

General Electric Co.

Model: A82

Chassis:

Year: Pre November 1935

Power:

Circuit:

IF:

Tubes:

Bands:

Resources

[Riders Volume 6 - GE 6-24](#)

[Riders Volume 6 - GE 6-25](#)

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[Riders Volume 6 - GE 6-29](#)

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MODELS A-82, A-87
Schematic

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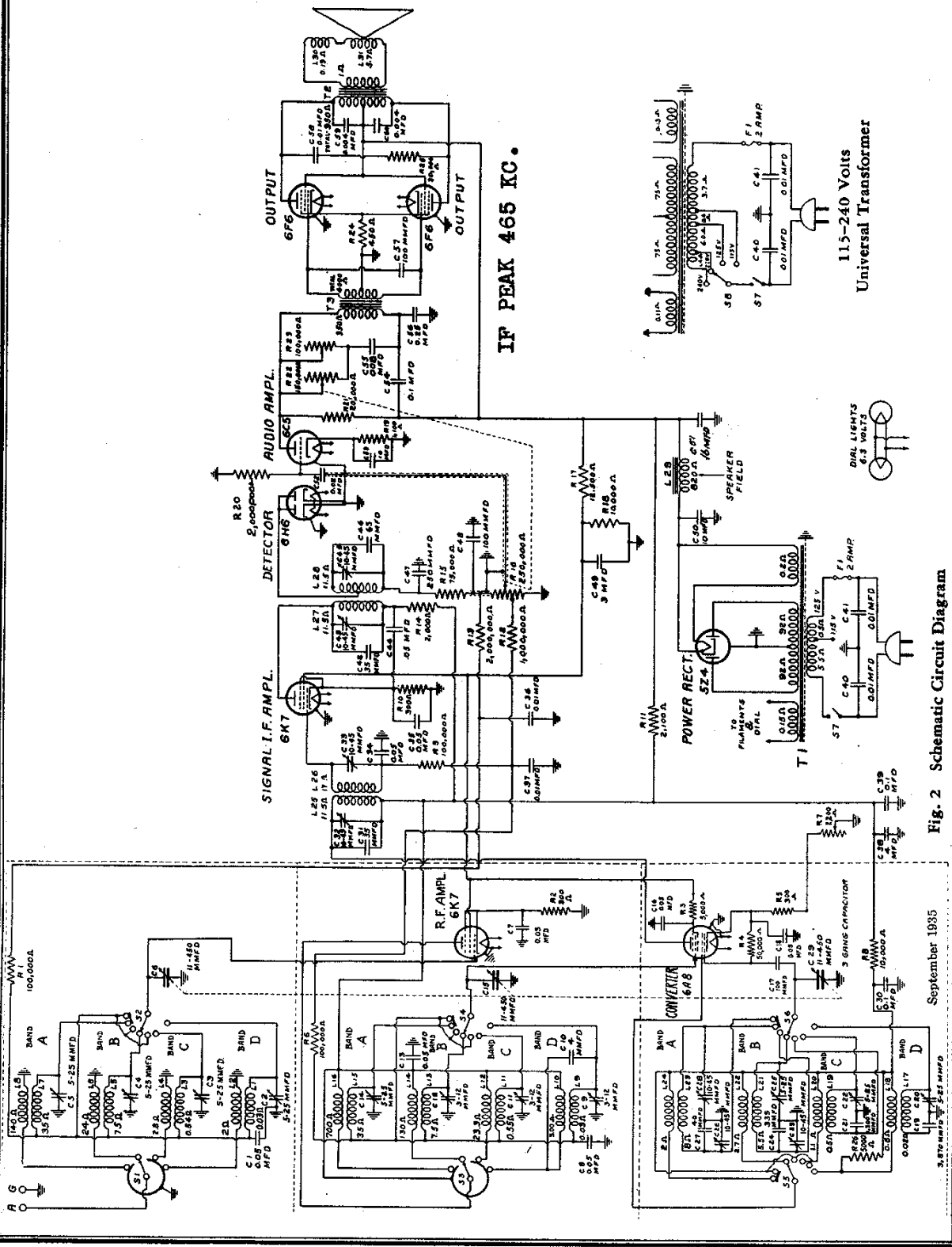


