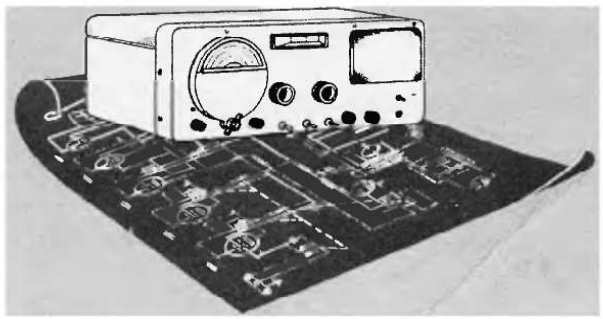
technical manual for model S-40 radio receiver



JANUARY, 1946 TM 94-145

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Figure 1-1. Radio Receiver Model S-40, front view.

SECTION I
DESCRIPTION

1. GENERAL.

Radio Receiver Model S-40 (Fig. 1-1) is a commercial superheterodyne receiver capable of receiving both phone and continuous wave (c-w) signals over a frequency range from 550 kilocycles (kc) to 44 megacycles (mc). Automatic volume control (A-V-C) and automatic noise limiter (NOISE LIMITER) circuits are included to improve the performance of the equipment. The receiver may be operated with its internal power supply from a 117-volt, 50/60 cycle single phase source, (25/60 cycle if receiver has a universal power transformer) or from an external supply which will provide direct current (D-C) at 6.3-volts and 260-volts. The receiver is self contained except for heed set and antenna. It is supplied in a sheet metal cabinet as shown.

2. DESCRIPTION OF MAIN COMPONENT.

Radio Receiver Model S-40 is housed in a well ventilated cabinet with a hinged lid that provides access to all tubes and i-f transformer adjustments. Holes in the bottom of the cabinet provide access to the r-f coil and trimmer adjustments. The following controls, all plainly marked, are located on the front panel: SENSITIVITY, BAND SELECTOR, VOLUME, main TUNING, BANDSPREAD tuning, PITCH CONTROL, and TONE control. In eddition to the controls, there are four toggle switches marked for the circuits in which they are used, namely, A-V-C, CW-AM, NOISE LIMITER and STANDBY/RECEIVE. The frequency of reception is read directly from the main tuning dial located to the left of the tuning control. The outer scale is used for logging purposes. The vernier logging dial, located above and between the main TUNING and BANDSPREAD tuning controls, is used for bandspread tuning.

All external connections, with the exception of the heedset, are made at the rear of the chassis. They are: antenna and ground connectiona, external supply power input socket, and a socket for connection to an external "S" meter.

3. FREQUENCY COVERAGE.

The Model S-40 Radio Receiver provides continuous coverage over the frequency range from 550 kilocycles (kc) to 44 megacycles (mc) in four bands. Each band is provided with sufficient overlap to insure continuity of coverage over the entire tuning range. The frequencies covered per band are as follows:

Band	Coverage
1	550 kc. to 1700 kc.
2	1680 kc. to 5.4 mc.
3	5.3 mc. to 15.8 mc.
4	15.3 mc. to 44 mc.

4. POWER REQUIREMENTS.

The receiver is designed to operate from a 117-volt, 50/60 cycle single phase, (25/60 cycle if receiver has universal power transformer) a-c source or from a 6-volt storage battery and 260-volts of "B" battery. The "B" batteries may be replaced by a suitable vibrator type power supply if it meets the following current requirements:

A-C Operation	* D-C Operation
Line voltage . . . . . 117 volts	Filament voltage. . . . . 6.3 volts
Line current . . . . . 0.76 amp.	Filament current. . . . . 5 amps.
Power consumption. . . . . 75 watts	"B" voltage . . . . . 260 volts
	"B" current . . . . . 70 ma.

* The 6-volt battery drain using a vibrator type supply for "B" voltage will run approximately 10 amperes.

5. MAIN COMPONENT - WEIGHT AND DIMENSIONS.

Component	Dimensions (inches)			Weight (lbs.)
	Height	Width	Depth	
Model S-40 Radio Receiver	9	18½	11	28

Note: Add 8¼ inches to height for opening top cover.

SECTION II
INSTALLATION AND ADJUSTMENT

1. INSTALLATION.

a. Unpacking. - Carefully unpack and inspect the equipment for any possible damages during shipment. In cases of damages, s claim should be filed immediately with the transportation company.

b. Mounting. - The radio receiver is designed for table mounting and has four rubber feet located on the bottom of the cabinet for this purpose.

c. Antenna Recommendations. - Three terminals are provided on the antenna terminal strip (TS-1) located on the rear apron of the receiver chassis. Terminals A-1 and A-2 are connected to the primaries of the r-f stage transformers, and the ground (G) terminal is connected to the receiver's ground system. Refer to Fig. 7-5 for suggested antennas.

(1) Single Wire Antenna. - When using a single wire antenna installation, connect a jumper between the antenna terminal A-2 and ground terminal G. A single wire antenna of about 50 to 75 feet (including lead-in) is then connected to terminal A-1. Use a #14 (AWG) or heavier stranded wire for best results. Erect the antenna as high and free from surrounding objects as possible. This type of antenna works well where the signal to noise ratio is relatively high and a more elaborate installation is not available.

(2) Doublet Antenna. - The doublet antenna is recommended where receiving conditions are bad or where maximum sensitivity is required over a relatively narrow range of frequencies. The transmission line from the antenna is connected to terminals A-1 and A-2. If a concentric line with a grounded outer conductor is used, connect the inner conductor to terminal A-1 and the outer conductor to terminal A-2, and connect a jumper between terminals A-1 and G. To determine the proper length in feet of the doublet antenna, divide 468 by the frequency of reception in megacycles. After cutting the wire tc the length determined above, cut it in half and insert an insulator at that point. Wrap and solder the two wires of the transmission line to each of the quarter-wave sections at the insulator. Refer to Fig. 7-5. Keep in mind that this type of antenna is directional broadside to its length and should be so orientated if maximum pick-up from a given direction is desired.

d. Audio Output Connections. - The headset jack marked PHONES, located on the front panel, provides output for headset reception. The circuit is such, that the speaker circuit is opened when the headset cord plug is inserted into the PHONE jack. The output of the first audio stage is then capacitively coupled to the PHONE jack.

e. Remote Operation Facilities. - The receiver may be disabled remotely by disconnecting the jumper wire between pins #3 and #4 on the shorting plug (PL-2), which is normally plugged into socket SO-1 during a-c operation, and connecting a remote switch or relay across these pins. The stand-by switch is connected in the "B" lead. When using the remote control disabling switch, the STANDBY/RECEIVE switch on the receiver must be set at STANDBY.

2. PREPARATION FOR USE.

a. A-C Operation. - The receiver may be operated from a 117-volt, 50/60 cycle, (25/60 cycle if universal power transformer is used) single phase a-c source of power. In the event that the receiver has a universal power transformer, check the line voltage and set the line voltage switch, located on top of the transformer, before connecting the receiver to a source of power. If the receiver power transformer is set for a higher line voltage than the source, it will not be damaged when connected to a line of lower voltage, but a receiver set for a lower line voltage will, in most cases, be damaged when plugged into an outlet having a higher line voltage.

b. **D-C Operation.** - The receiver may be operated from a 6-volt d-c source, generally a storage battery, and a 260-volt d-c supply in the form of dry batteries or vibrator type power pack. Consult the chart on power requirements for d-c operation in Section I, and provide battery facilities capable of supplying these demands. The receiver is connected to the d-c supply as follows:

(1) Remove the octal "jumper plug" (PL-2) used for a-c operation from socket SO-1. Use #18 (AWG) wire leads for the 260-volt "B" supply connections to pins #3 and #5, and #12 (AWG) wire leads for the 6-volt "A" battery connections to pins #1, #8 and #7.

> CAUTION - Check your wiring carefully before connecting up to the battery supply.

c. **Pre-Operational Check.** - The following checkup on a newly installed piece of equipment is recommended before turning on the power for the first time.

(1) See that the tubes are securely seated in their sockets. Refer to Fig. 7-1. for the proper location of each tube.

(2) Check the pilot lamps behind the dial escutcheons. See that they are securely in place.

(3) Check all external connections. See that they are secure and make positive contact. Remember that an improvised installation gives improvised results.

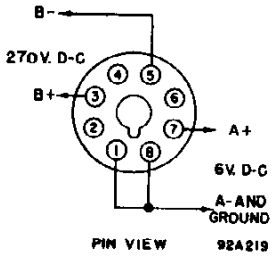


Figure 2-1. Wiring diagram for d-c power plug.

3. ADJUSTMENT.

No preliminary adjustments are required on this equipment to put it into operation since the receiver has been properly alignsd and tested at the factory before shipment.

SECTION III
OPERATION

1. CONTROLS AND THEIR FUNCTION.

Scanning across the front panel from left to right, the control markings and their functions are as follows:

a. **SENSITIVITY control.** - The sensitivity control regulates the sensitivity of the receiver. Turning the control to the right increases the sensitivity of the receiver. Ganged to this control is the "S" meter switch which connects the tuning meter, when one is used, into the circuit when the control is advanced all the way to the right.

b. **BAND SELECTOR.** - The band switch selects one of the four bands or frequency ranges for the operator. The frequencies covered by each band switch position are read directly from the main tuning dial. Each range has aufficient overlap to provide continuous coverage over the total 550 kc. (kilocycle) to 44 mc. (megacycle) range.

c. **VOLUME control.** - The volume control sets the audio level at the speaker or headset. The control is set for a level most pleasing to the operator.

d. **A.V.C switch.** - The automatic volume control switch, when set at "ON", provides a constant audio output level over reasonable variations in signal strength at the antenna. That is, it automatically controls the sensitivity of the receiver when this circuit is in operation. The A.V.C. switch must be set at "ON" to use the tuning meter, when one is used.

e. **MAIN tuning control.** - This control tunes the receiver to the desired frequency of reception. The frequency of reception is read on the main tuning dial located to the left of the control when the BANDSPREAD tuning dial is set at zero. The outer scale on the dial may be used for logging purposes. Refer to the discussion on logging in this section.

f. **AM-CW switch.** - This switch turns on a local oscillator used to produce the beat note necessary for c-w reception.

g. **BANDSPREAD tuning.** - This control is used in conjunction with the MAIN TUNING control explanation of which is included in the discussion on bandspread tuning in this section.

h. **NOISE LIMITER switch.** - The automatic noise limiter cuts in a circuit which clips the noise voltage peaks generated by electrical disturbances, thereby providing intelligible reception in cases where reception would normally be impossible. This feature will not totally remove the noise but will do a good job of limiting it to a reasonable level.

i. **TONE control.** - The tone control, as its name implies, adjusts the tone qualities of the aural signal for either headset or loud speaker and also includes a switch which turns the A-C power ON or OFF. The three types of response available are - LOW, MED, and HIGH. In the A-C OFF position the power to the receiver is disconnected.

(1) **LOW.** - The bass and high frequencies are attenuated to provide a response for voice frequencies only.

(2) **MED.** - The bass and high frequencies are attenuated somewhat less than for the LOW position providing a response for more than the ordinary voice frequencies. This position is preferred for voice communications when the signal to noise ratio will permit.

(3) **HIGH.** - The bass and medium frequencies are attenuated in favor of the higher audio frequencies providing good response for high audio frequency reception.

j. PITCH CONTROL. - The pitch control adjusts the pitch of the c-w signal when receiving c-w signals.

k. STANDBY/RECEIVE switch. - Use this switch for standby purpose when the receiver is to be disabled for short periods of time. This switch disconnects the d-c plate voltage from the receiver and leaves the tube heaters at operating temperature for instant use.

2. OPERATION.

Listed below are the receiver controls and their settings for the two types of reception provided by this receiver, namely, phone and c-w code reception. Refer to Figure 1-1 or the front panel of the receiver.

a. PHONE RECEPTION. - To receive phone signals set the front panel controls as follows:

STANDBY/RECEIVE switch	- Set at RECEIVE. (Set at STANDBY to disable receiver for short standby periods.
BAND SELECTOR switch	- Set at range number corresponding to band covering desired frequency.
AM-CW switch	- Set at AM.
A.V.C. switch	- Set at ON.
NOISE LIMITER switch	- Normally set at OFF.
SENSITIVITY control	- Turn the control all the way clockwise to maximum.
VOLUME control	- Adjust for desired volume at headset or loudspeaker.
PITCH CONTROL	- Not used.
TONE control	- Set to please listener. Set at HIGH for normal reception. Generally set at LOW or MED. when noise level is high.
TUNING control	- Set calibrated dial to frequency of desired signal and adjust for maximum tuning meter deflection (if a tuning meter is used.) Dial frequency calibrations are true only with BANDSPREAD tuning dial set at zero.
BANDSPREAD Tuning control	- Use this control in conjunction with the TUNING control as described in the paragraph on bandspread tuning in this section. This control is used for finer tuning.

b. C-W Code Reception. - To receive continuous wave (c-w) code signals, set the front panel controls as follows:

BAND SELECTOR switch	- Set at range number corresponding to band covering desired frequency.
A.V.C. switch	- Set at OFF.
AM-CW switch	- Set at CW.
NOISE LIMITER switch	- Set at OFF.

TUNING control	- Set calibrated dial at frequency of desired signal. Tune for maximum signal level at headset or loudspeaker. Dial frequency calibrations are true only with the BANDSPREAD tuning dial set at zero.
SENSITIVITY control	- Turn up as high as the signal strength of the code signal will permit. Too much gain will result in distortion of the signal.
TONE control	- Set at LOW or MED.
VOLUME control	- Turn up to full clockwise.
BANDSPREAD tuning control	- Use this control in conjunction with the MAIN tuning control as described in the paragraph in bandspread tuning in this section. This control is used for finer tuning.
PITCH CONTROL	- Set at desired pitch of code signal by turning to the right or left.
STANDBY-RECEIVE	- Set at RECEIVE (Set at STANDBY to disable receiver for short standby periods.

3. STATION LOGGING.

The first frequency range, broadcast, is calibrated in kilocycles (kc) while the three other frequency ranges are calibrated in megacycles (mc). The outer scale on the calibrated dial is used for logging purposes. The logging scale runs from 0 to 100. To record a station in a log it will be necessary only to indicate the frequency range used and the log number read on the calibrated dial. Dial frequency calibration is true only with the BANDSPREAD tuning dial set at zero.

4. BANDSPREAD TUNING.

To use the bandspread dial it is first necessary to select the desired band of reception, set the bandspread dial at zero, and set the calibrated dial at the high frequency end of the range to be covered. Tuning is then accomplished by the BANDSPREAD tuning control.

Example - Assume we wish to listen on the 20 meter amateur band. Set the BAND SELECTOR switch at position #3, the calibrated dial at 14.4 mc. (megacycles), the high end of that band, and the bandspread dial at zero. We can now listen on the 20 meter amateur band by tuning with the BANDSPREAD tuning control. The above example holds true for any frequency range, although the higher the frequency is the range of tuning on the calibrated dial the greater will be the range of tuning on the bandspread dial.

SECTION IV
FUNCTIONING OF PARTS

1. GENERAL.

Figure 4-1. shows, in a very simple block form, the plan of the circuit of the Model S-40 radio receiver. Note that the circuit is that of the conventional superhaterodyne receiver. A signal received at the antenna is fed through an r-f amplifier stage to a combined mixer-oscillator stage where a local signal is generated and mixed with the incoming signal. An intermediate frequency signal selected at the output of the mixer stage is fed through two i-f amplifier stages to a combined detector audio amplifier stage where it is demodulated, amplified and fed through an audio power amplifier stage to a loud speaker. Provision is made for headset reception. A combined a-v-c and a-n-l stage is also included to provide improved reception. A beat frequency oscillator is incorporated for the reception of continuous wave (c-w) signals. Provision is also made for bandspread operation. An external tuning meter may be used with the receiver, provision being made at the rear of the receiver for connections.

