TECHNICAL SPECIFICATIONS

POWER SUPPLY:

One 9-Volt Battery
Eveready Type 739.

CONSUMPTION:

15 mA (no signal).

TRANSISTOR COMPLEMENT:

OC71 — 1st A.F. Amplifier
OC75 — 2nd A.F. Amplifier
2 OC74 — Push-Pull Power Amplifiers

OUTPUT IMPEDANCE:

3.7 ohms at 400 c.p.s.

CIRCUIT DESCRIPTION

This chassis is a 3-stage, battery-powered gramophone amplifier incorporating 4 P.N.P. junction transistors, operating in the grounded emitter configuration.

The input and driver stages are resistance-capacitance coupled. Bias is applied to the bases through potential dividers R3, R4 and R7, R8. D.C. stabilisation of the operating point is provided by emitter resistors R6 and R10. These resistors are by-passed to prevent signal degeneration.

The push-pull class B output stage, using two matched OC74's, is forward biased by the potential divider R13, R12, RT, R14.

The driver is coupled to the output stage by an interstage, phase splitter transformer, T1.

Output transformer T2 provides matching from the output stage to a 3.7 ohm loudspeaker load. Feedback from the secondary of T2 is applied to the emitter, driver stage, via R17.

The R-C filters, R9, C6; R15, C8, in the supply line, reduce feedback effects, caused by an increase in battery impedance.

As an aid to following the circuit diagram it should be remembered that the transistor emitter, base and collector correspond to the cathode, grid and plate of a vacuum tube. Since the transistors used in this amplifier are P.N.P. types, the voltages applied to them are in the opposite polarity to those applied to a tube.

SERVICE NOTES

Transistors can be permanently damaged by excessive external heat or by heat generated within the circuit by excessive current flow. When servicing this equipment the following precautions should therefore be observed:

Battery polarity should never be reversed. Never remove or replace a transistor or circuit component without first switching the amplifier off.

When soldering transistor leads, hold the leads with long-nosed pliers to act as a heat shunt. Solder as rapidly as possible, keeping the iron well clear of the transistor body.

Disconnect transistors before making circuit checks with an ohm meter. Failure to do so will give misleading results and the transistors may be damaged by excessive conduction caused by the ohm-meter battery. Check polarity of ohm-meter leads—electrolytic capacitors may be damaged if the ohm-meter battery voltage is applied in reverse polarity.

When taking voltage measurements, use care to avoid accidental short-circuits by the volt-meter probes.

Fault finding can be carried out in the usual manner, remembering that a transistor failure is unlikely.

When using an audio frequency generator for signal tracing, a D.C. blocking capacitor should be used in the live lead to prevent disturbance of the transistor D.C. circuits.

Before connecting the generator, adjust its attenuator for minimum output. Signal generators designed for vacuum tube circuits can furnish more signal than a transistor can safely handle.

The output transformer must be correctly loaded with a 3.7 ohm loudspeaker during these tests. If the output load is reduced below the correct value the maximum dissipation of the output transistors will be exceeded at high output levels. When making output measurements, an output meter having a resistance of at least 250 ohms may be connected across the speaker voice coil. Do no use meters of low resistance.

TRANSISTOR VOLTAGES AND CURRENTS

Transistor	*Emitter*	*Base*	*Collector*	*Collector Current*
OC71 — 1st A.F.	1.65 V	1.6 V	3.7 V	0.64 mA
OC75 — 2nd A.F.	2.30 V	2.4 V	8.4 V	5.1 mA
OC74 — Output		0.16 V	9.0 V	3.8 mA Total
OC74 — Output		0.16 V	9.0 V	

All readings are negative with respect to chassis.
Voltage readings taken with 20,000 ohm per volt meter.
Do not use voltmeters having an impedance of less than 10,000 ohms per volt.
Total current drain with no audio output — 15 mA.