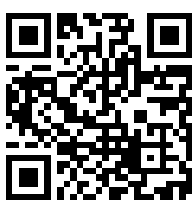

TM 11-849

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

RADIO TRANSMITTER BC-1149-A

DEPARTMENT OF THE ARMY • • *MARCH 1948*

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DESTRUCTION NOTICE

WHY —To prevent the enemy from using this equipment for his benefit.

WHEN—When ordered by your commander.

HOW—1. Smash—Use sledges, axes, handaxes, pickaxes, hammers, crowbars, heavy tools.

2. Cut—Use axes, handaxes, machetes.

3. Burn—Use gasoline, kerosene, oil, flame throwers, incendiary grenades.

4. Explosives—Use firearms, grenades, TNT.

5. Disposal—Bury in slit trenches, foxholes, other holes. Throw in streams. Scatter.

USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT

WHAT—1. Smash—All tubes, switches, castings, and every electrical and mechanical part whether moving or fixed.

2. Cut—All wires, cables.

3. Burn—Charts, diagrams, and manuals.

4. Bury or scatter—Any or all of the above pieces after destroying.

DESTROY EVERYTHING

PART ONE

INTRODUCTION

Section I. DESCRIPTION

1. General

Radio Transmitter BC–1149–A (Target) is a self-contained two-tube, four-band, battery-operated, portable unit which emits a balanced, low-power continuous-wave (c–w) or interrupted continuous wave (i-c-w) signal. The unit is intended as a target transmitter or signal source for calibrating and checking the operation of direction finding equipment in the field. The transmitter, mounted on its tripod and ready for operation, is shown in figure 1.

2. Application

For detailed information on using the target transmitter to calibrate and check a radio direction finder, refer to the technical manual on the direction finding equipment.

3. Technical Characteristics

Frequency range: ..... 1.5 to 32.0 megacycles.

Band	*Range (mc)*
1	1.5 to 3.0
2	3.0 to 7.0
3	7.0 to 15.0
4	15.0 to 32.0

Circuit: ..... Push-pull oscillator.
Types of signals: ..... CW and ICW.
Type of modulation: ..... Amplitude (ICW).
Modulation circuit: ..... Self-excited, resistance-capacity audio interrupter.
Number of tubes: 2
Power supply: ..... Battery, self-contained.

Figure 1. Radio Transmitter BC–1149–A (Target), set up.

Item	Quantity	Voltage	Total current drain (CW)	Milliamperes (ICW)
Battery BA–35	1	1.5	220	280
Battery BA–53	3			
HI-LO, switch at HI.		135	8.0	9.1
HI-LO, switch at LO.		67.5	3.0	3.5

Antenna: ..... Telescopic, dipole; length adjustable from 38 to 63 inches.

Note. This list is for general information only. See appropriate publication for information pertaining to requisition of spare parts.

4. Table of Components

Component	Required number	Height (in.)	Depth (in.)	Length (in.)	Weight (lb.)
Transmitter (complete).	1	16	17¾	7½	24.5
Mounting support	1				4.25
Tripod	1			56½ (min) 77¼ (max)	15.6
Antenna rod	2			38 (min) 62 (max)	0.94

5. Packaging Data

For packaging data refer to the technical manual on the radio direction finder with which the target transmitter is furnished.

6. Description of Major Components

a. RADIO TRANSMITTER BC–1149–A. The transmitter (fig. 1) consists of a four-band, vacuum-tube oscillator, a self-excited, vacuum-tube interrupter, and a self-contained battery power supply. All component parts, including the battery power supply, are mounted on a sheet-steel chassis and front panel. Top and bottom views of the unit are shown in figures 3 and 4. The chassis is housed in a welded, sheet-steel cabinet equipped with a leather carrying handle. The cabinet and front panel are finished in enamel. The front panel and chassis assembly are secured to the cabinet by wingnuts. Ceramic feed-through insulators on the top and bottom of the cabinet support the dipole antenna (*b* below).

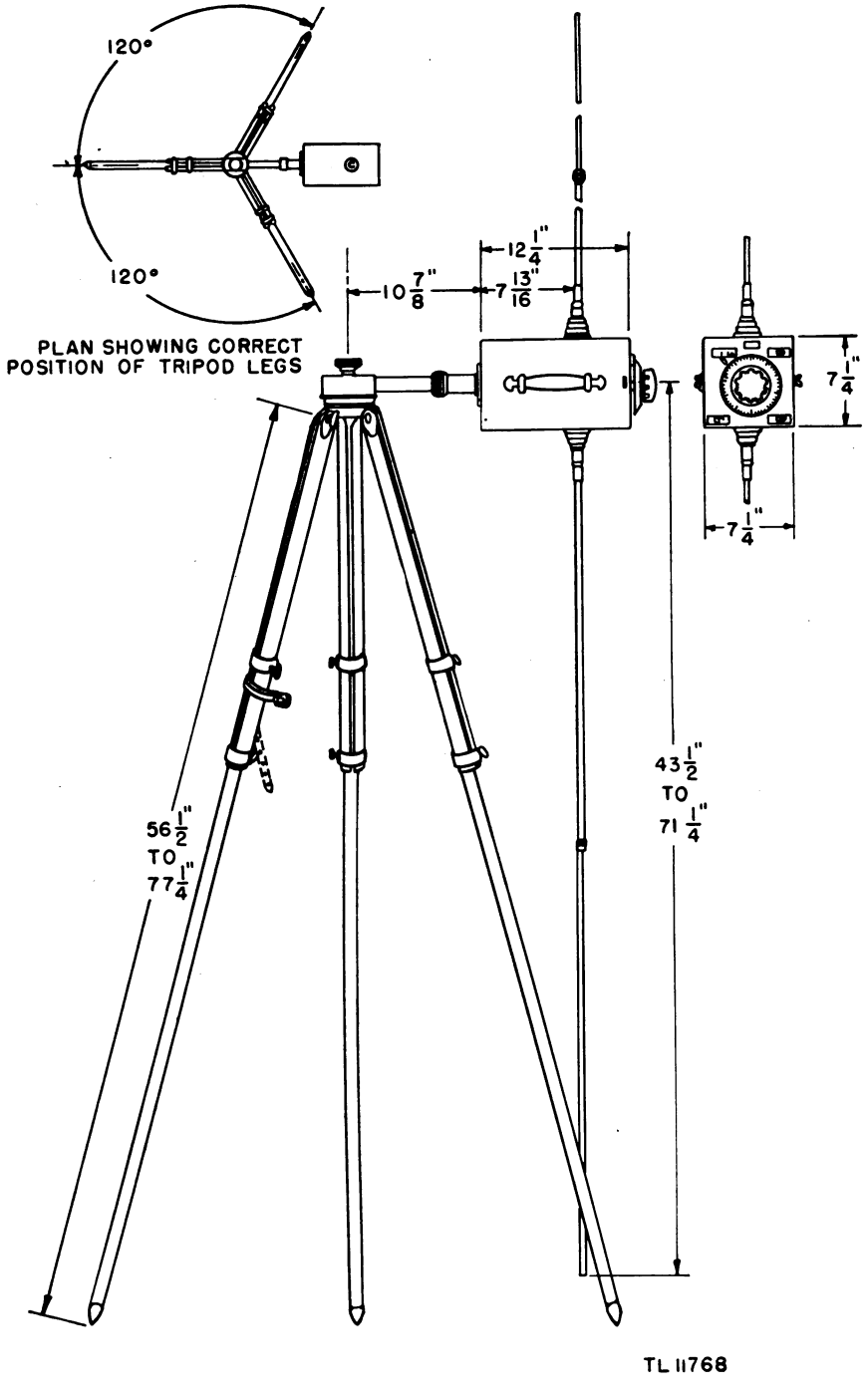

Figure 2. Radio Transmitter BC–1149–A, dimensions.

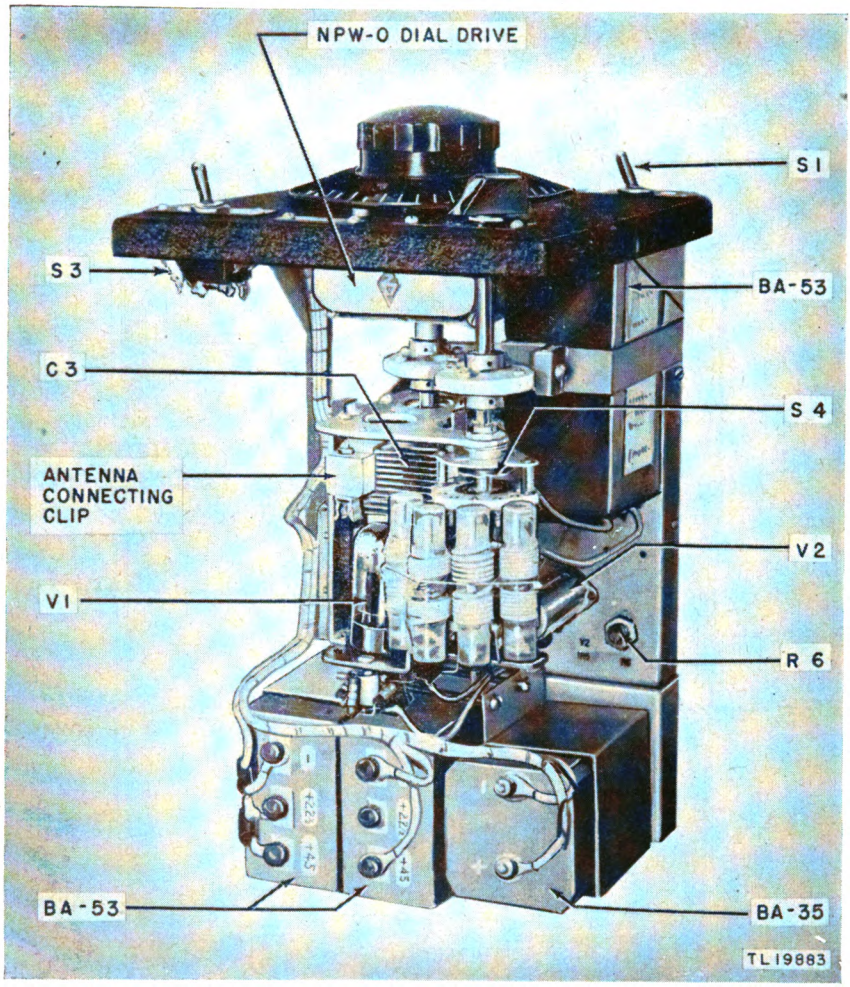

Figure 3. Radio Transmitter BC–1149–A, top view.

