & - - 12V 5A £28 ea. (P&P £4)		
Other Switched Mode PSUs available. Please enquire		
DISK DRIVES 5 1/4" DS/DD 80 track. from £50		
Some keyboards available. Please enquire		
MULTIMETERS (P&P All AVOs £10)		
AVO 8 Complete with Batteries & Leads From £50		
AVO 8 MKV Complete with Batteries & leads £90		
AVO TEST SET No 1 (Military version of AVO 8) Complete with batteries & leads. £65		
TEST LEADS suitable for AVO METERS: Red & Black with 2 Croc-Clips & 2 Prods. £5 (P&P £3)		
Black 'Ever-Ready' case for AVOs. Unused £15 (P&P £4)		
AVO VALVE TESTER CT150. Suitcase style. 22 Bases. (P&P £7) ONLY £25 each		
AVO TRANSISTOR ANALYSIS Mk2 CT446 Suitcase style complete with batteries and operating instructions ONLY £25 EACH (P&P £7)		
MARCONI AF POWER TF83A 20Hz - 35kHz 20MW - 10W with manual. ONLY £35 (P&P £7)		
MARCONI RF POWER METER TF1152A1 DC 500MHz 0.5 to 25W 50 Ohm with manual. ONLY £45 (P&P £7)		
NEW EQUIPMENT		
HAMEG OSCILLOSCOPE 604 Dual Trace 60MHz Delay Sweep Component Tester - two probes		£375
HAMEG OSCILLOSCOPE 203.6 Dual Trace 20MHz Component Tester with two probes		£314
All Other Models Available		
BLACK STAR COUNTER TIMERS (P&P £5)		
APOLLO 10 - 100MHz Radio Period/Time interval etc.		£222
APOLLO 100 - 100MHz (As above with more functions)		£295
BLACK STAR FREQUENCY COUNTERS (P&P £4) Meter 100 - 100MHz		£99
Meter 600 - 600MHz		£129
Meter 1000 - 1GHz		£178
BLACK STAR JUPITOR 500 FUNCTION GENERATOR Sine Square Triangle 0.1Hz - 500kHz (P&P £4)		£110
ORION COLOUR BAR GENERATOR Pal TV Video		£209
HUNG CHANG DMM 7030. 3 1/2 digit. Hand held 28 ranges including 10 Amp AC/DC 0.1%. Complete with batteries & leads. (P&P £4)		£39.50
As above DMM 6010 0.25% £33.50		
Carrying cases for above		£3 each
OSCILLOSCOPES PROBES Switched x1; x10 (P&P £3) £11		

GLASGOW WHOLESALE TELEVISION

SCOTLAND'S LARGEST WHOLESALE

**75 ROBERTSON STREET,
GLASGOW
(EX SABACO'S PREMISES)**

Junction 19 off M8

LARGE SELECTION OF GRANADA AND THORN WORKING AND OFF THE PILE AT UNBEATABLE PRICES!!

**DUE TO TREMENDOUS SUCCESS
OF LAST MONTH'S OFFER
WE ARE REPEATING OUR
SENSATIONAL OFFER**

FINLANDIA REMOTE CONTROL
SETS (WORKING)

from £25 + VAT
including hand unit

Spares available and diagram
Deliveries can be arranged

RING STUART
041-221 2146
for latest prices

CENTREVISION

**SLOPER RD, LECKWITH, CARDIFF
PHONE 0222 344754**

If you buy new televisions & Video's, **SAVE UP TO £70** and buy boxed, guaranteed seconds.

Quality ex-rental TV & video at **GREAT DISCOUNTS**, try before you buy.

Phone for our latest price list with all our monthly up to the date bargains.

TUBES

New and rebuilt for most makes of T.V.

including: Hitachi, Panasonic, Philips, Thorn, Toshiba, Sharp, Sony Mullard 20AX, 30AX, 45AX, F.S.T.

Two year guarantee with a four year option.
Price list available on request.

EXPRESS T.V. SUPPLIES
The Mill, Mill Lane, Rugeley, Staffs. 0889-577600

Exmouth
Bristol (AJC) London
0454-316285 0395-266210 01-863 9371

BOLTON COMMUNICATIONS PROJECT

SATELLITE TELEVISION COURSES

TO BE HELD AT BOLTON METROPOLITAN COLLEGE.

One Day **CITY AND GUILDS COURSE ON FIXED DISH SATELLITE INSTALLATION** (offered on behalf of the Confederation of Aerial Industries). Course date 28th Sept. Cost £90

Four Day **SATELLITE TELEVISION INSTALLATION COURSE** One day a week for 4 weeks. Start date 5th Oct. Cost £150.

STARTING SEPTEMBER

FULL-TIME TWO YEAR B.T.E.C. NATIONAL DIPLOMA IN ELECTRONICS AND COMMUNICATIONS (including Satellite Television)

PART-TIME CITY & GUILDS

279 – Television and Video Production (one or two days)

224 – Satellite Television (Day or Evening Course)

AVAILABLE 1990 – INTERACTIVE VIDEO ON SATELLITE TELEVISION

For further information please contact:

Terry Tudor (Project Manager),
Bolton Metropolitan College, Manchester Road, Bolton BL2 1ER.
Tel: (0204) 31411 Ext. 3371

MARSTALL LTD

TV & VIDEO WHOLESALEERS

38 HORNSBY SQUARE SOUTHFIELDS IND. ESTATE, LAINDON, ESSEX

FOR A LARGE SELECTION OF RECONDITIONED EX-RENTAL THORN TVs + VIDEOS PLUS MANY OTHER MAKES AT MOST COMPETITIVE PRICES

NEW & SECOND HAND SPARES ALSO AVAILABLE

QUANTITY DISCOUNTS

OPEN 9 a.m. - 6 p.m.
MONDAY - SATURDAY

DELIVERY SERVICE THROUGHOUT UK

COME AND PAY US A VISIT AT OUR NEW LARGER PREMISES

(JUST OFF M25 JUNCTION 29)

Don't Delay Phone TODAY!
0268-412711



REBUILT COLOUR TUBES

Delta – 20AX – 30AX – In Line

N.G.T. ELECTRONICS LTD.

120, Selhurst Road, London SE25 6LL

PHONE: 01-771 3535

First Independent Rebuilder with B.S.I. Certification

TV LINE OUTPUT TRANSFORMERS

PRICES INCLUDE CARRIAGE. VAT NOT APPLICABLE.

Barclaycard and Access welcome
9 am to 9 pm

DECCA "30" series Bradford colour 10.00 80 series colour 8.50 100 series colour 8.50 Fidelity ZX 22"/26" 27.00 Fidelity FTV12 10.00 Hinari CT4/5 22.60	ITT CVC5 CVC7 CVC8 CVC9 col. 10.00 CVC20 series colour 9.00 CVC30 CVC32 series colour 8.50 CVC45 8.50 FT100 FT110 state p/no. 10.00	PHILIPS G8 & G9 series colour 8.50	PYE 725-741 CT 200 KT2 8.50 REDIFFUSION Doric Mk.3 9.00 TANDBERG CTV 2-4-126 15.00 CTV 3-1-156 3-3-164 15.00 We also supply spares for Amstrad, Grundig, Tatung, Hitachi, Thom, Triumph, Saisho, Seneider, Sony, Toshiba	WINDINGS RANK BUSH MURPHY T20a T22, T26 Pri & Sec 6.00 Z718 primary state 18" or 22" 6.00 Z718 EHT, overwind 8.00	SOVEREIGN FARA £15.00 14" colour overwind THORN 1690/1691 EHT with rectifier £7.00	VISUAL DISPLAY UNITS We can Rewind the L.O.P.T.s for the I.B.M. LCE FB1 and the Digital VT100 £20.00 old unit Required.
---	---	--	---	---	--	---

E. PAPWORTH
120 Risegate Road,
Gosberton, Risegate,
Nr. Spalding,
Lincs PE11 4EY
0775 840778

Delivery by return of post.



CENTRAL



LONDON
BOLTON

TV & VIDEO WHOLESALERS (UK) LTD.
BIGGEST SELECTION - KEENEST PRICES

LEICESTER
BIRMINGHAM

FOR THE BEST DEAL AROUND

ENTIRE RANGE OF EX-RENTAL T.V.'s & VIDEO's FROM

THORN - GRANADA

PLUS MANUFACTURERS NEW 'GRADE B' T.V. & VIDEO
AUDIO - HI-FI - MICROWAVE - ETC.

HANDSETS - VIDEO HEADS - AERIALS - SET-TOP - SELFIX - R.F. LEADS - A.C. LEADS

50
BASIC T.V.'s
THORN/GRANADA
MIXTURE
SPECIAL
OFFER

50
TEXT T.V.'s
OR REMOTE
THORN/GRANADA
SPECIAL
OFFER

50
FULLY SERVICED
VHS VIDEO's
THORN/GRANADA
SPECIAL
OFFER

F.S.T.
NEW - USED 'B'
NEW 'B'
PORTABLES

FRESH STOCKS EVERY DAY. WORKING OR OFF THE LORRY LOADS AVAILABLE DIRECT FROM SOURCE

H/SETS
FROM £8.00

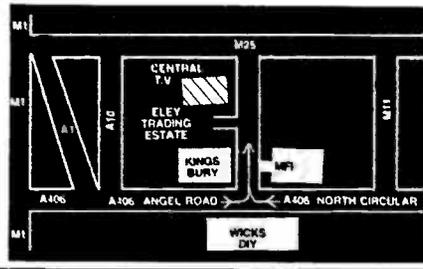
PHONE NOW FOR DETAILS

DELIVERY
SERVICE

LONDON
01-807 4090
01-884 1314
CEDER HOUSE, ELEY ESTATE
NOBEL ROAD, EDMONTON N18
OFF A406, ANGEL

BOLTON
0204 384868
UNIT 1
NILE STREET
BOLTON
LANCS.

