Supplement to The Wireless Electrical Trader, April 14, 1

"TRADER" SERVICE SHEET

988/T11

PYE LV30 SERIES

Covering Models LV30, BV30, LV51 and Consoles

FOURTEEN Mullard valves, six of them double-system valves, and a 9in Mullard cathode-ray tube are employed in a T.R.F. circuit in the Pye LV30, which is designed to operate from A.C. or D.C. mains of 200-250 V, 50 c/s in the case of A.C., to receive the London television transmissions.

A special lead on the voltage adjustment panel permits the rectifying valve to be bypassed on low-voltage D.C. mains, and as a result it is important that the mains plug should not be reversed in its socket, applying reverse polarity to the electrolytic smoothing capacitors, which may be damaged before the fuses blow.

The LV30C is a console version employing the LV30 chassis, and the LV51 is a 12in table model employing an LV30 chassis. Fringe versions are available of all three models, the modifications being explained overleaf.

The BV30, BV30C and BV51 are the equivalent models to the LV30, LV30C and LV51 respectively designed to receive the Birmingham transmissions, but they are not complemented with fringe versions.

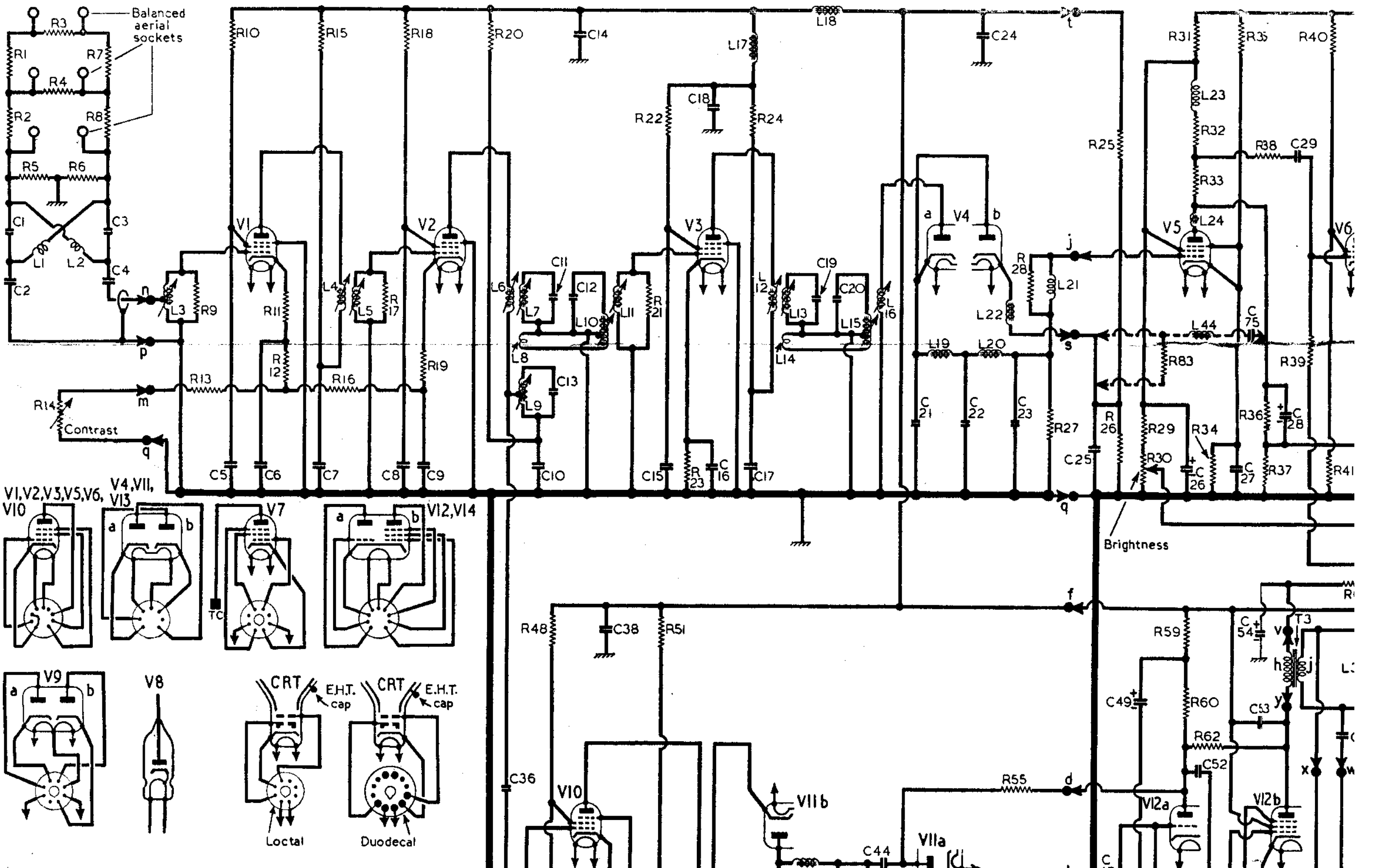
Certain modifications that have been made during the production run are explained under "Modifications" overleaf. Our sample receiver was an LV30.