A mounting sleeve, at the rear of the cabinet, clamps the unit to the tripod mounting support.

b. ANTENNA. The dipole antenna consists of two telescoping rods. Each rod consists of two silver-plated brass tubes, one inside the other. They are adjustable from 38 to 62 inches in length. The outer tube has a knurled nut that clamps the inner tube at the required length. The rod assembly is secured to a special adapter on the ceramic feed-through insulator on the transmitter cabinet. Studs on the feed-through insulator make contact with a pair of spring clips on the transmitter chassis, thus connecting the antenna to the transmitter circuits.

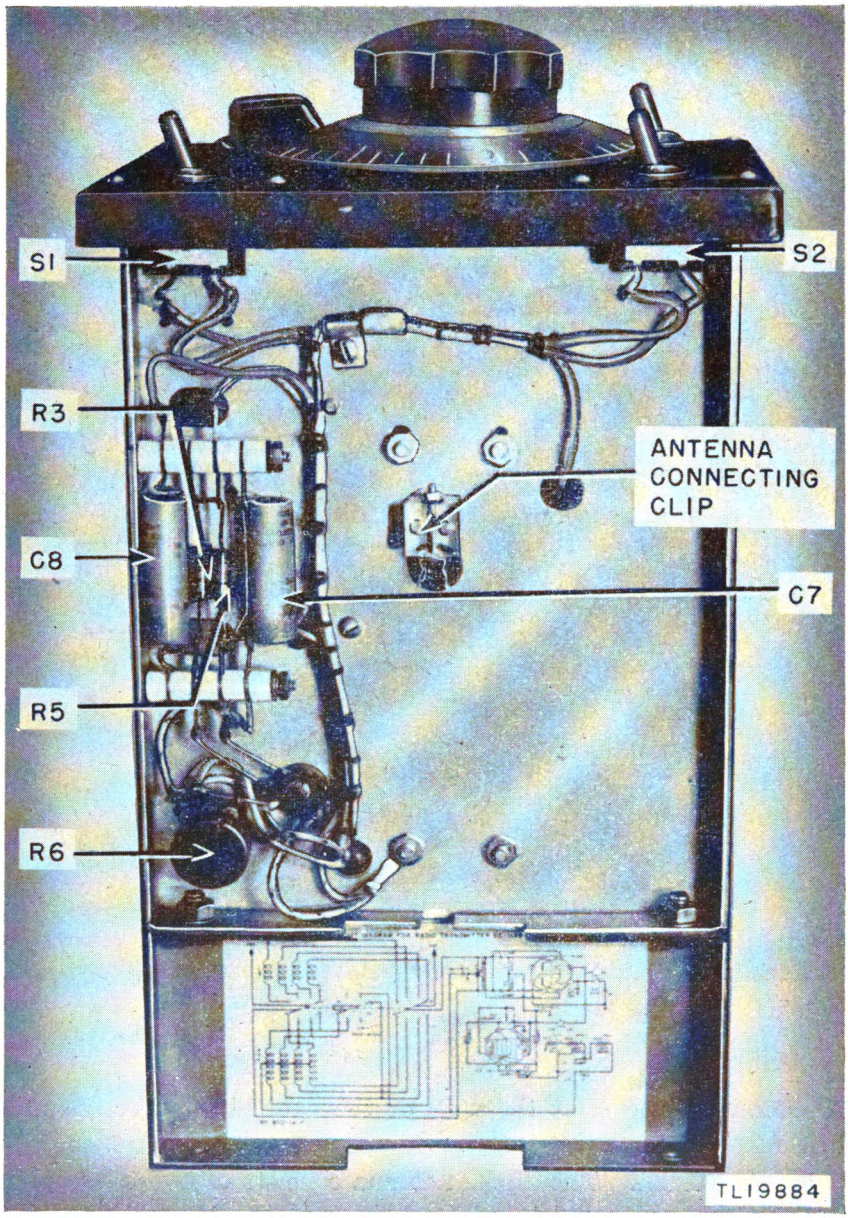

Figure 4. Radio Transmitter BC–1149–A, bottom view.

c. BATTERIES. The power supply for the target transmitter consists of three 45-volt Batteries BA–53 and one 1.5-volt Battery BA–35. The three 45-volt batteries constitute the plate power supply and the 1.5 volt battery is utilized for filament power.

The HI-LO switch applies 135 volts or 67½ volts to the plate circuits depending upon the position of the switch.

d. TRIPOD. A tripod (fig. 2) is provided for supporting the transmitter. Each leg of the tripod is 56½ inches long when telescoped and 77¼ inches long when fully extended. A tripod mounting adapter is used to mount the transmitter on the tripod.

Section II. INSTALLATION OF RADIO TRANSMITTER BC-1149-A

7. Siting

For information on siting the target transmitter, refer to the technical manual on the direction finder with which the transmitter is to be used.

8. Unpacking, Uncrating, and Checking

For information on unpacking, uncrating, and checking refer to the technical manual for the direction finder equipment with which the transmitter is supplied.

9. Connections and Interconnections

Since Radio Transmitter BC–1149–A is a self-contained, portable unit, no external connections or interconnections (with other units) are required.

10. Installation

a. BATTERY INSTALLATION. The transmitter is shipped without batteries. Three 45-volt Batteries BA–53, and a 1½-volt Battery BA–35, must be installed on the chassis. Loosen the wingnut on each side of the cabinet and remove the chassis from the cabinet. Place the batteries on the chassis as shown in figure 3. It may be necessary to loosen the clamping screws, if difficulty is experienced in placing the batteries in the clamps on the chassis. After the batteries are in place, tighten the clamping screws. Connect the battery cable to the battery terminals in accordance with the polarity and voltage designation tab on each lead.

b. FIELD SET-UP. (1) Screw the mounting support to the top of the tripod. Loosen the knurled knob on the top of the support and position the support rod so that the rod protrudes

in a direction equidistant between two legs of the tripod (fig. 2). Tighten the knob.

(2) Extend the legs of the tripod to their full length and level the tripod over the required spot, so that the mounting support faces toward the direction finder antenna. Push the leg shoes into the ground.

(3) Loosen the clamping screws on the rear of the transmitter cabinet mounting sleeve and slide the sleeve over the mounting support on the tripod. With the transmitter upright (fig. 2) tighten the clamping nut.

(4) Screw the transmitter antenna rods into the adapters on the ceramic feed-through insulators of the transmitter cabinet.

11. Repacking Information

Repacking information for Radio Transmitter BC–1149–A antennas, and tripod, is fully described in the technical manual for the direction finding equipment.

PART TWO

OPERATING INSTRUCTIONS

Section III. CONTROLS

Note. For information on destroying the equipment to prevent enemy use, refer to the destruction notice at the front of this manual.

12. Controls and Their Use

All controls used in operataing Radio Transmitter BC–1149–A are on the front panel and are designated by nameplates below each control (fig. 5). The controls and their use are listed below:

a. BAND SELECTOR SWITCH (S4). This rotary type switch is used to select the desired frequency range.

b. HI-LO SWITCH. (S3). This switch controls the power output of the oscillator stage of the transmitter by changing the plate voltage to the oscillator plate circuit.

c. ICW-CW SWITCH (S2). This switch selects either CW or an audio interrupted signal (ICW).

d. ON-OFF SWITCH (S1). This switch is used to turn the transmitter on or off.

e. TUNING CONTROL. The transmitter is tuned to the desired frequency by means of the tuning dial at the center of the front panel. This dial has a scale calibrated 0 to 500 and a ratio of 20 to 1. Ten complete revolutions are required to cover the range of each band. The dial settings for frequencies within each band are given in the frequency chart which is mounted on one side of the transmitter cabinet.

f. The audio interrupter frequency is controlled by variable resistor R6 which is located on the transmitter chassis (fig. 3). This control is properly set at the factory and requires no further adjustment.

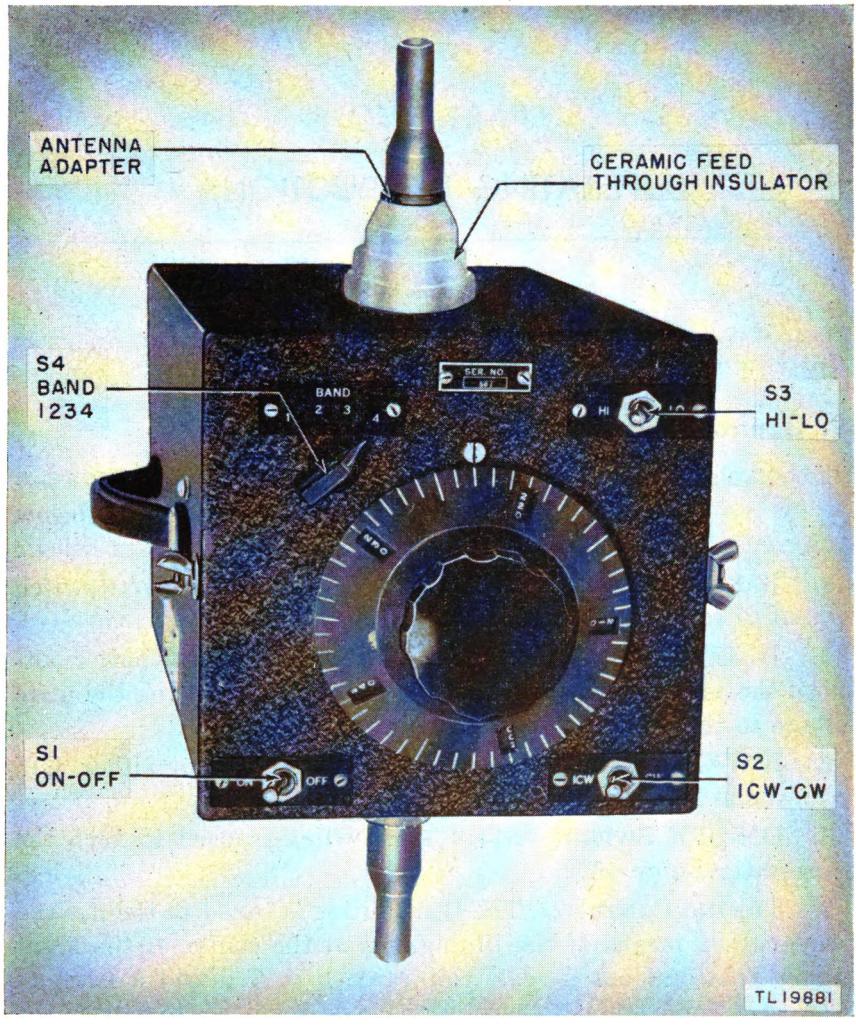

Figure 5. Radio Transmitter BC–1149–A, front panel view.

