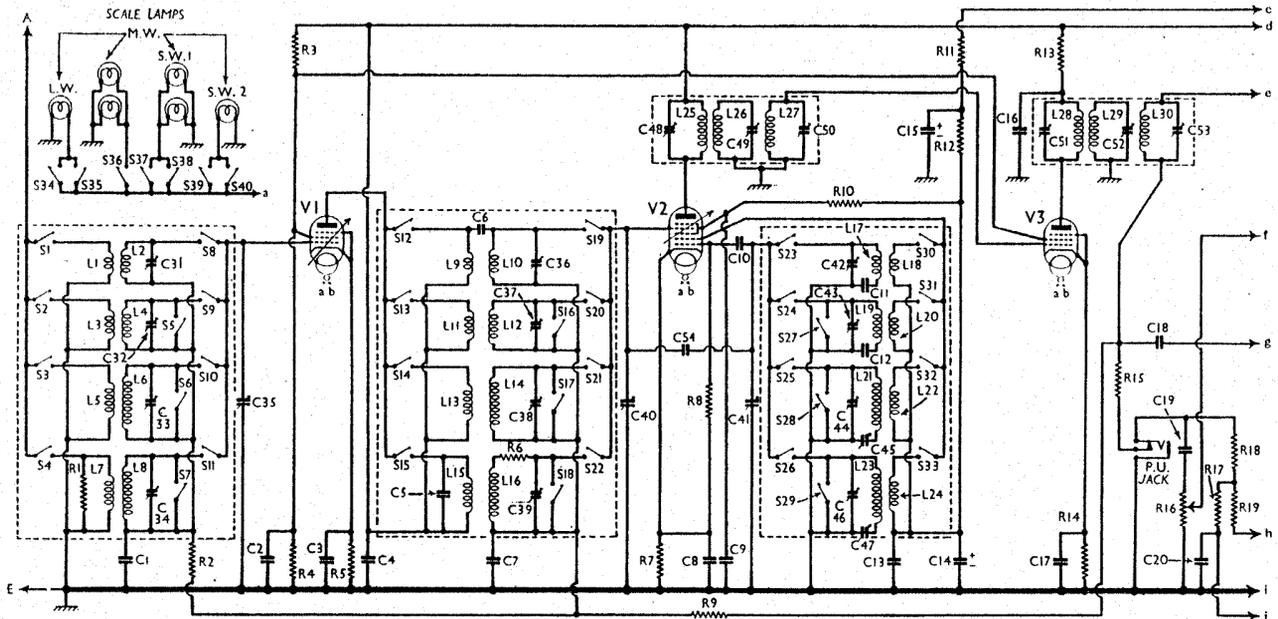


PILOT - U650 & CU650 & RGU650 & RGAU650



Circuit diagram of the Pilot U650 4-band A.C. superhet. The console and two radiogram models have similar chassis. Note the cathode ray tuning indicator. This and the speaker are connected to the chassis by valve-base type plugs. The connections are indicated by numbered circles in the circuit, and diagrams of the undersides of the sockets are, inset, above, and similarly numbered.

COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	Aerial L.W. coupling shunt	50,000
R2	V1 C.G. decoupling	100,000
R3	V1 and V3 S.G.'s H.T. potential divider	30,000
R4	V1 fixed G.B. resistance	40,000
R5	V1 fixed G.B. resistance	400
R6	H.F. trans. L.W. sec. series	250
R7	V2 fixed G.B. resistance	400
R8	V2 osc. C.G. resistance	50,000
R9	A.V.C. line decoupling	1,000,000
R10	V2 S.G.'s H.T. feed	30,000
R11	V2 osc. anode and S.G.'s decoupling	10,000
R12	V3 anode decoupling	4,000
R13	V3 G.B. resistance	600
R14	I.F. stopper	50,000
R15	Manual volume control	1,000,000
R16	T.L. feed decoupling	1,000,000
R17	V4 diode load	100,000
R18	V4 G.B. resistance	200,000
R19	V4 anode decoupling	2,000
R20	V4 anode decoupling	100,000
R21	V4 anode load	250,000
R22	V5 C.G. resistance	500,000
R23	Variable tone control	100,000

