DECCA

MODEL 1000

THIS receiver is a large screen (4 × 3 ft.), projection model with a Mullard $2\frac{1}{2}$-in. tube and Schmidt F.62 lens, the picture being projected on to an aluminium-sprayed screen placed approximately 8 ft. 6 in. in front of the receiver unit. Two types of R.F. units are fitted; (1) single-sideband superheterodyne suitable for all channels; (2) double-sideband superheterodyne intended for the reception of the London transmissions only. All receivers are suitable for operation from A.C. mains, 200–250 volts, 50 c/s., with a consumption of approximately 200 watts. A pulsed R.F. system, with voltage tripler, is used to give an E.H.T. supply of 25 kV. Two valves are used to protect the cathode-ray tube in the event of a failure of the time-bases. The aerial-input impedance is designed for use with 80-ohm unbalanced (co-axial) feeder.

Receivers are identified by the colour of the attenuator cover on the lower front of the chassis, and in most cases the colour appears also on the metal brackets fitted on the R.F. strip. Colour coding and the respective intermediate frequencies are as follows:

Transmission	*Colour*	*I.F. (Vision) (Mc/s.)*	*I.F. (Sound) (Mc/s.)*
(*a*) London:			
Single sideband . .	yellow	14·0	10·5
Double sideband .	black	13·0	9·5
(*b*) Sutton Coldfield . .	red	14·0	10·5
(*c*) Holme Moss . . .	blue	15·0	11·5
(*d*) Kirk o'Shotts . . .	green	14·0	10·5
(*e*) Wenvoe . . .	white	14·0	10·5

CIRCUIT NOTES

Valve Details

V1	EF42	R.F. amplifier, vision and sound
V2	EF42	Mixer-oscillator, vision and sound
V3	EF42	I.F. amplifier, vision and sound
V4	EF42	I.F. amplifier, vision
V5	EB91	Vision demodulator and D.C. restorer
V6	6F13	Video amplifier
V7	EF42	I.F. amplifier, sound
V8	EB91	Sound demodulator and interference limiter
V9	ECC34	Cathode follower and right form
V10	EB91	Sync. separator
V11	6F14	Sync. amplifier
V12	6L18	Pulse limiter
V13	EB91	Spotter and frame pulse separator