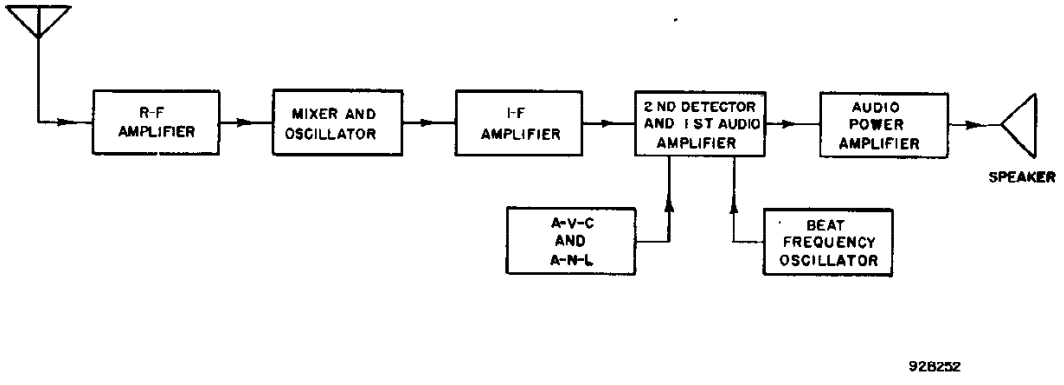


Figure 4-1. Radio Receiver Model S-40, block diagram.

2. DETAILED FUNCTIONING BY STAGES. (Refer to Fig. 7-7.)

Since the circuit functions of bands 1, 2, 3 and 4 are essentially identical, this discussion will describe the circuit with BAND SELECTOR switch (S-1A through S-1F) set at band 4 as shown in the schematic diagram.

a. R.F. Amplifier. - The r-f amplifier stage employs a type 6SG7 pentode tube in a conventional class A amplifier circuit. Signals present at the antenna are fed to the primary of transformer T-1 through terminals A-1 and A-2 of the antenna tarminal strip TS-1. The secondary of transformer T-1 is tuned by the ganged tuning capacitor section C-6A and trimmer C-1. Ganged tuning capacitor section C-7A acts as a bandapread for the secondary of transformer T-1. R-f signals selected by the parallel resonant circuit are applied to the grid of tube V-1 and appear in greater amplitude across the primary of transformer T-5. Resistor R-1 and capacitor C-5 provide decoupling for the a-v-c voltage applied to the control grid. Parasitic resistors R-4 and R-31 prevents unwanted oscillations in this stage and tends to atabilize the amplifier. Resistor R-2, by-passed by capacitor C-8, provides self-bias for the stage. Resistor R-3 (SENSITIVITY control) regulates the bias to the grid. Resiator R-5 and

capacitor C-9 act as a decoupling network for the screen of tube V-1. The signal voltage developed across the primary of transformer T-5 is then coupled to the grid of tube V-2 inductively through transformer T-5 and capacitively through capacitor C-10. Capacitor C-10 provides a small amount of coupling to improve the response at the high frequenoy end of the band, thus equalizing the r-f signal amplitude over the tunable frequency range.

b. **Mixer-Oscillator.** - The mixer-oscillstor stage employs a type 6SA7 converter tube. The tube functions both as oscillator and mixer. The secondary of r-f transformer T-5 is tuned by section C-6B of the ganged tuning capacitor and trimmer C-12. Ganged tuning capacitor section C-7B acts as bsndspread tuning for the secondary of transformer T-5. Ganged tuning capacitor section C-6C, trimmed by capacitor C-19, tunes the secondary of transformer T-9 which is part of the oscillator circuit. Ganged tuning capscitor section C-7C acts as bandspread tuning for the secondary of transformer T-9. A signal generated by the local oscillator, 455 kc. higher in frequency than the received signal on bands #1, #2, #3 and 455 kc. lower in frequency than the received signal on band #4, is mixed electronically in the mixer tube since the oscillator tube elements are included as part of the mixer tube V-2 in the same tube envelope. The frequency of oscillation is determined by a resonant circuit consisting of the secondary of transformer T-9 and section C-6C of the main tuning capacitor and trimmer capacitor C-19 connected in parallel. Section C-7C of the variable ganged bandspread capacitor is connected in psrallel with section 6-6C of the main tuning capacitor for the purpose of effectively spreading or broadening the frequency range. Capacitor C-26 is an additional fixed trimmer across the resonant cireuit. Capacitor C-18 provides increased gain for the oscillator on this band. Variable capacitors C-23, C-24, and C-25 are padders for bands #3, #2, and #1 respectively. Resistor R-7 is a grid return for the oscillator grid in tube V-2. Capacitor C-16 is the oscillator grid coupling capacitor while capacitor C-17 provides coupling and d-c blocking for the oscillator plate circuit. Resistor R-30 suppresses parasitic oscillstions. Plate voltage for the screen grid of tube V-2, which also acts as oscillator plate, is applied through resistor R-8. The difference frequency of the oscillator and incoming signal frequencies is applied to the first i-f transformer T-13 primary which is tuned by capacitor C-29. Capacitor C-29 is a by-pass for the mixer plate.

c. **First and 2nd I-F Amplifier.** - The first and 2nd i-f amplifier stages employ type 6SK7 pentode tubes. I-f amplifier coupling transformer T-13, T-14, and T-15 for these two stages are tuned to 455 kc by adjusting the trimmer capacitors across each transformer primary and secondary. The gain of the 1st and 2nd i-f amplifier stages is varied by the SENSITIVITY control (R-3), connected in series with the cathodes of both tubes, to provide sensitivity control for the receiver. The a-v-c grid voltage is spplied to this section of the receiver through resistor R-12 when A.V.C. switch S-2 is at OFFor in the opan position. C-31 is sn a-v-c by-pass for the control grid of 1st i-f smplifier tube V-3. Resistor R-9, by-passed by capacitor C-32, provides fixed bias for tube V-3. Resistor R-11 by-passed by capacitor C-35 provides fixed bias for 2ud i-f amplifier tube V-4. Capacitor C-39 is a plate by-pass for tube V-4. The signal voltage developed across the transformer T-15 primary is fed inductively to the 2nd detector.

d. **2nd Detector and 1st Audio.** - Both the second detector and first audio smplifier stages employ a single type 6SQ7 duo diode-triode. The diode section of tube V-5 serves as a detector by rectifying the modulated carrier. The r-f filter for this type of detection consists of resistor R-14 and capacitors C-41 and C-42 connected in a pi-section. Automatic volume control and sudio frequency voltage is obtained from a voltage divider consisting of resistors R-19, R-17 and R-15. Capacitor C-43 couples the 2nd detector to the VOLUME control, resistor (R-20). Resistor R-16 is bias for the first andio stage, part of tube V-5. Resistor R-22 is the plate load for the triode part of tube V-5. Capacitor C-44 acts as r-f filter at the plate. The audio frequency voltage is then fed throngh coupling capacitor C-45 to the grid of the output audio amplifier tube V-6.

e. **Power Audio Amplifier.** - The power audio amplifier stage is a class A amplifier employing a type 6F6-G pentode. Resistor R-23 is a grid return for the control grid of tube V-6. Resistor R-24, by-passed by cspacitor C-46, supplies bias to the control grid. Resistor R-25 and capacitors C-47 and C-48 serve as a tone control circuit. Capacitor C-49 serves as by-pass for the screen grid. The audio signal is then fed

through socket SO-3 and plug PL-3 to the primary of output transformer T-16 whence it is coupled inductively to the secondary and fed to the speaker LS-1 voice coil. An audio frequency signal is also fed from the grid of tube V-6 to PHONE jack J-1. Voltage is fed to the plate of tube V-6 through the primary of transformer T-16.

f. A.V.C. and NOISE LIMITER. - Both the automatic volume control and automatic noise limiter stages employ a single type 6H6 duo-diode. One diode of tube V-7 serves as the automatic volume control rectifier. The remaining diode section of tube V-7 serves as an automatic limiter as follows: Capacitor C-40 becomes charged by the rectified carrier voltage and the time constant of this capacitor and filter network associated with it is such that the audio frequency voltage variations do not alter this charge. During a severe noise pulse, however, the cathode of the diode plate connected to capacitor C-40 becomes more negatively charged than the charge held by capacitor C-40 until the cathode voltage of the a-n-l diode again reaches a less negative potential than its plate and capacitor C-40 acquires its normal charge. By shorting the andio voltage to ground during a noise pulse, the a-n-l circuit prevents the objectionable noise pulses from reaching the audio amplifier stages.

g. Beat Frequency Oscillator. - The beat frequency oscillator employs a type 6J5 triode tube in a tuned-grid, untuned plate oscillator circuit. The oscillator frequency is adjusted by a moveable powdered iron core in the field of transformer T-17. This iron core adjustment sets the oscillator frequency at 455 ke. and is adjusted by a screw driver during alignment. The fine adjustment of the oscillator frequency required to provide control of the beat note frequency is controlled by a knob (PITCH CONTROL) from the front panel. The AM-CW switch controls the use of the oscillator by opening or closing the plate voltage lead to the tube. Resistor R-28 provides a load for the plate of tube V-8. Resistor R-29 is the oscillator tube V-8 grid return while capacitor C-55 provides grid coupling from the oscillator tank circuit. Capacitor C-54, across part of transformer T-17, resonates the tank circuit. Capacitor C-53 forms part of a series impedance circuit with part of transformer T-17. The heat frequency signal is coupled to the 2nd detector through capacitor C-38.

h. Power Supply. - The receiver has provisions for operation from either an a-c or d-c source.

(1) A-C Operation. - The receiver's power supply provides for operation from a 117-volt source. The a-c current is fed to the primary of power transformer T-18 through the line cord. A type 80 (tube V-9) full wave rectifier is employed in a conventional full wave rectifier circuit. The high voltage from this rectifier is fed to a filter network through the "Shorting Plug" on the rear apron of the receiver chassis as is the filament current for the heaters of the tubes. The STANDBY/RECEIVE switch is connected in series with the transformer T-18 center tap lead to ground (chassis), thereby disabling the receiver but at the same time keeping the tube heaters hot and ready for instant use. The filter circuit consists of a pi network made up of the speaker field coil and capacitors C-50 and C-51. Resistors R-26 and R-27 are part of a voltage divider and capacitor C-52 is a by-pass.

(2) D-C Operation. - External 6-volt storage battery and 260-volts of "B" batteries or storage battery and vibrator type supply provide for d-c operation. When operating from an external d-c supply the "Shorting Plug" on the rear apron of the receiver chassis is removed and a similar plug is wired to supply filament and plate current to the receiver circuits. The "B" voltage is fed to the input side of the filter sections used for a-c operation thereby insuring adequate filtering for vibrator type power supplies.

i. Tuning Meter. - The tuning meter "S METER" is not supplied with the receiver, but can be purchased on request from the company. Provision has been made on the rear apron of the receiver for the external connection of the "S" meter. A five prong plug is wired to the meter as indicated in figure 4-2 and should be plugged into socket SO-2. When metering reception, the meter measures a voltage drop across resistor R-27 e.i. a change in screen current of first and second i-f amplifier tubes V-4 and V-3.

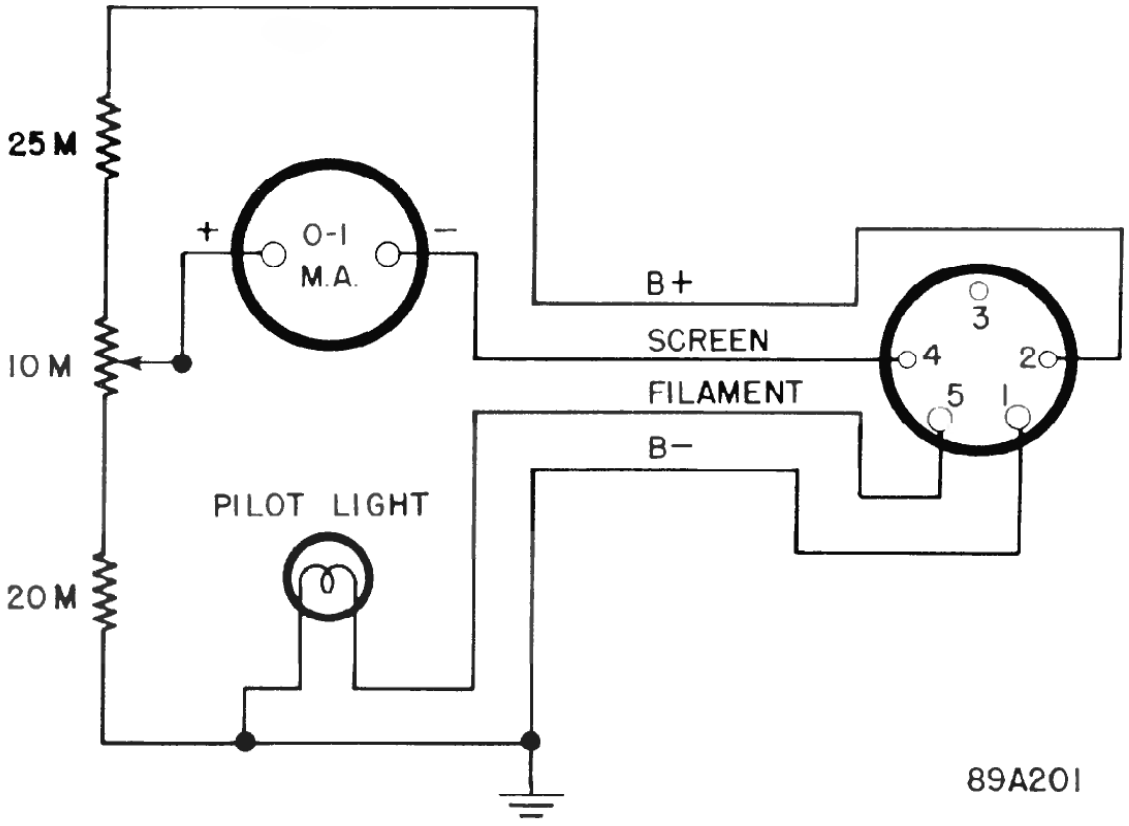


Figure 4-2. Tuning meter SM-40 and schematic wiring diagram.

The meter is mounted in an attractive case to match the receiver cabinet. A zero adjust control is mounted at the front of the case for meter zero adjustment. Installation and adjustment instructions are supplied with the meter.

SECTION V
MAINTENANCE

CAUTION. - Voltages at various points in this equipment are of sufficiently high potential to produce a severe shock. Locate the high - potential points on the VOLTAGE CHART before attempting to service circuits that are "hot". IT IS A GOOD RULE TO DISCONNECT THE POWER SOURCE BEFOHE MAKING ADJUSTMENTS WHEN POSSIBLE. BE CAREFUL.

