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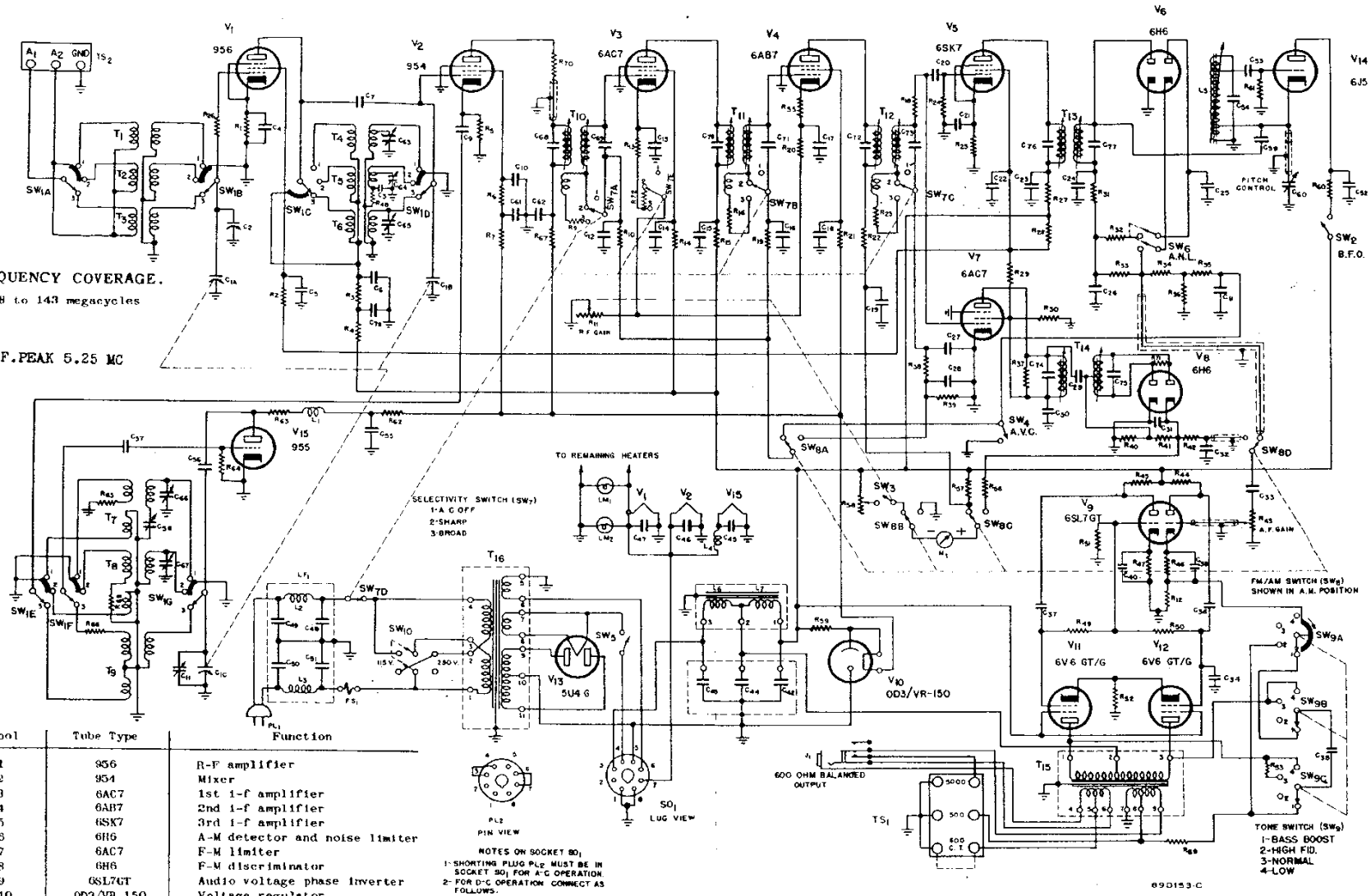

Symbol	Tube Type	Function
V-1	956	R-F amplifier
V-2	954	Mixer
V-3	6AC7	1st i-f amplifier
V-4	6AB7	2nd i-f amplifier
V-5	6SK7	3rd i-f amplifier
V-6	6H6	A-M detector and noise limiter
V-7	6AC7	F-M limiter
V-8	6H6	F-M discriminator
V-9	6SL7GT	Audio voltage phase inverter
V-10	0D3/VR-150	Voltage regulator
V-11	6V6GT/G	Audio power amplifier
V-12	6V6GT/G	Audio power amplifier
V-13	5U4G	Rectifier
V-14	6J5	Beat-frequency oscillator
V-15	955	High-frequency oscillator

Figure 7-7. Radio Receiver Model S-36A, schematic wiring diagram.

MODEL S-36A

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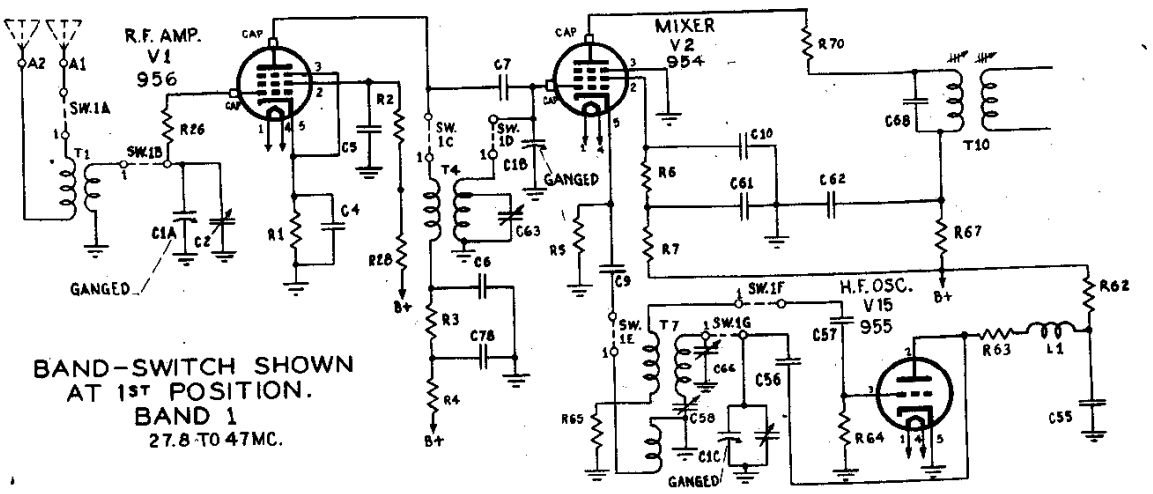

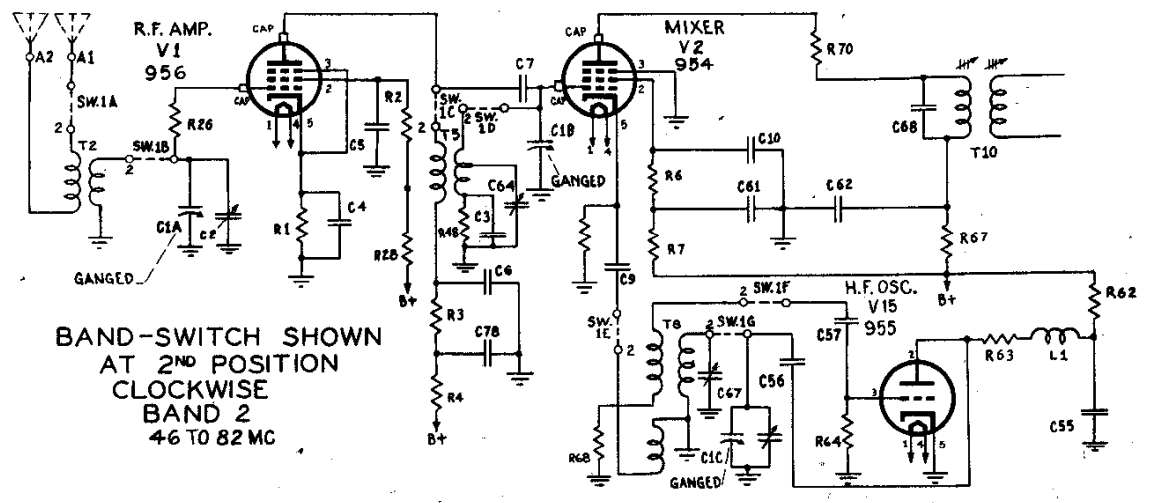

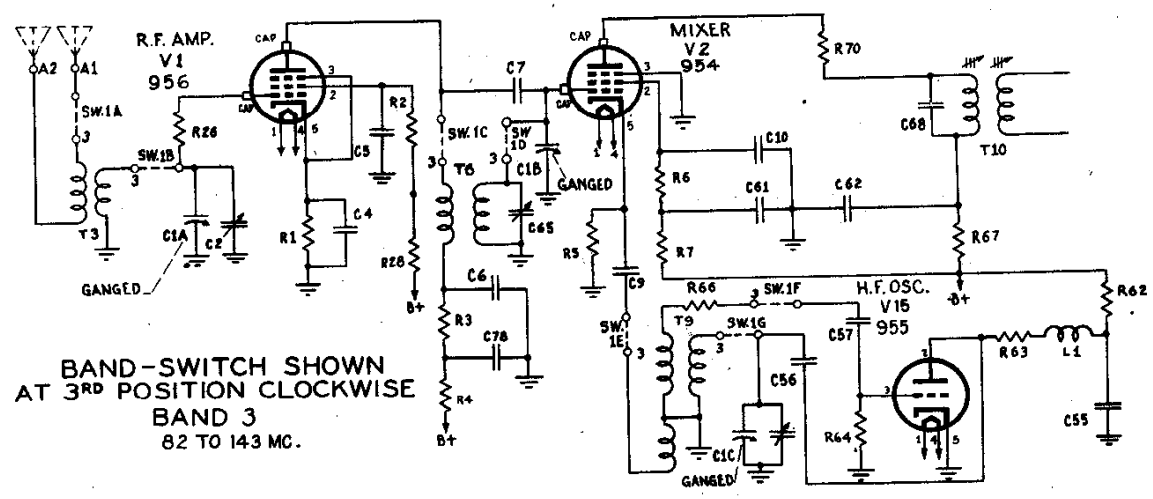

POWER REQUIREMENTS.

The receiver is designed to operate from either a 115-volt or 230-volt 50/60 cycle, single phase, a-c source or from a 6-volt storage battery and 270-volt "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 . . .115 volts, 230 volts	Filament voltage . . . . . 6.3 volts
Line current . . .1.0 amp., 0.5 amp.	Filament current . . . . . 4.5 amps.
Power consumption. . . . . 115 watts	"B" voltage. . . . . 270 volts
	"B" current . . . . . 145 ma.

* The 6-volt battery drain using a vibrator type supply for "B" voltage will run approximately 20 to 22 amperes.

Audio Output Connections.--A headset or loudspeaker may be used with the receiver.

(1) The headset jack marked PHONES, located on the front panel, provides a 600-ohm balanced output for headset reception. The center tap of the 600-ohm headset winding is grounded externally at the speaker output terminal board TS-1 by a jumper wire across the terminals marked 600 C.T. If it is desirable to operate with one side of the headset line grounded, disconnect the jumper on terminal board TS-1.

(2) The two sets of speaker terminals located on the rear chassis apron provide output impedances of 500 and 5000 ohms for loudspeaker reception. One side of each of the 500 and 5000-ohm output connections is grounded. This should be kept in mind if this receiver is to work in conjunction with other equipment. A speaker capable of handling 5 watts of audio power should be used with this equipment.

Remote Operation Facilities. - The receiver may be disabled remotely by disconnecting the jumper wire between pins #3 and #4 in 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, hence, the remote stand-by switch must be insulated for approximately 270 volts to protect the operator. When using the remote control disabling switch, the SEND/REC switch on the receiver must be set at SEND.

> CAUTION - The external stand-by switch and its connections will be approximately 270 volts above ground hence must be well insulated throughout.

PREPARATION FOR USE.

A-C Operation. - The receiver may be operated from either a 115-volt or 230-volt, 50/60 cycle, single phase, a-c source of power. To change over from one line voltage to the other, it is merely necessary to throw the line voltage switch (SW-10) located on the top of the chassis near the power transformer. See Fig. 7-1. for location of the line voltage switch.

> CAUTION - Check the line voltage and position of the line voltage switch before connecting the receiver to a source of power. A receiver set for 230-volt operation will not be damaged when connected to a 115-volt line, but a receiver set for 115-volt operation will, in most cases, be damaged when plugged into a 230-volt outlet. When in doubt, set the line voltage switch for 230-volt operation. If the dial lamps light up dimly, indicating a 115-volt line voltage, switch over to the 115-volt position.

D-C Operation. - The receiver may be operated from a 6-volt d-c source, generally a storage battery, and a 270-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 No. 18 (AWG) wire leads for the 270-volt "B" supply connections to pins #3 and #5 and No. 12 (AWG) wire leads for the 6-volt "A" battery connections to pins #1, #8 and #7.

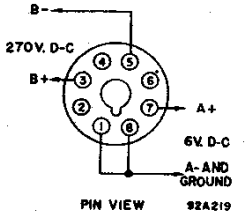

Fig. 2-1. Radio Receiver Model S-36A, wiring diagram for d-c power plug.

R.F. GAIN Control. - The radio frequency gain 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 into the circuit when the control is advanced all the way to the right.

SELECTIVITY Switch.-The selectivity switch serves a dual purpose. In position #1 it turns the receiver off when operating from an a-c source of power. (When operating from a d-c supply the power switch is part of the external supply, hence, the SELECTIVITY switch does not function in position #1). In positions #2 and #3 the selectivity switch controls the bandwidth of the i-f amplifier thereby affecting the selectivity of the receiver. In general, the switch is set at SHARP for amplitude modulated signals and at BROAD for frequency modulated signals.