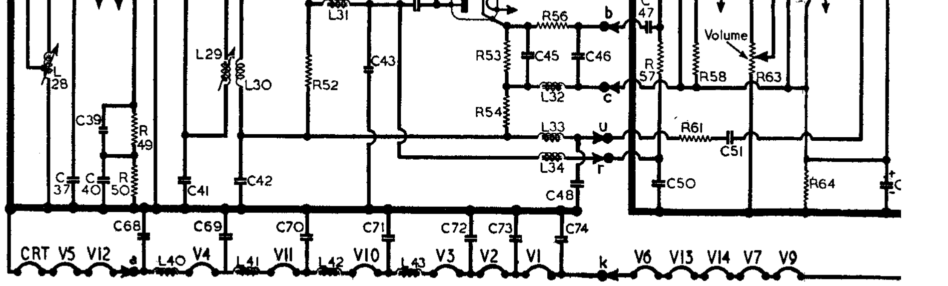
Release dates and original prices: LV30, June, 1950, £33 8s 10d; LV30C, June, 1950, £38 11s 8d; BV30, August, 1950, £33 8s 10d; BV30C, September, 1950, £38 11s 8d; LV51, BV51, September, 1950, £43 14s 7d. P.T. extra. Fringe models 21s extra.

CIRCUIT DESCRIPTION

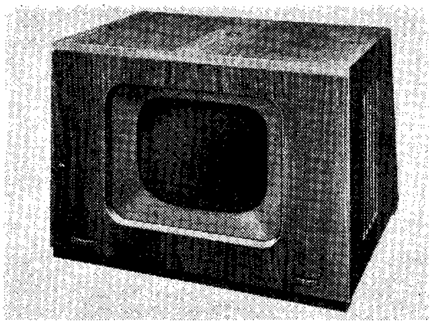
Balanced twin 75 Ω input via 3-stage attenuator **R1-R8**, to 3-valve T.R.F. vision amplifier **(V1-V3, EF80's)** tuned by band-pass coupling transformers to the lower sideband. **Contrast** control **R14** varies the gain of **V1** and **V2** by adjusting their cathode voltages, the change in their input capacitances being compensated by negative feedback via **R11** and **R19**. Coupling circuit **C1, C3, L1, L2** converts the balanced input to unbalance for connection to **L3**. **C2, C4** isolate the aerial from the mains.

V3 output is rectified by the vision diode





Circuit diagram of the Pye LV30 and, with **R9** omitted, the BV30 television receivers. It contains two errors: the focus and ion trap magnets on the **CRT** neck should be transposed; and the two sections of line deflector coil **L37** should be connected in parallel (40Ω each = 20Ω). In the fringe version, a pre-amplifier is inserted in front of **L3** at the points marked **n** and **p**, and **R83, L44, C75**, shown dotted just below **V5**, are added. Fifteen connections between the main chassis and the R.F. unit are coded **a-u**; **e, g, h, i, l** and **o** being omitted. The speaker connections are coded **v-y**.