1. PREVENTIVE MAINTENANCE.

All components of the receiver should be given a thorough inspection at regular intervals. The time interval between inspections will be determined by the operating conditions of the individual installation. In general, keep the components clean and dry. Moisture, even in a completely tropicalized set may cause serious deterioration and produce general unsatisfactory operation. Dust and dirt materially effect both electrical and mechanical operation. Keep the various parts clean, especially the tuning capacitors. Dust should be blown out with dry air or brushed out carefully without bending the gang plates in the slightest. Noisey reception may also be caused by dirty condenser wipers, faulty gain controls and switches, frayed cable connections, faulty tubes, etc. in the installation. Check accessible connections, switch contacts, etc. regularly, making sure that all are clean and tight and the tubes and cable connectors are held securely in their sockets.

2. REPLACING TUBES, LAMPS, and FUSES.

a. Replacing Tubes. - All tubes are accessible at the top of the chassis through the hinged cover of the cabinet. When replacing tubes, check the tube type carefully and replace with the correct type. Refer to the top view of the chassis to determine the location of the tubes and to the PARTS LIST for the type number and description of each.

b. Replacing Lamps. - The receiver employes two lamps with bayonet type sockets to illuminate the calibrated tuning dial and the bandspread tuning dial. The lamps are to be replaced with a 6/8-volt, 250 ma. (blue bead) G.E. #44 or equivalent. The color code referred to, is the color of the glass head above the glass stem inside the envelope of the lamps.

3. PERIODIC ADJUSTMENTS.

a. Receiver Alignment. - The receiver has been carefully aligned at the factory and should not require realignment until the receiver requires new tubes in the r-f and i-f amplifier stages, or shows signs of loss of sensitivity, off frequency calibration or requires service work on one or more of its r-f and i-f amplifier stages. Alignment should not be attempted by inexperienced persons as maximum performance is obtained only by careful and intelligent alignment.

(1) Aligning Tools. -

(a) Signal generator capable of providing a 400 cycle modulated signal at 455 kc, and 550 kc. to 44 mc. range.

(b) A 390 ± 20% ohm non-inductive carbon dummy antenna resistor.

(c) Non-metallic screw driver. A bakelite screw driver with a short metal blade is very good.

(d) Audio output meter capable of handling 1.5 watts of audio power for speaker load.

(2) I-F Amplifier Alignment. - (See Fig. 5-1)

(a) Connect the "hot" lead of the generator directly to the stator plates of the center section of the main tuning capacitor gang (the solder lug on top of that section). Connect the ground wire of the generator to the receiver chassis. Set main tuning capacitor at minimum capacity (open).

(b) Connect the output meter across the speaker voice coil and set the meter range switch for its highest range to prevent overloading the meter accidentally.

(c) Let the receiver warm up for approximately ten minutes, then set the receiver controls as follows:

SENSITIVITY control at maximum sensitivity (full clockwise).
VOLUME control at maximum volume (full clockwise).
A.V.C. switch at OFF.
NOISE LIMITER switch at OFF.
CW-AM switch at AM.
TONE control at HIGH.
STANDBY/RECEIVE switch at RECEIVE.

(d) Set the signal generator frequency at 455 kc, and turn on the 400-cycle modulation.

(e) Adjust transformers T-13, T-14, and T-15 for maximum output meter reading using just enough signal generator output to provide a good resonant swing on the output meter. The signal level at the generator should be approximately 52 microvolts for a 500 milliwatt audio output level. Repeat the alignment procedure until assured of accurate alignment. Refer to figure 5-1 for the location of i-f transformer adjustment screws #1 through #3 inclusive on transformers T-13, T-14, and T-15.

(3) Beat Frequency Oscillator Adjustment. -

Connect signal generator as in paragraph (2). Turn 400-cycle modulation off. Remove PITCH CONTROL knob with an Allen wrench and adjust the slotted screw shaft for zero feet. Replace knob so that red mark is on top.

(4) R-F Amplifier Alignment. -

†See note at end of this section.

(a) Connect the "hot" lead of the signal generator to terminal "A1" of the antenna terminal board through a 390 ± 20% ohm non-inductive carbon resistor. Connect the ground lead of the generator to the receiver chassis. Leave the jumper connected between terminals "A2" and "GND". Turn on the 400-cycle modulation.

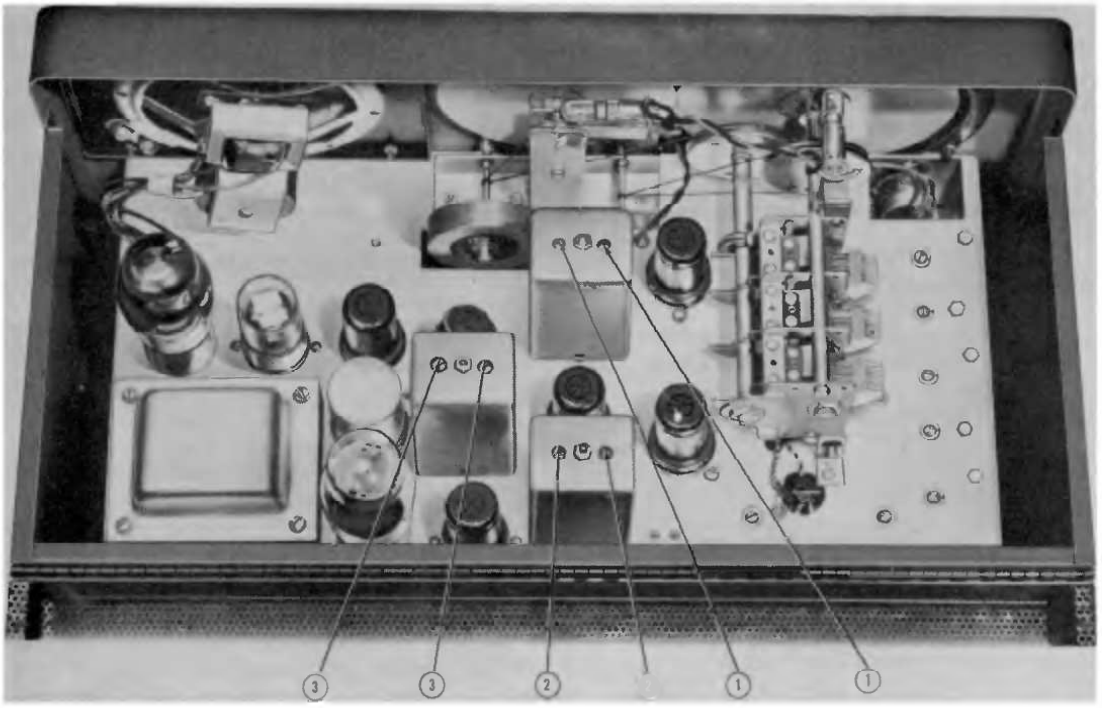
(b) Let the receiver warm up for approximately ten minutes, then set the receiver controls as follows:

SENSITIVITY control at maximum sensitivity (full clockwise).
VOLUME control at maximum volume (full clockwise).
A.V.C. switch at OFF.
NOISE LIMITER switch at OFF.
CW-AM switch at AM.
TONE control at HIGH.
STANDBY/RECEIVE switch at RECEIVE.

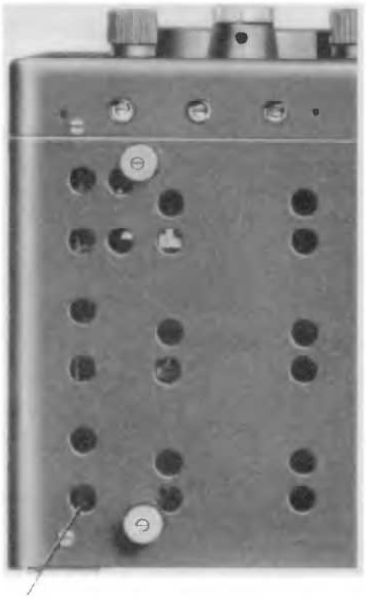
NOTE - For all alignment adjustments, the signal generator output attenuator must be adjusted to provide a 500 milliwatt audio signal output at the speaker socket of the receiver on the output meter.

NOTE - Refer to figure 5-1 for all r-f alignment points.

(c) Band 4. Alignment. -



① I-F Adjustments for 1st I-F Transformer T-13
② I-F Adjustments for 2nd I-F Transformer T-14
③ I-F Adjustments for 3rd I-F Transformer T-15



R-F and oscillator adjustment holes

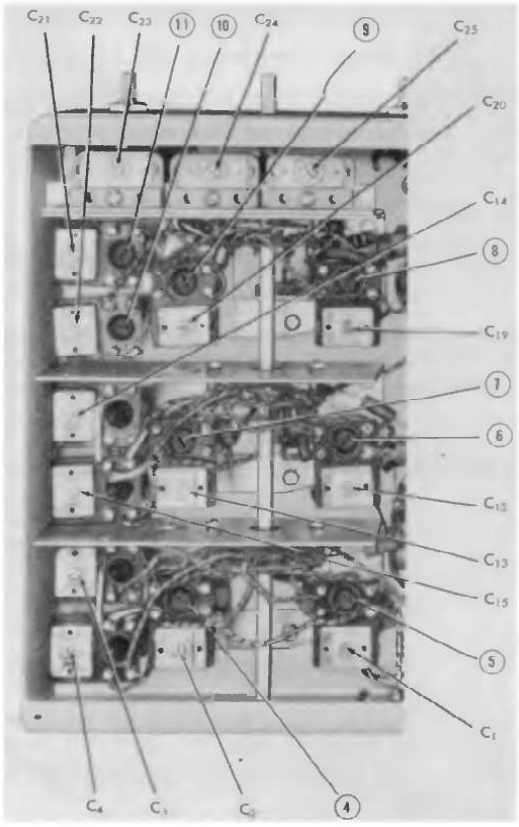


Figure 5-1. Radio Receiver Model S-40, view showing aligning points.

(1) Set the signal generator at 36 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 36 mc. no adjustment is necessary - if not, adjust oscillator trimmer capacitor C-19 for maximum output with the receiver dial set at 36 mc.

(2) Set the signal generator at 18 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 18 mc. no adjustment is necessary - if not, adjust slug #8 on transformer T-9 for maximum output with the receiver dial set at 18 mc.

NOTE - If slug #8 has been adjusted it will be necessary to repeat step (1) again. Several adjustments of capacitor C-19 in step (1) and slug #8 in step (2) may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(3) Set signal generator and receiver at 36 mc. and adjust trimmers C-1 and C-12 for maximum output.

(4) Set signal generator and receiver at 18 mc. and adjust slugs #5 and #6 for maximum output.

NOTE - If slugs #5 and #6 have been adjusted, it will be necessary to repeat step (3) again. Several adjustments of capacitors C-1 and C-12 and slugs #5 and #6 may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(d) Band 3. Alignment. -

(1) Set the signal generator at 14 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 14 mc. no adjustment is necessary - if not, adjust oscillator trimmer capacitor C-20 for maximum output with the receiver dial set at 14 mc.

(2) Set the signal generator at 7 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 7 mc. no adjustment is necessary - if not, adjust oscillator padder capacitor C-23 for maximum output with the receiver dial set at 7 mc.

NOTE - If capacitor C-20 has been adjusted it will be necessary to repeat step (1) again. Several adjustments of capacitor C-20 in step (1) and capacitor C-23 in step (2) may be required in casea where the transformer has been greatly detuned or a new transformer has been installed.

(3) Set the signal generator at 10 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 10 mc. no adjustment is necessary - if not, adjust slug #9 on transformer T-10 for maximum output with the receiver dial set at 10 mc.

(4). If slug #9 has been adjusted, repeat stepa (1) and (2).

(5) Set the signal generator and receiver at 14 mc. and adjust trimmers C-2 and C-13 for maximum output.

(6) Set signal generator and receiver at 7 mc. and adjust slugs #4 and #7 for maximum output.

NOTE - If slugs #4 and #7 have been adjusted, it will be necessary to repeat step (3) again. Several adjustments of capacitors C-2 and C-13 and slugs #4 and #7 may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(e) Band 2. Alignment. -

(1) Set the signal generator at 5 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 5 mc. no adjustment is necessary - if not, adjust oscillator trimmer capacitor C-21 for maximum output.

(2) Set the signal generator at 1.8 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 1.8 mc. no adjustment is necessary - if not, adjust oscillator padder capacitor C-24 for maximum output with the receiver dial set at 1.8 mc.

NOTE - If capacitor C-21 has been adjusted it will be necessary to repeat step (1) again. Several adjustments of capacitor C-21 in step (1) and capacitor C-24 in step (2) may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(3) Set the signal generator at 3 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 3 mc. no adjustment is necessary - if not, adjust slug #11 on transformer T-11 for maximum output with the receiver dial set at 3 mc.

(4) If slug #11 has been adjusted repeat steps (1) and (2).

(5) Set the signal generator and receiver at 5 mc. and adjust trimmers C-3 and C-14 for maximum output.

(f) Band 1. Alignment. -

(1) Set the signal generator at 1500 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 1500 kc. no adjustment is necessary - if not, adjust oscillator trimmer capacitor C-22 for maximum output with the receiver dial set at 1500 kc.

(2) Set the signal generator at 600 kc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 600 kc. no adjustment is necessary - if not, adjust oscillator padder capacitor C-25 for maximum output with the receiver dial set at 600 kc.

NOTE - If capacitor C-22 has been adjusted it will be necessary to repeat step (1) again. Several adjustments of capacitor C-22 in step (1) and capacitor C-25 in atep (2) may be required in caaes where the transformer has been greatly detuned or a new transformer has been installed.

(3) Set the aignal generator and receiver at 1000 kc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 1000 kc. no adjustment is necessary - if not, adjust slug #10 on transformer T-12 for maximum output with the receiver dial set at 1000 kc.

(4) If slug #10 has been adjusted repeat steps (1) and (2).

(5) Set the signal generator and receiver at 1500 kc. and adjust trimmers C-4 and C-15 for maximum output.

NOTE - After completing the above r-f alignment procedure check the image frequency to determine whether the oscillator frequency is higher than the signal frequency on bands 1, 2 and 3, and lower than the signal frequency on band 4.

(g) When completely aligned the overall receiver sensitivity will usually run from 7.2 microvolts at 600 kc. to 5 microvolts at 36 mc. for 500 milliwatts audio output. If your receiver falls reasonably close to this sensitivity, consider your job finished.

4. LOCATING FAULTS WITH A VOLT-OHM METER.

a. Voltage Chart. - Refer to Fig. 5-2 for the tube socket terminal voltages. Voltages shown are those between the terminal and ground (chassis) unless otherwise specified. To identify the tube socket connections, refer to Fig. 7-6. The readings were taken with a Weston Model 772 Analyzer using 20,000 ohm per volt sensitivity. To prepare the receiver for measurement, disconnect the antenna, connect a jumper between the antenna terminals A1, A2, and G, and set the controls as follows:

STANDBY/RECEIVE switch at RECEIVE.
A.V.C., NOISE LIMITER at ON and AM-CW switch at CW.
SENSITIVITY and VOLUME controls full clockwise.
TUNING, and PITCH CONTROL adjustments do not effect the reading.
TONE control at any one of the three tone positions.

b. Resistance Chart. - Refer to Fig. 5-3. for the tube socket terminal to ground (chassis) resistance measurements. To identify tube socket connections, refer to Fig. 7-6. The readings were taken with a Weston Model 772 Analyzer. To prepare the receiver for measurement, disconnect the a-c line cord and set the controls as follows:

STANDBY/RECEIVE switch at RECEIVE.
A.V.C., NOISE LIMITER at ON and AM-CW switch at CW.
SENSITIVITY and VOLUME controls full clockwise position.
TONE control at any one of the three tone positions.
TUNING and PITCH control adjustments do not effect the readings.

c. Checking Transformer and Inductor Windings With an Ohm-meter. -

NOTE - One terminal of each winding measured must be disconnected from the circuit to avoid measuring circuit resistance instead of winding resistance alone as indicated in the chart.