"S" Meter or Tuning Meter.- The tuning meter serves two functions in the receiver depending on the type of reception as follows:

(1) A.M. Reception. - When the receiver is adjusted to receive amplitude modulated signals, the tuning meter indicates the relative carrier strength of the received signal. To put the meter in operation, turn the R.F. GAIN control to the right until the switch connected to its shaft clicks, and set the A.V.C. switch at ON.

(2) F.M. Reception. - When the receiver is adjusted to receive frequency modulated signals, the tuning meter is used to indicate resonance with the station carrier. As the receiver is tuned through the f-m carrier the indicator will deflect to one side of zero, return to zero and deflect an equal distance to the opposite side of zero, and finally return to zero as the carrier is completely passed. The zero center position in the middle of the swing represents the correct setting of the receiver tuning dial and indicates resonance with the station carrier.

2. OPERATION.

Listed below are the receiver controls and their settings for the three types of reception provided by this receiver, namely, amplitude and frequency modulated telephone and c-w code reception.

a. A.M. (Amplitude Modulation) Telephone Reception - To receive amplitude modulated telephone signals set the front panel controls as follows:

SELECTIVITY switch	-	Set at A.C. OFF when the receiver is not in use. Set at SHARP for reception of amplitude modulated phone signals.
SEND/REC. switch	-	Set at REC. (Set at SEND to disable receiver for short stand-by periods.)
BAND SWITCH	-	Set at range number corresponding to band covering desired frequency.
A.M./F.M. switch	-	Set at A.M.
A.V.C.	-	Set at ON.
R.F. GAIN control	-	Turn to the right until tuning meter switch ganged to the control snaps on.
B.F.O. switch	-	Set at OFF.
PITCH CONTROL	-	Not used.
TUNING wheel	-	Set calibrated dial to frequency of desired signal, adjust for maximum tuning meter deflection.
ANTENNA trimmer	-	Adjust for maximum tuning meter deflection.
A.F. GAIN control	-	Adjust for desired volume at headset or loudspeaker.
TONE control	-	Set to please the listener. Generally set at HIGH FID. or BASS BOOST when signal to noise ratio is high or at NORMAL or LOW when signal to noise ratio is low.
A.N.L. switch	-	Normally set at OFF except when background noise is excessive.

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b. **F.M. (Frequency Modulation) Telephone Reception.** - To receive frequency modulated telephone signals set the front panel controls as follows:

SELECTIVITY switch	-	Set at A.C. OFF when the receiver is not in use. Set at BROAD for reception of frequency modulated phone signals.
SEND/REC. switch	-	Set at REC. (Set at SEND to disable receiver for short stand-by periods.)
BAND SWITCH	-	Set at range number corresponding to band covering desired frequency.
A.M./F.M. switch	-	Set at F.M.
R.F. GAIN control	-	Turn all the way to the right. (The switch ganged to this control does not operate during f-m reception).
A.V.C. switch	-	Set at OFF.
B.F.O. switch	-	Set at OFF.
PITCH CONTROL	-	Not used.
A.N.L. switch	-	Set at OFF
TUNING wheel	-	Set calibrated dial to frequency of desired signal, adjust for "0" position of tuning meter marked for F-M tuning.
ANTENNA trimmer	-	Adjust for minimum background noise (Control will only be effective on very weak signals.)
A.F. GAIN control	-	Adjust for desired volume at headset or loudspeaker.
TONE control	-	Set at BASS BOOST or HIGH FID.

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

SELECTIVITY switch	-	Set at A.C. OFF when the receiver is not in use. Set at SHARP for reception of c-w code signals.
SEND/REC. switch	-	Set at REC. (Set at SEND to disable receiver for short stand-by periods.)
BAND SWITCH	-	Set at range number corresponding to band covering desired frequency.
A.M./F.M. switch	-	Set at A.M.
A.V.C. switch	-	Set at OFF.
B.F.O. switch	-	Set at ON.
PITCH CONTROL	-	Adjust to produce a 500 to 1000 cycle code signal.
TUNING wheel	-	Set calibrated dial to frequency of desired signal. Tune for maximum signal level at headset or loudspeaker.
R.F. GAIN control	-	Turn up as high as the signal strength of the code signal will allow. Too much gain will result in distortion of the signal.
ANTENNA trimmer	-	Adjust for maximum signal level at the headset or loudspeaker.
TONE control	-	Set at LOW or NORMAL.
A.N.L. switch	-	Set at OFF.
A.F. GAIN control	-	Adjust for desired volume at headset or speaker.

FUNCTIONING OF PARTS

1. GENERAL.

Figure 4-1. shows, in a very simple block form, the plan of the circuit of the Model S-36A receiver. Note that the circuit is that of the conventional superheterodyne receiver up to the second i-f amplifier stage. The output of the 2nd i-f amplifier is fed to two channels, namely, the F-M signal channel and the A-M signal channel. The F-M channel consists of the f-m limiter and discriminator and the A-M channel consists of an additional i-f amplifier stage and second detector stage. The demodulated signal from both channels then feeds the same audio amplifier, being selected by the A.M./F.M. switch.

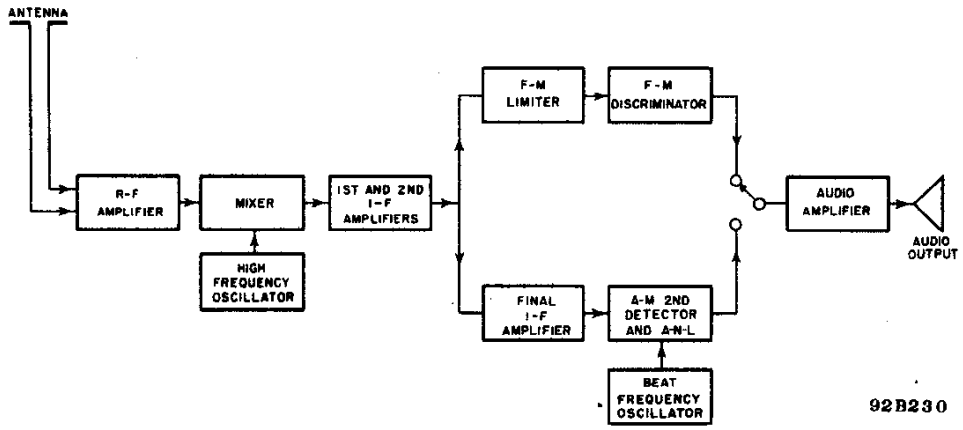

Fig. 4-1. Radio Receiver Model S-36A, block diagram.

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

Since the circuit functions of bands 1, 2 and 3 are essentially identical, this discussion will describe the circuit with BAND SWITCH (SW_{1A} to SW_{1G}) set at band 3 as shown in the schematic diagram.

a. R-F Amplifier. - The r-f amplifier stage employs a type 956 acorn type pentode tube in a conventional class A amplifier circuit. Signals present at the antenna are fed to the primary of transformer T-3 through terminals A_1 and A_2 of the antenna terminal strip TS-2. The secondary is tuned by the ganged tuning capacitor section C-1A and trimmer C-2. Trimmer capacitor C-2 is controlled from the front panel by the control marked ANTENNA to provide accurate alignment of the r-f stage with varying antenna load impedances. 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-6. Parasitic resistor R-26 prevents unwanted oscillations in this stage and tends to stabilize the amplifier. Resistor R-1 by-passed by capacitor C-4 provides self-bias for the stage. Resistor R-2 and capacitor C-5 act as decoupling network for the screen of tube V-1 and resistor R-3 and R-4 and capacitors C-6 and C-78 act as decoupling networks for the plate circuit. The signal across the primary of transformer T-6 is coupled to the grid of tube V-2 inductively by transformer T-6 and capacitively by capacitor C-7. Capacitor C-7 provides a small amount of coupling to improve the response at the high frequency end of the band, thus equalizing the r-f signal amplitude over the tunable frequency range. The signal developed at the grid of tube V-2 then feeds the mixer stage of the receiver.

b. Mixer. - The mixer stage employs a type 954 acorn type pentode in a cathode coupled mixer circuit. The secondary of transformer T-6 is tuned by section C-1B of the ganged tuning capacitor and trimmer C-65. R-F signals selected by the parallel resonant circuit are applied to the grid of the mixer tube, V-2. A signal from the local oscillator 5.25 mc higher in frequency than the received signal on band #1 and 5.25 mc. lower in frequency than the received signal on bands #2 and #3 is fed to the mixer tube through the cathode and provides the difference frequency of 5.25 mc for the i-f amplifier stages.

c. Oscillator. - The oscillator circuit consists of a type 955 acorn type triode in a tuned-plate untuned grid type of oscillator circuit. The frequency of oscillation is determined by a resonant circuit consisting of the secondary of transformer T-9 and section C-1C of the main tuning capacitor connected in parallel. Capacitor C-11 is used to trim transformer T-9 (Band #3) only, although it remains in the circuit on bands #1 and #2. The r-f energy is fed from the plate of tube V-15 to the tuned circuit by the d-c blocking capacitor C-56. The decoupling network in the plate circuit of the oscillator tube consists of R-63, L-1, C-55 and R-62. Resistor R-66 (in band #3 only) and capacitor C-57 (in all bands) in series with the feed-back winding of transformer T-9 provide grid voltage across resistor R-64 for the oscillator tube. The oscillator voltage is supplied for the mixer stage by a third winding on transformer T-9 which is fed to the mixer tube (V-2) through capacitor C-9.

d. First and 2nd I-F Amplifier. - The 1st and 2nd i-f amplifier stages employ type 6AC7 and 6AB7 pentodes respectively. The i-f amplifier coupling transformers T-10, T-11, and T-12 for these two stages are tuned to 5.25 mc. by adjusting the powdered iron core slugs in both primary and secondary windings. The gain of the 1st and 2nd i-f amplifier stages is varied by the R.F. GAIN control (R-11), connected in series with the cathodes of both tubes, to provide sensitivity control for the receiver instead of the usual practice of varying the gain of the r-f amplifier stages. This method of control permits the r-f amplifier stages to operate at maximum gain, thereby providing a high signal to noise ratio at all sensitivity settings. The a-v-c grid voltage is applied to this section of the receiver through the decoupling networks C-12, R-10, C-16, and R-19. The a-v-c voltage is supplied by the 2nd detector tube (V-6) during a-m reception and a small amount of voltage is also supplied for a similar purpose, from the limiter tube (V-7) during f-m reception. Since the 1st and 2nd i-f amplifier stages are used for both a-m and f-m reception, the band width of the i-f amplifier channel is varied to provide a relatively sharp frequency response for a-m reception (SELECTIVITY switch set at SHARP) and a relatively broad frequency response for f-m reception. (SELECTIVITY switch set at BROAD). The selectivity of the i-f amplifier is controlled by switching in a third winding which varies the coupling between the primary and secondary windings. In SHARP position, the coupling winding is disconnected and only the coupling between primary and secondary windings determines the band width of the i-f amplifier. In BROAD position, the coupling winding is introduced to increase the coefficient of coupling between primary and secondary winding. The increase in coupling broadens the i-f amplifier frequency response to accept f-m signals. The signal voltage supplied by the 2nd i-f amplifier is fed to the limiter and discriminator for f-m reception and to the 3rd i-f amplifier stage and 2nd detector for a-m reception.

e. Final I-F Amplifier. - The last i-f amplifier stage, used for a-m reception, employs a type 6SK7 pentode connected in a conventional class A amplifier circuit. The stage is coupled by transformers T-12 and T-13 which are tuned by adjustable powdered iron core slugs. Resistor R-25 by-passed by capacitor C-21 provides self-bias for the stage. The gain of this stage is not varied as was the case for the 1st and 2nd i-f amplifier stages. The amplified signal voltage developed across the secondary of transformer T-13 is then fed to the 2nd detector for demodulation of a-m signals.

f. A-M 2nd Detector and A-N-L. - Both the second detector and automatic noise limiter stages employ a single type 6H6 duo-diode. One diode section of tube V-6 serves as detector for amplitude modulated signals by rectifying the modulated carrier. The r-f filter for this type of detection consists of resistor R-31 and capacitors C-24 and C-26 connected in a pi-section. Automatic volume control voltage and audio frequency voltage is obtained from the load and voltage divider resistors R-33, R-34, and R-36. Resistor R-35 and capacitor C-8 serve as a-v-c decoupling. The remaining diode section of tube V-6 serves as automatic noise limiter as follows: Capacitor C-25 becomes charged by the rectified carrier voltage and the time constant of this capacitor and the 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-25 becomes more negatively charged than the charge held by capacitor C-25, hence, current flows shorting the audio voltage to ground through capacitor C-25 until the cathode voltage of the a-n-l diode again reaches a less negative potential than its plate and capacitor C-25 acquires its normal charge again. By shorting the audio voltage to ground during a noise pulse, the a-n-l circuit prevents the objectional noise pulses from reaching the audio amplifier stages.

g. Beat Frequency Oscillator. - The beat frequency oscillator employs a type 6J5 triode tube in a modified Hartley oscillator circuit. The oscillator frequency is adjusted by a moveable powdered iron core within the field of coil L-5. This iron core adjustment sets the oscillator's frequency at 5.25 mc. and is adjusted by a screw driver during alignment. The fine adjustment of the oscillator frequency re-

quired to provide control of the beat note frequency is controlled by variable capacitor C-60 (PITCH CONTROL) which tunes a small portion of the total oscillator coil (L-5). The B.F.O. switch controls the use of the oscillator by breaking the plate voltage lead to the tube. The decoupling network R-60 and C-52 prevents the oscillator signal from reaching the other stages through the "B" voltage supply.