LEICESTER
0533 515299
ST GEORGES MILL
HUMBERSTONE ROAD
CORNER OF WIMBLEDON ST
LEICESTER LE1



AGENTS REQUIRED

NATIONWIDE DELIVERY SERVICE

HEAD OFFICE
021 772 1591
369 STRATFORD RD
SPARK HILL
BIRMINGHAM
B11 4JY

TELEVISION

Classified
Advertisements

01-261-5942

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 £8.50 per single column centimetre (minimum 2.5cms). Classified advertisements 55p per word (minimum £10),

SETS & COMPONENTS

OCHRE MILL TECHNICAL SERVICES. Are now on 0666 (Malmesbury) 823228. Grundig TV spares all models to 1983. Fast, friendly, helpful service, sensible prices. Gt. Lype Farm, Charlton, Nr Malmesbury, Wilts SN16 9DR.

PANASONIC TV's + VIDEO's

Good range of late models – well worth a visit

*Superb and working
Many other models/makes
More profit, less headaches
Regular supply*

Repo TV
Daisy Works
345 Stockport Road,
Longsight, Manchester.
(A6 between M/c and Stockport)
Mr Poole or Mr Ricketts
Tel. 061-273-2854/274-3409

USED VIDEO SPARES

VHS – BETA – 2000

PANELS, MOTORS, CABINETS, TUNERS,
LOADING MECHANISMS, ETC.

SAVE £££s

PHONE US WE MAY HAVE IT.

HOLME SERVICES LTD
Union Street, Doncaster

Tel. 0302 349583 Fax 0302 349510

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

WIZARD DISTRIBUTORS

MANCHESTER TV & VIDEO SPARES

We stock spares for PHILIPS, PYE,
RANK, GEC, SHARP, SONY, HITACHI,
SCHNEIDER, HINARI & DECCA

And also THORN & ITT

FIDELITY SPARES MAIN DISTRIBUTOR.

Did you know we also stock

FUSES	I.Cs
TUBES	TOOLS
AERIALS	VIDEO LEADS
AEROSOLS	AUDIO LEADS
RESISTORS	SEMICONDUCTORS
CAPACITORS	SERVICE MANUALS
VALVES	TEST EQUIPMENT
HANDSETS	TV/VIDEO TROLLEYS
VIDEO HEADS	TELEPHONE ACCESSORIES

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.

C. T. V.

2 NORTON ROAD, STOURBRIDGE, WEST MIDLANDS

TELEPHONE: 0384-390706 / 0836-585829 (24 HR)

**LARGE SELECTION THORN TV + VIDEOS
QUANTITY OF NON THORN TV + VIDEOS
QUANTITY OF PORTABLES AVAILABLE**

ALL AT COMPETITIVE PRICES

OPEN: MON-FRI – 9.30-5.30

SAT – 9.30-3.00

**TEL: 0384-390706
0836-585829 (24HR)**

SERVICE PAGES

box number £1.00 extra. All prices plus 15% VAT. All cheques, postal orders etc., to be made payable to Television, and crossed "Lloyds Bank PLC". Treasury notes should always be sent registered post. Advertisements, together with remittance, should be sent to the Classified Advertisement Dept., Television Room 2331, IPC Magazine Limited, Kings Reach Tower, Stamford Street, London SE1 9LS. (Telephone 01-261 5942).



WELCOME

LINCOLNSHIRE AREA

FED UP WITH TRAVELLING FAR AND WIDE FOR YOUR EX-RENTAL TV AND VIDEO'S?



THEN WHY NOT TRY US FIRST?

BUDGET TV

Unit 4,
Exchange Road
Lincoln LN6 3JZ
Tel.
Lincoln 500413



SUFFOLK TV & VIDEOS

Large stocks always available

GEC, Fineline KT3, KT30, Hitachi, Nat Pan, working stocks in our showroom from **£20.00**.
Text **£85.00** with handset.

0394 670115

Bridge Road, Felixstowe,
Suffolk IP11 7FL

ANY SPARE SENT ANYWHERE

Whether you're professional or dabbler, your mail order answer for that hard to get component AGS THE small order specialist

(0752) 224369.

AGS Electronics, 49 Farringdon Road, Plymouth PL4 9ER

RCS VARIABLE VOLTAGE D.C. BENCH POWER SUPPLY
1 to 24 volts up to 1/2 amp. 1 to 20 volts up to 1 amp. 1 to 16 volts up to 1 1/2 amps D.C. Fully stabilised. Twin panel meters for instant voltage and current readings. Overload protection.

Fully variable.
Operates from 240V A.C.
Compact Unit: size 9x5 1/2x3ins.



£39 incl. VAT + Post £2.

RADIO COMPONENT SPECIALISTS

ACCESS 337 WHITEHORSE ROAD, CROYDON SURREY, U.K. Tel: 01-584 1665 VISA
List, Large S.A.E. Delivery 7 days Callers Welcome Closed Wednesday

FOR FURTHER DETAILS CONTACT CLASSIFIED ON 01-261 5942

QUALITY GUARANTEED QUALITY GUARANTEED

HAMBLEDON TV + VIDEO

UNIT 7E

ARGYLE INDUSTRIAL ESTATE

(ARGYLE STREET SOUTH)

BIRKENHEAD, MERSEYSIDE

3 MINUTES FROM BIRKENHEAD MERSEY TUNNEL,
15 MINUTES JNC. 3, M53

Whole range of working and non working TV + Video available

Videos serviced ready for your showroom packed with instruction book and R.F. lead

New boxed 'B' grade TV, Video, Midi, CD available

ALL AT SUPERB PRICES

You collect or we can deliver

CONTACT: PETER REARDON

051 647 2336

QUALITY GUARANTEED QUALITY GUARANTEED

NEWCASTLE upon TYNE

GEC	Solid State 2110
GEC	Starline
DECCA	80 or 100 series
FINLANDIA	Basic
FINLANDIA	Remote

PHILIPS	G11
PHILIPS	KT3
PHILIPS	K30 Basic
PHILIPS	K30 Remote
PHILIPS	K30 Text

SLOT METERS

Trade workers always available
Loads direct from source

VIDEO STANDS

FERGUSON TX	Basic
FERGUSON TX9	Text
FERGUSON TX10	Text
DORIC Mkiv	Text
DORIC Mkiii	Basic

ITT	Trimline Basic
ITT	CVC30
GRUNDIG	Basic
FINLANDIA	Basic
FINLANDIA	Text

TRANSLATERS

Delivery and Discount on Quantity

LARGE SELECTION



VIDEOS	
FERGUSON	3V29
FERGUSON	3V30
PANASONIC	NV333
HITACHI	VT8300



P.V.S.

COLOUR PORTABLES ALWAYS AVAILABLE

35 Nunsmoor Road, Fenham, Newcastle upon Tyne
Phone (091) 272 2303

NORTH WEST ELECTRONICS

STOCK CLEARANCE

YOU WON'T BETTER OUR PRICES OR QUALITY

WORKING STOCK
ALL THOROUGHLY CHECKED BY
OUR OWN ENGINEERS

TV'S

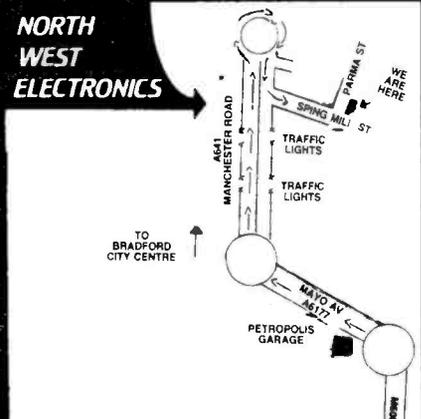
Bush T20/22,T24/6	£20
Pye G11	£20
Pye KT3	£30
Pye K30	£30
Ferguson TX	£30
Hitachi.....	£20
Hitachi 226 upwards from	£35

VIDEO'S

Sharp Electronic 7300 ...	£55
Ferguson 3V29	£70
Sharp 8300.....	£70
National Panasonic	£70
Ferguson 3V30	£85
Sharp 9300.....	£85
Hitachi VT11	£75

BRADFORD

**SPRING MILL STREET,
MANCHESTER ROAD,
BRADFORD 5**
5 MINS FROM MOTORWAY



PX MICROWAVES
£15

**IN STOCK NOW
TELETEXT BARGAINS**

from
£35.00

G11, K30/K35 Text
9.6 TX 9/10 Text
and Hitachi Text

TRADE SHOWROOM

LARGE QUANTITY
OF READY TO SELL
TV's & VIDEO'S

Also **BRAND NEW!!**
TOWER SYSTEMS,
MIDI SYSTEMS,
PERSONAL STEREO'S ETC.

CALL IN
YOU WILL BE DELIGHTED!

