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WDBJ

FIELD INTENSITY METER TYPE WX-2A

(MI-30002-A)

INSTRUCTIONS

FIELD INTENSITY METER

TYPE WX-2A

(MI-30002-A)

Scanned and Prepared by
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INSTRUCTIONS

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA
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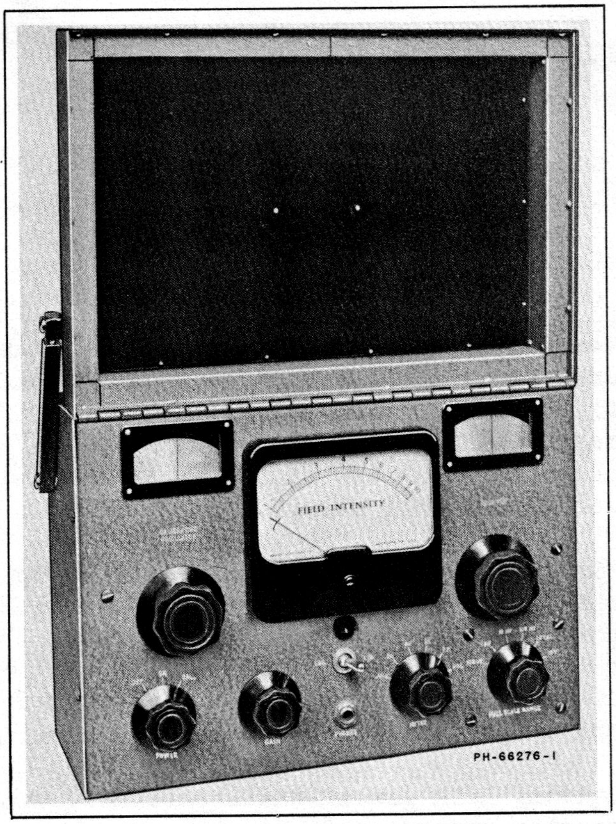


Figure 1 - Field Intensity Meter, Type WX-2A, Front Cover Open

TECHNICAL SUMMARY

Frequency Range	**550 to 1600 kc**
Field Intensity Range	**10 microvolts per meter to 10 volts per meter**
Accuracy of Attenuators	**2%**
Output Indicator	**Panel meter, direct reading. Provision for using recorder. Headphones, high-impedance (not supplied).**
Antenna	**Shielded, unbalanced loop**
Power Supply	**Batteries, 5-1½ volt, (RCA-VS001) 2-67½ volt (RCA-VS016). Provisions for external power supply.**
Battery Life	**500 indications (approx.)**
Electron Tube Complement	**4 - RCA-1T4 2 - RCA-1R5**

Mechanical Specifications

Overall dimensions, closed: Height 9", width 13", depth 5-3/4".

Weight, including batteries: 12-1/2 pounds.

FIELD INTENSITY METER
Type WX-2A

DESCRIPTION

1. INTRODUCTION.

The Type WX-2A Field Intensity Meter is a compact, light-weight portable instrument for the measurement of a wide range of radio signal intensities in the broadcast band of 550 to 1600 kilocycles. Its range of sensitivity, from 10 microvolts per meter to 10 volts per meter, makes it equally effective for interference studies at low signal strengths and for close-in measurements on high-power directional arrays.

Accuracy of measurement is assured by a calibration method that compensates for variations in tube characteristics and for voltage variations in the self-contained battery power supply. Operation is simple and measurements can be made rapidly, for the meter is direct reading at all ranges and requires the use of no charts or multiplication factors. Since tubes are of the filament type, no warm up period is necessary before taking readings.

The added feature of providing both linear and logarithmic indications permits its use with recording equipment for continuous observations. An external amplifier, not supplied, is required to drive a recorder. Provisions are made for the use of an external power supply when conditions require continual operation.

2. EQUIPMENT.

The following equipment is furnished on RCA Stock Number MI-30002-A:

1 Type WX-2A Field Intensity Meter
4 RCA-1T4 tubes in place
2 RCA-1R5 tubes in place

Batteries for operation may be obtained locally, the following being required:

5 Flashlight batteries, 1.5-volt, RCA-VS001
2 B-Batteries, 67.5-volt, RCA-VS016

A headset having an impedance of 10,000 to 25,000 ohms is recommended as an aid in identifying signals under observation, and may be used simultaneously while readings are being taken.

3. CONSTRUCTION.

The field intensity meter is assembled in a metal case, finished in crackle gray. A convenient carrying handle is provided on the narrow side of the case. The hinged cover is recessed to accommodate the loop aerial and held closed during transportation by spring-loaded telescoping braces at the ends of the case. When the cover is raised, the braces swing up and support the cover and loop in vertical position above the panel.

The rear compartment cover of the case is hinged and can be opened for replacing batteries.

A 1/4 x 20 threaded hole on the bottom face of the instrument case is provided to mount the meter on a tripod, if desired, for convenience in operation. No tripod is furnished with the equipment. Any reasonably sturdy camera tripod may be used.

The panel of the instrument is fitted with the following indicators and controls. Panel designations and function are given in the list.

FIELD INTENSITY meter, having a 200-microampere movement, indicates field strength directly on a logarithmic scale which is graduated 1 to 10 and has no zero position. The pointer rests to the left of the first mark, with no current input. Full-scale deflection for the highest range setting is 10 V/M. The meter indicates correctly, regardless of whether or not the carrier is modulated, provided the modulation is symmetrical.

RECEIVER tuning control knob for receiver circuits, driving dial visible through rectangular transparent panel opening. The dial is calibrated directly in frequencies, 55 to 160 corresponding to 550 to 1600 kilocycles.

CALIBRATING OSCILLATOR tuning control knob for calibrating oscillator circuits, driving a dial similar to the receiver tuning dial and calibrated in the same manner.

POWER switch, with three positions as follows:

OFF, power off all circuits
ON, power on receiver only
CAL, power on receiver and calibrating oscillator

GAIN potentiometer, to adjust receiver gain for calibration.

