PERFORMANCE CHECK:

Although very little deterioration in performance is likely to occur over quite long periods, it may become necessary or desirable to check the overall performance of a particular amplifier. This may be carried out in a well-equipped servicing establishment with the following instruments:

1. A constant-output low distortion variable-frequency audio oscillator.
2. An electronic voltmeter with a 0 to 1 or 1.5 volt A.C. range.
3. A cathode ray oscillograph of medium sensitivity.

The procedure to be adopted is as follows:

(a) Remove the pickup connections and connect the oscillator to the input tags of the amplifier.

(b) Connect the electronic voltmeter and the oscillograph in parallel across the loudspeaker voice coil.

(c) Connect the amplifier to a 9 volt battery and turn the volume control fully clockwise. Set the oscillator to 1000 c/s and adjust its output until traces of distortion just disappear from the oscillograph pattern.

IMPORTANT NOTES:

When servicing transistorised equipment, the following points should be borne in mind.

1. Coding of transistor connections. Many types of transistors have a spot of paint on the case adjacent to the collector. The emitter is diametrically opposite and the base is the middle one. When no coding is apparent, the collector is always to one side on its own, the emitter is diametrically opposite and the base is the one in between.
2. Analogy with valves. For a simple analogy between a transistor and a valve, the collector may be regarded as the plate, the base as the grid and the emitter as the cathode.
3. Polarity of supply voltage. Although the above analogy is a very useful one, it should be noted that, with transistors of the p.n.p. type such as are used in this amplifier, the supply voltage is of opposite polarity to that used with valves; that is, the negative terminal of the battery is connected to the collector circuits. Furthermore, such a transistor requires a negative rather than positive bias at the base to make it conduct. A transistor with an open-circuited base connection will draw very little current.
4. Soldering of transistors. By their physical nature, transistors are very sensitive to heat and exposure to temperatures above about 85°C may cause permanent damage. Therefore the soldering of transistor leads should be carried out as quickly as possible with the soldering iron kept well away from the case of the transistor.
5. Short circuiting of components. The use of screwdrivers or other tools for short circuiting components or checking the presence of supply voltages must be avoided since it may cause permanent damage to the transistors.
6. Continuity tests. Continuity testing of transistorised equipment while the transistors are in circuit will give misleading results due to the transistors behaving as low impedance diodes. Furthermore, the source of voltage in the ohmeter may cause damage to the transistors.
7. Voltage measurements. Voltmeters used for test purposes must have a resistance of not less than 10,000 ohms per volt to avoid misleading results due to shunting effects.
8. Polarity of capacitors. When replacing an electrolytic coupling or bypass capacitor, correct polarity of the capacitor must be observed. Reversed connection of an electrolytic capacitor will result in inferior performance, and in some cases, may cause damage to the transistors.