CONDENSERS (Continued)		Values (μF)
C36†	H.F. trans. sec. S.W.1 trimmer	—
C37†	H.F. trans. sec. S.W.2 trimmer	—
C38†	H.F. trans. sec. M.W. trimmer	—
C39†	H.F. trans. sec. L.W. trimmer	—
C40†	Oscillator circuit tuning	0.00045
C41†	Osc. circuit S.W.1 trimmer	0.00045
C42†	Osc. circuit S.W.2 trimmer	—
C43†	Osc. circuit M.W. trimmer	—
C44†	Osc. circuit L.W. trimmer	—
C45†	Osc. M.W. series tracker	0.0005
C46†	Osc. circuit L.W. trimmer	—
C47†	Osc. L.W. series tracker	0.00015
C48†	1st I.F. trans. pri. tuning	—
C49†	Absorption coil tuning	—
C50†	1st I.F. trans. sec. tuning	—
C51†	2nd I.F. trans. pri. tuning	—
C52†	Absorption coil tuning	—
C53†	2nd I.F. trans. sec. tuning	—
C54	Neutralising condenser	—

\* Electrolytic. † Variable. ‡ Pre-set.

CONDENSERS		Values (μF)
C1	V1 C.G. decoupling	0.05
C2	V1 and V2 S.G.'s by-pass	0.1
C3	V1 cathode by-pass	0.1
C4	V1 anode decoupling	0.25
C5	L.W. H.F. trans. pri. trimmer	0.00025
C6	S.W. H.F. trans. cap. coupling	0.00001
C7	V2 tetrode C.G. decoupling	0.05
C8	V2 cathode by-pass	0.1
C9	V2 S.G.'s by-pass	0.05
C10	V2 osc. C.G. condenser	0.00005
C11	Osc. S.W.1 series tracker	0.00287
C12	Osc. S.W.2 series tracker	0.00137
C13	V1 osc. anode and S.G.'s decoupling	0.05
C14*	V3 anode decoupling	2.0
C15*	V3 cathode by-pass	2.0
C16	V3 anode decoupling	0.05
C17	V3 cathode by-pass	0.1
C18	I.F. by-pass	0.00025
C19	Coupling to V4 triode	0.01
C20	T.L. feed decoupling	0.05
C21	4V triode anode decoupling	0.1
C22*	V4 cathode by-pass	10.0
C23*	H.T. smoothing	8.0
C24	V4 to V5 L.F. coupling	0.01
C25	Part of T.C. filter	0.05
C26	Fixed tone corrector	0.005
C27*	V5 cathode by-pass	10.0
C28*	H.T. smoothing	8.0
C29	Ext. L.S. coupling	0.05
C30	Ext. L.S. coupling	0.05
C31†	Aerial S.W.1 trimmer	—
C32†	Aerial S.W.2 trimmer	—
C33†	Aerial M.W. trimmer	—
C34†	Aerial L.W. trimmer	—
C35†	Aerial circuit tuning	0.00045