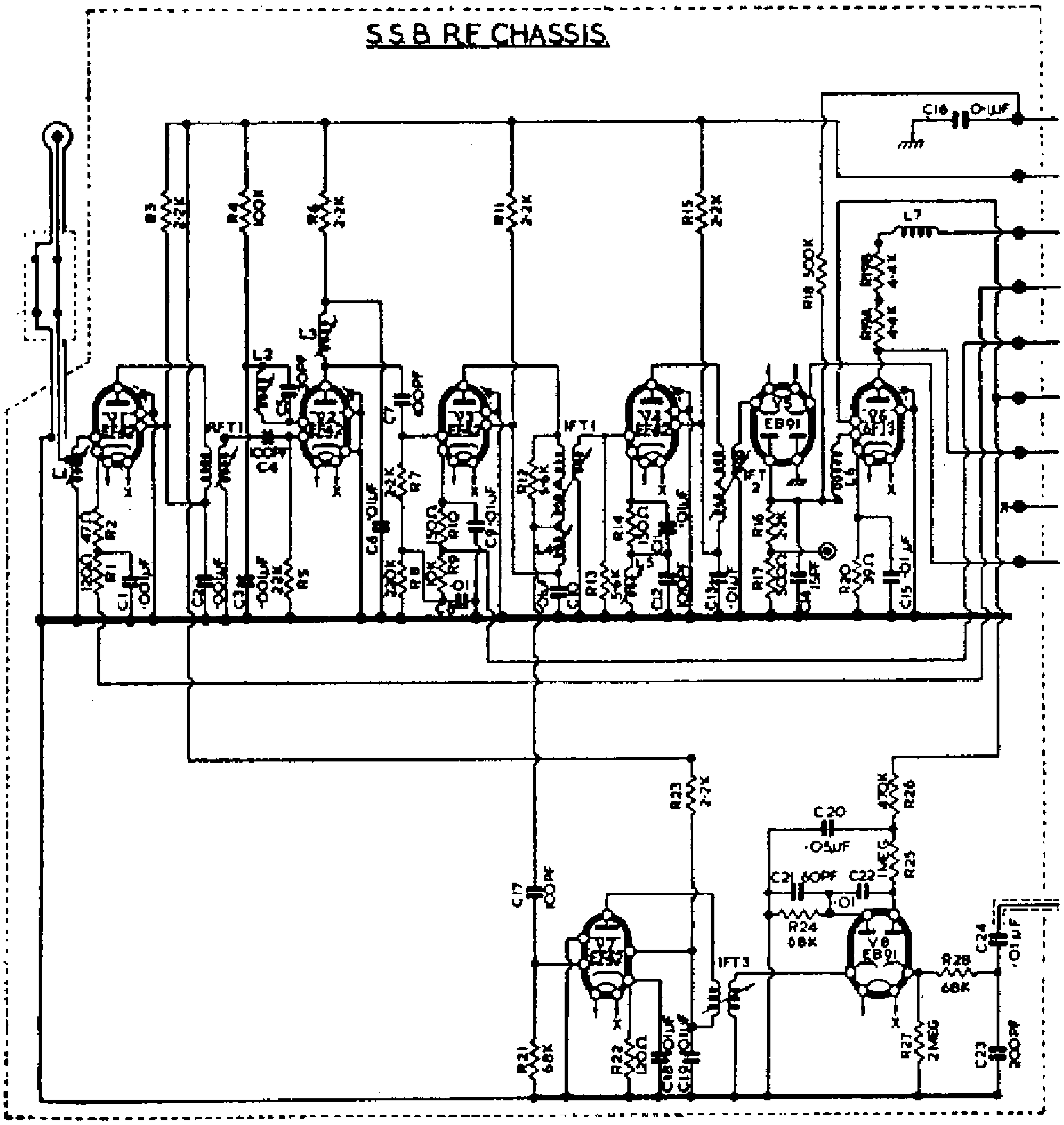


FIG. 1.—CIRCUIT DIAGRAM OF SINGLE-SIDEBAND R.F. CHASSIS

VALVE DETAILS—*continued*

V14	T41	Frame-scan oscillator
V15	Pen 45	Frame-scan output
V16	T41	Line-scan oscillator
V17	EL38	Line-scan output
V18	EL38	Left form
V19	6SN7GT	Tube protection
V20	6SN7GT	Tube protection and brilliance level control
V21	6L18	Audio amplifier
V22	6V6GT	Audio output
V23	GZ32 or 45IU	H.T. rectifier
V24, V25, V26	EY51	E.H.T. rectifiers
V27	EBC33	E.H.T. blocking oscillator
V28	EL38	E.H.T. pulse generator

The sound and vision signals are separated in the anode circuit of the first I.F. amplifier (V3). Gas-filled triodes are used for frame- and line-scan oscillators. The trapezium controls (left and right form) are necessary, due to the fact that the projection lens is at an inclined angle in relation to the viewing screen; distortion would therefore occur if correction were not made for