h. **F-M Limiter and Discriminator.** - The frequency modulation detector consists of a limiter stage and a discriminator stage. The 6AC7 limiter tube (V-7) is fed by the second i-f transformer secondary winding along with the third i-f amplifier tube V-5 for a-m reception. The limiter stage operates as a saturated amplifier in which the output voltage remains constant over a large range of input voltage levels, thus eliminating variations in the amplitude of the carrier signal to be demodulated by the discriminator. When operating as an f-m receiver, automatic volume control action is obtained by applying a part of the voltage developed across resistor R-39 in the grid return of the limiter tube (V-7), to the control grids of the 1st and 2nd i-f amplifier tubes (V-3 and V-4) through section SW-8A of the A.M./F.M. switch. The constant level signal voltage from the limiter tube (V-7) is fed to the type 6H6 discriminator tube (V-8) through the discriminator transformer (T-14) and coupling capacitor C-29. The discriminator circuit, consisting of transformer T-14, tube V-9 and load resistors R-40 and R-41, converts the frequency variations of the f-m signal into amplitude variations or the audio signal. The de-emphasis network, consisting of resistor R-42 and capacitor C-32, attentuates the high frequency end of the audio range since these frequencies are emphasized as the f-m transmitter. From the de-emphasis network the audio signal is fed to the A.F. GAIN control (R-43) in the same way as the audio signal from the amplitude modulation detector tube (V-6).

i. **Audio Amplifier.** - The audio amplifier stages consists of a class A phase inverter amplifier employing a type 6SL7GT twin-triode driving a pair of 6V6GT/G pentodes in push-pull class A. The audio signal from either the a-m detector or the f-m discriminator is fed to the grid of the first triode section of the phase inverter tube (V-9) through the A.F. GAIN control (R-43). The amplified audio signal voltage from the first triode section of tube V-9 is fed to the grid of power amplifier tube V-12 and to the grid of the second triode section of tube V-9 through the voltage divider network consisting of resistors R-50 and R-51 which also serve as grid return for the power amplifier tube (V-12). The audio signal voltage developed across the plate load resistor (R-45) of the second triode section of tube V-9, which is now 180 degrees out of phase, is then fed to the remaining power amplifier tube (V-11) grid. The output of the power amplifier tubes is coupled to the load through transformer T-15, the secondary of which provides output impedances of 500 ohms and 5000 ohms to ground and 600 ohms balanced to ground. The network consisting of R-69, R-53 and C-35 supplies inverse feedback in various amounts to provide tone control ranging from bass boost to high frequency cutoff. The TONE switch SW-9 selects the required network combination.

j. **Tuning Meter.** - The tuning meter serves two circuits in the receiver depending upon the type of signals being received. It is switched from one circuit to the other by the A.M./F.M. switch (SW-8 sections B and C).

(1) **A-M Reception.** - When metering the reception of a-m signals, the tuning meter measures the plate current of the 2nd i-f amplifier tube (V-4) which varies with the strength of the signal carrier. Resistor R-58 sets the zero (no signal) position of the tuning meter by controlling that part of the plate current of tube V-4 flowing through the meter. The intermediate frequency signal voltage then drives the plate current of tube V-4 to a lower value depending upon the signal strength. The screen grid voltage of tube V-4 is regulated by the voltage regulator tube (V-10) to provide an accurate control over the zero signal plate current so that the meter adjustment resistor (R-58) need not be continually re-set for variations of the a-c line voltage.

(2) **F-M Reception.** - When metering reception of f-m signals the tuning meter measures the unbalanced current in resistors R-40 and R-41 obtained when the receiver is tuned to one side of the f-m carrier. When the receiver is tuned to the exact center of the f-m carrier the meter rests at zero indicating that the currents in the discriminator load resistors are equal. Resistor R-56 functions to limit the maximum current in the meter circuit to a safe value.

k. **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 115 or 230-volt a-c mains. The a-c current is fed through the line filter which is a low pass pi-section network connected in each side of the line. The network consists

of inductances L-2 and L-3 and capacitors C-48, C-49, C-50 and C-51. The line filter attenuates all the objectionable noise components coming into the receiver circuit through the a-c power source. The line voltage at which the receiver will operate is determined by the setting of the line voltage switch SW-10. This switch simply connects the two 115-volt primary windings of transformer T-16 in parallel for 115-volt operation or series for 230-volt operation. A type 5U4G (tube V-13) full wave rectifier is employed in a conventional full wave rectifier circuit. The high voltage from this rectifier is fed to the 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 SEND/REC. switch is connected in series with the high voltage lead from the rectifier filament to the shorting plug socket to break the high voltage circuit to the receiver's filter sections, thereby, disabling the receiver but at the same time keeping the tube heaters hot, ready for instant use. The filter circuit consists of two low pass pi-section networks made up of inductances L-6 and L-7 and capacitors C-42, C-43, and C-44. In order to provide a constant "B" voltage for the oscillator, mixer, and screen grid of the 2nd i-f amplifier stages a voltage regulator tube type OD3/VR-150 is used. The voltage supplied to the screen of tube V-4 is regulated to provide accurate current control for the tuning meter connected in the plate circuit of this tube.

(2) D-C Operation. - External 6-volt storage battery and 270-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.

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 BEFORE 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 and associated gear drive. Dust should be blown out with dry air or brushed out carefully. Do not oil the gear teeth or the condenser wipers, as noisy reception will result from intermittant electrical contact at these points. Noisy 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 with exception of the three acorn types are accessible at the top of the chassis through the hinged cover of the cabinet. The three acorn type tubes are made accessible by removing the top cover of the r-f section which is held down by anchor clips. The acorn type tubes are inserted with the short end of the body in the socket. Acorn tubes are more fragile than the rest and must be handled accordingly. If the grid and plate clips on the connections to these tubes become loose replace or bend them to fit firmly. DO NOT ATTEMPT TO SOLDER DIRECTLY TO THE TUBE PIN as the heat generated by the soldering iron will crack the glass envelope. When replacing tubes, check the tube type carefully and replace with the correct tube 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 employs two lamps with bayonet type sockets to illuminate the calibrated tuning dial and the vernier dial. The lamps are to be replaced with a 6/8-volt, 250 ma. (blue bead) G.E. #44 or equivwlent. The color code referred to is the color of the glass bead above the glass stem inside the envelope of the lamp.

3. PERIODIC ADJUSTMENTS.

a. Tuning Meter Adjustment. -

(1) The tuning meter zero setting control is located behind its front panel button type cover, marked METER ADJ. Remove the button with a knife or screw driver blade.

(2) Disconnect the antenna and connect a jumper across terminals A_1, A_2, and GND. on terminal board TS-2.

(3) Set the front panel controls for amplitude modulation reception as follows:

(a) Set A.M./F.M. switch at A.M.

(b) Set A.V.C. switch at ON.

(c) Turn R.F. GAIN control to right until the switch on the control clicks.

(d) Set A.F. GAIN control for minimum gain. (All the way to the left.)

(e) Set A.N.L. switch at OFF.

(f) Set B.F.O. switch at OFF.

(g) Set SEND/REC. switch at REC.

(h) Set SELECTIVITY switch at SHARP.

(4) With a screw driver set the METER ADJ. control for the zero reading on the S-meter scale of the tuning meter.

(5) Remove the antenna terminal jumper and replace antenna leads and meter adjustment cover button, the adjustment is completed.

b. 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 personnel 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 5.25 mc. and 27 to 145 mc. range. Recommended generators are the Ferris Instrument Corp. Model 18D or 18FS and the Measurements Corp. Model 75.

(b) A 50-ohm non-inductive 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 10 watts of audio power for either 500 or 5000-ohm loads.

(2) I-F Amplifier Alignment. -

(a) Disconnect the grid lead of the type 954 mixer tube (V-2) and connect the "hot" lead of the signal generator to the grid of the mixer tube using a small clip or flexible piece of wire to make the connection. Connect the ground wire of the generator to the receiver chassis.

> CAUTION - Do not attempt to solder to the tube terminal as the heat of the soldering iron is certain to crack the glass envelope.

(b) Connect the output meter across the speaker terminals. Set the range of the output meter for its highest range to prevent overloading the meter accidentally.

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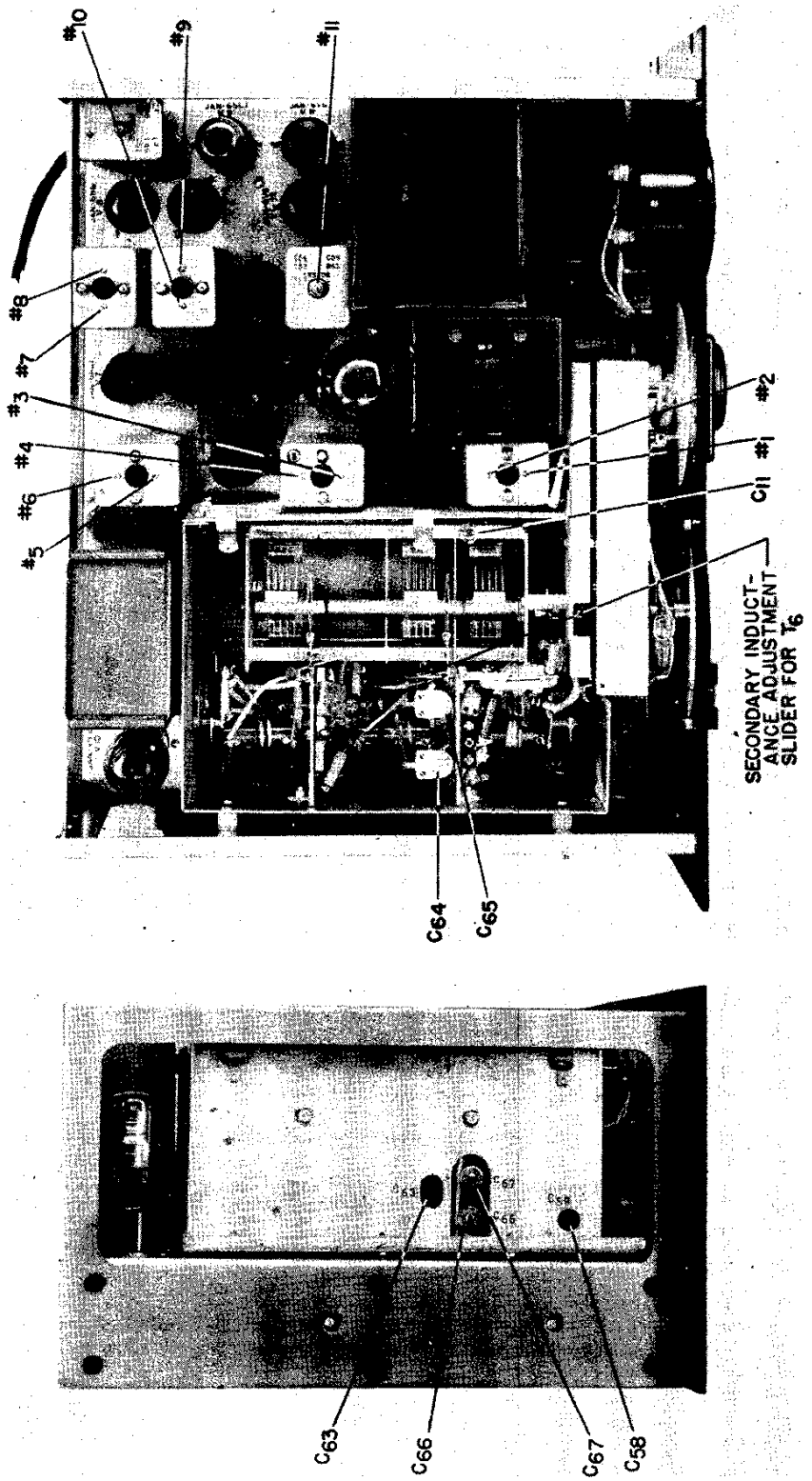


Figure 5-1. Radio Receiver Model S-36A, view showing alignment points.

(c) Let the receiver warm up for approximately half an hour, then set the receiver controls as follows:

R.F. GAIN control at maximum gain.

A.F. GAIN control at maximum gain. Work in a shielded room if possible.

SELECTIVITY switch at SHARP.

A.M./F.M. switch at A.M.
BAND SWITCH at band #2.

A.V.C. switch at OFF.

SEND/REC. switch at REC.

A.N.L. switch at OFF.

B.F.O. switch at OFF.

TONE control at HIGH FID.

(d) Set the signal generator frequency at 5.25 mc. and turn on the 400-cycle modulation.

(d) Adjust transformers T-10, T-11, T-12 and T-13 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 not be more than 70 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 #8 inclusive on i-f transformers T-10, T-11, T-12, and T-13.

(3) Discriminator Transformer Alignment. -

(a) Set the A.M./F.M. switch at F.M. and the SELECTIVITY switch at BROAD.

(b) Leave the signal generator set at 5.25 mc. with 400-cycle modulation.

(c) Adjust the secondary slug (#10) of the discriminator transformer (T-14) for zero signal level at the output meter. Note that this adjustment is critical, therefore turn the adjustment screw slowly. Use sufficient signal generator output to provide a good null indication.

(d) Detune the adjustment made in par. (c) slightly so that the output meter gives a readable indication.

(e) Adjust the primary slug adjustment (#9) of the discriminator transformer for maximum response.

(f) Retune the secondary (slug #10) of the discriminator transformer for the null point as in par. (c).

(g) Detune the signal generator to a frequency lower than the i-f frequency until the maximum output point is reached. Note the output meter reading and the frequency deviation from the i-f frequency (5.25 mc.).

(h) Repeat the procedure for the frequency above the i-f frequency. The frequency deviation and maximum output should be the same for good balance. If they are not, then tune the signal generator to the lower of the two peaks and adjust the primary slug adjustment (#9) until the output rises an amount equal to about half the difference of the two peaks previously noted.

