

NATIONAL RADIO INSTITUTE

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# Radio-Trician Service Manual

(TRADE MARK REGISTERED U. S. PATENT OFFICE)

Compiled solely for  Students & Graduates

on

**Crosley Models 40S, 41S, 42S, 82S, 41A, 42, 30S, 31S,  
33S, 34S, 60S, 61S, 62S, 63S, 20, 21 and 22**

Models 40S, 41S, 42S and 82S consist of three stages of Radio frequency amplification using —24 type tubes, a detector stage using a —27 type tube, a stage of audio frequency amplification using a —27 type tube and a push-pull amplifier using —45 type tubes. Figure 1 shows a schematic diagram of this set as it was first built for use with type J Dynacoil speaker. Two different types of antenna connections have been used on this receiver as shown in the diagram. The coil shown in the "new antenna connection" is connected directly to the grid of the first 224 tube and acts as an auto transformer, the other end of the coil being connected to the ground connection.

In order to use these receivers with the type M speaker, it was necessary to change the resistance values and the circuit arrangement slightly. The modifications made in adapting the chassis to the M type speaker are described in the following paragraphs.

#### Plate Supply Systems in Receivers Using M Type Speakers

As in receivers using the J speaker, the negative or low-potential plate supply lead (connected to the middle tap of the secondary supplying the rectifier plates) is grounded to the chassis, and the high-potential lead (from the middle tap of the secondary supplying the rectifier filament) is connected through a choke coil to a speaker terminal on the chassis. From this speaker terminal the circuit continues through the speaker

leads to the speaker itself. At this point, instead of all of the plate current flowing through the speaker field, a part branches off and goes directly to the middle tap of the output transformer primary (built into the speaker) and thence to the output tubes. The plate current for the radio-frequency, detector, and first audio stages flows through the speaker field and back to a terminal on the receiver.

It is necessary that the plate supply circuit branch within the M type speaker in this way, because the field coil of this speaker requires but 45 milliamperes (considerably less than the entire plate current drawn by all of the tubes) instead of 85 milliamperes, as required by the field of the J speaker.

The combined plate current used by the radio frequency, detector, and first audio-frequency tubes is less than 45 milliamperes, however. This makes it necessary to shunt part of the speaker field current around the plate circuits of these tubes, direct to the chassis. For this purpose a 5500-ohm resistance in the receiver (or two 11,000-ohm resistances in parallel) is connected from the plate supply circuit to ground (chassis).

As the plate supply circuit enters the receiver from the speaker field it is divided into two branches, one of which goes direct to the detector and first audio plates, the other going through a 440-ohm resistance to the radio-frequency plates and the 5500-ohm shunt resistance.



ages is the same as in receivers using the J type speaker, except that the values of resistances have been changed, as follows:

1. Output bias resistance from 850 to 700 ohms.

been used at various times on these chassis since their first introduction.

In the first type two resistances, varied simultaneously, were used. One of these controlled the energy transferred from the antenna circuit to the grid circuit of