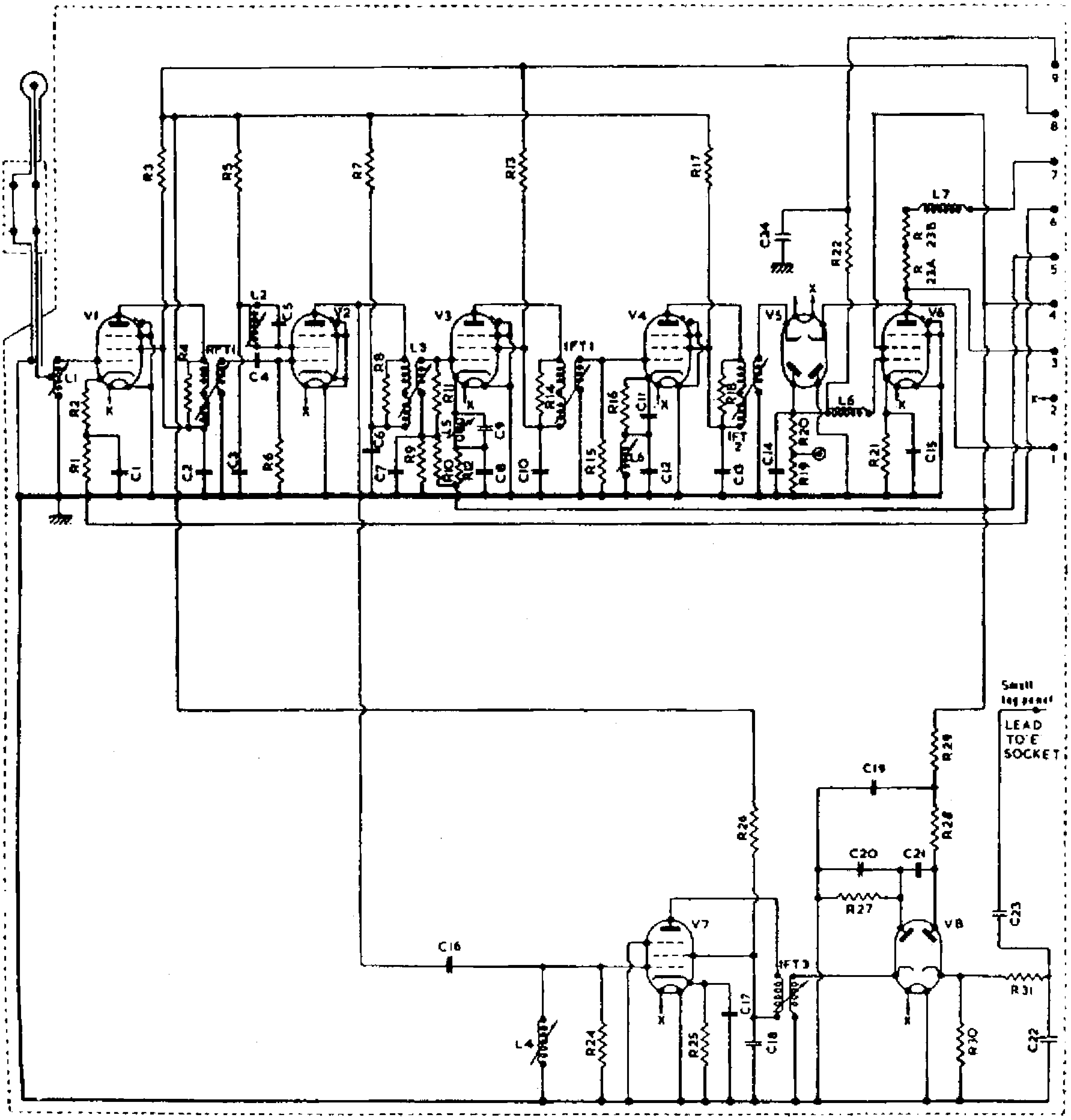


FIG. 2.—R.F. SECTION OF DOUBLE-SIDEBAND (LONDON) RECEIVER

Resistors.

R1	120	R16	150	R30	2M	C10	0·01
R2	47	R17	2·2k	R31	50k	C11	0·01
R3	2·2k	R18	5·1k			C12	1010 pF.
R4	3·3k	R19	500			C13	0·01
R5	100k	R20	2·2k			C14	15 pF.
R6	22k	R21	39	*Capacitors.*		C15	0·01
R7	2·2k	R22	5·1k	C1	0·001	C16	4 pF.
R8	3·3k	R23A	4·4k	C2	0·001	C17	0·01
R9	220k	R23B	4·4k	C3	0·001	C18	0·01
R10	10k	R24	110k	C4	100 pF.	C19	0·05
R11	3·3k	R25	120	C5	30 pF.	C20	60 pF.
R12	150	R26	2·2k	C6	0·01	C21	0·01
R13	2·2k	R27	68k	C7	0·01	C22	200 pF.
R14	3·3k	R28	1M	C8	0·01	C23	0·01
R15	3·3k	R29	470k	C9	1010 pF.	C24	0·1

this. In the "left form" control (V18) circuit a portion of the frame scan is taken via R59, the line-form control (R84) and C53, and is developed across R83. If the cathode and anode of V18 are considered as a diode, the action of which is controlled by the frame-scan waveform on the interposed grid,