(i) Retest for balance as above readjusting the primary slug adjustment until both maximum readings are alike when the signal generator is detuned approximately the same amount on either side of resonance (5.25 mc.). If a balance cannot be obtained, it is an indication that the discriminator transformer secondary slug adjustment (#10) has been misadjusted and will require a very slight correction in either direction. The direction of adjustment that will cause the off-tune peaks to assume the same values is the correct one. Care must be taken in adjusting the discriminator secondary control as even a very slight misadjustment will result in distortion of frequency modulated signals.

(4) B.F.O. Adjustment. - Set up the receiver and signal generator as for i-f amplifier alignment and proceed as follows:

(a) Shut off the 400-cycle modulation of the signal generator.

(b) Set the PITCH CONTROL at "0" and set the B.F.O. switch at ON.

(c) Back off the A.F. GAIN control slightly and use just enough signal generator output to provide a clean beat note.

(d) Plug a headset into the PHONES jack.

(e) Adjust the slug screw (#11) of coil L-5 for zero beat.

(f) Check the adjustment by turning the PITCH CONTROL to the right and left of "0". A change in the pitch of the beat note should result. The frequency of the beat note will vary from zero at the "0" setting to a very high pitch at the #5 setting of the control.

(g) Disconnect the signal generator and reconnect the grid lead to the mixer tube, the alignment of the i-f amplifier stages is completed.

(5) R-F Amplifier Alignment.- The following sequence must be followed to properly align the r-f amplifier stages. Band 3 is aligned first since the adjustment of trimmer C-11 is made for band 3 alignment only and will slightly effect the alignment of bands 1 and 2 if band 3 is not aligned first.

(a) Connect the "hot" lead of the signal generator to terminal "A1" of the antenna terminal board through a 50-ohm non-inductive resistor (carbon). Connect the ground lead of the generator to the receiver chassis. Leave the jumper connected between terminals "A_2" and "GND". Turn on the 400-cycle modulation.

(b) Let the receiver warm up for approximately half an hour, then set the receiver controls as follows:

R.F. GAIN control at maximum gain.

A.F. GAIN control at maximum gain.

SELECTIVITY switch at SHARP during alignment of band 1. and at BROAD during alignment of bands 2 and 3.

A.M./F.M. switch at A.M.

A.V.C. switch at OFF.

SEND/REC. switch at REC.

A.N.L. switch at OFF.

B.F.O. switch at OFF.

TONE control at HIGH FID.

NOTE For all alignment adjustments the signal generator output attentuator must be adjusted to provide a 500 milliwatt audio signal output at the speaker terminals of the receiver.

NOTE - During each of the following adjustments the ANTENNA control should be touched up to keep the antenna stage in alignment.

(c) Band 3. Alignment. - (BAND SWITCH at 3.)

1. Set the signal generator at 135 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 135 mc. no adjustment of capacitor C-11 is necessary if not, adjust C-11 for maximum output with the receiver dial set at 135 mc.

2. Set the signal generator at 90 mc. and tune in its signal on the receiver. If the receiver dial reads 90 mc. no adjustment of the plate winding inductance of transformer T-9 is necessary - if not, loosen the setscrew at the frame of the main tuning condenser (C-1), holding the end of the plate coil, and adjust the inductance. Increase the inductance if the generator signal falls lower than the 90 mc. calibration point on the receiver dial and reduce the inductance if the signal

falls above the 90 mc. calibration point. Tighten down the set screw each time before checking the adjustment.

NOTE - If the plate coil inductance was altered it will be necessary to repeat step 1. again. Several adjustments of capacitor C-11 in step 1. and the plate coil inductance in step 2. may be required in cases of where a new transformer (T-9) had to be installed.

3. Set the signal generator and receiver at 135 mc. and adjust trimmer capacitor C-65 for maximum output. Rock the tuning control back and forth slightly to determine the best adjustment.

4. Ordinarily no adjustment of the secondary winding inductance of transformers T-3 and T-6 is necessary at 90 mc., however, if the sensitivity of the receiver falls off at this end of the range or if new transformers have just been installed it will be necessary to adjust the secondary winding inductance for maximum response at 90 mc. Transformer T-6 is provided with a soldered slider adjustment at the gang condenser frame, however, the ground side of the secondary of transformer T-3 must be unsoldered to be adjusted. The value of inductance that provides maximum audio signal at the output meter is the correct adjustment.

NOTE - If the secondary inductance was altered it will be necessary to repeat step 3. again. Several adjustments of capacitor C-65 in step 3. and inductance in step 4. may be necessary depending upon the condition of the coils.

(d) **Band 2. Alignment. - (BAND SWITCH at 2.)**

1. Set the signal generator at 80 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 80 mc. no adjustment of capacitor C-67 is necessary - if not, adjust capacitor C-67 for maximum output with the receiver dial set at 80 mc.

2. Set the signal generator at 50 mc. and tune in its signal on the receiver. If the receiver dial reads 50 mc. no adjustment of the plate winding inductance of transformer T-8 is necessary - if not, it will be necessary to loosen the winding from the form with lacquer thinner and shift the individual turns until the signal peaks with the receiver dial set at 50 mc. Repeat step 1. above and recheck step 2. again before cementing the coil in place with Amphenol 912 cement.

NOTE - The presence of lacquer thinner may effect the winding inductance, hence, it is well to allow a few minutes for the lacquer thinner to evaporate before making inductance adjustments.

3. Set the signal generator and receiver at 80 mc. and adjust trimmer capacitor C-64 for maximum output. Rock the tuning control back and forth slightly to determine the best adjustment.

4. Ordinarily no adjustment of the secondary winding inductance of transformers T-2 and T-5 is necessary at 50 mc., however, if the sensitivity of the receiver falls off at this end of the range or if new transformers have just been installed it will be necessary to adjust the secondary winding inductance for maximum response at 50 mc. To adjust the secondary inductance it will be necessary to use lacquer thinner as in step 2. to loosen and shift turns until the signal peaks with the receiver dial set at 50 mc. Repeat step 3. above and recheck step 4. again before cementing the coils in place with Amphenol 912 cement.

(e) **Band 1. Alignment. - (BAND SWITCH at 1.)**

1. Set the signal generator at 45 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 45 mc. no adjustment of capacitor C-66 is necessary - if not, adjust capacitor C-66 for maximum response with the receiver dial set at 45 mc.

2. Set the signal generator at 30 mc. and tune in its signal on the receiver. If the receiver dial reads 30 mc. no adjustment of the padder capacitor C-58 is necessary - if not, adjust capacitor C-58 for maximum output with the receiver dial set at 30 mc.

3. Set the signal generator and receiver at 45 mc. and adjust trimmer capacitor C-63 for maximum response. Rock the tuning control back and forth slightly to obtain the best adjustment.

4. Ordinarily no adjustment of the secondary winding inductance of transformers T-1 and T-4 is necessary at 30 mc., however, if the sensitivity of the receiver falls off at this end of the range or if new transformers have just been installed it will be necessary to adjust the secondary winding inductance for maximum response at 30 mc. To adjust the secondary inductance it will be necessary to use lacquer thinner as before to loosen and shift turns until the signal peaks with the receiver dial set at 30 mc. Repeat step 3. above and recheck step 4. again before cementing the coils in place with Amphenol 912 cement.

NOTE - After completing the above alignment procedure check the image frequency to determine whether the oscillator frequency is higher than the signal frequency on band 1. and lower than the signal frequency on bands 2 and 3. For example: Set the receiver dial at 100 mc., set the signal generator frequency at twice the i-f,frequency lower than 100 mc. or 89.5 mc. and turn up the signal generator output to about 5000 times the normal alignment output. An image signal should be heard. If not, tune the signal generator to twice the i-f frequency higher than the signal frequency or 110.5 mc. and look for the image there. If the image shows up at 110.5 mc., the receiver's oscillator is operating above the signal frequency on this band and must be readjusted so that it falls below the signal frequency. Due to the construction of this receiver it is considered impossible to adjust the oscillator frequency so that it will fall on the wrong side of the signal frequency on any of the three bands, however, it is always well to check for the image after making any extensive alignment adjustments.

(f) When completely aligned the overall receiver sensitivity will usually run from 2 microvolts at 30 mc. to 10 microvolts at 130 mc. for 50 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 an RCA Volt-Ohymist Junior analyzer using 20,000 ohm per volt sensitivity. To prepare the receiver for measurement, disconnect the antenna, connect a jumper between the antenna terminals A_1, A_2 and GND, disconnect the speaker and replace with a 5000-ohm 10-watt resistor across the 5000-ohm output terminals or a 500-ohm 10-watt resistor across the 500-ohm terminals, and set the controls as follows:

SELECTIVITY switch at SHARP

SEND/REC. switch at REC.

A.M./F.M. switch at A.M.

A.V.C., A.N.L., and B.F.O. switches at ON.

R.F. GAIN and A.F. GAIN controls at maximum gain position.

ANTENNA, TONE, TUNING, and PITCH CONTROL adjustments do not effect the readings.

b. Resistance Chart. - Refer to Fig. 5-3. for the tube socket terminal to ground (chassis) resistance measurements.

The readings were taken with an RCA Volt Ohmyst Junior analyzer. To prepare the receiver for measurement, disconnect the a-c line cord and set the controls as follows:

SELECTIVITY switch at SHARP.

SEND/REC. switch at REC.

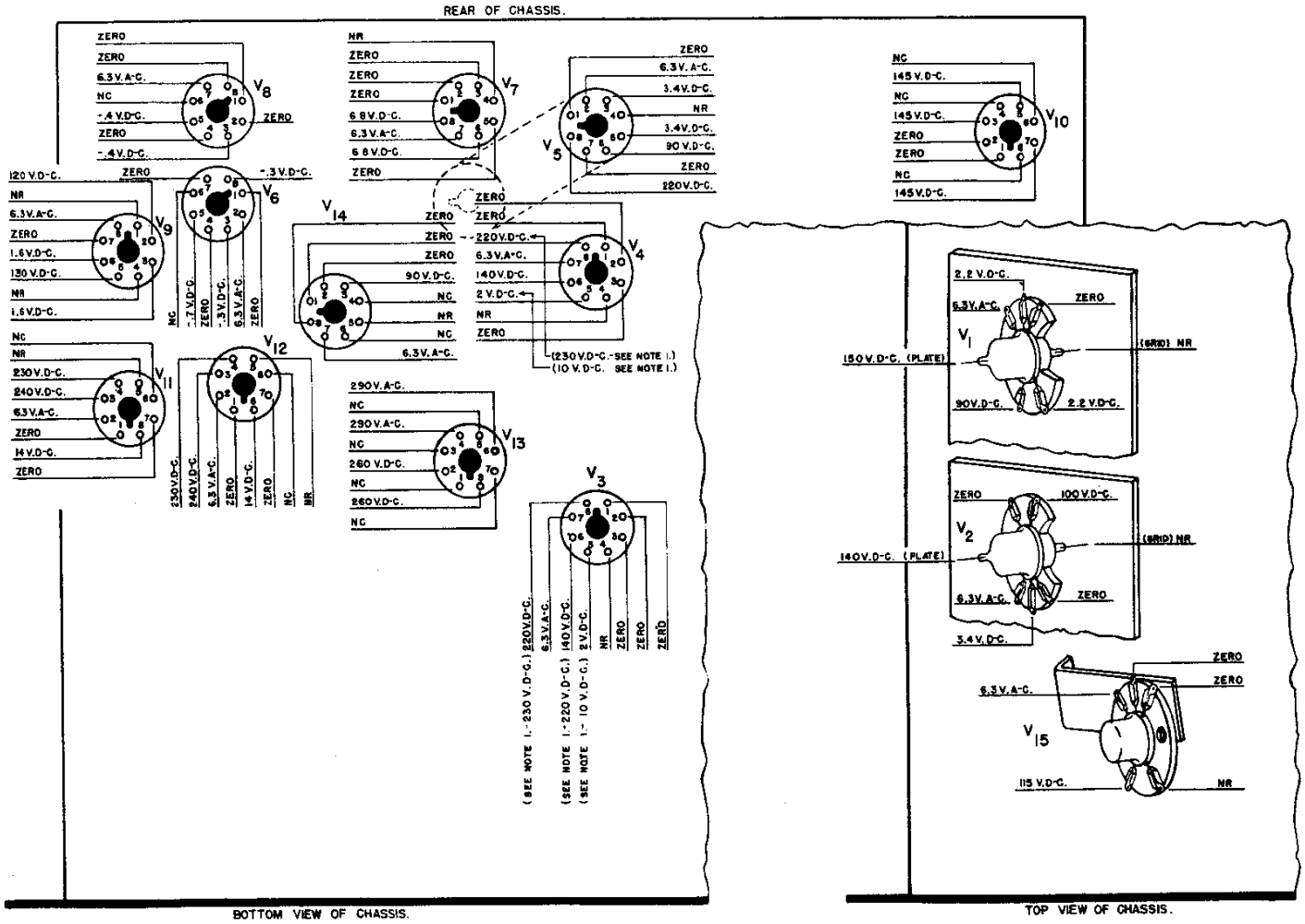
A.M./F.M. switch at A.M.

A.V.C., A.N.L., and B.F.O. switches at ON.

R.F. GAIN and A.F. GAIN controls at maximum gain position.

TONE control set at BASS BOOST.

ANTENNA, TUNING and PITCH CONTROL adjustments do not effect the readings.



NOTE : 1. VOLTAGE READING WITH R.F. GAIN CONTROL SET AT MINIMUM GAIN POSITION.
2. NC = NO CONNECTION.
3. NR = NOT READABLE ON A 20,000 OHM PER VOLT METER.

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Figure 5-2. Radio Receiver Model S-36A, voltage chart.

