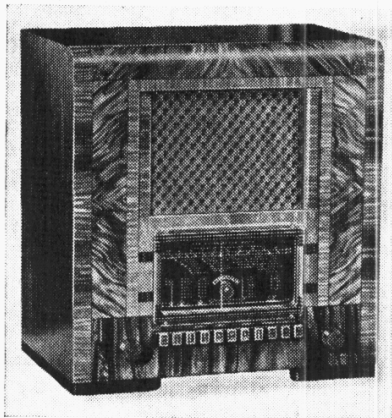


"TRADER" SERVICE SHEET
678

FERGUSON 771 AND 774 CONSOLE



The Ferguson 771 table model.

THE Ferguson 771 "Pressabutton" receiver is a 4-valve (plus rectifier) AC 3-band superhet with press-button trimmer tuning for seven stations and press-button switches for gramophone and wave-change purposes. It is suitable

for mains of 200-250 V, 50-100 c/s, and has a short-wave range of 16-50 m, while provision is made for the connection of an external speaker.

An identical chassis is fitted in the 774 Console, but this *Service Sheet* was prepared on a 771.

Release date for both models: August, 1938.

Original prices: 771, £12 1s. 6d.; 774, £15 15s.

CIRCUIT DESCRIPTION

Throughout the circuit diagram the switches associated with the press-buttons have been numbered according to a code which indicates their functions, and once the code has been grasped the action of the switches can be read off from the circuit diagram.

As the switches that are controlled by a single press-button fall naturally into groups, each switch in the group bears the group number. For instance, in the aerial circuit, the SW button controls all the switches in group one, which includes **S1a, S1b, S1c** and **S1x**; in the oscillator circuit, this button controls group eighteen: **S18a, S18b** and **S18x**.

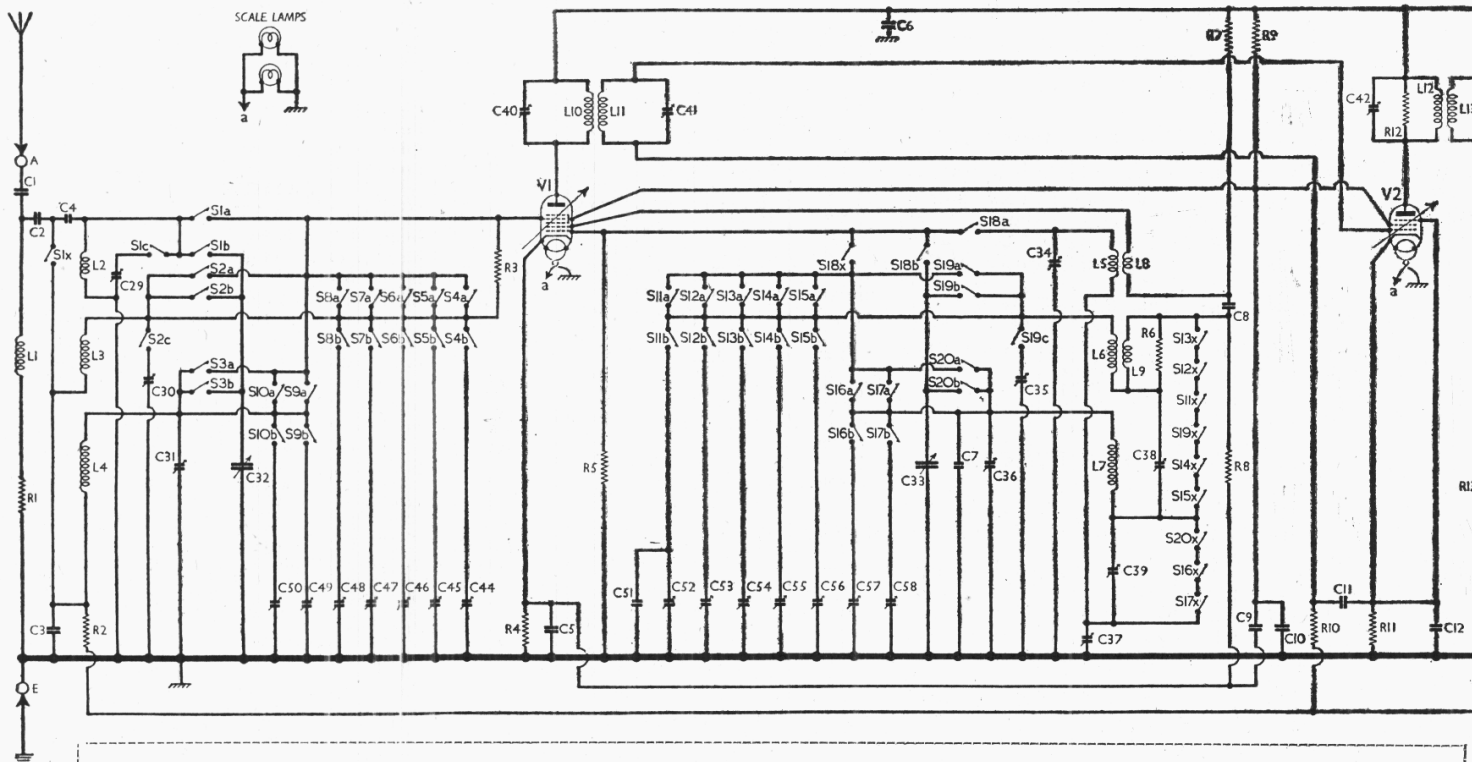
For group two (MW manual button) we have in the aerial circuit **S2a, S2b** and

