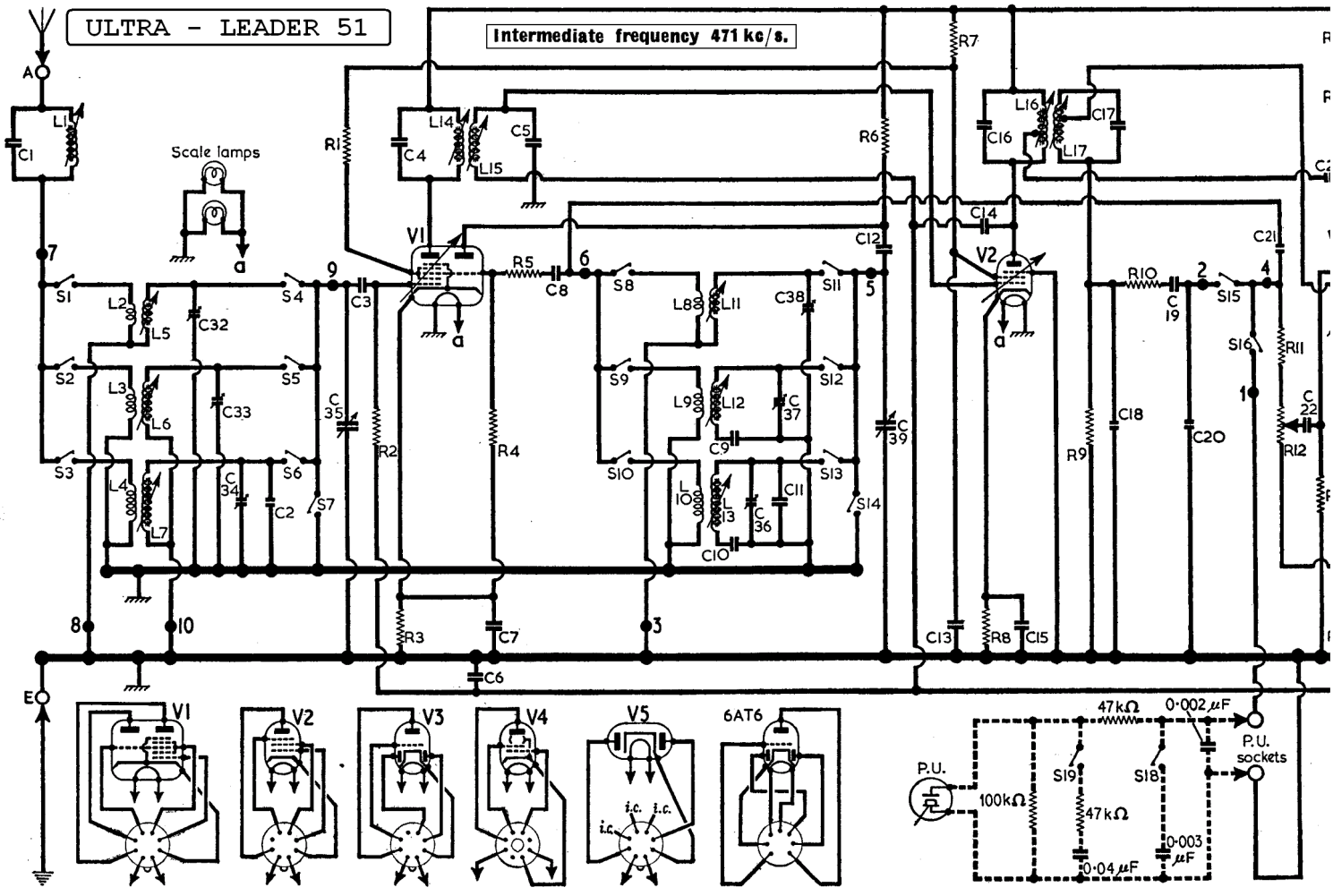
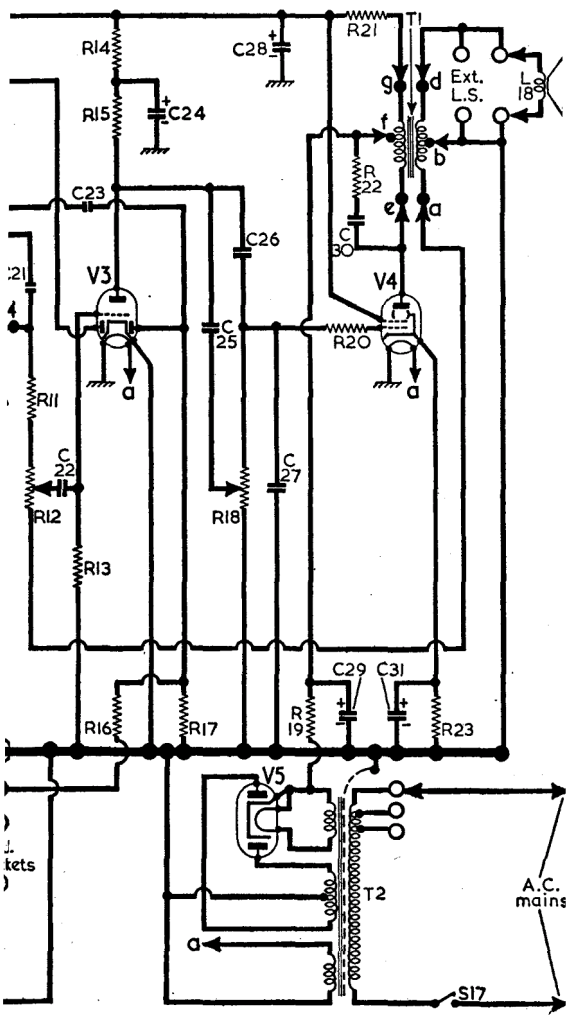
ULTRA - LEADER 51