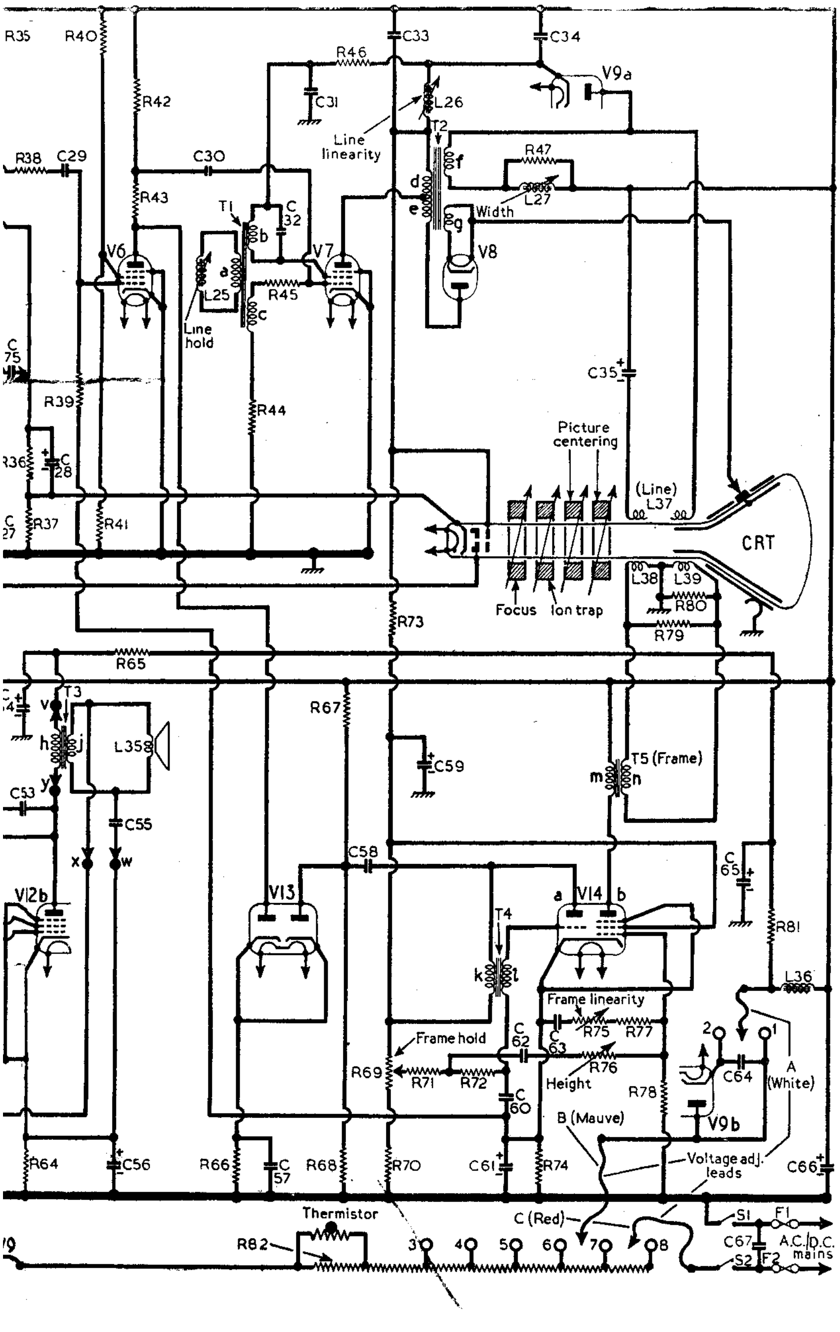


The LV30 and BV30 receivers.

detector, section **a** of double diode valve **(V4, EB91)**, the positive-going video signal being developed across load resistor **R27** and passed via compensating circuit **L21** and **R28** to the control grid of video amplifying valve **(V5, EF80)**.

Negative-going output from **V5** anode is

(*Continued col. 1, overleaf*)



Resistors

R1	220Ω	C4
R2	150Ω	C4
R3	120Ω	C4
R4	120Ω	C4
R5	2·7MΩ	C4
R6	2·7MΩ	C4
R7	220Ω	C4
R8	150Ω	C4
R9	5·6kΩ	L10
R10	33Ω	K10
R11	33Ω	L10
R12	120Ω	L11
R13	39Ω	L11
R14	3kΩ	A1
R15	3·3kΩ	L10
R16	120Ω	L11
R17	5·6kΩ	K10
R18	33Ω	K10
R19	47Ω	K11
R20	3·3kΩ	K10
R21	5·6kΩ	J11
R22	33Ω	J10
R23	220Ω	J11
R24	33Ω	J11
R25	560kΩ	D6
R26	27kΩ	D6
R27	4·7kΩ	C1
R28	10kΩ	C1
R29	33kΩ	E6
R30	25kΩ	D7
R31	5·6kΩ	E6
R32	2·7kΩ	D6
R33	2·7kΩ	D6
R34	330Ω	D6
R35	33kΩ	E6
R36	33kΩ	D6
R37	33kΩ	D6
R38	10kΩ	D6
R39	2·2MΩ	F6
R40	47kΩ	E6
R41	15kΩ	E6
R42	6·8kΩ	E6
R43	22kΩ	E6
R44	10kΩ	E8
R45	39kΩ	E9
R46	1·5kΩ	E9
R47	2·2kΩ	E9
R48	33Ω	J10
R49	47Ω	J10
R50	180Ω	J10
R51	33Ω	H10
R52	33kΩ	H10
R53	1MΩ	H10
R54	10kΩ	H10
R55	2·2MΩ	H11
R56	33kΩ	H10
R57	2·7MΩ	E6
R58	2·2MΩ	E6
R59	4·7kΩ	F6
R60	33kΩ	E6
R61	33kΩ	E6
R62	1MΩ	E6
R63	500kΩ	A4
R64	270Ω	E6
R65	1kΩ	F6
R66	220kΩ	6
R67	47kΩ	F6
R68	82kΩ	F6
R69	25kΩ	D7
R70	47kΩ	D7
R71	470kΩ	F9
R72	82kΩ	F9
R73	2·7kΩ	F9
R74	1kΩ	G9
R75	150kΩ	D7
R76	500kΩ	D7
R77	47kΩ	F9
R78	2·2MΩ	G8
R79	180Ω	B3
R80	4·7kΩ	E7
R81	39Ω	E9
R82‡	628Ω	C4
R83	100kΩ	—