WORKING EX-EQUIPMENT PANELS

	IF	Con- verger	De- coder	Line scan	Power	Frame
T20/22X		5	14	18	17	14
T26 X		5	16	20	17	X
718 7.50		5	14	20	3	14.00
Philips						
G11 14.50		5	12	20	20	11.50

All prices include Postage & Packing.
But + VAT

**100's PX
HOOVER JUNIOR VACS**

ALL MODELS
AND OTHER MAKES IN STOCK

**WE ALSO STOCK LATE
MODEL VIDEOS**

3V35/44/55/65
Hitachi VT33 etc.
Philips 6660/64/UR60
AND MANY MORE

**RING OUR HOTLINES
NOW FOR PRICES**

UNTESTED STOCK

TV'S

Bush T20/22/24/6	£8
Pye G11	£10
KT3	£20
K30	£20
Ferguson TX9/10	£15
Hitachi.....	£10
Hitachi 226 upwards from	£20

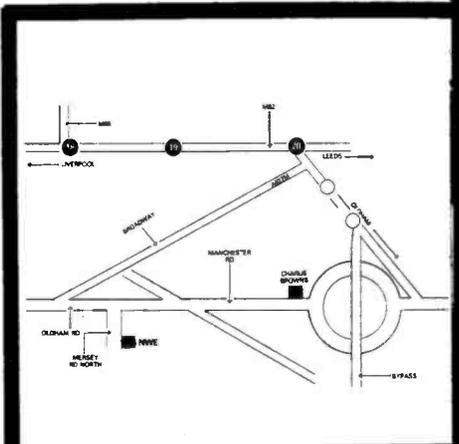
**MANY MORE GEC, ITT,
THORN etc. from** £5

VIDEO'S

Sharp Electronic 7300 ...	£35
Ferguson 3V29	£50
Sharp 8300.....	£50
National Panasonic	£45
Ferguson 3V30	£55
Sharp 9300.....	£55
Betamax all makes.....	£10

MANCHESTER

**UNIT 3,
MERSEY ROAD NORTH
INDUSTRIAL ESTATE,
FAILSWORTH**



Tel (0274) 308186

Fax (0274) 722229

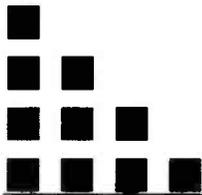
ALL PRICES ARE PLUS VAT & BASED ON QUANTITY

CHEQUES
ACCEPTED WITH
BANKERS CARD

VISA
WELCOME

**OPEN
6 DAYS
SAT 9-5.30**

**Tel
(061-683)
4612**



Sonic TV Distributors

WE VENTURE TO SUGGEST THAT IT WILL BE WORTH YOUR WHILE TO GLANCE THROUGH THE PRICES BELOW, WE ARE SELLING THESE RAPIDLY, AND WE CANNOT POSSIBLY REPEAT.

TELEVISION

	Working	Untested
G.E.C. Starline	£15	£12
K30 Basic	£20	£15
K30 Text	£50	£40
TX9 Text	£50	£35
Stereo Text	£75	£60
G11	£15	£10
Mk III	£15	£10
Mk IV Basic	£20	£15
Mk IV Text	£50	£40
FIN Basic	£15	£10
FIN Remote	£20	£10

VIDEOS

	Working	Untested
3V29/30	£65	£45
3V29 EQ	£60	£45
NV 2000	£55	£45
NV 2010	£50	£45
NV 333	£65	£50
NV 366	£65	£50
VT 8300	£60	£50
VT11 EQ	£70	£50
Fisher's EQ	£60	£50
Sharp 9300	£75	£55
3V35	£85	£65
3V31	£90	£75
VT19 L/P	£95	£75

VIDEOS FOR SPARES

1000 IN STOCK

£20 each in fives only

BIRMINGHAM

Tel: 021-565-1727
Fax: 021-555-5367

**UNIT 4A ABBERLEY STREET
SMETHWICK,
BIRMINGHAM B66 2QU**

5 MINUTES DRIVE FROM J1 ON M5

PRESTON

Tel: 0772-655011

**UNIT 34 ROMAN WAY
LONGRIDE ROAD,
PRESTON PR2 5BB**

10 MINUTES DRIVE FROM J31 ON M6

EXPORT ENQUIRIES WELCOME.

ALL PRICES ARE SUBJECT TO 15% VAT & BASED ON QUANTITY

INDEPENDENT TELEVISION & VIDEO COMPANY

SUMMER GIVE AWAY — SUMMER GIVE AWAY

FERG TX all sizes	TESTED £30	UNTESTED £20	VHS VIDEO TESTED ONLY   £55  	KT3 all sizes	TESTED £30	UNTESTED £20
TOSHIBA all sizes	TESTED £30	UNTESTED £20		GRUNDIG all sizes	TESTED £30	UNTESTED £20
VARIOUS COLOUR TELEVISIONS untested £5.00				VARIOUS COLOUR TELEVISIONS tested £10.00		
TELETEXT TELEVISION R/C untested £30.00				TELETEXT TELEVISION R/C Tested £50.00		
DIRECT LOADS AVAILABLE				ACCESS & VISA ACCEPTED		

**THESE ARE ALL GENUINE PRICES ONE & TWO'S INCLUDED
JUST BRING YOUR TRADE CARD**

**WE ARE EUROPE'S LARGEST EXPORTERS OF
RE-FURBISHED TELEVISIONS & VIDEOS
ALL ENQUIRIES WELCOME**

TELEX: 378414 BLBIRD G

FAX: 0602 861027

ALL OUR TELEVISIONS AND VIDEOS ARE IN GOOD ORDER WITH CLEAN CABINETS WITH WORKING REMOTE CONTROL. IF YOU ARE DISSATISFIED YOU MAY RETURN THE GOODS WITHIN SEVEN DAYS.

NOTTINGHAM

(10,000 sq. feet Warehouse)
Unit 3-3a Meadow Trading Est.
Meadow Lane
Near Notts County Football Ground
In National Tyre Yard,
Nottingham NG2 3HQ
Telephone:

(0602) 864627

SHEFFIELD

(6,000 sq. feet Warehouse)
2 min from Junc 34 of the M1
Unit 17,
Meadowhall Trading Estate
27 Amos Road
Sheffield 4
Telephone:

(0742) 422633

ELC EAST LONDON COMPONENTS
AUDIO TELEVISION VIDEO
COMPONENTS AT VERY KEEN PRICES
TEL: 01-472 4871

VCR SERVICE SHEETS £4.00p
VIDEO HEADS

JVC 3HS5V	£14.95p
JVC 3HS5VA	£24.95p
JVC 3HS5AVA	£24.95p
PANASONIC 3HS5N	£14.95p
PANASONIC 3HS5L1N	£20.95p
PANASONIC NV730	£39.95p
PANASONIC NV777	£35.95p
HITACHI VT8000/9000	£19.99p
HITACHI VT1133/63	£19.99p
SONY CS,C7	£19.99p
SHARP 3HS5P	£21.99p

VIDEO IDLERS

JVC	£4.75p
VT 9300	£2.95p
VT 11 14 17	£1.95p
VC 0006GEZ	£1.95p
VC 0006GEZ	£1.95p
NV 2000	£1.50p
NV 333	£1.50p
IDLER TYRES FOR MOST MODELS	50p
UNIVERSAL LAMPS	30p
JVC LAMPS	60p
SHARP LAMP	50p
UNIVERSAL TRIPERS	£5.00p
PINCH ROLLERS FOR MOST MODELS	£2.95p

ON/OFF SWITCHES

SONY ON/OFF SWITCH	£2.25p
G11 ON/OFF SWITCH WITH REMOTE	£2.00p
TX10 ON/OFF SWITCH WITH REMOTE	£2.00p

CASSETTE MOTORS

6-9-12-13-2 VOLTS	£3.00p
-------------------	--------

CASSETTE HEADS

MONO CASSETTE HEAD	95p
STEREO CASSETTE HEAD	£1.80p
TX10 FOCUS UNIT	£5.99p
RUBBER BELT ALL SIZE 1.2x1.2	70p
RUBBER BELT ALL SIZE 0.5x3	40p
RUBBER BELT ALL SIZE 0.5x5	80p

ELC EAST LONDON COMPONENTS
63 PLASNET GROVE, EAST HAM,
LONDON E6 1AD. TEL: 01-472 4871
OPEN 9AM TO 7PM.

two minutes walk from Upton Park Tube Station
PLEASE PHONE US IF WHAT YOU NEED
IS NOT LISTED AS WE HOLD THOUSANDS
OF ITEMS IN STOCK
ADD 70p P/P ADD 15% VAT
ALL GOODS DESPATCHED SAME DAY
PRICE SUBJECT TO CHANGE WITHOUT NOTICE
VISA ACCESS ACCEPTED

COMPUTER IC'S

4116	70p	AN203
4164	150p	AN210
Z80CPU	125p	AN214
6502	350p	AN215
6510	595p	AN262
6526	495p	AN272
6581	695p	AN301
6588	1695p	AN302
6589	350p	AN303
6594	350p	AN315
6595	350p	AN318
6596	350p	AN340
6597	350p	AN360
6598	350p	AN610
6599	350p	AN612
6600	350p	AN511
6601	350p	AN520
6602	350p	AN530
6603	350p	AN540
6604	350p	AN550
6605	350p	AN562
6606	350p	AN572
6607	350p	AN572
6608	350p	AN572
6609	350p	AN572
6610	350p	AN572
6611	350p	AN572
6612	350p	AN572
6613	350p	AN572
6614	350p	AN572
6615	350p	AN572
6616	350p	AN572
6617	350p	AN572
6618	350p	AN572
6619	350p	AN572
6620	350p	AN572
6621	350p	AN572
6622	350p	AN572
6623	350p	AN572
6624	350p	AN572
6625	350p	AN572
6626	350p	AN572
6627	350p	AN572
6628	350p	AN572
6629	350p	AN572
6630	350p	AN572
6631	350p	AN572
6632	350p	AN572
6633	350p	AN572
6634	350p	AN572
6635	350p	AN572
6636	350p	AN572
6637	350p	AN572
6638	350p	AN572
6639	350p	AN572
6640	350p	AN572
6641	350p	AN572
6642	350p	AN572
6643	350p	AN572
6644	350p	AN572
6645	350p	AN572
6646	350p	AN572
6647	350p	AN572
6648	350p	AN572
6649	350p	AN572
6650	350p	AN572
6651	350p	AN572
6652	350p	AN572
6653	350p	AN572
6654	350p	AN572
6655	350p	AN572
6656	350p	AN572
6657	350p	AN572
6658	350p	AN572
6659	350p	AN572
6660	350p	AN572
6661	350p	AN572
6662	350p	AN572
6663	350p	AN572
6664	350p	AN572
6665	350p	AN572
6666	350p	AN572
6667	350p	AN572
6668	350p	AN572
6669	350p	AN572
6670	350p	AN572
6671	350p	AN572
6672	350p	AN572
6673	350p	AN572
6674	350p	AN572
6675	350p	AN572
6676	350p	AN572
6677	350p	AN572
6678	350p	AN572
6679	350p	AN572
6680	350p	AN572
6681	350p	AN572
6682	350p	AN572
6683	350p	AN572
6684	350p	AN572
6685	350p	AN572
6686	350p	AN572
6687	350p	AN572
6688	350p	AN572
6689	350p	AN572
6690	350p	AN572
6691	350p	AN572
6692	350p	AN572
6693	350p	AN572
6694	350p	AN572
6695	350p	AN572
6696	350p	AN572
6697	350p	AN572
6698	350p	AN572
6699	350p	AN572
6700	350p	AN572