Circuit Symbol	Name of Part	Winding	Winding Terminals	D-C Resistance (Ohms)
T-16	TRANSFORMER, audio	Primary	Primary	400
		Secondary	Secondary	* 5
SPKR FIELD	Speaker field	-	-	1500
T-18	TRANSFORMER, power	Primary	1 to 3	.6
		H.V. secondary	6 to 10	280
		½ H.V. secondary	6 to 8	140
			8 to 10	140
		6.3-volt secondary	2 to 4	ZERO
		5.0-volt secondary	7 to 9	ZERO

* With speaker plug in socket.

†Note Rock main tuning gang capacitor when making r-f adjustments on bands 3 and 4.

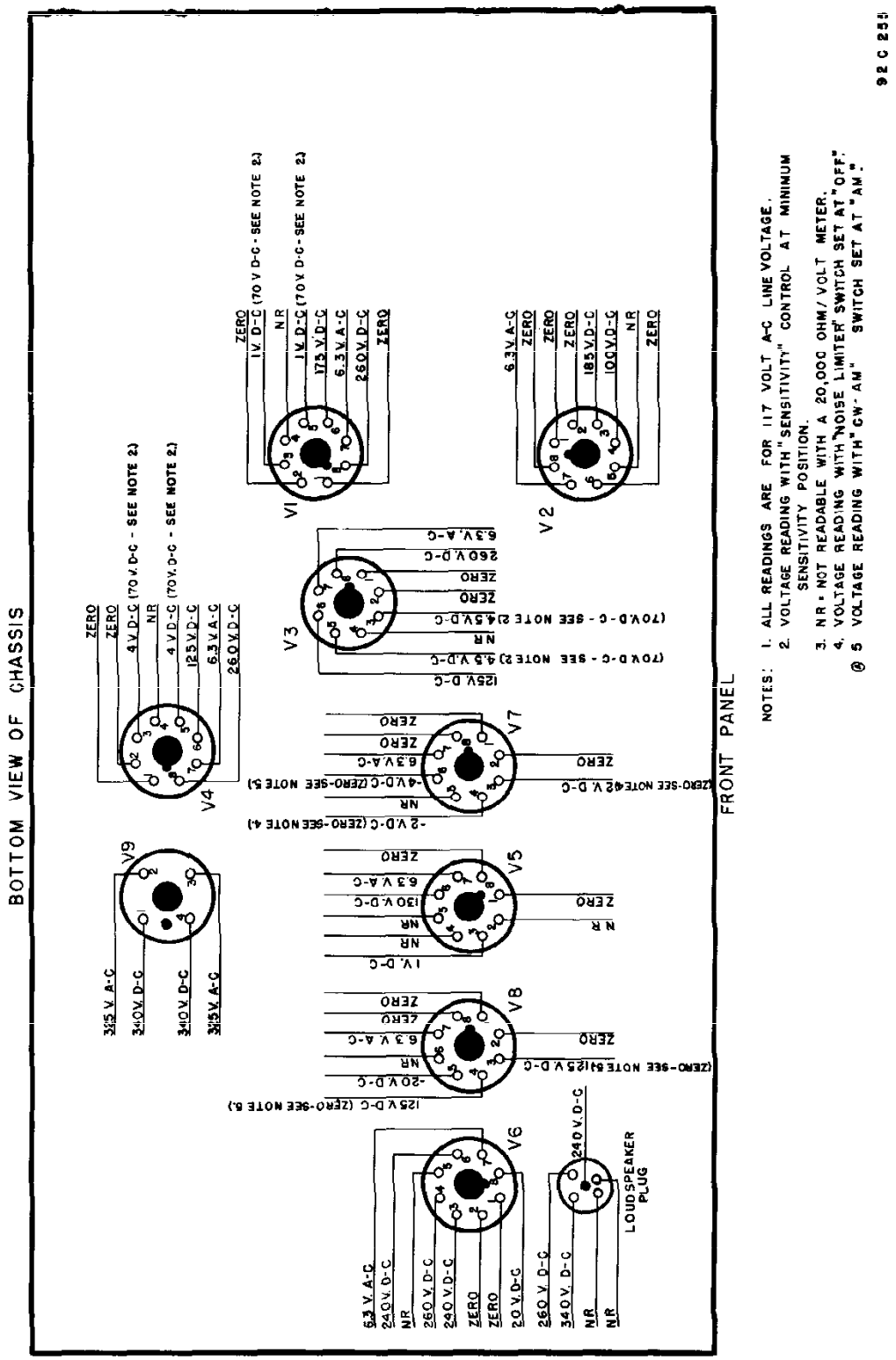


Figure 5-2. Radio Receiver Model S-40, voltage chart.

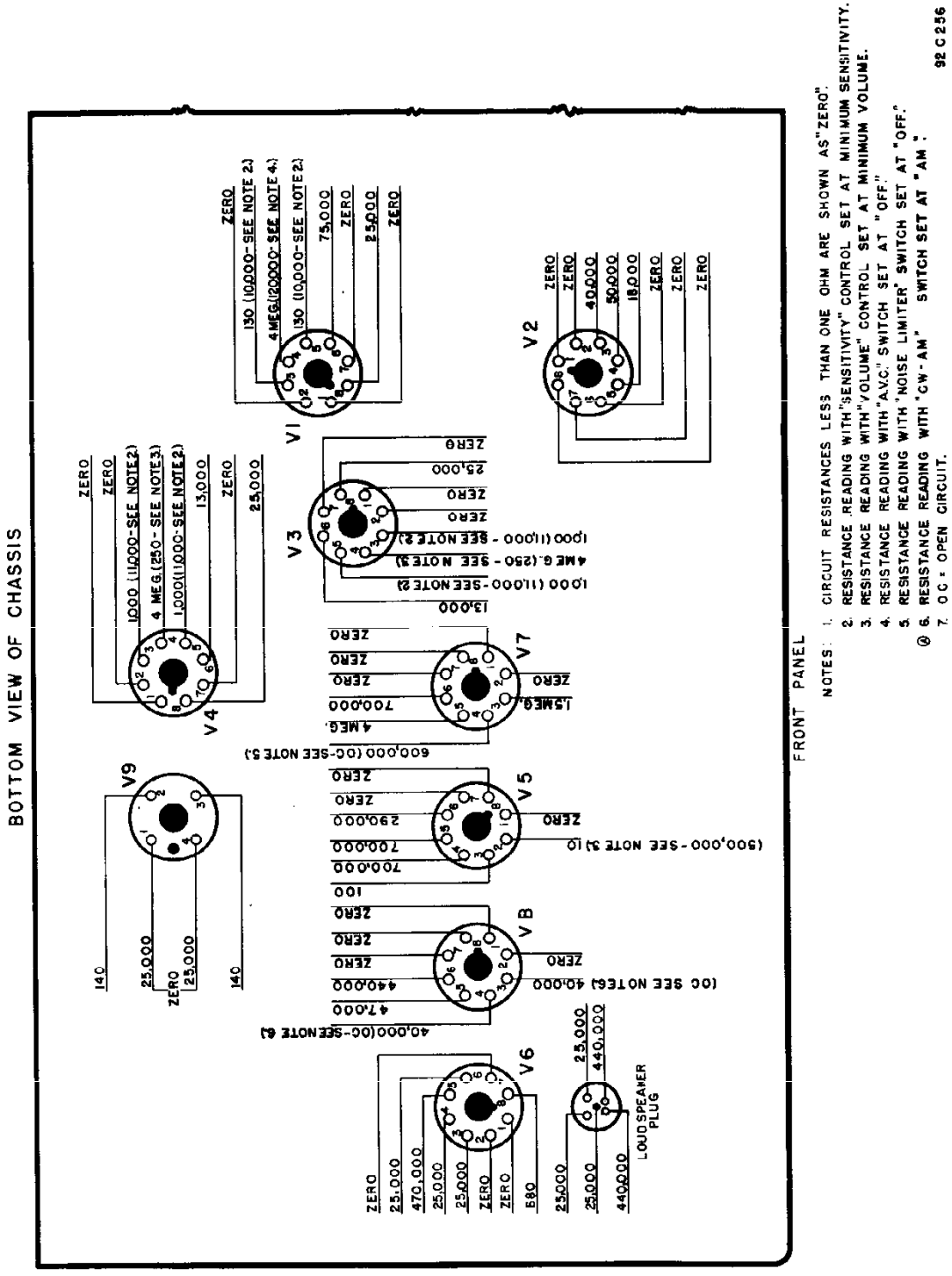


Figure 5-3. Radio Receiver Model S-40, resistance chart.

SECTION VI
SUPPLEMENTARY DATA

1. FREQUENCY RANGE.

550 kc. - 44 mc. (covered in four bands.)

2. POWER INPUT.

a. A-C Operation. -

Line voltage - 117 V.
Line current - 0.76 amp. at 117 V.

b. D-C Operation. -

Storage battery voltage - 6 V.
*Storage battery current drain - 5 amps. (Filament current only)
"B" battery or vibrator supply voltage - 270 V.
"B" battery or vibrator supply current drain - 70 ma.

*NOTE - When a vibrator supply operates from the storage battery the drain will run about 10 amperes.

3. AUDIO POWER OUTPUT.

Speaker operation - 1 watt with less than 10% distortion.

4. SENSITIVITY.

At 600 kc. - 22 microvolts (For 500 milliwatt audio output).
At 36 mc. - 5 microvolts (For 500 milliwatt audio output).
(Signal generator modulator 30% at 400 cycles.)

5. IMAGE RATIO.

Image ratio exceeds 6:1 at 30 mc.; 15:1 at 14 mc; 37:1 at 5 mc; and 1000:1 at 1500 kc.

6. SELECTIVITY.

I-F selectivity measured at the grid of the mixer tube is not less than 8.5 kc. at 2 times down nor more than 33.7 kc. at 1000 times down.

7. OVERALL WEIGHT.

Net 28 pounds.

8. OVERALL DIMENSIONS.

Height 9 x width 18-1/8 x depth 11 (inches)

NOTE - Allow additional height of 8¼ inches to clear hinged cabinet top section.

9. TUBE COMPLEMENT.

Symbol	Tube Type	Function
V-1	6SG7	R-F amplifier
V-2	6SA7	Mixer and local oscillator.
V-3	6SK7	1st i-f amplifier
V-4	6SK7	2nd i-f amplifier
V-5	6SQ7	Detector, 1st audio amplifier
V-6	6F6-G	Audio power amplifier
V-7	6H6	A-V-C and noise limiter
V-8	6J5	Beat frequency oscillator
V-9	80	Rectifier

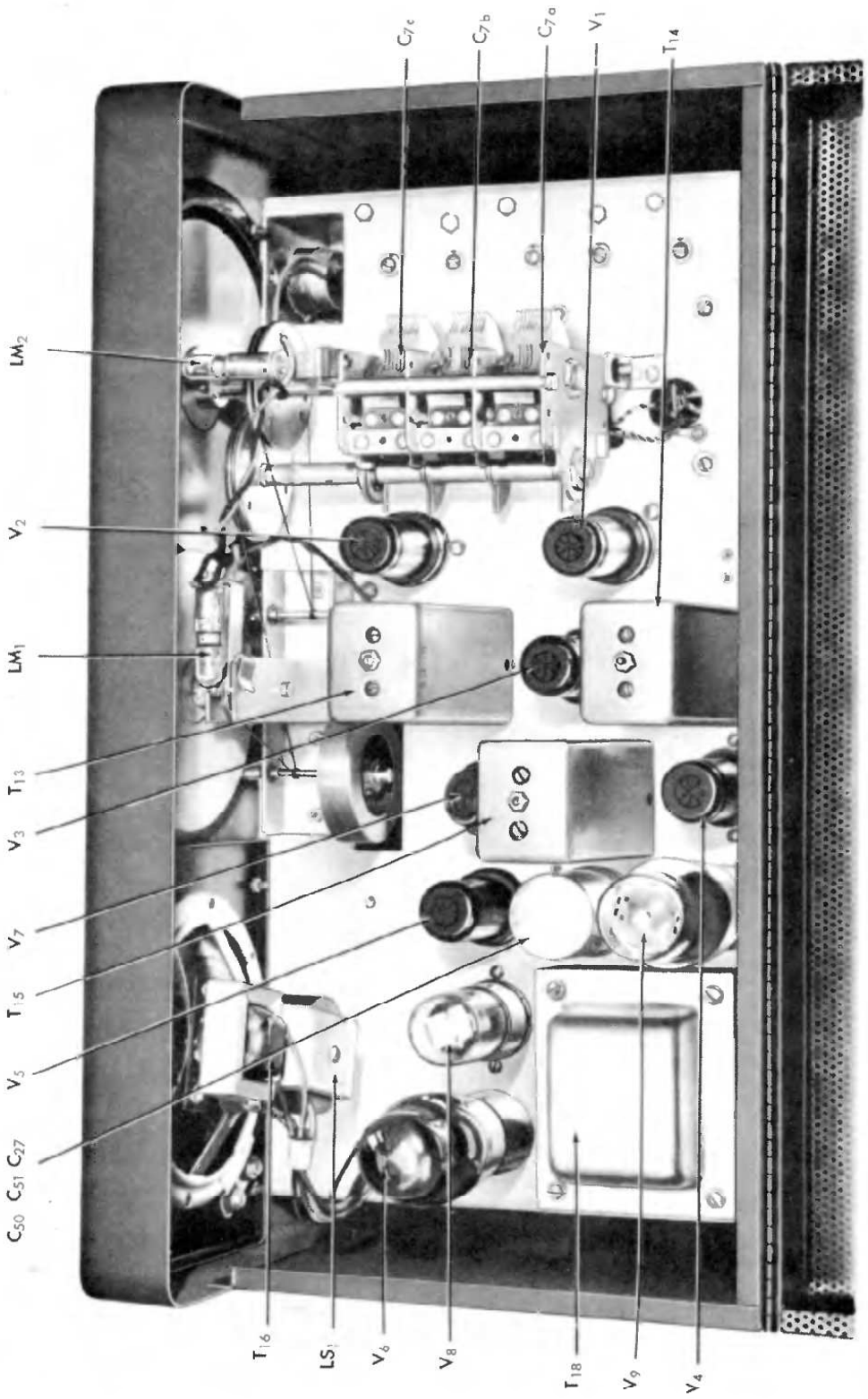


Figure 7-1. Radio Receiver Model S-40, top view.