S2c; and in the oscillator circuit group nineteen: **S19a, S19b, S19c** and **S19x**.

The LW manual button controls groups three (aerial circuit) and twenty (oscillator circuit). The remaining seven press-buttons control the automatic tuning switch groups, five of which are MW, and two LW.

The number, therefore, indicates to which group the switch is attached. The suffix letters **a, b, c** and **x** indicate the action of each switch when the button is pressed. Switches bearing the suffix **a, b** or **c** close when the button is pressed, while those bearing the suffix **x** open. When the button is released by pressing another button, the position is reversed, so that it must be borne in mind that an "x" switch is always closed except when its button is depressed. **S1x**, for instance, which is operated by the SW button, is closed when any MW or LW button is depressed.

Aerial input is fed on MW and LW via series condenser **C1** to coupling condensers **C2, C3**, which form a potential divider via **S1x**, that portion of the signal which appears across **C3** being coupled to the tuning coils **L3** (MW) and **L4** (LW). On SW, input is via **C1** and coupling condensers **C2, C4** to tuning coil **L2, S1x** then



Circuit diagram of the Ferguson 771 table and 774 console "Pressabutton" superhets. All the switches with the exception of **S22** are press-button operated, and they are code-numbered in the diagram to show their action. The coding is fully explained at the beginning of "Circuit Description." Differences in early models are described under "Chassis Divergencies" overleaf.

volt, and its negative lead was connected to chassis in each case.

If V2 should become unstable when its screen current or anode is being measured, it can be stabilised by connecting a non-inductive condenser of about 0.1 μ F from grid (top cap) to chassis.

DISMANTLING THE SET

Removing Chassis.—Remove the two control knobs (pull-off) and the eleven press-buttons (pull-off);

remove the four bolts (with washers and lock-washers) holding the chassis to the bottom of the cabinet.

The chassis may now be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes.

To free the chassis entirely, unsolder from the connecting panel on the speaker transformer the leads connecting it to chassis.

When replacing, take care that the press-button plungers do not foul the front of the cabinet, and fit the buttons in the following order, reading from left to right: National, Midland, London, Gram, SW, MW, North, Athlone, LW, Luxembourg, Droitwich (noting the differences in early chassis described under "Chassis Divergencies" in col. 4.

A felt washer should be fitted between each of the two control knobs and the cabinet.