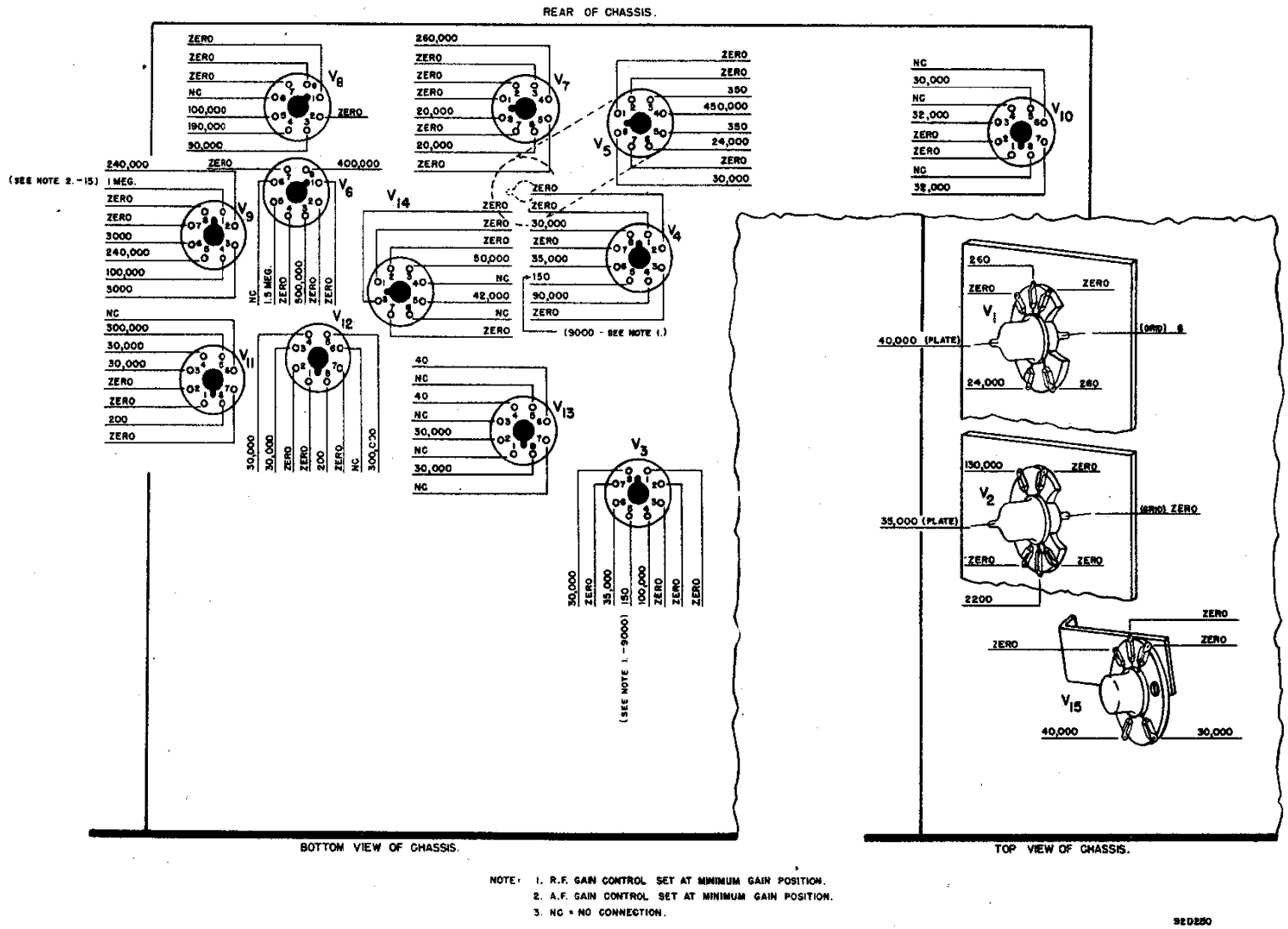

Figure 5-3. Radio Receiver Model S-36A, resistance chart.

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-15	TRANSFORMER, audio.	Primary	1 to 3	560
		½ primary	1 to 2/2 to 3	280
		600-ohm secondary	4 to 6	25
		½ 600-ohm secondary	4 to 5/5 to 6	12.5
		5000-ohm secondary	7 to 9	33
		500-ohm secondary	7 to 8	3
T-16	TRANSFORMER, power.	Primary #1	1 to 3	3.5
		Primary #2	2 to 4	3.5
		H.V. secondary	9 to 11	90
		½ H.V. secondary	8 to 10/10 to 11	45
		5.0-volt secondary	7 to 8	Zero
		6.3-volt secondary	5 to 6	Zero
L-6/L-7	Reactor, filter.	12-henry coil	1 to 2	215
		3-henry coil	2 to 3	85

SUPPLEMENTARY DATA

FREQUENCY RANGE.

27.8 mc. - 143 mc. (Covered in three bands).

AUDIO POWER OUTPUT.

Speaker operation - 3 watts with less than 5% distortion (500 or 5000 ohms).
Headset operation - 3 watts with less than 5% distortion (600 ohms).

SENSITIVITY.

At 30 mc. - 2.0 microvolts (For 50 milliwatt audio output).
At 135 mc. - 10.0 microvolts (For 50 milliwatt audio output).
(Signal generator modulated 30% at 400 cycles.)

AUDIO FIDELITY.

Audio response is flat within ± 3 db. from 40 to 10,000 cycles per second.

IMAGE RATIO.

Image ratio exceed 1000:1 at 30 mc., 300:1 at 58 mc.; 100:1 at 80 mc. and 60:1 at 100 mc.

SELECTIVITY.

I-F selectivity measured at the grid of the mixer tube is not less than 10kc. or more than 25 kc. with the SELECTIVITY switch at SHARP and not less than 65 kc. or more than 80 kc. with the SELECTIVITY switch at BROAD. at 6 db. down from resonance.

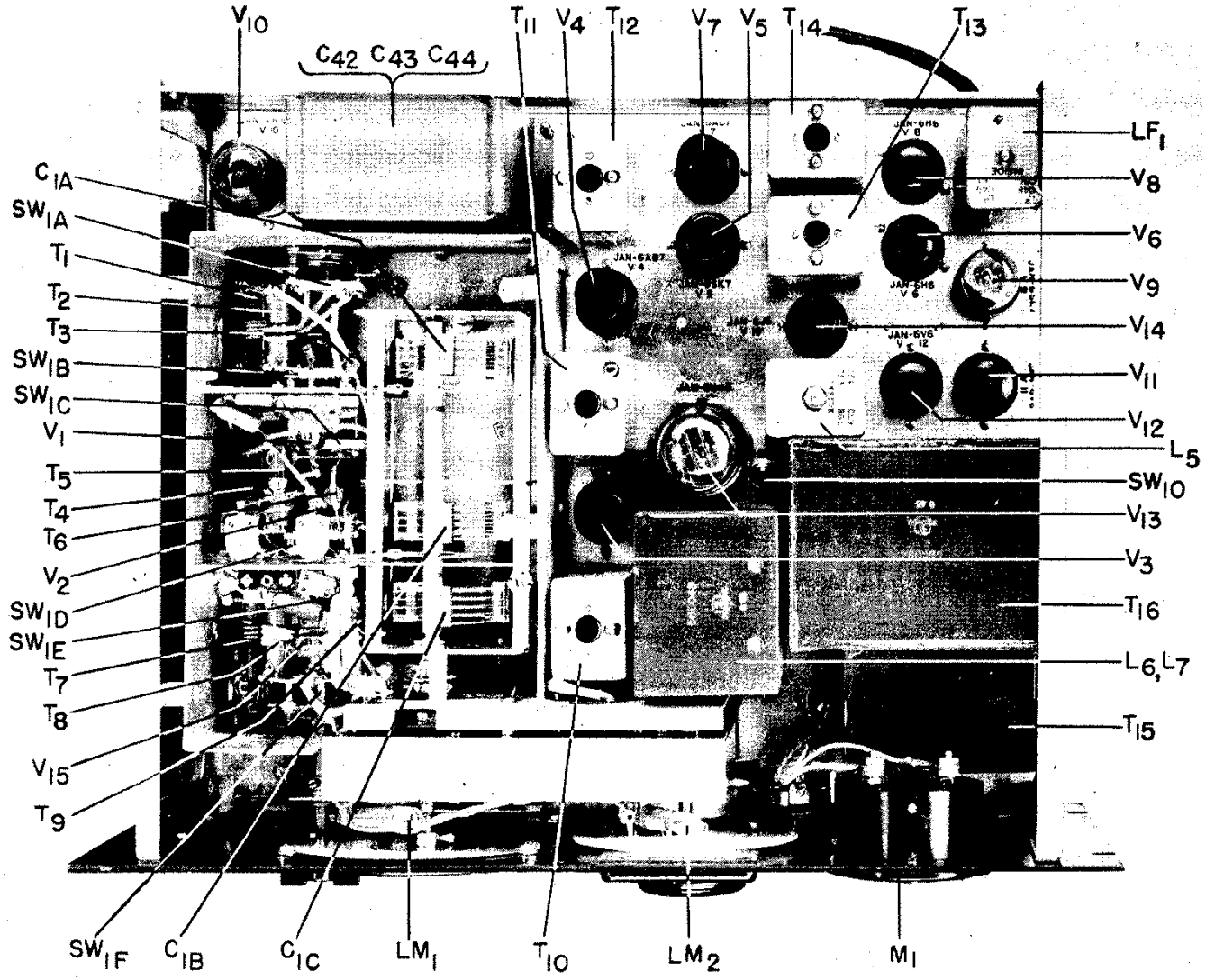

Figure 7-1. Radio Receiver Model S-36A, top view.

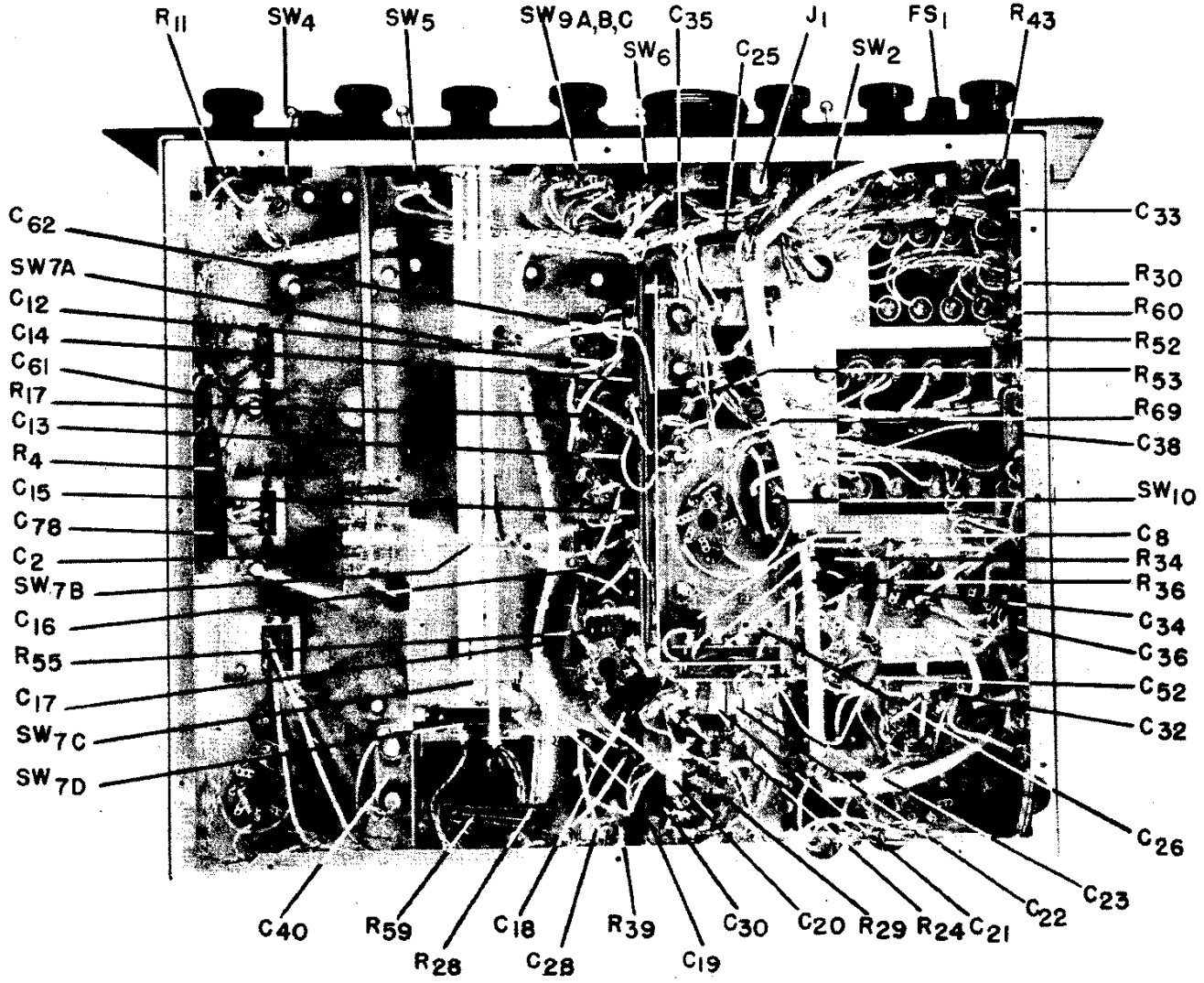

Figure 7-2. Radio Receiver Model S-36A, bottom view.

