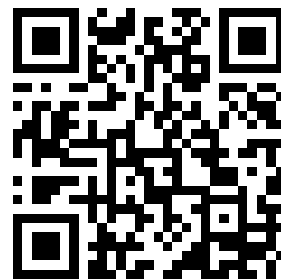


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5:11-1417

# TM 11-1417

DEPARTMENT TECHNICAL MANUAL

PREVENTIVE MAINTENANCE MANUAL

## RADIO EQUIPMENTS

C-150-B, RC-150-C, RC-150-D,  
RC-151, RC-151-A, RC-151-D



**CLASSIFICATION CANCELLED**, in accordance with par. 15, AR 380-5, by authority of W.D. Circular 117, 1946.

RESTRICTED MATTER.—The information and the essential characteristics of any person known to be in the possession of undoubted loyalty and discretion who are cooperating in Government work, but will not be communicated to the public or to the press except by authorized military public relations agencies. (See also par. 236, AR 380-5, 15 Mar 1944.)

DEPARTMENT 1 AUGUST 1944



PREVENTIVE MAINTENANCE MANUAL

RADIO EQUIPMENTS

RC-150-B, RC-150-C, RC-150-D,  
RC-151, RC-151-A, RC-151-D



WAR DEPARTMENT

1 AUGUST 1944

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WAR DEPARTMENT.

WASHINGTON 25, D. C., 1 AUGUST 1944.

TM 11-1417, Radio Equipments RC-150-B, RC-150-C, RC-150-D, RC-151, RC-151-A, and RC-151-D, Preventive Maintenance Manual, is published for the information and guidance of all concerned.

[A. G. 300.7 (16 Mar. 44).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,  
*Chief of Staff.*

OFFICIAL:

J. A. ULIO,  
*Major General,  
The Adjutant General.*

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IC 11: T/ 11-107, 11-237; 11-287; 11-400, Sig AW Orgn Radar Opng Team (D), Radar Maint Team (G); 11-500, Sig Sv Orgn - Radar Instl and Maint Team; 11-587; 11-592; 11-597; 11-617.

For explanation of symbols, see FM 21-6.

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## **WARNING**

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### **HIGH VOLTAGE**

Is used in the operation of this equipment.

---

### **DEATH ON CONTACT**

may result if operating personnel fail to observe safety precautions.

Be sure that high-voltage circuits and 110-120-volt a-c input connections are dead before performing preventive maintenance on this equipment.

High-voltage capacitors in power supplies must be discharged manually before performing preventive maintenance operations. Observe the *safety precautions* given in the individual items in chapter 4.

---

### **EXTREMELY DANGEROUS POTENTIALS**

exist in the following units:

Transmitter BC-1160-A.

Test Oscilloscope I-134-B.

# FIRST AID TREATMENT FOR ELECTRIC SHOCK

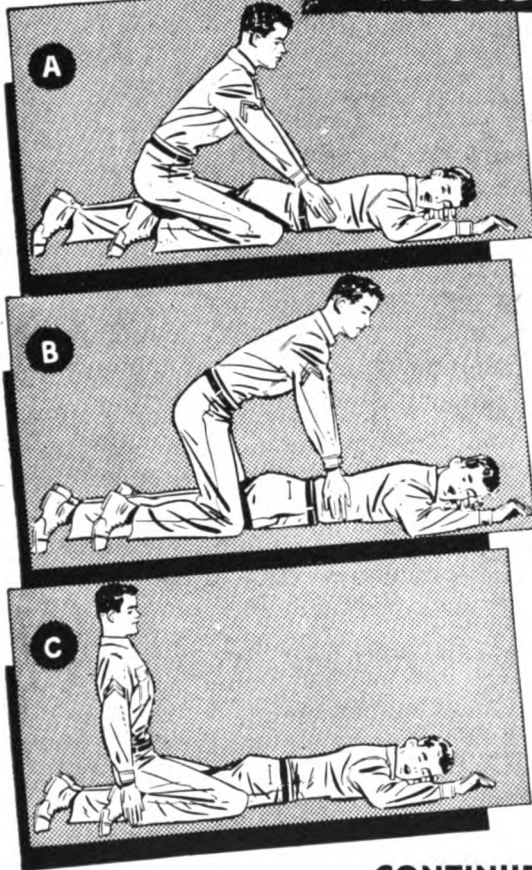
## I. FREE THE VICTIM FROM THE CIRCUIT IMMEDIATELY.

Shut off the current. If this is not immediately possible, use a dry nonconductor (rubber gloves, rope, board) to move either the victim or the wire. Avoid contact with the victim. If necessary to cut a live wire, use an axe with a dry wooden handle. Beware of the resulting flash.

## II. ATTEND INSTANTLY TO THE VICTIM'S BREATHING.

Begin resuscitation at once on the spot. Do not stop to loosen the victim's clothing. Every moment counts. Keep the patient warm. Wrap him in any covering available. Send for a doctor. Remove false teeth or other obstructions from the victim's mouth.

### RESUSCITATION



### POSITION

1. Lay the victim on his belly, one arm extended directly overhead, the other arm bent at the elbow, the face turned outward and resting on hand or forearm, so that the nose and mouth are free for breathing (fig. A).
2. Straddle the patient's thighs, or one leg, with your knees placed far enough from his hip bones to allow you to assume the position shown in figure A.
3. Place your hands, with thumbs and fingers in a natural position, so that your palms are on the small of his back, and your little fingers just touch his lowest ribs (fig. A).

### FIRST MOVEMENT

4. With arms held straight, swing forward slowly, so that the weight of your body is gradually brought to bear upon the victim. Your shoulders should be directly over the heels of your hands at the end of the forward swing (fig. B). Do not bend your elbows. The first movement should take about 2 seconds.

### SECOND MOVEMENT

5. Now immediately swing backward, to remove the pressure completely (fig. C).
6. After 2 seconds, swing forward again. Repeat this pressure-and-release cycle 12 to 15 times a minute. A complete cycle should require 4 or 5 seconds.

### CONTINUED TREATMENT

7. Continue treatment until breathing is restored or until there is no hope of the victim's recovery. Do not give up easily. Remember that at times the process must be kept up for hours.
8. During artificial respiration, have someone loosen the victim's clothing. Wrap the victim warmly; apply hot bricks, stones, etc. Do not give the victim liquids until he is fully conscious. If the victim must be moved, keep up treatment while he is being moved.
9. At the first sign of breathing, withhold artificial respiration. If natural breathing does not continue, immediately resume artificial respiration.
10. If operators must be changed, the relief operator kneels behind the person giving artificial respiration. The relief takes the operator's place as the original operator releases the pressure.
11. Do not allow the revived patient to sit or stand. Keep him quiet. Give hot coffee or tea, or other internal stimulants.

**HOLD RESUSCITATION DRILLS REGULARLY**



## DESTRUCTION NOTICE

**WHY** – To prevent the enemy from using or salvaging this equipment for his benefit.

**WHEN** – When ordered by your commander.

- HOW** –
1. Smash—Use sledges, axes, handaxes, pickaxes, hammers, crow-bars, 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, fox holes, other holes. Throw in streams. Scatter.

### USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT.

- WHAT** –
1. Smash—All tubes, meters, dials, connecting cables, and knobs. Take special care to destroy completely the oscillator tubes in the transmitter.
  2. Cut—All connecting cables and wiring.
  3. Burn—All literature and schematic diagrams.
  4. Bend—The antenna matching section, antenna, and transmitter tuning rods.
  5. Bury or scatter—All nameplates and other parts that cannot be destroyed otherwise.

## DESTROY EVERYTHING

---

### REFERENCE NOTICE

This is one of three Technical Manuals on Radio Equipments RC-150-B, RC-150-C, RC-150-D, RC-151, RC-151-A, and RC-151-D. The other two are:

TM 11-1317, Radio Equipments RC-150-B, RC-150-C, RC-150-D, Technical Operation Manual (General Description, Operating Instructions and Equipment Performance Log).

TM 11-1517, Radio Equipments RC-150-B, RC-150-C, RC-150-D, RC-151, RC-151-A, RC-151-D, Service Manual (Theory, Trouble Shooting, and Repair).

# RESTRICTED

*This manual, together with TM 11-1317 and TM 11-1517 supersede TM 11-1117, 12 December 1942 and 15 September 1943.*

## CHAPTER 1

# INTRODUCTION

---

## Section I. GENERAL DESCRIPTION OF PREVENTIVE MAINTENANCE

### 1. General

This manual describes the preventive maintenance procedures that are to be applied to Radio Equipments RC-150 and RC-151. In this manual, references to RC-150 will be made when all models of both Radio Equipments RC-150 and RC-151 are meant.

### 2. Meaning of Preventive Maintenance

Preventive maintenance may be defined as a systematic series of operations performed periodically on equipment in order to prevent break-downs. To appreciate the meaning of the term preventive maintenance it is necessary to distinguish between preventive maintenance, checks on equipment performance made by the Equipment Performance Log, and both trouble shooting and repair of actual break-downs.

*a.* The Equipment Performance Log is described in TM 11-1317 is a record of checks made while the equipment is in operation to see that it is operating within a range of tolerances which give the maximum efficiency of operation. These checks reveal signs of weakening and lead to their correction before they result in actual break-down.

*b.* Preventive maintenance, as described in this manual, is performed on the set while it is shut-down. It consists of adjustments and minor repairs that contribute toward preventing faults, or at least eliminating them when they first appear; thus break-downs are prevented and the necessity of major repair is avoided.

*c.* Trouble shooting and repair procedures are discussed in TM 11-1517. Their primary function is to locate and correct existing defects that have caused a complete break-down or at least a serious decline in operating efficiency.

### 3. Reasons for Preventive Maintenance

Preventive maintenance procedures are designed to—

*a.* Combat the detrimental effects of dirt, dust, moisture, water, and the ravages of weather on the equipment.

*b.* Keep the equipment in such condition as to insure uninterrupted operation.

*c.* Maintain the equipment so that it will always operate at maximum efficiency.

*d.* Prolong the useful life of the equipment.

### 4. Significance of Preventive Maintenance

*a.* Equipment must be kept running efficiently if it is to serve its purpose. Equipment will rapidly become useless if it is not maintained. A regular program of preventive maintenance is the only way to insure that proper maintenance is performed.

*b.* The application of preventive maintenance to radio equipment prolongs the useful life of the equipment and contributes to the success of the entire aircraft warning service. It must be recognized that the full benefit of preventive measures cannot be obtained merely by following the general directive "... shall be done." The men assigned to do the work must have the spirit and desire to perform their assignments well. They should have a keen appreciation of why the work is required and should not think of their routine tasks only as necessary evils.

*c.* Every soldier performs preventive maintenance on his pistol, rifle, or carbine and has a clear understanding of the part this work plays in his existence as a soldier. He knows that periodic disassembly, cleaning, and reassembly are done for a definite reason; that is, to keep his weapon in working order. Thus he minimizes the possibility of its jamming when the need is greatest and his weapon may mean the difference between life and death.

d. The same reasoning applies to the maintenance of Radio Equipment RC-150. Association between danger to personnel and failure of the apparatus is just as obvious as in the case of the soldier and his weapon. The enemy does not state his objective. It may be the demolition of the station, devastation of the area covered by the station, or the destruction of an important installation far behind the line. No matter what his objective is, efficient functioning of the equipment is essential in the job of preventing successful completion of the enemy's mission. Inoperative equipment is a source of danger to men and supplies, and to the defense of vital zones. The radio equipment can serve its purpose only if it is ready at all times to provide continuous and accurate information to identify approaching aircraft.

## 5. Preventive Maintenance Program

The program of preventive maintenance, as applied to Radio Equipment RC-150, has the following basic features:

a. The complete equipment is divided into components and miscellaneous accessories.

b. Each component has specific maintenance tasks performed on it which are listed as items.

c. The individual items are listed in the maintenance schedule (ch. 5). Scheduling is on a daily, weekly, monthly, and quarterly basis. Groups of items are assigned to particular days of the week.

d. Each item is divided into four subparagraphs:

(1) *Preparatory steps.* This subparagraph is subdivided into

(a) Tools and materials needed.

(b) Safety precautions.

(c) Equipment precautions.

(d) Location of component.

(2) *Removal procedure.* This subparagraph describes the procedure for taking the component from the rack, replacing it with the spare, and removing the chassis from the cabinet.

(3) *Maintenance procedure.* This subparagraph gives a detailed list of preventive maintenance jobs to be performed on the component.

(4) *References.* The reference subparagraph may be used for inserting a reference to information found in other manuals and that might prove of use here.

## 6. Precautions During Preventive Maintenance Operations

Special safety precautions must be observed before and during the application of preventive maintenance procedures. These are discussed under two major headings:

a. Safety of personnel.

b. Damage to equipment.

## 7. Safety of Personnel

a. **GENERAL.** Every effort must be made to avoid injury to personnel and equipment during preventive maintenance work. Familiarity with equipment is apt to breed carelessness. Pay strict attention to every safety measure.

b. **HIGH VOLTAGES.** High voltages used during the operation of Radio Equipment RC-150 are dangerous. Death by electrocution is certain for the operator or repairman who takes chances with high-voltage circuits. Careful operators or repairmen make certain every precaution is taken. They never trust others to obey rules for them.