The speaker leads should be connected as follows, reading from top to bottom, but using the numbers marked beside the tags on the connecting panel: F and 1 (joined together), red; 2, no tag fitted; 3, blue; F, red/white.

Removing Speaker.—The speaker can be removed from the cabinet by removing the nuts from the four screws holding it to the sub-baffle.

When replacing, see that the transformer is on the left. If the leads have been unsoldered, they should be connected as previously described.

GENERAL NOTES

Switches.—All the switches, with the exception of S22, the mains switch, are of the press-button type, and are contained in a single double-sided unit mounted inside the front of the chassis. The switches controlled by each press-button are assigned a number, followed by a suffix letter a, b, c or x. The a, b and c switches close when their button is pressed, while the x switches open when their button is pressed.

The action of the switches is explained in detail under "Circuit Description."

The switch unit is indicated in our under-chassis view, but for identification of the individual switches the diagrams on this side of this sheet must be consulted. These diagrams are of the two sides of the switch unit. The lower one shows the switches as seen when looking at the underside of the chassis, while the upper one shows the switches on the unit which are normally hidden from view by the chassis deck.

To examine the upper side, the whole switch unit must be removed. First unsolder the fourteen leads from the pre-set station trimmers and remove the trimmer assembly (two screws). Now code in a rough sketch the remaining external connecting wires to the switch unit and unsolder them. Then remove the screws holding the two banks of three trimmers (above and below the switch unit) and the two screws holding the unit to the chassis. When replacing, note that each wire from the switch unit to the pre-set station trimmers goes straight across to the nearest tag.

S22 is the QMB mains switch, ganged with the volume control R16.

Scale Lamps.—These are two National Union miniature bayonet cap-types, marked N51. The rating is 6.8 V, 0.2 A.

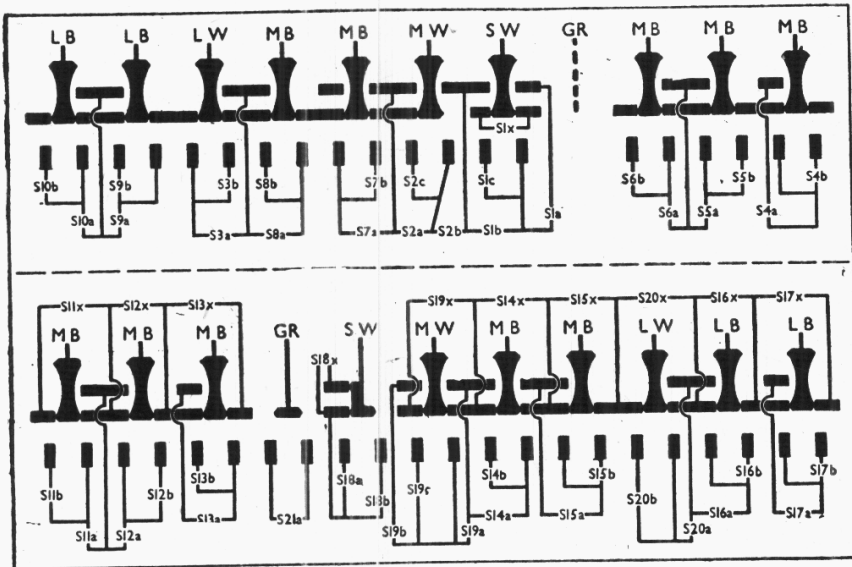
External Speaker.—Two sockets are provided at the rear of the chassis for a

(Continued in col. 4)