Capacitors

C1	47pF	C4
C2	0·001μF	C4
C3	47pF	C4
C4	0·001μF	C4
C5	0·001μF	L10
C6	0·001μF	L10
C7	0·001μF	L10
C8	0·001μF	K10
C9	0·001μF	L11
C10	0·001μF	K10
C11	10pF	K11
C12	10pF	K11
C13	50pF	K10
C14	0·001μF	K10
C15	0·001μF	J11
C16	0·001μF	J11
C17	0·001μF	J11
C18	0·001μF	J11
C19	10pF	J11
C20	10pF	H11
C21	5pF	H11
C22	5pF	H11
C23	5pF	C1
C24	0·001μF	C1
C25*	20μF	D6
C26*	12μF	E7
C27	0·001μF	D6
C28*	2μF	D6
C29	0·05μF	E6
C30	20pF	E9
C31	0·1μF	E8
C32	20pF	E8
C33	0·5μF	E8
C34	0·5μF	E8
C35*	25μF	E8
C36	5pF	K10
C37	0·001μF	J10
C38	0·001μF	H10
C39	15pF	J10
C40	0·001μF	J10
C41	0·001μF	J10
C42	0·001μF	H10
C43	5pF	H10
C44	0·05μF	H10
C45	0·01μF	H10
C46	0·001μF	C1
C47	0·01μF	E6
C48	0·001μF	H10
C49*	8μF	G6
C50	22pF	E6
C51	0·02μF	E6
C52	0·01μF	E6
C53	0·001μF	E6
C54*	12μF	E8
C55	0·02μF	—
C56*	25μF	E6
C57	220pF	F6
C58	0·01μF	F6
C59*	12μF	F8
C60	0·25μF	G9
C61*	50μF	G8
C62	0·5μF	G9
C63	0·05μF	F8
C64	0·025μF	E9
C65*	60μF	F7
C66*	100μF	F7
C67	0·01μF	C4
C68	0·001μF	C1
C69	0·001μF	H11
C70	0·001μF	H10
C71	0·001μF	J10
C72	0·001μF	J11
C73	0·001μF	K11
C74	0·001μF	L11
C75	0·1μF	—

Coils†

L1	—	C4
L2	—	C4
L3	—	A1
L4	—	L10
L5	—	L10
L6	—	K11
L7	—	K11
L8	—	K11
L9	—	K10
L10	—	K11
L11	—	K11
L12	—	J11
L13	—	J11
L14	—	J11
L15	—	J11
L16	—	J11
L17	0·2	B1
L18	0·2	K10
L19	0·2	H11
L20	0·2	H11
L21	5·0	C1
L22	0·2	H11
L23	8·2	D6
L24	0·2	D7
L25	17·5	D8
L26	7·1	D8
L27	8·0	D8
L28	—	J10
L29	—	H10
L30	—	H10
L31	0·2	H10
L32	0·2	H10
L33	0·2	H10
L34	0·2	H10
L35	3·0	—
L36	75·0	D9
L37	20·0	B2
L38	5·0	B2
L39	5·0	B2
L40	0·2	C1
L41	0·2	B1
L42	0·2	B1
L43	0·2	B1
L44	0·2	—

Transformers†

T1	a	7·0	E8
	b	53·0	
	c	60·0	
T2	d	55·0	E9
	e	450·0	
	f	7·5	
	g	0·2	
T3	h	720·0	—
	j	0·35	
T4	k	540·0	F8
	l	135·0	
T5	m	1,500·0	E7
	n	3·0	

Miscellaneous‡

F1,F2	750mA	C3
S1.S2	—	A4
Thermistor	CZ1	C4

* Electrolytic. † Approximate D.C. resistance in ohms. ‡ Tapped at 365Ω + 98Ω + 33Ω + 33Ω + 33Ω + 33Ω + 33Ω from V9 heater.