Fig. 2 Schematic Circuit Diagram

September 1935

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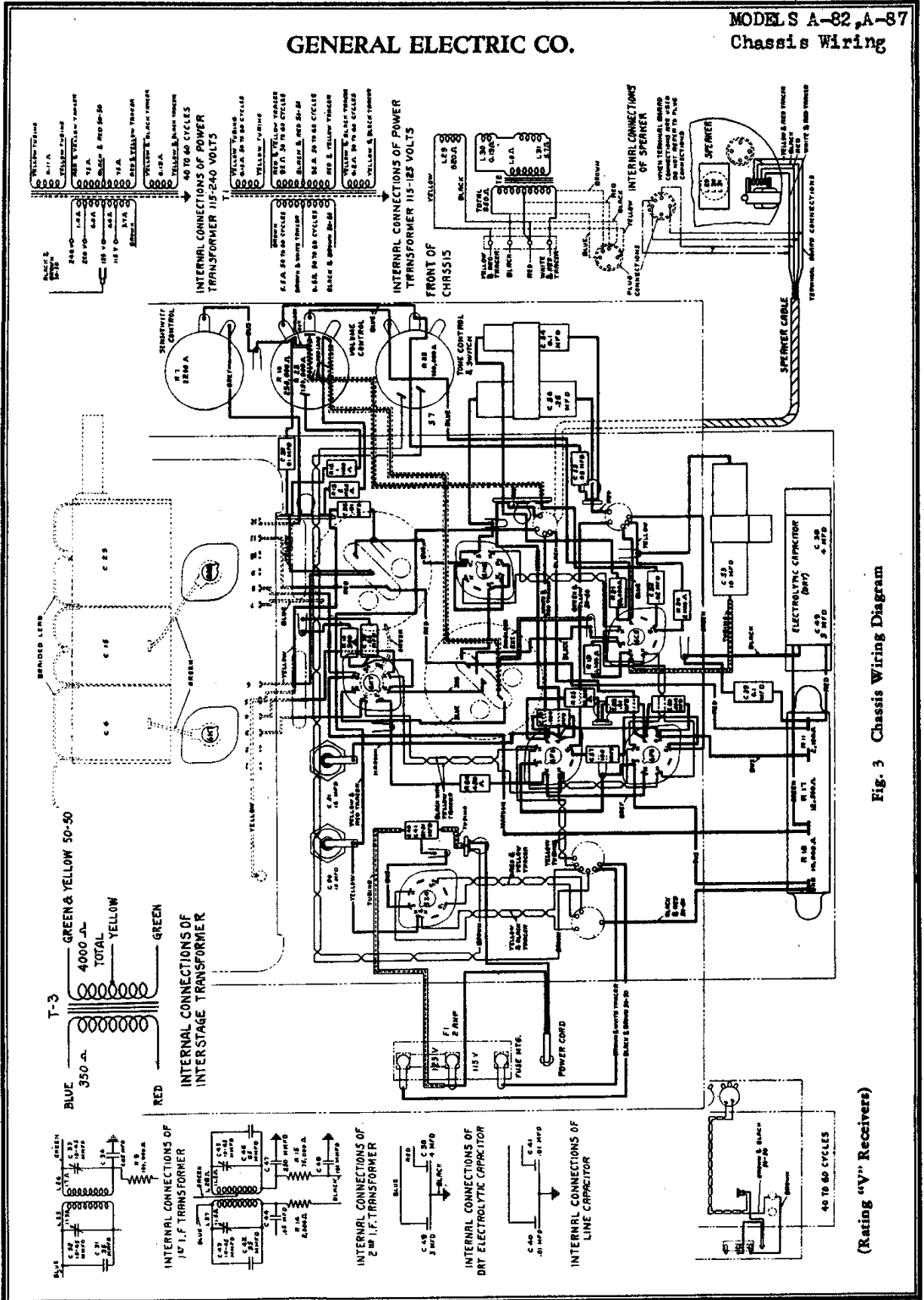


