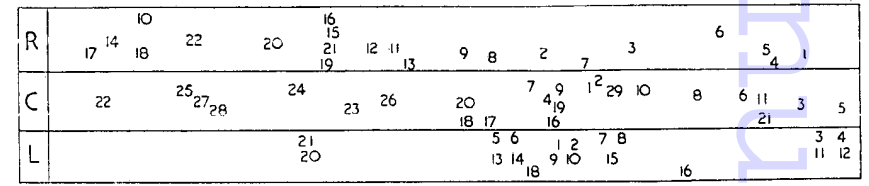
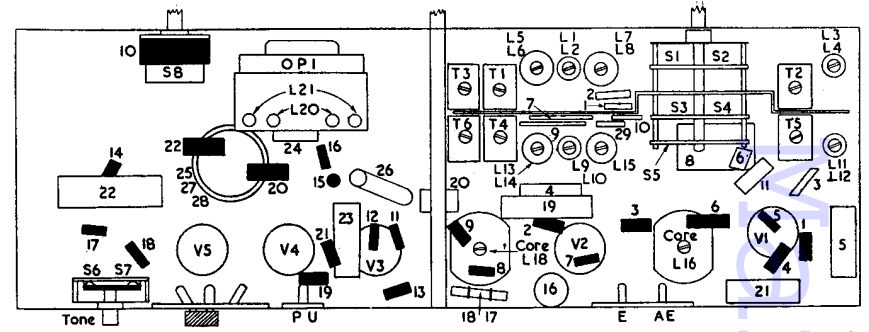
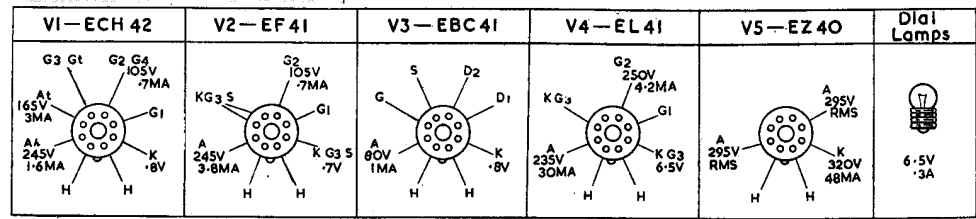
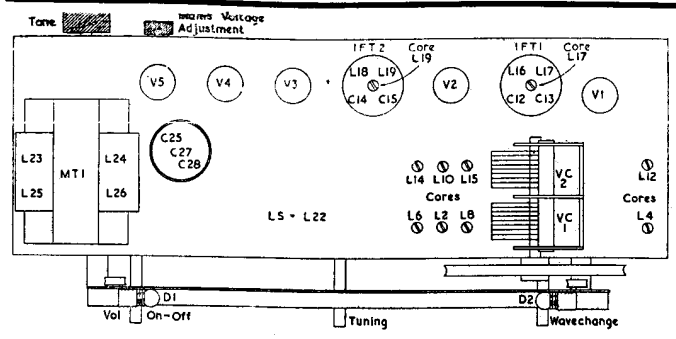


For more information remember www.savoy-hill.co.uk

INVICTA

33

Five-valve four-waveband superhet receiver with sockets for aerial, earth and high-resistance magnetic or crystal pickup. Walnut veneered table cabinet. Suitable for 200-250V 50-100 c/s AC. Manufactured by Invicta Radio, Ltd., Radio Works, Parkhurst Road, London, N7



RESISTORS

R	Ohms	Watts
1	680K	...
2	33K	...
3	33K	...
4	220	...
5	47K	...
6	22K	...
7	220 or 300	...
8	47K	...
9	680K	...
10	1M Pot	with SP switch
11	1M	...
12	1M	...
13	1K	...
14	2.2K	...
15	91K or 100K	...
16	47K	...

