

FERGUSON 378 AC

Seven-valve, plus rectifier, four-wave-band superhet with resistance-capacity coupled push-pull output in conjunction with a phase-reversal valve. Provision is made for a high resistance extra loudspeaker and pickup. For operation from AC mains. Service and Spares by TEI Service, 55, Blossom Street, Manchester, 4.

ON MW and LW signals are fed to the tuned grid circuit coils via series condensers C1 and C1A. On MW a coupling coil is also employed, while on LW the signal is fed in via C2. On the two SW bands the aerial input is via C3 direct to the grid circuit of the HF amplifying pentode V1.

The cathode circuit of V1 incorporates a standing bias resistance, R3, and a sensitivity control, VR1, which allows the bias for V1 and V3 cathodes to be increased

to prevent overloading and minimise background noise on powerful stations.

Coupling from the anode circuit of V1 to the tuned grid coils of the mixer, V2, is effected by an HF choke and capacity circuit, C7 being the coupling condenser. Tuned grid coils are employed in the oscillator circuit with reaction from oscillator anode applied through C11.

The output from V2 is coupled by an IF transformer to the pentode, V3, and a second transformer hands on the signal to the strapped diodes of the double diode triode, V4. R11 is the load resistance and the LF signal is coupled by C15 to the volume control, VR2, and thence to the grid of the triode section of V4. VR2 is HF by-passed by C16.

The DC potentials across R11 provide AVC for the first three valves via decoupling components R10, R5, R1, C14, C6 and C4.

Pickup terminals are provided across a shunt resistance, R12, and are fed via R11 and C15 to the volume control.

A tone control circuit comprising C19 and VR3 is incorporated in the grid circuit of V4. This valve is resistance-capacity coupled to the push-pull output stages. C20 couples the signal to the grid of V7, which has R19 and R20 as grid leaks, while V5 is the phase reverser fed from

the input to V7 and resistance-capacity coupled by R17 and C23 to V6, the second of the two push-pull output pentodes.

The coupling transformer to the loudspeaker has tone correction condensers C26, C27, across the two sections of the primary. Extra loudspeaker sockets are provided across the primary and extra speakers must be provided with their own matching transformers.

The HT supply circuit comprises the full-wave rectifier, V8, with the loudspeaker field for smoothing and C25 as the reservoir condenser and C24 the smoother. The mains are HF filtered via C29.

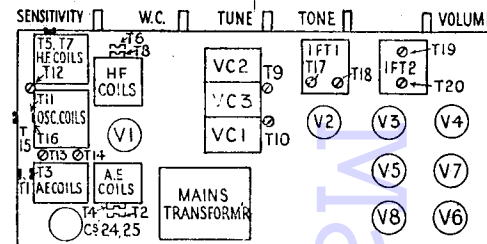
GANGING

IF Circuits.—Connect a modulated oscillator tuned to 465 kc to the grid of V3, and an output meter across the external speaker terminals. Roughly trim T19 and T20 for maximum output.

Transfer the oscillator to the grid of V2 and adjust T17, T18, T19 and T20 for maximum until no further improvement is possible.

Padding (all waves).—Connect a high note buzzer to the aerial and close the gang condenser (maximum capacity). Starting with the first SW band, adjust the padding condensers for maximum response on each waveband. The padders are :

Top of chassis layout indicating the trimmer positions. This receiver was one of the first Ferguson models to be marketed, and is of American design.



SW1, T10 ; SW2, T12 : MW, T13, and LW, T14.

LW Band.—With a high-frequency buzzer connected to the aerial terminals tune the receiver to 1,200 metres and adjust T16, T8 and T4 for maximum output. Close the gang condenser and

readjust the padder, T14, as before. Then return to 1,200 metres and readjust T16, T8 and T4.

MW Band.—Tune the receiver to 250 metres and adjust T15, T7 and T3 for maximum output. Fully mesh the condenser plates and readjust T13. Then return to 250 metres and complete the adjustment of all these trimmers.

SW Bands.—Switch to SW band 2 and tune the set to 34 metres and adjust T11, T6 and T9 for maximum output. Close the gang condenser and adjust padder T12. Then return to 34 metres and readjust T11, T6, T2 and T12 for maximum output.

Switch receiver to SW band 1 and tune receiver to 15.5 metres and trim T9, T5 and T1. Fully mesh the gang condenser and adjust the padder T10. Then return to 15.5 metres and readjust T9, T5, T1 and T10 for maximum output.

Two peaks may be found when adjusting T9. Tune to lower capacity.