Section IV. OPERATION

13. Starting Procedure

a. Set up Radio Transmitter BC–1149–A, as described in paragraph 10 and locate it as directed in the technical manual for the radio direction finder with which the transmitter is used.

b. Set the target transmitter ON-OFF switch to ON. For information on setting the HI-LO and ICW-CW switches, refer to the radio direction finder technical manual.

14. Operation

a. Turn the BAND switch to the band in which operation is desired. Refer to the calibration chart on the side of the transmitter cabinet and tune the transmitter to the required frequency. Then tune the transmitter signal in on the direction finder equipment.

b. If interference is present at this frequency, it may be avoided by tuning the receiver to a clear channel, and retuning the target transmitter to this clear channel frequency.

c. If the signal from the transmitter is too strong, set the HI-LO switch in the LO position. If a greater reduction of the signal strength is required, shorten the dipole antenna rods.

15. Stopping Procedure

To turn the transmitter off, turn the ON-OFF switch to the OFF position.

Caution: To preserve the life of the batteries always place the ON-OFF switch in the OFF position when the transmitter is not in use.

Section V. EQUIPMENT PERFORMANCE CHECK LIST

16. Purpose and Use of Check List

a. GENERAL. The equipment performance check list (par. 17) helps the operator determine whether Radio Transmitter BC–1149–A is functioning properly. The check list gives the item to be checked, the conditions under which the item is checked, the normal indications and tolerances of correct operation, and the corrective measures that the operator can take. Items 1 through 3 are checked before starting, item 4 when starting, items 5 through 10 during operation, and item 11 when stopping.

b. ACTION OR CONDITION. For some items the information given in the action or condition column consists of the settings of various switches and controls under which the item is to be checked. For other items it represents an action that must be taken in order to check the normal indication given in the normal indication column.

c. NORMAL INDICATIONS. The normal indications listed include the visible and audible signs present when the operator checks the items. If the indications are not normal, apply the recommended corrective measures.

d. CORRECTIVE MEASURES. The corrective measures listed are those that the operator can make without turning the equipment in for repairs. Reference to part five in the table indicates that the correction of the trouble cannot be effected during operation and that trouble shooting by an experienced repairman is called for. If the transmitter is completely inoperative or if the recommended corrective measures do not yield results, trouble shooting is necessary.

e. ITEMS 1 TO 3. Items 1 to 3 are preparatory.

f. ITEM 4. Item 4 is starting.

g. ITEMS 5 TO 10. These items are checked when operating the transmitter. Place the controls listed in the positions indicated unless otherwise required.

h. ITEM 11. This item is to be checked when stopping the transmitter.

17. Equipment Performance Check List

RADIO TRANSMITTER BC–1149–A

	Item No.	Item	Action or condition	Normal indications	Corrective measures
PREPARATORY	1	Tripod	Set-up tripod (par. 10)	Adjusted to terrain with platform horizontal.	None.
	2	Transmitter	Attach transmitter to tripod.		
	3	Antenna	Attach antenna to transmitter.		
START	4	ON-OFF Switch	Place ON-OFF switch in ON position.		
EQUIPMENT PERFORMANCE	5	HI-LO Switch	Place HI-LO switch in HI position.		
	6	ICW-CW Switch	Place ICW-CW switch in ICW position.		
	7	BAND Selector Switch	Turn BAND selector switch to desired range.		
	8	Tuning Control	Turn tuning control to selected frequency.	Signal should be heard in receiver.	Readjust tuning controls of receiver and/or transmitter.
	9	ICW-CW Switch	Set to CW.	Received signal changes to CW.	*a.* Check batteries and tubes. *b.* See part five.
	10	HI-LO Switch	Set to LO	Signal becomes weaker from transmitter.	Check switch.
STOP	11	ON-OFF Switch	Place ON-OFF switch in OFF position.	No signal at receiver	See part five.

PART THREE

MAINTENANCE INSTRUCTIONS

Section VI. PREVENTIVE MAINTENANCE TECHNIQUES

18. Meaning of Preventive Maintenance

Preventive maintenance is a systematic series of operations performed at regular intervals on equipment, when turned off, to eliminate major breakdowns, unwanted interruptions in service, and to keep equipment operating at top efficiency. To understand what is meant by preventive maintenance, it is necessary to distinguish between preventive maintenance, trouble shooting, and repair. The prime function of preventive maintenance is to *prevent break-downs* and, therefore, the need for repair. The prime function of trouble shooting and repair is to locate and correct *existing* defects. The importance of preventive maintenance cannot be overemphasized. A system of radio communication depends on the performance of every set. It must be *ready* to go on the air when it is needed, and it *must* operate efficiently. Therefore, it is vitally important that radio operators and repairmen maintain their radio sets properly.

Note. The operations in sections VI and VII are organizational maintenance operations. Some operations in section VIII and IX are field and base maintenance.

19. Description of Preventive Maintenance Techniques

a. GENERAL. Most of the electrical parts used in Radio Transmitter BC–1149–A require routine preventive maintenance. This preventive maintenance varies. Some parts require a different kind of maintenance than others. Some require more, some less. Definite and specific instructions must be followed. Hit-or-miss techniques cannot be applied. This section of the manual contains specific instructions to guide personnel assigned to perform the six basic maintenance operations: Feel, Inspect, Tighten, Clean, Adjust, and Lubricate. Throughout this manual the letter-

ing system for the six operations will be as follows:

* F—Feel
I —Inspect
T—Tighten
C—Clean
A—Adjust
L—Lubricate

The first two operations show whether the other four are needed. Selection of operations is based on a knowledge of field needs. For example, dust encountered on dirt roads during cross-country travel filters into equipment no matter how much care is taken to prevent it. Rapid changes in weather (such as heavy rain followed by blistering heat), excessive dampness, snow, and ice tend to cause corrosion of exposed surfaces and parts. Without frequent inspections and the necessary tightening, cleaning, and lubricating operations, equipment becomes undependable and subject to breakdown when it is needed most.

b. INSPECT. Inspection is the most important operation in preventive maintenance. A careless observer will overlook evidences of minor trouble. Although these defects may not at the moment interfere with performance of the equipment, invaluable time and effort can be saved if they are corrected *before* they lead to major and costly break-downs. To be able to recognize the signs of a defective set, make every effort to become thoroughly familiar with indications of normal functioning. Inspection consists of *carefully* observing all parts of the equipment, noticing their color, placement, state of cleanliness, etc. Inspect for the following conditions:

(1) Overheating, as indicated by discoloration, blistering, or bulging of the parts or surface of the container; leakage of insulating compounds; and oxidation of metal contact surfaces.

(2) Placement, by observing that all leads and cabling are in their original positions.

(3) Cleanliness, by carefully examining all recesses in the units for accumulation of dust, especially between connecting terminals and binding posts. Parts, connections, and joints should be free of dust, corrosion, and other foreign matter. In tropical and high-humidity areas, look for fungus growth and mildew.

(4) Tightness, by testing any connection or mounting which appears to be loose.

c. TIGHTEN, CLEAN, AND ADJUST. These operations are self-explanatory. Specific procedures to be followed in performing

* The Feel operation does not apply to Radio Transmitter BC–1149–A.

them are given wherever necessary throughout part three.

Caution: Screws, bolts, and nuts should not be tightened carelessly. Fittings tightened beyond the pressure for which they are designed will be damaged or broken.

Whenever a loose connection is tightened, moistureproof and fungiproof it again by applying the varnish with a small brush. See paragraph 37 for details of moistureproofing and fungiproofing.

d. LUBRICATE. Lubrication refers to the application of grease or oil to the bearings of motors or rotating shafts. It may also mean the application of a light oil to door hinges or other sliding surfaces on the equipment. Where the need for lubrication is indicated, refer to paragraph 35.

20. Vacuum Tubes

a. INSPECT (I). (1) Inspect glass tube envelopes for accumulation of dirt. Replace tubes with loose envelopes if possible.

(2) Inspect the firmness of tubes in their sockets. Make the inspection by pressing the tubes down in the sockets and testing them in that position, not by partially withdrawing the tubes and jiggling them from side to side. Movement of a tube tends to weaken the pins in the base and unnecessarily spread the contacts in the socket. Inspect the tube sockets when removing tubes.

(3) Be careful when removing a tube from its socket. Never jar a warm tube.

b. TIGHTEN (T). Tighten all loose connections to the tube sockets.

c. CLEAN (C). (1) Clean the tubes, if necessary. Since the tubes in this transmitter operate at low voltages and do not have exposed grid and plate caps, frequent cleaning will not be necessary. However, do not permit dirt to accumulate on low-voltage tubes.

(2) Remove dust and dirt from the glass envelopes with a clean lint-free dry cloth.

(3) When tube sockets are cleaned and the contacts are accessible, fine sandpaper may be used to remove corrosion, oxidation, and dirt.

21. Capacitors

a. INSPECT (I). (1) Inspect the terminals of fixed capacitors for corrosion and loose connections. Carefully inspect the mountings to discover loose mounting screws, studs, or brackets.

Examine the leads for poor insulation, cracks, and evidences of dry rot. Cut away frayed strands on the insulation. If the wire is exposed, wrap it with friction tape. See that the terminals of the capacitors are not cracked or broken.

(2) Thoroughly inspect the case of each fixed capacitor for leaks, bulges, and discoloration.

(3) Inspect the plates of variable capacitors for dirt, dust, or lint. Examine the movable set of plates for signs of damage or misalinement that would cause them to touch the fixed plates during tuning. Rotate the movable plates, using the panel tuning control, and thus check for proper operation of the capacitor.

b. TIGHTEN (T). Tighten loose terminals, mountings, and connections on the capacitors when necessary.

c. CLEAN (C). (1) Clean the cases of fixed capacitors, the insulated bushings, and all connections that are dirty or corroded. The capacitor cases and bushings can usually be cleaned with a dry cloth. However, if the deposit of dirt is hard to remove, moisten the cloth in dry-cleaning solvent (SD).

(2) Clean the plates of variable capacitors with a small brush or pipe cleaner, removing all dust and lint.