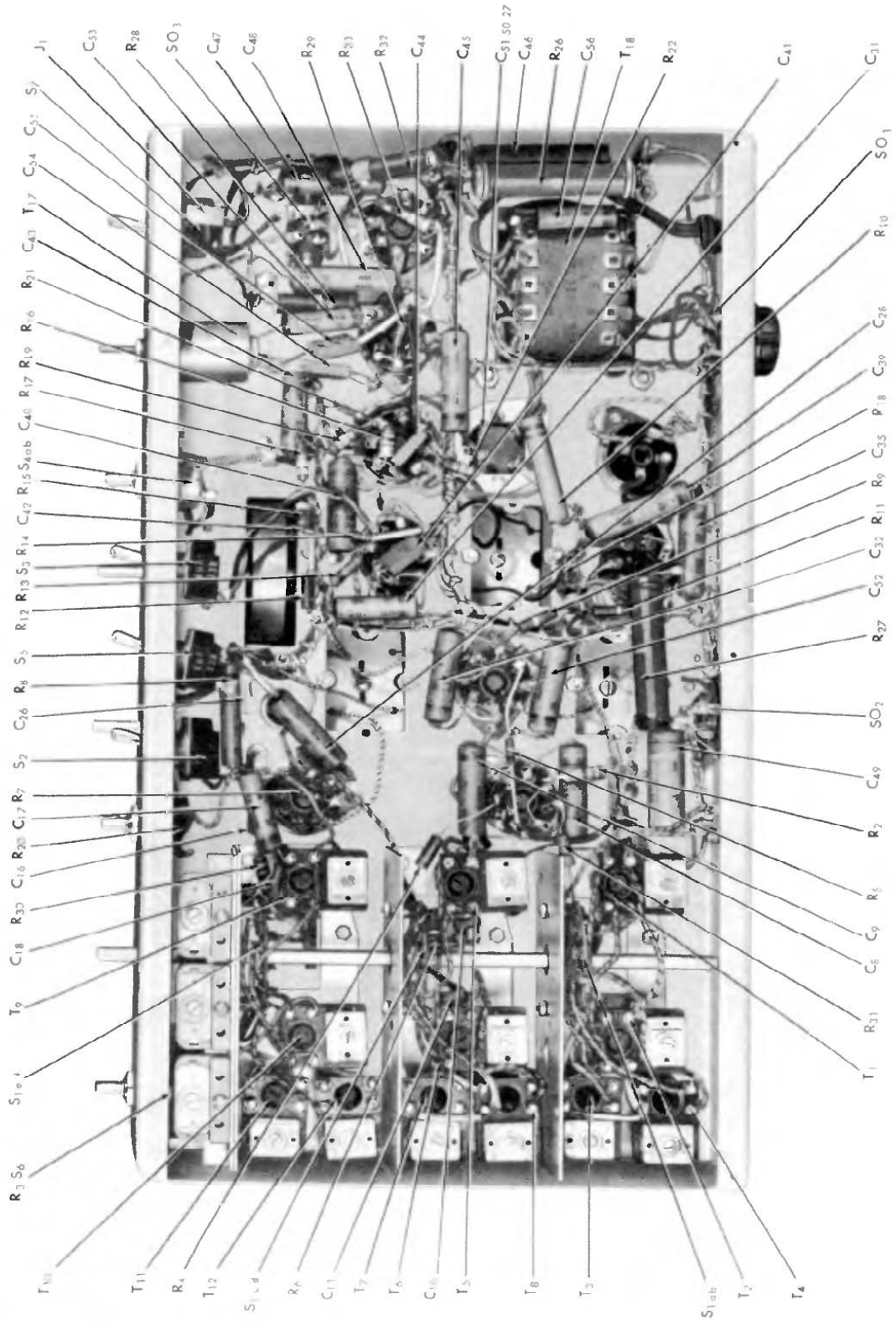


Figure 7-2. Radio Receiver Model S-40, bottom view.

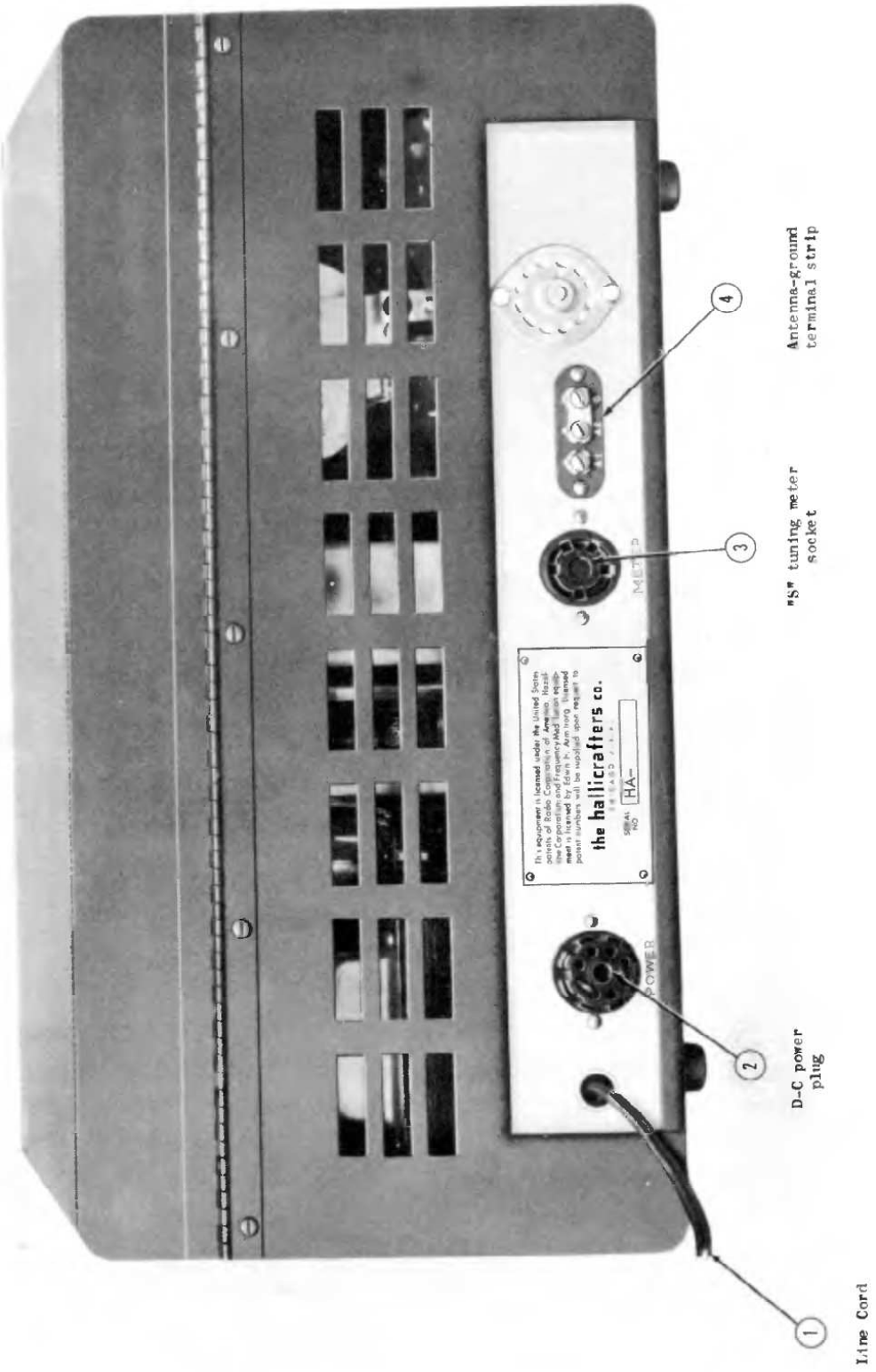


Figure 7-3. Radio Receiver Model S-40, rear view.

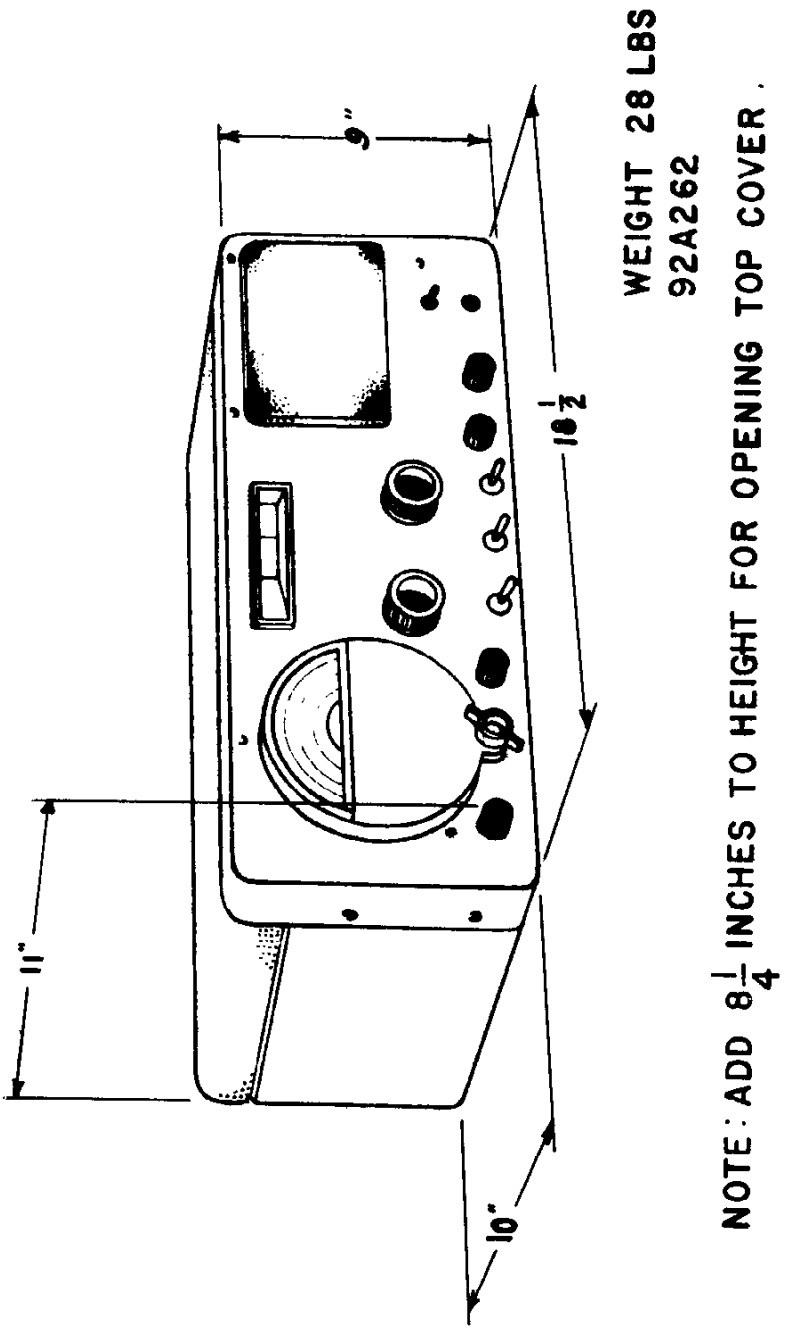


Figure 7-4. Radio Receiver Model S-40, outline dimensions.

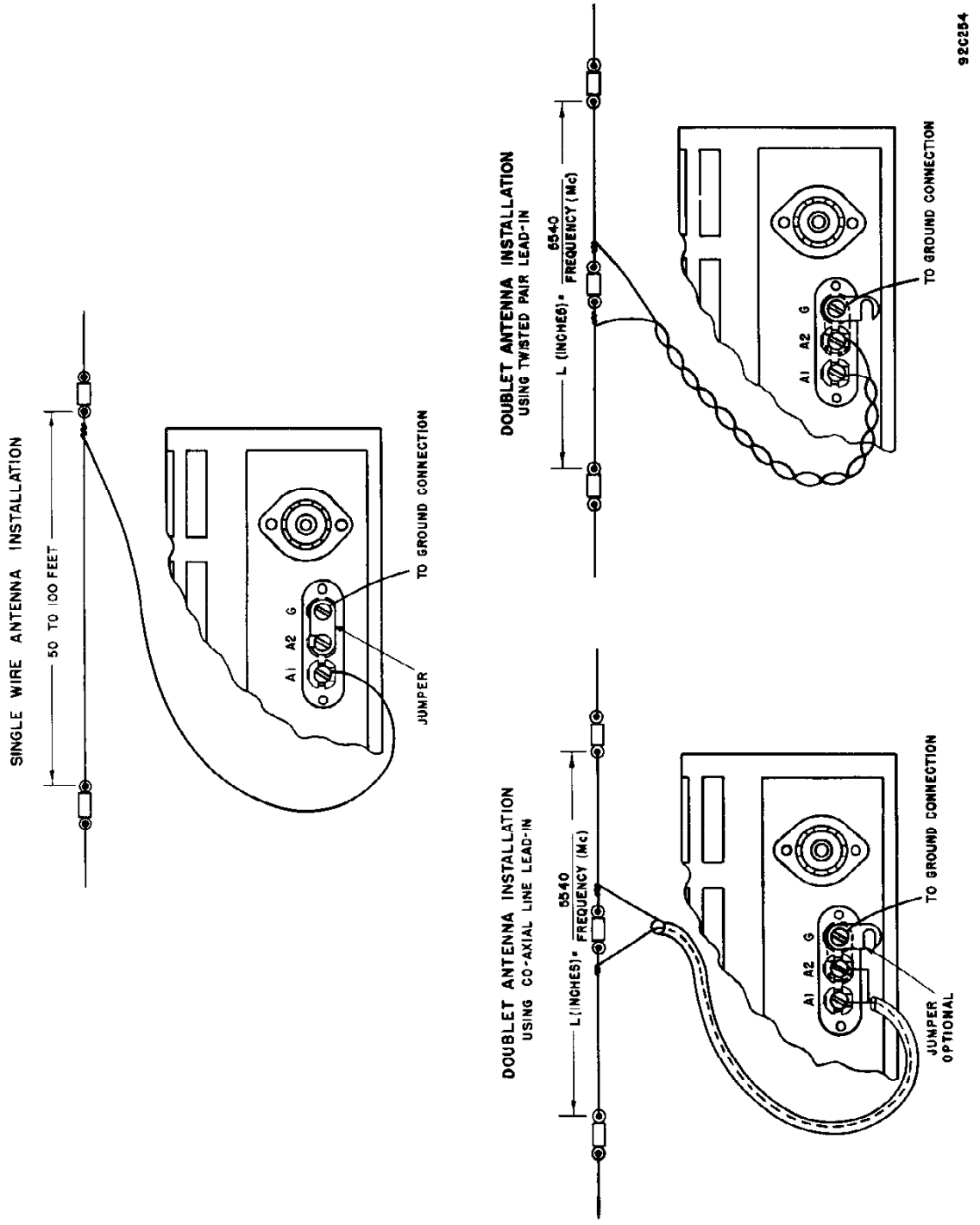


Figure 7-5. Radio Receiver Model S-40, recommended antenna installations.

