

FERGUSON 378 UNIVERSAL

Seven-valve, plus two rectifiers, four-waveband superhet for operation on AC or DC mains with provision for high resistance extra loudspeaker and pickup. Service and Spares by TEI Service, 55, Blossom Street, Manchester, 4.

THE chief features of the HF and IF circuits are practically identical with those employed in the Ferguson Model 378 AC reviewed opposite. The principal difference occurs in the supply circuits for HT and heater current.

HT is derived from the mains via two half-wave rectifiers V8, V9 in parallel. One HT supply circuit is via the speaker field and smoothing condensers C26 and C30 to the anode circuits of the output valves V6, V7, while a second HT feed is arranged via the smoothing choke CK1 and condensers C27 and C30 to all the other anode circuits.

The loudspeaker incorporates a hum-

bucking coil, but it should be noted that as in the AC model the extra loudspeaker sockets are across the primary of the output transformer and are therefore "live." Extra loudspeaker wiring should, therefore, be well insulated, or isolated by means of blocking condensers, and the extra loudspeaker must incorporate its own matching transformer.

The heater supply is obtained from the mains through barretters R26 and R27, all valve heaters being in series. The pilot lamps are arranged across a shunt R23, and are switched in or out of circuit on the various wavebands by means of contacts on the wavechange switch as in the AC model.

The mains input is HF filtered by C33.

GANGING

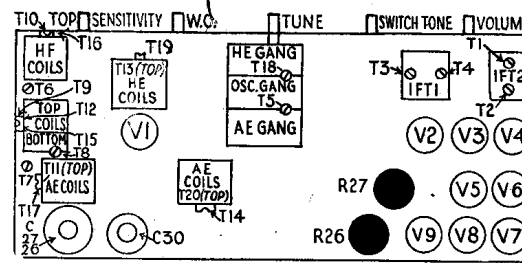
IF Circuits.—Connect a modulated oscillator, tuned to 465 kc, to the grid of V3, and an output meter with large series condenser to the external speaker terminals. Adjust T1 and T2 for maximum reading on the output meter.

Transfer the oscillator lead to the grid cap of V2 and accurately adjust T3, T4, T2 and T1 for maximum reading.

Padding (all waves).—The padding condensers should be adjusted after completing the IF adjustments. These condensers are T5, T6, T7 and T8.

A high-frequency buzzer should be connected in the aerial circuit and the

The chassis layout diagram for the AC-DC version of the Ferguson model 378. Trimmer positions are indicated.



padding adjusted for maximum output on each band with the gang condensers fully meshed.

LW Band.—Inject a signal of 1,200 metres from a modulated oscillator to the aerial and earth terminals. Tune it in and adjust T9 for maximum output. Then adjust T10 and T11 for maximum output. With the buzzer, and the tuning condenser at maximum, adjust T8.

Return to 1,200 metres and repeat adjustments of T9, T10 and T11, finishing off by again repadding.

MW and SW Bands.—The above procedure should be followed on medium waves and on the two short wavebands, the tune points and the trimmers being as follows:—

MW.—250 metres. T12, T13, T14 and T7.

SW 2.—34 metres. T15, T16, T17 and T6.

SW 1.—15.5 metres. T18, T19, T20 and T5.

While adjusting T18 two peaks will be found. The one nearer minimum capacity is the correct.

VALVE READINGS

V	Type	Electrodes	Volts	Ma
1	6D6	Anode	215	4.6
		Screen	60	1.3
2	6A7	Anode	210	1.6
		Osc. anode	135	2.25
3	6D6	Screen	70	2.2
		Anode	210	4.5
4	75	Screen	70	1.2
		Anode	50	.15
5	76	Anode	50	.55
		Screen	125	20
6	42	Anode	130	6.25
		Screen	125	20
7	42	Anode	125	20
		Screen	130	6.25
8 and 9	12Z3	Cathode	220	—