RESISTORS		Values	Locations
R1	V1 S.G. stopper ...	100Ω	F3
R2	V1 C.G.	470kΩ	F3
R3	V1 G.B.	220Ω	F3
R4	V1 osc. C.G. ...	47kΩ	F3
R5	Osc. stabilizer ...	220Ω	F3
R6	Osc. anode feed ...	68kΩ	F3
R7	V1, V2 S.G. feed ...	18kΩ	F4
R8	V2 G.B.	300Ω	F3
R9	Diode load ...	470kΩ	F4
R10	I.F. stoppers ...	470kΩ	F4
R11		22kΩ	B1
R12	Volume control ...	500kΩ	D3
R13	V3 C.G.	10MΩ	E4
R14	V3 anode decoup.	100kΩ	E4
R15	V3 anode load ...	220kΩ	E4
R16	A.G.C. decoupling	1MΩ	E3
R17	A.G.C. diode load	470kΩ	E4
R18	Tone control ...	500kΩ	D4
R19	Surge limiter ...	100Ω	E3
R20	V4 C.G. stopper ...	5·6kΩ	E4
R21	H.T. smoothing ...	1·2kΩ	E4
R22	Part tone correction	3·3kΩ	E4
R23	V4 G.B.	180Ω	D4

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	I.F. filter ...	—	A1
L2	Aerial coupling coils ...	—	G4
L3		33·0	G4
L4		130·0	G4
L5	Aerial tuning coils	—	G4
L6		3·0	G4
L7		17·0	G4
L8	Oscillator reaction coils ...	0·4	F4
L9		0·5	F4
L10		0·8	G4
L11	Oscillator tuning coils ...	—	F4
L12		2·5	F4
L13		5·0	G4
L14	1st I.F. trans. Pri.	7·5	B1
L15	Sec.	7·5	B1
L16	2nd I.F. trans. Pri.	7·5	B2
L17	Sec.	7·5	B2
L18	Speech coil ...	3·0	—
T1	O.P. trans. g-f ...	11·0	E3
	f-e ...	370·0	
	d-b ...	0·25	
	b-a ...	1·0	
T2	Mains trans. Pri., total	35·0	
	H.T. sec., total	235·0	
	Rect. htr.	—	C2
	Htr. sec.	—	
S1-S16	Waveband switches	—	G4
S17	Mains sw., g'd R12	—	D3

CAPACITORS		Values	Locations
C1	I.F. filter tune ...	270pF	A1
C2	L.W. fixed trim. ...	65pF	G4
C3	V1 C.G.	500pF	A1
C4	1st I.F. trans. tuning ...	120pF	B1
C5		120pF	B1
C6	A.G.C. decoupling	0·04μF	F3
C7	V1 cath. by-pass ...	0·04μF	F3
C8	V1 osc. C.G. ...	100pF	G3
C9	M.W. osc. tracker	470pF	F4
C10	L.W. osc. tracker	165pF	G4
C11	L.W. fixed trimmer	125pF	F4
C12	Osc. anode coup....	100pF	F3
C13	V1, V2 S.G. decoup.	0·05μF	F3
C14	Neutralizer ...	0·85pF	F4
C15	V2 cath. by-pass.	0·04μF	F4
C16	2nd I.F. trans. tuning	114pF	B2
C17		124pF	B2
C18	I.F. by-pass ...	50pF	F4
C19	A.F. coupling ...	0·01μF	F4
C20	I.F. by-pass ...	33pF	F4
C21	Neutralizer ...	2·5pF	F3
C22	A.F. coupling ...	0·01μF	E4
C23	A.G.C. coupling ...	50pF	E4
C24*	V3 anode decoup.	1μF	E4
C25	Part tone control...	0·01μF	D4
C26	A.F. coupling ...	0·04μF	E4
C27	I.F. by-pass ...	100pF	D4
C28*	H.T. smoothing ...	50μF	B2
C29*		50μF	B2
C30	Part tone correction	0·01μF	D4
C31*	V4 cath. by-pass ...	100μF	D3
C32‡	S.W. aerial trim. ...	—	G3
C33‡	M.W. aerial trim....	—	G3
C34‡	L.W. aerial trim. ...	—	G4
C35†	Aerial tuning ...	483pF	A2
C36‡	L.W. osc. trimmer	—	G4
C37‡	M.W. osc. trimmer	—	F4
C38‡	S.W. osc. trimmer	—	F3
C39†	Osc. tuning ...	483pF	A2