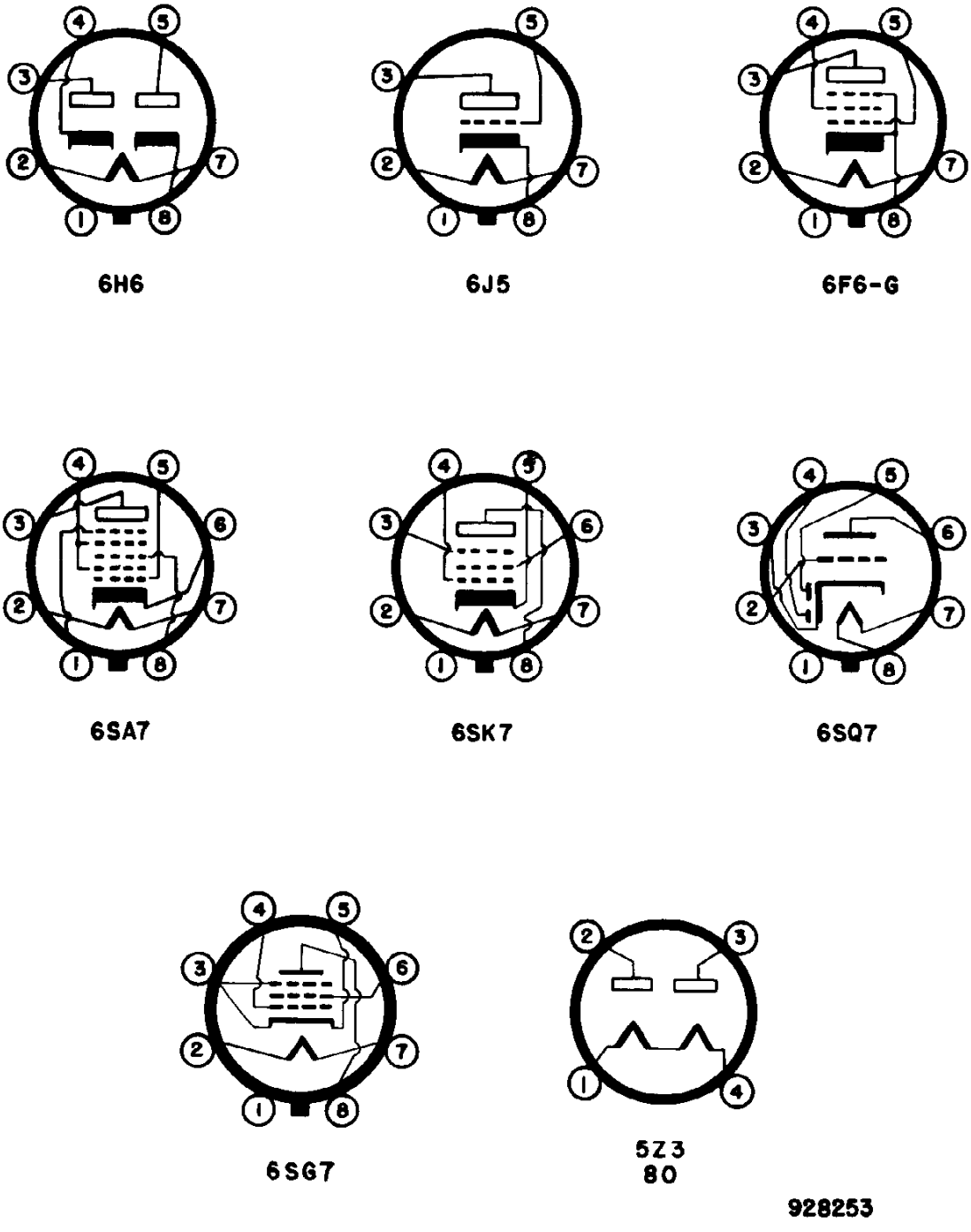
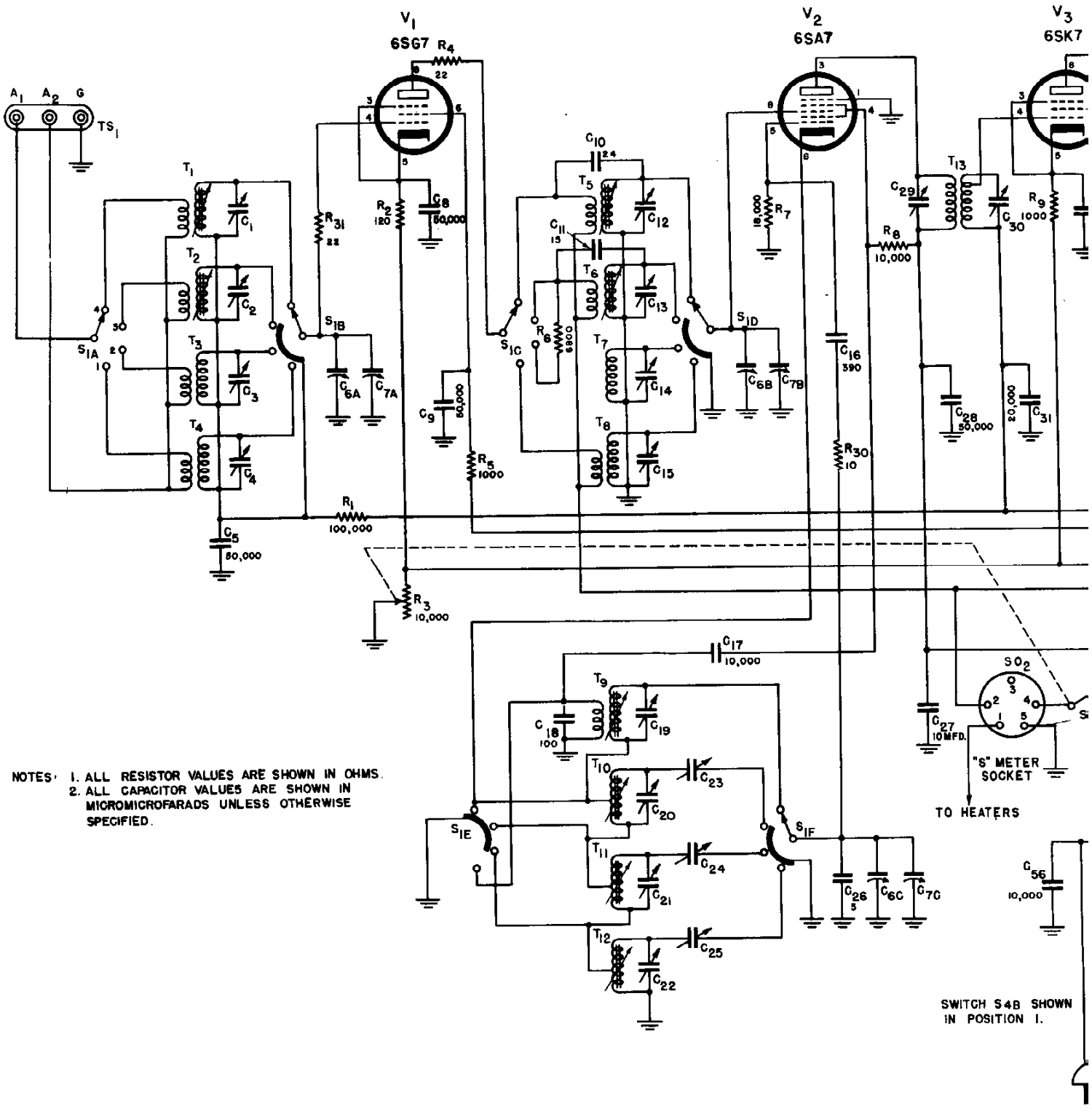
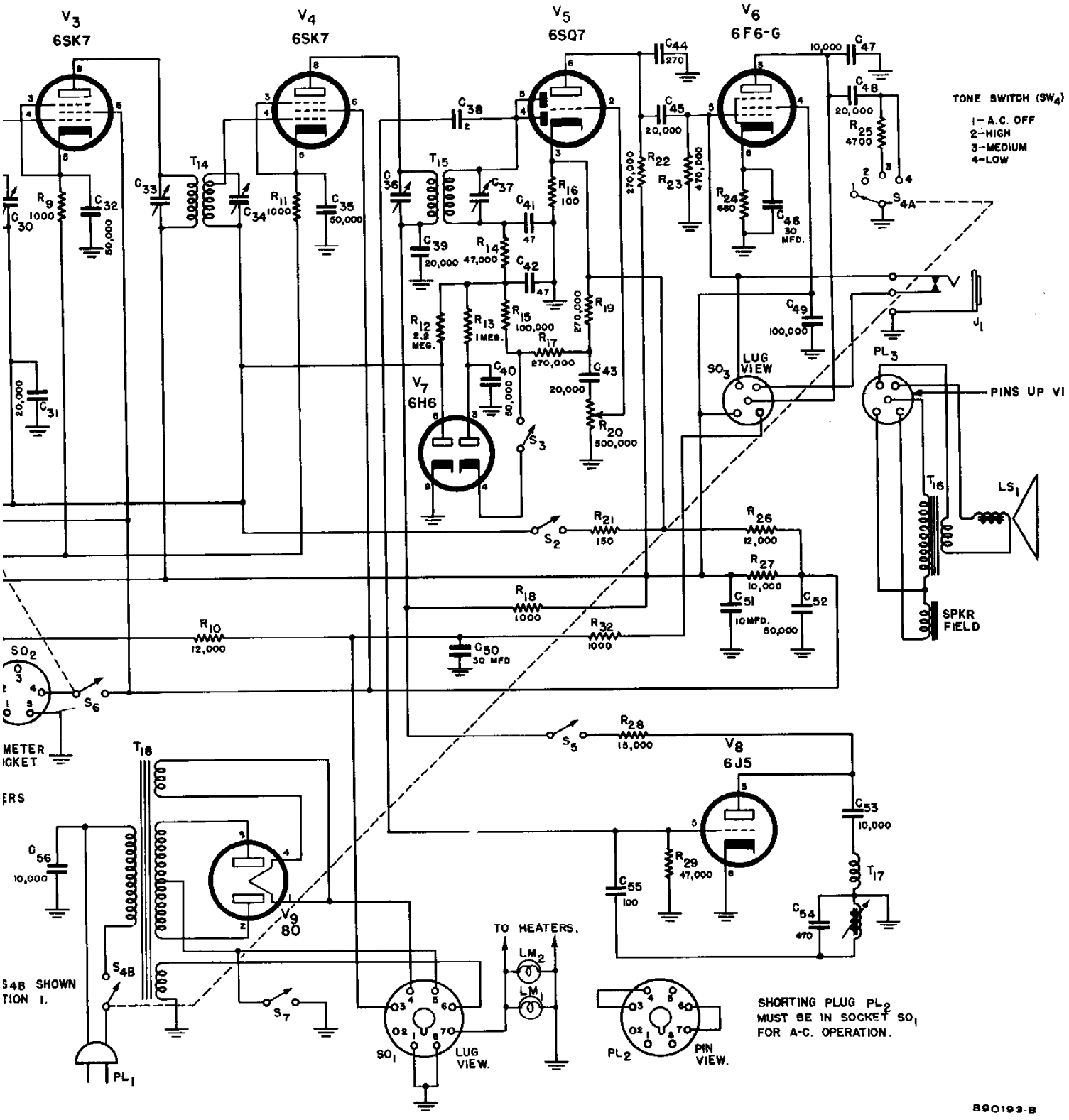


Figure 7-6. Radio Receiver Model S-40, tube socket connections.



NOTES: 1. ALL RESISTOR VALUES ARE SHOWN IN OHMS.
2. ALL CAPACITOR VALUES ARE SHOWN IN MICROMICROFARADS UNLESS OTHERWISE SPECIFIED.

Figure 7-7. Radio Receiver Model S



er Model S-40, schematic wiring diagram.

MODEL S-40 PARTS LIST

Ref. Symbol	Name of Part and Description	Function	Hallicrafter's Part No.
	CAPACITORS		
C_1	Capacitor, variable: 4 to 80 mmf; 300 vdcw; mica; screw driver compression type adjustment; ceramic insulation; two solder lug terminals and mtg; same as C_2, C_{12}, C_{13}, C_{19}.	Trimmer for transformer T1	44A149
C_2	Capacitor, variable: same as C_1.	Trimmer for transformer T_2	-
C_3	Capacitor, variable: 1.5 to 15 mmf; 300 vdcw; mica; screw driver compression type adjustment; ceramic insulation; two solder lug terminals and mtg; same as C_4, C_{14}, C_{15}, C_{20}, C_{21}, C_{22}.	Trimmer for transformer T_3	44A147
C_4	Capacitor, variable: same as C_3.	Trimmer for transformer T_4	-
C_5	Capacitor, fixed: 50,000 mmf; + 60 - 20%; 200 vdcw; paper; 1-5/8" lg x 7/16" diam; braided wire leads.	A-V-C decoupling	46A091
C_6	Capacitor, variable: two unit assembly, each unit has 3 sections; main tuning unit (C-6) capacity 12.5 to 410 mmf, bandspread tuning unit (C-7) 20 mmf effective capacity; air; each unit has its own rotor shaft mtg 2" diam pulleys; mts by a rivited on special mtg bracket, Hallicrafter's #67A544; and a rivited on stud, #73A395.	Main tuning capacitor	48C138
C_7		Bandspread tuning capacitor	
C_8	Capacitor, fixed: 50,000 mmf + 40 - 10%; 200 vdcw; paper; 1-½" lg x 7/16" diam; same as C_{32}, C_{35}, C_{40}.	Cathode by-pass for tube V_1	46AU503J
C_9	Capacitor, fixed: 50,000 mmf + 40 - 10%; 400 vdcw; paper; 1-5/8" lg x 5/8" diam; same as C_{28}, C_{52}.	Screen return for tube V_1	46AW503J
C_{10}	Capacitor, fixed: 24 mmf + 20%; temp coeff negative 750 mmf/mmf/degree C; 500 vdcw; ceramic; 0.562" lg x ¼" diam.	Primary to secondary coupling for transformer T_5	CC21UK240M
C_{11}	Capacitor, fixed: 15 mmf + 20%; temp coeff negative 750 mmf/mmf/degree C; 500 vdcw; ceramic; 0.562" lg x ¼" diam.	Primary to secondary coupling for transformer T_6	CC21UK150M
C_{12}	Capacitor, variable: same as C_1.	Trimmer for transformer T_5	

C_{13}	Capacitor, variable: same as C_1.	Trimmer for transformer T_6	-
C_{14}	Capacitor, variable: same as C_3.	Trimmer for transformer T_7	-
C_{15}	Capecitor, variable: same as C_3.	Trimmer for transformer T_8	-
C_{16}	Capacitor, fixed: 390 mmf ± 10%; 500 vdcw; mica; 51/64" lg x 15/32" wd x 7/32" thk; humidity resistant.	Oscillator grid coupling for tube V_2	CM20A391K
C_{17}	Capacitor, fixed: 10,000 mmf + 40 - 10%; 400 vdcw; paper; 1-5/8" lg x 5/8" diam; same as C_{53}, C_{56}.	Oscillator plate coupling for tube V_2	46AW103J
C_{18}	Capacitor, fixed: 100 mmf ± 10%; temp. coeff negative 0.00075 mmf/mmf/degree C; 500 vdcw; ceramic; 0.690" lg x 0.240" diam; radial wire leads.	Trimmer for transformer T_9	CC25UK101K
C_{19}	Capacitor, variable: same as C_1.	Trimmer for transformer T_9	-
C_{20}	Capacitor, variable: same as C_3.	Trimmer for transformer T_{10}	-
C_{21}	Capacitor, variable: same as C_3.	Trimmer for transformer T_{11}	-
C_{22}	Capacitor, variable: same as C_3.	Trimmer for transformer T_{12}	-
C_{23}	Capacitor, variable: preset to nominal 2645 mmf, ± 3%; 500 v test; mica; screw driver compression type adjustment; ceramic insulation; 3 mtg holes 0.144" diam with centers 3/8" apart x 1/8" from one side; silver plated plates.	Padder for transformer T_{10}	44B141
C_{24}	Capacitor, variable: 1300 mmf, adjustable ± 10%; 500 v test; mica; screw driver compression type adjustment; ceramic insulation; 3 mtg holes 0.144" diam with centers 3/8" apart x 1/8" from one side; silver plated plates; preset to nominal value ± 3%.	Padder for transformer T_{11}	44A024
C_{25}	Capacitor, variable: preset to nominal 490 mmf, ± 3%; 500 v test; mica; screw driver compression type adjustment; ceramic insulation; 3 mtg holes 0.144" diam with centers 3/8" apart x 1/8" from one side; silver plated plates.	Padder for transformer T_{12}	44A142
C_{26}	Capacitor, fixed: 3 mmf ± 0.2 mmf at 25 degrees C, capacity change 0.02 mmf per degree C; mica; 13/16" lg x 11/16" h overall including solder lug terminals; mtg by terminals.	Compensating capacitor for oscillator stage	44A158