METER switch, six-position, to set function of meter so as to indicate values as listed below for the various lettered settings:

AR, receiver filament (A) voltage
BR, receiver plate (B) voltage
AC, calibrating oscillator filament (A) voltage
BC, calibrating oscillator plate (B) voltage
FI, field intensity at range set by FULL SCALE RANGE switch
OSC, output voltage of calibration oscillator

FULL SCALE RANGE switch, six-position, to adjust attenuation in the receiver circuits and provide full-scale deflection of the meter for the values marked at each switch position, as follows:

100 µV, 1 MV, 10 MV, 100 MV, 1 V, 10 V.

LOG-LIN switch, to provide either logarithmic or linear output of the receiver; the former primarily for use when the meter is to operate a d-c amplifier in connection with recording equipment.

PHONE jack, for insertion of headset when necessary.

An unmarked pin jack, located below the meter, is for connection to d-c amplifier used with recording equipment.

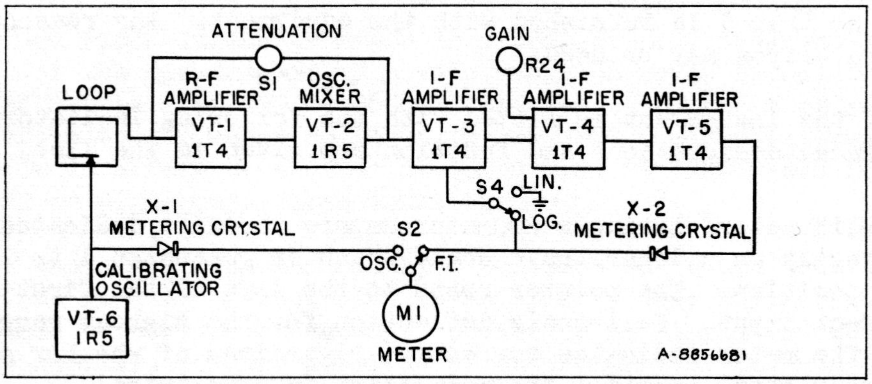


Figure 2 - Block Diagram, Field Intensity Meter

4. CIRCUIT DESCRIPTION.

The circuit employed in the field intensity meter is shown in detail in the schematic diagram at the end of the book, but the principle of operation is outlined in the block diagram, Figure 2.

The circuit components are carefully shielded to prevent stray couplings between the circuits, particularly between oscillator and receiver, to eliminate errors in calibration.

The receiver proper consists of a five-tube superheterodyne receiver, with one stage of r-f amplification before the mixer and three i-f stages. Attenuation circuits to obtain the wide range of sensitivities are inserted at two points as shown. The output of the receiver is metered through a crystal rectifier.

The output of the calibrating oscillator is also metered through a crystal. Through careful design, the harmonic content of this oscillator has been kept low.

In use, the receiver section, with the meter connected to the output, is first tuned to the signal to be measured, using the meter as a tuning indicator, and the signal then reduced to zero by rotating the instrument and loop. The calibrating oscillator is switched on and the strength of the signal injected into the loop is measured on the meter. The meter is then switched to the output of the receiver and with calibrator still on, the gain of the receiver is set to give a meter reading exactly equal to the oscillator input to the loop. In this manner the receiver output is calibrated to a known input at the frequency on which it is to be used. The field intensity is then read by switching off the calibrating oscillator and orienting the loop for maximum input.

a. SIGNAL INPUT.- Considering the circuit in detail, refer to the schematic diagram. The loop, L-1 is of the unbalanced, shielded type with one end connected to L-3 and the high end loaded by a high-Q adjustable inductance L-2. The loop has only a few turns so its fundamental frequency is above the highest frequency to be received. Additional inductance is lumped in L-2 to give a wide enough tuning range when adjusted by section C-2A of the tuning capacitor operated by front panel RECEIVER control. This form of antenna minimizes the effects of distributed capacities, reduces antenna effect and requires no balancing. The Q of the loop circuit is about 100 at one megacycle. This high Q factor makes for high sensitivity and selectivity and, coupled with the use of an r-f amplifier stage, provides high image rejection.

b. R-F AMPLIFIER.- The loop input is connected through a conventional capacity divider, which forms one section of the r-f attenuator system, to the r-f amplifier VT-1. The attenuator circuit is controlled in six steps by sections S-1A, B and C of the FULL SCALE RANGE switch, and works in conjunction with an i-f attenuator controlled by section S-1D of this same switch. Together these attenuators provide 6 steps of receiver output voltage, each step giving ten times the receiver output of a preceding step.

The attenuator is arranged so that attenuation takes place first in the input to the intermediate frequency amplifier. On the 100 µV/M position, the 1 MV/M position, and the 10 MV/M position of the FULL SCALE RANGE switch the r-f attenuator is out of the circuit. On the 100 MV/M position, the 1 V/M position, and the 10 V/M position the i-f attenuator is maintained at full attenuation and loss is introduced progressively in the r-f attenuator. With this arrangement, noise originating in the front end circuits has no effect on output meter indications except on the 100 µV/M position. Even on this position its effect is negligible and does not materially affect the accuracy of the indication.

Provision is made in the attenuator to avoid detuning of preceding circuits. The r-f amplifier tube, VT-1, operates with a fixed bias derived from the resistor network R-22, R-23, and R-24.

c. FIRST DETECTOR AND OSCILLATOR.- The output of the r-f stage is coupled to the first detector tube VT-2 by a transformer T-1. This same tube, through its associated circuits T-6, operates also as a local heterodyning oscillator. Circuits T-1 and T-6 are tuned, respectively, by capacitors C-2B and C-2C which are ganged with each other and with the loop tuning capacitor C-2A. The tube acts as a conventional oscillator-mixer to develop an intermediate frequency of 455 kc. Linearity of output of this detector is good since the range of signal inputs over which it has to function is reduced by the fact that there are only three steps of attenuation in the input to the r-f amplifier VT-1. The output circuit of VT-2 contains the fixed inductance which is tuned by C-20 to resonance at the intermediate frequency.

