FERGUSON 101 AC

Four-valve, plus rectifier, three wave-band superhet, for operation from AC mains of 200-250 volts, 40/100 cycles. Sockets are provided for a high-impedance pick-up which may be left in circuit, as a pick-up switch is provided. Sockets are also available for a high-impedance extra loudspeaker, or a low-impedance speaker with its own matching transformer. Marketed by Ferguson Radio, serviced by TEI Service, 55 Blossom St., Ancoats, Manchester, 4.

ON all bands the aerial coupling coil L1 provides a high impedance between aerial and earth sockets so that on SW, signals are fed via V1 and C3 to the SW tuning coil, L3.

On MW, signals are fed via C1 and the wave-change switch to the bottom end of L5 and thence to chassis, so that L5 acts as a coupling coil to the MW tuning coil, 4.

On LW, signals are fed via C1 and the wave-change switch to L2 and L5 which form the LW tuning inductance.

On all wavebands, the signal is then fed via another set of contacts on the wave-change switch to the grid of the triode-heptode frequency changer V1. The grid is shorted to chassis on gram.

The oscillator section of V1 employs grid leak and condenser R3, C6 with grid feed-back coils L6 (SW) and L7 (MW), while on all bands additional coupling is provided between grid and anode circuits by the tracking condensers, C7, T9 and T12.

The oscillator tuning coils are L8, L9 and L10 tuned by VC2 section of the gang.

The IF signal is transferred from the anode of V1 to the grid of the variable-mu pentode V2 by the IF transformer L10, L12.

Both V1 and V2 are cathode biased by R2 and R9 respectively, while their grid circuits are connected to the AVC line.

A second IF transformer, L13, L14 passes on the signal to the signal diode of the double diode triode V3. The load resistance is R11 and the LF signal is filtered by R10, C12 and C13 and coupled by C16 to the volume control VR1 and thence to the grid of the triode section of V3. C17 provides further IF filtering.

The AVC diode of V3 is fed from the anode of V2 via C15. The load resistances being R14, R15. Full AVC is applied to V1 and a smaller AVC voltage from the junction of R14, R15 to V2.

V3 is cathode biased by R12, decoupled by C18 and the LF signal is resistance capacity coupled by R13, C19 and R16 to the grid of the pentode output valve V4. This valve is cathode biased by R17 and a certain amount of negative feed-back is obtained by omitting the usual decoupling condenser across the cathode resistance.

R18 is an anode stopper and the output from V4 is coupled to the moving coil energised loudspeaker by the matching transformer L15, L16. L17 is the speech coil, L18 the hum-bucking coil, and L19 the field winding of the loudspeaker.

A permanent degree of tone correction is effected by C20 and the variable tone control is provided by C21 and VR2. Extra loudspeaker sockets for a high-impedance loudspeaker are connected across

Continued overleaf

VALVE READINGS

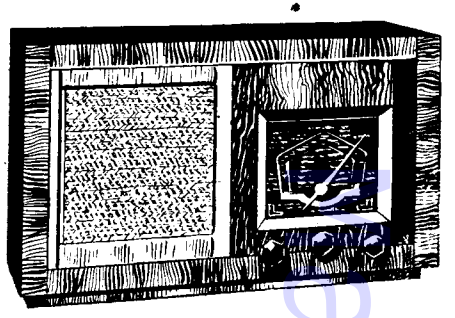
V	Type	Electrode	Volts	Ma
1	ECH35 (Met) Mullard	Anode	254	1.5
		Osc. Anode	126	4.3
		Screen	95	1.7
2	EF39 (Met) Mullard	Anode	254	6.1
		Screen	95	1.8
3	EBC33 (Met) Mullard	Anode	43	.6
4	EL23	Anode	229	34
	Mullard	Screen	254	5
5	5Y3G Mullard	Anode	340	AC

Pilot Lamps 6.2v .3 amps MES.

Readings taken with 1,000 opv meter on 200m. Volume control at maximum, no signal input.

RESISTORS

R	Ohms	R	Ohms
1	550,000	11	500,000
2	330	12	2,600
3	50,000	13	250,000
4	50	14	560,000
5	10,000	15	560,000
6	27,000	16	560,000
7	560,000	17	150
8	50,000	18	100
9	330	VR1	2 meg
10	82,000	VR2	100,000



Released in 1941, the 101AC provides both PU and ES connections.

