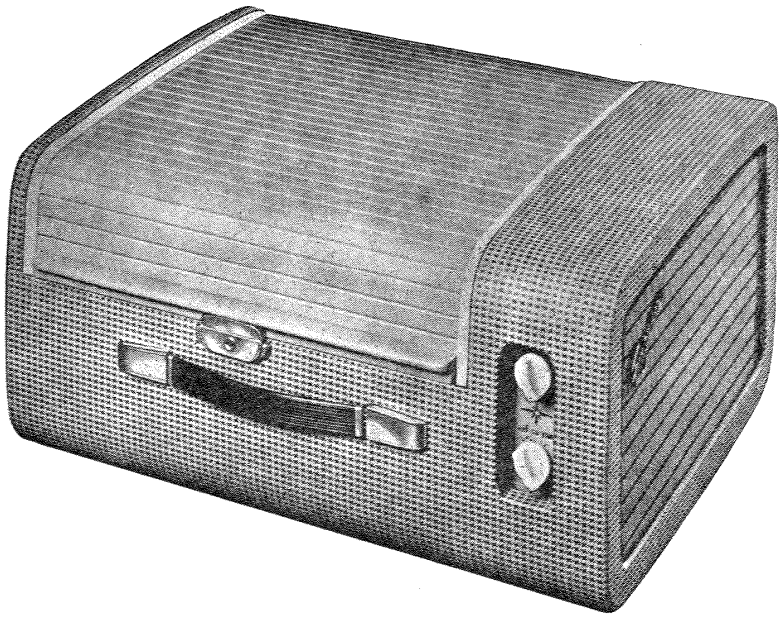
FERGUSON

RADIO



AUTO RECORD PLAYER

393 G

SERVICE MANUAL

AUTOMATIC RECORD PLAYER 393G

SPECIFICATION

Mains Supply : 200–250 Volts, 50 c.p.s. A.C. mains.

Power Consumption : Approximately 38 Watts at 240 Volts.

Valves : Two Mullard type UCL.83 triode pentodes.

Output Power : 6 Watts.

Record Changer : Collaro Challenger* four-speed automatic record changer with turnover crystal pick-up.

Loudspeaker : Widerange twin cone $6\frac{1}{2}$ in. diameter.

Pilot Lamp : 8 V. 0.15 A M.E.S.

Case : $18\frac{3}{4}$ in. wide x $14\frac{5}{8}$ in. deep x $9\frac{1}{8}$ in. high, finished in leather cloth, with carrying handle.

* The record changer is a special model supplied for use with the 393G only and is not interchangeable with the standard "Challenger."

CIRCUIT

Note : The heater supply for the two valves used in the amplifier is obtained by connecting the heaters in series with the induction motor of the record changer. This provides the necessary voltage drop on 226–250 volt mains supplies, but on lower voltages a 4.7KΩ 3W resistor, **R18**, is connected across the motor windings.

The push-pull amplifier circuit utilises two triode pentode valves type UCL.83, the pentode sections forming the output stage. One triode section **V2A**, functions as the phase invertor, the other, **V1A**, as the input voltage amplifier. The tone and volume controls operate in the grid circuit of **V1A** and a negative feedback voltage from the secondary of the output transformer is injected across **R5** in its cathode circuit. The effect of **C15** is to reduce the feedback at low frequencies to provide a degree of bass lift in the amplifier response.

The voltages developed across the anode and cathode loads of **V2A** are applied to the control grids of **V1B** and **V2B** through **C8** and **C9. C11** and **R15** across the primary of the output transformer **T2** provide phase correction.