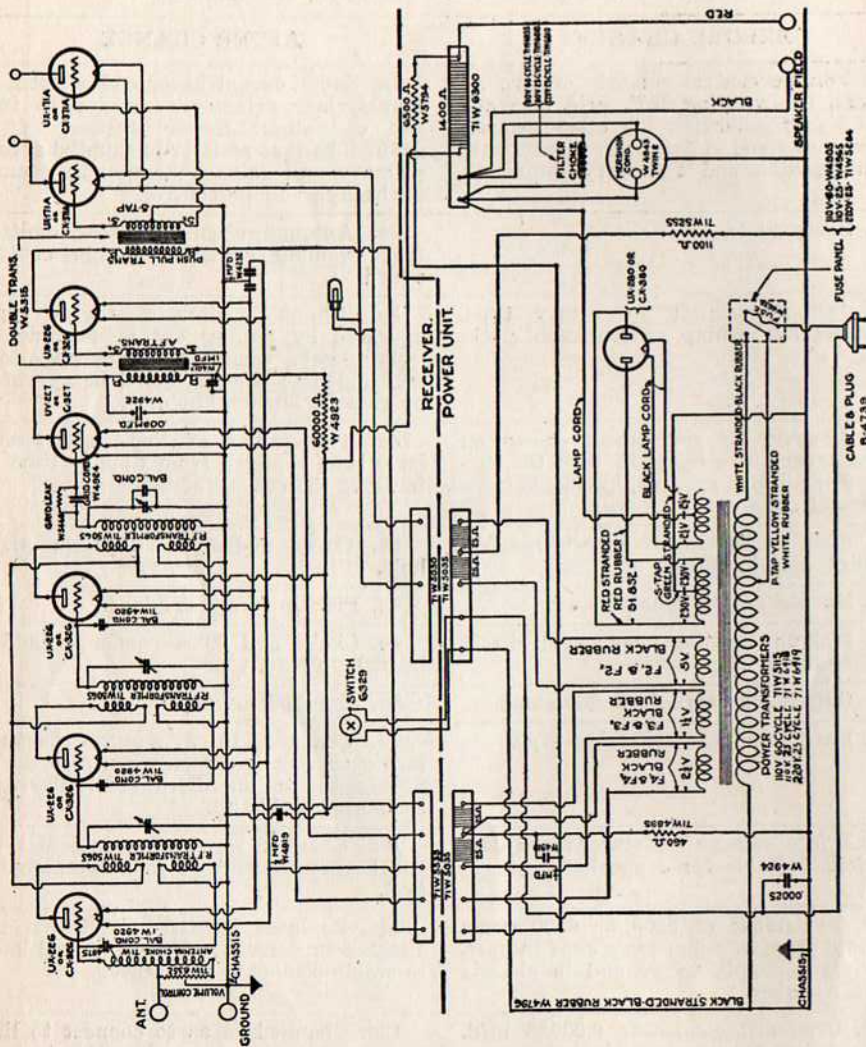


Fig. 2—Circuit diagram of Models 41A and 42.

2. Detector bias resistance from 60,000 to 55,000 ohms.

3. Bleeder current resistances from 100,000 to 55,000 ohms.

#### Volume Control Changes

Three types of volume control have

the first tube, while the other controlled the bias potential and screen element potential of the screen grid tubes.

The second type of control was exactly the same as the first except that the primary of the first R.F. transformer was

connected to the free end of the volume control resistance instead of to ground.

The third type of volume control was introduced coincident with the addition

remained the same. The primary of the first R.F. transformer was omitted and a single coil used, connected directly in the grid circuit of the first tube. Two