Caution: Exercise extreme care when cleaning variable capacitors as a slight bend or misalinement of plates will affect calibration.

d. LUBRICANT (L). See paragraph 35.

22. Resistors

a. GENERAL. Various types of resistors are used in Radio Transmitter BC–1149–A. The connections to the various resistors are either of the pig-tail or solder lug type.

b. INSPECT (I). Examine the bodies of all types of resistors for blistering, discoloration, and other indications of overheating. Inspect leads and all other connections for corrosion, dirt, dust, looseness, and broken strands in the connecting wires. Check the security of all mountings. Do not attempt to move resisitors with pig-tail connections, because there is danger of breaking the connections at the point where they enter the body of the resisitor. Such defects cannot be repaired.

c. TIGHTEN (T). Tighten resistor connections and mountings whenever they are found loose. If a resistor is allowed to remain loose, vibration may break the connection or damage the body.

d. CLEAN (C). (1) Clean all carbon resistors with a small brush.

(2) Resisitors with discolored bodies cannot be cleaned. Discoloration indicates that there has been overloading and overheating at some time prior to the inspection. This discoloration is probably due to circuit trouble which requires analysis and correction. Trouble-shooting procedures are described in part five.

23. Bushings and Insulators

a. DESCRIPTION. Insulated bushings are used in the high-voltage and r-f circuits. They are constructed of ceramic material with a glazed surface. Because an insulator is no better than its surface, deposits of foreign substances on the surface will reduce the insulation value of the bushing. Therefore, it is very important that all bushings used in the r-f circuits be inspected frequently.

b. INSPECT (I). (1) Inspect the physical condition of the insulated bushings. They should be clean without cracks or chips. A highly glazed insulator may develop fine-line surface cracks where moisture and dust will accumulate and eventually form a leakage for a high-voltage flash-over.

(2) As a rule, the bushings are held in position with nuts screwed onto the threaded conductors. These can be replaced very easily. If replacement is not possible because of a shortage of supplies, clean the defective bushing frequently and thoroughly with SD. Sometimes it is difficult to see dust on a glazed surface. A satisfactory check can be made by sliding a clean finger across the bushing.

c. TIGHTEN (T). The procedure to be used in tightening loose bushings is self-evident. However, one precaution must be observed. *Avoid forcing the nuts or screws down too tight.* If excessive pressure is exerted on the bushings, damage or breakage is almost certain. If the threads on bushing stud bolts are found stripped so that they cannot be tightened, replace the entire bushing.

d. CLEAN (C). Insulated bushings are easily cleaned. Never use abrasive materials because the glazed finish will be destroyed, thus permitting moisture to be absorbed. A clean cloth is usually satisfactory. If deposits of grime or dirt on the surface of a bushing are hard to remove, use SD. After the surface has been cleaned with solvent, carefully polish it with a dry cloth. Otherwise, a thin film of the solvent will be left which may impair the effectiveness of the bushing as a high-voltage insulator.

24. Switches

a. INSPECT (I). (1) Inspect the mechanical action of each switch and, while so doing, look for signs of dirt or corrosion on all exposed elements. In some cases, it will be necessary to examine the elements of the switch visually; in others, the action of the switch is checked by flipping the control knob or toggle, or pressing the switch button and noting the freedom of movement and amount of spring tension.

(2) Examine the ganged switch, S4, to see that it is properly lubricated and that the contacts are clean. Inspection is visual. Do not pry the leaves of the switch apart. The rotary members should make good contact with the stationary members; and as the former slides into the latter, a spreading of the stationary contact leaves should be visible. Switch action should be free. Wiping action of contacts usually removes any dirt at the point of contact.

b. CLEAN (C). Clean the exterior surfaces of switches with a stiff brush, moistened with SD.

c. LUBRICATE (L). See paragraph 35.

25. Coils

a. INSPECT (I). Inspect the coils for clealiness of the polystyrene coil forms and firmness of mounting supports. Check all connections for proper contact.

b. TIGHTEN (T). Tighten any loose coil mounting or connections by resoldering wires or tightening screws.

c. CLEAN (C). Clean the coil forms and coils with a soft brush.

26. Potentiometers

a. INSPECT (I). (1) Inspect the mechanical condition of potentiometer R6. The arm should be keyed tightly to the shaft, and the shaft should turn easily in the bushing which supports it.

(2) Inspect the assembly and mounting screws, setscrews, and nuts.

(3) Examine all metallic parts of the potentiometer for dust, dirt, and corrosion.

b. TIGHTEN (T). Tighten loose assembly or mounting screws.

c. CLEAN (C). (1) Clean the exposed surfaces of the potentiometer and the connections whenever they are dirty or corroded.

(2) Remove grease and dirt from the potentiometer parts with carbon tetrachloride.

27. Terminal Blocks

a. INSPECT (I). (1) Inspect terminal blocks for cracks, breakage, dirt, loose connections, and loose mounting screws.

(2) Carefully examine connections for mechanical defects, dirt, and corrosion.

b. TIGHTEN (T). Tighten loose screws, lugs, and mounting bolts. When tightening screws, be sure to select a screwdriver of correct size. Do not exert too much pressure. Tighten loose connections.

c. CLEAN (C). Clean terminal blocks, when they require it, with a dry brush. When necessary, use a cloth moistened with SD. Thoroughly wipe the block with a cloth and then brush it to remove any lint.

28. Cabinet, Chassis, and Mountings

The cabinet which houses the chassis of Radio Transmitter BC–1149–A is constructed of sheet steel finished with olive drab enamel.

a. INSPECT (I). Inspect the outside and inside of the cabinet thoroughly, paying strict attention to every detail. Inspect the panel for loose knobs and switches.

b. CLEAN (C). Clean the cabinet, outside and in, with a clean dry cloth. Use dry compressed air to blow out all accumulated dirt and dust. Repaint any surface that is found scratched, rusted, or chipped.

c. TIGHTEN (T). Tighten all loose mounting bolts, panel screws and control knobs.

29. Coupling Shafts and Control Knobs

The control of capacitor C3 and switch S4 is effected through coupling shafts that connect these items to control knobs located on the front panel. It is important that these shafts and control knobs be kept tight at all times. Use a screwdriver to tighten them.

Section VII. ITEMIZED PREVENTIVE MAINTENANCE

30. Introduction

For ease and efficiency of performance, preventive maintenance on Radio Transmitter BC–1149–A will be broken down into operations that can be performed at different time intervals. In this section the preventive maintenance work to be performed on

the radio set at the specified time intervals is broken down into units of work called items. The general techniques involved and the application of the FITCAL operations in performing preventive maintenance on individual parts are discussed in section VI. These general instructions are not repeated in this section. When performing preventive maintenance, refer to section VI if more information is required for the following items. All work is to be performed with the power removed from the equipment. After preventive maintenance has been performd on a given day, put the equipment into operation and check for satisfactory performance. (See par. 17.)

31. Preventive Maintenance Tools and Materials

The following preventive maintenance tools and materials will be needed:

Screwdrivers	⅛-inch and ½-inch with insulated handle.
Pliers	Long nose, cutting.
Soldering iron	
Dental mirror	Nonmagnifying.
Sandpaper	Grades #00, 000, and 0000.
Cloth	Lint-free, 6 inches by 6 inches.
Brushes	Assorted sizes from ¼ inch to 1 inch.
Pipe cleaners	Tobacco smokers'.
Solvent drycleaning	Federal spec P–S–661*a*.

Note. Gasoline will not be used as a cleaning fluid for any purpose.

32. Item 1, Exterior of Transmitter BC–1149–A

ITC	Antenna.
ITC	Tripod.
ITC	Cabinet.

33. Item 2, Interior of Transmitter BC–1149–A

ITCA	Tubes and sockets.
ITC	Capacitors.
ITC	Resistors.
ITC	Potentiometer.
ITC	Bushings and insulators.
ITCL	Switches.
ITL	Couplings.
ITC	Coils.
ITC	Terminal blocks.

34. Preventive Maintenance Check List

The following check list is a summary of the preventive maintenance operations to be performed on Radio Transmitter BC–1149–A. The time intervals shown on the check list may be reduced at any time by the local commander. For best performance of the equipment, perform operations at least as frequently as called for in the check list. The column indicates which operations are field or base maintenance. Operations are indicated by the letters of the word FITCAL. For example, if the letters ITCA appear in the "Operations" column, the item to be treated must be inspected (I), tightened (T), cleaned (C), and adjusted (A).

Item No.	Operations	Item	When performed								Maintenance performed by
			Before operation	After operation	Daily	Weekly	Monthly	Semi-annually	Yearly		
1	ITC	Antenna and tripod					X				0
1	ITC	Exterior of transmitter				X					0
2	ITC	Interior of transmitter					X				0
2	I	Batteries	X								0

* F	I	T	C	A	L
Feel	Inspect	Tighten	Clean	Adjust	Lubricate

Note. X indicates when operations are to be performed. 0 indicates operator.

Section III. LUBRICATION

35. Lubrication Instructions

a. APPROVED LUBRICANTS FOR RADIO TRANSMITTER BC–1149–A.

Symbol	Standard nomenclature
OE–10	Oil, engine, SAE–10.
PL–Special	Oil, lubricating, preservative, special.
GL	Grease, lubricating, special.
SD	Solvent, dry-cleaning.

* The Feel operation does not apply to Radio Transmitter BC–1149–A.