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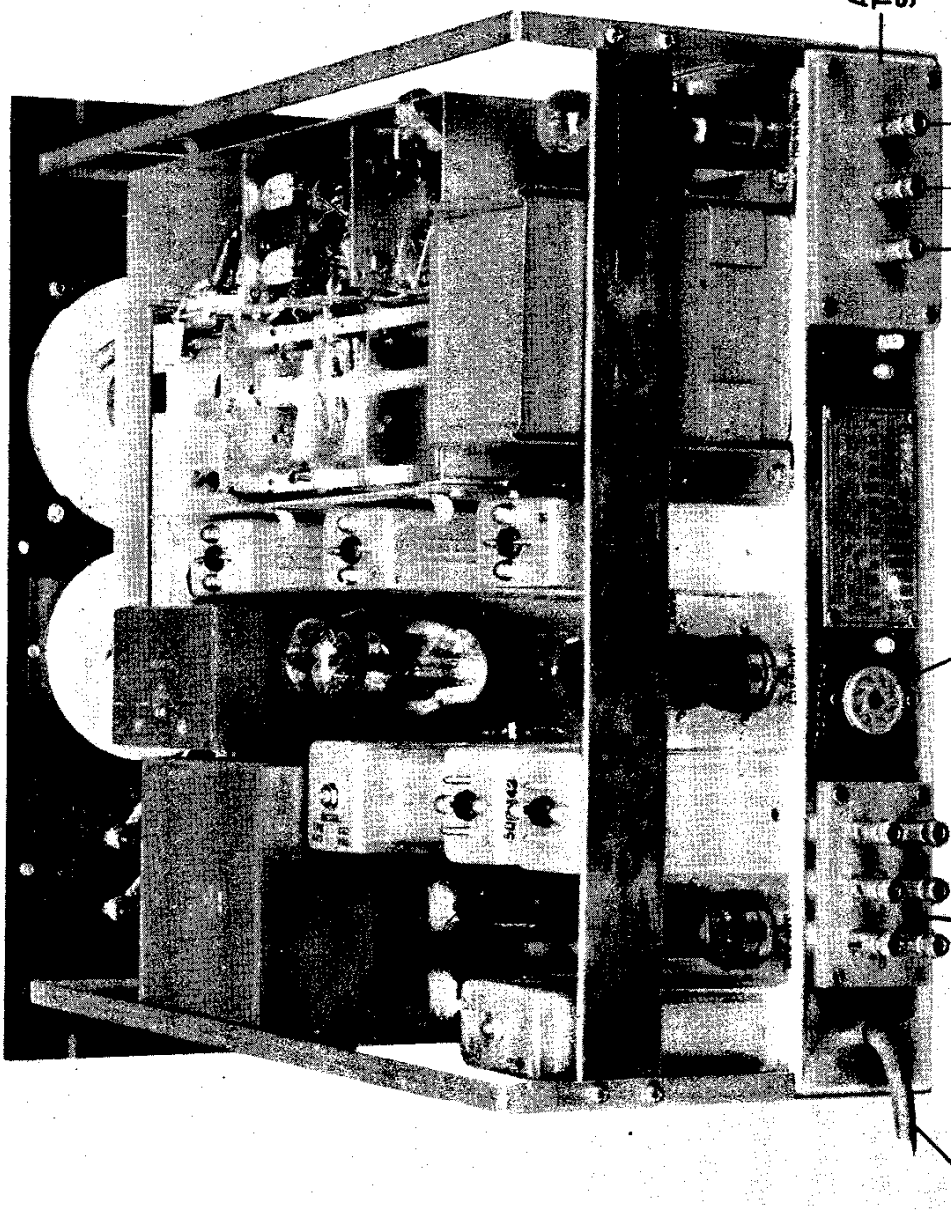

Figure 7-3. Radio Receiver Model S-36A, rear view.

CAPACITORS

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
C_1	Capacitor, variable: air dielectric; 3 section: 9 plates with double spacing between plates; min. cap, 6 mmfd., max. cap. 54.7 mmfd.; plates are aluminum: shaft silver plated brass ⅛" long x 0.375" dia., with x 2B insulation on stators; front rotor section grounded to frame, other two sections insulated from frame; spade lug mtg.; solder lug terminals.	OM special	48C147
C_2	Capacitor, variable: air dielectric; single section; 7 plates: min. cap. 3 mmfd., max. cap. 25 mmfd.; aluminum plates; ceramic insulation; brass shaft 3/4" long x ¼" dia., mtg. base ⅛" thick x 1-7/32" dia., mtg. centers 21/32"; total depth of unit 7/8"; solder lug terminals	BC type 22-7	48A039
C_3	Capacitor, fixed: mica dielectric; 330 mmfd. ± 10%; 500 V. D-C working; case 51/64" lg x 15/32" wd x 7/32" thk; same as C_5, C_9, C_{10}, C_{45}, C_{46}, C_{47}, C_{55}.	ASA	CM20A331K
C_4	Capacitor, fixed: mica dielectric: 2200 mmfd. ± 10%; 500 V D-C working; case 53/64" long x 53/64" wide x 9/32" thick; same as C_6, C_{52}, C_{61}.	ASA	CM30A222K
C_5	Same as C_3	-	-
C_6	Same as C_4	-	-
C_7	Capacitor, fixed: ceramic dielectric: 10 mmfd. ± 10%; 500 V. D-C working: temp. coeff. -0.00055 mmfd/ mmfd/ deg. Cent.; case 0.825" long x 0.225" dia.	CRL type 811-077	47A006
C_8	Capacitor, fixed: mica dielectric; 8200 mmfd. ± 10%; 500 V. D-C working; case 1-1/32" long x 41/64" wide x 11/32" thick; same as C_{13}, C_{14}, C_{15}, C_{17}, C_{18}, C_{19}, C_{21}, C_{22}, C_{23}, C_{30}, C_{33}, C_{36}, C_{37}, C_{62}, C_{78}.	ASA	CM40A822K
C_9	Same as C_3	-	-
C_{10}	Same as C_3	-	-
C_{11}	Capacitor, variable: air dielectric; small variable capacity formed between a 6-32 metal screw and a CRS plate 5/8" wd x 13/16" lg, rolled to 3/16" ID, at one end, with a 7/32" dia mtg hole 3/16" center from other end x 7/32" center from top side; cadmium plated plate.	H 48A140	48A140
C_{12}	Capacitor, fixed: paper dielectric; 1000 mmfd. + 100-20%; 600 V. D-C working; case 3/4" lg x ½" wd x 7/32" thk.	CE	47A121
C_{13}	Same as C_8	-	-
C_{14}	Same as C_8	-	-
C_{15}	Same as C_8	-	-
C_{16}	Same as C_{12}	-	-
C_{17}	Same as C_8	-	-
C_{18}	Same as C_8	-	-
C_{19}	Same as C_8	-	-
C_{20}	Capacitor, fixed: mica dielectric; 47 mmfd. ± 10%; 500 V. D-C working; case 51/64" long x 15/32" wide x 7/32" thick; same as C_{31}.	ASA	CM20A470K
C_{21}	Same as C_8	-	-
C_{22}	Same as C_8	-	-
C_{23}	Same as C_8	-	-
C_{24}	Capacitor, fixed: mica dielectric; 56 mmfd. ± 10%; 500 V. D-C working; case 51/64" long x 15/32" wide x 7/32"; thk same as C_{26}	ASA	CM20A560K
C_{25}	Capacitor, fixed: paper dielectric; 0.05 mfd. - 6 + 14%; 600 V. D-C working; metal case 1-25/32" long x 1-1/32" deep x 13/16" high, with 2 mtg. feet with 2-1/8" mtg. centers; 2 solder lug terminals insulated from case by neoprene seals and phenolic washers; same as C_{35}	IC type 7678	46A006
C_{26}	Same as C_{24}	-	-
C_{27}	Capacitor, fixed: mica dielectric; 100 mmfd. ± 10%; 500 V. D-C working; case 51/64" lg x 15/32" wd x 7/32" thick.	ASA	CM20A101K
C_{28}	Capacitor, fixed: mica dielectric; 560 mmfd. ± 10%; 500 V. D-C working; case 53/64" long x 53/64" wide x 9/32" thick.	ASA	CM30A561K
C_{29}	Capacitor, fixed: ceramic dielectric; 25 mmfd. ± 10%; 500 V. D-C working; negative 0 temp. coeff; body 5/8" lg x 3/16" dia.	IRC special	47A142
C_{30}	Same as C_8	-	-
C_{31}	Same as C_{20}	-	-
C_{32}	Capacitor, fixed; mica dielectric; 560 mmfd. ± 10%; 500 V. D-C working; case 1-1/16" long x 15/32" wide x 7/32" thick.	ASA	CM25A561K
C_{33}	Same as C_8	-	-
C_{34}	Capacitor, fixed: mica dielectric; 1000 mmfd ± 10%; 500 V. D-C working; case 53/64" square x 9/32 thk.	ASA	CM30A102K
C_{35}	Same as C_{25}	-	-
C_{36}	Same as C_8	-	-
C_{37}	Same as C_8	-	-
C_{38}	Capacitor, fixed: paper dielectric; 20 mfd. - 10 + 75%; 25 V. D-C working; case hermetically sealed metal 2-1/8" long x 1" deep x 13/16" high; 2 mtg. feet with 2-1/8" mtg. centers; 2 solder lug terminals insulated from the case; same as C_{40}	IC type 18113	46A011
C_{39}	Capacitor, fixed: mica dielectric; 150 mmfd. ± 10%; 500 V. D-C working; case 51/64" lg x 15/32" wd x 7/32" thk	ASA	CM20A151K
C_{40}	Same as C_{38}	-	-
C_{41}	Not used		
C_{42}, C_{43}, C_{44}	Capacitor, fixed: paper dielectric: triple unit; unit #1 is 4 mfd. 650 V. D-C working (C_{42}), unit #2 is 8 mfd. 650 V. D-C working (C_{43}), unit #3 is 8 mfd. 650 V. D-C working (C_{44}): hermetically sealed metal case 4-½" long x 2-½" deep x 5-7/16" high: 2 mtg. feet with 4-3/4" x 2" mtg. centers; 4 solder lug terminals (one common to all units) insulated from the case by bakelite and neoprene washers; terminals marked "8", "4", "8".	IC type 7382E	42B043
C_{45}	Same as C_3	-	-
C_{46}	Same as C_3	-	-
C_{47}	Same as C_3	-	-

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
C_{48}	Capacitor, fixed: mica dielectric: 8200 mmfd ± 20%; 500 V. D-C working; case 53/64" square x 11/32" thk; same as C_{49}, C_{50}, C_{51}.	ASA	CM35A822V
C_{49}	Same as C_{48}	-	-
C_{50}	Same as C_{48}	-	-
C_{51}	Same as C_{48}	-	-
C_{52}	Same as C_4	-	-
C_{53}	Capacitor, fixed: mica dielectric; 100 mmfd ± 20%; 500 V. D-C working; case 51/64" lg x 15/32" wd x 7/32" thk.	ASA	CM20A101K
C_{54}	Capacitor, fixed: ceramic dielectric; 300 mmfd ± 10%; 500 V. D-C working; zero temp. coeff; body 1.875" lg x 0.265" dia.	ER	47A026
C_{55}	Same as C_3	-	-
C_{56}	Capacitor, fixed: ceramic dielectric; 50 mmfd ± 2.5 mmfd; 500 V. D-C working; neg. 0.00075 mmfd/mmfd/deg. Cent.; body 7/16" lg x 7/32" dia.	ER type N750K	47A108
C_{57}	Capacitor, fixed: ceramic dielectric; 1000 mmfd ± 20%; 500 V. D-C working; body 11/16" lg x 3/16" dia.	MT type 20K1200	47A132
C_{58}	Capacitor, adjustable: mica dielectric; 450 mmfd ± 10%; bakelite mtg. insulation; 2 solder lug terminals to which are attached #18AWG tinned copper leads 1" long, both leads insulated from the frame; special L shaped mtg. frame 1" x 7/8" x 1"; octagon condenser frame 3/4" diam.	UE type S81A	44A050
C_{59}	Capacitor, fixed: twisted pair of leads to form 1 mmfd capacity.		
C_{60}	Capacitor, variable: air dielectric; min. cap. 3.5 mmfd, max. cap. 23 mmfd; ceramic insulation; 2 mtg. holes with 21/32" mtg. centers; one solder lug terminal (rotor plates); wire slot on stator plates mtg. posts; shaft 29/32" long x ¼" dia.; base 1-7/32" long x 15/16" wide; overall depth 3-3/8".	HC type 22-7	48A064
C_{61}	Same as C_4	-	-
C_{62}	Same as C_8	-	-
C_{63}	Capacitor, adjustable: mica dielectric; min. cap. 3 mmfd, max. cap. 50 mmfd; ceramic insulation; compression type adjustment; unit is 3/4" long x 5/8" wide x 11/16" deep including 2 solder lug terminals.	UE Special	44A049
C_{64}	Capacitor, adjustable: ceramic dielectric; 4 to 20 mmfd; 300 V. D-C working; screw driver adjustment; vertically mounted by a CRS special mtg bracket; same as C_{65}.	H Special	44A101
C_{65}	Same as C_{64}	-	-
C_{66}	Capacitor, adjustable: air dielectric; 1 to 12 mmfd; bakelite insulation; screw driver adjustment; 1-11/64" lg x 0.555" dia. overall excluding solder lug terminals; same as C_{67}.	MN type 22-5230 modified	44A140
C_{67}	Same as C_{66}	-	-
C_{68}	Capacitor, fixed: ceramic dielectric; 100 mmfd ± 3%; 500 V. D-C working; neg. 0.00005 mmfd temp. coeff.; body 3/4" lg x ¼" dia.; same as C_{69}, C_{70}, C_{71}, C_{72}, C_{73}, C_{76}, C_{77}.	ER Special	47A117
C_{69}	Same as C_{68}	-	-
C_{70}	Same as C_{69}	-	-
C_{71}	Same as C_{68}	-	-
C_{72}	Same as C_{68}	-	-
C_{73}	Same as C_{68}	-	-
C_{74}	Capacitor, fixed: ceramic dielectric; 50 mmfd ±10%; 500 V. D-C working; zero temp. coeff; body 3/4" lg x 1/4" dia.; same as C_{75}.	ER Special	47A091
C_{75}	Same as C_{74}	-	-
C_{76}	Same as C_{74}	-	-
C_{77}	Same as C_{74}	-	-
C_{78}	Same as C_8	-	-
	FUSES		
FS_1	Fuse: 3 amperes 6250 V.; 3AG; glass enclosed; 1-¼" long x 9/32" dia.; cans nickle plated copper alloy; carries 110% of rated current; vibration factor is 200.	LF type 1099	30A318
	JACKS		
J_1	Jack, phone: switching-one make, one break; steel frame; silver contacts; rubber and bakelite insulation; mounted by 3/8-32 brass bushing ¼" long; frame dimensions 1-19/32" x 27/32" x 3/4"; solder lug contacts; 1" from front of bushing to tip contact.	C type ST-687 modified	36B008
	INDUCTORS		
L_1	Inductor, R-F: 73 turns of #38SCE single layer winding; inductance 15.5 microhenries ± 10%; d-c resistance 4.10 ohms ± 3%; wound on molded bakelite coil form 15/16" long x 5/32" dia., coated with Chinese red lacquer; air core.	SWI type 661	53A008
L_2	Inductor, line filter: 57 turns of #22SCE universal winding; 46 microhenries inductance; winding ¼" ID x 1-1/16" OD x 9/32" lg; air core; coil form 1" lg x ¼" dia., tapped 6-32 at each end for mtg.	H 53A082	53A082
L_3	Same as L_2		
L_4	Inductor, R-F: 42 turns of #28SCE single layer winding; inductance 4.20 microhenries ± 10%; d-c resistance 0.25 ohms ± 70%; wound on molded bakelite coil form 7/8" long x 9/32" dia., coated with Chinese blue lacquer; air core.	SWI type 662	53A009
L_5	Inductor, beat frequency oscillator: 15-7/8 turns of #15/44 B cel. litz single layer winding tapped 3-1/8" turns and 10-7/8 turns from start of winding; coil wound on xx bakelite tube 1-5/8" long x ¼" O.D. x 0.409" I.D.; tuned by adjustable iron core; unit shielded; assembly includes resistor R_{61} and capacitors C_{53}, C_{54}, and C_{59}.	SWI type 3491	54C024