VALVE READINGS

V	Type	Electrode	Volts	Ma
(All National Union)				
1	6D6	Anode	250	4.4
		Screen	65	1.15
2	6A7	Anode	250	1
		Osc. anode	140	3.8
		Screen	65	1.2
3	6D6	Anode	250	4.4
		Screen	65	1.15
4	75	Anode	40	.1
5	76	Anode	40	.4
6	42	Anode	240	26.5
		Screen	250	5.6
7	42	Anode	240	26.5
		Screen	250	5.6
8	80	Filament	340	—

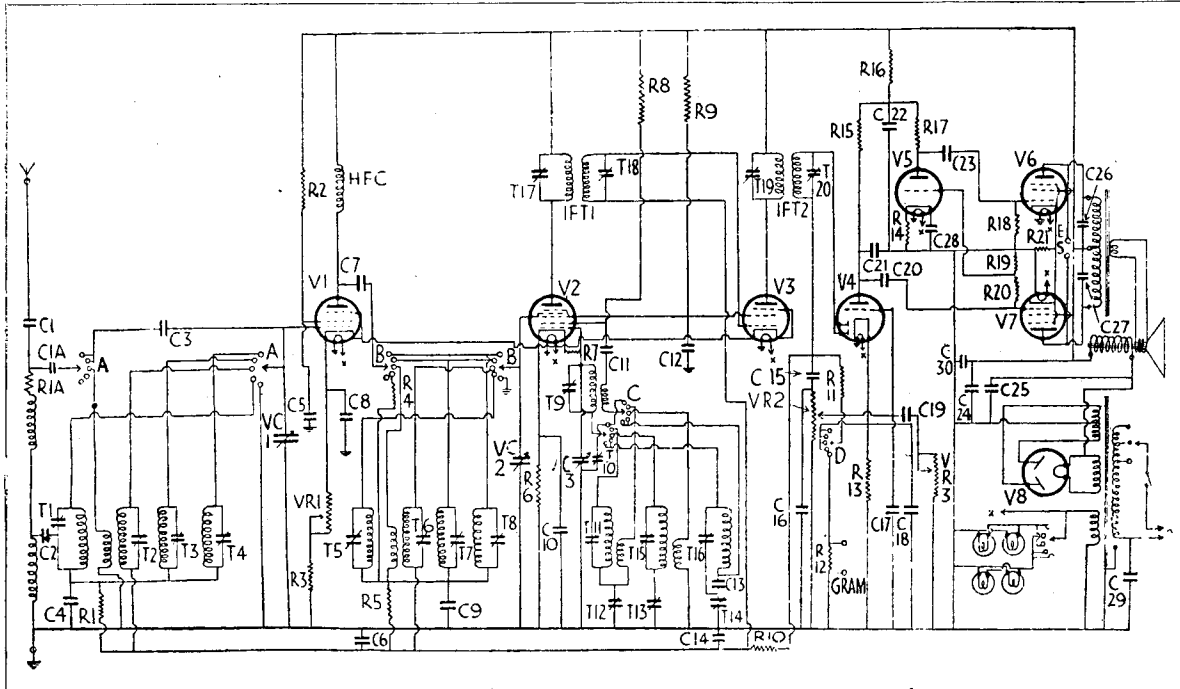
Pilot lamps 6v, .3 amp.

RESISTANCES

R	Ohms	R	Ohms
1	500,000	14	10,000
1A	2,500	15	250,000
2	100,000	16	100,000
3	200	17	250,000
4	50,000	18	500,000
5	500,000	19	50,000
6	5,000	20	500,000
7	50,000	21	300
8	25,000	VR1	3,000
9	50,000	VR2	500,000
10	250,000	VR3	500,000
11	250,000		
12	25,000		
13	10,000		

CONDENSERS

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



SERVICE CASE-BOOK

RECENTLY had a tricky fault in a valve tester in which the mains transformer was burnt out. It was one of those instruments in which all the voltages are AC and are supplied from the transformer, via switches, to the valve electrodes.

When the transformer was rewound it was found that the tester would not function correctly and yet the voltage supplies were in order and the valve was lighting.

This was very puzzling until it was remembered that the supplies were AC and that not only was the voltage required, but that there was also the question of phase relationship between the various voltages.

Reversing the GB connections rectified the trouble.

WHEN the drive cords of sets are breaking too often, see that the brass bushes on the variable condensers are not bearing too heavily and that the

Continued end column opposite page

MODELS 801, 804 Continued

output does not incorporate a feed condenser) and adjust T1, T2, T3 and T4 for maximum output.