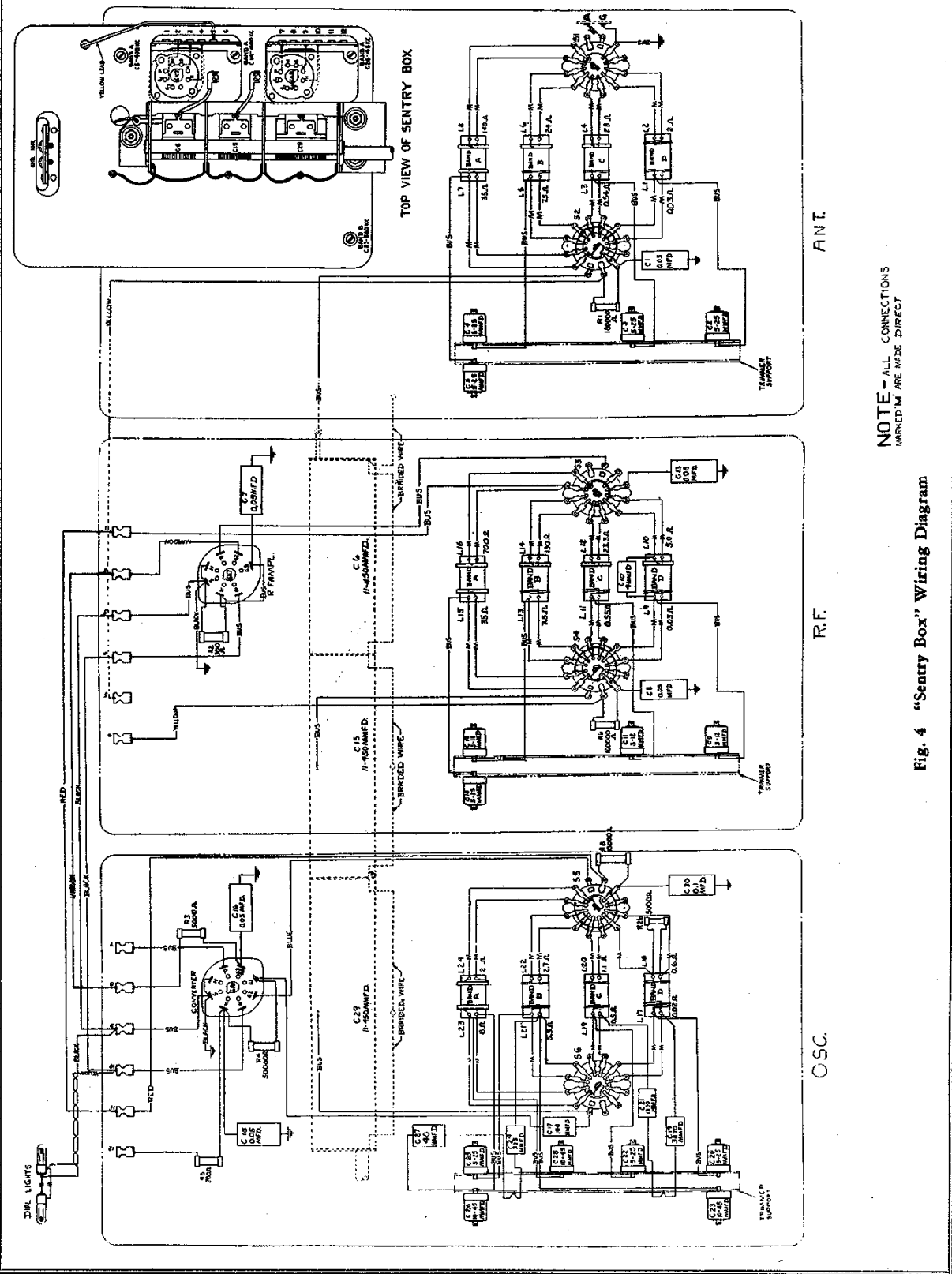
Fig. 3 Chassis Wiring Diagram

(Rating "V" Receivers)

MODELS A-82, A-87

Sentry Box
Chassis Wiring

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MODELS A-82, A-87
Circuit Data
Alignment

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	105-130	50-60	105
C	105-130	25-60	110
V	105-130 and 220-250	40-60	110

NOTE—Taps on universal transformers (Rating "V") are accessible by removing the cap cover on the top of the transformer.