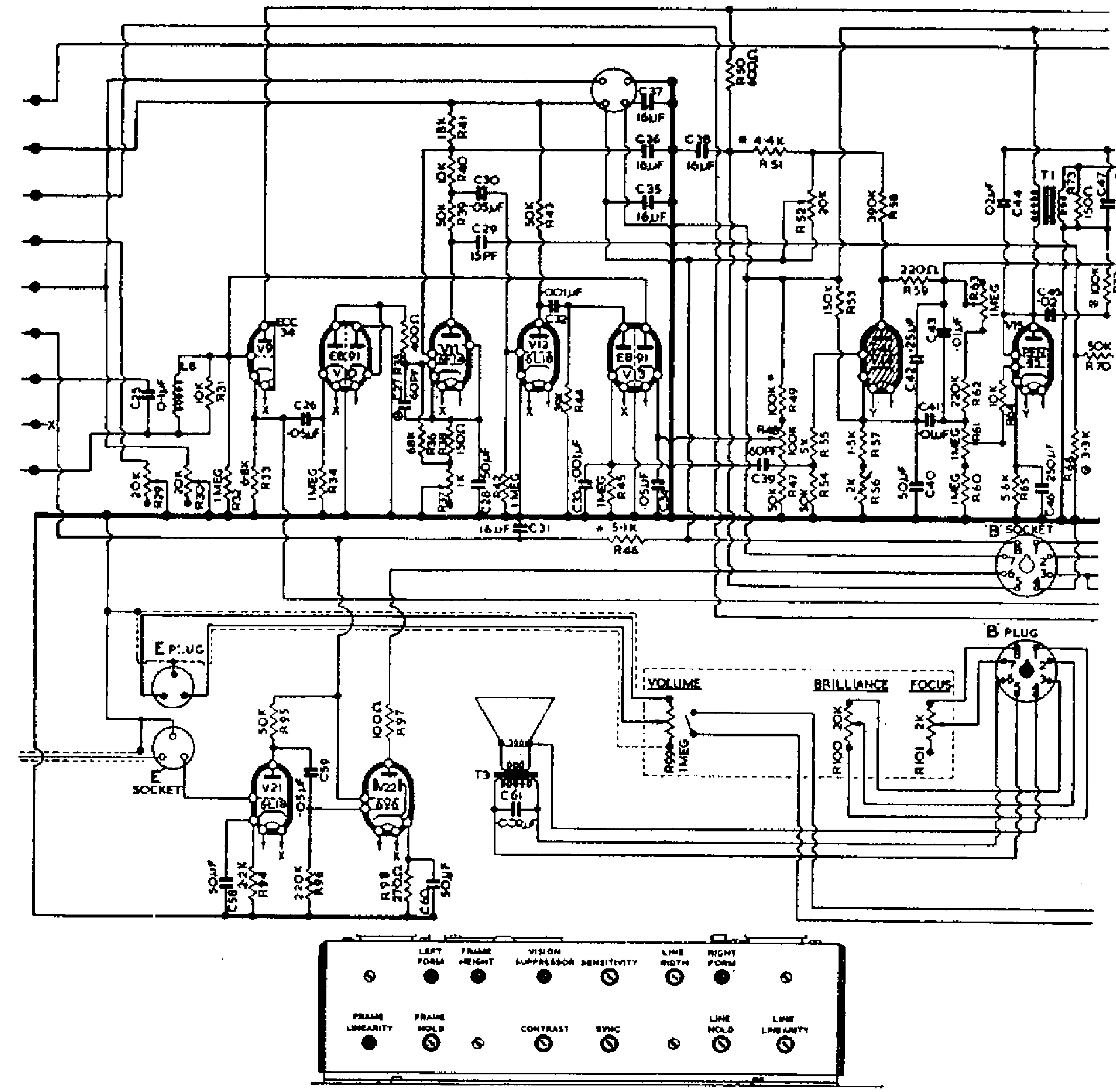