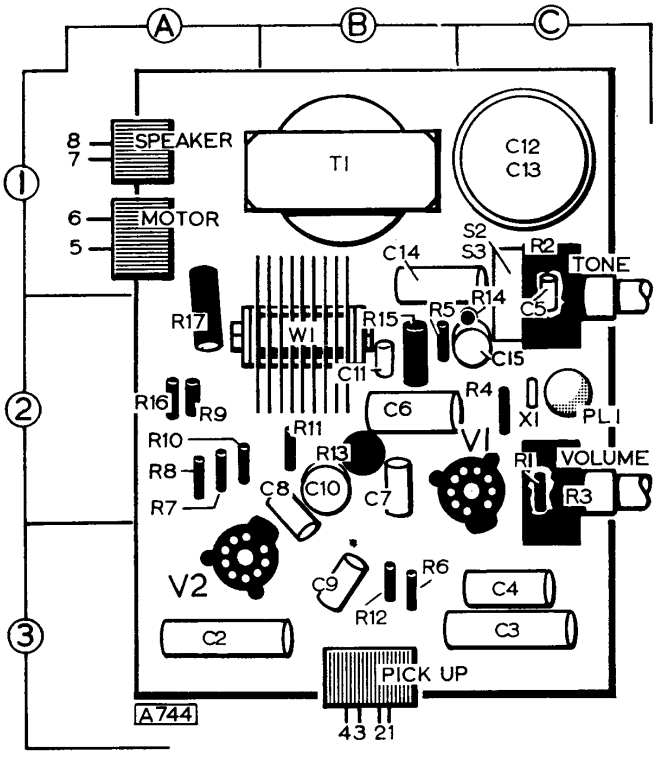


Fig. 1. Printed circuit panel viewed from components side.

C2	A3	C12 }	C1	R6	B3	R16	A2
C3	C3	C13 }		R7	A2	R17	A2
C4	C3	C14	B1	R8	A2		
C5	C2	C15	C2	R9	A2		
C6	B2			R10	A2	PL1	C2
C7	B2	R1	C2	R11	B2	S2 }	C1
C8	B2	R2	C1	R12	B3	S3 }	
C9	B3	R3	C2	R13	B2	T1	B1
C10	B2	R4	C2	R14	C2	W1	B2
C11	B2	R5	B2	R15	B2	X1	C2