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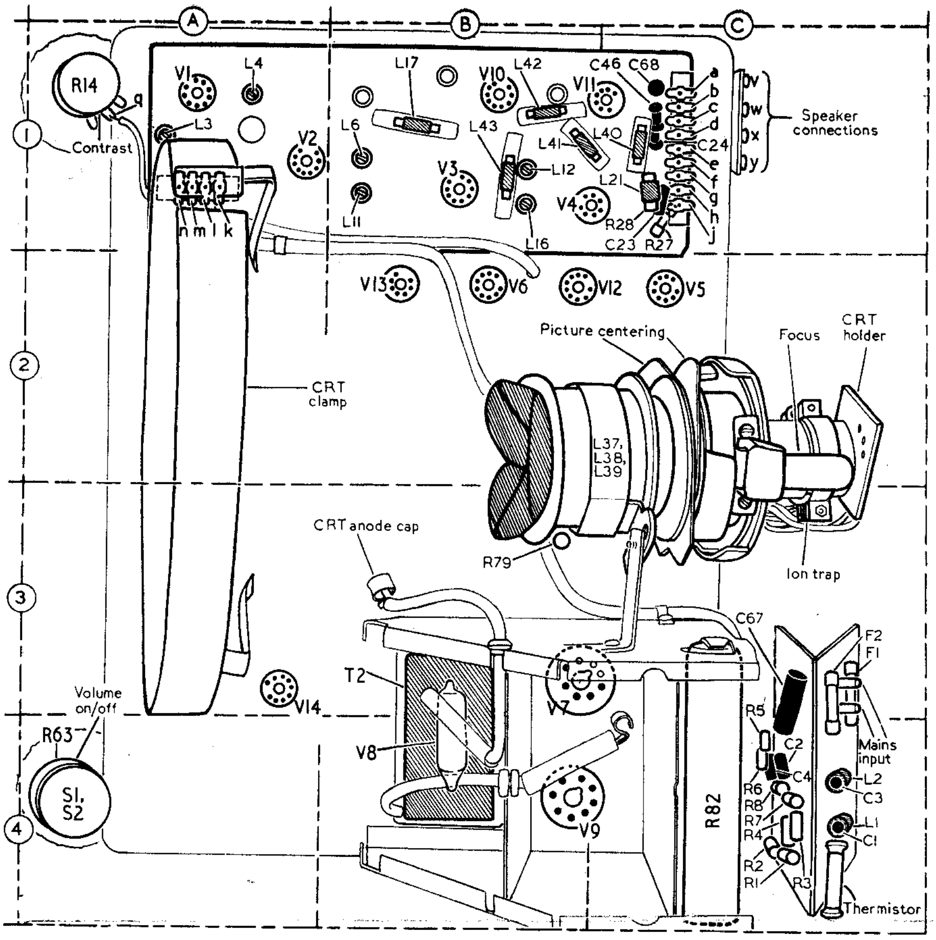


Plan view of the chassis. When stood this way, the line oscillator box forms a support. The mains input panel at location C4 has been moved rearwards and opened out to show components on both sides. Normally it is hidden by **R82**.

Circuit Description—*continued*

coupled to the cathode of the C.R. tube **(CRT, MW22-16)** via **R36, R37** and **C28** which operate as a frequency-correcting network, providing a 50 per cent step down at D.C. modulation levels and helping to offset aeroplane flutter. Frequency compensation in **V5** anode by **L23, C26.**

Section **b** of **V4** operates as vision interference limiter diode, its anode being sent positive by interference pulses from **V4a** cathode, causing it to conduct momentarily and short-circuit the video output via **C25.** In the fringe version only, negative pulses from **V5** anode are applied also to **V4b** via **C75, L44.** H.T. potential divider **R25** and **R26** biases the cathode of **V4b** so that the diode conducts only on interference pulses of greater amplitude than the "peak white" video output. R.F. decoupling by **C14, C18, L17, L18, C24,** and R.F. filtering by **C21, L19, C22, L20, C23.**

Negative-going output from **V5** is also passed via **R38** and **C29** to the sync separator **(V6, EF80),** where the positive-going sync pulses produce grid current which biases the valve to cut-off, restoring the D.C. level and eliminating the negative-going picture signal.

V6 output, as it appears across **R42,** is fed via **C30** to the control grid of single-valve line time-base circuit associated with **V7 (PL38)** where the negative-going line pulses trigger the valve. A triode oscillator is formed by the screen grid and control grid, **T1** being the oscillator transformer. A third winding on **T1** is shunted by **L25** which varies the inductive loading on the transformer to give **Line hold** control.

Output from **V7** is transformer coupled by **T2** to the line deflector coils **L37** via the **Width** control and the D.C. isolator **C35.** The efficiency diode, which is section **a** of I.H.C. rectifying valve **(V9, PZ30),** is fed with energy from **T2** secondary, and the rectified output, developed across reservoir capacitor **C34,** is used to boost the H.T. supply voltage to **V7. Line linearity** is controlled by variable inductance **L26** in the anode circuit of **V7.**

Frame sync impulses appearing at **V6** anode are passed to section **a** of double diode valve **(V13, EB91)** which operates as interlace filter. When the resulting charge built up across **R66, C57** is sufficiently negative to overcome the biasing voltage, supplied by H.T. potential divider **R67, R68,** section **b** conducts and delivers a pulse via **C58** to the anode of the frame oscillator, which is section **a** of triode pentode valve **(V14, ECL80). T4** is the blocking oscillator transformer.

Frame hold control **R69** varies the charging voltage fed to **C60,** and the saw tooth voltage developed across **R72, C60** is passed via **C62** and **Height** control **R76** to control grid of pentode section **V14b,** which operates as frame output valve. **R75** varies the amount of feedback between control grid and cathode, giving control of **Frame linearity.**

Current from the boosted H.T. line is fed to the anode of section **a,** and to the screen grid of section **b.**

The frame time-base is transformer coupled by **T5** to the frame deflector coils **L38, L39. R79** shunts the deflector coils to eliminate "ringing" and **R80** connects one side of **L39** to chassis to reduce interaction between the line and frame deflector coils.