STR50103

STR50103	595p	STK043
HA1350S	500p	STK080
HA1370	375p	STK082
HA1372	350p	STK084
HA1374	230p	STK430
HA1377	230p	STK431
HA1384	400p	STK433
HA1388	350p	STK435
HA1389	230p	STK436
HA1391	230p	STK437
HA1392	230p	STK439
HA1394	300p	STK441
HA1396	395p	STK443
HA1397	275p	STK457
HA1398	260p	STK459
HA1399	195p	STK461
HA1420	150p	STK463
LA4220	150p	STK463
LA4230	200p	STK465
LA4420	280p	STK006011
LA4430	450p	STK0080
LA4440	375p	STK1060
LA4445	250p	STK2025
LA4460	180p	STK2025
LA4461	180p	STK2025
LA4500	250p	STK2025
LA4505	280p	STK2240
LA4507	400p	STK2250
LA4508	280p	STK3041
LA4520	250p	STK3042
LA7800	195p	STK3044
LA7205AP	100p	STK306211
LA7207P	180p	STK4026
LA7208P	170p	STK4060
LA7214P	280p	STK41311H
LA7215P	250p	STK41411H
LA7221P	160p	STK4151
LA7222P	250p	STK5481
LA7223P	140p	STK7308
LA7225P	230p	STR380
LA7227P	340p	STR440
LA7229P	220p	STR441
LA7230P	330p	STR451
LA7232P	200p	STR490
LA7233P	200p	STR620
LA7234P	200p	STR620
LA7240AP	290p	UPC1001H
LA7241AP	290p	UPC1018C
LA7242P	250p	UPC1025H
LA7249P	550p	UPC1031H
LA7250P	275p	UPC1032H
LA7271P	275p	UPC1158H
LA7272P	300p	UPC1181H
LA7273P	325p	UPC1277H
LA7274P	300p	UPC1278H
LA7280P	375p	UPC1188H
MB3705	180p	UPC1225H
MB3712	150p	UPC1230H
MB3714	160p	UPC1263H
MB3722	350p	UPC1274H
MB3723	350p	UPC1278H
MB3730	350p	UPC1363H
MB3731	250p	UPC1364H
MB3732	350p	UPC1365H
MB3733	350p	UPC1366H
MB3734	350p	UPC1367H
MB3735	350p	UPC1368H
MB3736	350p	UPC1369H
MB3737	350p	UPC1370H
MB3738	350p	UPC1371H
MB3739	350p	UPC1372H
MB3740	350p	UPC1373H
MB3741	350p	UPC1374H
MB3742	350p	UPC1375H
MB3743	350p	UPC1376H
MB3744	350p	UPC1377H
MB3745	350p	UPC1378H
MB3746	350p	UPC1379H
MB3747	350p	UPC1380H
MB3748	350p	UPC1381H
MB3749	350p	UPC1382H
MB3750	350p	UPC1383H
MB3751	350p	UPC1384H
MB3752	350p	UPC1385H
MB3753	350p	UPC1386H
MB3754	350p	UPC1387H
MB3755	350p	UPC1388H
MB3756	350p	UPC1389H
MB3757	350p	UPC1390H
MB3758	350p	UPC1391H
MB3759	350p	UPC1392H
MB3760	350p	UPC1393H
MB3761	350p	UPC1394H
MB3762	350p	UPC1395H
MB3763	350p	UPC1396H
MB3764	350p	UPC1397H
MB3765	350p	UPC1398H
MB3766	350p	UPC1399H
MB3767	350p	UPC1400H
MB3768	350p	UPC1401H
MB3769	350p	UPC1402H
MB3770	350p	UPC1403H
MB3771	350p	UPC1404H
MB3772	350p	UPC1405H
MB3773	350p	UPC1406H
MB3774	350p	UPC1407H
MB3775	350p	UPC1408H
MB3776	350p	UPC1409H
MB3777	350p	UPC1410H
MB3778	350p	UPC1411H
MB3779	350p	UPC1412H
MB3780	350p	UPC1413H
MB3781	350p	UPC1414H
MB3782	350p	UPC1415H
MB3783	350p	UPC1416H
MB3784	350p	UPC1417H
MB3785	350p	UPC1418H
MB3786	350p	UPC1419H
MB3787	350p	UPC1420H
MB3788	350p	UPC1421H
MB3789	350p	UPC1422H
MB3790	350p	UPC1423H
MB3791	350p	UPC1424H
MB3792	350p	UPC1425H
MB3793	350p	UPC1426H
MB3794	350p	UPC1427H
MB3795	350p	UPC1428H
MB3796	350p	UPC1429H
MB3797	350p	UPC1430H
MB3798	350p	UPC1431H
MB3799	350p	UPC1432H
MB3800	350p	UPC1433H
MB3801	350p	UPC1434H
MB3802	350p	UPC1435H
MB3803	350p	UPC1436H
MB3804	350p	UPC1437H
MB3805	350p	UPC1438H
MB3806	350p	UPC1439H
MB3807	350p	UPC1440H
MB3808	350p	UPC1441H
MB3809	350p	UPC1442H
MB3810	350p	UPC1443H
MB3811	350p	UPC1444H
MB3812	350p	UPC1445H
MB3813	350p	UPC1446H
MB3814	350p	UPC1447H
MB3815	350p	UPC1448H
MB3816	350p	UPC1449H
MB3817	350p	UPC1450H
MB3818	350p	UPC1451H
MB3819	350p	UPC1452H
MB3820	350p	UPC1453H
MB3821	350p	UPC1454H
MB3822	350p	UPC1455H
MB3823	350p	UPC1456H
MB3824	350p	UPC1457H
MB3825	350p	UPC1458H
MB3826	350p	UPC1459H
MB3827	350p	UPC1460H
MB3828	350p	UPC1461H
MB3829	350p	UPC1462H
MB3830	350p	UPC1463H
MB3831	350p	UPC1464H
MB3832	350p	UPC1465H
MB3833	350p	UPC1466H
MB3834	350p	UPC1467H
MB3835	350p	UPC1468H
MB3836	350p	UPC1469H
MB3837	350p	UPC1470H
MB3838	350p	UPC1471H
MB3839	350p	UPC1472H
MB3840	350p	UPC1473H
MB3841	350p	UPC1474H
MB3842	350p	UPC1475H
MB3843	350p	UPC1476H
MB3844	350p	UPC1477H
MB3845	350p	UPC1478H
MB3846	350p	UPC1479H
MB3847	350p	UPC1480H
MB3848	350p	UPC1481H
MB3849	350p	UPC1482H
MB3850	350p	UPC1483H
MB3851	350p	UPC1484H
MB3852	350p	UPC1485H
MB3853	350p	UPC1486H
MB3854	350p	UPC1487H
MB3855	350p	UPC1488H
MB3856	350p	UPC1489H



MIDLAND TELEVISION



WORKING C.T.V.

Philips KT3 & K30	£15
Philips KT3 & K30 Text	£56
Bush T20 & T26	£15
Grundig 7400	from £25
Toshiba	£29
Sanyo	£40

THORN

8800	£6
9000	£15
9600 R/C	£15
9900 R/C	£20
TX9 & TX10 Basic	£27
TX9 & TX10 R/C	£33
TX9 & TX10 Text	£56
Stereo Text	£95
FST Text	£95
FST Stereo Text	£105

WORKING C.T.V.

FERGUSON

3V23	£65
3V30-8940	£69
3V31	£78
3V32 L/P	£85
3V35	£78
3V43 L/P Hi/Fi	£100
3V65	£100

PHILIPS

VR6462	£78
VR6560	£85
VR6740	£100
VR6760	£100

TOSHIBA

V65	£78
V72	£100
V75	£100
GRUNDIG VHS	£78

We specialise in working and guaranteed Thorn & Co-op stock. No customer too large or small. Our collection days are Wednesday, Thursday & Friday. Call Steve or Keith for stock availability. **SPECIAL OFFER**, free delivery in Leicestershire, Warwickshire, Cambridgeshire, Lincolnshire, Northamptonshire and London areas.

4 MINS J22 M1

ALL R/C & TEXT SETS SUPPLIED WITH HANDSETS	Nationwide Delivery Service Available 11 MARKET STREET, COALVILLE, LEICS. TEL: (0530) 810836 or 810837	ALL PRICES SUBJECT TO VAT AT 15%
---	---	---

REBUILT TV TUBES

DIRECT FROM THE FACTORY WHERE THE BEST COSTS LESS

FINEST QUALITY LOWEST PRICES

SPECIAL DISCOUNTS FOR BULK BUYERS

2 YEAR GUARANTEE, 4 YEAR OPTIONAL

ALL MAKES INC. SONY
NATIONWIDE DELIVERY

PHONE NOW FOR FREE LISTS

SHERWOOD TUBES LTD
60A PEVERIL STREET, NOTTINGHAM NG7 4AH.
Tel. 0602 786896

NOTICE TO READERS

Whilst prices of goods shown in classified advertisements are correct at time of closing for press, readers are advised to check with the advertiser both prices and availability of goods before ordering from non-current issues of the magazine.

ADMIN TELEVISION

K30 KT3	£20 INC
GEC BOW/FRONT	£20 INC
ITT TRIMLINE	£20 INC
TOSHIBA	£20 INC
MK 4 DORICS	£20 INC
ALL TEXT	£45 TO £65 INC
PORTABLES	£40 INC
PYE G11 BASIC	£14 INC
TX9s/10s	£18 INC
PHILIPS G11 BASIC	£12 INC
JAPS	FROM £10 INC

MK3. GEC T20. ITT. DECCA
80s/100s
£10 INC

PHONE

051-548 4414

**UNIT J, ADMIN BUILDINGS,
KIRKBY, LIVERPOOL L33 7JX**

BUSINESS FOR SALE

WIRRAL

THE LEISURE PENINSULA

Large freehold, main road location, Retail/W/Shop premises.

