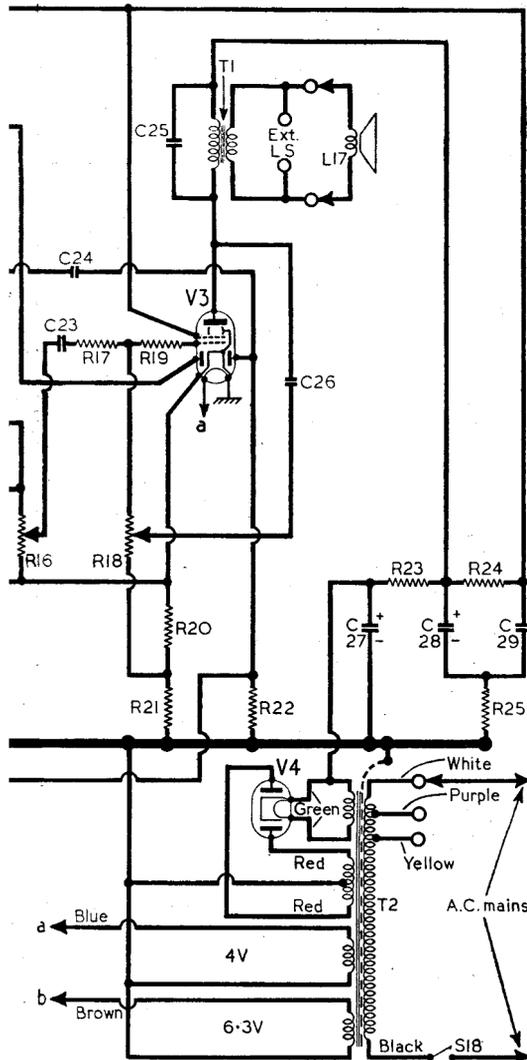
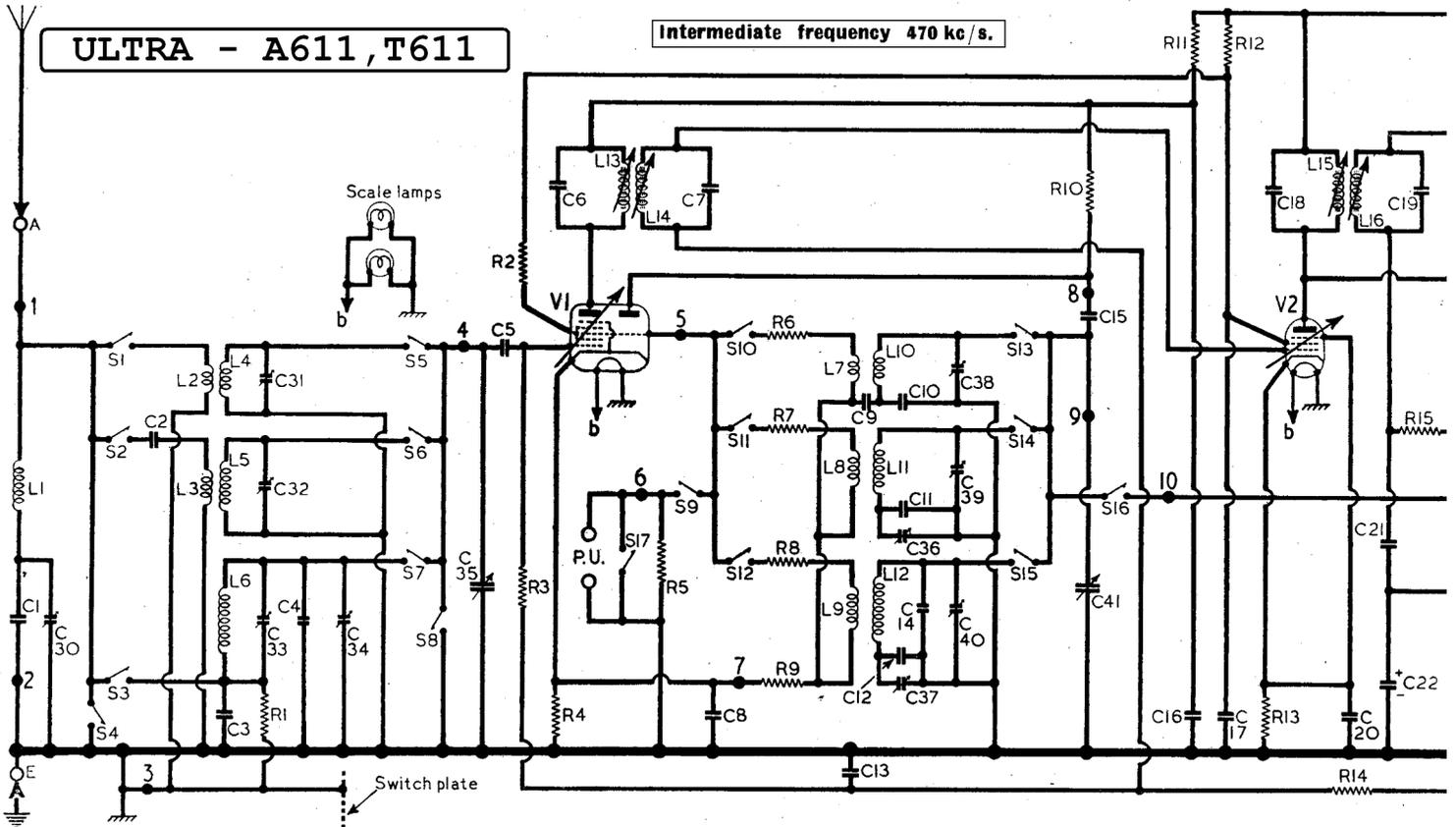