Sound signals are amplified by **V1** and **V2** in the vision amplifier, and extracted by **L9, C13.** They are further amplified by **V10 (EF80)** and rectified by sound detector diode **(V11b, one half of EB91).** Rectified output developed across **R52** is passed via the series limiter diode **V11a** to the grid of triode amplifying valve **(V12a, one half of ECL80).** R.F. filtering by **L31, C43, C45, R56, C46** and **L32.**

Resistance-capacitance coupling by **R60, C52** and **Volume** control **R63** between **V12a** and pentode output valve **V12b.** Negative feed-back between anodes by **R62,** and between secondary of output transformer **T3** and triode grid circuit by **C51, R61, C48** and **C55.**

E.H.T. current for **CRT** is obtained from the line fly-back, and rectified by **V8 (EY51),** windings **d** and **e** of **T2** forming an auto-transformer to step up the fly-back pulse voltage. A heater winding is provided on **T2** for **V8.**

Normal H.T. current is supplied by section **b** of **V9.** Main smoothing by **L36** and electrolytic capacitor **C66.** Separate smoothing for **V12b** anode by **R81, R65** and electrolyte capacitors **C54, C65.** On 200 and 210 V D.C. mains, the rectifier is by-passed to avoid the voltage-drop it entails by connecting the white voltage adjustment lead **A** to tag **1.** Otherwise it goes to tag **2.**

Valve heaters, together with ballast resistor **R82** and R.F. chokes **L40-L43,** are connected in series across the mains input. R.F. filtering by **C64** and **C67.**

GENERAL NOTES

L1, L2, L21.—These three coils are wound directly on to their associated components, **C1, C3** and **R28** respectively, and failure of one part means replacement of both.

R.F. Unit Connections.—There are 15 interconnections between the R.F. unit and the main chassis, and these are all indicated in our circuit diagram and chassis illustrations, and are useful as check points or if the unit has to be removed.

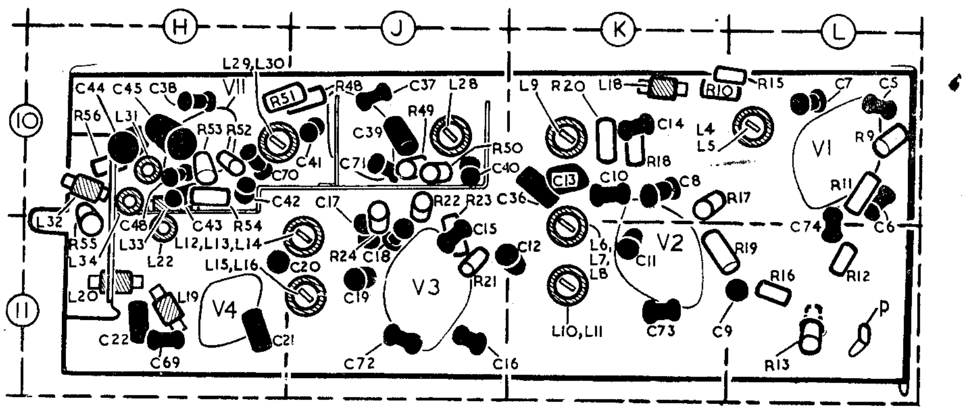
Tags **a-j** (**i** is omitted) are on one tag board in location reference C1; tags **k-n** are on another at A1, and **o** is omitted; **p** is at **L11, q** at A1 (on contrast control), **r, s, t** are at D5, and **u** is on the tag board carrying **a** large number of components at E6. It is the tenth tag from the left as seen in our under-chassis view.

MODIFICATIONS

Fringe Models.—These are fitted with a pre-amplifier which is inserted into the circuit between the aerial and **L3** at the junctions coded **n** and **p.** Physically it stands in the corner of the chassis deck just behind the volume control. The valve is an EF80.

In addition, the three components shown connected by dotted lines in the complete diagram, **R83, L44, C75,** are inserted, and **C25** is omitted. **R26** becomes 68 kΩ.

To align the output coil core, feed in a 45 Mc/s signal and adjust for maximum output, reducing input so as to maintain the output meter reading at 2 V. Then adjust **L3** in the same manner. The input coil is pre-



The R.F. unit, in the same position as it occupies in our under-chassis view.

set at works. Overall sensitivity from "distant" aerial sockets should now be better than 20 μV for full modulation of C.R. tube.

Birmingham Models.—Except for the tuning coils and alignment procedure, the differences in these models are as follows: **R9** is omitted, **R17** becomes 10 kΩ, **R21** becomes 15 kΩ and **C1, C3** become 33 pF each.

LV51, BV51.—These are 12in versions of the LV30 and BV30, using a Mullard MW31-18 tube. A different line output transformer is used (type 770264 instead of 770248), and a 100 pF capacitor is added in parallel with the line deflector coils **L37** to improve the efficiency of the circuit. The E.H.T. voltage is 7.5 kV.