Excellent service income, extensive scope for sales.

Property + Business £42,000 SAV to include valuable fixtures and fittings.

Details (Principals only):

P.O. BOX 254

THE BEST ELECTRONIC COMPONENT, AUDIO AND VIDEO ACCESSORIES BUSINESS IN THE SOUTH EAST

Established and in the same hands 15 years. 2 freehold lockup shops with rear stores, good trading position just off High Street, Ramsgate, Kent. Parking outside. Price includes fittings, fixtures, goodwill and lots of essential stock, help from the present owner when taking over.

ALL FOR £75,000

Phone 0843 594072 24 hours

WANTED

WANTED

Substantial Quantities of Good Used Ferguson TV's

20"/22" G (2 or 3)

20"/22" H (2 or 3)

OR ANY F.S.T.

Tel. Mr Hicks 0707 336188

END OF RUN LINES. Surplus stock. Mail order returns Audio, TV, Video, small appliances or ex-rental or P/X models TV, Video. Any quantity considered, contracts preferred with rental firms direct. Phone LORRAINE on 0532 444195.

WANTED EX-RENTAL T.V.s and Videos, any quantity, quick collection. Cash paid. 0742 312832.

WANTED: MACDONALDS RADIO AND TELEVISION Servicing Book 1986-87. Tel. 0254 60333.

SITUATIONS VACANT



Rank Video Services

Europe's Leading Video Duplicator

ENGINEERS

We have various positions available for maintenance engineers. Whilst a video engineering background is preferable, anyone with suitable experience will be considered.

A generous salary and good career prospects are offered.

Please telephone Adrian New on 01-568 4311 or send him your C.V. at the Personnel Department, Rank Video Services Ltd., Phoenix Park, Great West Road, Brentford, Middlesex TW8 9PL.



Part of The Rank Organisation

FIND FAULTS FAST!

with this efficient battery-powered SIGNAL TRACER. Much quicker to use than a 'scope, especially at millivolt levels! Listen clearly to tape head signals. Trace through tuners, IF's, switching and AF-amps with ease.

Complete and ready to use, with AF and RF probes £37.50 inc carr + £2.35 per battery. VAT extra.

COLEBOURN ELECTRONICS
20 Folly Lane, St Albans, Herts. AL3 5JT
or Tel. 0727 44785 for more details

TEKTRONIX 454 OSCILLOSCOPE. 150 MHz delayed sweep. Manual. Carrying case. Probes VGC. £295 cash, PX Bush TV22. Tel. Basingstoke 56732.

LOGIC ANALYSER THURLBY LA160B with three LC01 data pods and three LG09 grabber leads GWO £400 o.n.o. inc VAT. COTSON ELECTRONICS 021 429 3797.

PRIVATE RETAILER has excellent part exchange colour TV's & videos to clear on regular basis. 0494 814317.

TEKTRONIX 564B STORAGE OSCILLOSCOPE 30 mhz Bandwidth 3A6 + 3B3 Time base modules perfect condition £200.00. Tel. 0495 215210.

REFURBISHED HAND SETS FOR SALE. From £4.60 + VAT. For details phone 0532 444195.

WHY NOT FAX YOUR

COPY TO US ON:

01-261 6704

SKILLED TECHNICIAN WANTED. Good pay rates apply. Jomill Enterprises, 173 Daiston Lane, E8. Tel. 01-533 2229.

METERS. Reconditioned 10p/50p available from stock. Contact THE METER CO. (Poole) LTD. (0202) 683498.

FOR SALE

SATELLITE TELEVISION VIDEO COURSE OF INSTRUCTION

A NEW PRODUCTION FOR **MICROFORGE** BY FLINTDOWN C5 TV

- COVERS :
- SATELLITE FOOTPRINTS AND POSITIONS
 - MICROWAVE TECHNIQUES
 - VIDEO MODULATION (PAL, DMAC, ETC.)
 - ENCODING AND ENCRYPTION
 - INSTALLATION OF DISHES AND AIMING
 - HARDWARE OF INSTALLATION

AND MANY OTHER IMPORTANT FACTS YOU NEED TO KNOW.

INTENDED FOR ALL INVOLVED IN THE SELLING & INSTALLATION OF DOMESTIC SATELLITE SYSTEMS.

AVAILABLE ON VHS, BETA OR V8 CASSETTES AT £39.95 incl.vat (Access or Visa)

INFORMATION PACK AVAILABLE FROM

MICROFORGE LTD., 339 CLIFTON DRIVE SOUTH, ST. ANNES

LANCS. FY8 1LP TEL. (0253) 725499

AERIALS

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

U.H.F. Aerials Coaxial Cable Amplifiers

Groups A, B, CD & W

10 Element Aerial	2.25
18 Element End Mount	3.47
18 Ele. with Support Arm	4.38
Diamond DC10 Boxed	6.95
Diamond DC18 Boxed	9.95
Diamond Colour Grid	16.95
Antiference XG8	20.50
Antiference XG14	32.95
Set Top Aerials	2.30

Priced in 100 Metre Lengths all Cables can be supplied in 100 or 250 Metre Lengths Attenuation figures are Approx at 900 MHz/100M.

Volex Raydex

C55B 21dB Brown	13.50
C55W 21dB White	14.95
C56B 17dB Brown	13.95
C56W 17dB White	13.95
CT75 21dB DS	30.40
CT100 19dB DS	30.40
CT125PE 15dB DS	52.95
CT167PE 11dB DS	76.95
CT167RBS 11dB UG	84.95
R.A. RG & URM Types	POA

Delta & Pope Cables

TR100H109F	28.95
TR125PE-H47	42.58
TR167PE-H43	64.00

Antiference OX4 29.95
Walsey Electronics
The Full Range of Domestic & Professional Equipment is Available from Stock.
The following List are the Most Popular Lines

Set Back 12dB	9.99
Two Set 2 x 7dB	9.99
Three Set 12dB	12.99
Four Set 12.9 & e db	16.99
Q200 P20 26dB	16.99
Amerthyst U 6dBmV	120.45
Amerthyst W 6dBmV	154.60

J.W. Hardy communications

2 Way Amplifier 2dB	12.99
3 Way Amplifier 2dB	19.95
4 Way 20dB 46dBmV	32.56
Silver 24dB 46dBmV	38.95
Booster 20dB 54dBmV	49.50
Booster 20dB 60dBmV	75.50

V.H.F. Aerials

FM Omni Heavy Duty	7.95
FM Dipole Heavy Duty	3.64
FM 2 Ele. Heavy Duty	4.80
FM 3 Ele. Heavy Duty	6.95
FM 4 Ele. Heavy Duty	7.95
FM 6 Ele. Heavy Duty	12.95

Loft Stand & Bracket

12" x 1" Loft Stand	0.80
24" x 1" with 90° Bend	1.25

Masts

Alloy

6' x 1" 18g	1.95
10' x 1 1/2" 16g	6.95
16' x 2" 16g	16.95
20' x 2" 14g	26.50

Chimney Lashing

Standard Repair Kit	1.28
5 meter wire Coil	0.80
Corner Plates	0.06
4 1/4" J Bolt & Nut	0.14
1 1/4" V Bolt & Nuts	0.12
2 1/2" V Bolt & Nuts	0.22

Chimney Brackets

6" x 6" Pressed	0.68
6" x 6" Welded	0.98
6" x 9" Welded	1.48
7 1/2" x 7 1/2" Welded	2.15
13 1/2" Cradle Welded	2.35
Double Lashing Pair	2.65

Clamps

Aerial to Mast Clamps

15mm to 2"	0.30
Cross Clamp	0.65
V Bolt & Nuts fl.	0.12

Mast to Mast Clamps

1" to 2" Cross Clamp	0.75
1 1/2" to 2" Universal	1.60

Amstrad Satellite Now in Stock
SRX100 £154.50 SRX200 £199.00

Cable Accessories

Cable Clips

5.6 & 7mm	per 100 0.60
9mm Black	per 100 0.75
11mm Black	per 100 0.95

Adhesive Tape

20M 3/4" Black	0.32
10M Self Amalgamating	2.99

Cable Connectors

Coax Plug Alloy per 100	12.95
Coax Plug Alloy each	0.17
Coax Cuppler per 50	5.95
Coax Cuppler each	0.17
F Screw On 1mm	0.20

Attenuators

3, 6, 12, 18 & 24 dB	1.00
----------------------	------

Fly Leads

2M Plug to Plug	0.60
2M Plug to Socket	0.66

Wall Fixings

Welded Wall Brackets

6" x 6" Painted	0.97
6" x 6" Galvanised	1.97
6" x 9" Painted	1.48
9" x 9" Painted	2.26
12" T&K Painted	3.75
18" T&K Painted	4.75
18" T&K Galvanised	7.45
24" T&K Painted	5.35
16" Tripod Galvanised	12.95
Drills, Plugs, Screws	POA

Splitters & T Units

Walsey Electronics

Die-Cast T Units	3.75-8.82
Die-Cast Splitters	7.14-10.08
Die-Cast Outdoor Lid	0.99
Indoor Lid	0.55
Line Terminator 75ohm	0.40
Mini Splitters	POA
Mini T Units 2 Way	4.50

Altai In Door

2 Way "Y"	0.65
3 to 6 Way	1.48-2.25

SAC Splitters

2 Way Resistive	2.00
2 Way Inductive	2.65
3 Way Resistive	2.38
Diplexer UHF VHF	2.65
Diplexer A/E	2.65
Diplexer K CD	2.65

Coax Outlet Plates

Altai Surface Socket	0.48
Altai Surface Twin	0.75
Altai Flush Wall Socket	0.68
Altai Flush Twin	0.95
PO1U Single Isolated	2.16
PO1U 12 to 3dB	3.31-5.71
PO2U TV FM Iso	3.44-3.75
PO2U RS1 Show Room	3.75
PO2U 16 to 32dB	4.44-4.86
Trunk Mounting Socket	3.00

All prices Quoted are plus VAT
Carrier Up to 25kg 6.50
Carrier Up to 50kg 9.50
P=P for small light parcels 2.50

WE ACCEPT ACCESS

TELEVISION STUDIO SYSTEMS ENGINEERING

This BTEC validated Higher National Diploma course provides a unique opportunity to study for an advanced level engineering award.