**TAKE NOTHING FOR GRANTED.**

c. **SAFETY PRECAUTIONS.** Read the safety precautions given in the preparatory steps for each component before performing any maintenance inside the component.

## 8. Damage to Equipment

a. Parts such as tube envelopes and resistor bodies located in the high power components remain very hot for several minutes after the power supply switches have been turned off. Some units have a temperature so high that very painful burns will result if the bare skin touches them. A bad burn may cause involuntary movements of the arm or the body which can damage the equipment, especially the tubes. If work is started immediately after the power switches have been turned off, extreme care must be taken.

b. Careful handling of equipment should become a regular habit. Space for working on units partially covered by others should not be made by pushing and tugging and moving parts roughly out of the way. Care should be taken to avoid unnecessary strain on wires, cables, connections, and couplings.

c. Tools used inside the components must be firmly grasped. Special care must be taken to prevent dropping pliers, screw drivers, and similar repair tools. A tool, if dropped, may readily smash the glass envelope of a tube, damage circuit parts, or disturb wiring connections.

## Section II. FUNDAMENTAL OPERATIONS OF PREVENTIVE MAINTENANCE

### 9. Basic Preventive Maintenance Operations

The actual work performed during the application of the preventive maintenance schedule items is divided into six types of operations:

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

The first two operations show to what extent the application of the other four is necessary. The selection of particular operations is often determined by the particular field conditions encountered. For example, the dust encountered on dirt roads during cross country travel filters into the equipment regardless of how much care is taken to prevent it. Changes in climatic conditions such as heavy rain followed by blistering heat, excessive dampness, snow, and ice all tend to cause deterioration of exposed surfaces and parts. Unless continuous inspection is the rule and the necessary work of tightening, cleaning, and lubricating is done, the equipment will soon become unsatisfactory in performance, wholly undependable, and subject to break-down when it is most needed. Each of the basic operations listed above will be described from two points of view. The description given in this chapter states the general nature of the operation and its performance. The second description given in chapter 3 states specifically how the operation is used in relation to particular parts and components.

### 10. Meaning of Feel (F) Operation

The *feel* operation is used most often to check rotating machinery such as the blower motor and to determine if electrical connections, resistors, or bushings are overheated. Overheating indicates the need for lubrication or the existence of some defect requiring correction. The normal operating temperature of a motor is described as that temperature which will permit holding the hand in contact with the motor or bearing case for a period of 5 seconds without feeling discomfort. It is important that the *feel* operation be performed as soon as possible after the shut-down, and *always before* any other maintenance is done.

### 11. Meaning of Inspect (I) Operation

*a. Inspection* is probably the most important operation in the preventive maintenance program. Careful observation is required. A careless observer will overlook obscure evidences of defects and abnormalities. A slight abnormality may exist without clearly interfering with the equipment performance. These are the deviations from normal that should be discovered early. Valuable time and effort can be saved if defects are corrected before they lead to a major break-down. The operating personnel must make every effort to become thoroughly familiar with the signs of normal functioning. In this way they will be able to recognize signs of abnormal functioning readily.

*b. Inspection* consists of carefully observing all parts of the equipment for discoloration, for placement, and state of cleanliness. *Inspect* particularly for the following conditions:

(1) Overheating should be checked by looking for discoloration, blistering, or bulging of the parts or surface of the container, leakage of insulating compounds, and oxidation of metal contact surfaces.

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

(3) Cleanliness should be checked by carefully examining all recesses in the components for accumulation of dust, especially between connecting terminals. Parts, connections, and joints should be free of dust, corrosion, and other foreign matter. In tropical and humid locations, look for fungus growth and mildew.

(4) Tightness should be checked by testing any connection or mounting which appears to be loose by gently pulling on the wire or feeling the lug or terminal screw.

### 12. Meaning of Tighten (T) Operation

*a. All mobile units* while in transit are subject to vibration. Other movements of equipment caused by concussion, falling shells, or by vibration from moving machinery may result in loose connections which are likely to impair the operation of the equipment. All loose parts, especially if they are large, are definite hazards. If they shift or fall out of place, near-by parts may be crushed.

*b. Although the importance of firm mountings and connections cannot be overemphasized, screws, bolts, and nuts should not be tightened*

indiscriminately. Tighten them only when they are definitely known to be loose. Fittings that are tightened beyond the pressure for which they are designed will be damaged or broken. Excessive force applied with a wrench or screw driver will often snap off the head of a bolt or a screw. Always use the correct tools for *tightening*; otherwise, fittings will be damaged and further adjustments will be impossible until replacement is made.

### 13. Meaning of Clean (C) Operation

When the schedule calls for a *cleaning* operation, it does not mean that every item which bears the identifying letter must be cleaned each time it is inspected. *Clean* parts only when inspection shows that it is necessary. Periodic cleanings are more frequent on exposed parts than on those contained within cabinets. Inspection may also indicate the need for cleaning more frequently than is required by the schedule. Always do the work in accordance with the specific cleaning instructions given in chapter 3.

### 14. Meaning of Adjust (A) Operation

*Adjustment* will be made only when inspection indicates that it is required in order to maintain normal operating conditions. The required adjustments vary so greatly that complete instructions are given in chapter 4 as a part of the explanation of specific items of maintenance.

### 15. Meaning of Lubricate (L) Operation

The word *lubricate* as used in this manual has its usual meaning of referring primarily to the application of grease or oil to the bearings of a motor or other moving parts. It may also mean

the application of light oil to door hinges or other sliding surfaces found around the equipment.

a. There is only one place in the RC-150 that requires regular *lubrication*. Every three months the blower motor in the transmitter must be lubricated by applying a few drops of oil (specification AXS-777 or U.S.A. 2-120) to the oil cups. Specification AXS-777 or U.S.A. 2-120 is an oil (lubricating, preservative, special) which will pour at  $-70^{\circ}$  F and has corrosion- and rust-preventive qualities. It is mainly used for light lubrication where only a few drops are required, such as on the motor, door hinges, and other sliding surfaces mentioned above.

b. Although the gear assemblies in the wave-meter, receiver, and transmitter have been lubricated at the factory and should not require further attention during their normal lifetime, mention is made here in case greasing should become necessary. In that event, proceed as follows: Wipe gear surfaces with cloth moistened with dry-cleaning solvent (specification FED P-S-661a). Apply a light coating of grease (specification AXS-637) to gear teeth. Wipe off excess. Do not allow dry-cleaning solvent to get on other parts of equipment.

(1) Specification FED P-S-661a is a dry-cleaning solvent similar to carbon tetrachloride; if necessary, carbon tetrachloride may be substituted for the solvent. Wipe off immediately any deposit resulting from its use.

(2) Specification AXS-637 is a grease (lubricating, special) with a lithium base and of approximately the same consistency as vaseline but with much less tendency to freeze. Vaseline becomes hard at  $+10^{\circ}$  F. This grease is satisfactory for use in temperatures between  $-90^{\circ}$  F and  $+150^{\circ}$  F.

## CHAPTER 2

# CARE AND HANDLING OF MAINTENANCE TOOLS

### 16. Tools Included with Radio Equipment RC-150

a. **Tool Kit No. 205-392.** The tools listed below are supplied with Radio Equipment RC-150 in tool kit No. 205-392 (fig. 1) which is included in spare-parts chest CH-160. The kit will be found in a small envelope in the right-hand compartment of this chest.

Tool	Mfr's No.
One No. 8 Allen wrench (tip, 5/64" across)	A-55A-700
One No. 6 Allen wrench (tip, 1/16" across)	A-55A-1951
One adjustment rod (aligning tool)	A-5G-2531

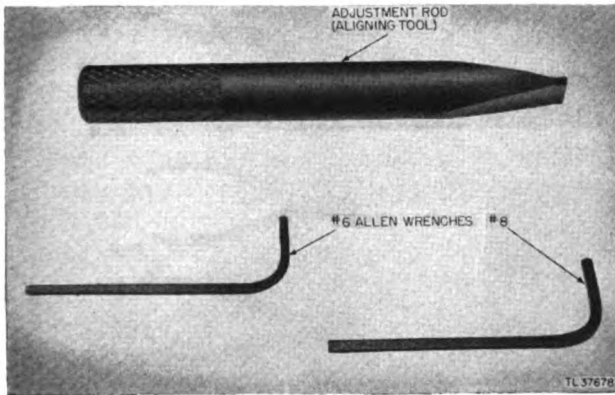


Figure 1. Tool kit No. 205-392.

b. **TOOLS IN TRANSMITTER.** Also included with the RC-150 is an Allen wrench and a metal 6-inch ruler (fig. 2) mounted on the inside cover of the rear of the transmitter. These tools are to be used only when adjusting the lecher lines and are not to be removed for any other purpose.

c. **TUBE PULLER.** Mounted inside the receiver chassis (fig. 3) is a tube puller used to remove the metal tubes from their sockets. This tool is used by inserting the prongs into the slots at the base of the tube and gently rocking the tube from the socket. Be sure to grasp both the tube puller and tube.

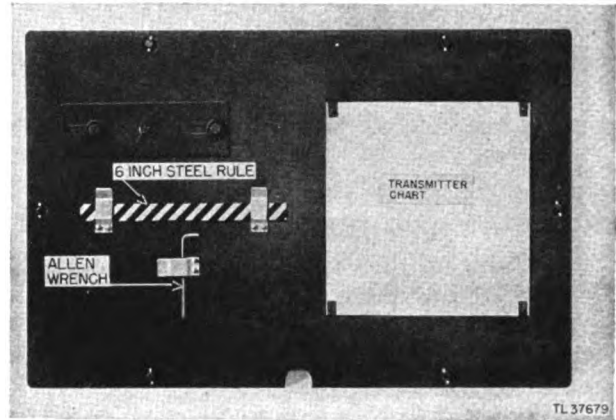


Figure 2. Tools mounted on inside cover of rear of transmitter.

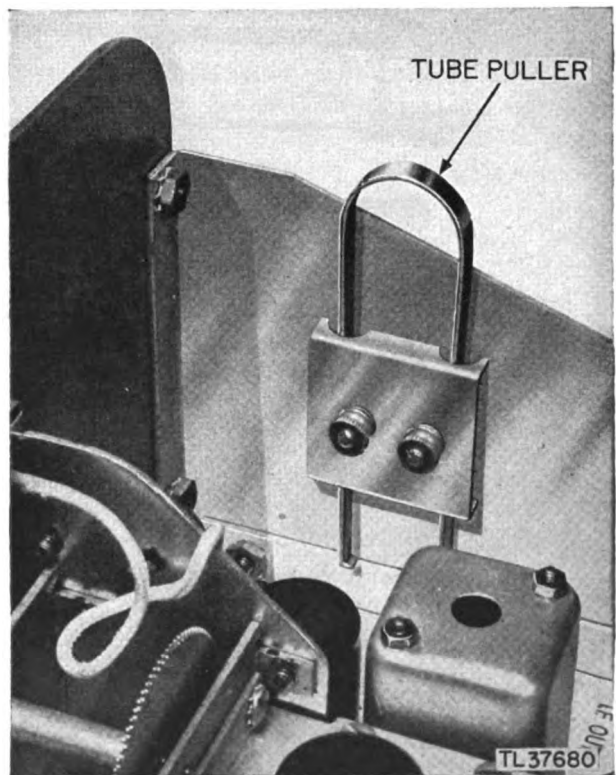


Figure 3. Receiver chassis, portion showing tube puller.

## 17. Other Tools Needed to Maintain and Service the RC-150

a. Refer to TM 11-1410 for a complete list of tools furnished with Radio Set SCR-270 and SCR-271.

b. The additional tools listed below will be needed to service and maintain the RC-150, and will be found in the tool kits of Radio Sets SCR-270 and SCR-271 (fig. 4):

- (1) Soldering iron, 100-watt, 3/8-inch tip, 120-volt.
- (2) Screw driver, 12-inch blade, insulated handle.
- (3) Screw driver, 8-inch blade, insulated handle.
- (4) Screw driver, 2 1/2-inch blade, insulated handle.
- (5) Screw driver, 1-inch blade, stubby.
- (6) Screw driver, offset, 9/32-inch tip.
- (7) Paint brush, 1 inch wide.
- (8) Soldering paste, 2-ounce can.
- (9) Knife, electrician's.
- (10) Wrenches, midget set.

- (11) Tape, friction.
- (12) Solder, half-and-half, No. 110.
- (13) Pliers, 5-inch, diagonal cutting.
- (14) Pliers, 6 1/2-inch, long-nose.
- (15) Pliers, 8-inch, side-cutting.
- (16) Wrench, 8-inch, adjustable crescent.
- (17) Vise, stationary, 3-inch with steel jaw (not illustrated).
- (18) Sandpaper, #0000 (not illustrated).
- (19) Paint, olive-drab, 1-pint can (not illustrated).

## 18. Relay Tools

a. **SPECIAL TOOLS.** A number of items in the preventive maintenance schedule require work of a special and somewhat delicate nature. This includes cleaning relay contacts. To do the work properly, special supplies and a few specially constructed tools are needed. These are furnished with Radio Sets SCR-270 and SCR-271 and are listed below:

- (1) One package of lint-free cloths, 2 pounds.
- (2) Six sheets of crocus cloth.