# ULTRA - A611, T611

Intermediate frequency 470 kc/s.



CAPACITORS	Values	Locations
C1	Part I.F. filter tune	180pF K6
C2	M.W. coupling	470pF K6
C3	L.W. coupling	0.003μF K6
C4	Aerial L.W. trimmer	25pF K6
C5	V1 C.G. coupling	470pF A1
C6	1st I.F. trans- former tuning	120pF B2
C7		120pF B2
C8	V1 cath. by-pass	0.05μF H5
C9	V1 osc. C.G. coupling	270pF L6
C10	Osc. S.W. tracker	0.005μF L6
C11	Osc. M.W. tracker	500pF L6
C12	Osc. L.W. tracker	120pF L6
C13	A.G.C. line decoupl.	0.05μF G4
C14	Osc. L.W. trimmer	68pF L6
C15	Osc. anode coupling	0.01μF H4
C16	H.T. feed de- coupling	0.05μF H4
C17		0.05μF H4
C18	2nd I.F. trans- former tuning	120pF B1
C19		120pF B1
C20	V2 cath. by-pass	0.05μF G5
C21	L.F. by-pass	100pF G4
C22*	V3 cath. by-pass	50μF G4
C23	A.F. coupling	0.01μF E3
C24	A.G.C. diode coup.	10pF G4
C25	Tone corrector	0.005μF F4
C26	Part tone control	27pF E3
C27*		16μF F3
C28*	H.T. smoothing capacitors	24μF C1
C29*		16μF C1
C30†	I.F. filter tuning	50pF J4
C31†	Aerial S.W. trim	50pF J4
C32†	Aerial M.W. trim	50pF J4
C33†	Image rejector	— J3
C34†	Aerial L.W. trimmer	50pF J3
C35†	Aerial tuning	494pF\$ A1
C36†	Osc. M.W. tracker	50pF J4
C37†	Osc. L.W. tracker	50pF J3
C38†	Osc. S.W. trimmer	40pF J5
C39†	Osc. M.W. trimmer	50pF J4
C40†	Osc. L.W. trimmer	50pF J4
C41†	Oscillator tuning	494pF\$ A2