Possession of this award may qualify a student for direct entry engineer status with the BBC or an ITV broadcast company.

The college installation uses a wide range of the most up to date broadcast standard, television studio equipment and is available for use in the various study areas.

The reward for two years intensive study, is offers of employment from TV broadcast companies, facility houses etc at attractive starting salaries.

If you have an interest in the design, performance evaluation, and maintenance of Television Studio systems such as video tape recorders, audio systems, TV cameras, digital systems of microprocessor control systems, then apply to the address below for further information.

Ravensbourne College of Design & Communication School of Television Wharton Road Bromley BR1 3LE Telephone: 01-464 3090

SATELLITE TV RECEPTION EQUIPMENT

LNB's, Receivers, Dishes, polar mounts and accessories.

90cm dish, mount and feed assy. with adaptor for Marconi LNB £89.00
C and Ku band LNBs from £49.00
F connectors - 10 for £2.00
NF and FN adaptors £1.20
20dB line amps. £14.00
Prices excl. VAT - Send SAE for leaflets.

DX ANTENNA

KESH ELECTRICS LTD.
Main St., Kesh, Co. Fermanagh, N.I.
Tel: 03656 31449 Tlx: 747412

BOOKS & PUB'S

NO COLOUR DEAD SET TRIPPING

FAST FIX

INTERMITTENT SOUND
BLANK RASTER
TUNER DRIFT

If you keep back issues of *Television* then read on. Fast Fix is a complete card filing system, listing the symptoms of television faults published in *Television Magazine* under *TV Fault Finding and Service Bureau* from 1981-1988 inclusive. Over 500 cards and thousands of faults are collated and indexed under manufacturers name and then chassis-model. An example is a Philips K30 with a blank raster, look on p744/Aug '88. For all those faults you know you have read about but cannot remember where, Fast Fix is a must.
Ready boxed, quick to use and easily updatable. Fast Fix could pay for itself with just one successful repair. Price £35.00.

Send cheque/P.O. payable to:
A. G. Humphreys,
13 Mansfield Avenue,
St John's Park, Hawarden, Clwyd.
Tel: 0244 532961

EATS LINE OUTPUT TRANSISTORS FRAME COLLAPSE

LET TELEVISION SELL YOUR PRODUCT FOR YOU RING NOW FOR FURTHER DETAILS 01-261 5942

TECHNICAL PUBLICATIONS!
SALORA TV's (Finlandia)

Digital Television :- £15.50

Operation, Servicing & Circuit Description of the Salora 'M' Chassis
Plus
The Granada series of Salora/Finlandia Training Course Notes.

XZ1 series & Service Guide	H Chassis	£8.50
YZ series & Service Guide	J "	£8.50
BZ series & Service Guide	J "	£8.50
CZ series & Service Guide	K "	£7.50
DZ series & Service Guide	L "	£7.50

Plus

VHS - The System	£ 5.50
VHS - Non Standard Playback	£ 8.50
VHS - C-Format	£ 6.50
VHS - Hi-Fi Sound (with video programme)	£11.95

UK Rental & Retail Ltd
Technical Training Department
PO Box 31, Amptill Road, Bedford MK42 9QQ
Telephone: 0234 226486, Fax: 0234 22609

Ⓜ A Member of Granada Group PLC

Ku BAND SATELLITE TV	£23.00	SATELLITES TODAY, A Short History	£8.00
SATELLITE AND CABLE SCRAMBLING AND DESCRAMBLING. Basic theory. 2nd Ed. 280p.	£19.00	HIDDEN SIGNALS ON SATELLITE TV. Teletext, telephone channels, teletype	£20.00
VIDEO SCRAMBLING & DESCRAMBLING. Advanced theory and circuits, 246 pages by Graf & Sheets	£21.00	SATELLITE, OFF-AIR & SMATV. By F. Baylín	£25.00
EUROPEAN SCRAMBLING SYSTEMS. Circuits, Tactics & Techniques, by J. McCormac, fascinating information for the service engineer	£29.00	WORLD SATELLITE ALMANAC. All footprints, 650 pages, second edition by M. Long	£32.00
HOME SATELLITE TV INSTALLATION VIDEOTAPE, 40 min- utes. VHS PAL	£27.00	WORLD 1990 SATELLITE ANNUAL. By Mark Long. Latest information	£31.00
		SATELLITE TV INSTALLATION GUIDE. 2nd edition by John Breeds	£12.00

Price includes P&P UK. Airmail Europe £2. Outside Europe £6.00 extra per item.
Pay by cheque, ACCESS MASTERCARD, or COD J. VINCENT TECHNICAL BOOKS,
24 RIVER GARDENS, PURLEY, READING RG8 8BX. TEL: 0734 414468 (Answerphone)

SERVICE SHEETS

ACCESS TECHNICAL INFO SERVICES (T) MASTERCARD EUROCARD
76 Church St., Larkhall, Lanarkshire ML9 1HE
Phone 0698 884585 Mon-Fri 9-5, 0698 883334 any other time FOR FAST QUOTES
IMMEDIATE DESPATCH of all Phone Orders by ACCESS, etc. or to Listed Customers
WORLD'S LARGEST COLLECTION OF SERVICE MANUALS . . . from £3.50 to £50 . . . Most unobtainable elsewhere
Every issued FULL SIZE SERVICE SHEET in stock; CTV's or Combinations £3.50/Singles £2.50; Plus LSAE
LSAE for any Quotation, plus FREE large Catalogue, STREE Review, Pricelists, etc.

Almost any original Video Service Manual from J.V.C. or Siemens at £15 each

A small selection from titles in stock . . . many only obtainable from TIS via mailorder POST FREE:

Practical TV Repairs by Tunbridge	£12.95	Newnes Guide to TV & Video Technology	£8.95
Mobile Radio Servicing Handbook	£25.00	IEE Wiring Regs Explained & Illustrated	£7.95
Practical Radio, Repair & Service Course	£9.95	Servicing Personal Computers by Tooley	£20.00
Video Recorders, Servicing by Beeching	£20.00	Spectrum Repair & Service Guide	£5.00
Oscilloscopes, How to Use/How they Work	£6.95	Servicing Radio, HiFi, TV Eqpt by King	£9.95
Computer Engineers Pocketbook	£9.95	Refrigeration & Air Conditioning	£7.95
1987 Brit CTV Repair Manual by Tunbridge	£8.95	Domestic Eqpt Repair & Service	£16.95
Principles of Compact Disc	£2.95	VHS Common Faults	£3.50
Video Techniques 2nd ed by G White	£30.00	Practical Transistor (Clearance offer)	£1.95
Audio & HiFi Engineers Pocketbook	£9.95	TV & Video Engineers Pocketbook	£9.95
Questions & Answers on Radio Repair	£4.95	Audio Equipment Tests by King	£12.95
Video Service Manuals	each £15.00	Colour TV Service Manuals	each £9.50

Integrated Circuits Technical Data Manuals from £5 to £7.50 each, full list on application

12 Big Colour TV Repair Manuals covering the British & many Foreign from 1970 to 1988	£99.95
20 Fault Finding Booklets covering most Videos from 1979 to 1986 to match circs below	£48.00
The Set of Thorn's own 10 Video Circuit Description Manuals from 3V00 to 3V43	£40.00
10 Giant Binders containing Circuits & Layouts for Brit & Foreign CTV from 1974-1989	£225.00
4 Giant Binders containing Circuits & Layouts for most Videos from 1979 to 1986	£95.00

Send now for
Full details of our Famous Complete Integrated Repair Systems for TVs, Videos & Domestic Equipment
These systems contain all the circuits & data needed to cover repairs and servicing for anyone in business or wishing to start up their own business. All the Diagrams, Repair, Service & Technical Data needed. At a fraction of the normal cost of buying such data. Terms are also available.

The Circuit/Layout Set for almost any Video . . . £7 each, CTVs . . . £4 each
For £3 . . . Comprehensive Service Manuals & Sheets Catalogues PLUS 1988 Chassis Guide & £4 Vouchers
SERVICING COLOUR TELEVISION by Gordon J. King . . . £14.95
Completely reprinted, only obtainable from T.I.S. NOW

SERVICE MANUALS & CIRCUIT DIAGRAMS

Available for Colour Televisions, Mono Televisions, Video Recorders, Audio equipment, Music Systems, Car Radio's, Cameras, Test equipment etc etc.
Over 100,000 stocked, originals and photostats.
LSAE Enquiries with Make/Model wanted.
FREE catalogue Unique Repair and Data Guides for LSAE.

MAURITRON (TV)
8 Cherry Tree Road, Chinnor, Oxfordshire, OX9 4QY.
Telephone: (0844) 51694 anytime.

COPY DATE FOR OCTOBER IS 22nd AUG. PUBLISHED SEPT.

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

ALARMS

PROTECT YOUR STOCK

Use one of our economical loop alarms. Cmos circuit - Low consumption British Made and manufactured LP1 Loop Alarm £16.50. 1m Loop Sections £0.60 each. All prices include VAT. Please add £1.50 post, cash with order.

Orders to:
Mr S. Taylor, 8 Park Avenue, Markfield,
Leicestershire LE6 0WA

MISCELLANEOUS

405 TVs. - Bush TV22, etc.

As original or converted to 625 line monitor.
Early radios and 78 RPM players - send for list.
WE REPAIR AND REBUILD
JOSEPH URBAN & SONS
44 HIGH STREET, ANSTRUTHER, FIFE
Telephone: 0333 310471

NEW AND SECONDHAND TV VIDEO AND AUDIO SPARES. Panels and components, new record decks, £10 ea, also large stocks of Bush stereo units (some damaged), £12 ea. Tel. 0704 76828. Fax: 0704 76828 anytime 24 hrs. 7 days.