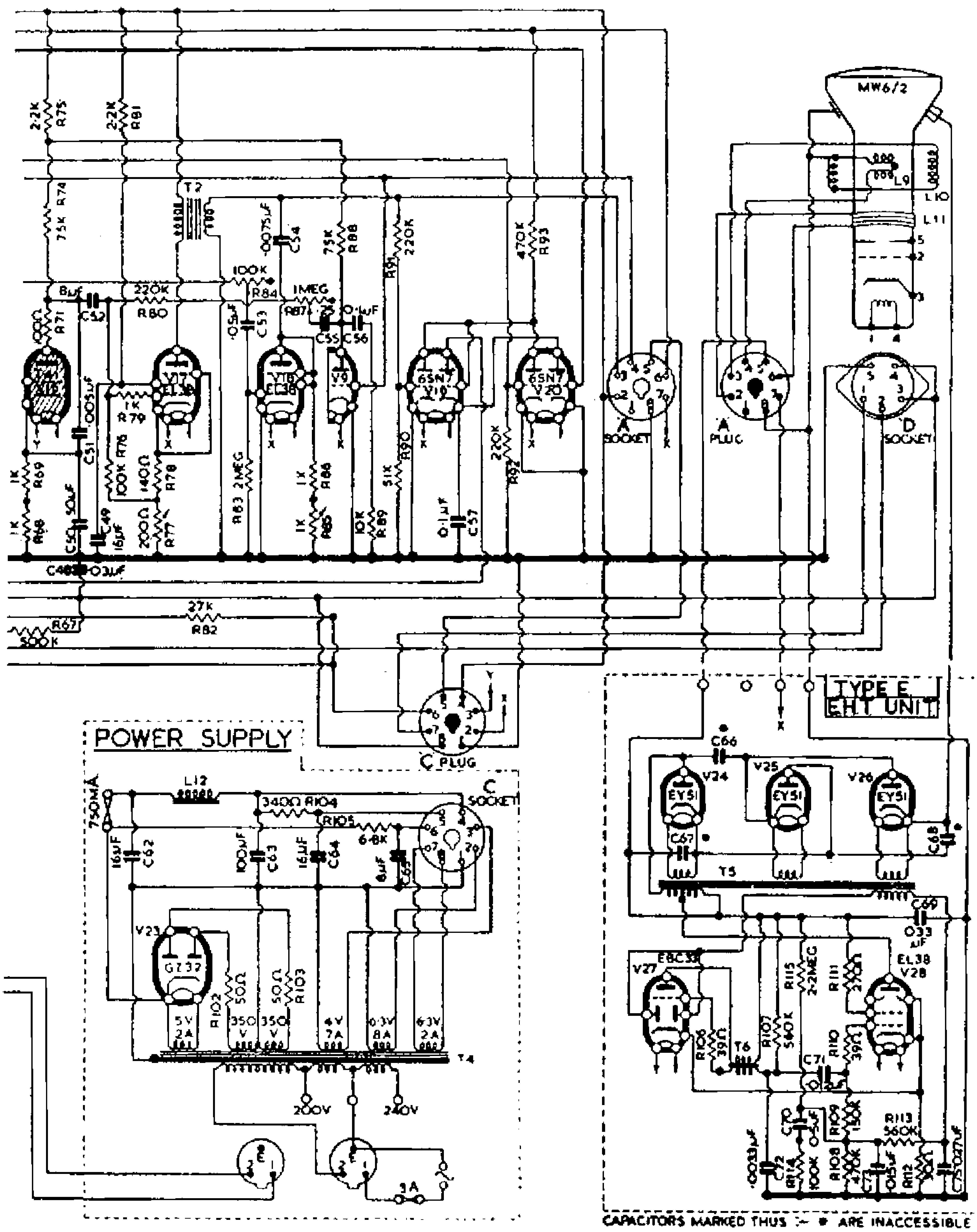