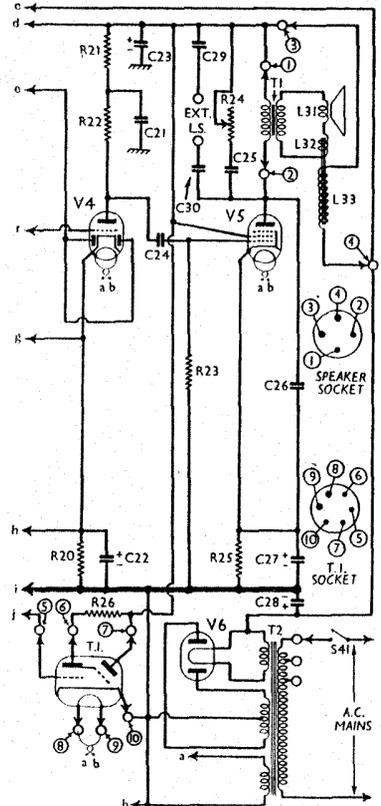
OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial S.W.1 coupling coil	1.0
L2	Aerial S.W.1 tuning coil	0.05
L3	Aerial S.W.2 coupling coil	3.0
L4	Aerial S.W.2 tuning coil	0.8
L5	Aerial M.W. coupling coil	19.5
L6	Aerial M.W. tuning coil	3.0
L7	Aerial L.W. coupling coil	115.0
L8	Aerial L.W. tuning coil	18.0
L9	H.F. trans. S.W.1 pri.	3.5
L10	H.F. trans. S.W.1 sec.	0.05
L11	H.F. trans. S.W.2 pri.	10.0
L12	H.F. trans. S.W.2 sec.	0.8
L13	H.F. trans. M.W. pri.	90.0
L14	H.F. trans. M.W. sec.	2.6
L15	H.F. trans. L.W. pri.	120.0
L16	H.F. trans. L.W. sec.	18.0
L17	Osc. S.W.1 tuning coil	0.05
L18	Osc. S.W.1 reaction coil	0.6
L19	Osc. S.W.2 tuning coil	0.7
L20	Osc. S.W.2 reaction coil	1.3

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 220 V, using the 225 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the medium band and the volume control was at maximum, but there was no signal input the aerial and earth leads being connected together. Voltages were measured on the 1,200 V scale of an Avometer, with chassis as negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 6D6	260	6.5	100	1.5
V2 6A7*	260	2.1	100	3.1
V3 6D6	235	5.1	100	2.0
V4 75	75	0.5	—	—
V5 42	230	37.0	260	5.0
V6 80	310†	—	—	—

\* Oscillator anode (G2) 180 V, 4.7 mA.  
† Each anode, A.C.

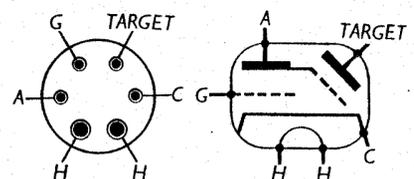


GENERAL NOTES

Switches.—S1-S33 are the waveband switches, and S34-S40 the scale lamp switches, ganged together in four rotary units beneath the chassis. These are indicated in our under-chassis view by numbers in circles. The arrows show the directions in which the units are viewed in the diagrams on page VIII.

The table (p. VIII) gives the switch positions for the various control settings. The vertical columns, from left to right, indicate the control settings as the knob is turned clockwise from fully anti-clockwise.

S41 is the Q.M.B. mains switch, ganged with the tone control R24. A jack switch, not separately numbered, is used for connection of a pick-up.



Connections of the tuning indicator, looking at the underside of the base, with its electrode diagram on the right.

Coils.—L1-L24 are in the coil and switch unit, in three separately screened sections. This unit also contains the associated trimmers, indicated at the side of our plan chassis view.

## PILOT U650—Continued

The I.F. transformers (each containing three coils) are in two separate screened units on the chassis deck.

**Scale Lamps.**—These are American-type 6.8 V bulbs with small centre-contact bayonet caps. There are six in all, switched by S34-S40.

**External Speaker.**—Sockets are provided at the rear of the chassis for a high resistance external speaker. It is fed via two fixed condensers.

**Tuning Indicator.**—This is of the cathode ray type. A separate electrode diagram, and the connections of the pins, looking at the underside of the base, are given on page VII.

**Internal Speaker and T.I. Connectors.**—Valve-holders are fitted at the back and front of the chassis for the speaker and T.I. plugs. Diagrams, numbered to agree with the connections shown in the circuit, are included at the bottom of the circuit diagram.

**Condensers C23, C28.**—These are two 8 $\mu$ F dry electrolytics in a single tubular unit. The case is isolated, and the black lead is the common negative. There are two red leads for the positives, that connected to one of the heater sockets of V6 belonging to C28.