Tuning Frequency Range

Band "A"	140-410 kc
Band "B"	540-1750 kc
Band "C"	1.75-6.0 mc (1750-6000 kc)
Band "D"	6.0-19.5 mc (6000-19,500 kc)

Tuning Control Drive Ratio

Fast Tuning	5½ to 1
Vernier Tuning	55 to 1

Electrical Power Output

Undistorted	5.0 watts
Maximum	7.0 watts

Loud-speaker—Electrodynamic

Cone: Model A-82 10¼ in. overall, 9¼ in. effective diameter
Model A-87 10¼ in. overall, 9¼ in. effective diameter
Cone Coil Impedance: 5 ohms at 400 cycles

DESCRIPTION OF ELECTRICAL CIRCUIT

The signal from the antenna is applied to the control grid of the 6K7 R. F. amplifier tube through the antenna coil, the secondary of which is tuned to the incoming signal by the rear section of the main tuning condenser. The secondary of the coil for the band next lower in frequency to the one in use is short-circuited by the band switch to prevent absorption of energy at its resonant frequency, which falls in the next higher band. The primaries of all coils not in use are also short-circuited by the band switch.

The amplified radio frequency signal is impressed on the control grid of the 6A8 converter and oscillator tube through the R. F. coil, the secondary of which is tuned to the signal frequency by the center section of the main tuning condenser. The sensitivity control consists of a variable resistor in the cathode circuit of the 6A8 converter tube. In the 6A8 tube the incoming signal is combined with the local oscillator signal which is 465 kc higher in frequency. The local signal is generated by the oscillator elements of this tube and the proper frequency difference is maintained throughout the tuning range by the front section of the main tuning condenser in conjunction with the oscillator coil and padding capacitors. The oscillator section of the main tuning condenser, although of the same capacity as the other two sections, is larger physically to permit wider spacing of the plates, thereby reducing the possibility of microphonic feedback howl.

The combination of the signal frequency with the local oscillator frequency in the converter tube produces the intermediate frequency of 465 kilocycles. This particular intermediate frequency is chosen to reduce image response and improve short-wave performance. The intermediate frequency amplifier consists of a 6K7 tube and two transformers, each with two tuned circuits.

The output of the I. F. amplifier is applied to the 6H6 diode rectifier, which is a combined detector and automatic volume control tube. The direct current component of the rectified signal produces a voltage drop across R-16. This voltage drop provides automatic bias for the R. F. and I. F. amplifier tubes and converter tube and so gives automatic volume control action. Full automatic bias is applied to the R. F. amplifier tube, while a part of this voltage, from a tap on R-16, is applied to the converter tube and I. F. amplifier,

which handle somewhat larger signal voltage than the R. F. amplifier.

The manual volume control selects the amount of audio signal applied through coupling capacitor C-52 to the grid of the 6C5 audio amplifier tube, and thus regulates the output of the receiver. This is a dual control, the second or lo-note compensation section acting to preserve proper balance between high and low audio frequencies as the volume is changed, by means of a variable 150,000-ohm resistance (R-22) in series with a capacitor (C-55) across the primary of the interstage audio transformer. The tone control consists of a variable 100,000-ohm resistor (R-23) connected in parallel with the lo-note compensation section of the volume control, so as to permit attenuation of the higher audio frequencies as desired.

The output of the 6C5 tube is coupled to the grids of the push-pull 6F6 output pentodes by means of a resistance capacity network working into the interstage audio transformer. The plate circuits of the 6F6 output pentodes are suitably matched to the loud-speaker by means of a step-down output transformer.

Plate and grid voltages for all tubes are supplied by the power supply system employing a 5Z4 full-wave rectifier tube which, together with a suitable network of resistors and capacitors, supplies the required voltages and filtering action.

ALIGNMENT PROCEDURE

Before making any adjustments, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal from the test oscillator to the receiver and inserting a "Tuning Wand" into the coil involved. The "Tuning Wand" consists of a rod of insulating material having a ring of nonmagnetic metal attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the metal ring end into the center of a particular coil through the openings provided in the "Sentry Box" compartment shields, the inductance of the coil is lowered, increasing its resonant frequency. Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the circuits are in exact alignment, inserting either end of the tuning wand in any coil will result in a decrease in output. When an increase in signal is obtained with the iron-filled end of the wand, a decrease in resonant frequency of that circuit by increasing its trimmer capacity is indicated. When an increase in signal is obtained with the metal ring, a decrease in trimmer capacity is indicated.

Changes Indicated by Wand

Wand	Signal	Trimmer adjustment required
Metal Ring	Decrease	None
Iron filings	Decrease	
Metal Ring	Increase	Decrease capacity
Iron filings	Decrease	
Metal Ring	Decrease	Increase capacity
Iron filings	Increase	

Fig. 6 shows the location of the antenna, R. F. and oscillator coils for each of the four frequency bands of Models A-82 and A-87 receivers. Openings are provided in the coil shields for insertion of the tuning wand into the antenna or R. F. coil of any band. No provision is made for checking the alignment of the oscillator circuits, as this is easily determined by noting the dial calibration.