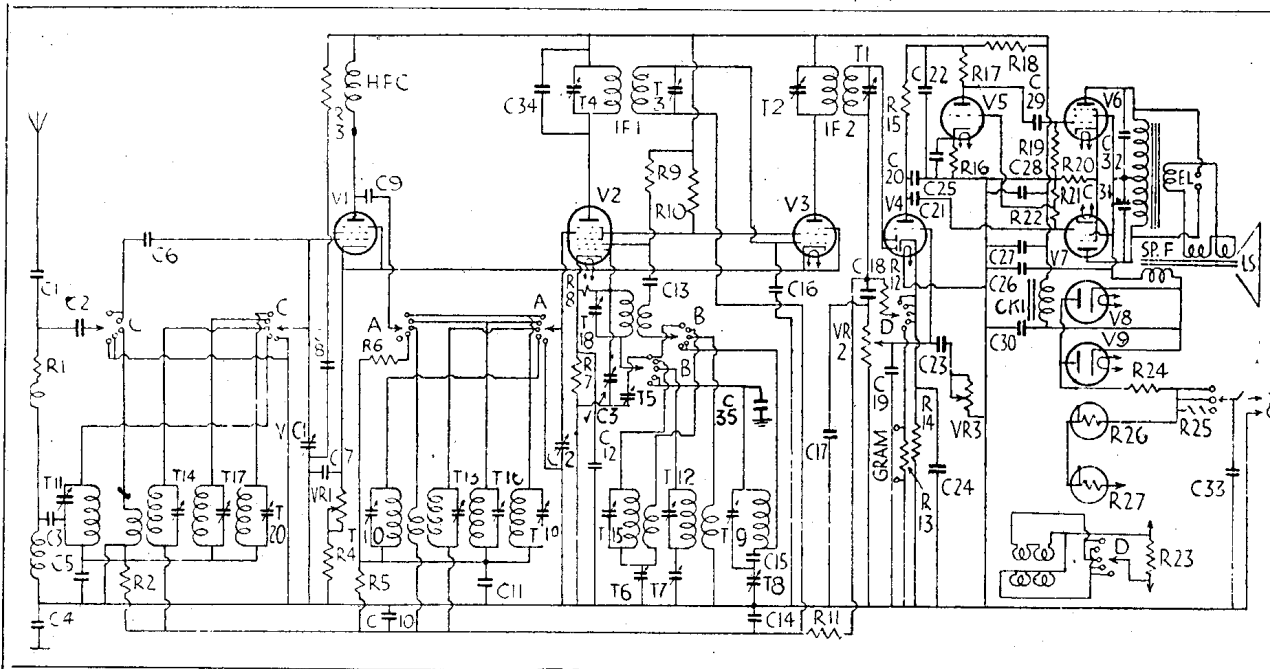
Pilot lamps 6v, .3 amps.

RESISTANCES

R	Ohms	R	Ohms
1	2,500	15	250,000
2	500,000	16	100,000
3	100,000	17	250,000
4	200	18	10,000
5	500,000	19	500,000
6	50,000	20	300
7	500	21	50,000
8	50,000	22	500,000
9	25,000	23	50
10	50,000	24	50
11	250,000	25	1,000
12	250,000	26	185
13	25,000	27	185
14	10,000		

CONDENSERS

C	Mfds	C	Mfds
1	.01	19	.00025
2	.00025	20	.001
3	.01	21	.01
4	.01	22	.1
5	.002	23	.01
6	.00005	24	.25
7	.1	25	.5
8	.1	26	.20
9	.00025	27	.20
10	.1	28	.1
11	.002	29	.01
12	.1	30	.20
13	.00025	31	.002
14	.1	32	.002
15	.00025	33	.01
16	.1	34	.00005
17	.00025	35	.000025
18	.01		



SERVICE CASE-BOOK

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cords are correctly fitted and the tensioning springs not over-tight.

In the Philips model 525U it will be found that if the drive wheel is too far in on the condenser spindle, the latter is drawn forward, so causing the moving vanes to foul the fixed ones.

IN the HMV 418 range a troublesome fault is sometimes experienced. If signals fail and the LF side is found to be OK and voltages on both the HF and LF sides are correct, try by-passing the condenser at the lower (or earthy) end of the IF coils by another condenser of .1 mfd or so.

This condenser gives trouble in a number of these models, and in the first case was only located by using the oscillograph. The slightest change in circuit conditions (such as testing with a meter) was sometimes enough to restore the set temporarily.

IN the condenser mentioned above the following was found to be the cause of the breakdown: The end caps were soldered to thin strips of foil, and these were in surface contact with the foil electrodes. Both the foils appeared to make good contact with their electrodes, and when the condenser was tried in a tester it appeared perfect.

The tester was of the audio-frequency type supplying a considerable LF voltage compared to the HF voltage normally applied in use.

Recourse was had to the microscope, and under this one foil showed a very slight film of wax or wax-like substance, and it was assumed that this was the cause of the trouble. Probably this "coat" was sufficient to offer a considerable resistance to the small IF voltages in the set, and, at times, due to local causes, the resistance increased to such an extent that the signals were cut off almost entirely.

WHEN loudspeakers develop on certain notes a rattle which appears to be a resonance in the cone, try the effect of painting the outside of the cone near the suspension with shellac.

The writer has fixed a number in this way, and the tone is not noticeably affected if the shellac is allowed to dry in small patches before continuing with next application until results are achieved.

F. DAY-LEWIS.