MODEL S-40 PARTS LIST

Ref. Symbol	Name of Part and Description	Function	Hallicrafter's Part No.
C_{27}	Capacitor, fixed: 3-section; section #1 (C_{50}) is 30 mmfd + 40 - 10%; section #2 and #3 (C_{27} and C_{51}) are each 10 mfd + 40 - 10%; all sections 450 vdcw; electrolytic; metal case 3" lg x 1-7/16" diam, is common negative terminal for all sections; positive coded solder lug terminals at base; unit mts by 4 mtg lugs located at base 90 degrees apart.	Smoothing filter	45A062
C_{28}	Capacitor, fixed: same as C_9.	Plate decoupling for tube V_2	-
C_{29}	Capacitor, variable: dual unit; each unit, 40 to 120 mmf; 500 vdc test; mica; screw driver compression type adjustment; ceramic insulation; 4 solder lug terminals; mtg by 3 holes 0.154" diam centered in a row on 25/64" mtg/c; heat treated to minimize drift at nominal setting 80 mmf.	Primary trimmer for 1-f transformer T_{13}	44A095
C_{30}		Secondary trimmer for 1-f transformer T_{13}	
C_{31}	Capacitor, fixed: 20,000 mmf + 40 - 10%; 200 vdcw; paper; 1-½" lg x 7/16" diam; same as C_{43}.	A-V-C decoupling	46AU203J
C_{32}	Capacitor, fixed: same as C_8.	Cathode by-pass for tube V_3	-
C_{33}	Capacitor, variable: same as C_{29}; part of transformer T_{14}	Primary trimmer for 1-f transformer T_{14}	-
C_{34}		Secondary trimmer for 1-f transformer T_{14}	
C_{35}	Capacitor, fixed: same as C_8.	Cathode by-pass for tube V_4	-
C_{36}	Capacitor, variable: dual unit; each unit 40 to 175 mmf; 500 vdc test; mica; screw driver compression type adjustment; ceramic insulation; solder lug terminals; mtg by 3 holes 0.154" diam centered in a row on 25/64" mtg/c; heat treated to minimize drift at nominal settiug of 100 mmf.	Primary trimmer for 1-f transformer T_{15}	44A098
C_{37}		Secondary trimmer for 1-f transformer T_{15}	
C_{38}	Capacitor, fixed: gimick; 2 mmf; formed by twisting two insulated wire leads together.	B.F.O. coupling to detector	-

C_{39}	Capacitor, fixed: 20,000 mmf + 40 - 10%; 600 vdcw; paper; 1-5/8" lg x 5/8" diam; same as C_{45}, C_{48}.	Plate decoupling for the V_4	46AY203J
C_{40}	Capacitor, fixed: same as C_8.	Plate decoupling for tube V_4	-
C_{41}	Capacitor, fixed: 47 mmf ± 20%; 500 vdcw; mica; 51/64" lg x 15/32" wd x 7/32" thk; humidity resistant; same as C_{42}.	A-V-C decoupling	CM20A470M
C_{42}	Capacitor, fixed: same as C_{41}.	A-V-C decoupling	-
C_{43}	Capacitor, fixed: same as C_{31}.	Detector to first audio stage coupling	-
C_{44}	Capacitor, fixed: 270 mmf ± 10%; 500 vdcw; mica; 51/64" lg x 15/32" wd x 7/32" wd x 7/32" thk; humidity resistant.	Plate decoupling for tube V_5	CM20A271K
C_{45}	Capacitor, fixed: same as C_{39}.	Coupling between tubes V_5 and V_6	-
C_{46}	Capacitor, fixed: 30 mfd + 250 - 10%; 25 vdcw; electrolytic; 2-1/8" lg x 9/16" diam; axial 10 strand flexible wire leads 3-1/8" lg; case is wax impregnated cardboard tube sealed at ends with high temperature wax.	Cathode by-pass for tube V_6	45A034
C_{47}	Capacitor, fixed: 10,000 mmf + 40 - 10%; 800 vdcw; paper; 1-5/8" lg x 1/2" diam; wax impregnated.	Plate decoupling for tube V_6	46A023
C_{48}	Capacitor, fixed: same as C_{39}.	Tone control by-pass capacitor	-
C_{49}	Capacitor, fixed: 100,000 mmf + 40 - 10%; 400 vdcw; paper; 1-5/8" lg x 5/8" dism.	Screen return for tube V_6	46AV104J
C_{50}	Capacitor, fixed: 30 mfd unit of capacitor C_{27}.	Input filter	-
C_{51}	Capacitor, fixed: 10 mfd unit of capacitor C_{27}.	Output filter	-
C_{52}	Capacitor, fixed: same as C_9.	Screen return for tube V_4	-
C_{53}	Capacitor, fixed: same as C_{17}.	D-C blocking for B.F.O. transformer T_{17}	-
C_{54}	Capacitor, fixed: 470 mmf ± 5%; 500 vdcw; mica; 51/64" lg x 15/32" wd x 7/32" thk; humidity resistant.	Resonating capacitor for B.F.O. transformer T_{17}	CM20A471J
C_{55}	Capacitor, fixed: 100 mmf ± 20%; 500 vdcw; mica; 51/64" lg x 15/32" wd x 7/32" thk; humidity resistant.	Coupling for grid of tube V_8 and B.F.O. transformer T_{17}	CM20A101M
C_{56}	Capacitor, fixed: same as C_{17}.	A-C line smoothing filter	-

MODEL S-40 PARTS LIST

Ref. Symbol	Name of Part and Description	Function	Hallicrafter's Part No.
	JACKS		
J_1	Jack, telephone: headphone; closed circuit; short body; accepts standard headset plug; mtg by 3/8-32 x 3/8" bushing; solder lug terminals.	PHONES connection	36A002
	LAMPS		
LM_1	Lamp, incandescent: bayonet; 6-8 v 250 ma; clear glass; socket mtg; blue bead; General Electric #44; same as LM_2	Dial illumination	39A003
LM_2	Lamp, incandescent: same LM_1	Disl illumination	-
	SPEAKER		
LS_1	Speaker, dynamic: 5" diam cone; electro-magnetic; voice coil impedance 3.2 ohms; field coil 1100 ohms d-c resistanca; mts with two mtg brackets, each having two 0.3125" diam mtg holes with 3/4" centers, centered; 5-9/16" mtg/c; terminal leads approx 5" lg terminated with plug PL-3; assembly includes transformer T_{16}.	Loudspeaker	85C022
	PLUGS		
PL_1	Connector, male contact: with line cord; standsrd 2 prong A-C connection; plug molded to cord; line cord 6 ft. lg rubber jacket partially bonded to adjacent conductor jacket, #18 stranded conductors.	A-C line connection	87A073
PL_2	Connector, male contact: octal; Amphenol type CP-8 plug; jumpers wired between pins 3 & 4 and 6 & 7.	Shortiug plug for a-c operation	35A003
PL_3	Connector, male contact: 5 proug; Cinch Mfg. type 2749; part of speaker assembly LS_1.	Speaker assembly connection	10A197

RESISTORS

R_1	Resistor, fixed: 100,000 ohm ± 20%; 1/2 watt; composition; 0.468" lg x 0.249" diam; same as R_{15}.	A-V-C filter	RC20AE104M
R_2	Resistor, fixed: 120 ohm ± 10%; 1/2 watt; composition; 0.468" lg x 0.249" diam.	Cathode bias for tube V_1	RC20AE121K
R_3	Resistor, variable: 10,000 ohm; Hallicrafter's #86 taper; 1-7/16" diam x 13/16" d body; shaft 11/16" lg x 1/4" diam; mts by 3/8-32 x 1/4" bushing; 3 solder lug terminals; includes a SPST toggle action switch at rear, 8-6, closed at maximum clockwise rotation.	SENSITIVITY control	25A533
R_4	Resistor, fixed: 22 ohm ± 1/2 watt; composition 0.468" lg x 0.249" diam.	Parasitic suppressor for plate of tube V_1	RC20AE220M
R_5	Resistor, fixed: 1,000 ohm ± 20%; 1/2 watt; composition; 0.468" lg x 0.249" diam; same as R_{18}, R_{32}.	Screen voltage dropping for tube V_1	RC20AE102M
R_6	Resistor, fixed: 6800 ohm ± 10%; 1 watt; composition; 0.718" lg x 0.280" diam.	Primary loading for transformer T_6 on band 2	RC30AE682K
R_7	Resistor, fixed: 18,000 ohm ± 10%; 1/2 watt; composition; 0.468" lg x 0.249" diam.	Grid return for tube V_2, oscillator section	RC20AE183K
R_8	Resistor, fixed: 10,000 ohm ± 10%; 2 watt; composition; 1.78" lg x 0.342" diam.	Plate voltage dropping for tube V_2, oscillator section	RC41AE103K
R_9	Resistor, fixed: 1000 ohm ± 10%; 1/2 watt; composition; 0.468" lg x 0.249" diam; same as R_{11}.	Cathode bias for tube V_3	RC20AE102K
R_{10}	Resistor, fixed: 12,000 ohm ± 10%; 4 watt; composition; 2.66" lg x 0.730" diam; not insulated; radial wire leads.	Plate decoupling for tube V_2	RC65CE123K
R_{11}	Resistor, fixed: same as R_9.	Cathode bias for tube V_{14}	-
R_{12}	Resistor, fixed: 2.2 megohm ± 20%; 1/2 watt; composition; 0.468" lg x 2.249" diam.	A-V-C decoupling	RC20AE225M

MODEL S-40 PARTS LIST

Ref. Symbol	Name of Part and Description	Function	Hallicrafter's Part No.
R_{13}	Resistor, fixed: 1 megohm ± 20%; 1/2 watt; composition; 0.468" lg x 0.259" diam.	Diode load for tube V_7	RC20AE105M
R_{14}	Resistor, fixed: 47,000 ohm ± 20%; 1/2 watt; composition; 0.468" lg x 0.249" diam; same as R_{29}.	Diode load for tube V_5	RC20AE473M
R_{15}	Resistor, fixed: same as R_1.	Decoupling for tube V_7	-
R_{16}	Resistor, fixed: 100 ohm ± 10%; 1/2 watt; composition; 0.468" lg x 0.249" diam.	Cathode biss for tube V_5	RC20AE101K
R_{17}	Resistor, fixed: 270,000 ohm ± 10%; 1/2 watt; composition; 0.468" lg x 0.249" diam; same as R_{19}, R_{22}.	Decoupling for tube V_7	RC20AE274K
R_{18}	Resistor, fixed: same as R_9.	Plate voltage dropping for tube V_4	-
R_{19}	Resistor, fixed: same as R_{17}.	Diode filter for tube V_5	-
R_{20}	Resistor, variable: 500,000 ohm; #6 taper; 1-1/8" diam x 1/2" d body; shaft 11/16" lg x 1/4" diam; mta by a 3/8-32 x 1/4" bushing; 3 solder lug terminals; no taps.	AUDIO GAIN control	25A534
R_{21}	Resistor, fixed: 150 ohm ± 20%; 1/2 watt; composition; 0.468" lg x 0.249" diam.	A-V.C decoupling	RC20AE151M
R_{22}	Resistor, fixed: same as R_{17}.	Plate load for tube V_5	-
R_{23}	Resistor, fixed: 470,000 ohm ± 20%; 1/2 watt; composition; 0.468" lg x 0.249" diam.	Grid return for tube V_6	RC20AE474M
R_{24}	Resistor, fixed: 680 ohm ± 10%; 1 watt; composition; 1.28" lg x 0.310" diam.	Cathode bias for tube V_6	RC31AE681K
R_{25}	Resistor, fixed: 4700 ohm ± 20%; 1 watt; composition; 1.28" lg x 0.310" diam.	Tone control resistor	RC31AE472M

R_{26}	Resistor, fixed: 12,000 ohm ± 10%; 4 wett; composition; 2.66" lg x 0.730" diam; not insulated; radial wire leede.	Plate voltage droppiug for tube V_5	RC41AE123K
R_{27}	Resistor, fixed: 10,000 ohm ± 10%; 2 watt; composition; 1.78" lg x 0.342" diam.	DC filter resistor	RC65CE103K
R_{28}	Resistor, fixed: 15,000 ohm ± 20%; 2 watt; composition; 1.178" lg X 0.342" diam.	Plate load for tube V_8	RC41AE153M
R_{29}	Resistor, fixed: same as R_{14}.	Grid return for tube V_8	-
R_{30}	Resistor, fixed: 10 ohm ± 20%; 1/2 watt; composition; 0.468" lg x 0.249" diam.	Parasitic suppressor for oscillator section of tube V_2	RC20AE100M
R_{31}	Resistor, fixed: same as R_4.	Grid parasitic suppressor for tube V_1.	-
R_{32}	Resistor, fixed: 1,000 ohm ± 10%; 10 watt; wire wound; 1-3/4" lg x 3/8" diam; vitreous enamel insulation.	Heat dissipation	24BG102E
	SWITCHES		
S_1	Switch, rotary; 4 position, 3 section; two bekelite wafers (S_{1A}, B, C and D, Hallicrafter's #62B039) and one bakelite wafer (S_{1E} and F, Hallicrafter's #62A044) are individually mtd; wafers driven by a nickel plated steel shaft 10-15/64" lg overall with 1/4" diam x 0.185" across flats with a stainless steel index plate (Hallicrafter's #74C172).	BAND SELECTOR	62B039 62A044 74C172
S_2	Switch, toggle; SPST; 3 amp 250 v; mts by 15/32-32 x 15/32" bushing; solder lug terminals; Cutler-Hammer type 8280; same as S_3, S_5, S_7.	A.V.C. ON OFF switch	60A138
S_3	Switch, toggle: same as S_2.	NOISE LIMITER ON OFF switch	-
S_{4A} S_{4B}	Switch, rotary: 2 section; encased; section "A" is single pole 4 position; section "B" rated 3 amp 125 v A-C, 1 amp 250 v A-C; shaft 11/16" lg x 1/4" diam; mts by 3/8-32 N.C.-2 x 1/4" bushing; 5 solder lug terminals for section "A", 2 solder lug terminals at rear for section "B"; Stackpole type SBD.	TONE switch A. C. line switch	60A325
S_5	Switch, toggle: same as S_2.	AM-CW switch	-
S_6	Switch, toggle: toggle action SPST switch located on rear of R.F GAIN control R_3; part of R_3.	"S" meter switch	-

MODEL S-40 PARTS LIST

Ref. Symbol	Name of Part and Description	Function	Hallicrafter's Part No.
S_7	Switch toggle: same as S_2.	STANDBY-RECEIVE switch	-
	SOCKETS		
SO_1	Connector, female contact: octal; Amphenol type MIP-8; 2 mtg holes 0.144" diam on 1-1/2" mtg/c; solder lug terminals.	DC line connection	6A035
SO_2	Connector, female contact: 5 contacts; Amphenol type MIP-5; 2 mtg holes 0.144" diam on 1-1/2" mtg/c; solder lug terminals.	"S" meter connection	6A186
SO_3	Connector, female contact: 5 contacts; Cinch mfg type 2649-B socket; two 0-136" diam mtg holes in base on 1-1/4" mtg/c.	Spaaker LS_1 connection	6A246
	TRANSFORMERS		
T_1	Coil, R-F: antenna stage, Band 4.; adjustable powdered iron core; primary single layer winding, secondary single layer winding; molded black phenolic one piece coil form and terminal board assembly Hallicrafter's part no. 8C557; single hole mtg. tappad 6-32 N.C.-1: includes trimmer capacitor C_1, 4 solder lug terminals marked "A" (ground), "B" (grid), "C" (ground) & "D" (antenna); bears Hallicrafter's part no. 51B783.	Coupling between antenna and grid of tube V_1 for Band 4	51B783
T_2	Coil, R-F: antenna stage, Band 3.; adjustable powdered iron core; primary and secondary single layer windings; molded black phenolic one piece coil form and terminal board assembly, Hallicrafter's part no. 8C557; single hole mtg., tapped 6-32 N.C.-1; includes trimmer capacitor C_2, 4 solder lug terminals marked "A" (grid), "B" (ground), "C" (antenna) & "D" (ground); bears Hallicrafter's part no. 51B782.	Coupling between antenna and grid of tube V_1 for Band 3	51B782