d. I-F ATTENUATOR.- The i-f attenuator circuit functions on the 100 µV/M, 1 MV/M, and 10 MV/M positions of the FULL SCALE RANGE switch S-1 (positions of greatest sensitivity). This circuit is fed by a capacitance voltage divider formed by C-21 and C-22. This arrangement prevents changes in the attenuator capacities with setting from affecting the tuning of the choke T-2.

e. FIRST I-F AMPLIFIER.- This is a conventional i-f amplifier stage operating on fixed bias, when the LOG-LIN toggle switch S-4 is in the LIN position, to give linear output. With S-4 in the LOG position, an AVC bias is derived from the d-c output of the metering crystal X-2 which varies the gain in VT-3 ten-to-one over the output range. The output of the tube is then in approximate logarithmic proportion to the input.

f. SECOND I-F AMPLIFIER.- This stage of i-f amplification, utilizing VT-4, is of the usual type. It has an adjustable gain control R-24, operated by the GAIN knob on the panel. The purpose of this control is to set the overall gain of the receiver during the calibration procedure mentioned at the beginning of these paragraphs.

g. THIRD I-F AMPLIFIER.- This is a straight i-f stage with no AVC or gain control, and from which maximum output is obtained at all times to drive the crystal rectifier circuit.

h. CRYSTAL RECTIFIER.- The output of the third i-f stage is coupled to the crystal circuit. The use of a crystal, in place of a thermionic rectifier, makes accuracy independent of battery voltages. The crystal circuit is such as to swamp out variations due to temperature. The rectified output of the crystal X-2 is fed directly to the meter through R-20. The crystal output is also capacity-coupled to the PHONES jack J-1 on the front panel, into which a high-impedance headset may be plugged for assistance in identifying the signals being checked.

i. CALIBRATION OSCILLATOR.- The oscillator tube VT-6 is operated on a separate set of batteries. The circuit is of the inductive feedback type. The metering crystal, X-1, is connected across the grid and cathode of the tube and prevents the grid from going positive at any time. The grid circuit is tuned by C-56, which is coupled to the CALIBRATING OSCILLATOR control on the panel.

The tuned circuit of the oscillator is designed with a high Q factor. The output of the oscillator is taken off the grid through a high resistance R-33. This produces minimum loading on the circuit, and the output waveform is practically free of harmonics.

After passing R-33, the oscillator output is divided into two paths:

(1) An r-f path through C-54 which injects the r-f voltage into the loop circuit.

(2) A d-c path to ground through R-26, R-27, and R-28. The rectifying action of the crystal X-1 provides the d-c component of the output and a tap on R-27 feeds the measuring voltage to the panel meter M-1 when the METER switch S-2 is set on OSC. Since the oscillator output is free from harmonics, the meter reading is a true indication of peak voltage of the fundamental oscillator frequency.

j. SWITCHING SYSTEM.- In addition to the FULL SCALE RANGE switch, S-1, two other switching circuits are employed:

(1) METER switch, S-2 connects the meter, M-1, to the output of the receiver or of the calibration oscillator, as desired. Four other positions of the switch connect the meter, through a suitable multiplier network, to permit reading voltages of the four sets of batteries used in the instrument.

(2) POWER switch, S-3, controls the current to the tubes: All tubes are off in the OFF position of the switch; the receiver circuits are on in the ON position; and both receiver and calibrating oscillator are on in the CAL position. A microswitch, S-5 is included in the receiver filament circuit to cut off the filaments when the cover of the meter is closed. However, S-3 must be placed in the OFF position to switch off the calibrator tube.

ELECTRON TUBE COMPLEMENT AND FUNCTIONS

Symbol No.	Type	Function
VT-1	RCA-1T4	R-F Amplifier
VT-2	RCA-1R5	First Detector and Heterodyne Oscillator
VT-3	RCA-1T4	I-F Amplifier
VT-4	RCA-1T4	I-F Amplifier
VT-5	RCA-1T4	I-F Amplifier
VT-6	RCA-1R5	Calibrating Oscillator
		METERING CRYSTALS
X-1	IN34	Calibrating Oscillator Output
X-2	IN34	Receiver Signal Output

INSTALLATION

1. UNPACKING.

The Field Intensity Meter is shipped with all tubes in place, less batteries. Upon receipt of the instrument remove it carefully from its packing and examine for visible damage that may have occurred during shipment. Lay the instrument on its back and check the cover, to see that it opens freely and telescoping braces function. Examine panel and check all controls for free movement. Do not force any control that may stick.

2. BATTERY INSTALLATION.

Procure five 1.5-volt flashlight cells and two 67.5-volt B-batteries of any of the types listed below.

Quan.	Voltage	Type Numbers			Dimensions (inches)		
		RCA	Eveready	Burgess	Height	Width	Length
5	1.5	VS001	950	2	2 3/8	1 1/4 (dia.)	
2	67.5	VS016	467	xx45	3 11/16	1 5/16	2 11/16