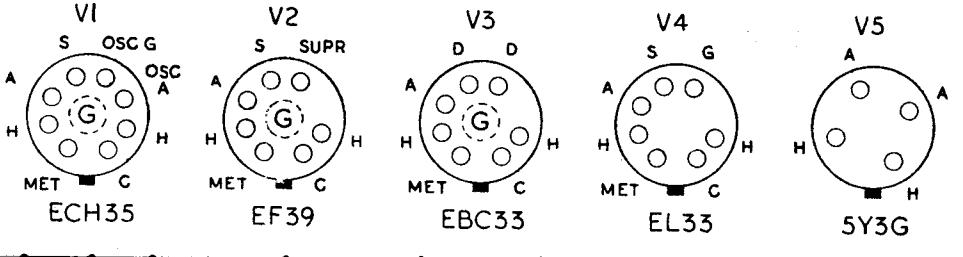
CONDENSERS

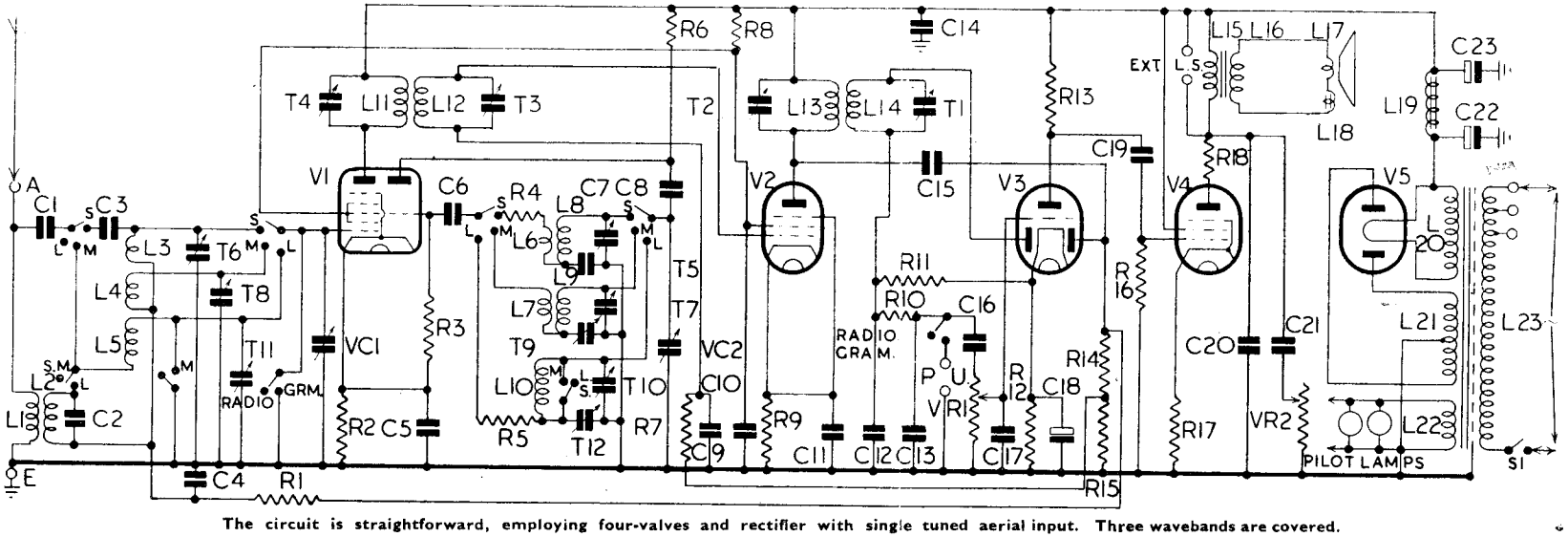
C	Mfds
1	.0005
2	.002
3	.0001
4	.1
5	.1
6	.0001
7	.005
8	.0001
9	.1
10	.1
11	.1
12	.00025
13	.00025
14	.1
15	.0001
16	.02
17	.0001
18	25
19	.02
20	.005
21	.05
22	16
23	16

WINDINGS

L	Ohm
1	330
2	20
3	low
4	3
5	26
6	.1
7	1
8	low
9	2
10	5.2
11	8.5
12	8.5
13	8.5
14	8.5
15	550
16	.3
17	2
18	.1
19	1,500
20	.2
21	(total) 330
22	.1
23	(total) 29

(Right) — bases of the valves as seen with chassis inverted. The abbreviations indicate the electrodes to which pins are connected inside the valves.





The circuit is straightforward, employing four-valves and rectifier with single tuned aerial input. Three wavebands are covered.

FERGUSON 101 AC—*Continued*

the primary, L15, of the output matching transformer.

