PLATED CHASSIS

New production technique forecasts drastic changes in methods of production

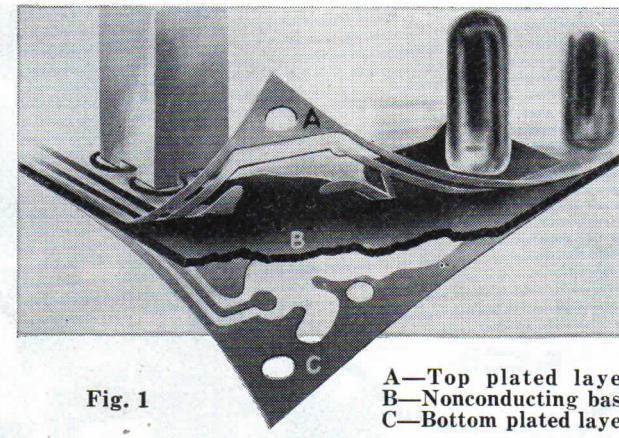


Fig. 1

A—Top plated layer
B—Nonconducting base
C—Bottom plated layer

PLACIR is the name of a new plated-circuit process used by Motorola in the construction of the 5-tube a.c.-d.c. broadcast receiver models using the HS-289 chassis. In these sets, the usual metal chassis has been replaced by a stamped plastic base appliquéd on both sides with a thin layer of copper in a pattern which duplicates the wiring layout of the receiver. Each line of the pattern is a conductor which replaces the hookup wire or bus bar used in standard wiring techniques. The metal plating extends through all holes in the chassis to connect circuits on the front with those on the rear. A cross-section drawing of one corner of the chassis is shown in Fig. 1 and the underside of the chassis is shown in Photo A.

This type of construction minimizes lead breakage through vibration and eliminates problems of hum and feedback caused by variations in lead dress.

Sockets are integral parts of the chassis. They are made by boring holes in the plate and inserting small clips which fit over the tube pins. The clips connect to the proper circuit elements through plated leads.

The outer edges of the chassis and the large plated areas in the center form the common B minus return. Other short leads carry r.f., i.f., and a.f. signals, and filament and d.c. operating voltages.

There are *no* printed-circuit components in the receiver. All resistors and capacitors are conventional components soldered to the plated-circuit leads on the chassis. Photo B shows the major components mounted on the top or front of the chassis.

Servicing precautions

The circuit (Fig. 2) is conventional but the physical construction requires modifications in service methods.

Always observe the following precautions when servicing or handling plated-circuit chassis:

1. Use an isolation transformer between the set and the power line. The edges of the chassis and the large plated areas in the center are connected directly to one side of the line, so there is a danger of a serious shock or a short circuit if the transformer is omitted and the line polarity makes the chassis hot with respect to ground.

2. Do not service the chassis on a metal plate. A short circuit is likely.

3. Handle the chassis with care. All voltage-carrying leads are exposed.

Replacing components

The unusual construction of this chassis makes it necessary to use new techniques and precautions when replacing components. Follow these rules:

1. Avoid tube breakage by removing them before starting work. Pull the tubes *straight* out. Wiggling them may deform a socket clip and cause a poor