Alignment Frequencies

I. F.	Band "A"	Band "B"	Band "C"	Band "D"
465 kc	140 kc	580 kc	6000 kc	18,000 kc
	410 kc	1740 kc		

In order to align these receivers properly, it is necessary to have available the following test equipment:

MODELS A-82, A-87
Alignment, Part 2
GENERAL ELECTRIC CO.

1. A modulated test oscillator with frequencies available of 140, 410, 465, 580, 1740, 6000, and 18,000 kc
2. An output indicator, such as a high resistance a-c voltmeter with a maximum scale reading of 3 to 5 volts, or a neon lamp indicator.
3. An alignment tool consisting of an insulating shaft with a small screwdriver blade.
4. A tuning wand.

The location of all trimmer capacitors is shown in Fig. 5. It should be noted that on all "Permaliner" trimmer capacitors, clockwise rotation of the adjusting screw decreases capacity while counterclockwise rotation increases capacity.

1. I. F. Alignment

Set the frequency band switch of the receiver to Band "B," short-circuit the antenna and ground terminals and tune the receiver at some point above 1500 kc so that no signal is heard. Set the volume control and sensitivity control at maximum (extreme clockwise position) and ground the chassis.

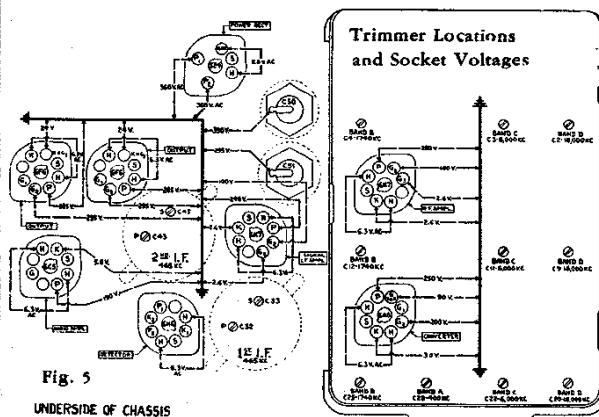


Fig. 5

UNDERSIDE OF CHASSIS

The I. F. amplifier is tuned to 465 kc; set the test oscillator dial at this frequency. Make sure that a d-c path exists between the output terminals of the test oscillator, then remove the control grid clip (green lead) from the 6A8 tube and connect the test oscillator output between chassis and the dome terminal of the 6A8 tube. Connect the output meter across the cone coil of the speaker and adjust the test oscillator output control so that, with the receiver volume control at maximum, a small deflection is observed on the output meter. During both I. F. and R. F. alignment, the test oscillator signal should be maintained at the lowest level that will give a good readable output indication.

Adjust the secondary trimmer of the second I. F. transformer until a maximum output reading is obtained, maintaining a small deflection on the output meter throughout alignment by adjusting the test oscillator output. Next, adjust the primary trimmer of the second I. F. transformer for maximum output. Continue this procedure, adjusting the secondary trimmer of the first I. F. transformer and lastly the primary trimmer of the first I. F. transformer. After completing this procedure, repeat it a second time for final alignment. The I. F. alignment will then be complete.

2. R. F. Alignment

Bands "A" and "B" each require four trimmer adjustments, while Bands "C" and "D" each require three adjustments. Care should be taken to adjust only the trimmers of the band under test. Check the position of the dial pointer with the tuning condenser plates fully engaged as outlined in the section on adjustment of the dial mechanism. Make sure the antenna and ground terminals of the receiver are not short-circuited and connect to them the output from the test oscillator, preferably using a dummy antenna of 250 mmfd in

series with 200 ohms between the test oscillator and the receiver antenna terminal. Connect the output indicator across the speaker cone coil.

Band "A," 140-410 kc

Set the frequency band switch to the position where the dial indicates the above range. Tune the test oscillator to 410 kc, and turn the dial pointer on the receiver to this frequency. Adjust the Band "A" oscillator trimmer for maximum output, keeping the receiver volume control at its extreme clockwise position and adjusting the test oscillator output to maintain a small deflection on the output indicator. When optimum adjustment on the Band "A" oscillator trimmer is obtained, adjust the Band "A" R. F. and antenna trimmers for maximum output.