COMPONENTS AND VALUES

RESISTORS		Values (ohms)
R1	Anti-modulation damping	10,000
R2	V1 tetrode CG decoupling	500,000
R3	V1 tetrode CG resistor ...	3,000,000
R4	V1 fixed GB resistor ...	150
R5	V1 osc. CG resistor ...	500,000
R6	Osc. MW reaction damping	2,500
R7	V1 osc. anode HT feed	25,000
R8	V1 osc. CG resistor ...	50,000
R9	V1, V2 SG's HT feed ...	25,000
R10	V2 CG decoupling ...	500,000
R11	V2 fixed GB resistor ...	300
R12	2nd IF trans. pri. damping ...	600,000
R13	V3 diodes load resistor ...	500,000
R14	IF stopper ...	25,000
R15	Gramophone PU shunt ...	25,000
R16	Manual volume control ...	500,000
R17	V3 triode CG resistor ...	500,000
R18	V3 triode anode load ...	250,000
R19	Variable tone control ...	100,000
R20	V4 CG resistor ...	500,000
R21	Parts of fixed tone corrector ...	10,000
R22	rector ...	10,000
R23	V4 GB resistor ...	300
R24	V4 anode stopper ...	100
R25	V3 CG decoupling ...	250,000
R26	V3 GB resistor ...	35

CONDENSERS		Values (μ F)
C1	Aerial series condenser ...	0.0005
C2	Aerial circuit LW coupling potential divider	0.0001
C3	ling potential divider	0.004
C4	Aerial SW coupling ...	0.00002
C5	V1 cathode by-pass ...	0.1
C6	HT circuit RF by-pass ...	0.1
C7	Osc. LW fixed trimmer ...	0.00006
C8	V1 osc. anode coupling ...	0.00025
C9	V1 SG RF by-pass ...	0.00025
C10	V1, V2 SG's decoupling	0.1
C11	V2 CG decoupling ...	0.1
C12	V2 cathode by-pass ...	0.1
C13	IF by-pass condensers ...	0.00025
C14	IF by-pass condensers ...	0.00025
C15	V3 triode CG decoupling	0.25
C16	AF coupling condensers to V3 triode ...	0.02
C17	to V3 triode ...	0.02
C18	IF by-pass condensers ...	0.00015
C19	IF by-pass condensers ...	0.00025
C20	Part tone control ...	0.01
C21	V3 triode to V4 coupling	0.01
C22	Parts of fixed tone corrector ...	0.01
C23	rector ...	0.01
C24*	V4 cathode by-pass ...	5.0
C25*	HT smoothing condensers	16.0
C26*	HT smoothing condensers	8.0
C27*	V3 GB circuit by-pass ...	25.0
C28	Mains RF by-pass ...	0.01
C29†	Aerial SW (manual) trimmer ...	—
C30‡	Aerial MW (manual) trimmer ...	—
C31†	Aerial LW trimmer ...	—
C32†	Aerial manual tuning ...	—
C33†	Oscillator manual tuning	—
C34†	Osc. circ. SW trimmer ...	—
C35‡	Osc. MW (manual) trimmer ...	—
C36‡	Osc. circ. LW trimmer ...	—
C37‡	Osc. circ. SW tracker ...	—
C38‡	Osc. circ. MW tracker ...	—
C39‡	Osc. circ. LW tracker ...	—
C40‡	1st IF trans. pri. tuning	—
C41‡	1st IF trans. sec. tuning	—
C42‡	2nd IF trans. pri. tuning	—
C43‡	2nd IF trans. sec. tuning	—
C44‡	—	—
C45‡	—	—
C46‡	Aerial circuit MW automatic tuning trimmers	—
C47‡	—	—
C48‡	—	—
C49‡	Aerial circuit LW automatic tuning trimmers	—
C50‡	—	—
C51‡	—	0.00005
C52‡	—	—
C53‡	Oscillator circuit MW automatic tuning trimmers ...	—
C54‡	—	—
C55‡	—	—
C56‡	—	—
C57‡	Oscillator circuit LW auto tuning trimmers	—
C58‡	—	—



Diagrams showing both sides of the press-button switch unit. The lower view is that seen from beneath the chassis, and the upper one is that facing the underside of the chassis deck.

* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS		Approx. Values (ohms)	
L1	Anti-modulation choke ...	20-0	
L2	Aerial SW tuning coil ...	0-1	
L3	Aerial MW tuning coil ...	3-0	
L4	Aerial LW tuning coil ...	17-0	
L5	Osc. SW tuning coil ...	0-1	
L6	Osc. MW tuning coil ...	3-0	
L7	Osc. LW tuning coil ...	5-0	
L8	Osc. SW reaction ...	0-5	
L9	Osc. MW reaction ...	1-0	
L10	1st IF trans. { Pri. ...	9-0	
L11		Sec. ...	11-0
L12	2nd IF trans. { Pri. ...	12-0	
L13		Sec. ...	9-0
L14	Speaker speech coil ...	2-0	
L15	Hum neutralising coil ...	0-15	
L16	Speaker field coil ...	1,800-0	
T1	Speaker input { Pri. ...	500-0	
		Sec. ...	0-5
	T2 Mains { Pri., total ...	30-0	
		Heater sec. ...	0-05
	trans. { Rect. heat. sec. ...	0-1	
		HT sec., total ...	360-0
S1a, b, c, x	SW manual button groups	—	
S18a, b, x		MW manual button groups	—
S2a, b, c			LW manual button groups
S19a, b, c, x	MW automatic button groups		
S3a, b		LW automatic button groups	
S20a, b, x			Gram PU switch ...
S4a, b to S8a, b	Mains switch, ganged R16		
S11a, b, x to S15a, b, x			
S9a, b			—
S10a, b		—	
S16a, b, x		—	
S17a, b, x		—	
S21a		—	
S22		—	

General Notes (continued)

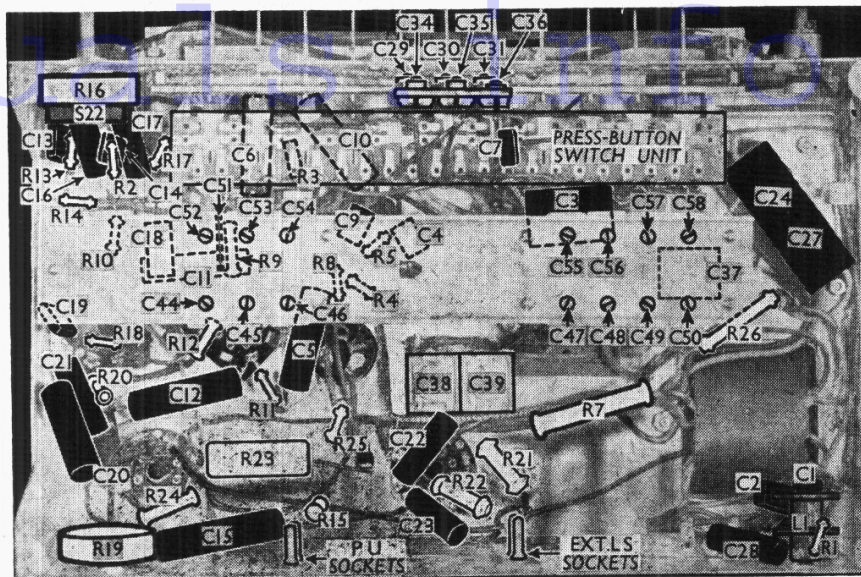
high impedance (about 5,000 Ω) external speaker.

Condensers C25, C26.—These are two dry electrolytics in a single tubular metal case on the chassis deck. Beneath the chassis there are three tags. That spotted black is the common negative; that spotted red is the positive of C25 (16 μF); while the plain tag is the positive of C26 (8 μF).

Condensers C24, C27.—These are two dry electrolytics (35 V working) in a single carton beneath the chassis, having a common negative (black) lead. The red lead is the positive of C24 (5 μF), while the yellow lead is the positive of C27 (25 μF).

CHASSIS DIVERGENCIES

A few chassis went out at the beginning of the run with a rather different circuit. Our sheet has been prepared from one of the later chassis, which can be identified by the fact that the screw holding the L1 unit at the back of the chassis has a black washer underneath its head, while the early models have no such washer. The arrangement of the press-buttons is also different. Reading from left to right, looking at the front of the set, our chassis has buttons as follows: Three MW pre-set; gram; SW; MW; two MW pre-set; LW; two LW pre-set. The arrangement in the early chassis was: Three MW pre-set; gram; SW; MW; LW; two MW pre-set; two LW pre-set.