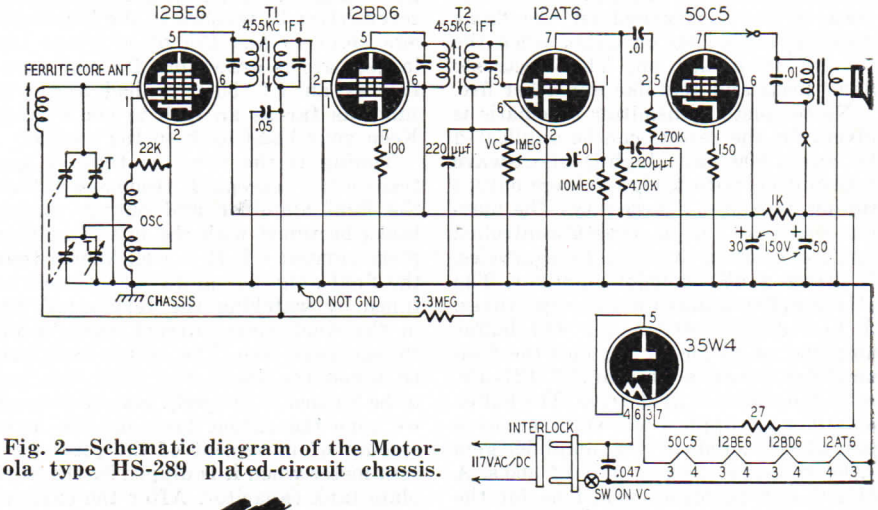
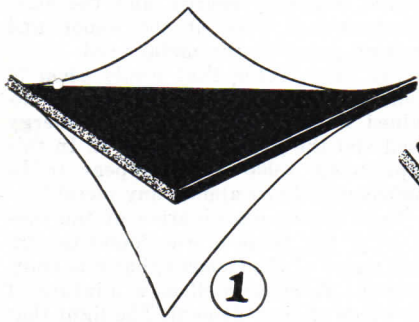
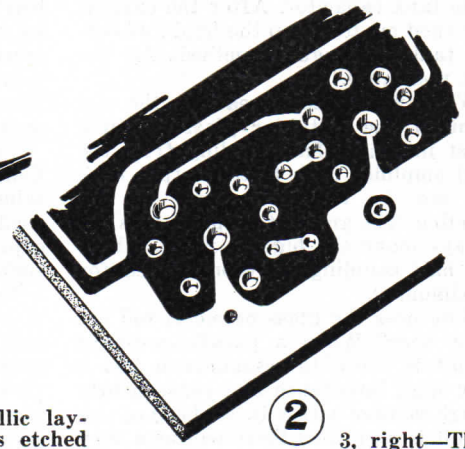
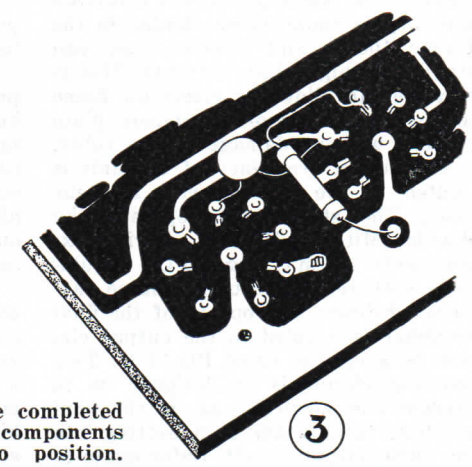


Fig. 2—Schematic diagram of the Motorola type HS-289 plated-circuit chassis.