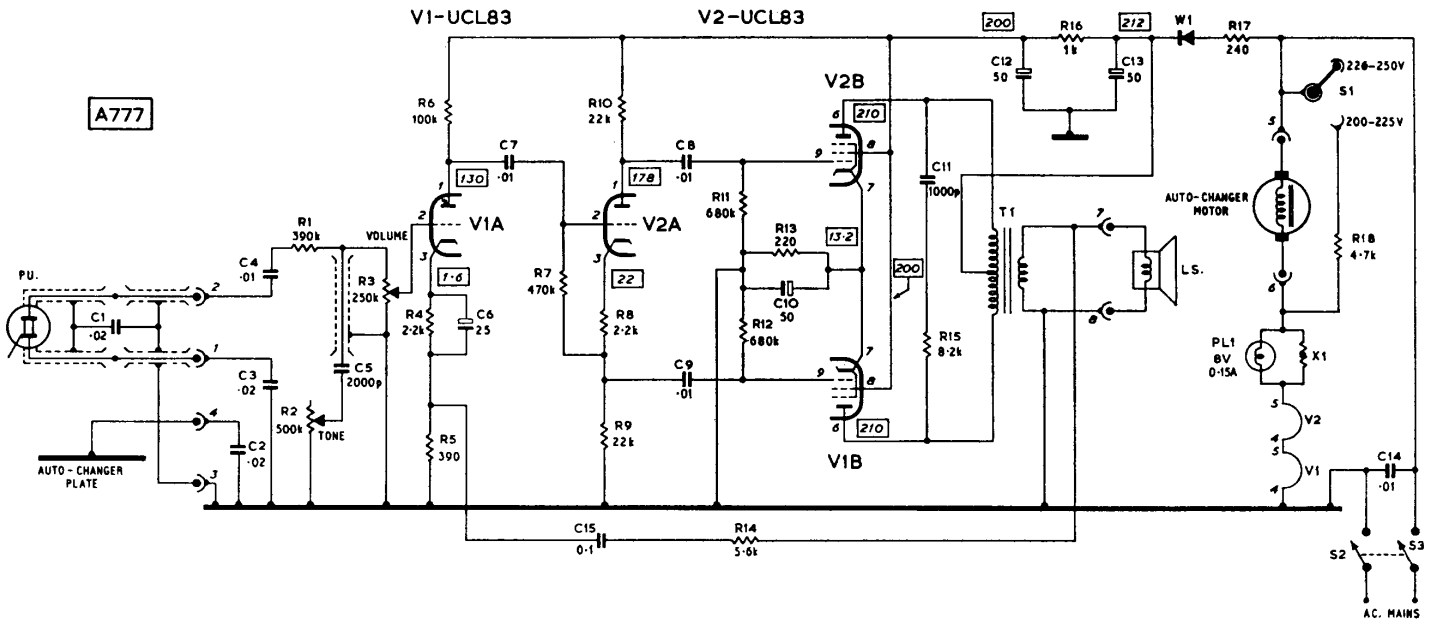


Fig. 2. Circuit diagram. Figures in rectangles are voltage readings taken with a 20,000Ω/Voltmeter. In those receivers in which R9 and R10 are 47 KΩ, the voltage at the anode of V2A will be approximately 168 V. and the cathode 32 V.

RESISTORS

(All ¼ watt, 20% tolerance unless otherwise stated)

Ref.	Value	Rating	Function
R1	390 KΩ		Pick-up series
R2*	500 KΩ	Carbon pot. (rev. log.)	Tone Control
R3†	250 KΩ	Carbon pot. (log.)	Volume Control
R4	2.2 KΩ		V1A grid bias
R5	390 Ω	10%	Neg. feedback injection
R6	100 KΩ		V1A anode load
R7	470 KΩ		V2A grid leak
R8	2.2 KΩ		V2A grid bias
R9	22 KΩ‡	10%	V2A cathode load
R10	22 KΩ‡	10%	V2A anode load
R11	680 KΩ		V2B grid leak
R12	680 KΩ		V1B grid leak
R13	220 Ω	10% 1 W.	V1B/V2B grid bias
R14	5.6 KΩ	10%	Neg. feedback limiter
R15	8.2 KΩ	½ W.	Phase correction
R16	1 KΩ		H.T. smoothing
R17	240 Ω	3 W.	Rectifier current limiter
R18	4.7 KΩ	3 W.	Low mains voltage shunt

* Part No. Y.13054
† Part No. Y.13055
‡ 47 KΩ 10% in some models

CAPACITORS

(All 350 V. working 20% tolerance unless otherwise stated)

Ref.	Value	Rating	Function
C1	0.02μF	300 V. A.C.	Pick-up and record changer isolating
C2	0.02μF	300 V. A.C.	
C3	0.02μF	300 V. A.C.	
C4	0.01μF	300 V. A.C.	
C5	2000pF		Tone control
C6	25μF*	25 V.	V1A cathode bypass
C7	0.01μF		V2A grid coupling
C8	0.01μF		V2B C.G. coupling
C9	0.01μF		V1B C.G. coupling
C10	50μF*	25 V.	V1B/V2B cathode bypass
C11	1000pF		Phase correction
C12	50μF*	275 V.	H.T. smoothing
C13	50μF*	275 V.	H.T. reservoir
C14	0.01μF	300 V. A.C.	Mains R.F. bypass
C15	0.1μF		Bases response correction

* Electrolytic

C6 — Part No. Y.13210/7
C10 — Part No. Y.13210/6
C12/13 — Part No. Y.13200/9

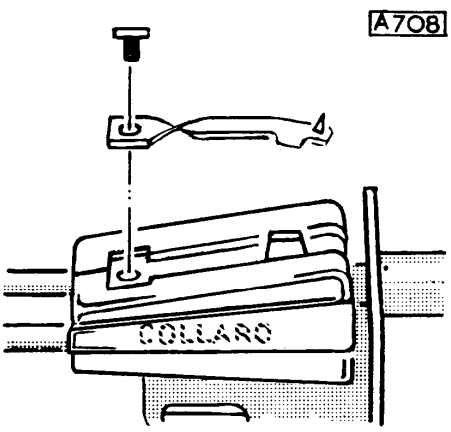


Fig. 3. Stylus replacements for the Collaro Studio O pick-up:—

Studio STD (78 r.p.m.).