SW Band.—Switch receiver to SW and adjust pointer to 15 megacycles. Inject a 15 megacycles signal into the aerial socket and adjust T5 and T6 for maximum output. Inject and tune in a 6 megacycles signal and adjust T7 while rocking gang to obtain maximum output. Retrim at 15 megacycles.

MW Band.—Inject and tune in a 1200 kc signal and adjust T8 and T9 for maximum output.

Inject and tune in a 580 kc signal and adjust T10 for maximum output while rocking gang.

Check over T8 and T9 adjustments.

LW Band.—Inject and tune in a 240kc signal and adjust T11, T12, for maximum output.

Inject and tune in a 145 kc signal and adjust T13 for maximum output while rocking gang.

Readjust T11 and T12 if necessary.

VALVE READINGS

V	Type	Electrode	Volts	Ma.
1	6A8G	Anode	240	5.2
		Osc. anode	138	3.1
		Screen	90	3.4
		Cathode	1.8	—
2	6U7G	Anode	240	7.2
		Screen	90	2.1
		Cathode	2.2	—
3	6Q7G	Anode	115	.4
		Grid	2.3	—
4	6V6G	Anode	220	35
		Screen	240	3.2
		Cathode	12	—
5	25Z6G	Cathode	12	—
		Cathode	340	—

Pilot lamps 6-8v, .3 amps MBC.

Above voltages apply when the smoothed HT measures 240v with a 1,000 opv meter, receiver switched to MW, gang fully meshed, A and E shorted and vol control at minimum.

Motor Field Winding

WHEN replacing the field coils on small electric motors after rewinding, be very careful to see that the turns are in the same direction as formerly and that the connections are the same. If not the motor will run slow and fail to turn a record when the pickup is in position. If in any doubt, change the connections to one field coil.

The coils can be tested for correct connections by passing a current from a dry cell or accumulator through them and testing for polarity of the magnet poles. In a two-pole machine the opposite poles should have different polarity and a small compass will indicate if this is the case.—F. D-L.

FERGUSON 802, 805

Six-valve, plus rectifier and CR tuning indicator, superhet, with push-pull output. Manual tuning with press-button wavechange and radio-gram. switches. For operation from AC or DC mains, 200-250 v. The 802 is a table model and the 805 a radiogram.

THESE models employ a similar chassis and circuit to those in the Models 801-804 reviewed elsewhere in this issue. The essential differences are, the addition of a cathode ray tuning indicator and a push-pull output.

From the accompanying circuit diagram it will be seen that the cathode ray tuning indicator is designated V5 and its control grid is fed from the grid circuit end of R5, which is the AVC line to V2.

To feed the push-pull output the LF output from the anode circuit of V3 is split into two channels. One feeds direct via C29 to one of the output pentodes, V7, while the other channel is taken via C20 to a potential divider R19, R20, which cuts down the signal fed to the grid of the phase reversal valve, V4, and thus

compensates for the extra amplification of this valve.

The output from V4 is resistance capacity coupled by R24 and C26 to the grid of the second pentode output valve, V6.

Anode instability suppressors, R28 R 29, are connected in the anode circuit of V6 and V7, and extra loudspeaker sockets for a high impedance speaker are provided across the primary of the output transformer L14, L15.

Ganging is same as with 801.

CONDENSERS

C	Mfd	C	Mfd
1	.0005	16	.0001
2	.0001	17	.1
3	.1	18	.01
4	20 mmfd.	19	.00025
5	.004	20	.01
6	.1	21	.25
7	.00025	22	.00025
8	.1	23	.25
9	.1	24	.5
10	.00025	25	.25
11	.1	26	.01
12	.00025	27	.16
13	.00025	28	.16
14	.02	29	.01
15	.02		

WINDINGS

L	Ohms	L	Ohms
1	20	10	9
2	17	11	11
3	3	12	9
4	.1	13	12
5	5	14	330
6	3	15	.5
7	1	16	2
8	.1	17	230
9	.5	Pickup*	2000

* Model 805 Radiogram.

VALVE READINGS

V	Type	Electrodes	Volts	Ma.
1	6A8G	Anode	245	4.7
		Osc anode	140	2.5
		Screen	93	3.8
		Cathode	2	—
2	6U7G	Anode	245	6.8
		Screen	93	1.8
		Cathode	2	—
3	6Q7G	Anode	118	.4
		Grid	2.2	—
		Cathode	2	—
4	6CSG	Anode	50	.8
		Cathode	245	—
5	6G5	Anode	245	—
		Cathode	238	27
6	6V6G	Screen	245	1.5
		Cathode	15	—
7	25Z6G	Cathode	340	—
		Cathode	340	—

Pilot lamps 6-8v, .3 amps MBC.
Voltages measured with a 1,000opv meter, A and E shorted, vol control at minimum, gang maximum capacity on MW.