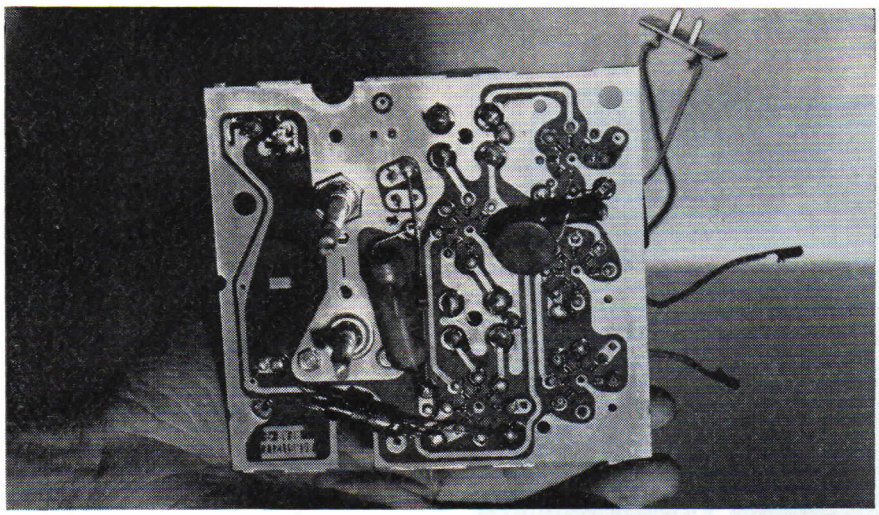


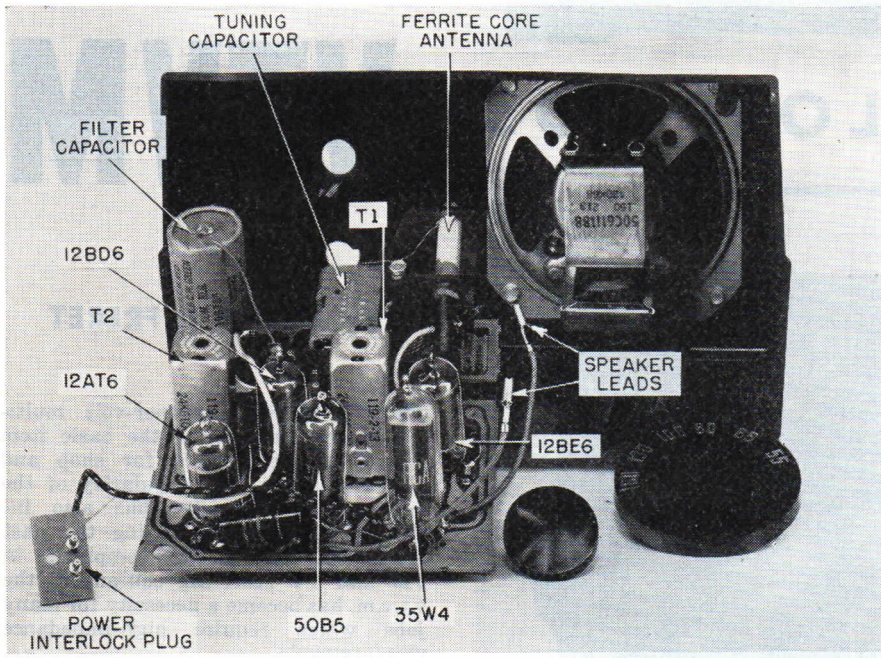


1—Insulating base and two metallic layers form a sandwich. 2—Metal is etched out by photoengraving techniques, leaving metal circuit lines on nonconductive base.



3, right—The completed chassis, with components soldered into position.





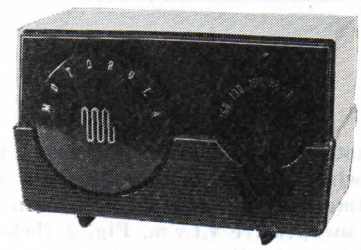


Photo A (top)—Underside of the Motorola HS-289 chassis. Photo B (bottom)—A top view of the new chassis. Photo at right shows the smart cabinet of the five-tube a.c.- d.c.-type receiver which uses the new HS-289 chassis.

contact between it and the tube pin.

2. When removing defective components, use a *small* soldering iron (60 watts or less) to avoid damage to the wiring. *Do not use a soldering gun.* The leads are very thin and too much heat will burn them or cause them to pull away from the base material.

3. Replace damaged circuit leads with regular hookup wire.

4. When removing i.f. transformers, the volume control, or electrolytic capacitor, the recommended procedure is to immerse all lugs simultaneously in a small soldering pot. The component can then be lifted away from the chassis. If a soldering pot is not available, heat each lug individually with a *small* soldering iron, and shake off as much molten solder as possible. The component can be removed by alternately heating and loosening each lug. Take care that you do not pull the plated connection away from the chassis.

5. Damaged tube clips can be removed by squeezing with pliers and then unsoldering. Snap the new clip into the hole and solder it to the lead.

6. To remove resistors and capacitors, unsolder one lead at a time. Be sure to remove all solder from the holes and do not permit it to run into adjacent leads where it will cause a short circuit.

7. Be extremely careful not to damage the plating while removing or replacing the volume-control mounting nut or the tuning-capacitor mounting screws.

8. Insulating washers must be placed under the heads of the chassis-mounting screws when reinstalling the chassis in the cabinet. These washers prevent the screw heads from damaging the plating on the chassis.

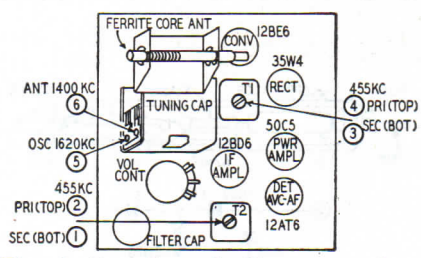


Fig. 3—Location of alignment points.

Alignment procedure

The alignment procedure is standard. An isolation transformer should be used between the receiver and the power line to avoid shock, short circuits, and hum. If a transformer is not available, connect the low side of the signal generator output lead to the chassis or negative leg of the filter capacitor through a 0.1-μf capacitor rated at 400 volts or higher.

Alignment Table

Sig. Gen. Connection	Sig. Gen. Frequency	Tuning Gang	Adjust. (See Fig. 3)
Pin 7 of 12BE6	455 kc	Fully open	1, 2, 3, and 4.
Pin 7 of 12BE6	1620 kc	Fully open	5 (Osc. trimmer)
Loop*	1400 kc	Tune for maximum	6 (Ant. trimmer)

**Connect signal generator across a 5-inch diameter, 5-turn loop placed at least 12 inches from the antenna of the receiver.*

All circuits are tuned for maximum output on an output meter connected across the voice coil of the speaker. The signal generator should be set for 30%, 400-cycle modulation. A 0.1-μf capacitor in series with the hot lead from the signal generator acts as a dummy antenna.

Alignment procedure is given in the table. Begin the alignment with the volume control set for maximum output. Reduce the output of the generator as the circuits are brought into resonance so the signal across the voice coil does not exceed 0.4 volt (.05 watt). This prevents the receiver from being overloaded. END