**Condensers C14, C15.**—These are two 2 $\mu$ F dry electrolytics in a tubular unit, the case being isolated. The black lead is the common negative, the green the positive of C14 and the red of C15.

**Condenser C54.**—This small neutralising condenser is situated beneath C40 and C41 in the gang condenser unit. It is formed of the capacity between two tags riveted to a strip of insulating material.

### CIRCUIT ALIGNMENT

**I.F. Stages.**—Switch set to M.W., and turn gang to maximum. Connect signal generator between top cap of V3 via a 0.1 $\mu$ F condenser, and chassis. Feed in a 456 KC/S signal, and adjust C53, C52 and C51 for maximum output. Transfer the signal generator high potential lead (via the condenser) to the top cap of V2 and adjust C50, C49 and C48 for maximum output. Keep the input low in all cases. Finally, repeat these adjustments.

**M.W.**—Connect signal generator to A and E leads. Switch set to M.W., and tune to 1,500 KC/S on scale. Feed in a 1,500 KC/S signal, and adjust C44 for maximum output. Next adjust C38, and then C33. Feed in a 600 KC/S signal, tune the signal in, then

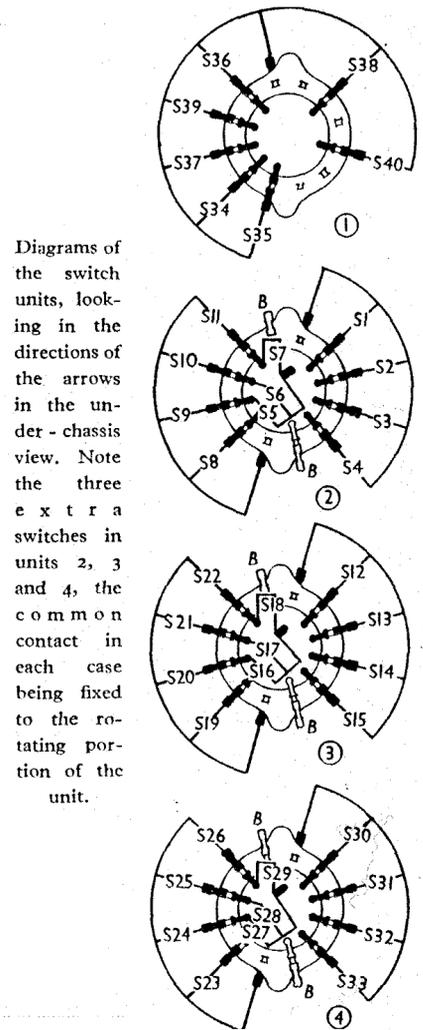
adjust C45, while rocking the gang for optimum output. Repeat the adjustment of C44, C38 and C33.

**S.W.2.**—Switch set to S.W.2 band, set pointer to 49 m. on scale, feed in a 49 m. signal, and adjust C43, C37 and C32 for maximum output.