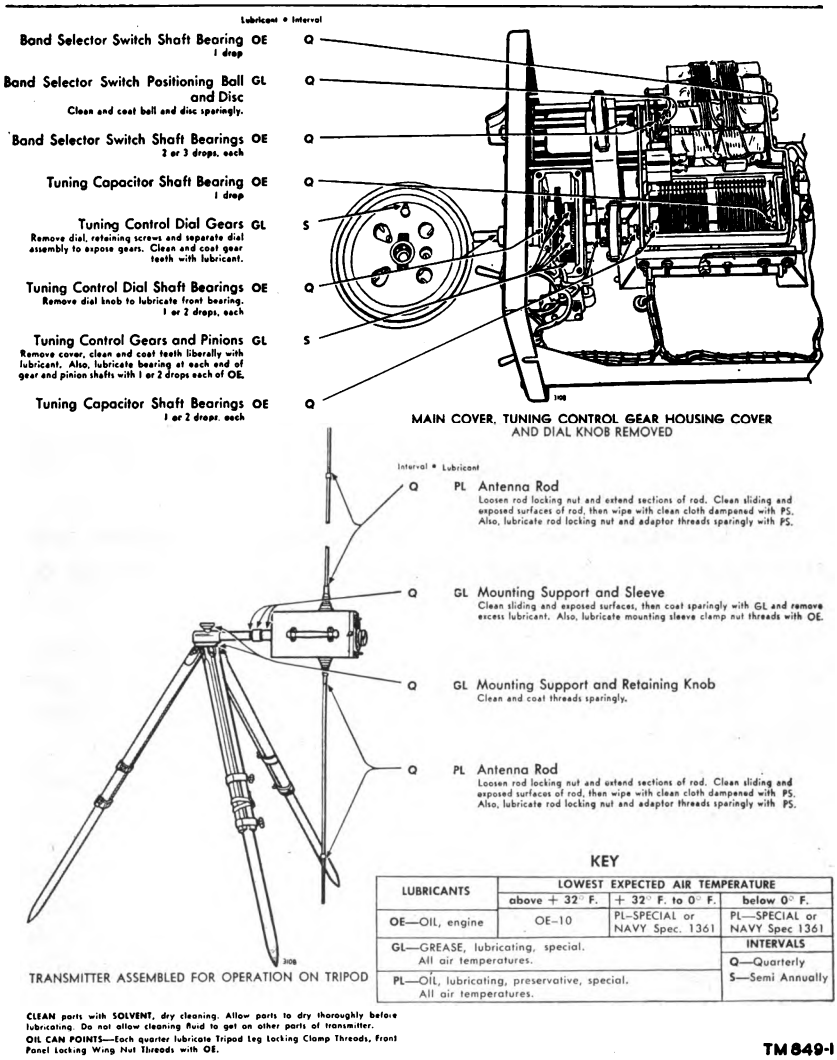

Figure 6. Radio Transmitter BC–1149–A, lubrication chart.

b. APPLICATION. Refer to figure 6. Before applying any lubricant, be sure all parts are clean and free from dust or dirt. Lubricate sparingly. Wipe off any excess lubricant.

(1) Apply 1 drop of OE–10 to the BAND selector switch shaft bearing quarterly.

(2) Coat the positioning ball and disk of BAND selector switch sparingly with GL quarterly.

(3) Apply 2 or 3 drops of OE–10 to each BAND selector switch shaft bearings quarterly.

(4) Apply 1 drop of OE–10 to the tuning capacitor shaft bearing quarterly.

(5) Remove the dial, retaining screws and separate dial assembly of the tuning control dial gears. With gears exposed, clean and coat gear teeth with GL semiannually. Wipe off excess grease.

(6) Apply 1 or 2 drops of OE–10 to each of the tuning control dial shaft bearings quarterly. Remove dial knob to lubricate front bearings.

(7) Remove cover, clean and coat gear teeth liberally with GL. Apply 1 or 2 drops of OE–10 to each bearing at each end of the gear and pinion shafts of the tuning control gears and pinions semiannually.

(8) Apply 1 or 2 drops of OE–10 to each of the tuning capacitor shaft bearings quarterly.

(9) Loosen rod locking nut of the antenna rods and extend sections of the rods. Clean sliding and exposed surfaces of rods, then wipe with a clean cloth dampened with SD.

(10) Clean the sliding and exposed surfaces of mounting support and sleeve, then coat sparingly with GL. Wipe off excess lubricant. Also, lubricate mounting sleeve clamp nut threads with OE–10. Above operations to be performed quarterly.

(11) Clean and coat threads of mounting support and retaining knob sparingly with GL quarterly.

Section IX. WEATHERPROOFING

36. General

Signal Corps equipment, when operated under the severe climatic conditions which prevail in the tropical, Arctic, or desert regions, requires special treatment and maintenance.

37. Tropicalization

a. GENERAL. Because fungus growth, insects, corrosion, salt spray, and excessive moisture affect most materials harmfully, a special moistureproofing and fungiproofing treatment has been devised which, if properly applied, provides a reasonable degree of protection. Refer to TB SIG 13, for a detailed description of the varnish-spray method of moistureproofing and fungiproofing

and the supplies and equipment required in this treatment. The following problems may be encountered:

(1) Resistors, capacitors, coils, chokes, transformer windings, etc., fail because of the effects of fungus growth and excessive moisture.

(2) Electrolytic action, often visible in the form of corrosion, takes place in resistors, coils, chokes, transformer windings, etc., causing eventual break-down.

(3) Hook-up wire insulation and cable insulation break down. Fungus growth accelerates deterioration.

(4) Moisture forms electrical paths on terminal boards and insulating strips, causing flash-overs and crosstalk.

Caution: Varnish spray may have poisonous effects if inhaled. To avoid inhaling spray, use a respirator if available; otherwise fasten cheesecloth or other cloth material over nose and mouth. Never spray varnish or lacquer near an open flame. Do not smoke in a room where varnish or lacquer is being sprayed. The spray may be highly explosive.

b. MOISTUREPROOFING AND FUNGIPROOFING AFTER REPAIRS. If the coating of protective varnish has been punctured or broken during repair and if a complete treatment is not needed to reseal the equipment, apply a brush coat to the affected part. Be sure the break is completely sealed.

38. Winterization

a. GENERAL. Special precautions are necessary to prevent poor performance or total operational failure of equipment in subzero temperatures. Most signal equipment can be used in winter if difficulties common in low temperatures are anticipated and precautions taken to prevent them. For operation purposes, place equipment in heated rooms whenever possible. Wrap it in blankets when on the march to protect it from winds and freezing temperatures. Refer to TB SIG 66 for complete information. The following problems may be encountered:

b. STEEL. Steel shrinks and becomes brittle in subzero temperatures.

c. GLASS. Glass is especially susceptible to sudden temperature changes. The difference between a low-air temperature and the warmth of a man's breath may be sufficient to shatter a lens.

d. RUBBER. Prewar rubber resists cold weather well, while certain types of synthetic rubber are unreliable and become brittle.

e. CANVAS. Canvas freezes and loses its pliability in cold weather.

f. LUBRICANTS. Lubricants become stiff causing drag and also causing moving parts to stick. Refer to paragraph 35 for detailed lubrication instructions.

39. Dustproofing

Signal Corps equipment operated in desert localities is affected by the extremely high temperatures and the amount of dirt, dust, sand, and other foreign matter in the air. Take care to keep such elements from filtering into lubricated parts. Cover the equipment when it is not in use. Thorough cleanliness is imperative. Instead of merely adding new lubricants at regular intervals, whenever practicable, clean and lubricate all moving parts. If possible, inspect and clean the equipment daily. In any case, inspect the air filters and similar protective devices every day and clean them whenever necessary. Refer to TB SIG 75. Some of the problems encountered are the following:

a. LUBRICANTS. Lubricants become thin and drain from moving metal and fiber parts rapidly. Refer to paragraph 35 for detailed lubrication instructions.

b. FOREIGN MATTER. Foreign matter, such as dirt, dust, and sand, acts as an abrasive causing excessive wear, clogging air cleaners, and impeding the flow of air.

PART FOUR

AUXILIARY EQUIPMENT

(Not used.)

PART FIVE

REPAIR INSTRUCTIONS

Note. For more detailed information refer to TM 11–4040.

Section X. THEORY OF EQUIPMENT

40. Transmitter BC–1149–A

a. GENERAL. Radio Transmitter BC–1149–A consists of an r-f oscillator stage and an interrupter stage. A complete schematic diagram is given in figure 7. The oscillator generates a signal which is radiated by a dipole antenna. The interrupter stage is essentially an audio oscillator which acts as an electronic switch, starting and stopping the r-f oscillator. This produces an output signal which is amplitude-modulated at an audio frequency of approximately 1,000 cycles.

b. The power supply for both stages of this transmitter consists of a single 1½ volt Battery BA–35 and three 45-volt Batteries BA–53.

41. Step–by–step Analysis

a. OSCILLATOR (fig. 8). The oscillator stage utilizes Tube JAN–3B7/1291 (VI) connected in a conventional push-pull oscillator circuit. The circuit is designed to operate at any frequency within the range of 1.5 to 32 megacycles. This range is divided into four bands, each band covering a specific range (par. 3). A BAND switch (S4) is used to select the band in which operation is desired. The frequency of the oscillator is determined by the tank circuit (coil L1 and capacitor C3) for band 1, coil L2 and C3 for band 2, and so on).

Each coil has a plate and antenna winding; the plate windings, being tuned by the 260-mmf per section, split capacitor (C3) constitute the plate tank circuit. The antenna windings function as coupling coils to transfer the r-f energy to the dipole antenna. In addition to selecting the proper coil for each band, S4 is equipped with a wafer which is connected so that the plate tank coil of band 2 is shorted when the BAND switch is in position 4 and tank coil of band 1 is shorted when the switch is in position 3. This reduces absorption by the unused coils. The circuit oscil-