General.—In earlier models the C.R. tube was either a Mullard MW22-14 (loctal base) or MW22-18 (duodecal base) and there were the following circuit differences in the sound output and interference limiter circuits: **L33, L34, C48, R62, R57** and **C50** were omitted and **R61** was connected via a 33 kΩ resistor to **V12** cathode; a 1 kΩ resistor was used in place of **L32**, and, together with **C46**, it was connected to the junction of **R61** and the 33 kΩ resistor; **R55** was connected to the junction of **R59** and **R60**.

In the earlier models, too, **L17** was omitted, **V3** being fed direct from the H.T. line, a 5.6 kΩ resistor took the place of **R32, R33** and **R38** was connected to the junction of **R36, R37**.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those derived from the manufacturers' service manual. Measurements were taken with the receiver operating from A.C. mains of 220 V, the voltage adjustment being set to the appropriate tapping. The brightness control was turned to minimum, the contrast and volume controls set at mid-position; and the remaining controls adjusted for normal operation. There was no signal input.

Voltages, except where otherwise indicated, were measured on a 1,000Ω per volt meter, chassis being the negative connection in every case.

Valve			Anode V	Anode mA	Screen V	Screen mA	Cath. V
V1	EF80		150	11	190	3·0	2·2
V2	EF80		150	11	190	3·0	2·2
V3	EF80		195	9	195	2·2	2·7
V4	EB91	a	—	—	—	—	—
		b	—	—	—	—	—
V5	EF80		117	2·8	148	0·7	3
V6	EF80		85	3	37	0·8	—
V7	PL38		†	85	210	20	—
V8	EY51		†	—	—	—	6·5k*
V9	PZ30	a	†	105	—	—	247
		b	210‡	—	—	—	210
V10	EF80		192	9·5	192	2·5	3
V11	EB91	a	—	—	—	—	—
		b	—	—	—	—	—
V12	ECL80	a	65	3·5	—	—	6
		b	180	17	195	3·5	
V13	EB91	a	85	—	—	—	100
		b	100	—	—	—	100
V14	ECL80	a	230	0·3	—	—	12
		b	180	9·5	230	2·2	
CRT	MW22-16		247V* (1st anode), 6,500V* (2nd anode)				60

* Measured on an electrostatic meter.

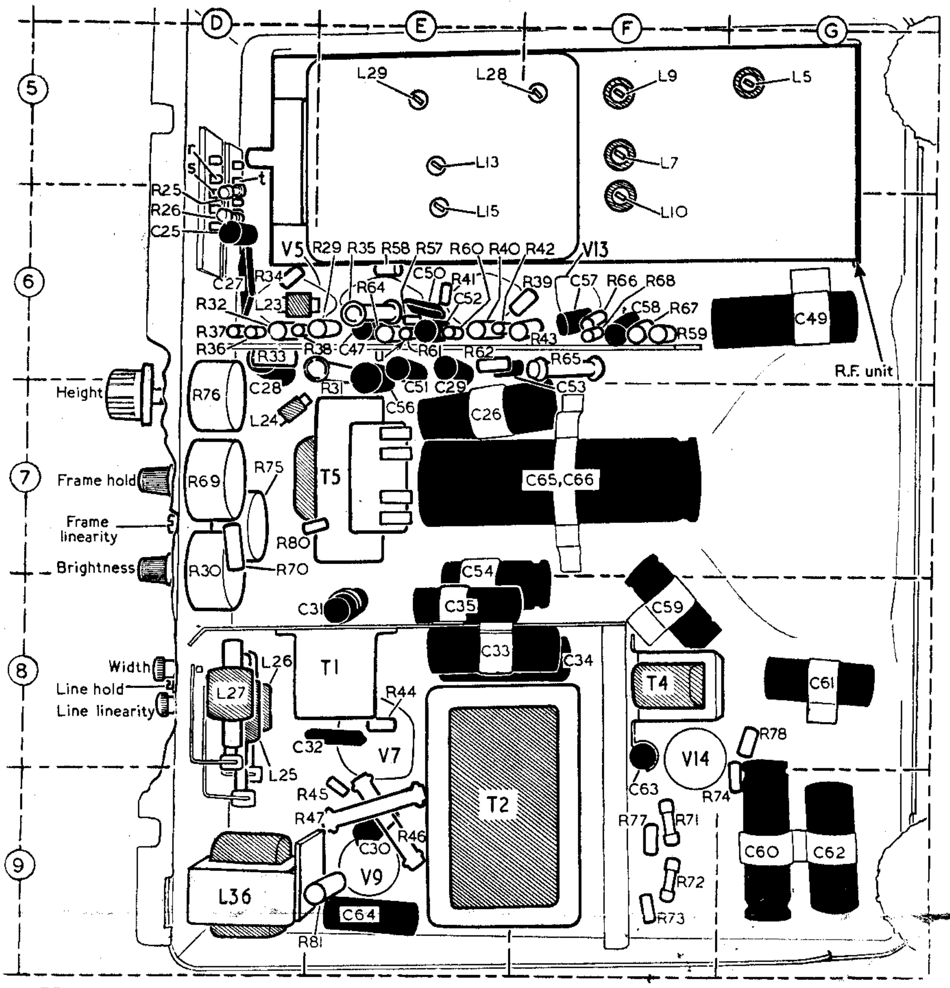
† Not measured owing to presence of a pulse voltage.