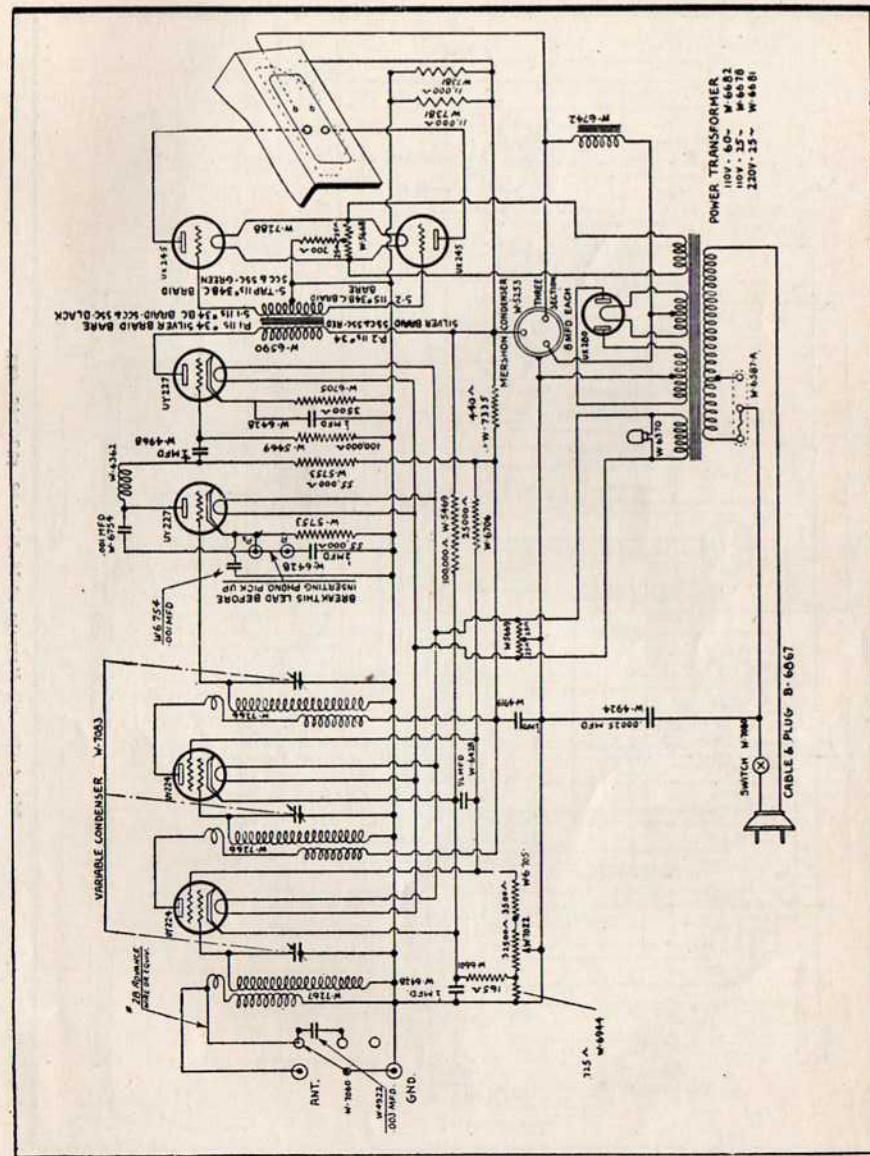


Fig. 3—Circuit diagram of Models 30S, 31S, 33S, 34S.

of the range control on this receiver. The variable resistor in the antenna circuit was omitted. The arrangement for controlling bias and screen grid voltages

points of the range control switch are connected to the taps on this coil, and a third point provides pick-up through capacity coupling to the other two. The arm of



tion in place of three stages used in the 40S series. A wiring diagram of the 30S series is shown in Figure 3.

#### Models 60S, 61S, 62S, and 63S

These receivers all use the same chassis mounted in different types of cabinets and are designed primarily for operation from 110-volt D. C., although they may be operated on 220-volt D. C. supply as described below. This receiver is to be operated with Dynacoil speaker type L. The following tubes are required: Four —22, two —12A, and two —71A type tubes.

Before connecting this receiver be sure that the electric line supplies 110 or 220 volts direct current—not alternating current.

Since direct current is used, the receiver must be connected to the line with proper polarity. To test the polarity, proceed as follows: Make all connections with the exception of that to the light socket or receptacle, and insert the tubes in the proper sockets. Screw a lamp bulb into the fuse socket on the supply cable. For 110-volt lines, use a 110-volt, 40 or 60 watt lamp bulb; and for 220-volt lines, use a 220 volt, 40-watt bulb. Turn on the switch on the receiver. Connect the supply cord to a light socket or baseboard receptacle, and note the brilliance of the lamp bulb. Remove the plug and reinsert it with its prongs reversed, again noting the brilliance of the bulb. The proper connection is that in which the bulb is less brilliant. Never operate the receiver with the plug inserted in the other position.

After the polarity has been determined, the lamp bulb used for testing must be replaced as follows: If the receiver has been connected to a 110-volt line, replace the bulb with the plug fuse supplied with

the receiver. If it has been connected to a 220-volt line, replace the bulb with a 40-watt, 110-volt lamp bulb. This is the only difference in installation and operation for 110 and 220 volts.

Never operate the receiver without a 6-volt Mazda, miniature base bulb No. 40 burning in the dial light socket.

The wiring diagram of this receiver is shown in Figure 4.

#### Models 20, 21 and 22

These receivers differ only in the type of cabinet. They all use a 6-tube, screen grid, battery type chassis. Tubes used are three —22, two —01A or —12A, and one —71A type tubes. The filament supply requires a 6-volt storage battery while the "B" supply uses four 45-volt "B" batteries. The "C" supply requires two 22½-volt and one 4½-volt batteries.

A wiring diagram is shown in Figure 5.

#### Improved Changes in Chassis

The original chassis were built for use with Type E Dynacone. When the type C Dynacone (with separately excited field coils) was introduced, two terminals (Red and Black) were added to the chassis for supplying the field of the "C" type speaker with current direct from the storage battery, or "A" supply. For a short time the yellow and black filament terminals were connected to the points shown by the dotted lines marked "2Y" and "2B" on the diagram.

In recent chassis the 3-megohm resistor W5468 in the detector grid circuit is replaced by an A-2 radio-frequency choke, the 0.85-ohm resistor is moved to the negative filament lead, and the detector grid return is connected to the negative side of the 0.85-ohm resistor. See the changes marked "3" on the circuit diagram.