RESISTORS

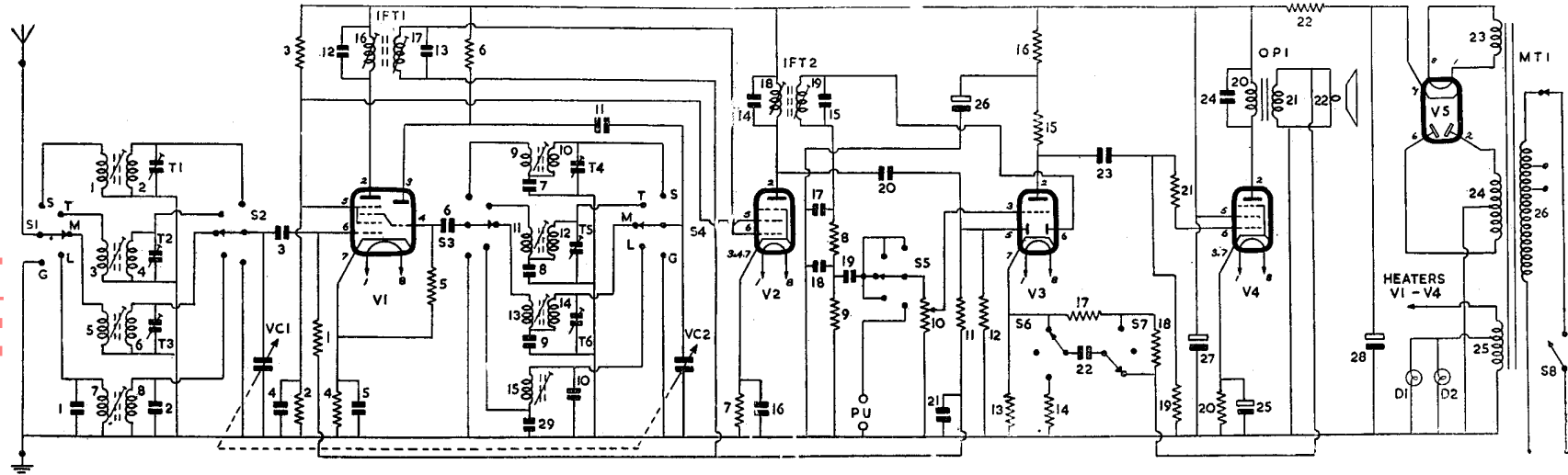
R	Ohms	Watts
17	2.2K	...
18	2.2K	...
19	680K	...
20	180 WW	3W
21	91K or 100K	...
22	1.5K WW	3W

INDUCTORS

L	Ohms
1	Very low
2	Very low
3	6.5
4	1.2
5	48
6	3.75
7	260
8	16.5

CAPACITORS

C	Capacity	Type
1	100pF	Silver Mica
2	110pF	Silver Mica
3	100pF	Silver Mica
4	.03	Tubular 500V
5	.05	Tubular 500V
6	100pF	Silver Mica
7	5000pF	Silver Mica
8	1700pF	Silver Mica
9	500pF	Silver Mica
10	150pF	Silver Mica
11	100pF	Silver Mica
12	125pF	Silver Mica
13	125pF	Silver Mica
14	125pF	Silver Mica
15	125pF	Silver Mica
16	.05	Tubular 500V
17	100 x 100pF	Tubular Ceramic
18	.01	Tubular 1000V
19	22pF	Silver Mica
20	.02	Tubular 500V
21	.1	Tubular 500V
22	.02	Tubular 500V
23	.01	Tubular 500V
24	.25	Electrolytic 25V
25	2	Electrolytic 150V
26	32	Electrolytic 350V
27	32	Electrolytic 350V
28	220pF	Silver Mica



FERGUSON 989T—Continued

ripple current. On DC supplies rectifiers can be shorted out to give increased HT by insertion of a 1A fuse in holder F2.

Heaters V1-8, V10-19 and CRT are series connected with thermal surge limiter R91 shunted by R89 and fed from input mains direct on 200-210V or through droppers R88 and R87 on 220-230 and 240-250V supplies respectively.

Appropriate dropping resistors for HT rectifier anode voltage and valve heater circuit are selected by calibrated adjustable plug at rear of chassis.

Mains input to receiver is fitted with fuse F1 in live lead. On AC supplies fuse should be 1A P 4 type and on DC supplies a 2A P 6 type. C70 is mains RF bypass capacitor. S5, which is ganged to sound volume control, is ON/OFF switch.

CRT is a tetrode Mullard MW41—1 with metal cone and 16in. diameter flat screen. Permanent magnet focusing is employed. Video signal is applied to its cathode and Brilliance is controlled by variation of grid voltage by R34.

ALIGNMENT INSTRUCTIONS

Apparatus required: Signal generator covering 10-20mc/s and 40-70mc/s; AC output meter; Avometer model 7 to indicate vision output. Connect AC output meter across or in place of LS speech coil.

Connect positive lead of Avometer through a 50K resistor to cathode of CRT (resistor must be connected as close as possible to cathode pin of CRT holder). Connect negative lead of Avometer to slider of 20K potentiometer connected between HT line and chassis. Switch meter to 2mA DC range and adjust potentiometer to give

a reading of 20V with zero signal input (full scale reading of meter connected as above is 100V).

Signal-generator should be connected to injection point by short length of co-axial cable the bared ends of which should also be kept as short as possible. Place Volume and Contrast controls in their maximum positions.

IF stages. Short circuit L4 and feed signal as given below, through a .01 mF capacitor to anode V1.