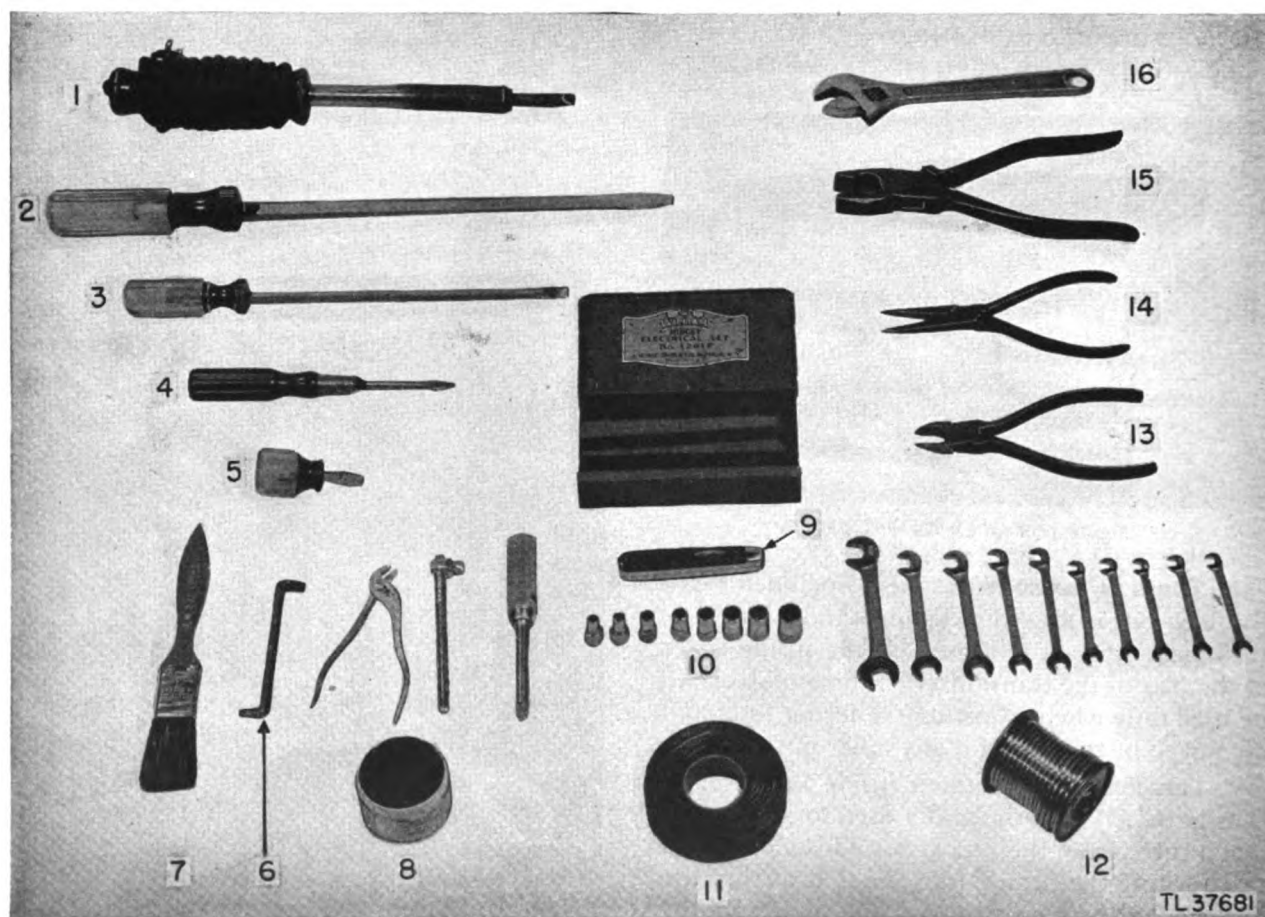


Figure 4. Group of tools from Radio Sets SCR-270 and SCR-271 tool kit.

- (3) One relay-contact burnishing tool.
- (4) One 1-inch cleaning brush.
- (5) Two tubes of household cement.

**b. CONSTRUCTION OF SPECIAL TOOL.** In addition to the tools supplied it will be necessary to construct a crocus-cloth stick to be used on the relay contacts. A small piece of crocus-cloth is cemented to a small stick as shown in figure 5. Note that both sides of the stick are covered. Place the stick in a vise until the cement hardens. The pieces of crocus cloth which extend over the back edge of the stick may be cut off with a knife.

*Note.* Do not use steel wool to clean electrical equipment.

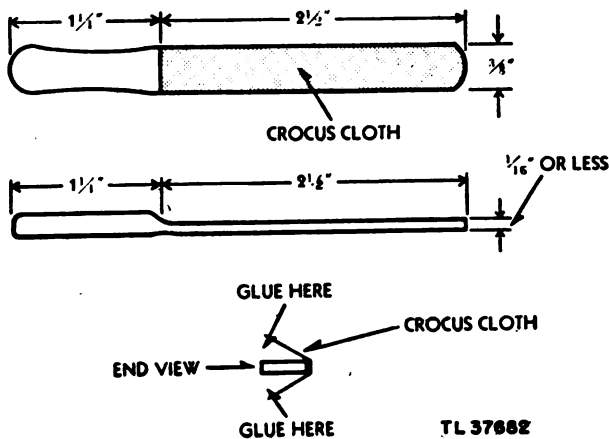


Figure 5. How to make the special relay cleaning tool.

## 19. Purpose and Handling of Tools

Since the preventive maintenance program is a regular part of the daily schedule, the required tools not only must be available, but also must be in satisfactory working condition at all times. Many of the tools provided with the RC-150 are of a special type, and some repairs cannot be made without them; consequently, too much stress cannot be placed upon the need for careful handling and storing of tools. Missing or broken tools cause delays and the use of a substitute tool that is not exactly suitable for the work at hand may cause unnecessary damage. The proper care of tools is just as important as the proper care of the radio equipment itself. The following information will be helpful in using and caring for the tools listed below:

**a. ALLEN WRENCHES.** Allen wrenches are used to tighten or loosen Allen setscrews. They are small and must be kept in the small paper bag provided for them. After use, they should be wiped with an oily rag and replaced in the bag.

**b. PLIERS.** Several types of pliers are included in the tool kit. Although they have different shapes and sizes, all must be cared for in the same

way. They should be kept clean and oiled occasionally to keep the joints free; then the excess oil should be removed with a cloth. Pliers should be stored in the tool box, not in the trousers pocket.

**c. DIAGONAL PLIERS.** Diagonal pliers are used to cut copper wire up to size No. 14. Do not cut iron wire or thick wire with them.

**d. LONG-NOSE PLIERS.** Long-nose pliers are used to hold and bend small wire, grip very small parts, and service delicate apparatus. They can be damaged quickly if they are used carelessly.

**e. SCREW DRIVERS.** Screw drivers of different sizes are furnished in the tool kit and must be kept in good condition. In the selection of a screw driver for a particular job, make certain that the bit is the same width as the head of the screw and that it fits snugly in the slot. The handle should be large enough to give adequate leverage. Screws and bolts should be fully tightened, but excessive pressure sufficient to break the fitting should not be used. Never force a screw. Examine the threads for crossed, bent, or damaged spots; if necessary, replace the screw.

**f. SOLDERING IRON.** The soldering iron is an important piece of maintenance equipment and must be carefully handled. The tip must be kept clean, bright, and properly tinned. The cord should be in good condition and kept rolled around the iron when stored. The attachment plug must be fastened tightly to the wire. A reasonable amount of care will keep the iron in good working condition, but it will be necessary to refile and retin the tip occasionally. This is done in the following manner, whenever the tip becomes pitted and misshapen:

- (1) File the tip until it is free of pits, has the desired shape, and is smooth.

- (2) Connect the iron to the 110- 120-volt a-c outlet and allow it to heat; then test the tip temperature with a piece of resin core solder. When the solder melts, rub it all over the tip until the tip is completely coated with solder. Wipe off excess solder. The iron now is ready for use.

*Note.* The tip should be removed from the heating element occasionally and the scale cleaned from the shank of the tip and the threads. This cleaning can be done with sandpaper. All sand grains should be removed from the threads before the tip is again inserted into the heating element.

**g. SOLDERING HINTS.** Before a joint is soldered, it should be prepared in the following manner:

- (1) Clean the joint carefully, using sandpaper to remove corrosion from the wire and lug.

- (2) Make the joint mechanically tight.



(3) Hold the clean soldering iron against the joint, heating it until the solder flows when placed against the joint.

(4) Use enough solder to fill the joint completely and apply the heat until the connection is smooth. After allowing the joint to cool, test it for tightness.

(5) Do not use a dirty iron and do not expect solder to stick to a dirty joint.

(6) Do not expect solder alone to make a joint tight. The wire must be wrapped around the lug or connector until it is mechanically tight before the solder is applied.

(7) Do not waste solder. If a joint is properly prepared, only a little solder will be required.

**h. RUBBER TAPE.** When it is necessary to protect a wire or soldered joint against water or atmospheric conditions, or when added insulation is needed, cut a strip of rubber tape from the roll long enough to cover the joint; then remove the cloth from the tape. Wrap one end of the tape around one end of the joint with the sticky side against the wire; then stretch and tightly wrap the tape around the joint in a progressive spiral. Apply friction tape as the final outside covering.

**i. FRICTION TAPE.** Friction tape is cloth coated with an adhesive compound. It is used on joints and wire which must be kept from touching bare surfaces. It is also used as a cover on rubber tape wrappings, since it has a more durable surface than rubber. When small joints are covered, it is advisable to split the tape down the center

to form two  $\frac{3}{8}$ -inch strips. Friction tape alone should never be used on wires carrying high voltage. Use rubber tape first. Friction tape will not protect a joint from water; rubber tape, however, with a covering of friction tape will.

**j. VISE.** The threads of the mounting bracket screw and of the jaw screw of the vise must be clean and somewhat oily. Dust and lint should not be permitted to cake in the threads.

**k. PACKING TOOLS.** The manner in which the tools are stored in the tool box is important. The following rules should be observed:

(1) Do not force the tools into the box. If they are properly positioned they will fit easily.

(2) Do not place tools into the box when they are dirty. Clean them first.

(3) Do not place heavy tools on top of light ones. Put the heavy tools in first, in the bottom of the box.

## 20. Safety Shorting Bar

Before attempting to work inside any equipment, all high-voltage capacitors must be discharged. Construct a shorting bar and place it from capacitor terminals to ground. Use a short strip of clean metal and be sure the handle attached is an extremely good insulator. The handle of the shorting bar must be dry before using. Although using plastic handled screw drivers to short capacitors is convenient, this practice is not encouraged. Continued use of tools in this manner will damage them.

## CHAPTER 3

# MAINTENANCE TECHNIQUES

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### 21. General

**a. MAINTENANCE INSTRUCTIONS.** This chapter contains general information for performing preventive maintenance on the various electrical parts of Radio Equipment RC-150. Refer to this information for the best procedure in accomplishing maintenance work. For example, in item 5, Transmitter (par. 45), the maintenance man is directed to inspect the general condition of the variac. Complete instructions for inspecting and performing the necessary maintenance work on the variac are given under Voltage adjusters in this chapter (par. 32).

**b. SPECIFIC MAINTENANCE PROCEDURES.** The different kinds of parts in Radio Equipment RC-150 require detailed application of the general F, I, T, C, A, L, procedures. These detailed procedures for the various parts are described in the remainder of this chapter. The kinds of parts and the paragraphs in which they are discussed are listed below:

- (1) Tubes and sockets (par. 22).
- (2) Capacitors (par. 23).
- (3) Resistors (par. 24).
- (4) Fuses (par. 25).
- (5) Bushings and insulators (par. 26).
- (6) Relays (par. 27).
- (7) Switches (par. 28).
- (8) Blower motor (par. 29).
- (9) Transformers and filter chokes (par. 30).
- (10) Potentiometers (par. 31).
- (11) Voltage adjusters (variac) (par. 32).
- (12) Terminal strips (par. 33).
- (13) Cables and plugs (par. 34).
- (14) Lights (par. 35).
- (15) Air filters (par. 36).
- (16) Cases (par. 37).
- (17) Meters (par. 38).
- (18) Jacks (par. 39).

### 22. Tubes and Sockets

Preventive maintenance work on vacuum tubes includes inspection and cleaning. Work on tube sockets and mountings involves inspection, tightening, cleaning, and adjusting. Each of these operations is discussed in detail below.

**Caution:** Avoid doing any work upon the tubes immediately after shut-down while they are still hot. Severe burns may result from contact with envelopes of hot tubes.

**a. INSPECT (I).** (1) Both glass and metal tube envelopes must be inspected for accumulation of dirt and for possible break-away of the envelopes from the tube bases. Examine the tube caps for dirt, corrosion, and for possible break-away from the cement which attaches them to the glass envelopes. When tubes with loose plate caps or envelopes are found, replace them if suitable replacement is available. If replacement is not available, do not attempt repair. Record the unsatisfactory condition in the DISPOSITION column on the Assignment Sheet and make the replacement when possible.