RESISTANCES

R	Ohms	R	Ohms
1	10,000	20	35,000
2	3 meg	21	.25 meg
3	150	22	.25 meg
4	.5 meg	23	.25
5	.5 meg	24	.25 meg
6	.5 meg	25	.5 meg
7	2,500	26	300
8	25,000	27	.5 meg
9	25,000	28	100
10	300	29	100
11	.5 meg	30	100
12	25,000	31	100
13	.5 meg	32	90
14	.25 meg	33	277
15	50,000	34	166
16	.5 meg	35	290
17	25,000	36	45
18	100,000	37	45
19	.5 meg		

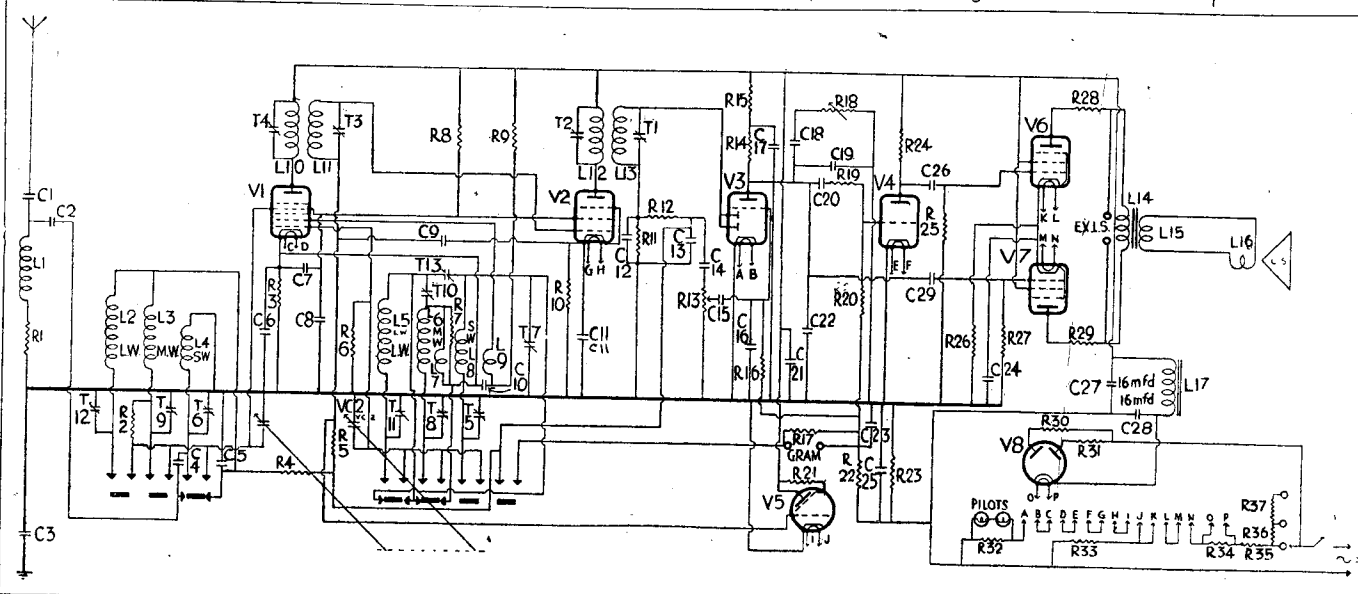
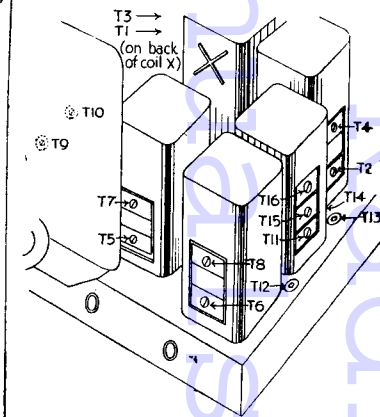
FERGUSON 378

IN the January issue we published service sheets for the Ferguson 378 AC and 378 AC-DC. It appears that the trimmer positions given are not those found in the majority of models.

A revised diagram is given below and the trimmer numbers correspond to those given in the circuit and text for the AC model on page vi of the January issue.

The same instructions apply to AC-DC models and the details given previously for that set should be ignored.

The IF of both AC and AC-DC models is 465 kcs.



In the 802 table model and 805 radiogram there are eight valves against the five of the 801. Push-pull output is provided with a phase reversing input stage. The third additional valve is a CR type tuning indicator.