- 14.5mc/s adjust L8 for min. vision.
- 19.5mc/s adjust L11 for min. vision.
- 19.5mc/s adjust L7 for min. vision.
- 19.5mc/s adjust L17 for max. sound.
- 19.5mc/s adjust L15 for max. sound.
- 17.75mc/s adjust L13 for max. vision.
- 17.75mc/s adjust L12 for max. vision.
- 17.75mc/s damp L9 with 1K resistor and adjust L10 for max. vision.
- 17.75mc/s damp L10 and adjust L9 for max. vision.
- 17.75mc/s damp L5 and adjust L6 for max. vision.
- 17.75mc/s damp L6 and adjust L5 for max. vision.

Note on TS (fringe area) receives the last six operations should be carried out at 17.1mc/s.

RF Stages. It is essential to adjust oscillator trimmer T9 so that sound rejection peak occurs exactly at sound carrier frequency.

Inject appropriate sound carrier frequency into Direct aerial socket and with Fine Tuner at rear of chassis set in approximately mid position, adjust T9 for maximum sound and also maximum vision outputs. Inject appropriate vision carrier frequency and adjust L3 and L2 for maximum vision output.

Finally check to see that sound frequency rejection relative to vision carrier frequency is at least 35 dB—approximately 56:1.

Image rejector. This is factory aligned to 95mc/s but can be realigned to any known interference frequency between 70-100mc/s. Adjustment can be made by trimming T2 for minimum interference on CRT or if exact frequency of interference signal is known then this frequency can be injected into aerial socket and T2 adjusted for minimum deflection on vision output meter.

SERVICE CASEBOOK

ULTRA 431

REPLACEMENT of rectifier valve U404 by recommended equivalent Mullard UY41. Pins 2 and 5 (anode) are joined internally in U404. Pin 2 only is anode in UY41.

Since AC supply to anode is connected to pin 5 on valveholder in this model, no supply reaches anode of UY41.

To avoid dismantling set, pins 2 and 5 were connected on valve by 5amp fuse wire in 1mm. sleeving.

ULTRA 611

INTERMITTENT weak reception. During periods of weak reception, the fault was found to be prior to the AF stage (by checking at the PU sockets). Tapping of the chassis produced noise and intermittent change in volume.

By following up this clue, a dry joint was located at trimmer condenser (fixed type) in second IF can.

These trimmers are moulded (in pairs) as a coil base, and connection from IF coil pass through eyelets terminating the condenser. Resoldering all such connections recommended.

PHILIPS 588A

INTERMITTENT noise. During periods when a fault was present, with volume control at minimum, noise was eliminated, indicating fault to be in previous stages.

Shorting grid of IF valve to earth produced same results. Shorting grid of FC4 valve to earth had no effect. FC4 replaced, made no difference.

During prolonged tests sparking was noted from first IF trimmer. Fault was due to arcing between HT and trimmer adjusting screw,

EKCO UAW78

INTERMITTENT fading. Prolonged tests when fading occurred eliminated valves and AF circuits. Any electrical disturbance would clear fault.

When second IF can was tapped the fault could occasionally be brought on. A faulty fixed trimmer, which was intermittently open circuit, was located.

All IF trimmers were changed; these were of foreign type, which caused so much trouble in Bush pre-war sets.

AMBASSADOR 545H

INTERMITTENT noise. During periods when noise was present, the following tests were made. Volume control at minimum: no noise. With grid of IF valve shorted to earth: no noise.

With grid of FC4 earthed, noise was still present. Valve changed without effect, leaving transformer suspect.

The IF transformer was disconnected, and for a quick test a resistance of some 100,000ohms was used as anode load. The output was coupled to the next stage through a small condenser.

The fault was due to an intermittent primary winding.—T. E. P.

BUSH TV22

BUSH TV22 came in with no EHT. Usual suspect, PZ30, found to be OK. Line transformer found normal.

Trouble was due to 2mF electrolytic condenser, EHT boost reservoir (C21), going o/c.

Subsequently a number of similar failures have been dealt with.—M.H.

INVICTA 33

AERIAL signal is switched by S1 to aerial coupling coils L1 (SW), L3 (TW), L5 (MW) and L7, C1 (LW). Grid coils L2 (SW), L4 (TW), L6 (MW), L8 (LW), which are trimmed by T1 T2 T3-C2 respectively, are switched by S2 to aerial tuning capacitor VC1 and coupled by C3 to triode-hexode frequency-changer V1.

AVC voltages decoupled by R11 C21 are fed through R1 to grid. Cathode bias is provided by L 4 decoupled by C5. Screen voltage is obtained from divider R2 R3 decoupled by C4. Primary 16, C12 of IFT1 is in the hexode anode circuit.

Oscillator is triode section of V1 in a shunt-fed anode-tuned circuit. Anode coils L10 (SW), L12 (TW), L14 (MW), L15 (LW), which are trimmed by T4 T5 T6-C10 and padded by C7 C8 C9 C29 respectively, are switched by S4 to oscillator tuning capacitor VC2 and coupled by C11 to oscillator anode of V1 of which R6 is the load.