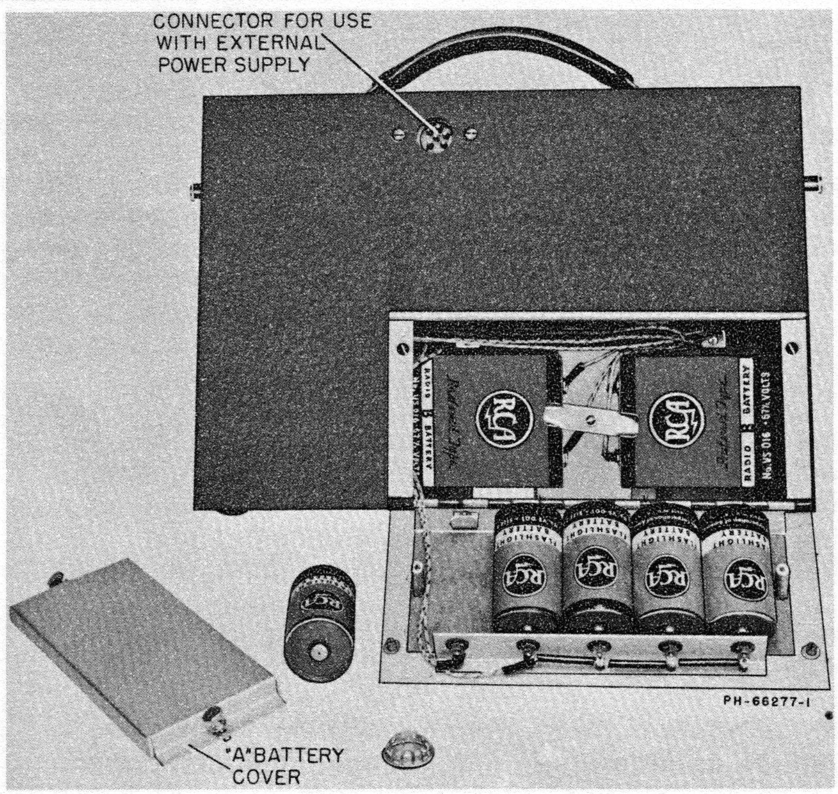


Figure 3 - Field Intensity Meter, Rear View, Battery Compartment Open

Install the batteries as follows:

a. FILAMENT (A) BATTERIES.- Open the battery compartment lid on the rear of the instrument by releasing the two winged fasteners and swing the lid downward. Unscrew the two captive thumb screws holding the cover on the A-battery compartment mounted on the inner face of the lid. Place the five cells in the compartment with the positive center studs against the terminals located furthest from the hinge and with the bottom of the cells contacting the corresponding retaining springs at the other end. Replace the cover plate and tighten the thumb screws.

b. PLATE (B) BATTERIES.- Withdraw the two pairs of wires from the battery compartment in the instrument proper. Each pair of wires is to be connected to a separate battery. Connect the wire with the black tracer and male snap fastener to the negative terminal of one 67-1/2-volt battery and connect the wire with red tracer and female fastener to the positive terminal of the same battery. Connect the second battery to the second pair of wires in the same manner.

Insert the batteries into the spaces provided for them, avoiding contact with the center clamp to prevent shorting the batteries. With both batteries in place rotate the clamp on its pivot so it will hold both batteries firmly in place.

Close the lid on the battery compartment and fasten the two wing clamps.

3. USE OF EXTERNAL POWER SUPPLY.

When extended observations are to be made or when a recorder is employed, the use of an external power source is recommended. A six-pin receptacle is mounted on the rear of the case to facilitate the connection of external batteries or an a-c power supply unit. The wiring details of the plug terminals are shown in the schematic diagram. An Amphenol No. 91MPF6L plug is required to make this connection.

To convert the meter from internal battery operation, it is not necessary to remove the filament or plate batteries. The plug from the external power source may be inserted in the receptacle on the rear of the meter without change in internal connections.

4. USE OF RECORDING EQUIPMENT.

For recording field intensities, a pin jack is provided on the panel of the WX-2A Field Intensity Meter which will supply 1 to 10 volts d-c into a high-impedance input d-c amplifier which is necessary for the operation of a recorder over the range of the meter. Details of installation are furnished with the external amplifier and recording equipment.

OPERATION

1. GENERAL.

The operation of the WX-2A Field Intensity Meter may be divided into three procedures as follows:

a. Checking battery voltages (see paragraph 2)
b. Meter calibration (see paragraph 3)
c. Measuring signal strength (see paragraph 4)

2. CHECKING BATTERY VOLTAGES.

The voltage of the batteries should be checked before taking the meter into the field and it is advisable to replace them before starting a series of measurements if voltages are approaching the minimum permissible value given in the following procedure.

To check battery voltages proceed as follows:

a. Open cover of meter.

b. Move POWER switch to CAL position.

c. Place METER switch in positions listed below and check meter deflections against values listed.

Switch Pos.	Nominal Operating Voltage	Meter Indication	Minimum Permissible Voltage	Meter Indication
AR	1.4	1.4	1.1	1.1
BR	67.5	6.75	50	5
AC	1.4	1.4	1.1	1.1
BC	67.5	6.75	50	5

3. METER CALIBRATION.

The meter should always be calibrated at the frequency of the signal to be measured, to eliminate any non-linearity due to frequency-sensitive components in the circuits. The procedure is as follows:

a. Set up the meter on a flat support or tripod at the point where signal strength is to be measured. Open the cover and swing the loop to a vertical position.

b. Turn POWER switch to ON and place LOG-LIN switch on LIN.

c. Set FULL SCALE RANGE switch to some value approximating the signal strength to be expected and set gain 3/4 on.

d. Place METER switch on Fl.

e. Adjust RECEIVER tuning to frequency of signals to be measured. Approach the setting from right or left, as desired, to obtain maximum deflection on the meter but do not rock dial through resonance point. Leave at this setting for subsequent calibration and field measurement. After signals are peaked, rotate instrument to get minimum meter indication. NOTE: A high-impedance headset may be plugged into the PHONES jack to aid in identifying the signals, and left in the circuit while making measurement. When making readings on 910 kc, at low signal intensities with the instrument set at full gain, some trouble may be experienced due to the second harmonic of the intermediate frequency being coupled back to the loop through the headset cord. When this occurs the headset should be removed.

f. Move the FULL SCALE RANGE switch to CAL.

g. Turn POWER switch to CAL.

h. Tune the CALIBRATING OSCILLATOR until an indication is noted on the meter; maximize the deflection.

i. Move the METER switch to OSC position and note the meter deflection.

j. Return METER switch to FI position and adjust GAIN control until meter indication is the same as obtained in step i. Check by moving switch back and forth between FI and OSC positions.

k. Place METER switch in FI position and move POWER switch to ON position to switch off oscillator.

The meter is now calibrated for the frequency of the signals to which it was originally tuned.