(2) The spring clips which make contact with the grid caps must be examined for possible corrosion or loss of tension and consequent loose connections. Condition of the wires soldered to these spring clips must also be checked. The wires should be free of frayed insulation or broken strands. Special care should be taken in removing a loose spring clip attached to a grid cap which has broken away from its glass envelope. Never turn the clip while it is on a loose cap. Be particularly careful when signs of corrosion exist; the clip may be bound to the cap.

(3) Firmness of the tubes in sockets can be determined by inspection. Press the tube down in the socket. Do not partly withdraw the tube and then jiggle it from side to side; such movements tend to weaken the pins attached to the base and spread the contacts in the socket. This may produce trouble where it did not exist before.

(4) It may seem desirable to inspect the sockets of tubes at the same time that the tubes are examined. This practice is discouraged, except as indicated in the schedule. The sockets for each tube can be conveniently examined whenever a tube is replaced. Most certainly, however, tubes should not be pulled out of the socket each time the tube is examined. If there is good reason to believe that the socket is faulty and

responsible for improper operation, it then becomes a servicing item and is discussed in TM 11-1517 (when published).

**b. TIGHTEN (T).** Tighten any loose connections in the tube sockets or on the tubes. However, if the connections are dirty or corroded, they should be cleaned before they are tightened. When tightening screws which hold the socket base on the top of an insulated bushing, excessive pressure should not be applied; too much pressure may crack the bushing. Socket mountings must be tight at all times. They may become loose during transit which will result in the tubes being damaged beyond repair.

**c. CLEAN (C).** (1) Tubes must be cleaned if inspection indicates it is necessary. Tubes operated at high voltages with exposed plate connections and caps mounted upon the envelopes should be kept free from dirt and dust because of possible leakage between the grid and plate terminals. Tubes which do not operate at high voltages and do not have exposed plate caps do not need such frequent cleaning.

(2) One precaution must always be observed in cleaning vacuum tubes. Tubes that need cleaning should not be removed from their sockets. The danger of tube breakage or socket injury is great when tubes are removed, and the scarcity of supplies makes it necessary to exercise every precaution. Be particularly careful when working with high-power tubes which have external caps.

(3) Cleaning involves removing dust and dirt from the envelopes. Use a clean, dry rag that is free of lint or other substances which may scratch the glass. If proper care is taken, plate caps may be cleaned by using a piece of #0000 sandpaper. The paper should be wrapped around the cap and gently applied to the surfaces of the cap. Excessive pressure is unnecessary and harmful.

(4) When sockets are to be cleaned and contacts are accessible, use fine sandpaper to remove corrosion, rust, or dirt.

**d. ADJUST (A).** Adjust loose tube connections whenever they are found. Adjustments of tube socket contact springs should not be made unless inspection clearly indicates that they are necessary. Tube connector clips should not be flattened during adjustment. If they are, they will not make adequate contact with the surface of the tube cap. The clip is made of a thin metal and it can be adjusted by compressing gently with the fingers. The adjustment of the tension of socket contact springs should not be done by

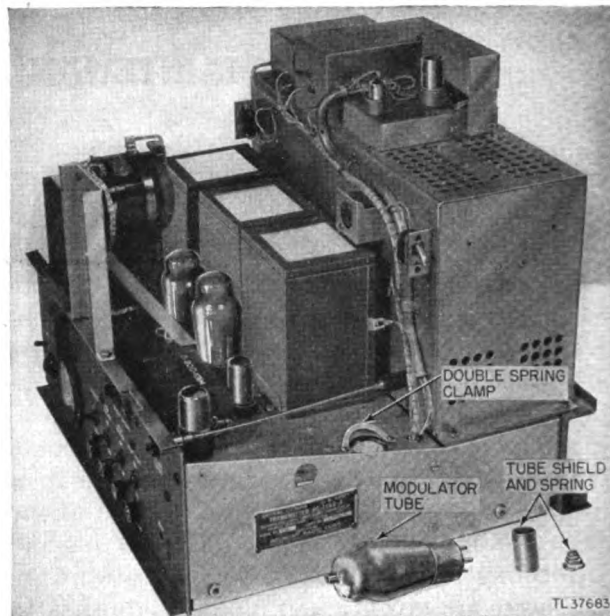


Figure 6. Transmitter—side view showing tube clips and tube shields.

bending the spring. Instead, place the tips of the long-nose pliers on the spring near its point of attachment to the socket base and apply gentle pressure in the direction in which increased tension is desired. Repeat this action as the pliers are moved toward the contact end of the spring. The result will be a slight bow in the spring, but the desired effect will be produced.

**e. REMOVAL OF TUBES FROM SOCKETS.** (1) The low-voltage power supply and modulator tubes in the transmitter are each held in place by a double spring clamp at the base of the tube (fig. 6). To remove a tube, press down on both sides of the clamp and gently raise the tube from the



Figure 7. Receiver—top view showing tube locking rings.

socket with a slight rocking motion. If the tube shakes loose in transit, press it down firmly in order to reengage the clamp.

(2) Three metal tubes mounted on the top of the radio-frequency amplifier chassis in the receiver are held in place by metal locking rings (fig. 7). To remove one of these tubes, unscrew the locking ring in a counterclockwise direction and lift it off. The tube may then be rocked out in the usual manner.

*Note.* The substitution of a new metal tube in any of these positions requires a special installation technique. These tubes require grounding of the tube shields. This grounding is accomplished by means of the locking rings. Remove the black finish around the rim of a tube before installation. This is done easily by slipping a lock ring over a tube and rotating the tube and ring in opposite directions under slight pressure until the teeth on the under side of the locking ring have scraped the tube rim clean (fig. 8). The tube and locking ring can now be installed. Screw the ring down tightly so that the teeth will bite into the metal thereby insuring good contact around the entire ring.



Figure 8. Removing black finish to insure grounding.

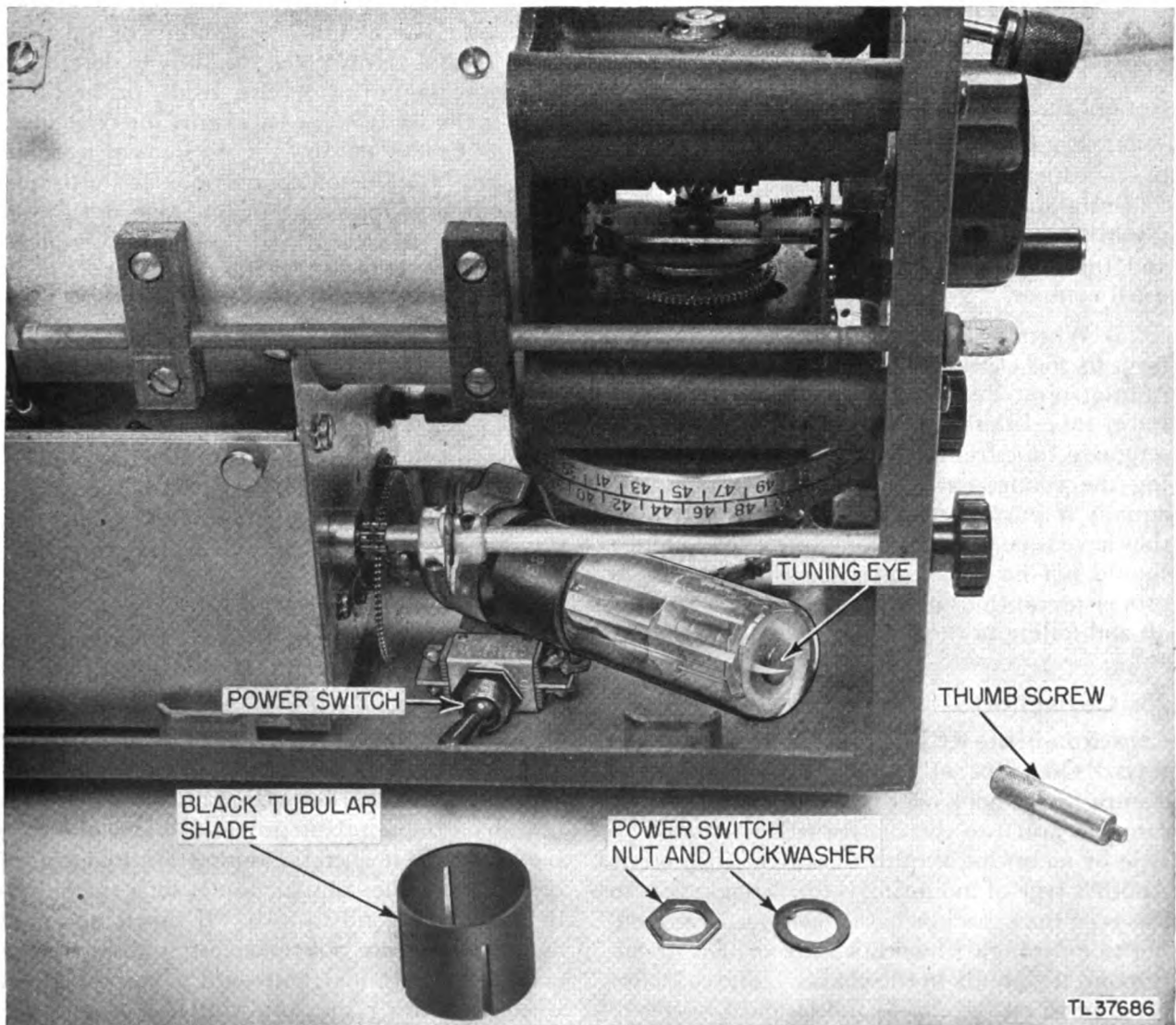


Figure 9. Front assembly of wavemeter with tuning indicator tube about to be removed.

(3) The mixer tube of the receiver is located on the top of the radio-frequency amplifier chassis. This tube may be removed by removing its metal shield first (fig. 6). Unscrew the metal shield, lift it and the tube spring off the top, then grasp the glass envelope of this tube between thumb and forefinger and rock it gently before pulling the tube from the socket.

(4) To remove the tuning indicator tube, it is necessary to remove the bottom plate of the receiver chassis. Remove the 14 screws holding this baseplate to the chassis and lift the plate off. The tube and its socket may then be pulled from the tube mounting assembly. Then remove the tube from its socket.

(5) The tuning indicator tube in the wave-meter is removed in the following manner (fig. 9):

(a) Push the black tubular shade back on the glass envelope of the tube.

(b) Remove the a-c power switch from the front of the chassis.

(c) Remove the clamp holding the tube socket by rotating the thumbscrew counterclockwise. The tube and socket assembly may then be pulled toward the side where the a-c switch is located, and the tube removed from the socket in the usual manner.

(6) When it is necessary to remove a tube from its socket, especially the high-power tubes, caution must be observed. When removing a warm tube from a socket, do not jar it. Never remove a tube from its socket before first removing the connection, if any, to the cap. It is equally important to place tubes properly after they have been removed from the sockets. Tubes should not be placed on a flat surface without proper precautions to prevent them from rolling off and falling to the floor or ground.

## 23. Capacitors

Capacitors in the RC-150 are mounted in various ways. One type of mounting uses two metal clamps which hook over the top of the capacitor case and fasten to the chassis with screws. This type of mounting requires frequent inspection. Another type of mounting is the flange type. In this type the capacitor has flanges on the mounting side through which holes are drilled to correspond with holes in the chassis. The capacitor is mounted on the chassis and fastened by means of bolts or studs through these holes.

**Caution:** Unless properly discharged, capacitors may retain dangerous charges for some time. Before touching capacitor terminals, be sure they have been shorted with the safety shorting bar.

**a. FEEL (F).** Immediately after shut-down, discharge and then feel the terminals of the high-voltage filter capacitors. These should be reasonably cool. If they are abnormally warm, there are probably losses due to loose, dirty, or corroded terminal connections. Feel the sides of these, and of any other oil filled and electrolytic capacitors. They should feel cool or slightly warm. If they are decidedly warm or hot, there may be excessive internal leakage. Capacitors in this condition are subject to failure at any time and should be reported for immediate replacement.

**b. INSPECT (I).** (1) Terminals of the capacitor must be inspected for corrosion and loose connections. The mounting assemblies of the capacitors should be inspected carefully to determine any loose mounting screws, studs, or brackets. Inspect the leads to the capacitors for poor insulation. Cracks and dry rot are signs of poor insulation. Conductor connections at the terminals should be inspected for breakage and frayed insulation. Correct frayed insulation by removing the loose strands. If too much bare wire is exposed, cover it with friction tape.

(2) The case of each oil-filled capacitor should be thoroughly inspected for leaks, particularly if there are signs of oil. Whenever a capacitor is found to be leaking oil, remove and replace it if a replacement is available. Occasionally, a defective capacitor case may be encountered whose seams are improperly soldered and leaking oil. To retain such a capacitor in the circuit is not wise, but if a replacement is not available there is no alternative but to locate the leak and resolder the seam. If the leak is resoldered from the outside before an appreciable amount of oil has leaked out, the capacitor may be as good as it was originally. **NO ATTEMPT SHOULD BE MADE TO ADD OIL.**

**c. TIGHTEN (T).** If inspection discloses any loose terminals, tighten them properly. Particular care should be taken when tightening terminal nuts of capacitors. The construction is such that binding post bolts tend to turn. If this is observed and terminals are not sufficiently tight, grip the end of the terminal bolt with a pair of pliers while tightening the nut with the proper size wrench; otherwise, the seal or internal connec-

tions may be damaged. Tightening support insulators should be done with care. Do not apply too much pressure.