RESISTORS	Values	Locations
R1	L.W. coupling	12kΩ K6
R2	V1 S.G. stopper	68Ω H4
R3		470kΩ H5
R4	V1 fixed G.B.	220Ω H5
R5	P.U. shunt	100kΩ L6
R6		150Ω L6
R7	Oscillator reaction stabilisers	1kΩ L6
R8		2.7kΩ L6
R9	V1 osc. C.G.	47kΩ L6
R10	V1 osc. H.T. feed	27kΩ H4
R11	V1 H.T. feed	300Ω H4
R12	S.G.'s H.T. feed	18kΩ G4
R13	V2 fixed G.B.	300Ω G5
R14	A.G.C. line decoupl.	1MΩ G4
R15	P.U. isolator	47kΩ G4
R16	Volume control	1MΩ E3
R17	F-B isolator	100kΩ E3
R18	Tone control	1MΩ E4
R19	Grid stopper	47kΩ C1
R20	V3 G.B. and P.U. isolator	180Ω G4
R21	A.G.C. delay	56Ω F4
R22	A.G.C. diode load	470kΩ F4
R23		700Ω D1
R24	H.T. smoothing resistors	1kΩ D1
R25		5Ω* F3

\* Made up of two 10Ω resistors in parallel.

\* Electrolytic. † Variable. ‡ Pre-set.  
§ "Swing" value, minimum to maximum.  
|| Made up of 0.002μF and 0.003μF connected in parallel.

OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	I.F. filter coil	8.0 K6
L2	Aerial coupling	— K6
L3	coils	1.8 K6
L4	Aerial S.W. tuning	— K6
L5	Aerial M.W. tuning	2.4 K6
L6	Aerial L.W. tuning	32.0 K6
L7		— L6
L8	Oscillator reaction coils	1.0 L6
L9		4.5 L6
L10	Osc. S.W. tuning...	— L6
L11	Osc. M.W. tuning...	3.5 L6
L12	Osc. L.W. tuning...	8.0 L6
L13	1st I.F. trans. { Pri.	7.5 B2
L14		7.5 B2
L15	2nd I.F. trans. { Pri.	7.5 B1
L16		7.5 B1
L17	Speech coil	2.6 —
T1	Output trans. { Pri.	500.0 H3
		0.2 —
		30.0 —
T2	Mains trans. { Pri., total H.T. sec., total...	350.0 D2
		Very low
	4v. htr. sec.	—
	5.3 v. htr. sec.	—
	sec. ...	Very low
	Rect. htr. sec. ...	Very low
S1-S16	Waveband switches	— K6
S17	P.U. jack-switch	— H5
S18	Mains sw., g'd R16	— E3

Valve	Anode		Screen		Cath.
	V	mA	V	mA	
V1 6C9 ...	220	3.5	94	6.4	2.9
	{ oscillator 90				
V2 6F15 ...	222	6.0	94	1.7	2.3
V3	236	33.0	222	6.2	8.8
Pen 45DD	270†	—	—	—	296.0

† Each anode, A.C.

**CIRCUIT ALIGNMENT**

**I.F. Stages.**—Switch set to M.W., and turn the gang and volume control to maximum. Connect signal generator via a 0.1  $\mu$ F capacitor to the fixed-vane tag of **C35** (A1) and chassis, feed in a 470 kc/s (638.3 m) signal, and adjust **L16**, **L15**, **L14** and **L13** cores (location references **B1** and **B2**) for maximum output, keeping the input signal low enough to avoid A.G.C. action.

**I.F. Filter.**—Transfer signal generator leads to **A** and **E** sockets, via M.W. dummy aerial (0.0002  $\mu$ F capacitor). Feed in a strong 470 kc/s signal, and adjust **C30** for minimum output.

**R.F. and Oscillator Stages.**—With the gang at maximum capacitance, the cursor should cover the short vertical line at the high wavelength end of the scale backing plate, actually on the cursor guide rail.

As the scale panel is mounted in the cabinet and the chassis must be removed for alignment, the scale backing plate carries a number of calibration marks, in the form of dots.

In early chassis (see "Chassis Divergencies"), these marks consisted of six dots numbered 1-6 and three more marked "L," "L" and "H" for the Light Programme on 262 m and 1,500 m and the Home Service on 341 m respectively.