Now tune the test oscillator to 140 kc and set the receiver to that frequency. Slowly rocking the tuning condenser back and forth through the signal, adjust the 140-kc padding capacitor for maximum output. When this has been done, return to 410 kc on the receiver and test oscillator and recheck the alignment for maximum output. This completes alignment of Band "A."

Band "B," 540-1750 kc

Set the frequency band switch to the position where the dial indicates the above range. Tune the test oscillator to 1740 kc and set the dial pointer on the receiver to this frequency. Adjust the Band "B" oscillator trimmer for maximum output, keeping the receiver volume control at its extreme clockwise position and adjusting the test oscillator output to maintain a small reading on the output indicator. When optimum adjustment on the Band "B" oscillator trimmer is obtained, adjust the Band "B" R. F. and antenna trimmers for maximum output.

Now tune the test oscillator to 580 kc and set the receiver to that frequency. Slowly rocking the tuning condenser back and forth through the signal, adjust the 580-kc padding capacitor for maximum output. When this has been done, return to 1740 kc on the receiver and test oscillator and recheck the alignment for maximum output. Band "B" should now be in alignment.

Band "C," 1.75-6.0 mc (1750-6000 kc)

Set the band switch to the position where the dial indicates the above range. Tune the test oscillator to 6000 kc and set the dial pointer on the receiver to this frequency. Adjust the Band "C" oscillator trimmer for maximum output, using the first peak obtained when increasing the capacitance from minimum to maximum.

Check for the image signal which should be received at about 5070 kc on the receiver dial. It should be necessary to increase input to the receiver from the test oscillator for this check. Retune the receiver to the correct scale reading (6000 kc) and adjust the test oscillator output to its previous value. Then adjust the Band "C" R. F. and antenna trimmers for maximum output.

Band "D," 6.0-19.5 mc (6000-19,500 kc)

Set the band switch to the position where the dial indicates the above range. Tune the test oscillator to 18,000 kc and set the dial pointer on the receiver to this frequency. Adjust the Band "D" oscillator trimmer for maximum output, using the first peak obtained when increasing the capacitance from minimum to maximum.

Check for the image signal which should be received at about 17,070 on the receiver dial. It may be necessary to increase input to the receiver from the test oscillator for this check. Retune the receiver to the correct scale reading (18,000 kc) and adjust the test oscillator output to its previous value.

Reduce the capacitance of the R. F. trimmer to a minimum. While slowly rocking the tuning condenser through the 18,000-kc point, increase the Band "D" R. F. trimmer capacitance until a maximum response point is obtained. The Band "D" antenna trimmer should now be peaked. It is not

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MODELS A-82, A-87
Sentry Box Data
Dial Data

necessary to rock the tuning condenser while making the last adjustment.

When these adjustments have been completed, the receiver will be in alignment.

METHOD OF SERVICE PROCEDURE— SENTRY BOX

The "Sentry Box" assembly includes the tuning condenser and dial mechanism as well as the coil and switch compartments. The complete unit may be dismantled from the chassis by removing the side-fastening bolts, unscrewing the dial mechanism anchoring nut and unsoldering the leads to the chassis from the terminal strips.

In order to remove the coil shield cans it is necessary to take out the frequency band switch shaft. With the "Sentry Box" dismantled from the chassis the dial gears may be disengaged and the switch shaft removed merely by lifting the reduction drive end of the dial assembly, allowing the switch shaft gear to pass the dial scale cap shaft. With the "Sentry Box" mounted in place, removal of the switch shaft requires removing the dial scale gear and cap shaft.

Each compartment shield can house a bracket assembly comprising the coils, band switch and other component parts associated with that particular circuit. With the band

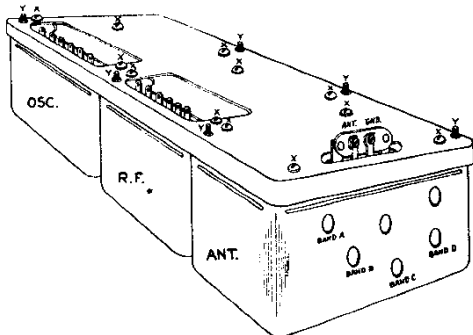


Fig. 6 "Sentry Box" Coil Locations and Assembly

switch shaft out, any shield can be easily removed by unscrewing the two mounting stud nuts ("Y," Fig. 6).