Grid reaction voltages, which are obtained from L9 (SW), L11 (TW), L13 (MW) and capacitively from padder C29 (LW), are switched by S3 through C6 to oscillator grid. Bias is developed on C6 with R5 as leak.

IF amplifier operates at 420 kc/s. Secondary L17 C13 of IFT1 feeds signal and AVC voltages, decoupled by R11 C21 to IF amplifier V2. Cathode bias is provided by R7 C16. Screen voltage is obtained in common with that of V1. Suppressor (g3) is internally strapped to cathode. Primary L18, C14 of IFT2 is in the anode circuit.

Signal rectifier. Secondary L19 C15 of IFT2 feeds signal to one diode of V3, of which R9 is the load with R8 C17 C18 an IF filter. Rectified audio signal across R9 is fed by C19 to the four radio positions of S5.

AVC. Signal at anode of V2 is fed by C20 to second diode of V3, of which R12 is the load. AVC voltages are decoupled by R11 C21 and fed to V1 V2.

Cathode voltage across R13 provides a small delay bias for AVC diode.

Pickup. Sockets are provided for a high-resistance magnetic or crystal pickup. Pickup signal is fed to PU contact on S5 which is ganged to wavechange switches S1—S4. When wavechange switch is in Gram position then aerial, and oscillator tuning capacitors and oscillator grid (through C6) are shorted to chassis to prevent radio breakthrough.

AF amplifier. Rectified audio, or pickup, signal is switched by S5 through volume control R10 to grid of triode AF amplifier section of V3. Cathode bias is by R13. Anode load is R15 and HT feed to anode is decoupled by R16 C26.

Tone control. Three degrees of tone control are given by adjustment, by S6—S7 and C22, of negative feedback circuit between secondary L21 of output matching transformer OP1 and cathode V3. Maximum top is given when C22 is between R14 and junction R17 R18.

Output stage. Signal at anode V3 is fed by C23 through stopper R21 to grid of pentode output amplifier V4. Cathode bias is by R20 decoupled by C25. Screen voltage is obtained direct from HT line decoupling being given by C27. Amplified signal at anode is transformer coupled by OP1 to a 6½in. PM speaker L22.

HT is provided by indirectly-heated full-wave rectifier V5 fed from HT secondary L24 of mains input transformer MT1. Resistance-capacity smoothing is by R22, C27, C28. Reservoir smoothing capacitor C28 should be rated to handle 100 mA ripple current.

Heaters V1 to V4 are parallel connected and fed from secondary L25 of MT1. Dial lamps, which are 6.5V .3A type, are parallel connected and fed from a 4V tapping on secondary L25 of MT1. Primary L26 of MT1 is tapped for inputs of 200-210, 220-230, 240-250V, 50-100 c/s AC. S8, which is ganged to volume control spindle, is the ON/OFF switch.

TRIMMING INSTRUCTIONS

Apply signal as stated below	Tune receiver to	Trim in order stated for maximum output
(1) 420kc/s to gl of V1 via .01mF	—	Cores L19, L18, L17, L16
(2) 210kc/s to aerial socket via dummy aerial	LW Band 1428 metres	Cores L15, L8
(3) 1.5mc/s as above	MW Band 200 metres	T6, T3
(4) 600kc/s as above	500 Metres	Cores L14, L6. Repeat operations (3) and (4)
(5) 3.3 mc/s as above	Trawler Band 90 metres	T5, T2
(6) 1.5mc/s as above	200 metres	Cores L12, L4. Repeat operations (5) and (6)
(7) 20mc/s as above	SW Band 15 metres	T4, T1
(8) 8mc/s as above	37.5 metres	Cores L10, L2. Repeat operations (7) and (8)

Casebook

MARCONIPHONE AC/DC RECEIVER

A PRE-WAR model came in with persistent crackling on LW. Chassis was checked for usual causes of crackle without success.

More by luck than skill, the fault was found when one of the two mains fuses was replaced. The crackling immediately ceased, though putting the old fuse back caused it to recur. The fuse in question was tested and found OK and has since been fitted in another set where it functions perfectly.—P.G.

AMERICAN MAINS/BAT. PORTABLE

CAME in "dead" on both mains and batteries, though the latter were definitely OK. Valves were checked, then valveholder voltages. Tracing the signal through it was found the FC was operating but no signals could be obtained beyond it.

The grid lead from the first IF transformer is taken across the length of the chassis to the IF valve, and to hold this rigid its screening is soldered to the frame of the tuning condenser. Under the metal braiding the rubber insulation had been perished by the heat of soldering the screen, and the grid of the IF valve was shorted to earth.—P.G.