*d. CLEAN (C).* Cases of capacitors, insulating bushings, and connections should be cleaned whenever they are found to be dirty, rusted, or corroded. Capacitor cases can usually be cleaned with a dry cloth, but if the deposit of dirt on these parts is hard to remove, the cloth may be moistened with some solvent such as carbon tetrachloride or dry-cleaning solvent (par. 15). Bushings should be carefully wiped with a dry cloth after they are cleaned. Corroded connections should be sanded with fine sandpaper and properly tightened. If necessary, repaint any exposed surfaces of the cases.

## 24. Resistors

Various types of resistors are used in the RC-150 equipment. The most common type is the metalized resistor molded in plastic. This is widely used where the heat dissipation factor is not great. Another common type is the vitreous enameled resistor with a hard ceramic coating baked upon the resistance element. Connections to the various resistors are made in several ways, the most common of which is the pig tail type, in which the conducting lead enters the body of the resistor.

*a. INSPECT (I).* Examine the coating of the vitreous resistors for cracks and chipping, especially at the ends. Look for blistering and discoloration which indicate overheating on the bodies of all types of resistors. Look for arc pits. Inspect the leads, brackets, and all connections for corrosion, dirt, dust, and looseness. Look for broken strands in the connecting wire. Check for firmness of mountings. Do not attempt to move resistors with pig tail connections because of the danger of breaking the pig tail connection at the point at which it enters the body of the resistor. Such damage cannot be repaired. Inspect the connections of the pig tail resistors for proper soldering.

*b. TIGHTEN (T).* Tighten all loose resistor connections and mountings. If the resistor is allowed to remain loose, vibration may break the connection or damage the body of the resistor.

*c. CLEAN (C).* (1) Clean all dirty or corroded connections of resistors with a brush dipped in carbon tetrachloride or dry-cleaning solvent. Vitreous resistors must be kept clean to avoid flash-over or leakage between the terminals. Wipe

with a dry cloth, but if a dirt deposit is unusually difficult to remove, moisten the cloth with carbon tetrachloride or dry-cleaning solvent.

(2) Discolored resistors cannot be cleaned. Slight discoloration of the resistor body at the center is normal. Excessive discoloration, however, is indicative of overloading at some time prior to the inspection and is probably due to some circuit trouble which requires analysis. Instructions for this analysis are given in TM 11-1517.

(3) Resistors with pig tail connections should be cleaned with a small brush.

## 25. Fuses

*a. GENERAL.* (1) Fuses are small strips of metal with a low melting point. They are inserted in series with an electrical circuit to open the circuit when the amount of current in the circuit exceeds a prescribed value. Such fuses serve to protect equipment against overload and damage. The type of fuse used in the RC-150 is nonrenewable and when blown must be replaced in its entirety. Whenever a fuse blows, an effort should be made to discover the reason for the failure and to make corrections, if possible, before a new fuse is installed.

(2) Nonrenewable or one-time fuses (fig. 10) are to be discarded when blown and replaced with good fuses. The holder and fuse can be unscrewed from the socket. This type of fuse is found in the RC-150. To remove a fuse, place a screw driver in the slot of the red plug of the fuse holder, unscrew the plug until it turns freely; then pull it out with the fingers. The red plug of the fuse holder fits over one terminal of the fuse and is held there by friction. The plug and fuse are separated by pulling them apart. Care must be taken to see that the contact surfaces of the fuse and socket are kept clean and tight.

*b. INSPECT (I).* Examine fuse caps for evidence of burning, charring, or corrosion. Examine the fuse clips for tension, dirt, or loose connections.

*c. TIGHTEN (T).* Resolder all connections to the fuse clips if they are loose.

*d. CLEAN (C).* Clean all fuse ends, when necessary, with fine sandpaper and wipe with a clean cloth. If a file is used to remove deep pits in fuse ends or contacts, always polish with fine sandpaper afterward to leave a smooth contact surface. Finish by wiping with a clean cloth.

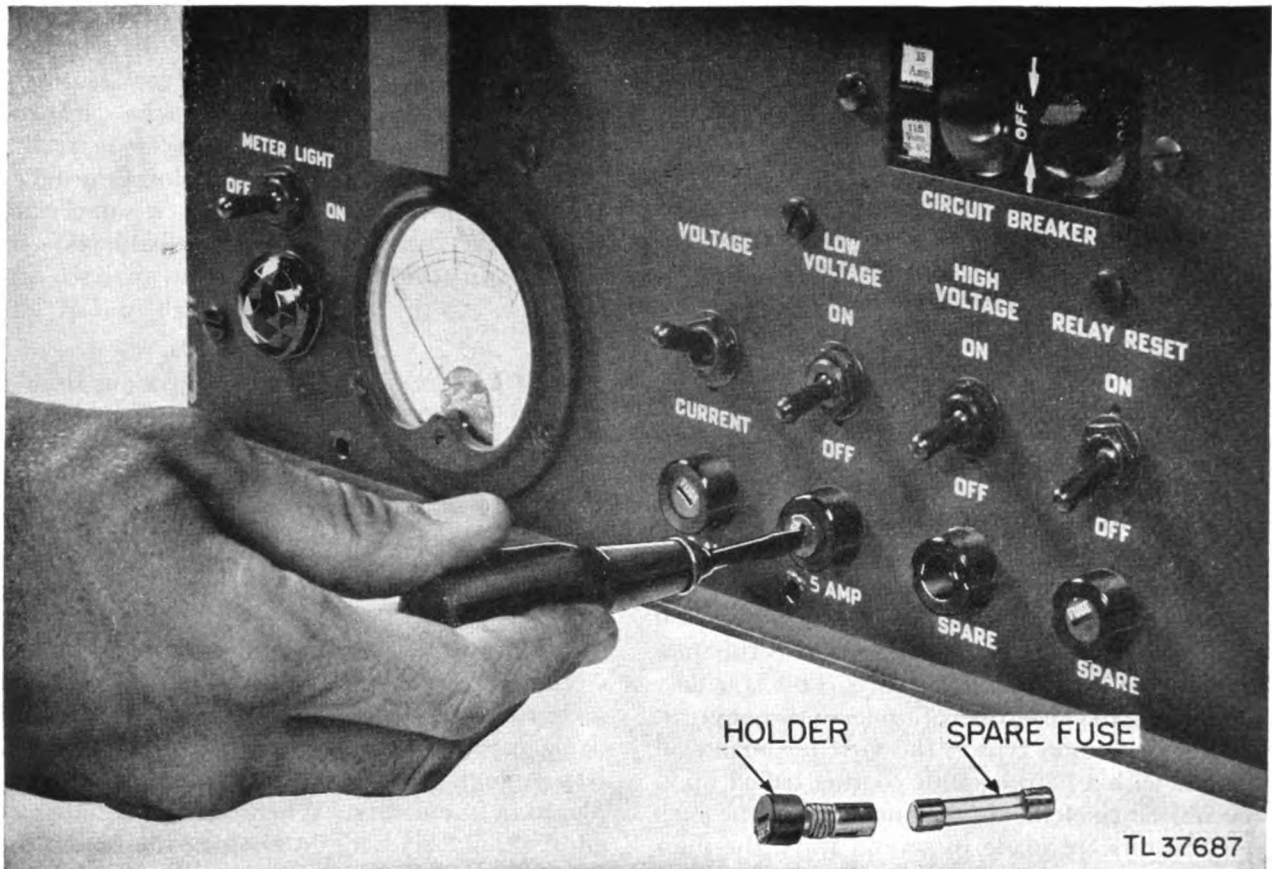


Figure 10. Method of removing and replacing fuses.

## 26. Bushings and Insulators

**a. GENERAL** (1) Insulator bushings used in the high-voltage circuits of the RC-150 equipment are constructed of ceramic material with a highly glazed surface. Since an insulator is no better than its surface, deposits of foreign substances upon the surface will materially reduce the insulation value of the bushing. It is important, therefore, that bushings used in high-voltage circuits be inspected frequently.

(2) The insulating bushings are used in various ways. One use of bushings is as a support for high-voltage tube sockets; another is as a support for high-voltage leads; and a third is as a support for the voltage terminals of transformers and capacitors (fig. 11).

**b. INSPECT (I).** Inspect the physical condition of the insulator bushings. Each should be clean and without cracks or chips. It is possible for a highly glazed insulator to develop fine hair line surface cracks where moisture and dust accumulate and eventually form a leakage path for a high-voltage flash-over. Consequently, the surface of the bushings must be inspected to detect such cracks.

When a defective bushing is found, replacement is the only solution. As a rule, bushings are held in position with a hexagonal nut on a threaded conductor which passes through the bushing and can be replaced easily. If replacement is impossible, the insulating bushings must be kept clean with carbon tetrachloride and inspected frequently. If it is difficult to see dust on a glazed surface, check by rubbing the finger across the bushing.

**c. TIGHTEN (T).** Tighten all loose bushings. The procedure used is simple, but one precaution must be observed. Avoid forcing the nuts or screws too tightly. If too much pressure is exerted on the bushings, damage is almost certain. Whenever a bushing with stud bolts screwed into threaded holes is loose and has stripped threads, replace the entire bushing.

**d. CLEAN (C).** Insulated bushings are easily cleaned, but to prevent destruction of the glazed surface abrasive material should never be used. A clean dry cloth is entirely satisfactory for the cleaning process. However, if a foreign deposit on the surface of the bushing is hard to remove,

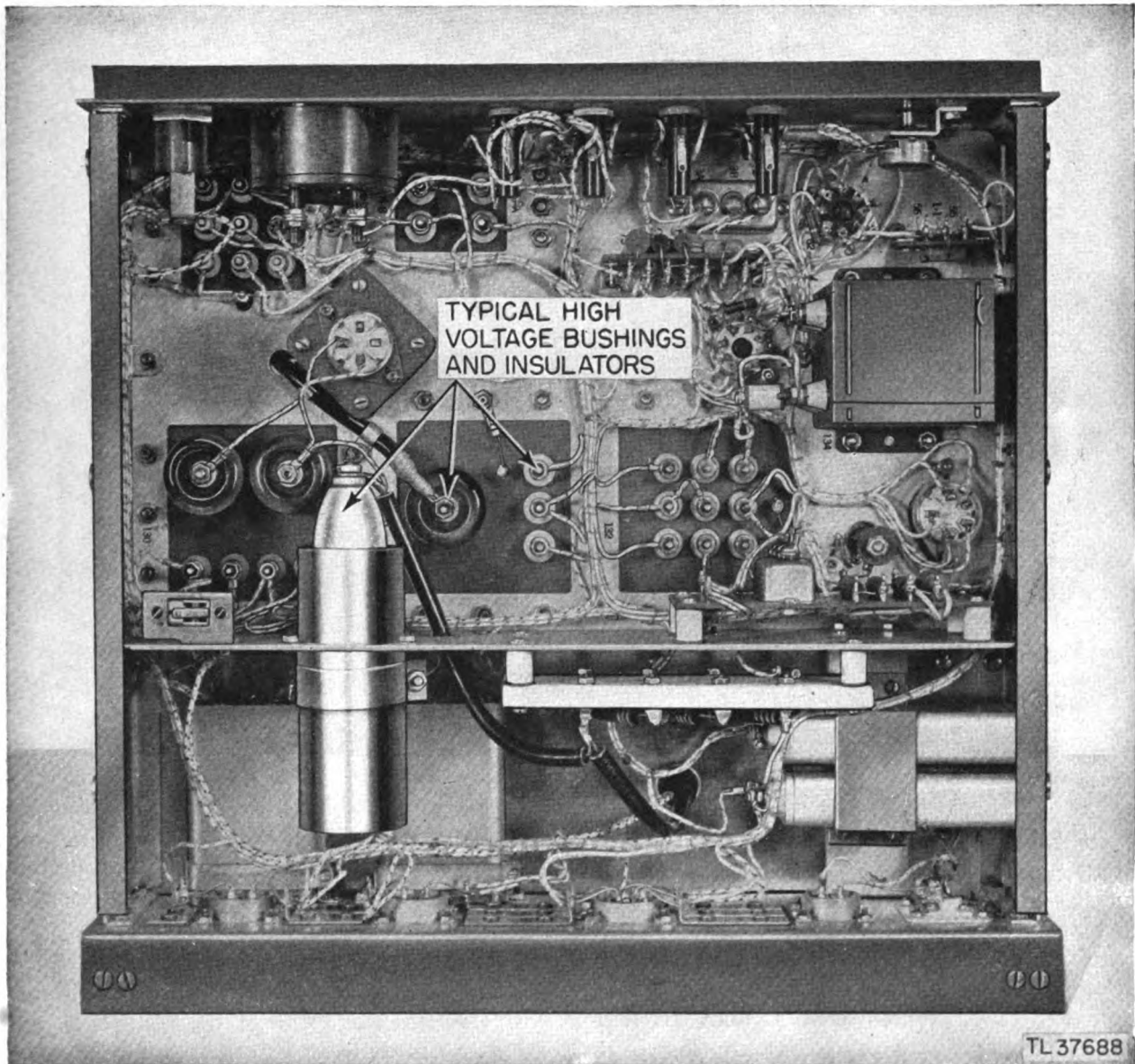


Figure 11. Transmitter—under side showing high-voltage bushings.

carbon tetrachloride or dry-cleaning solvent may be used. After the surface has been cleaned with the solvent, it should be carefully polished with a dry cloth; otherwise, the solvent will leave a deposit on the surface of the bushing. This deposit will impair the effectiveness of the bushing as a high-voltage insulator.