The Theory and Practice of PAL Colour Television in three important Video Cassette Programmes

Part 1. The Colour Signal
Part 2. The Receiver Decoder
Part 3. Receiver Installation

VHS★★★V2000★★★
BETAMAX★★★UMATIC

For full details telephone
0253 725499 (Day)
0253 712769 (Night)

Or send for precise details
FLINTDOWN CHANNEL 5
339 CLIFTON DRIVE SOUTH,
LYTHAM ST ANNES FY8 1LP
(enclosing this advert)

NAME.....
ADDRESS.....
TEL:.....

MAIL ORDER ADVERTISING

British Code of Advertising Practice

Advertisements in this publication are required to conform to the British Code of Advertising Practice. In respect of mail order advertisements where money is paid in advance, the code requires advertisers to fulfil orders within 28 days, unless a longer delivery period is stated. Where goods are returned undamaged within seven days, the purchaser's money must be refunded. Please retain proof of postage/despatch as this may be needed.

Mail Order Protection Scheme

If you order goods as a private individual from Mail Order advertisements in this magazine and pay by post in advance of delivery, Television will consider you for compensation if the Advertiser should become bankrupt or go into liquidation provided:

- (1) You have not received the goods or had your money returned; and
- (2) You write to the Publisher of Television summarising the situation not earlier than 28 days from the official on sale date of the publication and not later than three months from that date. (Please retain proof of payment).

Please do not wait until the last moment to inform us. When you write, we will tell you how to make your claim and what evidence of payment is required.

We guarantee to meet claims from readers made in accordance with the above procedure as soon as possible after the Advertiser has become subject to bankruptcy proceedings or gone into liquidation up to a limit of £4,050 per annum for any one Advertiser so affected and up to £12,150 per annum in respect of all advertisers.*

This guarantee covers only advance payment sent in direct response to an advertisement in this magazine (not, for example, payment made in response to catalogues etc., received as a result of answering such advertisements. All display advertisements are covered but only boxed trader classified advertisements are included. Advertisements as loose inserts are not covered.

HOW

- HOW** Long it can take to locate faults on VHS Video Recorders.
- HOW** Can I avoid tying up all these vital hours?
- HOW** Costly it can be to buy individual manuals for different models.
- HOW** Exhausting it is when days pass and the same video is still on the bench, problem unsolved.
- HOW** When you find a fault after hours and hours of searching, you realise it was a very simple cause.
- HOW** Can I take more work on and gain greater profits in less time?
- HOW** I wish someone would make up a manual with hundreds of 'stock' and more difficult faults to save me the headaches.

HOW ABOUT THIS THEN

Technical Advisory Systems have collated and indexed hundreds of 'stock' and the more difficult faults, along with symptoms/data on many popular models including:

**FERGUSON — PHILIPS — JVC —
PYE — PANASONIC — HITACHI —
AKAI — MITSUBISHI — SHARP —
SANYO — FIDELITY —
ETC, ETC, ETC,**

You will wonder HOW you managed without this powerful aid, containing

SYMPTOMS/DIAGNOSTICS/FAULTS/ PROCEDURES/MODIFICATIONS

All well PROVEN as a great TIME SAVER and ESSENTIAL for all service depts. and personnel, quick and easy reference and easily updated on our monthly subscription system.

**ALL THIS STILL ONLY
£73.00 (inclusive)**

NEW

Tremendous value none-updating book version

ONLY £35

Regular monthly up-dates still only £30, per year, payment with order only to:

**TECHNICAL ADVISORY SYSTEMS
33 FOXCOTE, ASTLEY VILLAGE,
CHORLEY, LANCASHIRE PR7 1XE.
Telephone: (02572) 75667**

**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**

**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**

**02993-79642 or
79643**

INDEX TO ADVERTISERS

ADM Electronic Supplies	884	Gamma U.K. Ltd.	880	Radio Components Specialist	885
Admin Televisions	890	General Factors	889	Rank Video Services	891
Aerial Techniques	843	G.G.L. Components	820	Ravensbourne College	892
AGS Electronics	885	Glasgow Wholesale TV	881	Relay Omagh Ltd.	880
Amrick Visions Wholesale	872	Grandata Ltd.	814, 815, 816	Reliable Wholesale TV Repo. Ltd.	819 884
Apollo	840	Hambledon TV & Video	885	Simple Service	875
Audio Electronics	822	Hardy, J.W.	892	Senz Components 830, 896, Cover III, Cover IV	
Audio Visual Services	869	Highsurge	868	Sherwood Tubes Ltd.	890
A-Z Electrics	875	Holme Service Ltd.	884	Sonic TV Distributors	887
Bi-Tech	866	Humphreys, A.G.	892	Southside TV	880
Bi-Tel	821	Hussain Central TV	877	Stewart of Reading	881
B.K. Electronics	818	Ibex	822	Suffolk TV & Video	885
Blendown Ltd.	894	ICS	819	Supertronics	870
Bolton Metropolitan College	882	Irwin Electronics	867	Taylor Bros (Oldham) Ltd.	833
Broughfame Ltd.	874	I.T.V.C.	888	Taylor, S.P.	893
Budget TV	885	Kesh Electrics	892	Technical Advisory Systems	895
Bull, J & N Electrical	823	Kitvision	822	Technical Information Service	893
Campion Wholesale Ltd.	895	LRC (Spares)	880	Teleprice Ltd.	864
Carter, John (Electrical) Ltd.	874	Manor Supplies	Cover II	Teletraders	878
Central TV & Video Wholesalers Ltd.	883	Marshall Ltd.	882	Televideo Services	873
Centrevision	881	Mauritron (TV)	893	Teltech	876
Chromavac Ltd.	821	Microforge Ltd.	891	T.E.S.D. Ltd.	865
Chromavision	872	Midland TV's	890	Tidman Mail Order Ltd.	866
Clearvision	876	NGK Electronics	870	Tree, W., Trade TV	866
Colebourn Electronics	891	N.G.T. Electronics Ltd.	882	Trundle, Eugene	865
Coxon, Ken, T.V.'s	878	North West Electronics	886	UK Rental & Retail Ltd.	892
Crewe Wholesale TV	868	Omega Electronics	855	Urban, Joseph & Sons	893
C.T.V.	884	Papworth, E.	882	View-Tel	874
Display Electronics Group	879	Phoenix TV Wholesale	821	Viewvision	878
Donberg Electronics	893	Powell, T.	879	Vincent, J., Technical Books	893
East Cornwall Components	824	P.V.S.	885	Visions	829
East London Components	889	P.V. Tubes	817	West Midland TV & Video	819
Economic Devices	856, 857			Willow Vale Electronics	894
Electrosmart	894			Wiltsgrove Ltd.	871
Express TV Supplies	881			Wizard Distributors	884
Flintdown Channel 5	893			Zoneport	876

Tuner Units	
TX90-TX100 Tuners	£5.00
Thorn TX Tuner V/Cap eqs to ELC1043	£4.50
Min. UHF Tuner 40dB gain	
2 x 1/2" x 1/2"	£1.50
VHF-UHF with Data MEC1-F51	£3
F501 Family with Data Mosier	
Thorn TX10 Export V/Cap UHF	VHF£3
V/Cap Rank UHF Z7767/Unit	£6
V/Cap Rank VHF Z7731/Unit	£3.90
NEW G8 Tuner V/Cap	£7
T206 Push Button Unit	£2.50
ELC200 on Panel	£5
GEC 2110 V/Cap	£20.00
FE618Q	£6.00
ELC1042 NEW	£3.75
ELC1043 (Ex Panel)	NEW £4.00
ELC1044	NEW £8.00
ELC2003	£4.00
ELC2006	NEW £4.00
GEC Tuner V/Cap Hitachi After	1979 ETS48, ETS47, ETS41B
ETS46	£6.00
ET614 UHF Tuner	£2.50
ETS66P UHF Very Small	£2.50
ETS66P VHF/UHF Very Small	£2.50
UHF ETS66P small	£10.00
ASTEC UM1183	£2.00
V314 (VHF)	£2.00
U32	£2.00
U35	£2.00
U34 UHF	£2.00
U34 (UHF)	£2.00
U343 Phono	£2.00
U34C	£10.00
U34C	£2.00
U41 UHF	£2.00
U41W	£10.00
U.V. 411 Tuner	£2.00
U.V. 412	£2.00
U.V. 415	£2.00
U.V. 417	£2.00
U.V. 418	£2.00
U.V. 617	£12.00
U74 Tuner	£7.00
Fidelity and Amstrad 2000 V/Cap Tuner	£5.00
Small V/Cap Mitsumi	£4.00
VHF	£3.00
VHF & UHF ETS28P Tuner	£6.00
Portable & rotary Tuners Sanyo & Mitsumi	£8.00
NSF-UHF/VHF Varicap (old type)	£8.00
Mosfit UHF/VHF (new type)	£8.00
UE2-B31 Fidelity V/Cap Tuner	£6
UHF-VHF V/Caps on panel	£40
HITACHI 20 Turn Pot	£6.00
U321 on panel	£6.00
Tuner unit VHS Sylvania GTR Videom	£25.00
MTS 981	£2.50
Toshiba VHF-UHF EGS22F	£5.00
Mullard Video Modulator. Application. video tape recorders, TV cameras, video games, closed circuit TV, C.C.T.V. system. Data supplied.	£10.00
4 button Rank Z18 Tuner	£4.00