4. MEASURING SIGNAL INTENSITY.

With the instrument in position and calibrated for the frequency of the signal to be measured proceed as follows:

a. Set METER SCALE RANGE switch to some value approximating signal intensity expected, and set LIN-LOG switch on LIN.

b. With POWER switch at ON, rotate instrument to orient loop and obtain maximum deflection on meter, moving METER SCALE RANGE switch if necessary to keep meter pointer on scale. Read field intensity direct from meter, using setting of FULL SCALE RANGE switch as a guide to meter scale values. For example, with the METER SCALE RANGE switch on 100 MV, for which setting the full-scale reading of 10 on the meter means 100 millivolts per meter, a reading of 2.3 indicates a field intensity of 23 millivolts per meter.

5. OPERATING PROCEDURE SUMMARY.

Use of the Field Intensity Meter involves the three procedures described in paragraphs 2, 3, and 4 which may be summarized as follows:

a. Check voltages before starting a series of field intensity measurements.

b. Calibrate the meter when first set up and check calibration for each measurement.

c. Cut power off tubes by moving POWER switch to OFF immediately upon completing a measurement. This will increase battery life appreciably, for the instrument can be switched on and used instantly, no warm-up period being required.

6. USE OF LOG-LIN SWITCH.

The LOG-LIN switch is normally in the LIN position for field intensity measurements to obtain meter deflections that are directly proportional to the signal intensity and permit direct reading of the values.

The LOG position of the switch is intended for use when an external d-c amplifier and recorder is used with the equipment. With the switch in the LOG position the effect is to compress the range of the output voltages, being relatively larger for weak signals and smaller for strong signals. Under this condition the rectified output voltage and meter indication are not directly proportional to the input intensity but to a power (log or db) of the field intensity.

The LOG position of the switch may be used to advantage when searching for weak signals, going over to LIN setting for making the actual field measurement.

7. STOPPING EQUIPMENT.

When measurements have been completed, turn the POWER switch to the OFF position. Note that closing the lid of the instrument opens the micro-switch S-5 and cuts current off the receiver if POWER switch is accidently left on; but filament circuit of the oscillator is not protected if switch is left in the CAL position. Therefore, make certain POWER switch is OFF before closing cover.

MAINTENANCE

1. GENERAL.

Barring physical derangement due to accidental damage, replacement of tubes and batteries will constitute the major part of maintenance involved in the case of the meter. Battery condition can be readily checked and failure from this cause corrected by installing batteries as described in installation section, paragraph 2.

2. TUBE REPLACEMENT.

Tubes should be checked periodically or when GAIN control must be set increasingly higher to obtain a calibration setting of the meter. Tube characteristics are not critical and replacing a tube with one of the same type will not require realignment of the circuits.

NOTE: Since type 1T4 tubes vary appreciably in their characteristics, a high-gain tube should be selected in replacing VT-5 to avoid non-linearity in the meter indications. The use of high-gain tubes should be avoided in replacing VT-4, or the range of the gain control may not be sufficient to reduce gain to the point where the instrument will calibrate.

Testing or replacing tubes, or the adjustment of circuit components, will require the removal of the chassis from the case; proceed as follows:

a. Remove the screws holding the ends of telescoping braces to cover of the meter.

b. Remove the screws from the ends and bottom of the case that hold the front panel and chassis assembly to the case.

c. Removal of the chassis from the case is now prevented by the three springed loop-contact studs in back of the loop hinge. These studs should be pressed down as far as possible and the chassis worked out of the case. Do not apply excessive force in removing chassis which might stress leads to the plug in the back of the chassis and bend the plug contacts.

d. Detach plug from receptacle in the rear of the chassis.

The chassis may be replaced by reversing the above procedure.

3. ALIGNMENT PROCEDURES.

When batteries and tubes check satisfactorily and gain in the circuit is poor, it may be necessary to align the circuits. These circuits should be aligned in the following order: The i-f circuits, oscillator circuits, r-f circuits, and loop circuit. After completing each procedure, check to see if the trouble has been eliminated. It is necessary that the battery plug be inserted in the chassis receptacle in order to provide power for the receiver while the alignment procedure is being carried out. **Alignment procedures should be performed with a low filament voltage and not with a fresh battery to assure satisfactory operation over the full filament voltage range.**

a. I-F ALIGNMENT.

(1) Set panel controls as follows:

LOG-LIN to LIN	POWER to ON
METER to FI	FULL SCALE RANGE to CAL
GAIN to left	

(2) Apply 455-kc from an accurately calibrated signal generator to the control grid of VT-2 and adjust signal strength to obtain a 3/4-scale deflection on the meter.

(3) Adjust i-f transformers in the following sequence for peak reading on the panel meter, reducing generator input to keep meter pointer as close to full scale as possible.

T-5 (Maximize C-46, then C-47, recheck C-46, and then recheck C-47)
T-4 (C-39 and C-40 alternately)
T-3 (C-34 and C-35 alternately)
T-2 (C-20)

b. OSCILLATOR ALIGNMENT.

(1) Set panel controls as for i-f alignment, paragraph 3a, except GAIN control should be set at 1/4 clockwise roation. Set RECEIVER tuning control at 600 kc.

(2) Couple a 600-kc signal from a signal generator to the loop on the meter by means of a coil placed close to the loop.

(3) Adjust core of local oscillator coil T-6 for maximum indication on the meter.

(4) Set both signal generator and RECEIVER tuning dial to 1500 kc.

(5) Adjust C-52 for peak reading on panel meter.

(6) Repeat steps 2 to 5 for final adjustment.

c. R-F ALIGNMENT.

(1) Set panel controls as for oscillator alignment paragraph 3b, and couple signal generator to loop of meter in same manner.

(2) Set signal generator and RECEIVER dial to 600 kc.

(3) Adjust core of r-f transformer, T-1, for peak indication on panel meter.

(4) Set signal generator output and RECEIVER dial to 1500 kc.

(5) Adjust C-18 for maximum deflection of panel meter.

(6) Repeat steps 2 to 5 for final adjustment.

d. LOOP ADJUSTMENT.

(1) Set panel controls as for oscillator alignment, paragraph 3b, except FULL SCALE RANGE switch should be placed in 10 MV position. Couple signal generator to loop in similar manner.