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
L_6 L_7	Inductor assembly, filter: 2 section unit; section #1 inductance 2 henries - 10 + 30% @ 150 milliamperes; d-c resistance 85 ohms ± 10%; connected to solder lug terminals #2 and #3 (L_6); section #2 inductance 12 henries - 10 + 20%, @ 90 milliamperes; d-c resistance 215 ohms ± 10%; connected to solder lug terminals #1 and #2 (L_7); each section has a separate iron core; coils and cores located so no mutual coupling exists; hermetically sealed case 3-½" long x 2-9/16" deep x 5-½" high; unit mounts by 4 threaded lugs with 2-5/8" x 1-9/16" mtg. centers; breakdown between core and windings 2000 V. RMS; heat rise under rated load 40 deg. Cent. or less	ST type 10C023	56C048
	LINE FILTERS		
LF_1	Line filter assembly: consists of inductors L_2 and L_3, and capacitors C_{48}, C_{49}, C_{50} and C_{51}, mounted in drawn aluminum can 4-15/32" high, x 1-3/8" wide x 1-13/16" deep with solder lug terminals and mounted by 4 spade lugs.	SWI type 3492	53A056
	LAMPS		
LM_1	Lamp: bayonet base 6 to 8 volts @ 250 milliamperes; glass bulb; same as LM_2	GE type 44	39A003
LM_2	Same as LM_1	-	-
	METERS		
M_1	Meter, "S" meter: calibrated in "S" units; 100-0-40 microamperes movement; body 2.82" dia. x 1.56" deep; round flush type mtg. plate 3.5 O.D., with 3 mtg. holes 120 degrees apart; includes 2 terminals 2-28-NF2 which project 0.69" from rear of meter.	H Special	82A097
	PLUGS		
PL_1	Plug and line cord assembly: 2 conductor #18 type S-J all rubber covered cord 6 feet long with a spring type (allied type 371) molded on plug at one end and stripped and tinned for 5/8" at the other end.	H type 1750	87A125
PL_2	Plug, octal: male, bakelite body 1-¾" O.D. x 7.16" thick; metal contact prongs 7/16" long; supplied with insulated jumpers between contacts 3 and 4, and contacts 6 and 7.	AP type CP-8	35A003
	RESISTORS		
R_1	Resistor, fixed: 270 ohms ± 10%; ½ watt; carbon; insulated: 0.249" O.D. x 0.655" long.	ASA	RC21AE271K
R_2	Resistor, fixed: 1000 ohms ± 10%; ½ watt; carbon; insulated: 0.249" O.D. x 0.655" long; same as R_3, R_6, R_{21}, R_{27}, R_{67}.	ASA	RC21AE102K
R_3	Same as R_2	-	-
R_4	Resistor, fixed: 10,000 ohms ± 20%; 2 watt; carbon; insulated: 0.342" O.D. x 1.78" long.	ASA	RC41AE103M
R_5	Resistor, fixed: 2200 ohms ± 10%; ½ watt; carbon; insulated: 0.249" O.D. x 0.655" long; same as R_{29}, R_{72}.	ASA	RC21AE222K
R_6	Same as R_2	-	-
R_7	Resistor, fixed: 100,000 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R_{33}, R_{40}, R_{41}, R_{51}.	ASA	RC21AE104K
R_8	Not used		
R_9	Resistor, fixed: 10 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R_{16}, R_{23}, R_{26}.	ASA	RC21AE100K
R_{10}	Resistor, fixed: 100,000 ohms ± 10%; ½ watt; carbon; insulated: 0.170" diam x 0.406" long.	ASA	RC10AE104K
R_{11}	Resistor, variable: 10,000 ohm ± 20%; #8 reversed taper; shaft 1" long x ¼" dia.; 3 solder lug terminals with the variable contact located in the center and the fixed contacts 1-7/16" apart; no taps; includes a toggle action switch (SW_3) on rear which closes the circuit when the control is turned to the extreme right (clockwise).	CT type 135	25C056G
R_{12}	Resistor, fixed: 120 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.468" long.	ASA	RC20AE121K
R_{13}	Resistor, fixed: 120 ohms ± 10%; ½ watt; carbon; insulated: 0.249" O.D. x 0.655" long; same as R_{20}.	ASA	RC21AE121K
R_{14}	Resistor, fixed: 39,000 ohms ± 10%; ½ watt, carbon; insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE393K
R_{15}	Resistor, fixed: 330 ohms ± 10%; ½ watt; carbon; insulated: 0.249" O.D. x 0.655" long; same as R_{22}, R_{25}, R_{92}.	ASA	RC21AE331K
R_{16}	Same as R_9	-	-
R_{17}	Not used.		
R_{18}	Resistor, fixed: 33 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R_{55}, R_{57}, R_{65}.	ASA	RC21AE330K
R_{19}	Same as R_{10}	-	-
R_{20}	Same as R_{13}	-	-
R_{21}	Same as R_2	-	-
R_{22}	Same as R_{15}	-	-
R_{23}	Same as R_9	-	-
R_{24}	Resistor, fixed: 470,000 ohms ± 10%; ½ watt; carbon; insulated: 0.249" O.D. x 0.655" long; same as R_{35}, R_{56}.	ASA	RC21AE474K
R_{25}	Same as R_{15}	-	-
R_{26}	Same as R_9	-	-
R_{27}	Same as R_2	-	-
R_{28}	Resistor, fixed: 7500 ohms ± 5%; 10 watt; wire wound; coated with baked vitreous enamel: 3.8" O.D. x 1-3 4" long.	IRC type AB	24BG752D
R_{29}	Same as R_5	-	-
R_{30}	Resistor, fixed: 22,000 ohms ± 10%; 2 watt; carbon; insulated: 0.342" O.D. x 1.78" long; same as R_{60}.	ASA	RC41AE223K
R_{31}	Resistor, fixed: 47,000 ohms ± 10%; ½ watt; carbon; insulated: 0.249" O.D. x 0.655" long.	ASA	RC21AE473K

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
R_{32}	Resistor, fixed: 1 megohm ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE105K
R_{33}	Same as R_7	-	-
R_{34}	Resistor, fixed: 220,000 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R_{35}, R_{39}, R_{42}, R_{44}, R_{45}, R_{49}, R_{50}.	ASA	RC21AE224K
R_{35}	Same as R_{24}	-	-
R_{36}	Same as R_{34}	-	-
R_{37}	Resistor, fixed: 15,000 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R_{71}.	ASA	RC21AE153K
R_{38}	Resistor, fixed: 56,000 ohms ± 10%; ½ watt; carbon, insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE563K
R_{39}	Same as R_{34}	-	-
R_{40}	Same as R_7	-	-
R_{41}	Same as R_7	-	-
R_{42}	Same as R_{34}	-	-
R_{43}	Resistor, variable: 1 megohm ± 20%; carbon; #6 taper; shaft 1" long x ¼" dia.; 3 solder lug terminals with the variable contact located in the center and the fixed contacts 1-7/16" apart; no taps.	CT type 125	25C058
R_{44}	Same as R_{34}	-	-
R_{45}	Same as R_{34}	-	-
R_{46}	Resistor, fixed: 3300 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R_{47}.	ASA	RC21AE332K
R_{47}	Same as R_{46}	-	-
R_{48}	Resistor, fixed: 100,000 ohms ± 20%; ½ watt; carbon; insulated; 0.249" diam x 0.655" long.	ASA	RC21AE104M
R_{49}	Same as R_{34}	-	-
R_{50}	Same as R_{34}	-	-
R_{51}	Same as R_7	-	-
R_{52}	Resistor, fixed: 220 ohms ± 10%; 2 watt; carbon; insulated; 0.342" O.D. x 1.76" long.	ASA	RC41AE221K
R_{53}	Resistor, fixed: 3900 ohms ± 10%; 2 watt; carbon; insulated; 0.405" diam x 1.41" long.	ASA	RC40AF392K
R_{54}	Not used		
R_{55}	Same as R_{17}	-	-
R_{56}	Same as R_{24}	-	-
R_{57}	Same as R_{17}	-	-
R_{58}	Resistor, variable: 1500 ohms ± 20%; wire wound; st. line taper; shaft 3/8" long x ¼" dia. slotted 1/16" x 1/16"; 3 solder lug terminals with the variable contact located in the center and the fixed contacts 1-7/16" apart; no taps.	CT type 125	25C060
R_{59}	Resistor, fixed: 3300 ohms ± 5%; 10 watt; wire wound; coated with baked vitreous enamel; 3/8" O.D. x 1-3/4" long.	IRC type AB	2486332D
R_{60}	Same as R_{30}	-	-
R_{61}	Resistor, fixed: 47,000 ohms ± 10%; ½ watt; carbon; insulated; 0.249" diam x 0.468" long.	ASA	RC20AE473K
R_{62}	Same as R_{15}	-	-
R_{63}	Resistor, fixed: 4700 ohms ± 10% ½ watt; carbon; insulated: 0.249" diam x 0.655" long.	ASA	RC21AE472K
R_{64}	Resistor, fixed: 22,000 ohms ± 10%; ½ watt; carbon; insulated: 0.249" O.D. x 0.655" long.	ASA	RC21AE223K
R_{65}	Same as R_{17}	-	-
R_{66}	Resistor, fixed: 6 ohms ± 10%; ½ watt; carbon; insulated; 0.215" O.D. x 7/16" long.	ER type 504	23A011
R_{67}	Same as R_2	-	-
R_{68}	Resistor, fixed: 8 ohms ± 10%; ½ watt; carbon; insulated; 0.215" O.D. x 7/16" long.	ER type 504	23A019
R_{69}	Resistor, fixed: 15,000 ohms ± 20%; ½ watt; insulated: 0.249" diam x 0.406" long.	ASA	RC20AE153M
R_{70}	Same as R_{52}.	-	-
R_{71}	Same as R_{37}.	-	-
R_{72}	Same as R_5.	-	-

SOCKETS

SO_1	Socket, octal: female; high dielectric mica filled bakelite body 1-7/64" dia. x 31/64" thick; silver plated phosphor bronze solder lugs; molded on steel mtg. plate 1-9/32" wide x 0.031 thick having 2 mtg. holes of 5/32" dia. x 1-½" mtg. centers; pins are numbered on back of socket clockwise from locating pin.	AP type MIPSTM	6A900

SWITCHES

SW_1	Switch, rotary selector: 3 position single pole, 7 section; non-shorting type contacts; ceramic wafers oval shaped 1-7/8" x 1-5/8" x 5/32" thick; 2 holes 0.144" dia. x 1-9/16" mtg. centers mount wafers individually; entire shaft 11-3/4" long x 0.248" dia. squared on opposite sides to 0.185" dia., with index plate 1-7/8" x 1-3/8" x 0.036" thick and having two 0.1875" stainless steel balls; 3 stops, each 60 degrees apart and position 1 symetrical to mtg. holes; minimum torque not less than 70 inch ounces.	OM type HC	60B181
SW_2	Switch, toggle: SPST; rated 3 amperes @ 250 V.; case 1" long threaded 15/32-32; solder lug contacts; same as SW_4, SW_5.	CH type 8280	60A175
SW_3	Switch, toggle action; SPST; part of resistor R_{58}	-	-
SW_4	Same as SW_2	-	-
SW_5	Same as SW_2	-	-
SW_6	Switch, toggle: DPST; rated 3 amperes @ 250 V.; case 1-3/32" long x 17/32" wide x 9/16" deep; mounted by bushing 15/32" long threaded 15/32-32; solder lug contact	CH type 8360 EZ	60A123