In most cases, coils or Permaliner trimmer capacitors may be replaced merely by removing their particular shield can. It is an easy matter, however, to remove each complete bracket assembly by taking out the mounting bolts ("X," Fig. 6) and unsoldering the bus or braid connections to the tuning condenser. In the case of the R. F. or oscillator units it will also be necessary to unsolder the external leads to the respective terminal boards of these units.

Permaliner trimmers are replaced by unsoldering the bus lead from the trimmer terminal, and then unsoldering the Permaliner case from its mounting cup. The latter operation may require the use of two soldering irons.

Coils are replaceable by merely unsoldering the coil lugs from the switch lugs. If it is necessary to replace a section of the band switch, however, it will be found expedient to remove the complete bracket and coil assembly for easy access to the switch lugs.

ADJUSTMENT OF DIAL MECHANISM

The dial mechanism is rigidly mounted at one end to the tuning condenser frame by two removable screws and anchored to the chassis deck at the other end by a rubber-cushioned nut. The dial pointer, station selector knob, and tuning condenser drive drum are interconnected by means of the drive cord and drive cable; the frequency band switch and cylindrical scale by the switch shaft and scale gears.

1. Position of Drum on Condenser Shaft

With set screws (5) loosened and tuning condenser plates fully engaged, place the drum in the position shown in Fig. 7. The drum should be located on the tuning condenser shaft so

as to be in line with the drive cord pulleys ($\frac{1}{4}$ in. from the dial mechanism mounting bracket), and so that, with condenser plates fully engaged, guide (38) occupies the position shown in Fig. 7.

2. Removing and Replacing Scale

Pry out fastener (40) and remove the scale by lowering the fastener end below the mounting ear. Take the scale out of cap assembly (29). Replace by placing tabs of caps (29) and (30) in slots of scale. Replace fastener (40).

3. Removing and Replacing Band Switch Shaft

To remove the band switch shaft with the "Sentry Box" assembled in place, the dial scale cap and gear must be removed. This is done by removing the cylindrical scale as in

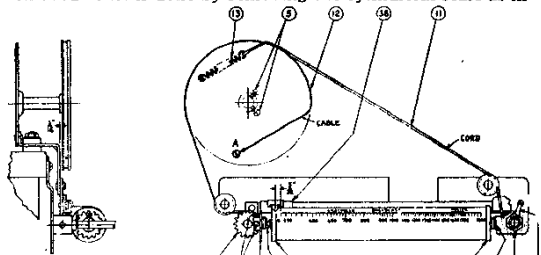


Fig. 7 Dial Mechanism

paragraph 2. Then loosen set screws (9) and remove cap (29), spring (7) and gear (8).

When replacing the switch shaft, note that the shaft will fit the switch gang slots in only one position; turn the shaft before inserting so that the locating button will pass through the keyed side of the slots. Note also that the brass bearing just behind the switch shaft gear determines the forward position of the gear. Insert the bushing just far enough into the index plate hub so that the shaft gear meshes snugly with the scale gear, then tighten the set screw.

4. Locating Scale

Loosen the two gear set screws (9). Rotate the scale backward until there is slight tension on spring (7) with the pointer indicating on the Band "A" scale. With the frequency band switch in the Band "A" position, place gear (8) in mesh with the gear on part (6) and tighten the two set screws (9).

5. Replacing Drive Cord and Drive Cable

The position of the dial scale pointer with respect to the tuning condenser drum is held fixed by a special metal braid cable (12) connecting the drum with guide (38). Tension is maintained on the cable through the drum spring (18) and drive cord (11). To replace either the drive cable or the drive cord, remove the dial scale for convenient access to guide (38). Unhook spring (13) from its drum tab to release tension. Unhook the cable or cord from guide (38) and unwind from the pulleys and drum. To replace the cable or cord, rethread to agree with Fig. 7, and rehook drum spring (13) as shown.

6. Replacing Reduction Drive

To replace the reduction drive, unhook spring (13), loosening the drive cord. Unscrew pal nut (47) and remove drive. Replace with new drive and rehook drive cord.

7. Setting Scale Pointer

The scale pointer is soldered to the slider. To set the pointer mechanically, turn the tuning condenser rotor so that the plates are fully engaged, and solder the pointer to indicate a point $\frac{1}{4}$ in. to the left of the extreme left-hand mark on the scale on Band "B."