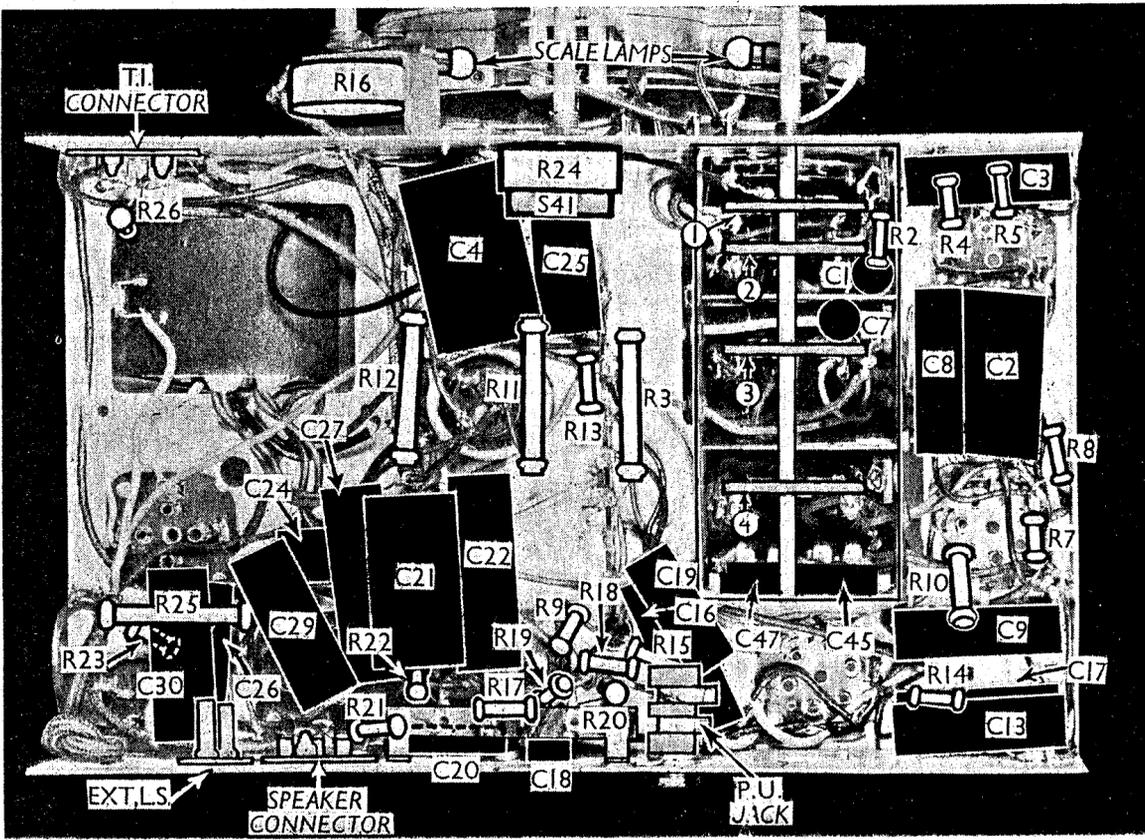
**S.W.1.**—Switch set to S.W.1 band, set pointer to 16.6 m., feed in a 16.6 m. signal and adjust C42 for maximum output. Next adjust C36, rocking the gang meanwhile. Finally adjust C31.

**L.W.**—Proceed as for M.W., except that C46, C39 and C34 are adjusted at 750 m. and C47 at 2,000 m.

Switch	L.W.	M.W.	S.W.2	S.W.1
S1	O	O	O	C
S2	O	O	C	O
S3	O	C	O	O
S4	C	O	O	O
S5	O	O	O	O
S6	O	O	C	C
S7	O	C	C	O
S8	O	O	C	C
S9	O	O	C	O
S10	O	C	O	O
S11	C	O	O	O
S12	O	O	O	C
S13	O	O	C	O
S14	O	C	O	O
S15	C	O	O	O
S16	O	O	O	C
S17	O	O	C	C
S18	O	C	C	O
S19	O	O	C	C
S20	O	O	C	O
S21	O	C	O	O
S22	C	O	O	O
S23	O	O	O	C
S24	O	O	C	O
S25	O	C	O	O
S26	C	O	O	O
S27	O	O	O	C
S28	O	O	C	C
S29	O	C	C	O
S30	O	O	O	C
S31	O	O	C	O
S32	O	C	O	O
S33	C	O	O	O
S34	O	O	O	O
S35	O	C	O	O
S36	O	O	C	O
S37	O	C	O	C
S38	O	O	C	O
S39	O	O	O	C
S40	O	C	O	O



Diagrams of the switch units, looking in the directions of the arrows in the under-chassis view. Note the three extra switches in units 2, 3 and 4, the common contact in each case being fixed to the rotating portion of the unit.



Under-chassis view. The numbers in circles refer to the switch units, diagrams of which are given above. The speaker and tuning indicator plug into connectors which are indicated. A jack is used for pick-up connection and switching.