In later models, with the later-type gang, these markings were changed altogether. The calibration points at the ends of the scales were repeated at the same frequencies, but they bore different numbers (4, 7, 1, 6, 9, 3 instead of 1-6) and the station programme positions, which were rendered obsolete by the Copenhagen Plan, were replaced by alignment check points at 30 m (No. 2), 300 m (No. 5) and 1,500 m (No. 8).

In the following instructions, both numbers will be quoted for each frequency where two are involved, the earlier type mark being quoted first. All the adjustments will be found in the tuning assembly, and they are indicated in location references **J3**, **J4** and **J5** in our under-chassis view.

**M.W.**—With the set still switched to M.W., tune to 200 m (mark 1 or 4 on backing plate), feed in a 200 m (1,500 kc/s) signal, and adjust **C39**, then **C32**, for maximum output. Tune to 500 m (mark 4 or 6), feed in a 500 m (600 kc/s) signal, and adjust **C36** for maximum output while rocking the gang for optimum results. In later type receivers, check calibration at 300 m (1,000 kc/s) (Mark 5).

**L.W.**—Switch set to L.W., tune to 1,000 m (Mark 2 or 7), feed in a 1,000 m (300 kc/s) signal, and adjust **C40**, then **C34**, for maximum output. Tune to 2,000 m (Mark 5 or 9), feed in a 2,000 m (150 kc/s) signal, and adjust **C37** for maximum output while rocking the gang for optimum results. In later type receivers, check calibration at 1,500 m (200 kc/s) (mark 8).

**S.W.**—Switch set to S.W., and replace dummy aerial with a 400  $\Omega$  resistor. Tune to 20 m (mark 3 or 1), feed in a 20 m (15 Mc/s) signal, and adjust **C38**, then **C31**, for maximum output. Tune to 50 m (mark 6 or 3), feed in a 50 m (6 Mc/s) signal, and check calibration. In later type receivers, calibration should also be checked at 30 m (10 Mc/s) (mark 2).

**Image Rejector.**—When the receiver was designed, the Light Programme on 261 m was liable in areas of high field strength to produce an image on the L.W. band at about 209 kc/s, where it caused a whistle to appear with the L.W. Light Programme. **C33** was then adjusted while a strong 1,149 kc/s (261 m) signal was being fed into the receiver, which was tuned to the image, for minimum output.

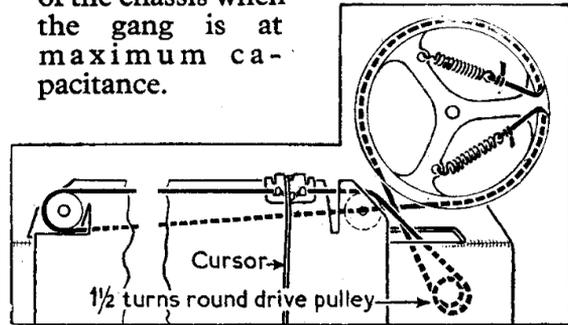
As the Copenhagen has since moved the transmitter to 247 m, the image no longer troubles the L.W. Light Programme, but in some areas it may be troublesome at about 274 kc/s (1,095 m), in which case it would be suppressed by adjusting **C33** while feeding in a strong 1,214 kc/s (247 m) signal and receiving the image on L.W. **C33** should be adjusted for minimum output by sliding the sleeving along the central wire, then sealed with varnish.

**DRIVE CORD REPLACEMENT**

Four feet of Nylon braided glass yarn is required for a new drive cord, which should be run as shown in the sketch below, where the system is drawn as seen from the front when the gang is at maximum capacitance.

Starting in this position, tie a spring to one end of the cord and hook it on to the lower anchorage. Then run the cord as shown, pulling against the gang stop to hold the cord in position. When tying off, the springs should be extended to about 1½ times their relaxed length. The overall length of our cord, including the knots, was 43½ inches.

Sketch showing the tuning drive system, drawn as seen from the front of the chassis when the gang is at maximum capacitance.



**Switch Table and Diagrams**

Switch	Gram	S.W.	M.W.	L.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
S16	C	—	—	—

Diagrams of the two wave band switch units drawn as seen in the directions of the two arrows in our illustrations of the tuning assembly (above) and chassis underside. The associated table is above.