*Note.* Insulator bushings used in high-voltage systems are always carefully constructed, but on rare occasions one may be found which has sharp points on the surface. This is a defective bushing and should be replaced as soon as possible.

## 27. Relays

a. **GENERAL.** The types of relays in Radio

Equipment RC-150 require very little attention (fig. 12). They are permanently adjusted at the factory and do not require further adjustment. Because they operate infrequently, the contacts do not need to be cleaned often.

b. **INSPECT (I).** Inspect the windings for evidence of overheating. Look for charred insulation or burned spots on the coil wrapper. Inspect the relay contacts for burns or pitting. Do not use crocus cloth or sandpaper on the contacts unless they are severely burned. Usually they can be wiped clean with a bit of cloth. Inspect the leads, brackets, and all connections for corrosion, dirt, dust, and looseness.



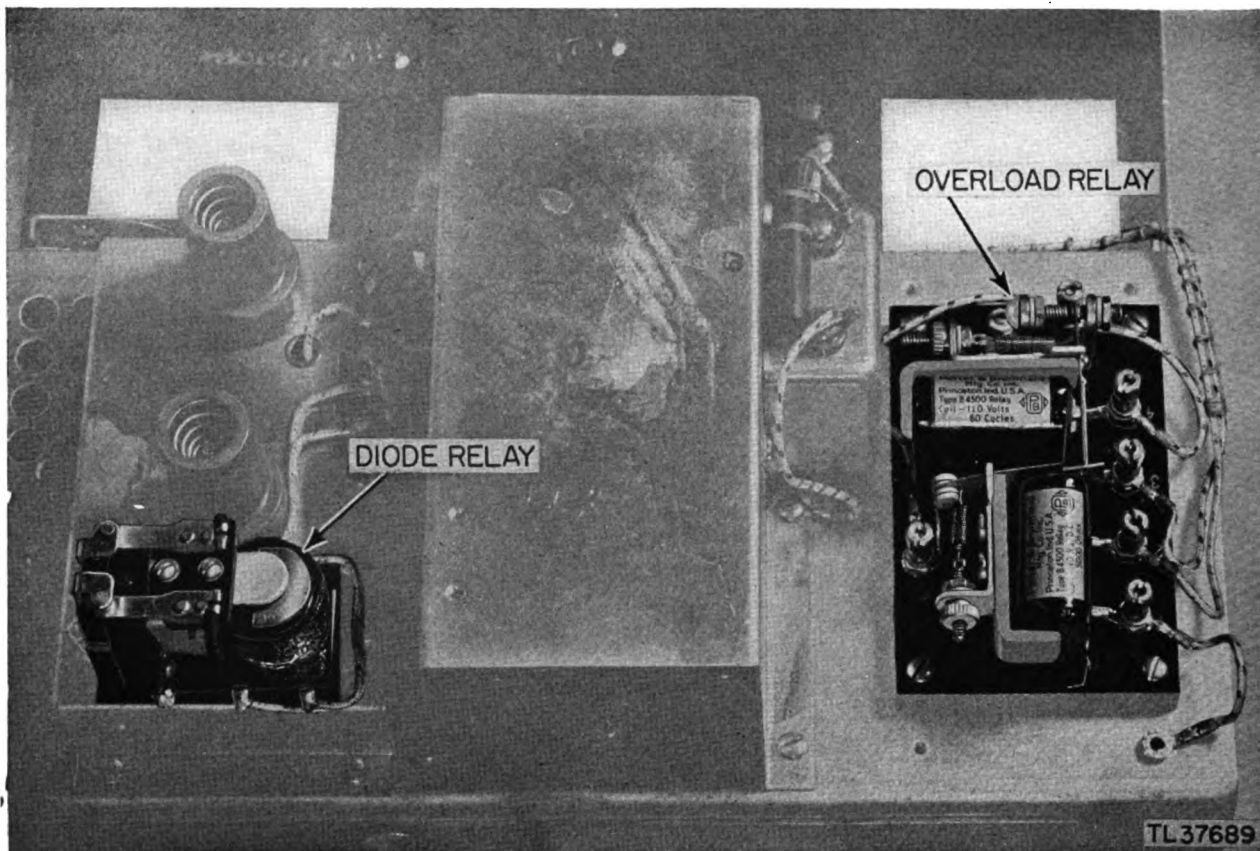


Figure 12. Diode and overload relays of transmitter.

## 28. Switches

Many types of switches are used in the RC-150, such as toggle switches, circuit breakers, interlock switches, and gang switches. All of these require preventive maintenance. The location of each of the switches is indicated in the discussion of individual maintenance items in chapter 4. Representative switches are shown in figure 13.

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

(2) Inspect the gang switches to see if the contacts are clean. The inspection is visual only; do not attempt to pry the leaves of the switch apart. The contacts are silver plated and do not corrode easily. The rotary member should make good contact with the stationary member. As the former slides into the latter, a spreading of the stationary contact leaves should be seen.

**b. TIGHTEN (T).** Tighten loose mountings and connections. Increase the tension of springs only when inspection indicates that adjustment is necessary.

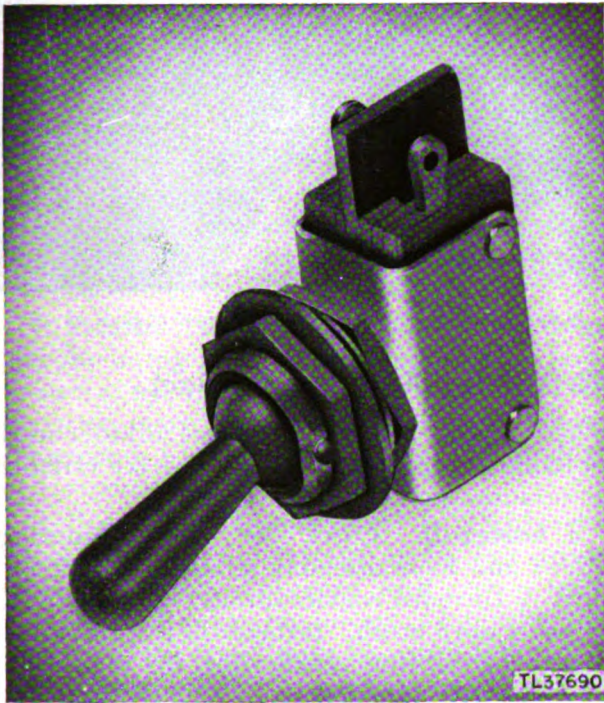
**c. CLEAN (C).** Clean the exterior surfaces of switches, when dirty, with a stiff brush moistened with carbon tetrachloride or dry-cleaning solvent. Polish with a piece of clean cloth. Corroded connections are cleaned with #0000 sandpaper.

**d. LUBRICATE (L).** If binding is noted during inspection of switch operation, apply a drop of lubricating oil with a toothpick to the point of motion or rotation. Do not allow oil to run into the electrical contact; a film of oil may cause serious damage or poor contact. Lubrication of switches is not recommended unless serious binding is noticed.

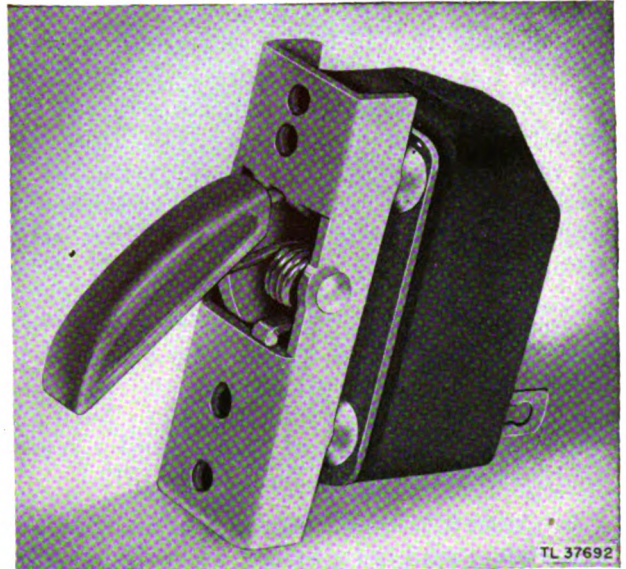
## 29. Blower Motor

**a. INSPECT (I).** Inspect the blower motor for cleanliness and evidence of overheating.

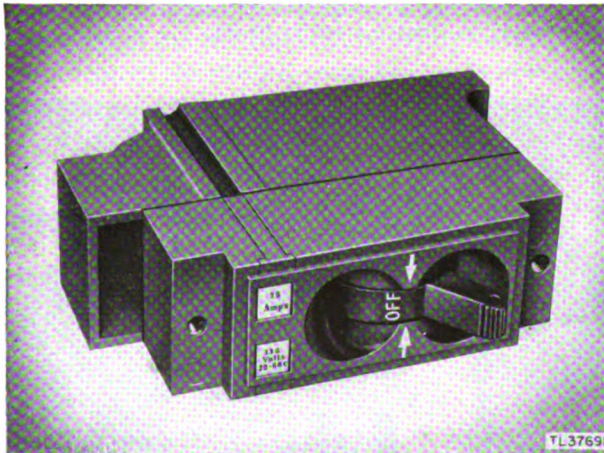
**b. LUBRICATE (L).** Approximately every 3 months, fill the blower-motor oil cups with lubricating oil. See paragraph 45 for removal procedure.



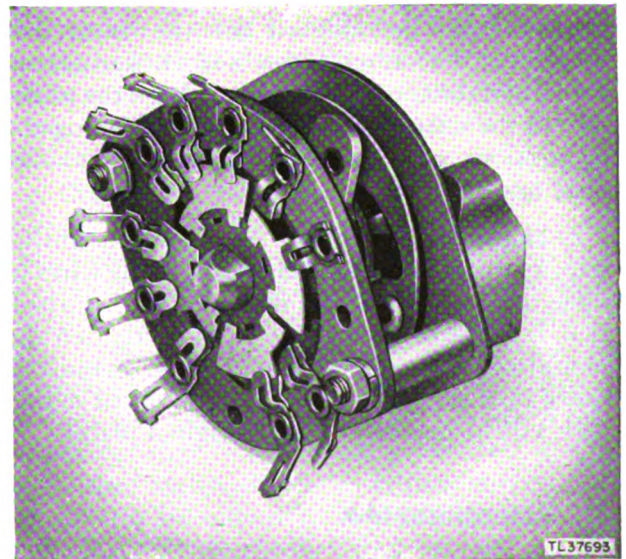
① Toggle switch.



③ Interlock switch.



② Circuit breaker.



④ Gang switch.

Figure 13. Types of switches.

## 30. Transformers and Filter Chokes

In virtually every case a defective transformer or choke must be replaced, but certain preventive maintenance operations are applicable as measures of protection against failure at inopportune times.

**a. INSPECT (I).** (1) Check all transformers and chokes for general cleanliness. Examine for tightness of connections, connecting lugs or terminals, mounting brackets and rivets. Dust, dirt, or moisture present between the terminals of high-voltage transformers or chokes located at high-potential points in the circuit may cause flash-over.

(2) Wax impregnated transformers should be inspected for signs of overheating indicated by the presence of insulating compound (wax) on the outside of the seams of the cases. Such evidence is an indication of trouble and a system analysis must be made. (See TM 11-1517.)

**b. CLEAN (C).** Clean the cases of transformers and chokes with a dry cloth. In some instances it may be necessary to use carbon tetrachloride or dry-cleaning solvent to remove foreign matter. Corroded contacts or connections can be sandpapered and wiped clean. Corrosion at ground contacts must be removed and the connection soldered. The transformer and chokes are enclosed and the connections are made on the under side of the chassis. Inspecting and cleaning the connections on these transformers and chokes need not be frequent.

**c. TIGHTEN (T).** Tighten all loose mounting screws or connections. Placement of the wires in these units is critical and must not be disturbed. If it is necessary to remove wires to tighten the mountings of parts, positions of the wires must be noted on a tag before they are unsoldered so that they will be restored to their original places.

## 31. Potentiometers

**a. INSPECT (I).** Check mechanical operation of the potentiometers. Inspect the assembly and mounting screws and nuts. All metallic parts should be inspected for dust, dirt, and corrosion.

**b. TIGHTEN (T).** Tighten all loose assembly or mounting screws. Tighten the control knobs in place with an Allen wrench. A typical example of the use of the Allen wrench is shown in figure 14.