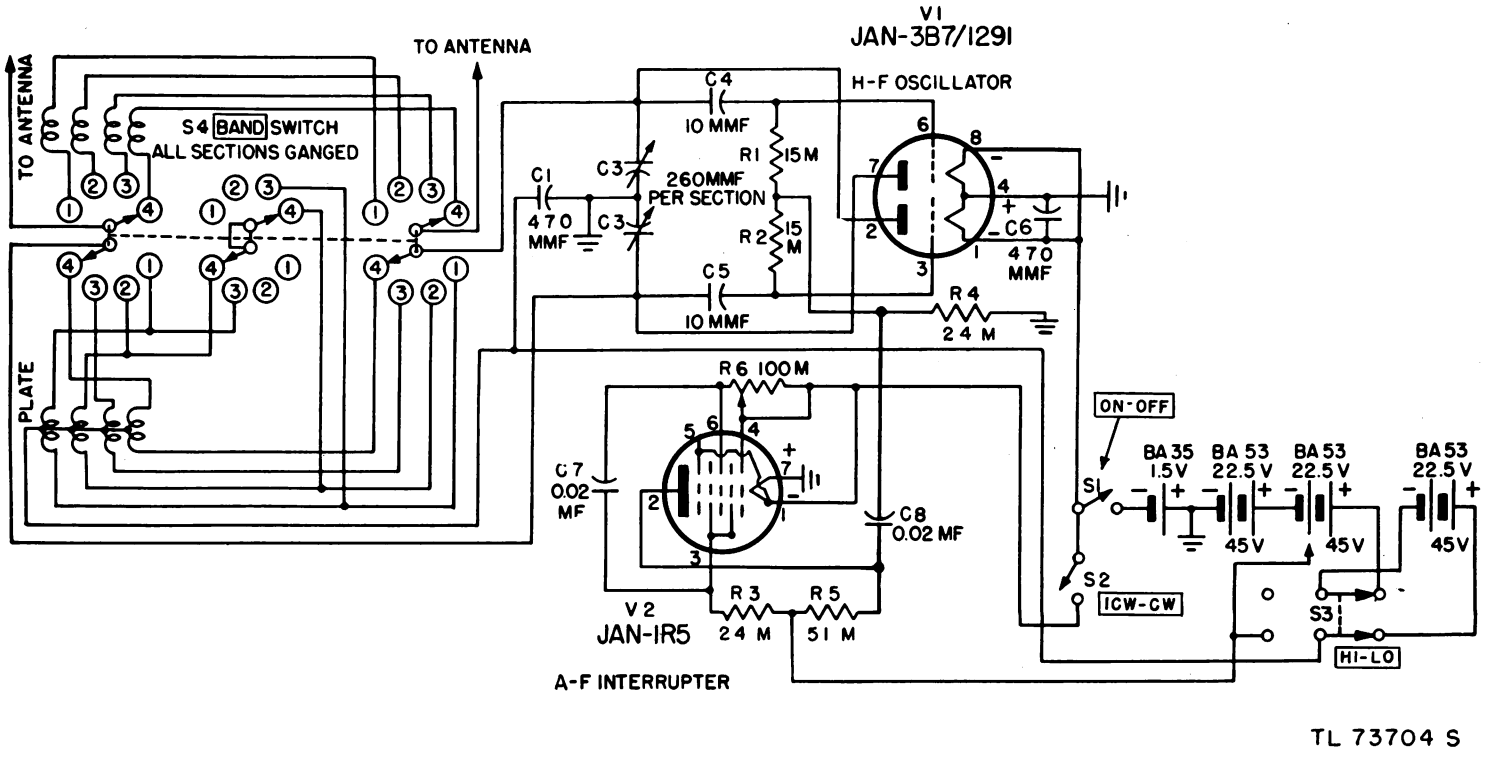

Figure 7. Radio Transmitter BC–1149–A (Target), complete schematic diagram.

lates because of feedback voltage which is fed from the output (plate) of one triode section of V1 to the input (grid) of the other triode section. The plate and grid of each section of V1 are cross-connected in this manner through the 10-mmf capacitors C4 and C5. The grids are, therefore, fed a voltage of proper phase and magnitude thus sustaining oscillation. Grid bias for this stage is obtained from the voltage drop across grid resistor R4 and fed to the grids through grid resistors R1 and R2. The plate and filament circuits are bypassed by the 470-mmf capacitors C1 and C6, respectively.

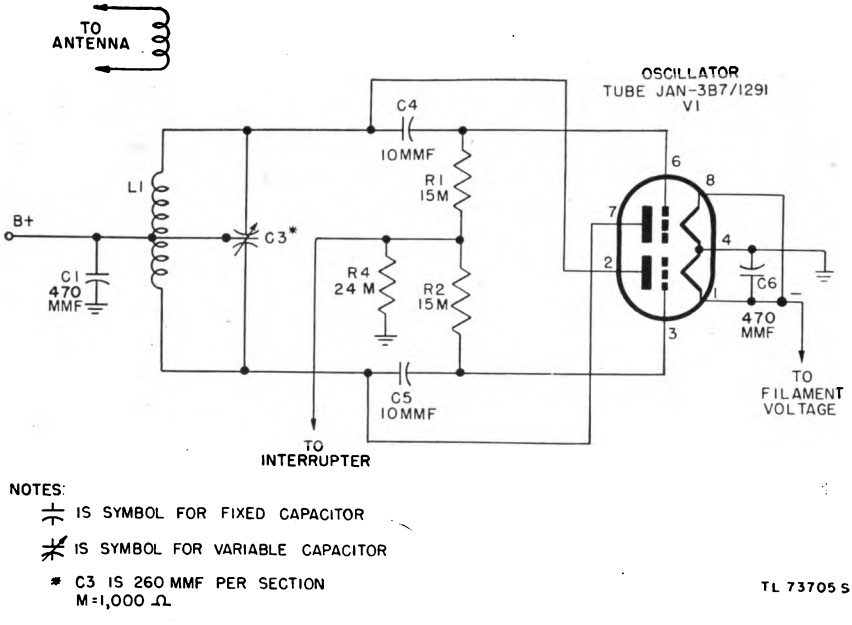

Figure 8. Simplified schematic diagram, oscillator stage.

b. INTERRUPTER (fig. 9). The interrupter stage uses Tube JAN–1R5 (V2) connected in a resistance-capacity oscillator circuit. This stage oscillates at frequencies within the audio range. The specific frequency at which it oscillates is determined by the 0.02-mf capacitor C7 and the setting of the 100,000-ohm potentiometer R6. The output of the oscillator is obtained from the plate of V2 and coupled through the 0.02-mf capacitor C8 and the 24,000-ohm resisitor R4 to the grids of the r-f oscillator through resisitors R1 and R2 (fig. 8). This action interrupts the r-f oscillator at an audio-frequency rate of approximately 1,000 cycles. The interrupter circuit is turned on or off by switching the ICW-CW switch, S2, to ICW or CW respectively.

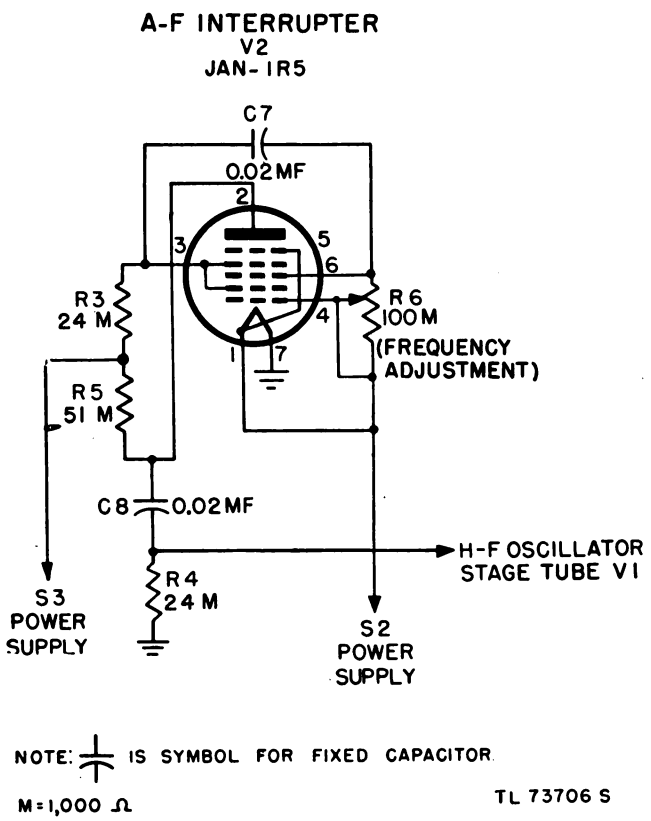

Figure 9. Simplified schematic diagram, interrupter stage.

Section XI. TROUBLE SHOOTING

42. General Trouble-shooting Information

No mattaer how well equipment is designed and manufactured, faults occur in service. When such faults occur, the repairman must locate and correct them as rapidly as possible. This section contains general information to aid personnel engaged in this highly important duty of trouble-shooting.

a. TROUBLE-SHOOTING DATA. Take advantage of the material supplied in this manual. It will help in the rapid location of faults. Consult the following trouble-shooting data.

(1) Complete schematic diagram (fig. 7).

(2) Simplified and partial schematic diagrams. These diagrams are particularly useful in trouble shooting, because the repairman can follow the electrical functioning of the circuits

more quickly than on the regular schematics, thus speeding trouble location (figs. 8 and 9).

(3) Voltage and resistance data for all socket connections (fig. 10).

(4) Illustrations of components. Front, top, and bottom views which aid in locating and identifying parts (figs. 3, 4, and 5).

(5) Pin connections. Pin connections on sockets, plugs, and receptacles are numbered or lettered on the various diagrams.

(*a*) Seen from the bottom, pin connections are numbered in a clockwise direction around the sockets. On octal sockets, the first pin clockwise from the key way is the No. 1 pin.

Note. Test equipment is included in direction finder equipment.

(*b*) Steps used in trouble shooting follow. The first step in servicing a defective transmitter is to sectionalize the fault. Sectionalization means tracing the fault to the component or *circuit* responsible for the abnormal operation of the transmitter. The second step is to localize the fault. Localization means tracing the fault to the defective *part* responsible for the abnormal condition. Some faults such as burned-out resisitors, r-f arcing, and shorted transformers can often be located by sight, smell, and hearing. The majority of faults however, must be located by checking voltage and resistance.

(*c*) The simplicity of the transmitter makes sectionalizing impracticable.

(*d*) Paragraphs 43 and 44 describe the method of localizing faults within the individual components. These paragraphs are followed by a trouble-shooting chart (par. 45) which lists abnormal symptoms and their probable causes.

(*e*) Voltage measurements are an almost indispensable aid, for most troubles either *result* from abnormal voltage or *produce* abnormal voltages. Voltage measurements are taken easily, because they are always made between two points in a circuit. The circuit need not be interrupted.