8. Replacing Dial Lamp

The dial lamp sockets are easily accessible by lifting them clear of the dial mechanism. Lamps may then be replaced in their sockets. After replacing lamps, slide the socket clip back onto the mounting bracket.

MODELS A-82, A-87
Voltage, Parts

GENERAL ELECTRIC CO.

REPLACEMENT PARTS (Continued)

Insets on genuine factory-issued parts, which may be purchased from authorized dealers.

Stock No.	Description	List Price
RS-569	SENSITIVITY CONTROL—Rheostat 2200 ohms (R-7)	\$0.85
RT-081	TRANSFORMER—Power Transformer (T-1) 11.5-09 cycles 105-200 volts (Rating "A")	0.75
RT-082	TRANSFORMER—Power Transformer (T-2) 11.5-09 cycles 105-200 volts (Rating "C")	0.70
RT-083	TRANSFORMER—Power Transformer (T-3) 11.5-09 cycles 105-200 volts (Rating "B")	0.70
RT-084	TRANSFORMER—First I. F. Transformer (C-31, C-32, C-33, C-34, L-26, L-28, R-9)	2.95
RT-208	TRANSFORMER—Second I. F. Transformer (C-35, C-36, C-37, C-38, C-39, C-40, C-41, C-42, C-43, C-44, C-45, C-46, C-47, C-48, L-27, L-29, R-14, R-15)	3.30
RT-600	TRANSFORMER—Interstage Audio Transformer (C-5)	1.25
RT-701	TRANSFORMER—Rectifier Transformer (R-23) and Power Switch (S-7) 100,000 ohms	2.25
RV-003	VOLUME CONTROL—Potentiometer 250,000 ohms (R-16) and Rheostat 150,000	1.70
RW-002	WINDOW—Dial Window	.15
RX-002	CUSHION ASSEMBLY—Tuning Condenser Mounting, Chushions, Nets and Washers	.10
RX-004	SCREENING CHLORINE—Chassis Mounting Screws and Washers	.10

"SENTRY BOX" ASSEMBLIES

Stock No.	Description	List Price
RA-001	ASSEMBLY—Antenna Compartment Assembly Complete	\$9.00
RA-101	ASSEMBLY—Antenna Compartment Assembly Complete	12.50
RA-201	ASSEMBLY—Oscillator Compartment Assembly Complete	14.75
RB-010	BOARD—P. F. Oscillator Compartment	.10
RB-012	BOARD—Antenna Terminal Board	.15
RB-108	BRACKET—Antenna Bracket Assembly	.95
RB-109	BRACKET—Oscillator Bracket Assembly	.95
RB-105	BRACKET—R. F. Bracket Assembly	.95
RC-072	CAPACITOR—.05 Mfd. 200 Volt (C-1, C-7, C-8, C-9, C-10, C-11, C-12, C-13, C-14, C-15, C-16, C-17, C-18, C-19, C-20, C-21, C-22, C-23, C-24, C-25, C-26, C-27, C-28, C-29, C-30, C-31, C-32, C-33, C-34, C-35, C-36, C-37, C-38, C-39, C-40, C-41, C-42, C-43, C-44, C-45, C-46, C-47, C-48, C-49, C-50, C-51, C-52, C-53, C-54, C-55, C-56, C-57, C-58, C-59, C-60, C-61, C-62, C-63, C-64, C-65, C-66, C-67, C-68, C-69, C-70, C-71, C-72, C-73, C-74, C-75, C-76, C-77, C-78, C-79, C-80, C-81, C-82, C-83, C-84, C-85, C-86, C-87, C-88, C-89, C-90, C-91, C-92, C-93, C-94, C-95, C-96, C-97, C-98, C-99, C-100, C-101, C-102, C-103, C-104, C-105, C-106, C-107, C-108, C-109, C-110, C-111, C-112, C-113, C-114, C-115, C-116, C-117, C-118, C-119, C-120, C-121, C-122, C-123, C-124, C-125, C-126, C-127, C-128, C-129, C-130, C-131, C-132, C-133, C-134, C-135, C-136, C-137, C-138, C-139, C-140, C-141, C-142, C-143, C-144, C-145, C-146, C-147, C-148, C-149, C-150, C-151, C-152, C-153, C-154, C-155, C-156, 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