T_3	Coil, R-F: antenna stage, Band 2.; air core; primary and secondary single layer windings; molded black phenolic one piece coil form and terminal board assembly; Hallicrafter's part no. 8C557; single hole mtg., tapped 6-32 N.C.-1; includes trimmer capacitor C_3; 4 solder lug terminals marked "A" (grid) "B" (grouod), "C" (antenna) & "D" (ground); bears Hallicrafter's part no. 51B781.	Coupling between antenna and grid of tube V_1 for Band 2.	51B781
T_4	Coil, R-F: antenna stage, Band 1.; air core; primary single pi universal winding; secondary two pi universal winding; molded black phenolic one piece coil form and terminal board assembly. Hallicrafter's part no. 8C577; single hole mtg, tapped 6-32 N.C.-1; includes trimmer capacitor C_4; 4 solder lug terminals. marked "A" (grid), "B" (ground), "C" (antenna) & "D" (ground); bears Hallicrafter's part no. 51B780.	Coupling between antenna and grid of tube V_1 for Band 1.	51B780
T_5	Coil, R-F: converter stage, Band 4.; adjustable powdered iron core, primary single layer winding, secondary single layer winding; molded black phenolic one piece coil form and terminal board assembly, Hallicrafter's part no. 8C557; single hole mtg, tapped 6-32 N.C.-1; includes trimmer capacitor C_{12}; 4 solder lug terminals marked "A" (ground), "B" (grid), "C" (B+) and "D" (plate); bears Hallicrafter's part no. 51B786.	Coupling between tubes V_1 and V_2 converter stage grid	51B787
T_6	Coil, R-F: converter stage, Band 3.; adjustable iron core; primary single pi universal winding, secondary single layer winding; molded black phenolic one piece coil form and terminal board assembly, Hallicrafter's part no. 8C557; single hole mtg, tapped 6-32 N.C.-1; includes trimmer capacitor C_{13}; 4 solder lug terminals marked "A" (grid), "B" (ground), "C" (plate) & "D" (B+); bears Hallicrafter's part no. 51B786.	Coupling between tubes V_1 and V_2 converter stage grid	51B786
T_7	Coil, R-F: converter stage, Band 2.; air core; no primary, secondary single pi universal winding; molded black phenolic one piece coil form and terminal board assembly, Hallicrafter's part no. 8C557; single hole mtg, tapped 6-32 N.C.-1; includes trimmer capacitor C_{14}; 4 solder lug terminals marked "A" (grid), "B" (ground), "C" & "D" (no connection); bears Hallicrafter's part no. 51B785.	Coupling between tubes V_1 and V_2 converter stage grid	51B785

MODEL S-40 PARTS LIST

Ref. Symbol	Name of Part and Description	Function	Hallicrafter's Part No.
T_8	Coil, R-F: converter stage, Hand 1.; air core; primary single layer winding, secondary two pi universal winding; molded black phenolic one piece coil form and terminal board, assembly, Hallicrafter's part no. 8C557; single hole mtg, tapped 6-32 N.C.-1; includes trimmer capacitor C_{15}; 4 solder lug terminals marked "A" (grid), "B" (ground), "C" (plate) & "D" (B+); bears Hallicrafter's part no. 51B784.	Coupling between tube V_1 and V_2 converter stage grid	51B784
T_9	Coil, R-F: oscillator stage, Baod 4.; adjustable powdered iron core; primary and secondary single layer windings; molded black phenolic one piece coil form and terminal board assembly, Hallicrafter's part no. 8C557; single hole mtg, tapped 6-32 N.C.-1; includes trimmer capacitor C_{19}; 4 solder lug terminals marked "A" (cathode), "B" (grid), "C" (plate) & "D" (ground); bears Hallicrafter's part no. 51B791.	Oscillator coil for Band 4.	51B791
T_{10}	Coil, R-F: oscillator stage, Band 3.; adjustable powdered iron core; single layer winding tapped at 1-2/3 turns; molded black phenolic one piece coil form and terminal board assembly, Hallicrafter's part no. 8C557; single hole mtg, tapped 6-32 N.C.-1; includes trimmer capacitor C_{20}; 4 solder lug terminals marked "A" (grid), "B" (ground), "C" (cathode) & "D" (no connection); bears Hallicrafter's part no. 51B790.	Oscillator coil for Band 3.	51B790
T_{11}	Coil, R-F: oscillator stage, Band 2.; adjustable powdered iron core; single layer winding tapped at 3-3/4 turns; molded black phenolic one piece coil form and terminal board assembly, Hallicrafter's part no. 8C557; single hole mtg, tapped 6-32 N.C.-1; includes trimmer capacitor C_{21}; 4 solder lug terminals marked "A" (ground), "B" (grid), "C" (no connection) & "D" (cathode); bears Hallicrafter's part no. 51B789.	Oscillator coil for Band 2.	51B789

T_{12}	Coil, R-F: oscillator stage, Band 1; adjustable powdered iron core; single pi universal winding tapped at 7-1/4 turns; molded black phenolic one piece coil form and terminal board assembly, Hallicrafter's part no. 8C557; single hole mtg, tapped 6-32 N.C.-1.; includes trimmer capacitor C_{21}; 4 solder lug terminals marked "A" (grid), "B" (ground), "C" (no connection) & "D" (cathode); bears Hallicrafter's part no. 51B788.	Oscillator coil for Band 1.	51B788
T_{13}	Transformer, I-F: 455 kc; shielded; shield case 1.876" lg x 1.407" wd x 4.032" h overall; air core; windings; primary and secondary tuned by mica compression type trimmer capacitors C_{29} and C_{30}; 2 spade lug mtg on 1-3/8" mtg/c; 4 flexible, insulated wire leads brought out at base coded blue (plate), red (B+), green (grid) and black (A-V-C or ground); bears Hallicrafter's part no. 50C185.	Coupling between tubes V_2 and V_3	50C185
T_{14}	Transformer, I-F: same as T_{13}; except it has different lead lengths; tuned by mica compression type trimmer capacitors C_{33} and C_{34}; bears Hallicrafter's part no. 50C186.	Coupling between tubes V_3 and V_4	50C186
T_{15}	Transformer, I-F: 455 kc; shielded; shield can 1.876" lg x 1.407" wd x 4.032" h overall; air core; windings; primary and secondary tuned by mica compression type trimmer capacitors C_{36} and C_{37}; 2 spade lug mtg on 1-3/8" mtg/c; 4 flexible, insulated wire leads brought out at base coded blue (plate), red (B+), green (grid) and black (A-V-C or ground); bears Hallicrafter's part no. 50C067.	Coupling between tubes V_4 and V_5	50C192
T_{16}	Transformer, A-F: audio output; matches output of a single type 6F6 tube to a 3.2 ohm voice coil; part of speaker assembly LS_1.	Coupling between output tube V_6 and speaker LS_1	-
T_{17}	Coil, R-F: beat frequency oscillator; range 455 kc; shielded; shield can 1" diam x 1-9/16" h; adjustable powdered iron core; tuning; single pi universal winding tapped at 60 turns from start; bakelite coil form; mtg by a brass bushing, thd 1/4-32 N.S.-2 x 3/8" OD with 8-32 N.C.-2 thd ID for adjustment screw; 3 solder lug terminals at top of assembly; bears Hallicrafter's part no. 54B028.	Beat frequency oscillator coil	54B028

MODEL S-40 PARTS LIST

Ref. Symbol	Name of Part and Description	Function	Hallicrafter's Part No.
T_{18}	Transformer, power: plate and filament; primary 117 v A-C, 50/60 cycle; first secondary 225 v D-C at 80 ma out of a tube type 80 rectifier, a 30 mfd input capacitor and a 1400 ohm d-c resistance field coil; second secondary 6.3 v A-C at 3.5 amp; third secondary 5.0 v A-C at 2.0 amp; coil and core vacuum wax impregnated; half shell type mtg; 3-3/4" lg x 3-1/8" wd x 3-1/4" h overall; mtg by four 1/2" lg thd bolts on 3-1/8" x 2-1/2" mtg/c; 10 solder lug terminals at base; marked "1" (pri), "2" (second sec), "3" (primary), "4" (second sec), "5" (dummy lug), "6" (first sec), "7" (third sec), "8" (first sec CT), "9" (third sec), "10" (first sec), "11" and "12" (no lug); bears Hallicrafter's part no. 52C026; General Transformer Corp type 7G58.	Power supply	52C026
T_{18}*	Transformer, power: plate and filament; primary 110/130/150/220/250 v A-C, 25 cycles; first secondary 225 v D-C at 80 ma out of a tube type 80 rectifier, a 30 mfd input capacitor and a 1400 ohm d-c resistance field coil; second secondary 6.3 v A-C at 3.3 amperes; third secondary 5.0 v A-C at 2.0 amp; coil and core vacuum wax impregnated; half shell type mtg; 3-3/4" lg x 3-1/8" wd x 6-3/32" h overall; mtg by four thd bolts on 3-1/8" x 2-1/2" mtg/c; has primary voltage selector switch; 10 solder lug terminals at base marked "1" (pri), "2" (second sec), "3" (pri switch rotor), "4" (second sec), "5" (no connection), "6" (first sec), "7" (third sec), "8" (first sec CT), "9" (third sec), "10" (first sec), "11" and "12" (no lug); bears Hallicrafter's part no. 52C027; General Transformer Corp type 9G60.	Power supply	52C027
	TERMINAL STRIPS		
TS_1	Board, terminal: mts 3 solder lug type binding posts; 2" lg x 11/16" wd overall; bakelite base 1/16" thk; two 9/64" diam mtg holes on 1-11/16" mtg/c; fungacide treated; marked "A_1", "A_2" and "G"; includes a metal jumper between terminals "A_2" and "G"; Cinch Mfg. type 1738.	Antenna and ground connections	88A002

TUBES

V_1	Tube, electron: rf pentode, semi-remote cutoff; RCA type 6SG7.	R-F amplifier	90X6SG7
V_2	Tube, electron: pentagrid converter; RCA type 6SA7.	Mixer	90X6SA7
V_3	Tube, electron: rf pentode, remote cutoff; same as V_4; RCA type 6SK7.	I-F amplifier	90X6SK7
V_4	Tube, electron: same as V_3.	I-F amplifier	
V_5	Tube, electron: duplex diode, high mu triode; RCA type 6SQ7.	Detector-1st audio amplifier	90X6SQ7
V_6	Tube, electron: power amplifier, pentode; RCA type 6F6-G.	Power amplifier	90X6F6-G
V_7	Tube, electron: twin diode RCA type 6H6.	A-V-C NOISE LIMITER amplifier	90X6H6
V_8	Tube, electron: detector - amplifier triode RCA type 6J5GT/G.	B-F-O oscillator	90X6J5GT/G
V_9	Tube, electron: full-wave high vacuum rectifier RCA type 80.	Power rectifier	90X80

*Supplied on special order only.

SUPPLEMENT
TO
INSTRUCTION BOOK FOR MODEL S-40 RADIO RECEIVER

Due to circumstances beyond our control it was necessary to modify the design of the Model S-40 Radio Receiver slightly. Information contained in this supplement will serve to correct this instruction book.

SECTION 1:

Page 1-1, par 1:

Change 550 kilocycles to read 540 kilocycles
Change 44 megacyles to read 43 megacycles.

Par 3;

The frequencies listed under Coverage should read as follows:

540 kc. to 1700 kc.
1.7 mc to 5.35 mc.
5.35 mc to 15.7 mc
15.7 mc to 43 mc.

Adequate overlap is provided at the ends of all bands.

SECTION IV:

Page 4-1, par. 2,d:

Delete the sixth sentence and add the following:
"Resistor R-33 is the grid return for tube V-5".

Par. 2, b. , (1):

In the next to the last sentence delete "The speaker field coil." The sentence shoudl now read, "the filter circuit consists of a pi-network made up of resistor R-32 and capacitors C-50 and C-51."

SECTION V:

Page 5-0, par. 3, a.,(1), (a):

Change 550 kc. to 540 kc. and 44 mc, to 43 mc.

Page 5-1, par. 3, a., (3):

Set all controls as above except CW-AM Switch which should be set at CW.

Page 5-5, chart at end of par. 4:

Delete the entry "SPKR FIELD" "Speaker Field - - 1500."

Page 5-7, figure 5-3:

Terminal .. 1 of tube V-6 should read 35,000.
terminal .. 2 of tube V-5 should read 15 megohm.
Terminal .. 3 of tube V-5 should read ZERO
Terminal .. 4 of tube V-3 should read 4 megohm. (150 - see note 4.)
Terminal .. 3 of tube V-4 should read 4 megohm. (150 - see note 4.)
Terminal .. 6 to tube V-1 should read 13,000.
Terminal .. 4 of tube V-7 should read 4 megohm. (150- see note 4.)

Delete Note 3 at the bottom of the page, but keep the same numbering order.

SECTION VI:

Page 6-0, par. 1:

Change 550 to 540 and 44 to 43.

SUPPLEMENT TO INSTRUCTION BOOK FOR
MODEL S-40 RADIO.

SECTION: VII:

Page 7-1, figure 7-2;

Locate R-16. This has been deleted. In approximately the same place is located R-33. Next locate C-43. Just below it is now located C-57. Locate R-32. Just below it is now located R-34.

Page 7-7 and 7-8, figure 7-7:

The following corrections were made on the schematic wiring diagram:

1. The speaker field has been eliminated and a jumper connected between the terminals to which it was connected.

2. In series with the lead from terminal 4 to tube socket for tube V-6 is now connected a 10,000 ohm resistor (R-34).

3. Resistor R-32 is now 1,500 ohms.

4. Resistor R-16 was eliminated and a lead is now connected from terminal 3 to ground.

5. From terminal 2 of the socket for tuvo V-5 a 15 megohm resistor R-33 is connected to ground.

   In series in the line from terminal 2 to resistor R-20 is connected a .001 mfd. paper condenser, C-57.

6. The lead from resistor R-19 to the junction of resistors R-21 and R-26 is eliminated and this junction point is now grounded.

7. The B + end of resistor R-22 is now connected to the left side of resistor R-10 (as seen on the schematic wiring diagram.)

SECTION VIII:

Page 8-3;

Add capacitor C-57, fixed, 1000 mmf; ±20-10% 600 vdcw, paper, grid coupling for tube V-5, our part #46.C102F.

Page 8-6:

Delete the entry for resistor R-16 as it was eliminated from the circut.

Page 8-7:

Add resistor R-33, 15 meg, fixed, 1/2 watt, 20 %; composition; grid return for tube V-5, our part #RC20[illegible]156H.

Add resistor R34 fixed, 10,000 ohm ± 20%; 1/2 watt; composition; screen dropping for tuve V-6; our part #RC20[illegible]103H.