HT supply is derived from the full-wave rectifier V5 and the usual mains transformer, the rectified output being smoothed by the field coil L19, and condensers C22, C23.

GANGING

IF Circuits.—Switch receiver to SW and adjust gang condenser to full capacity and volume control to maximum.

Connect a .5 megohm. resistance between the top connector of V1 and the top cap of the valve. Inject a 470 kcs signal via a .0002 mfd condenser between the top cap of V1 and chassis. Adjust T1, T2, T3 and T4 for maximum output.

SW Band.—Check the calibration by noting that the pointer is horizontal when the condenser is at maximum capacity.

Switch receiver to SW and adjust pointer to 15 m on the scale. Inject a 15 m signal via a suitable dummy aerial into the aerial and earth leads and adjust T5 and T6 in that order for maximum output.

When adjusting T5 use the peak output obtained with the trimmer at the lower capacity adjustment.

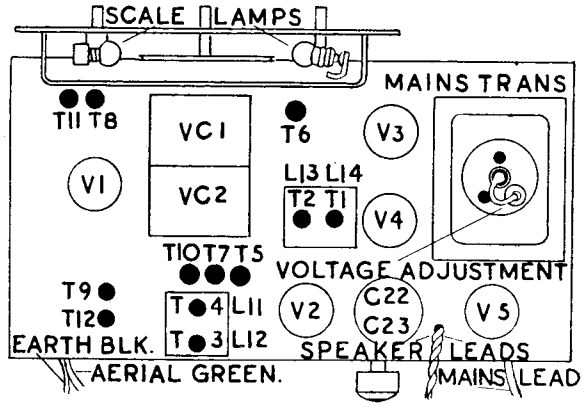
MW Band.—Switch receiver to MW and adjust pointer to 214 m on the scale. Inject a 214 m signal and adjust T7 and T8 for maximum output.

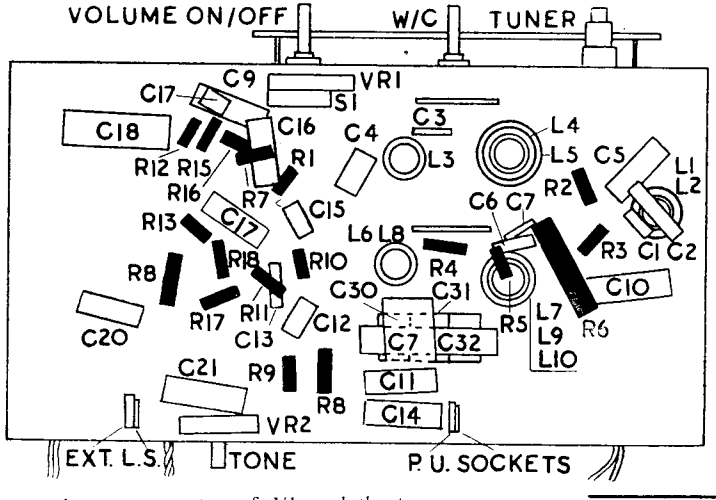
Inject a 500 m signal and tune it in carefully. Adjust T9 for maximum output while rocking gang.

LW Band.—Switch receiver to LW and adjust pointer to 1,250 m on scale. Inject a 1,250 m signal and adjust T10 and T11 for maximum output.

Feed in a 2,000 m signal, tune it in and adjust T12 for maximum output while rocking gang.

Repeat adjustments to T10 and T11.





All trimmers and padders are accessible from above, some being adjusted through holes in the deck. The layout of parts, it will be seen, follows a logical sequence.

Under the chassis, most of the small parts are suspended in the wiring. Resistors are drawn in solid black to distinguish them from condensers

Wasteful Output Stages

IT would be interesting to know how much output power is thrown away in the average commercial set. Designers seem to go to any amount of trouble to get high gain by means of iron dust cored coil, high-slope valves and so on, and yet spoil the whole job in the output stage.

My workshop "mascot" is an old Ferranti constructor set with really large transformers (inter-valve and output) feeding turn Rola speakers. The P625 output triode is rated at only .6 watt and yet the "enjoyable volume," as distinct from "noise" is better than with many so-called 2-watt sets.

Recently I had an American set with 45 valves in push-pull giving so-called eight watts output. There was trouble with both input and output push-pull transformers.

With the owner's consent, I did the simplest thing—converted the set to single output valve RC coupled. I put in a large output transformer matched to the existing speech coil and also, of course, altered the bias resistor.

The owner is very pleased, saying the volume is just as great and the tone somehow clearer. Moreover, he has a 45 valve in reserve.—N.C., Woolwich.