* Electrolytic. † Variable. ‡Pre-set.

Valves	Anode		Screen		Cath.
	V	mA	V	mA	V
V1 6C9	220 Oscillator	2·5	76	6·2	2·2
	54	2·2			
V2 6F15	220	4·5	76	1·4	1·7
V3 6LD20	32	0·7	—	—	—
V4 6P25	236	36·0	220	0·7	7·0
V5 UU9	240†	—	—	—	255·0

† A.C. voltage.

CIRCUIT ALIGNMENT

The I.F. amplifier in the Leader 51 has been designed to have a "flat-topped" response with a bandwidth of ±3 kc/s about a centre frequency of 471 k/cs. To achieve this the 1st I.F. transformer has been over-coupled to give a "double-humped" response, while the 2nd I.F. transformer has a single-peak response. The correct flat-topped response is easily obtained if the following alignment procedure is adhered to.

In the earlier Leader, the I.F. alignment is quite straightforward, all four cores being adjusted for maximum output, but the frequency is 470 kc/s.

Switch set to M.W. and turn gang to maximum. Turn volume control and tone control fully clockwise and connect output meter across **T1** primary winding. During alignment adjust output from signal generator so that output meter reading does not exceed 22 V. Use a completely insulated trimming tool and check each adjustment carefully.

I.F. Stages.—Connect signal generator output, via an 0.01 μF capacitor in the "live" lead to control grid (pin 6) of **V2** and chassis. Detune **L15** (location reference F3) by unscrewing core flush with end of former. Feed in a 471 kc/s (637 m) signal modulated by 400 c/s to a depth of 30%, and adjust the cores of **L17** (F4) and **L16** (B2) for maximum output. Repeat these last two adjustments carefully. Transfer signal generator "live" lead to junction of **C35** and **C3,** and adjust the core of **L14** (B1) and **L15** (F3) for maximum output.

Tune signal generator about 471 kc/s and check that the response is level between the limits ±3 kc/s or is symmetrical about 471 kc/s, with a slight dip in the centre. If the response is not level or symmetrical the following adjustments must be made.

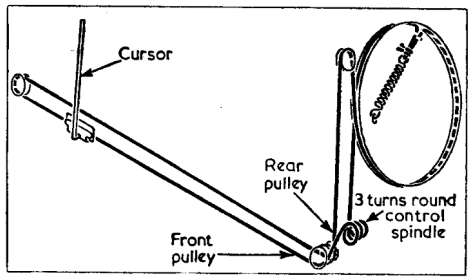
Adjust output of signal generator at 471 kc/s to give an output meter reading of 22 V. Tune signal generator to the excessive peak and reduce the amplitude of the peak by adjusting the core of **L15,** screwing it in if the peak is below 471 kc/s, or out if it is above 471 kc/s. Repeat the above procedure if necessary.

I.F. Filter.—Connect output of signal generator, via a dummy aerial, to **A** and **E** sockets and feed in a 471 kc/s signal. With the set tuned to the high wavelength end of M.W., tune signal generator to centre of I.F. response curve and adjust the core of **L1** (A1) for minimum output, selecting the greater dip if two dips are found.