BF694	10p	25C2229	15p	BC365	10p
BF758	10p	25C2688	20p	BC368	10p
BF760	10p	25C3795	30p	BC369	10p
BF734	15p	25C3973B	30p	BC384	10p
BF733	15p	25C37551	15p	BC394	10p
BF784	10p	25D1801 TO3 NKN		BC413	10p
BF711	20p	6A	15p	BC414	10p
BFX29	30p	25D200	£2.00	BC416	10p
BFX84	25p	25D401	£1.00	BC440	30p
BFY50	15p	25D716	£1.00	BC454	30p
BFY52	20p	25D787	30p	BC455	30p
BFY90	25p	25D789	30p	BC456	30p
BLY49	25p	25D820	£1.00	BC460	25p
BPV41	25p	25D868	75p	BC462	10p
BRX116	25p	25D870	£1.00	BC463	10p
BRX43	15p	25D880	30p	BC478	10p
BRX48X	10p	25D1364	£1.00	BC479	10p
BRX56	10p	25D1266	£1.00	BC532	10p
BSS68	10p	25D1415	£1.00	BC536	10p
BSY79	10p	25D1432	£1.00	BC547	10p
BSY95A	10p	25D1576	£1.00	BC548	10p
BTY80	20p	25D1577	£2.00	BC556	10p
BXS19	17p	25D1578	£1.00	BC557	10p
BXS20	17p	25SK30A	10p	BC558	10p
TC3055	30p	BC107	10p	BC559	10p
TC882	30p	BC108	10p	BC635	10p
TCE520	30p	BC109	5p	BC636	5p
2N930	5p	BC113	10p	BCX31	25p
2N222	8p	BC114	10p	BCX32	25p
2N2222	10p	BC115	10p	BD116	25p
2N2906	10p	BC116	10p	BD124	25p
2N3055	40p	BC117	20p	BD124 (metal)	25p
2N3566	10p	BC119	20p	BD130Y	25p
2N3702	10p	BC125	10p	BD131	10p
2N3711	10p	BC126	10p	BD132-238	10p
2N3588	50p	BC139	10p	BD135	25p
2N3904	15p	BC140	30p	BD136	30p
2N4355	10p	BC141	25p	BD138	30p
2N4442	£1.00	BC143	25p	BD140	25p
2N4444	£1.00	BC147	10p	BD176	25p
2N5278	20p	BC148	£1.00	BD182	£1.00
2N5296	40p	BC149	10p	BD183	10p
2N5983	30p	BC153	10p	BD202	10p
2N6099	40p	BC154	10p	BD204	10p
2N6109	40p	BC157a	10p	BD207	60p
2N6130	50p	BC158	10p	BD221	20p
2N6133	20p	BC159	10p	BD222	30p
2N6348	10p	BC160/16	25p	BD228	30p
2N6399	10p	BC171	5p	BD226	20p
2X 2N6099 on heat sink	50p	BC172	5p	BD233	30p
2SA437	20p	BC173	5p	BD234	25p
2SA673P	10p	BC174	5p	BD235	30p
2SA844P	10p	BC183	5p	BD238	30p
2SC643A	£1.00	BC184	5p	BD239	15p
2SA992	10p	BC207	5p	BD240	5p
2SB407 Sanyo TO3	10p	BC212	5p	BD243c	5p
2SB474	30p	BC213	5p	BD244	5p
2SB566	10p	BC214	5p	BD250a	5p
2SB686	75p	BC237	5p	BD250b	20p
2SC515A	£1.00	BC238	5p	BD253B	5p
2SC772	20p	BC239	5p	BD331	20p
2SC781	10p	BC250	5p	BD373b	20p
2SC388	50p	BC251	5p	BD416	25p
2SC491	50p	BC252	5p	BD437	25p
2SC732	10p	BC262	10p	BD438	50p
2SC733	10p	BC263b	10p	BD439	50p
2SC941	£1.00	BC294	30p	BD544D	40p
2SC1030	£1.00	BC298	30p	BD650	50p
2SC1061	30p	BC301	30p	BD678	30p
2SC1162 C/18	30p	BC301	30p	BD681	30p
2SC1514	50p	BC307	30p	BD682	30p
2SC1520	25p	BC308	7p	BD687	5p
2SC1546	20p	BC309	10p	BD509	30p
2SC1617	£1.00	BC327	10p	BD510	10p
2SC1725	30p	BC328	10p	BD517	30p
2SC1740	20p	BC328/338 pair		BD519	30p
2SC1756	50p	BC337	10p	BD534	30p
2SC1942	£1.00	BC338	10p	BD535	30p
2SC2027	£1.00	BC347	10p	BD544D	40p
2SC2068	30p	BC349b	10p	BD562	10p
2SC2073	8p	BC350	20p	BD610	30p

SENDZ COMPONENTS

63 Bishopsgate, Shoeburyness, ESSEX SS3 8AF
SAME DAY SERVICE

All items subject to availability. Technical information by telephone only. No Accounts / No Credit Cards
Postal Order/Cheque with order
Add 15% VAT, then £1 Postage
Add Postage for overseas

Callers: To shop at 212 London Rd., Southend. Tel. 0702 332992. Fax 0702 338805
Open 9-12.30-6. GVMT + school orders accepted on official headings add 10% handling charge.

UHF Tuner GTR Sylvania F4714A	£2
VHF Tuner GTR Sylvania F3720B	£2
Sylvania UHF F4720B	£6.00
Sylvania VHF 9X	£6.00
Small Tuner DX 175-220MHz	
Auto Changeover	£5.00
9000 Thorn Tuner on Panel	£7.00
Change over switch co-ax type box with lead	50p
Delay Lines DL700	£1.00
KT 3 Luminescence	75p
Luminescence Delay Line (CVC 45)	
Co-Ax Joint	15p
Co-Ax Belling Lee Plug	12p
Co-Ax Splitter	£1.00
UHF Modulator CCCR	£3.00
UHF Modulator Astec 1286	£2.50
Infra Red Emitting Diode	20p
NE286H Small Neon Lamps GEC & Philips	5p
Mullard 5 Watt Amps. LP1162 New	75p

T.V. Tubes	
12" 90% black and white	£10
12" 110" 31/510	Post £2.50 £5

S.W. Filters		S.W. Filters	
HW2013	50p	SW185	£1
SW453	50p	SW153A	50p
SW150	£1	SW154	50p
HW2013	50p	SW173	50p
RW303	50p	F1035B	50p
SY2155	50p	F1045A	50p

BD646	50p	BD676A	50p	BD807	20p	BD933	30p	BD939	30p	BD948	30p	BDT31A	50p	BDN75	20p	BDV64B	50p	BDU065	50p	BF761	30p	BF769	30p	BF788	30p	BF819A	30p	BF858	30p	BF869	40p	BF871	30p	BF872	7p	BF881	15p	BF890	10p	BF894	10p	BF924	20p	BF925	20p	BF926	20p	BF927	20p	BF928	20p	BF929	20p	BF930	20p	BF931	20p	BF932	20p	BF933	20p	BF934	20p	BF935	20p	BF936	20p	BF937	20p	BF938	20p	BF939	20p	BF940	20p	BF941	20p	BF942	20p	BF943	20p	BF944	20p	BF945	20p	BF946	20p	BF947	20p	BF948	20p	BF949	20p	BF950	20p	BF951	20p	BF952	20p	BF953	20p	BF954	20p	BF955	20p	BF956	20p	BF957	20p	BF958	20p	BF959	20p	BF960	20p	BF961	20p	BF962	20p	BF963	20p	BF964	20p	BF965	20p	BF966	20p	BF967	20p	BF968	20p	BF969	20p	BF970	20p	BF971	20p	BF972	20p	BF973	20p	BF974	20p	BF975	20p	BF976	20p	BF977	20p	BF978	20p	BF979	20p	BF980	20p	BF981	20p	BF982	20p	BF983	20p	BF984	20p	BF985	20p	BF986	20p	BF987	20p	BF988	20p	BF989	20p	BF990	20p	BF991	20p	BF992	20p	BF993	20p	BF994	20p	BF995	20p	BF996	20p	BF997	20p	BF998	20p	BF999	20p	BF1000	20p
-------	-----	--------	-----	-------	-----	-------	-----	-------	-----	-------	-----	--------	-----	-------	-----	--------	-----	--------	-----	-------	-----	-------	-----	-------	-----	--------	-----	-------	-----	-------	-----	-------	-----	-------	----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	-------	-----	--------	-----

Thorn ML926	£1.00	TBA625	50p	TDA2575A	£1.00
MABN400B-C	£2.00	TBA651	£2.00	TDA2577A	£2.00
MABN440 P-D070	£2.00	TBA673	£1.00	TDA2578A	£2.00
MABN441 PTH01	£3.00	TBA700	£1.50	TDA2579A	£2.00
MABN500PC185	£2.00	TBA780	£1.50	TDA2581	£1.00
MABN522P-Q015	£2.00	TBA810	50p	TDA2591	£2.00
MABN540P	£2.00	TBA820	60p	TDA2592	£1.00
MAR400BUX	£3.00	TBA830	60p	TDA2593	£3.00
M78L1B1	£2.00	TBA820M	25p	TDA2596	50p
MMS587	£1.00	TBA890	25p	TDA2600	£1.50
MMS591	£1.50	TBA920	£1.50	TDA2611A	£1.00
MMS640	£3.00	TBA950	£1.50	TDA2611A10	£1.00
PCD8571P	£3.00	TBA990	£1.50	TDA2651	£1.00
K35 Philips Receiver IC		TMA1500NPL	£2.00	TDA2652	£2.50
MA1250 BJC	£3.00	TMS1943 N2L (clockchip)	£1.00	TDA2660	£2.00
M491BB1	£3.00	TMS2700JG45	45p	TDA2668	£2.00
M540A-84	£5.00	TMS32716L	£1.00	TDA2690	£2.00
MMS590N-4	75p	TMS329	£1.00	TDA2693	£1.00
MMS5108N	£4	TMS3292	£1.00	TDA2698	£1.00
MN1250BJC	£2	TMS3293	£1.00	TDA2700	£1.00
MR1366	20p	TMS3294	£1.00	TDA2701	£1.00
MS4101	£1.00	TMS3295	£1.00	TDA2702	£1.00
NE555P					