‡ A.C. reading.

CIRCUIT ALIGNMENT

Equipment Required.—An accurately calibrated signal generator with an output impedance of 75Ω; an 0-200 milliwattmeter with an impedance of 2.5Ω for sound output; a valve voltmeter with ranges 0-2.5 V and 0-25 V for vision output; an insulated trimming tool for core adjustments, and 10pF damping capacitor.

Connect the sound output meter across **T3** secondary, and the vision output meter across **R37.** Connect the output of the signal generator as indicated in the alignment table under "Feed in at." When the output is fed to a valve grid, the signal generator output leads should be terminated with a 75Ω resistor and connected, via a 0.001μF capacitor in the "live" lead, to the control grid (pin 2) and chassis. The chassis is directly connected to one side of the mains supply and care should be taken to see that the signal generator is not earthed. Connect the damping capacitor as indicated under "Shunt," and except where otherwise indicated, turn the volume control to minimum and the contrast control to maximum.



Underside view of the chassis, standing on the same edge as in our plan view. The R.F. unit at the top is shown in detail in cols. 2 and 3 with the screen removed.

Make the adjustments in the order shown in the alignment tables. "V" under "Meter deflection" means vision, and "S" sound. "Max. V" means maximum change downwards (decreased reading) from the steady state with no signal input. Adjust the output from the signal generator so that the sound output does not exceed 50 mW. Use the vision output meter on the 2.5 V range except where otherwise indicated. Feed in an unmodulated signal for vision alignment and a signal modulated to a depth of 30% for sound adjustments.

London Models

Sensitivity Figures.—A decrease of not less than 6.5 V should be obtained in the vision output meter reading on feeding in a 65μV, 45 Mc/s unmodulated signal to the "Distant" aerial sockets. A reading of not less than 20 mW should be obtained on the sound output meter on feeding in a 25μV, 41.5 Mc/s signal.

Vision Response Curve.—With the contrast control at maximum check that the output from the signal generator at 42.3 Mc/s does not need to be more than 1.3 times, and at 45.25 Mc/s not more than 1.12 times, that required at 61.75 Mc/s to produce a 6.5 V reading on the vision output meter.

Sound Rejection.—With the contrast control at mid-position and the volume control at minimum, check that the output from the signal generator at 41.5 Mc/s is not less than 70 times that required at 45 Mc/s to produce a 0.5 V reading on the vision output meter.

Birmingham Models

Sensitivity Figures.—A decrease of not less than 6.5 V should be obtained in the vision output meter reading on feeding in a 175μV 61.75 Mc/s signal to the "Distant" aerial sockets. A reading of not less than 20 mW should be obtained on the sound output meter on feeding in a 50 μV, 58.25 Mc/s signal.

Vision Response Curve.—With the contrast control at maximum check that the output from the signal generator at 59.25 Mc/s does not need to be more than 1.3 times, and at 62 Mc/s not more than 1.12 times that required at 61.75 Mc/s to produce a 6.5 V reading on the vision output meter.

Sound Rejection.—With the contrast control at mid-position and the volume control at minimum check that the output from the signal generator at 58.25 Mc/s is not less than 70 times that required at 61.75 Mc/s to produce a reading of 0.5 V on the vision output meter.

Alignment Table

Sig. Gen. Output (Mc/s) Lond.	B'ham	Feed in at	Shunt	Adjust	Meter deflection
43·9	61·0	V2 C.G.	V3†	L13*	max. V
43·9	61·0	V2 C.G.	L16	L15*	max. V
43·9	61·0	V2 C.G.	C20	L16*	max. V
43·9	61·0	V2 C.G.	C19	L12*	max. V
43·9	60·6	V1 C.G.	V2†	L7	max. V
43·9	60·6	V1 C.G.	L11	L10	max. V
43·9	60·6	V1 C.G.	C12	L11	max. V
43·9	60·6	V1 C.G.	C11	L6	max. V
43·4	60·1	V1 C.G.	V1†	L5	max. V
43·4	60·1	V1 C.G.	L5	L4	max. V
43·9	60·6	R4§	—	L3	max. V
41·5	58.25	R4	—	L9	min. V
41·5	58·25	R4‡	—	L29	max. S
41·5	58.25	R4‡	—	L28	max. S.

* Remove screening can for these adjustments.

† Connect damping capacitor between anode and chassis.

‡ Turn contrast to mid-position, and volume control to maximum.

§ Set valve voltmeter to 25 V vange.

Printed in England by Cornwall Press Ltd., Paris Garden, London, S.E.1.