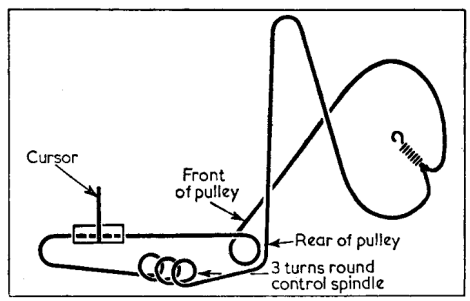
Swing signal generator frequency about this minimum, and check that the rise in output immediately on each side of the minimum is symmetrical. The rise in output on each side of the minimum can be equalized by a fine adjustment to the core of **L1.**

R.F. and Oscillator Stages.—Check that with the gang set to maximum the cursor coincides with the vertical line at the top right hand end of the tuning scale panel. Numbered alignment points are printed along the top of the tuning scale. and this mark is $\frac{7}{16}$in beyond the last one (No. 11). These numbers are quoted in parentheses after the appropriate frequency for each alignment setting in the following instructions. Connect signal generator leads, via a suitable dummy aerial, to **A** and **E** sockets. The procedure is the same for the Leader 51 and the earlier Leader.

L.W.—Switch set to L.W. and tune to 2,000 m (11). Feed in a 2,000 m (150 kc/s) signal and adjust the cores of **L13** (G4) and **L7** (G4) for maximum output. Tune set to 1,000 m (8), feed in a 1,000 m (300 kc/s) signal and adjust **C36** (G4) and **C34** (G4) for maximum output. Repeat these adjustments, then tune to 1,429 m (9), feed in a 1,429 m (210 kc/s) signal, and check calibration. Tune to 1,500 m (10) and check calibration against B.B.C. L.W. Light transmission.



Sketch showing the tuning drive systems of the Leader 51 (above) and the Ultragram 51 (below) as seen from the front.



M.W.—Switch set to M.W., tune to 500 m (7), feed in a 500 m (600 kc/s) signal and adjust the cores of **L12** (F4) and **L6** (G4) for maximum output. Tune set to 200 m (4), feed in a 200 m (1,500 kc/s) signal and adjust **C37** (F4) and **C33** (G3) for maximum output. Repeat these adjustments. Tune set to 300 m (5), feed in a 300 m (1,000 kc/s) signal and check calibration. Tune set to 330.5 m (6) and check calibration on B.B.C. Home Service transmission.

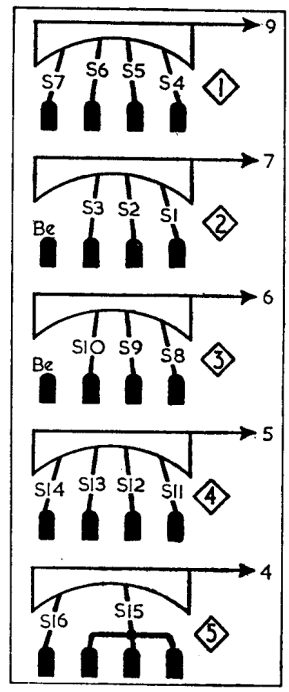
S.W.—Switch set to S.W., tune to 40 m (3), feed in a 40 m (7.5 Mc/s) signal and adjust the cores of **L11** (F4) and **L5** (G4) for maximum output. Tune set to 20 m (1), feed in a 20 m (15 Mc/s) signal and adjust **C38** (F3) and **C32** (G3) for maximum output, rocking gang while adjusting **C32** to obtain optimum results. Tune to 30 m (2), feed in a 30 m (10 Mc/s) signal and check calibration.

DRIVE CORD REPLACEMENT

Leader 51.—Five feet of cord is required for a new drive cord, and that in our sample was nylon braided glass yarn. It should be run as shown in our sketch in the upper drawing in the next column, which is drawn viewing the chassis from the right-hand front corner, with the gang at minimum.

The simplest method of running the cord is to set the gang at maximum, loop the tension spring with a non-slip knot to one end of the cord, and hook it to the anchorage on the gang drum. Then run the cord down to the control spindle, commencing with about a quarter-turn anti-clockwise round the drum as viewed in our sketch. The rest of the run can be made while pulling against the gang stop to hold the cord in place.

Ultragram 51.—We did not have a sample of this model on which to work, but we reproduce in col. 5 the tuning drive system drawing as shown in the makers' service manual. They give the length of cord as approximately five feet.



Diagrams of the five sections of the waveband switch assembly in the R.F. tuning assembly. The numbered arrowheads represent connecting tags which project from the side of the unit. These diagrams are drawn as seen when viewed from the opposite end to the control knob, after the unit has been removed and turned over. Below is the switch table.

Switches	Gram.	L.W.	M.W.	S.W.
S1	—	—	—	C
S2	—	—	C	—
S3	—	C	—	—
S4	—	—	—	C
S5	—	—	C	—
S6	—	C	—	—
S7	C	—	—	—
S8	—	—	—	C
S9	—	—	C	—
S10	—	C	—	—
S11	—	—	—	C
S12	—	—	C	—
S13	—	C	—	—
S14	C	—	—	—
S15	—	C	C	C
S16	C	—	—	—