(2) Set RECEIVER tuning dial to 600 kc and apply 600-kc signal from generator.

(3) Adjust core of loading coil L-2 for peak indication on panel meter.

(4) Set signal generator and RECEIVER dial to 1500 kc.

(5) Adjust C-1 for maximum reading on panel meter.

(6) Repeat steps 2 to 5 until no readjustment is required.

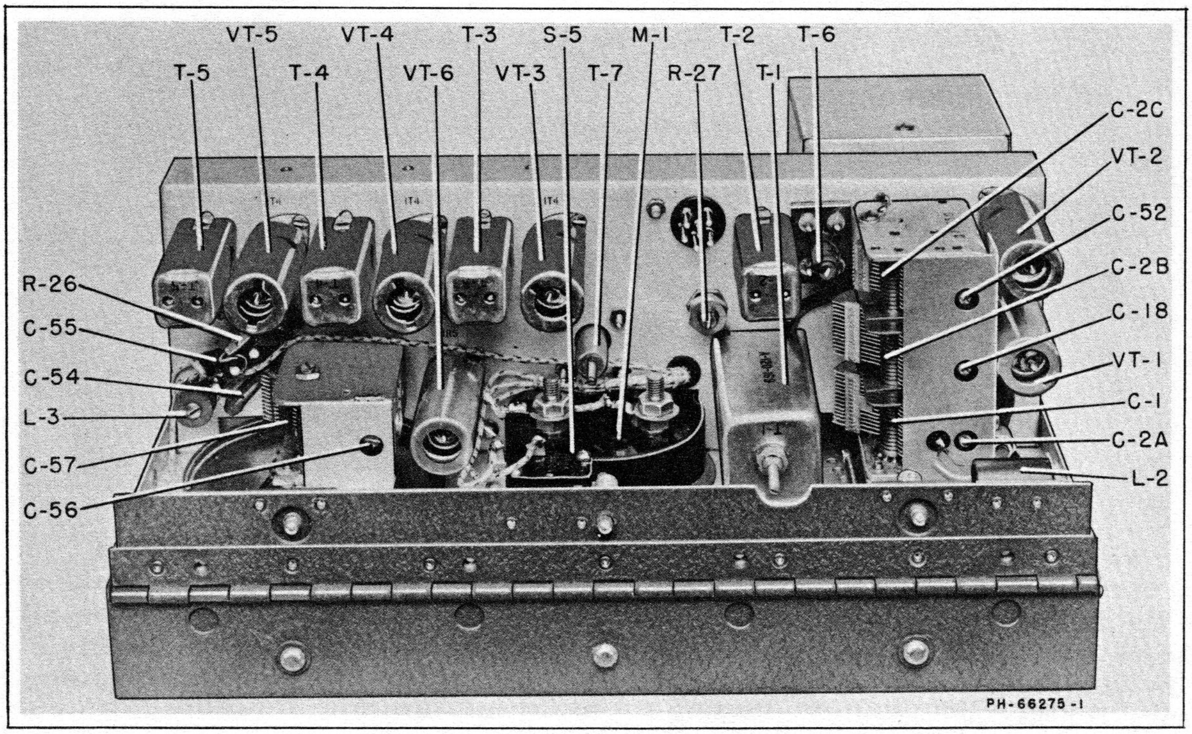


Figure 4 - Field Intensity Meter, Top Oblique View

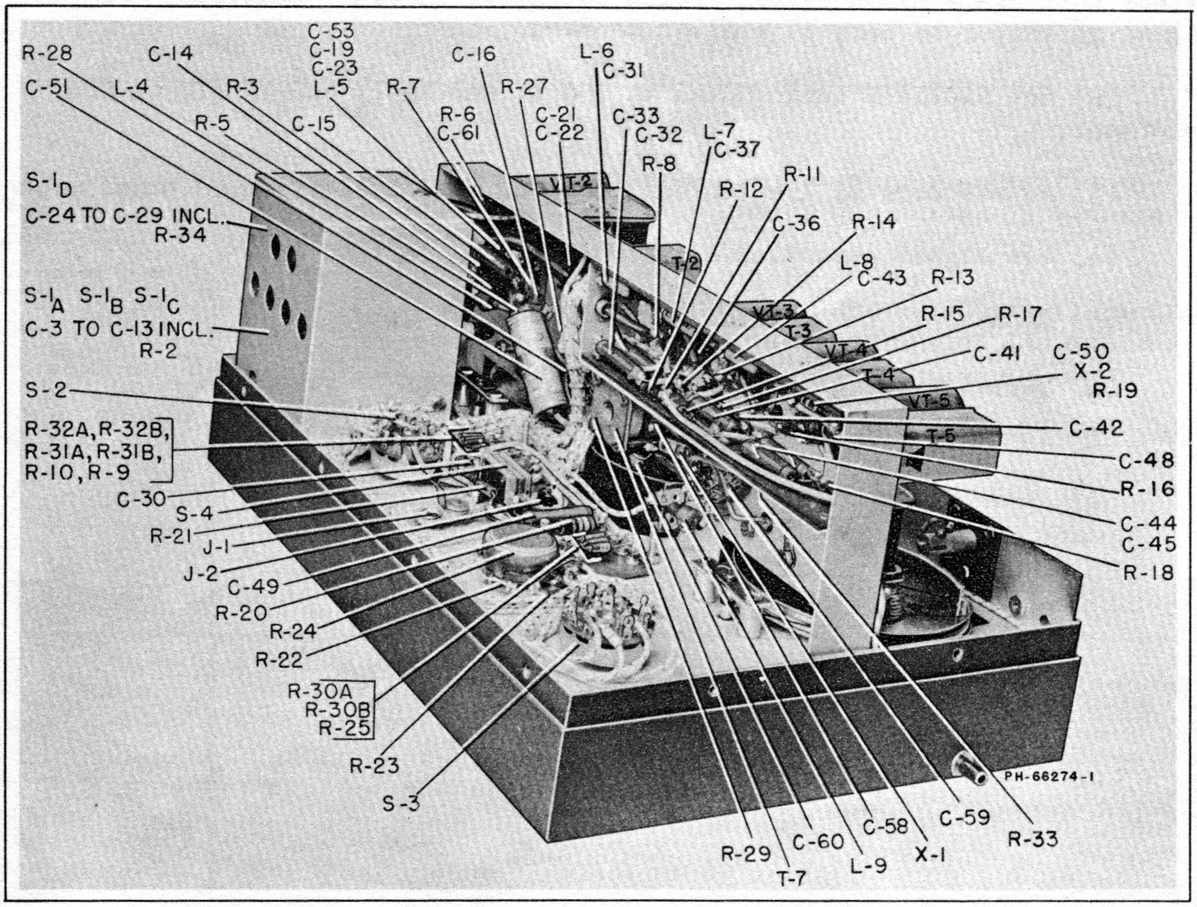
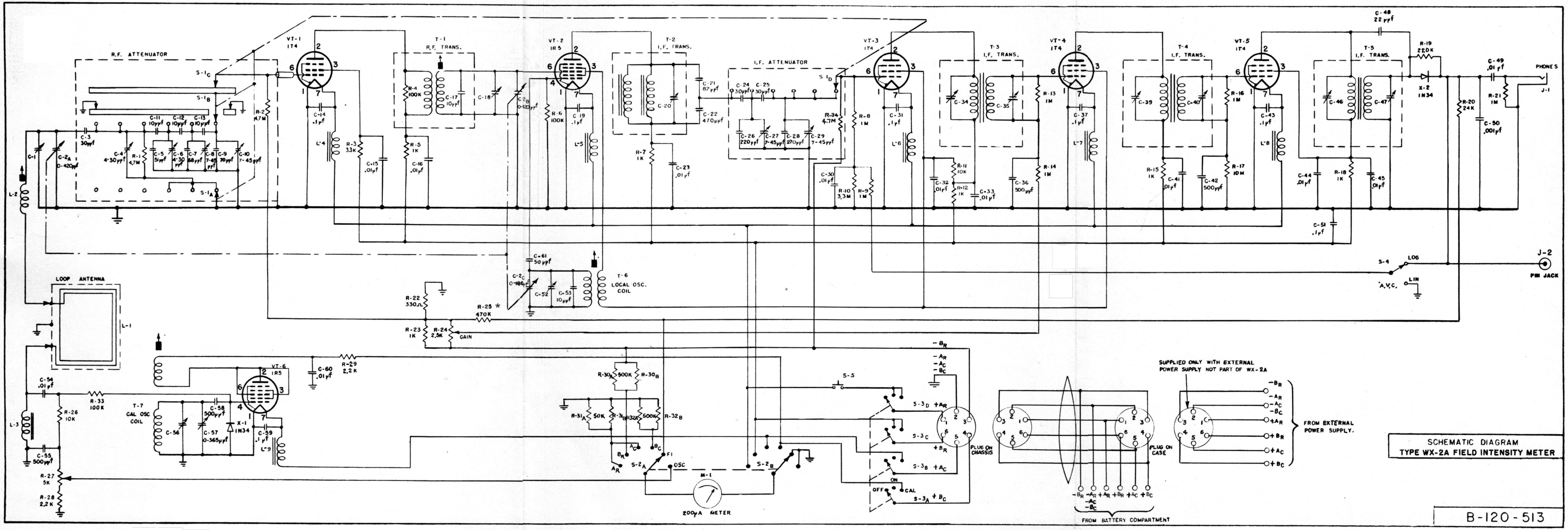


Figure 5 - Field Intensity Meter Chassis, Bottom Oblique View

e. CHECKING ATTENUATORS.- The attenuating networks are set at the factory with the aid of high-precision test equipment not usually available in the field. Ordinarily, they should remain accurate indefinitely. Adjustment of the attenuator or R-27 should not be attempted in the field. The manufacturer of the instrument maintains the special equipment necessary for making these adjustments.

If desired, a rough check of the attenuator ratio can be made in the following manner. Feed a steady signal into the equipment from a radio station or signal generator inductively coupled to the loop. Adjust the GAIN control until the meter indicates 10 on the scale. Move the FULL SCALE RANGE switch tc the next highest position. The meter pointer should drop back to approximately 1 on the scale.

NOTE: The values given for R-25 and R-26 on the schematic diagram, Figure 6, are normal design center-values. Some changes in both directions from the normal value are sometimes necessary for the proper performance of a given meter.



* R-25 omitted on serial no. 592

Figure 6 - Schematic Diagram, Field Intensity Meter

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Dale H. Cook

REPLACEMENT PARTS LIST

When ordering replacement parts, please give Symbol, Description, and Stock Number of each item ordered.

The part which will be supplied against an order for a replacement item may not be an exact duplicate of the original part, however, it will be a satisfactory replacement, differing only in minor mechanical or electrical characteristics. Such differences will in no way impair the operation of the equipment.

FIELD INTENSITY METER
Type WX-2A
(MI-30002-A)