1. Unless otherwise specified, voltages listed on the voltage charts are measured between the indicated points and ground.
2. Always begin by setting the voltmeter on the *highest* range so that the voltmeter will not be overloaded. Then if it is necessary to obtain increased accuracy, set the voltmeter to a lower range.
3. When checking cathode voltage, remember that a reading can be obtained when the cathode resisitor is actually open as the resistance of the meter may act

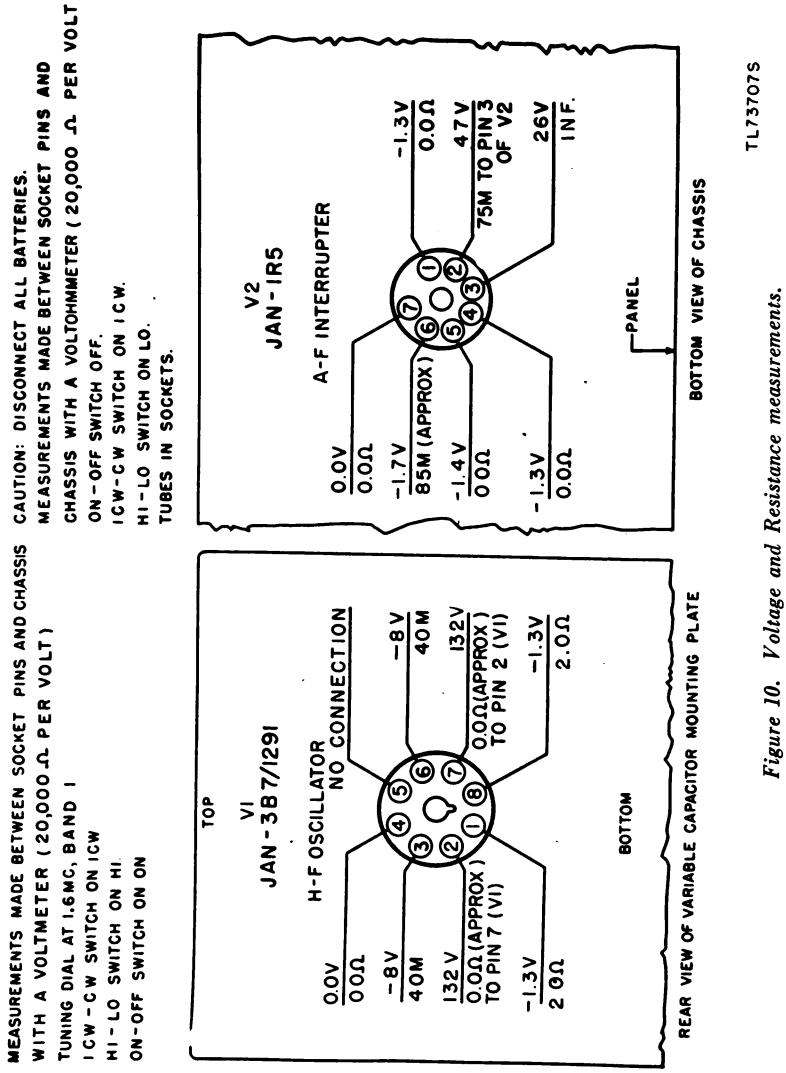

Figure 10. Voltage and Resistance measurements.

as a cathode resistor. Thus, the cathode voltage may be approximately normal only as long as the voltmeter is connected between cathode and ground. Before cathode voltage is measured, first make a resistance check with the power off to determine whether the cathhode resistor is normal.

(*f*) Certain precautions *must* be followed when measuring voltages above a few hundred volts. High voltages are dangerous and can be fatal. When it is necessary to measure high voltage, observe the following rules:

1. Connect the ground lead to the voltmeter.

2. Place one hand in your pocket. This eliminates the possibility of making accidental contact with another part of the circuit thus causing the electricity to travel from one hand to the other through the body.
3. If the voltage is less than 300 volts, connect the test lead to the hot terminal (which may be either positive or negative with respect to ground).
4. If the voltage is greater than 300 volts, shut off the power, connect the hot lead, step away from the voltmeter, turn on the power, and note the reading on the voltmeter. Do not touch any part of the voltmeter, particularly when it is necessary to measure the voltage between two points which are above ground.

(*g*) Voltmeter resistance must be at least 10 times as large as the resistance of the circuit across which the voltage is measured. If the voltmeter resistance is nearly equal to the circuit resistance, the voltmeter will indicate a voltage *lower* than the actual voltage present when the voltmeter is removed from the circuit.

1. The resistance of the voltmeter on any range can be calculated by this simple rule: Resistance of the voltmeter equals its ohms-per-volt multiplied by the full scale range in volts. For example: the resistance of a 1,000 ohm-per-volt meter on the 300-volt range is 300,000 ohms (R = 1,000 ohms-per-volt times 300 volts = 300,000 ohms).
2. To minimize voltmeter loading in high-resistance circuits, use the highest voltmeter range. Although only a small deflection will be obtained (possibly only 5 divisions on a 100-division scale), the electrical accuracy of the voltage measurement will be increased. The decreased loading of the voltmeter will more than compensate for the visual inaccuracy which results from reading only a small deflection on the voltmeter scale.
3. Close observation of the meter when switching voltage ranges will show if the voltmeter is loading the circuit under test.
   (a) *Extremely heavy loading* is indicated when the deflection of the pointer on the meter (not the voltage reading) is nearly the same for different ranges.
   (b) *Appreciable loading* is indicated when the voltage readings (not the deflection) for different ranges do not agree.

(c) *Negligible loading* is indicated when the voltage readings (not the deflection) for different ranges do agree.

4. The ohm-per-volt sensitivity of the voltmeter used to obtain the readings recorded on the voltage and resistance charts in this manual is printed on each chart. Use a meter having the same ohms-per-volt sensitivity. Otherwise it may be necessary to consider the effect of loading.

43. Localization

Prior to detailed testing, general tests on unit parts of the equipment will provide valuable information as to their condition.

a. INPUT RESISTANCE MEASUREMENTS. With tubes and batteries removed, place switch S1 in ON position and switch S2 in ICW position. Place one lead of the ohmmeter on lower center terminal of switch S3 and the other lead on chassis (ground). The ohmmeter should indicate open circuit on the 100-megohm scale in both HI and LO positions of switch S3.

b. INPUT VOLTAGE MEASUREMENTS. Test the output voltages of Batteries BA–35 and BA–53 when the transmitter is operating. Use a high resistance voltmeter in making these tests. Replace the batteries if the voltage reading is less than 1 volt for Battery BA–35 and/or 35 volts for each Battery BA–53.

44. Localization to Stage

The purpose of this paragraph is to provide the procedure for localizing trouble to one particular stage and, finally, to the defective unit part. This procedure is indicated in step-by-step form by the following:

a. TUBE TESTS. Test the tubes in a tube tester such as Tube Tester I–177. Refer to the technical manual on the tube tester for information on testing the tubes.

b. VOLTAGE ANALYSIS. (1) *Voltage readings.* Make voltage readings from tube socket pins to chassis, using a 20,000 ohms/volt voltmeter under the conditions listed in the following subparagraphs. Variations of more than 10 percent from the readings shown in figure 10 may indicate a defective circuit.

(2) *Test conditions:* (*a*) Tuning dial at 1.6 mc.

(*b*) ICW-CW switch on ICW.

(*c*) HI-LO switch on HI.

(*d*) ON-OFF switch at ON.

c. RESISTANCE ANALYSIS. (1) *Resistance readings.* Normal resistance readings at the tube socket pins are shown in figure 10. These readings were made with the tubes in place. If variations of more than 10 percent are noted, make a complete point-to-point circuit check of the associated circuits in accordance with applicable schematic diagram.

(2) *Test conditions* (*a*) ON-OFF switch OFF.

(*b*) ICW-CW switch on ICW.

(*c*) HI-LO switch on LO.

(*d*) Tubes in sockets.

Caution: Disconnect batteries.

d. POINT-TO-POINT CHECK. (1). *General.* Upon isolating trouble to a particular stage, make point-to-point resistance measurements to locate the defective part. Replace defective parts.

(2) *Test conditions.* Remove batteries and turn power switch (S1) ON.

(3) *Oscillator stage.* Check capacitors C1, C3, C4, C5, and C6 for short circuits. Check coils L1, L2, L3, and L4 for continuity, and check resistors R1 and R2 for d-c resistance value.

(4) *Interrupter stage.* Check capacitors C7 and C8 for short circuits. Check resistors R3, R4, R5, and R6 for d-c resistance value.

(5) *Battery test.* With the transmitter in operating condition, check the batteries as described in paragraph 43*b*.

45. Localizing Trouble in Transmitter BC–1149–A

Symptom	Probable trouble	Correction
No output signal on all one band.	*a.* Defective oscillator tube (JAN–3B7/1291).	*a.* Replace tube.
	b. Dead batteries	*b.* Check batteries and replace if below standard.
	c. Defective range switch (S4).	*c.* Repair or change BAND switch.
	d. Tuning capacitor (C3) shorted (bent plates).	*d.* Repair or replace capacitor. Recalibrate after this operation.
	e. Defective switch (S1 or S3).	*e.* Replace switch.
No output signal on one band.	*a.* Defective coil	*a.* Check coil of dead band. Repair or replace and recalibrate.
	b. Defective switch contact.	*b.* Repair or replace switch.

Symptom	Probable trouble	Correction
No ICW signal	*a.* Defective tube (JAN–1R5).	*a.* Replace tube.
	b. Defective switch (S2)	*b.* Replace switch.
	c. Poor connections at tube socket (X2).	*c.* Inspect and repair.
	d. Defective potentiometer (R6).	*d.* Replace (R6).
Inoperative with HI-LO switch in LO position.	*a.* Weak batteries	*a.* Change batteries.
	b. Defective switch (S3)	*b.* Change switch.
	c. Defective oscillator tube (V1).	*c.* Change tube.
	d. Poor battery connections.	*d.* Inspect and tighten or repair connections.
Intermittent operation.	*a.* Poor connections	*a.* Inspect and repair.
	b. Noisy tube (V1 or V2)	*b.* Check tubes, replace if necessary.
	c. Dirt in tuning capacitor.	*c.* Clean capacitor plates.
	d. Defective contacts in BAND switch (S4).	*d.* Inspect contacts, clean and repair switch.
Calibration changes	*a.* Dirty band switch (S4) contacts.	*a.* Clean BAND switch contacts.
	b. Dial setscrew loose	*b.* Tighten setscrews.
	c. Dial shaft coupling setscrews loose.	*c.* Tighten setscrews.

Section XII. REPAIRS

46. Replacement of Parts

Most of the parts in Radio Transmitter BC–1149–A, are readily accessible and are easily replaced if they are found to be faulty. If the BAND switch requires replacement, the wires connected to the switch should be marked carefully with tags or other devices to avoid misconnection when the new switch is installed. This practice is recommended in all cases where replacement requires the disconnection of numerous wires.

47. Rustproofing and Repainting

When the finish on the case has been badly scarred or damaged, rust and corrosion can be prevented by touching up bared surface as follows:

(1) Use #00 or #000 sandpaper to clean the surface down to the bare metal. Obtain a bright smooth finish.

Caution: Never use steel wool. Minute particles frequently enter the case and cause harmful internal shorting or grounding of circuits.

(2) When a touch-up job is necessary, apply paint with a small brush. When numerous scars and scratches warrant complete repainting, remove the transmitter chassis and spray paint over the entire case. Remove rust from the case by cleaning corroded metal with SD. In severe cases it may be necessary to use SD to soften the rust. Sandpaper to complete the preparation for painting. Paint used will be authorized and consistent with existing regulations.