Under-chassis view. The press-button switch unit is shown in detail in the diagrams at the foot of columns 1 and 2 opposite. The pre-set station trimmers are in two rows just behind the switch unit.

In early chassis also, the aerial coupling on SW was different, the bottom end of L2 being returned to the junction of R2, C3 and S1x. The oscillator circuit switching and coil arrangements were also slightly different, and trackers C37 and C38 were interchanged in position.

In some chassis, too, the fixed tone corrector may be modified, R21, C22 being omitted, and C51, in the oscillator auto-tuning bank, may not be present.

CIRCUIT ALIGNMENT

IF Stages.—Remove the grid (top cap) connection of V1, and connect a 500,000 Ω resistor between the connection and the cap. Connect signal generator between the cap (via a 0.00025 μF condenser) and chassis. Switch set to MW, and turn gang and volume control to maximum.

Feed in a 465 kc/s (645.16 m) signal, and adjust C43, C42, C41 and C40 for maximum output. Re-check these settings, then remove the resistor and replace top cap.

RF and Oscillator Stages.—With the gang at maximum, pointer should be at the right hand terminations of the horizontal scales. Connect signal generator to A and E leads, via a suitable dummy aerial. Turn volume control to maximum.

SW.—Since the SW tracker is in series with the MW and LW trackers it is essential to align the SW band first.

Switch set to SW, tune to 15 Mc/s on scale, and feed in a 15 Mc/s (20 m) signal. Adjust C34 for maximum output, using the peak involving the lesser trimmer capacity. Now adjust C29 for maximum output.

Feed in a 6 Mc/s (50 m) signal, tune it in, and adjust C37 for maximum output, while rocking the gang for optimum results. Return to 15 Mc/s and re-check C29 and C34. Repeat until no further improvement results.

MW.—Switch set to MW and tune to 250 m on scale. Feed in a 250 m (1,200

kc/s) signal, and adjust C35, the C30 for maximum output. Feed in a 520 m (580 kc/s) signal, tune it in, and adjust C38 for maximum output, while rocking the gang for optimum results. Return to 250 m and re-check C35 and C30. Repeat until no further improvement results.

LW.—Switch set to LW, and tune to 1,250 m on scale. Feed in a 1,250 m (240 kc/s) signal, and adjust C36, then C31, for maximum output. Feed in a 2,000 m (150 kc/s) signal, tune it in and adjust C39 for maximum output, while rocking the gang for optimum results. Return to 1,250 m and re-check C36 and C31. Repeat until no further improvement results.

STATION SETTING

In the model 771 the station trimmers may be adjusted through holes in the bottom of the cabinet. In-Console 774 it is necessary to withdraw the chassis to re-set the trimmers.

Looking at the front of the set, the first three buttons counting from the left cover wavebands of 200-300 m, 250-350 m, and 300-400 m respectively. The seventh and eighth buttons cover 350-500 m and 400-550 m. The tenth and eleventh buttons (LW) cover 1,000-1,600 m and 1,400-2,000 m respectively.

The trimmer screws are indicated in our under-chassis view. Thus C44 and C52 belong to the first button (200-300 m), while C50 and C58 belong to the eleventh button (1,400-2,000 m).

Select the button covering the wavelength of the required station, and adjust the corresponding oscillator trimmer until the station is heard. Then adjust the corresponding aerial trimmer for maximum output. Finally readjust both trimmers.

If the station to which the button is being adjusted is not very strong, it may be difficult to hear it on the oscillator trimmer while its aerial trimmer is far off tune. It may then be necessary to tune both trimmers to the nearest strong known station, and then to take the aerial trimmer up or down in small steps, searching on the oscillator trimmer for the required station at each step.

Alternatively, a signal generator may be used for rough adjustment, and then final check can be made on the station itself.