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
SW_{7A} SW_{7B} SW_{7C} SW_{7D} SW_{7E}	Switch, rotary selector: 3 section 3 position; 2 shields separate section #1 from rest of the assembly; a single pole A-C power switch is included at rear and is open at position #1, and closed in positions #2 and #3; all metal parts silver plated brass except for stainless steel index spring and ball; vacuum wax impregnated phenolic wafers; shorting type rotor contacts; frame 11° long including special mtg. bracket at rear of assembly; front of assembly mounts by 3/8-32 bushing $\frac{1}{2}$" long, shaft 1" long x $\frac{1}{4}$" dia.	OM type H	60B178
SW_{8A} SW_{8B} SW_{8C} SW_{8D}	Switch, rotary selector: single section 2 position; all metal parts silver plated brass except for stainless steel index spring and ball; vacuum wax impregnated phenolic wafer; non shorting teeth at contacts 5 and 8; frame 5/16" long, mounts by 3/8-32 bushing $\frac{1}{2}$" long; shaft 1" long x $\frac{1}{4}$" dia.	OM type QH	60A177
SW_9	Switch, rotary selector; 3 circuit; single section 4 position; metal parts brass, fungacide treated bakelite wafer; shorting type contacts; 1-3/8" lg x 1-7/16" wd x 1-5/8" h overall; shaft $\frac{1}{2}$" lg x $\frac{1}{4}$" dia.; mtg by 3/8-32 x $\frac{1}{2}$" lg brass bushing.	OM Special	60B212
SW_{10}	Switch, toggle, DPDT, rated 3 amperes @ 250 V., 1-3/4" long x 21/32" wide x 5/8" deep, mounted by bushing 13/32" long threaded 15/32-32, solder lug contacts.	MH	60A090

TRANSFORMERS

T_1	Transformer, R-F: 27.8 to 47 megacycles; one primary and one secondary winding; primary 1-$\frac{1}{2}$ turns of #30SCE single layer winding with a Q of 85 at 44 megacycles with 96.8 micro-microfarads; secondary 5 turns of #22 D cel. single layer winding with a Q of 163 at 26 megacycles with 83.5 micro-microfarads; air cores; coils wound on a xx bakelite tube 1-5/8" long x $\frac{1}{4}$" O.D. x 3/8" I.D.; solder lug terminals.	SWI type 651	51A265
T_2	Transformer, R-F: 46 to 82 megacycles; one primary and one secondary winding; primary 1-$\frac{1}{2}$ turns of #30SCE single layer winding with a Q of 67 at 45 megacycles with 106 micro-microfarads; secondary 1-7/8 turns of #18 D cel. braid single layer winding with a Q of 158 at 45 megacycles with 98 micro-microfarads; air cores; coils wound on a bakelite tube 1-5 8" long x $\frac{1}{4}$" O.D. x 3 8" I.D., solder lug terminals.	SWI type 654	51A266
T_3	Transformer, R-F: 82 to 143 megacycles; one primary and one secondary winding; primary 3-$\frac{1}{2}$ turns of #28 braided cel. single layer winding; secondary 1-$\frac{1}{2}$ turns of #14 solid copper single layer winding; air cores; coils wound on a solid form 3 4" long x $\frac{1}{4}$" dia.; extended coil winding leads for terminals.	SWI type 657	51A792
T_4	Transformer, R-F: 27.8 to 47 megacycles; one primary and one secondary winding; primary 28-$\frac{1}{2}$ turns of #34SCE single layer winding; secondary 6 turns of #22 D cel. braid; air cores; coils wound on a bakelite tube 1-5 8" long x $\frac{1}{4}$" O.D. x 3/8" I.D.; solder lug terminals.	SWI type 652	51B793
T_5	Transformer, R-F: 46 to 82 megacycles; one primary and one secondary winding; primary 11-$\frac{1}{2}$ turns of #34SCE single layer winding (wound counter-clockwise), secondar; 2-$\frac{1}{2}$ turns of #22 D cel. braid single layer winding (wound clockwise); air cores; coils wound on a bakelite tube 1-5/8" long x $\frac{1}{4}$" O.D. x 3/8" I.D.; solder lug terminals.	SWI type 655	51B794
T_6	Transformer, R-F: 82 to 143 megacycles; one secondary winding; primary 2-3/4 turns of #36SCE single layer winding; secondary 3/4 turns of #14 solid copper single layer winding; air cores; coils are wound on a solid bakelite from 7/8" long x $\frac{1}{4}$" dia.; extended coil winding leads for terminals.	SWI type 658	51A776
T_7	Transformer, R-F: 27.8 to 47 megacycles: one primary and two secondary windings; primary 1-3/4 turns of #34SCE; first secondary 4-1/8 turns of #22 D cel. braid; second secondary 2-$\frac{1}{2}$ turns of #30DCE; air cores; coils are wound on a bakelite tube 1-5/8" long x $\frac{1}{4}$" O.D.; solder lug terminals.	SWI type 653	51A267
T_8	Transformer, R-F: 46 to 82 megacycles; one primary and two secondary windings; primary 3/4 turn of #30S cel. braid; first secondary 2-$\frac{1}{2}$ turns of #18D cel. braid; second secondary $\frac{1}{2}$ turn of #22D cel. braid; air cores; coils are wound on a bakelite tube 1-5/8" long x $\frac{1}{4}$" O.D.; solder lug terminals.	SWI type 656	51A270
T_9	Transformer, R-F: 82 to 143 megacycles; one primary and two secondary windings: primary $\frac{1}{2}$ turn of #26 plain enamel; first secondary 1 turn of #14 bare copper wire; second secondary 1-$\frac{1}{2}$ turns of #28S cel. braid; air core; coils are wound on xx bakelite tube 1-5 8" long x 3 8" dia.; one solder lug and extended coil winding leads provide terminals.	SWI type 659	51B778
T_{10}	Transformer, intermediate-frequency; 5.25 megacycles; one primary and three secondary windings; primary 16$\frac{1}{2}$ turns single layer winding on adjustable polyiron core assembly; first secondary 1$\frac{1}{2}$ turns single layer winding on same form as primary; second secondary 21$\frac{1}{2}$ turns single layer winding on adjustable polyiron core assembly; third secondary 2$\frac{1}{2}$ turns wound on same form as second secondary; fixed trimmer capacitors (C_{68}) and (C_{69}), a fixed resistor (R_{10}) and a fixed capacitor (C_{12}) complete the assembly; aluminum shield can 4" high x 1-7 8" long x 1-7 16" wide with 4 spade lugs centered one on each side of shield; solder lug terminals at base numbered 1 thru 8 and a 7$\frac{1}{2}$" insulated stranded wire lead brought out through a hole in the side of the shield provide connections.	MH Special	50C140
T_{11}	Transformer, intermediate-frequency; 5.25 megacycles; one primary and three secondary windings; primary 16$\frac{1}{2}$ turns single layer winding on adjustable polyiron core assembly; first secondary 1$\frac{1}{2}$ turn winding on same form as primary; second secondary 20 turns single layer winding on adjustable polyiron core assembly; third secondary 2$\frac{1}{2}$ turn winding on same form as second secondary; fixed trimmer capacitors (C_{70}) and (C_{71}), a fixed resistor (R_{19}) and a fixed capacitor (C_{16}) complete the assembly; aluminum shield can 4" high x 1-7 8" long x 1-7 16" wide with 4 spade lugs centered one on each side of shield mounted 9 32" from base; solder lug terminals at the base numbered 1 thru 8 provide connections.	MH Special	50C141

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
T_{12}	Transformer, intermediate-frequency: 5.25 megacycles; one primary and three secondary windings; primary 16½ turns single layer winding on adjustable polyiron core assembly; first secondary 1½ turn winding on same form as primary; second secondary 20½ turns single layer winding on adjustable polyiron core assembly; third secondary 2½ turn winding on same form as second secondary; fixed trimmer capacitors (C_{72}) and (C_{73}), complete the assembly; aluminum shield can 4" high x 1-7 8" long x 1-7 16" wide with 4 spade lugs centered one on each side of shield mounted 9 32" from base; solder lug terminals at base numbered 1 thru 8 provide connections.	EW Special	50C142
T_{13}	Transformer, intermediate-frequency: 5.25 megacycles; one primary and one secondary winding; primary 31½ turns single layer winding on adjustable polyiron core assembly; secondary 31½ turns single layer winding on adjustable polyiron core assembly; fixed trimmer capacitors (C_{76} and C_{77}) complete the assembly; aluminum shield can 4" high x 1-7 8" long x 1-7 16" wide with 4 spade lugs centered one on each side of shield mounted 9 32" from base; solder lug terminals at base numbered 1 thru 8 provide connections.	EW Special	50C143
T_{14}	Transformer, discriminator: 5.25 megacycles; one primary and one secondary winding; primary 33 turns single layer winding on adjustable polyiron core assembly; secondary 35 turns center tapped single layer winding on polyiron core assembly; fixed trimmer capacitors (C_{74} and C_{75}), and a fixed coupling capacitor (C_{29}) complete the assembly; aluminum shield can 4" high x 1-7/8" long x 1-7/16" wide with 4 spade lugs centered one on each side of shield mounted 9/32" from base; solder lug terminals at base numbered 1 thru 8 provide connections.	EW Special	50C144
T_{15}	Transformer, A-F: one primary and 2 secondary windings; primary to match a 12,000-ohm push-pull load @ 35 ma. for each tube; first secondary to match a load of 600 ohms, center tapped; second secondary to match a load of 5000 ohms; iron core; case hermetically sealed; vacuum impregnated; coil and core assemblies bolted to brackets spot welded to case, solder lugs terminals marked 1 through 9 at base of transformer, 4 mtg. lugs at base with 3-1.16" x 1-11 16" mtg. centers; breakdown between windings and core 1000 R.M.S. volts.	ST type 10A40	55C082
T_{16}	Transformer, power: primary, 2 section winding connected in parallel for 115 V. A-C, and connected in series for 230 V. A-C operation, 50/60 cycles, single phase; first secondary center tapped to provide 270 V. D-C @ 150 milliamperes across 10 mfd. capacitor and a 2 henry 85 ohm choke with a 5R4G rectifier tube; second secondary 6.4 V. A-C @ 4 amperes; third secondary 5 V. A-C @ 3 amperes; hermetically sealed case 4-15/16" long x 3-3/4" deep x 5-5 16" high spot welded at all joints; coil and core assemblies bolted to brackets spot welded to case; vacuum impregnated; mounted by 4 lugs at base with 3-5/8" x 2-3 8" mtg. centers; 4 terminals threaded 8-32 NC-2 connected to primary as follows: 1 and 3 to one section of primary, 2 and 4 to other section of primary; 7 solder lug terminals connected as follows; 5 and 6 connect to secondary #2 (6.4 V. A-C), 7 and 8 connect to secondary #3 (5 V. A-C), 9 and 11 connect to secondary #1 (540 V. A-C), 10 is center tap for secondary #1 and ground for transformer case and core, iron core; breakdown voltages as follows between windings and core and case; primary - 1500 V. RMS, secondary #1-2500 V. RMS, secondary #2-1500 V. RMS, secondary #3-2500 V. RMS.	ST type 10P51	52C084

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
	TERMINAL BOARDS		
TS_1	Board, terminal: output; consists of vacuum impregnated natural linen bakelite mtg. board 3½" long x 2" wide x 1.8" thick with 4 mtg. holes 0.144" dia. and having 2-7.8" x 1-5/8" mtg. centers, marked "600 OHM CENTER TAP - GND. and 500 OHM, 5000 OHM-GND", six brass knurled thumb screw binding posts provide electrical connection.	H Special	41X5306
TS_2	Board, terminal: antenna input; consists of natural paper bakelite mtg. board 4-5/16" long x 2-½" wide x 3/16" thick with 4 mtg. holes 0.144" dia. and having 3-13/16" x 2" mtg. centers; marked A_1, A_2, GND; 3 brass knurled thumb screw binding posts provide electrical connections.	H Special	41X5308

INDEX TO PARTS MANUFACTURERS

Symbol	Manufacturer	Symbol	Manufacturer
AP	American Phenolic Corp. Chicago, Illinois	IC	Industrial Condenser Chicago, Illinois
ASA	Any manufacturer meeting the applicable American Standards Association specifications.	IRC	International Resistance Co. Philadelphia, Pa.
B	Belden Mfg. Co. Chicago, Illinois	LF	Littlefuse, Inc. Chicago, Illinois
BC	Brenner Chemical Co. Chicago, Illinois	MCM	McClintock Meter Co. Minneapolis, Minn.
CE	Coronet Electric Co. Chicago, Illinois	MN	Meissner Manufacturing Co. Mt. Carmel, Illinois
CH	Cutler-Hammer Milwaukee, Wis.	MT	The Muter Co. Chicago, Illinois
CRL	Centralab Milwaukee, Wis.	OM	Oak Manufacturing Co. Chicago, Illinois
CT	Chicago Telephone & Supply Co. Elkhart, Indiana	RC	Radio Condenser Corp. Chicago, Illinois
ER	Erie Resistor Erie, Pa.	RCA	RCA Manufacturing Co., Inc., Camden, N. J.
EW	Electronic Winding Corp. Chicago, Illinois	ST	Standard Transformer Corp. Chicago, Illinois
GE	General Electric Co. Schenectady, N. Y.	SWI	S.W. Inductor Co. Chicago, Illinois
H	The Hallicrafters Co. Chicago, Illinois	U	Utah Products Company Chicago, Illinois
HH	Hart & Hegeman Electric Co. Hartford, Conn.	UE	Underwood Electric Co. Chicago, Illinois