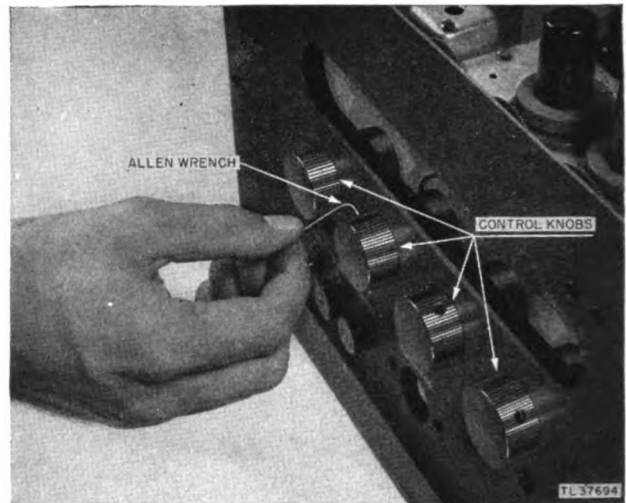


Figure 14. Control knobs showing Allen wrench in use.

## 32. Voltage Adjusters (Variac)

There is only one type of voltage adjuster used in Radio Equipment RC-150. This is a variable autotransformer, or variac (fig. 15).

**a. INSPECT (I).** Check for loose mounting screws and loose assembly screws. Inspect for dirty or corroded contact surfaces and windings, or badly worn brush. If the surface of the windings is charred from overheating, the variac will probably have to be replaced. The brush should be removed and replaced before it is worn dangerously close to the brush holder. Inspect the spring tension of the brush holder and adjust, if necessary, to insure firm contact.

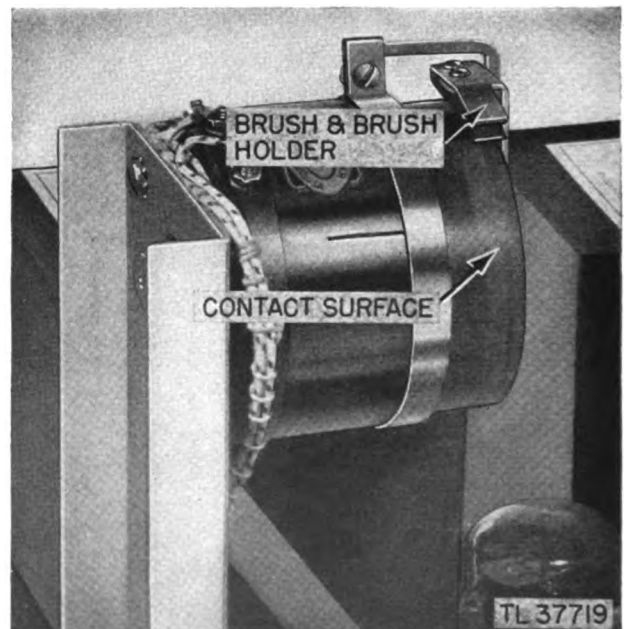


Figure 15. Close-up of variac.

b. **CLEAN (C).** Clean the exterior of the variac with a cloth or brush. Clean dirty connections and the contact surfaces with carbon tetrachloride or dry-cleaning solvent. Be careful not to damage the windings.

### 33. Terminal Strips

Terminal strips are used as distribution and connecting points for electrical circuits. The usual construction consists of a strip of insulation with screw type or soldered connections mounted on it.

a. **INSPECT (I).** Check terminal strips for cracks, breakage, dirt, and loose connectors or mounting screws. Carefully examine the connections for mechanical defects, dirt, or corrosion.

b. **TIGHTEN (T).** Tighten all loose screws, lugs, and mounting bolts. When tightening screws, be sure to select the proper screw driver. Do not exert too much pressure. Do not remove loose connections to clean them unless they are dirty or corroded.

c. **CLEAN (C).** Clean terminal strips with a dry brush when they are dusty or dirty. In extreme cases use a cloth moistened with carbon tetrachloride or dry-cleaning solvent. Following this operation, the board must be wiped thoroughly with a cloth and then brushed to remove the lint.

### 34. Cables and Plugs

The cables in Radio Equipment RC-150 can be regarded as the life lines of the equipment. The condition of the cabling must be closely observed.

a. **INSPECT (I).** Inspect cables and cords for cracked or deteriorated insulation, frayed or cut insulation at the connecting and supporting points, (broken lacing cords), and for any improper placement which puts the cables under strain. Inspect the flexible coaxial cable to see that it is properly supported and that there are no kinks or sharp bends in the line.

**Caution:** During cold weather, handle all connectors and cables carefully, especially cables with Vinylite composition (flexible coaxial lines).

b. **TIGHTEN (T).** All loose cable clamps, coupling rings, and cable connections must be tightened.

c. **CLEAN (C).** Clean all dirty or corroded connections. The easiest way to clean dirty connections is to remove the connection and clean it with a brush dipped in carbon tetrachloride. Make sure that the connection is thoroughly wiped with a dry cloth. Corroded connections

are cleaned with #0000 sandpaper. It is important that the entire surface of the connections be cleaned, but no attempt should be made to remove individual prongs from cable plugs.

### 35. Lights

Pilot lights are small lights used to indicate the application of power to a circuit. The construction of these lights is simple, and they can be removed and replaced easily. The maintenance of pilot lights should present no special difficulty.

a. **INSPECT (I).** Examine pilot-light assemblies for broken or cracked pilot-light shields; loose bulbs; bulbs with loose bases; loose mounting screws; and loose, dirty, or corroded connections.

b. **TIGHTEN (T).** Tighten loose mounting screws and resolder loose connections. If the connections are dirty or corroded, they should be cleaned before soldering. Loose bulbs should be screwed tightly into their bases or reseated, but bayonet bases should not be twisted hard enough to break the glass bulb loose from the base. Broken or burned out pilot-light bulbs must be replaced as soon as possible, using the following method. Fold small piece of friction tape over the top of the bulb and press against the two sides. After the tape is attached, turn the bulb and remove it from the socket. Inspect socket connections while the bulb is out. A new bulb can be replaced with the fingers, but, if difficulty is encountered, the above procedure may also be used to replace it.

c. **CLEAN (C).** The pilot-light shields, the base assembly, and the glass of the bulb, where accessible, should be cleaned with a dry cloth. If the interior of the base has accumulated dust or dirt it can usually be removed with a small cloth. Films of foreign material on the connections or the socket contacts may be removed with a piece of cloth or a small brush dipped in carbon tetrachloride, after which the clean surfaces should be polished with a dry cloth. Clean contacts and connections are important in pilot lights because of the low voltage at which they operate.

### 36. Air Filters

In Radio Equipment RC-150, air filters are placed in the two side panels of the transmitter to remove dust from the air drawn into the cabinet. One of the filters mounted in the panel is shown in figure 16. The filters are impregnated with oil to facilitate the filtering action. The following procedures cover their maintenance.

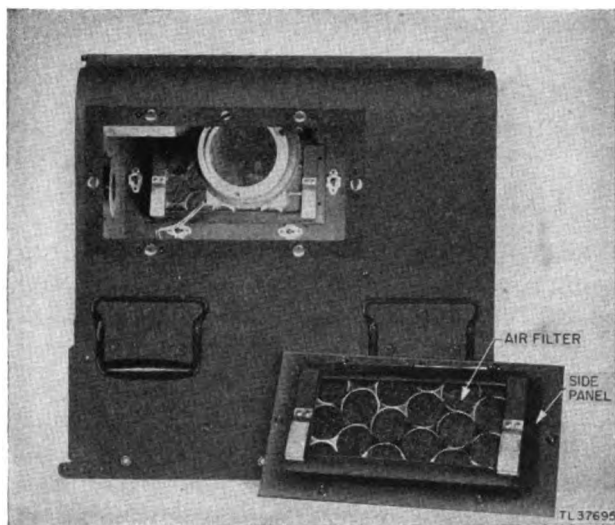


Figure 16. Transmitter case—side view showing air filter in side panel.

**a. INSPECT (I).** Inspect the filter for an excessive accumulation of dirt. Note whether the filter is mounted correctly on the panel (see CAUTION below). Improperly assembled filter elements or warped frames will allow unfiltered air to leak around the edges and permit dust to enter the cabinet.

**b. TIGHTEN (T).** Tighten mounting brackets if loose, and readjust the filter if not properly fitted.

**Caution:** The filter should be installed by holding it lightly by the taped edges only and with arrows pointing in direction of air flow (that is, from outside the chassis in).

*Wash hands after handling.*

### 37. Cases

The cases which house the various components of Radio Equipment RC-150 are constructed of sheet steel painted olive-drab.

**a. INSPECT (I).** Inspect the outside and inside of each case thoroughly, paying strict attention to every detail. Check the door hinges, the ventilator mountings, the panel screws, and the zero setting of the meter. Examine pilot-lamp covers for cracks and breaks. Occasionally remove the covers and examine the fit of the pilot-light bulb in its socket. Inspect the panels for loose knobs, switches, and jacks.

**b. ADJUST (A).** Adjust the zero setting of all meters found to be incorrect, following the specific instructions given in paragraph 38.

**c. CLEAN (C).** Dust each cabinet inside and out with a clean dry cloth. Clean the meter cover glasses and control knobs with a clean cloth.

**d. LUBRICATE (L).** Check door hinges and latches for lubrication. They will need little lubrication, but if inspection shows them to be getting dry, a small amount of lubricating oil should be applied. All excess oil should be removed with a dry cloth.

### 38. Meters

A meter is an extremely delicate instrument and must be handled very carefully. It requires very careful treatment, because it is a precision instrument and cannot be repaired in the field. A damaged meter should be replaced with a spare and returned to the depot for repair.

**a. INSPECT (I).** Inspect leads and connections to the meter. Look for loose, dirty, and corroded connections, and also for cracked or broken cases or cover glass. Since the movement of a meter is extremely delicate, its accuracy will be seriously affected if the case or glass is broken and dirt and water filter through. If the climate is damp, it will only be a matter of time until enough moisture goes through a crack to ruin the meter.

**b. TIGHTEN (T).** Tighten all loose connections. If loose mounting screws are found, they too should be tightened. Any loose meter wires should be inspected for dirt or corrosion before they are tightened.

**c. CLEAN (C).** Meter cases usually are made of hard, highly polished bakelite and can be cleaned with a dry cloth. If cleaning is difficult, the cloth should be dampened with carbon tetrachloride or dry-cleaning solvent. Dirty connections may be cleaned with a small stiff brush dipped in carbon tetrachloride, or with a small piece of cloth dipped in the dry-cleaning solvent.

**d. ADJUST (A).** Normally, the meter in the RC-150 should indicate zero when the equipment is turned OFF. The procedure for setting a meter to zero is not difficult. The tool required is the thinnest screw driver found in the tool kit of Radio Set SCR-270. Before deciding that a meter needs readjusting, tap the meter case lightly with the finger tips. This will help the needle to overcome the slight friction which sometimes exists at the bearings and prevents an otherwise normal unit from coming to rest at zero. *Zero shift* is caused by the gradual yielding of the spring when the instrument is kept at a large deflection for a considerable length of time. If, on breaking the circuit, the pointer does not return at once to its original zero position, it will

probably do so gradually. For this reason, it is most important that the zero setting of the meter be checked and readjusted only after the unit has been off the air for several minutes. If adjustment is needed, insert the tip of the screw driver in the slotted screw head located below the meter glass. Slowly turn the adjusting screw until the pointer is at zero (fig. 17). Observe the following precautions. View the meter face and pointer directly and not from either side. Avoid turning the screw too far because the needle may be bent or the hair spring damaged.

### 39. Jacks

Jacks require very little attention and only at infrequent intervals. Occasionally, it will be necessary to tighten the mounting nut, clean the contacts, or increase the spring tension. Dirt is removed with a brush and dry-cleaning solvent or carbon tetrachloride, and corrosion is removed with a piece of crocus cloth. Spring tension is increased, when necessary, by grasping the spring near its point of attachment with a pair of long-

nose pliers. The pliers are twisted slightly in the direction tension is desired and continuously moved along the spring toward the contact end. The result is a slight bow in the spring. Try the action of the jack after each adjustment. Care should be exercised to keep all soldered connections intact.

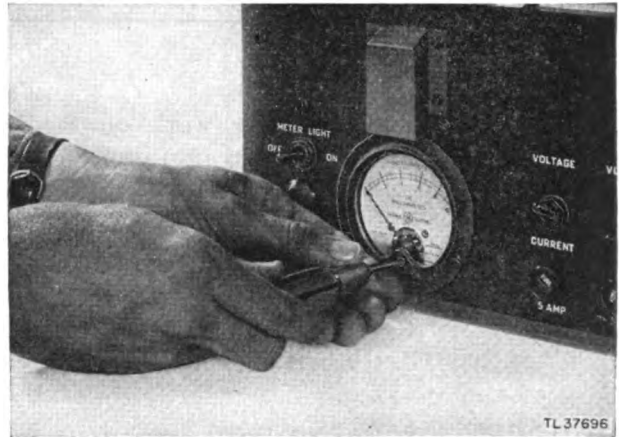


Figure 17. Method of zeroing meter.