FIG. 3.—MAIN CIRCUIT DIAGRAM FOR DECCA

then successive lines will be damped at one end by an amount directly proportional to the amplitude of the applied frame scan, the action being controlled by R84. The action of the "right form" control stage (half V9) is similar to the left form control except that the 50-c/s. modulation is applied to the grid directly from the secondary of the frame output transformer, while the effect influences the anode of the line-scan oscillator valve V16 via the networks C55, the right form control R87, R80, C52, R74, R75 and R88.

Examination of the brilliance-level control circuit will show that V20b, V19b, the brilliance control R100, R82 and R105 are in series between chassis and the H.T. line. The grid of V20b is connected to the video demodulation cathode of V5 via R18 and is decoupled by C16. It will be apparent, therefore, that changing levels at the cathode of V5 due to maximum modulation (peak



Model 1000 Projection Receiver

white) will effectively control the series chain between the slider of R100 and chassis. This signal-controlled potentiometer thus maintains the tube brightness level narrowly at the potential manually set by R100 and prevents excessive peak white over-modulation effects on the picture tube.

The action of the tube-protection device is that in the absence of scan voltages at the grids of V19a and V20a both triodes conduct heavily and their anode voltage is therefore low. V19b is at cut-off as its grid voltage is considerably negative with respect to the cathode due to the position of V19b in the series chain already mentioned. V19b is thus, under these conditions, a high resistance in series with R100, the slider of which is connected to the cathode of the cathode-ray tube. When the time-bases are functioning, the anode voltage on V19a and V20a rises, but this rise is limited by a small (due to the high value of R93) value of grid current produced in V19b. If either or both time-bases fail, therefore, the voltage on the anodes of V19a and V20a, and hence the grid of V19b, immediately falls. The result is a reduction of V19b anode current, a rise of the cathode-ray tube cathode voltage and a consequent reduction of beam current.

INSTALLATION

The distance between the front of the receiver cabinet and the screen should be approximately 8 ft. 6 in. This distance is not critical, but mechanical focus adjustments will be required if the receiver is placed much nearer or farther away from the screen.

The screen should be securely suspended on a wall directly facing the projection lens of the receiver, the two struts fitted to the top of the frame being used to tilt the screen downwards. An average height for the screen is 38 in. above floor level, measured to the lower edge of the picture area. A wing-nut adjustment is provided at the front of the optical unit on the receiver to enable the angle of the lens to be varied within limits to position correctly the picture on the screen.

The adjustment of the auxiliary controls follows normal practice, but the notes given below may prove of assistance:

Focusing.—Both electrical and mechanical focus arrangements are used. The mechanical adjustments are made by means of three knurled knobs on the optical unit, and are generally similar to those required for Decca receivers using the rear-projection system. The mechanical focus is set at the factory, and no further adjustment of this should be needed for normal use. If, due to movement in transit, the degree of resolution is not even all over the raster, the mechanical alignment may require checking.

Electrical focus is adjusted by the centre control on the top receiver panel, and this works in conjunction with a pre-set control mounted towards the left of the end of the chassis remote from the auxiliary controls. With the main focus control set at two-thirds of its travel in a clockwise direction, adjust the pre-set control for the sharpest picture focus.

Sync.—The normal position for this control is one-third of revolution back from its full clockwise position. The control is set correctly at the factory, and should not be disturbed any more than necessary, as incorrect adjustment will interfere with interlacing.

ALIGNMENT PROCEDURE

Single-sideband Models

It is not recommended that re-alignment be attempted unless an accurately calibrated signal generator covering the intermediate and radio frequencies is available.

Indication of video output may be obtained by connecting a voltmeter (such as Avo Model 7) in parallel with R17. A test socket is provided on the left-hand side of the R.F. strip to facilitate this connection; the positive lead being taken to this socket and the negative lead to chassis. Sound output may be measured on an output meter as for an ordinary broadcast receiver.

All trimming adjustments should be made with the contrast and sensitivity controls turned fully clockwise for maximum gain, but the brilliance control should be set at minimum. A non-metallic trimming tool must be used. To avoid damage to the tuning cores a little gentle heat may be applied before turning them. If the chassis is covered by a cloth and left working on the bench for about 15 minutes beforehand the wax will become sufficiently soft for the cores to be turned with ease.