Studio LP (33/45 r.p.m.).

MISCELLANEOUS

Ref.	Function and Description	Part No.
L.S.	6½ in. diameter twin cone, 3Ω speech coil	Y.16002/6
P.L.1.	Pilot lamp, 8 V., 0.15 A., 12 mm., M.E.S.	33767
S1	Mains voltage adjustment	*Z.17617
S2, S3	Mains On/Off Switch	Y.13054
T1	Audio output transformer	Z.17613
W1	H.T. rectifier	Y.17612
X1	Brimistor CZ3	Z.6126

* Shorting plug—Part No. Z.17622

SERVICING NOTES

When servicing is necessary on the printed circuit panel, it must be remembered that excessive heat can loosen the bond between the copper conducting circuits and the insulating board ; consequently, particular care is necessary if any connections must be soldered to the 'wiring' side of the panel. For this reason, when replacing a resistor or capacitor, cut out the faulty component so that as much as possible of the original lead-out wires remain for connecting in the new component, soldering to the ends of the wires instead of to the printed conductors. Use a small low consumption iron and do not apply the bit for longer than is necessary to produce a sound joint.

The heavier components are secured on the board by clip lugs which also make the electrical connections to the panel. To remove these, use a heavier type iron and apply heat and pressure to the lug—not the printed circuit—so that when the solder melts, the lug is pressed clear of the connecting point. In some cases a small stiff haired brush will assist in breaking the connection.

When a section of printed conductor is damaged or fused, scrape off the damaged portion and restore the connection with a jumper wire on the component side of the panel. Should it become necessary, however, to solder directly to a printed conductor, use a 60/40 resin cored solder and with a low consumption iron, make the joint quickly to avoid overheating. Do not use a corrosive type flux.

Any of the usual switch cleaning fluids may be used for cleaning the printed contacts which engage with the input and output connectors.

MECHANICAL DETAILS

Removing the Record Changer

Remove the panel at the right-hand side of the record changer compartment and withdraw the two screws securing the mains voltage adjustment panel. The two leads from the adjusting panel are terminated in a clip connector on the printed circuit board and when removed, releases the connecting leads to the record changer motor.

The record changer mounting board fits into a groove in the front of the case and is secured by four screws. Remove the screws and slide to the rear to release the front edge. Lift the left-hand side of the board and hold in position at about 45° so that the connector on the bottom edge of the printed panel can be unclipped. The record changer may then be withdrawn from its case.

Removing the Amplifier Panel

To remove the printed circuit panel, first withdraw the record changer as described above and release the clips securing the scale panel to the cabinet. Do not attempt to pull off the control knobs.

The amplifier panel is secured in position by a screw and rubber grommet at the rear and a small strip of wood at the top. Removing these allows the panel to be pushed to the rear so that when the controls are clear of the case, the panel may be lifted out to the extent of the mains connecting leads to the On-Off switch.

MECHANICAL SPARES

Part Description	Part No.
Cabinet	V.17609/1
Control Knob	X.7718/9
Control Knob Spring	37346
Control Knob Ring Clip	45906
Control Knob Felt	Z.17624
Mains Input Plug	Z.15059/1
Mains Lead with Moulded Connector	Y.15923/1
Pilot Lampholder	Y.13309/2
Printed Circuit Connectors :—	
Loudspeaker	Z.17614
Pick-up	Z.17616
Record Changer	Z.17615
Record Changer	N.16107
Valveholder	Z.13625

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