Symbol No.	Description	RCA Stock No.
C-1	Capacitor, variable, mica, 5-30 mmfd. Part of variable tuning capacitor C-2A,C-2B,C-2C	56577
C-2A,B,C	Capacitor, 3 gang, tuning	56607
C-3	Capacitor, fixed ceramic, 30 mmfd. ±5%	56578
C-4	Capacitor, variable, ceramic, 4-30 mmfd.	56579
C-5	Capacitor, fixed (silvered) 50 mmfd. ±5%	64621
C-6	Capacitor, same as C-4	
C-7	Capacitor, fixed, mica, silvered 70 mmfd. ±5%	39624
C-8	Capacitor, variable, ceramic, 7-45 mmfd.	54221
C-9	Capacitor, same as C-7	
C-10	Capacitor, same as C-8	
C-11,C-12,C-13	Capacitor, fixed, ceramic, 10 mmfd. ±10%	53511
C-14	Capacitor, fixed, paper, 0.1 mfd.	56580
C-15,C-16	Capacitor, fixed, ceramic, phenolic insulated, 0.01 mfd. minimum value	56581
C-17	Capacitor, same as C-11	
C-18	Capacitor, same as C-1	
C-19	Capacitor, same as C-14	
C-20	Capacitor, variable, mica. Part of T-2	
C-21	Capacitor, fixed, mica, silvered, 82 mmfd. ±5%	39626
C-22	Capacitor, fixed, mica, silvered, 470 mmfd. ±5%	39644
C-23	Capacitor, same as C-15	
C-24,C-25	Capacitor, same as C-3	
C-26	Capacitor, fixed, mica, silvered, 220 mmfd. ±5%	39636
C-27	Capacitor, same as C-8	
C-28	Capacitor, fixed, mica, silvered, 270 mmfd. ±5%	39638
C-29	Capacitor, same as C-8	
C-30	Capacitor, same as C-15	
C-31	Capacitor, same as C-14	
C-32,C-33	Capacitor, same as C-15	
C-34,C-35	Capacitor, variable, mica. Part of T-3	
C-36	Capacitor, fixed, ceramic, 500 mmfd. 300 vdc	69394
C-37	Capacitor, same as C-14	
C-38	Capacitor, same as C-15	
C-39,C-40	Capacitor, variable, mica. Part of T-4	

Symbol No.	Description	RCA Stock No.
C-41	Capacitor, same as C-15	
C-42	Capacitor, same as C-36	
C-43	Capacitor, same as C-14	
C-44,C-45	Capacitor, same as C-15	
C-46,C-47	Capacitor, variable, mica. Part of T-5	
C-48	Capacitor, fixed, ceramic, 22 mmfd. ±10%	56576
C-49	Capacitor, same as C-15	
C-50	Capacitor, fixed, ceramic, phenolic insulated, 0.001 mfd. minimum value	54677
C-51	Capacitor, fixed, paper, oil filled, 0.1 mfd.	52384
C-52	Capacitor, same as C-1	
C-53	Capacitor, fixed, ceramic, phenolic insulated, 10 mmfd.	53511
C-54	Capacitor, same as C-15	
C-55	Capacitor, same as C-36	
C-56	Capacitor, variable, mica, 5-30 mmfd. Part of C-57	
C-57	Capacitor, variable, air, 0-365 mmfd.	56318
C-58	Capacitor, fixed, mica, 500 mmfd. ±20%	90009
C-59	Capacitor, same as C-14	
C-60	Capacitor, same as C-15	
C-61	Capacitor, same as C-5	
J-1	Jack, open circuit	23421
L-1	Loop antenna and cover	56585
L-2	Coil, antenna loading	56586
L-3	Coil, calibrating signal injection	56587
L-4,L-5,L-6, L-7,L-8,L-9	Coil, choke, filament decoupling	56588
M-1	Meter, 200 microamperes, logarithmic scale	56594
R-1,R-2	Resistor, fixed, composition, 4.7 megohms ±10%, 1/2 watt	
R-3	Resistor, fixed, composition, 33,000 ohms ±20%, 1/2 watt	
R-4	Resistor, fixed, composition, 100,000 ohms ±20%, 1/2 watt	
R-5	Resistor, fixed, composition, 1000 ohms ±20%, 1/2 watt	
R-6	Resistor, same as R-4	
R-7	Resistor, same as R-5	
R-8,R-9	Resistor, fixed, composition, 1 megohm ±20%, 1/2 watt	
R-10	Resistor, fixed, composition, 3.3 megohms ±20%, 1/2 watt	
R-11	Resistor, fixed, composition, 10,000 ohms ±20%, 1/2 watt	
R-12	Resistor, same as R-5	
R-13,R-14 R-15,R-16	Resistor, same as R-8	
R-17	Resistor, fixed, composition, 10 megohms ±20%, 1/2 watt	
R-18	Resistor, same as R-5	
R-19	Resistor, fixed, composition, 220,000 ohms ±20%, 1/2 watt	

Symbol No.	Description	RCA Stock No.
R-20	Resistor, fixed, composition, 24,000 ohms ±5%, 1 watt	
R-21	Resistor, same as R-8	
R-22	Resistor, fixed, composition, 330 ohms ±20%, 1/2 watt	
R-23	Resistor, same as R-5	
R-24	Resistor, variable, composition, 2500 ohms, linear taper	56596
R-25	Resistor, fixed, composition, 470,000 ohms ±20%, 1/2 watt	
R-26	Resistor, same as R-11	
R-27	Resistor, variable, composition, 5000 ohms, linear taper with locking bushing	56597
R-28	Resistor, fixed, composition, 2200 ohms ±10%, 1/2 watt	
R-29	Resistor, fixed, composition, 2200 ohms ±20%, 1/2 watt	
R-30A,B	Resistor, fixed, composition 500,000 ohms ±2%; matched parallel pair	44869
R-31A,B	Resistor, fixed, composition, 50,000 ohms ±2%; matched parallel pair	44874
R-		
R-32A,B	Resistor, same as R-30A,B	
R-33	Resistor, carbon, deposited, 100,000 ohms ±10%	56595
S-1A,B,C,D	Attenuator assembly	56582
S-2A,B	Switch, meter selection, 2 pole, 6 position	56583
S-3A,B,C,D	Switch, power, shorting, 4 pole, 3 position	56584
S-4	Switch, toggle, SPDT	17375
T-1	Transformer, radio frequency	56589
T-2	Transformer, intermediate frequency	56590
T-3,T-4,T-5	Transformer, intermediate frequency	56591
T-6	Coil, local oscillator	56592
T-7	Coil, calibrating oscillator	56593
X-1,X-2	Crystal, rectifier	54374
	Block, latch, end	56601
	Clip, battery	56615
	Clip, B-battery	56614
	Door, back	56603
	Panel, front	56604
	Plunger, antenna contact	56609
	Screw, latch	56599
	Screw, thumb	56605
	Shaft, latch	56602
	Spring, antenna contact	56598
	Spring, latch	56606
	Tube, latch assembly	56600

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