I.F. Alignment

1. Connect the signal-generator output between the grid of V2 and chassis, and adjust L4, followed by the primary and secondary windings of IFT3, for maximum sound output at the relevant frequency according to the table shown below:

London	*Sutton Coldfield*	*Holme Moss*	*Kirk o'Shotts*	*Wenvoe*
10 Mc/s.	10·5 Mc/s.	11·5 Mc/s.	10·0 Mc/s.	10·5 Mc/s.

2. Adjust L5 at the same frequency for minimum vision indication.
3. Check L4 to see that maximum sound output corresponds with minimum vision response. If not, repeat operations 1 and 2.
4. Adjust secondary windings of IFT1 and IFT2 (both below chassis) for maximum vision reading at frequency as determined below:

London	*Sutton Coldfield*	*Holme Moss*	*Kirk o'Shotts*	*Wenvoe*
10·5 Mc/s.	11·0 Mc/s.	12·0 Mc/s.	10·5 Mc/s.	11·0 Mc/s.

5. Adjust primaries of IFT1 and IFT2 (both above chassis) for maximum vision reading according to the following table:

London	*Sutton Coldfield*	*Holme Moss*	*Kirk o'Shotts*	*Wenvoe*
13·0 Mc/s.	13·5 Mc/s.	14·5 Mc/s.	13·0 Mc/s.	13·5 Mc/s.

6. Repeat all preceding adjustments.
7. Adjust core of L3 at 12·5 Mc/s. for London, Sutton Coldfield, Kirk o'Shotts and Wenvoe, or 13·5 Mc/s. for Holme Moss. The settings are approximate, as L3 should be set for an overall flat response.

R.F. Alignment

Transfer signal-generator output to aerial socket and proceed as follows:

8. Adjust L2 for maximum sound output at a frequency according to the table below:

London	*Sutton Coldfield*	*Holme Moss*	*Kirk o'Shotts*	*Wenvoe*
41·5 Mc/s.	58·25 Mc/s.	48·25 Mc/s.	53·25 Mc/s.	63·25 Mc/s.

9. Adjust secondary of RFT1 for maximum vision response as follows:

London	*Sutton Coldfield*	*Holme Moss*	*Kirk o'Shotts*	*Wenvoe*
43·0 Mc/s.	60·0 Mc/s.	50·0 Mc/s.	55·0 Mc/s.	65·0 Mc/s.

10. Adjust L1 for best results on frequency as in following table:

London	*Sutton Coldfield*	*Holme Moss*	*Kirk o'Shotts*	*Wenvoe*
44·0 Mc/s.	61·0 Mc/s.	51·0 Mc/s.	55·0 Mc/s.	66·0 Mc/s.

11. Check that the response curve is flat overall, re-adjusting L3, if necessary, to obtain this result.

Double Sideband Chassis

Set up the receiver as for single-sideband models and proceed as follows:

I.F. Alignment

1. Feed signal generator to grid of V2, and adjust L4, followed by primary and secondary of IFT3, for maximum sound output at 9·5 Mc/s.
2. Adjust L6 and L5 at 9·5 Mc/s. for minimum vision response, and follow this by re-setting L4 for minimum vision reading.
3. Adjust primaries (above chassis) of L3, IFT1 and IFT2 for maximum vision output at 15·5 Mc/s. Two positions of resonance will normally be found: use the first one encountered as the core is screwed in.
4. Adjust secondaries (below chassis) of L3, IFT1 and IFT2 for maximum vision output at 10·5 Mc/s.
5. Repeat above operations.

R.F. Alignment

6. Feed generator output to aerial socket and trim L2 for maximum sound at 41·5 Mc/s.
7. Adjust primary of RFT1 for maximum vision response at 48·0 Mc/s.
8. Adjust secondary of RFT1 for maximum vision response at 42·0 Mc/s.
9. Adjust L1 for maximum vision response at 45·0 Mc/s.
10. Repeat operations, 7, 8, and 9.