48. Unsatisfactory Equipment Report

a. WD AGO FORM 468 (WAR DEPARTMENT UNSATISFACTORY EQUIPMENT REPORT) FOR EQUIPMENT USED BY ARMY GROUND FORCES AND TECHNICAL SERVICES. WD AGO Form 468 will be filled out and forwarded through channels to the Office of the Chief Signal Officer, Washington 25, D. C., when trouble occurs more often than is normal, as determined by qualified repair personnel.

b. AF FORM 54 (UNSATISFACTORY REPORT) FOR EQUIPMENT USED BY DEPARTMENT OF THE AIR FORCE. AF Form 54 will be filled out and forwarded to Commanding General, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio, in accordance with the AF Regulation 15–54.

APPENDIX

IDENTIFICATION TABLE OF REPLACEABLE PARTS

Note. The fact that an item appears in this technical manual is not sufficient basis for requisitioning it. Requisitions must cite an authorized basis, such as T/O&E, TE, TA, T/BA, SIG 6, SIG 7&8, SIG 7–8–10, SIG 10, list of allowances of expendable material, or other authorized supply basis. Pamphlets of the Department of the Army Supply Catalog applicable to the equipment covered in this manual are listed in paragraph 1 below.

1. Department of the Army Supply Pamphlet Reference

The following information was compiled on 18 February 1948. The appropriate pamphlet of the Department of the Army Catalog is—

Organizational Maintenance Allowances, and Field and Base Maintenance Stockage Guide

SIG 7 and 8–BC–1149 (when listed in FM 21–6).

For an index of available catalog pamphlets, see the latest issue of War Department Supply Catalog SIG 1 and 2.

2. Identification Table of Replaceable Parts for Radio Transmitter BC–1149–A

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	RADIO TRANSMITTER BC–1149–A: transmits low power signals for use in orienting and calibrating associated radio direction finder.		2C6596–1149A
	ANTENNA: rod; telescopic; 60″ lg extended, 36½″ lg collapsed; outer section ½″ diam; two sections; Fed Tele & Rad #NL–41037.	Dipole radiator	2A3192
C4, C5	CAPACITOR, fixed: mica; 10 mmf ± 10%; 500 vdcw; 51/64″ lg x 15/32″ wd x 7/32″ d; JAN type CM20B100K.	Feedback capacitor	3K2010021
C1, C6	CAPACITOR, fixed: mica; 510 mmf ± 5%; 500 vdcw; 51/64″ lg x 15/32″ wd x 7/32″ d; JAN type #CM20B511J.	Bypass capacitors, plate and filament.	3K2051122
C7, C8	CAPACITOR, fixed: paper; 20,000 mmf ± 20%; 600 vdcw; 1 11/16″ lg x 9/16″ diam; JAN type #CP26A1EF203M.	Coupling capacitors	3D20–171
C3	CAPACITOR, variable: air; plate meshing, dual section; 11 to 260 mmf ea section; 5¾″ lg x 3″ wd x 2¼″ h; Cardwell part #MR–260–BD.	Tuning capacitor	3D9260V–6
	CLIP: fuse; to provide electrical contact to antenna; 5/16″ lg x 11/32″ wd x 7/16″ h; ¼″ max jaw opening; Littelfuse part #1011.	Antenna connection	3Z1011
L1A/B	COIL, RF: plate tank and antenna coupling; single layer wound; unshielded; plate coil 138 turns #36 AWG CT, ant coil 26 turns #22 AWG; polystyrene solid form; form 2½″ lg x ½″ diam; RCA part/dwg #442329–501.	Antenna coupling and plate tank inductances, band 1.	3C1084K–4
L2A/B	COIL, RF: plate tank and antenna coupling; single layer wound; unshielded; plate coil 58 turns #30 AWG CT, ant coil 12 turns #18 AWG; polystyrene solid form; form 2½″ lg x ½″ diam; RCA part/dwg #442330–501.	Antenna coupling and plate tank inductances, band 2.	3C1084K–5

L3A/B	COIL, RF: plate tank and antenna coupling; single layer wound; unshielded; plate coil 26 turns #22 AWG CT, ant coil 10 turns #18 AWG; polystyrene solid form; form 2½" lg x ½" diam; RCA part/dwg #442331-501.	Antenna coupling and plate tank inductances, band 3.	3C1084K-6
L4A/B	COIL, RF: plate tank and antenna coupling; single layer wound; unshielded; plate coil 12 turns #18 AWG CT, ant coil three turns #18 AWG; polystyrene solid form; form 2½" lg x ½" diam; RCA part/dwg #442332-501.	Antenna coupling and plate tank inductances, band 4.	3C1084K-7
	COUPLING, flexible: steatite ring w/two nickel finish hubs; 1⅝" diam x 25/32" lg overall; ¼" axial hole in each hub; Natl Co #TX-9S.	Insulated coupling	2Z3269-1
	DIAL: vernier scale, calibrated 0-500, rotation ratio 20¼ to 1; 4⅝" diam x 1½" d overall; axial mtg hole for ¼" shaft; Natl Co Part #NPW, dwg #SA:645.	Main tuning dial	2Z3719-6.1
	DRIVE, gear assembly between tuning dial and capacitor; p/o Natl Co part #NPW-0; 3 9/16" h x 3 1/16" wd x 2" d (less dial mtg shaft); four #8-32 tapped mtg holes on 1.406" x 2¼" mtg/c; Natl Co #NPW-0, dwg #SA-2478.	Main tuning gear assembly	2Z3719-6.2
	GASKET: neoprene; one square hole 7 1/16" x 7 1/16"; 7¼" square overall x 1/16" thk; RCA part/dwg #897505-1.	Waterproofs cover	2Z4868.577
	INSULATOR, bushing: cylindrical; w/ctb at one end; steatite, white, unglazed; ¼" h overall; ⅜" diam w/0.147" diam axial hole; RCA part/dwg #897124-1.	Mounting terminal	3G100-5
	INSULATOR, bushing: cylindrical; one end ctb; other end shouldered; steatite, white, unglazed; 0.370" h overall; ⅜" diam overall w/0.147" diam axial hole; RCA part/dwg #897123-1.	Mounting terminal	3G100-4
	INSULATOR, bushing: cylindrical w/cylindrical shoulder; steatite, white, unglazed; 0.370" h overall; ⅜" OD overall w/0.147" diam axial hole; RCA part/dwg #897122-1.	Mounting terminal	3G100-3

2. Identification Table of Replaceable Parts for Radio Transmitter BC–1149–A (contd)

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	INSULATOR, bushing: conical; fabric base phenolic, natural; ½" thk x 2" diam overall, conical head ¼" thk x 2" diam, shoulder ¼" thk x 0.620" diam w/0.257" diam axial hole; RCA part/dwg #897104–1.	Bushings for feed thru insulators	3G100–2
	INSULATOR, feed through: conical; ceramic; 2" diam x 1⅝" h overall; 1 9/32" ID at base; ctb; 9/32" diam at top; Birnbach cat #4233.	Antenna feed thru insulators	3G1350–119
	INSULATOR, stand-off: cylindrical; steatite ceramic, white, glazed; ½" lg x ⅜" OD; #6–32 axial hole in ea end; JAN #NS3W0104.	Mounting terminal	3G3501–04
	KNOB: bar; black molded phenolic; for ¼" diam shaft; #8–32 setscrew; w/white index line; 1¼" lg x ¾" wd x ⅝" h overall; Mallory type #366.	Band switch knob	2Z5838
	MOUNTING, fuseholder: polystyrene; ⅝" lg x ⅝" wd x ½" h overall; two #4–40 mtg holes in base, one 0.120" diam through hole at right angle to mtg holes; RCA part/dwg #897108–1.	Antenna clip mounting	3Z4012
	NUT, knurled: compression type, cylindrical; brass, olive drab; 1½"–18 thd; 1⅞" outside diam; unthreaded portion tapered; RCA part/dwg #897109–1.	Clamping nut	6L3444–18F
R1, R2	RESISTOR, fixed: composition; 15,000 ohms ± 10%; ½ w; 0.468" lg x 0.249" diam; JAN type #RC20BF153K.	Grid resistors	3RC20BF153K
R3, R4	RESISTOR, fixed: composition; 24,000 ohms 5% ½ w; 4.468" lg x 0.249" diam; JAN type #RC20BF243J.	R3, screen dropping resistor. R4, oscillator bias resistor	3RC20BF243J

R5	RESISTOR, fixed: composition; 51,000 ohms 5%; ½ w; 0.468" lg x 0.249" diam; JAN type RC20BF513J.	Plate load resistor	3RC20BF513J
R6	RESISTOR, variable: composition; 100,000 ohms ± 20%; 0.04 w; three term; metal case, 1 3/32" diam x ½" d, incl case; slotted metal shaft ¼" diam x ⅝" lg from mtg surface; linear taper; Stackpole type LP.	Audio-freqency adjustment	3Z7480–21
	SHIELD, steel, cad pl; tubr open top; 0.810" ID x 0.941" OD x 1¾" lg; int tension spring; JAN type #SOS6.	Tube shield	2Z8320–13
X2	SOCKET, seven contact miniature; two ⅛" diam mtg holes on ⅞" mtg/c; mica filled bakelite 1 9/32" diam x 0.805" lg; JAN #S010M.	Tube socket, audio interrupter	2Z8677.94
X1	SOCKET, loctal; two 5/32" diam mtg holes on 1 5/16" mtg/c; mica filled bakelite 1 3/16" diam x 19/64" d; Amphenol #88X8XT.	Tube socket, oscillator	2Z8678.36
S4	SWITCH, rotary: six-pole, four-position; three-sec; silver pl brass cont; ceramic body; 1⅞" lg x 1⅝" wd x 3½" d; Centralab part #2525.	Band change switch	3Z9550.5
S1 S2	SWITCH, toggle: SPST; bakelite body; 1 9/64" h x ½" wd x 1 1/16" d behind panel; 15/32-32 thd mtg bushing 15/32 lg; JAN type #ST42A.	S1, ON-OFF switch S2, CW-ICW switch.	3Z9863–42A
S3	SWITCH, toggle: DPDT; bakelite body; 1 9/32" h x 23/32" wd x 31/32" d behind panel; 15/32–32 thd mtg bushing 15/32" lg; JAN type #ST22N.	HI-LO switch	3Z9849.135
V2	TUBE, electron: JAN–1R5	Interrupter oscillator	2J1R5
V1	TUBE, electron: JAN–3B7/1291	R-f oscillator	2J3B7/1291

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