MAINTENANCE ITEMS

40. General

a. Preventive maintenance work on Radio Equipment RC-150 is divided into nine special jobs or *Items* as follows:

<i>Item number</i>	<i>Item</i>
1.....	Interconnector.
2.....	Wavemeter.
3.....	Antenna matching section.
4.....	Receiver.
5.....	Transmitter.
6.....	Test oscilloscope.
7.....	Cords and cables.
8.....	Rotary coupling, cable No. 111, and antenna.
9.....	Mounting rack.

b. Each item begins with the *Preparatory Steps* section that should be read before attempting the actual maintenance work. The tools required are listed, followed by necessary precautionary measures for the protection of both men and equipment. The location of each component referred to in the items is illustrated.

c. The *Removal Procedure* section of most items describes the procedure followed in removing the operating components and replacing them with the spare components. A spare is furnished for each of the major components, and this is mounted in place of the operating component so that the operation time will be shared by both components. Maintenance is performed on the operating component, and when completed it is placed in the rack as a spare. Preventive maintenance will be performed on any one unit only once a month, and the units will be interchanged twice a month.

d. Under the heading *Maintenance Procedure*, the various operations are described in the order in which they should be performed. Where the proper method for doing the work is doubtful, refer to chapter 3 for a detailed explanation.

e. Information which is in other manuals and may prove useful here can be made readily avail-

able by inserting a reference to it in the *References* subparagraph.

41. Item 1—Interconnector  
(Control Unit BC-1162-A)

a. **PREPARATORY STEPS.** (1) *Tools and materials needed.*

- (a) Screw driver, 8-inch.
- (b) Screw driver, 2½-inch.
- (c) Allen wrench, No. 8.
- (d) Allen wrench, No. 6.
- (e) Oil, lubricating.
- (f) Cleaning brush, 1-inch.
- (g) Cloth, dry, clean.
- (h) Solvent, dry-cleaning (or carbon tetrachloride).

(2) *Safety precautions.*

(a) Be sure that all power is removed from the interconnector unit by throwing the main circuit breaker on the transmitter to the OFF position (fig. 18) and removing plug from a-c outlet (fig. 19).

(b) Avoid contact with the hot envelopes of the tubes for at least 5 minutes after the power has been turned off.

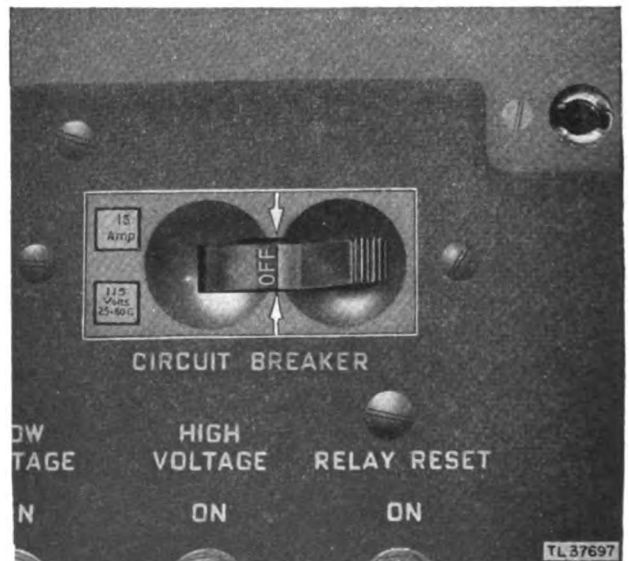


Figure 18. Circuit breaker on transmitter in OFF position.

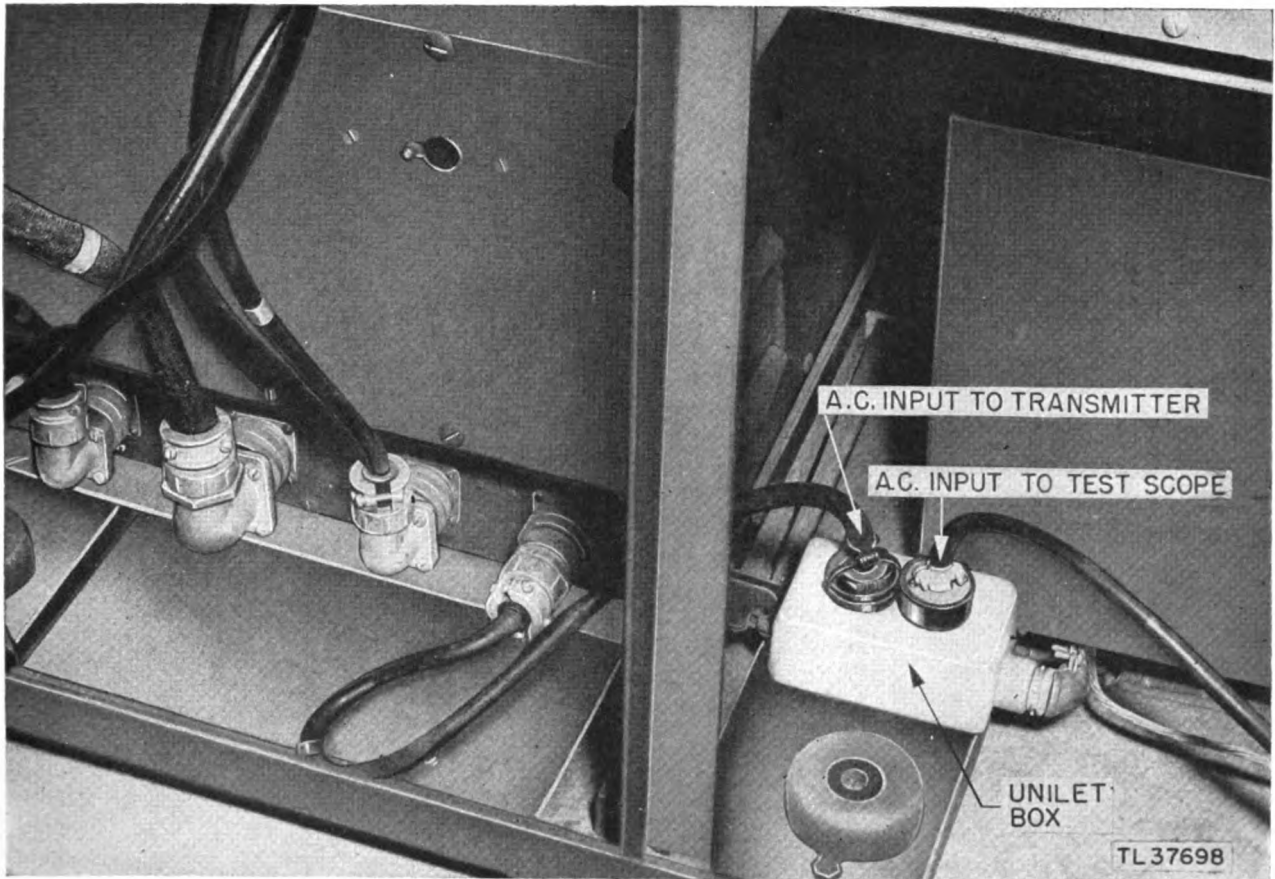


Figure 19. Unilet outlet at back of rack.



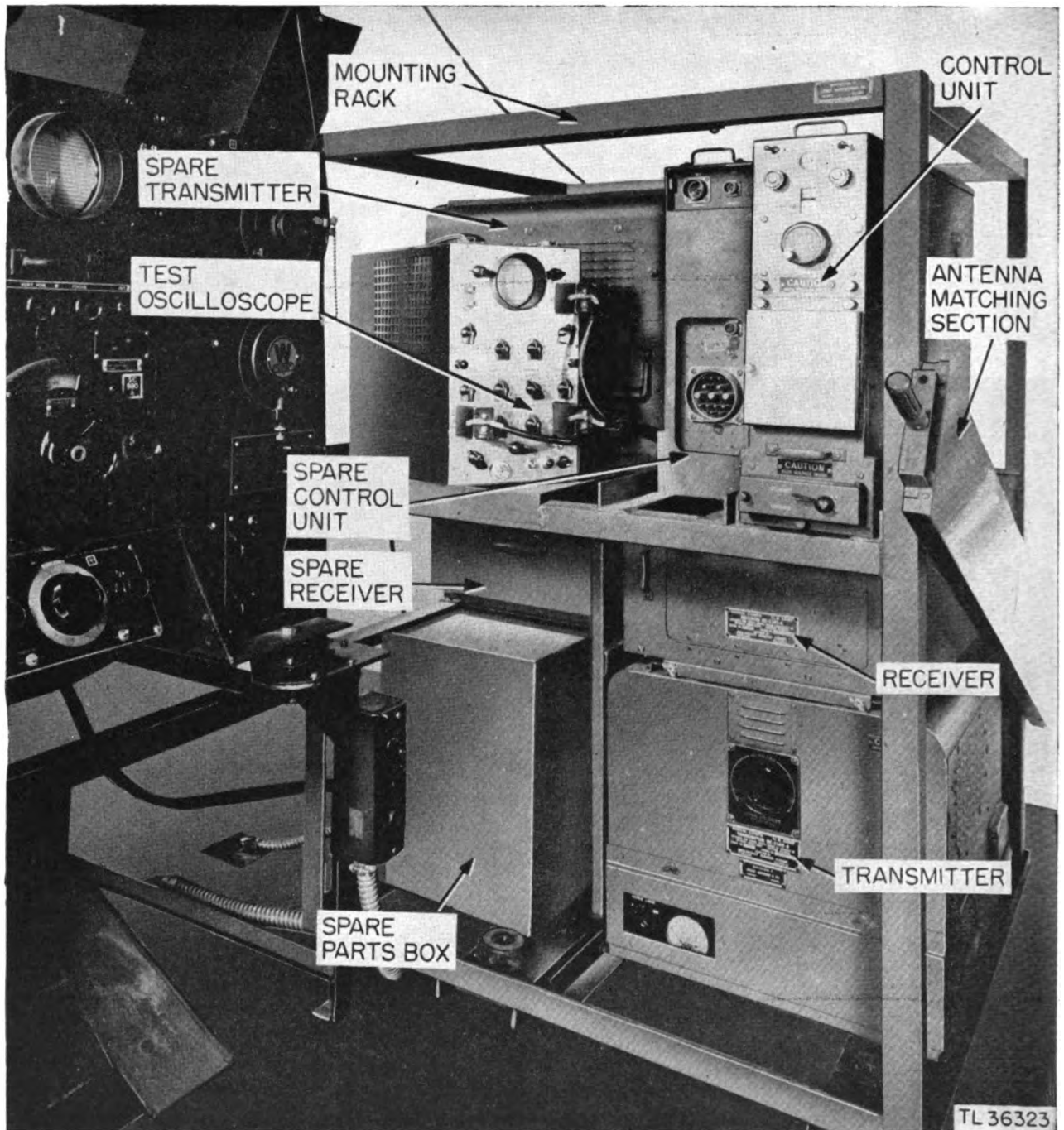


Figure 20. Radio Equipment RC-150 showing location of components.

(3) *Equipment cautions.* (a) Do not remove tubes from chassis except when scheduled.

(b) Close and secure cover doors on front panel when removing and lifting the interconnector unit.

(c) Never use water or steel wool for cleaning anything within the unit. The only cleaning agent to be used is the dry-cleaning solvent or carbon tetrachloride (par. 15).

(4) *Location* (fig. 20).

**b. REMOVAL PROCEDURE.**

(1) *To remove operating interconnector from case.* (a) Remove cables 109 and 101 from the rear of the interconnector chassis.

(b) Open the door covering STANDBY OPERATE switch.

(c) Turn the knurled screw, found under the door, until disengaged from interconnector case.

(d) Turn the knurled screws, found at the top of the interconnector panel, until disengaged.

(e) By means of the handle, located on the front panel, slide the interconnector chassis from its case.

(2) To remove spare interconnector from case. Follow the procedure used to remove the operating interconnector. No cables are attached to the spare interconnector.

(3) To mount spare interconnector into operating position. Reverse the removal procedure in (1) above.

**c. MAINTENANCE PROCEDURE.**

**FITC. TOP OF INTERCONNECTOR CHASSIS (fig. 21).**

(1) Feel the cases of all transformers and chokes for signs of overheating. This operation is to be done as soon as possible after the power to the interconnector has been turned off.

(2) Inspect the transformers and chokes for signs of overheating (par. 30).

(3) Inspect the tubes for proper seating in their sockets (par. 22).

(4) Inspect the oil-filled capacitors for leakage (par. 23).

(5) Inspect the cable connector pins for corrosion.

(6) Inspect all connections for proper soldering and tightness.

(7) Tighten all mountings, mounting screws, and holding brackets where necessary.

(8) Clean the top of the interconnector when necessary.

**ITC. UNDER SIDE OF INTERCONNECTOR CHASSIS (fig. 22).**

(1) Inspect the oil-filled capacitors for leakage (par. 23).

(2) Inspect the transformer stand-off insulators for cleanliness (par. 26).

(3) Inspect the gang switches for mechanical operation and tightness of contacts (par. 28).

(4) Inspect the setscrews and mountings on the TEST and SELECTOR switch shafts for tightness.

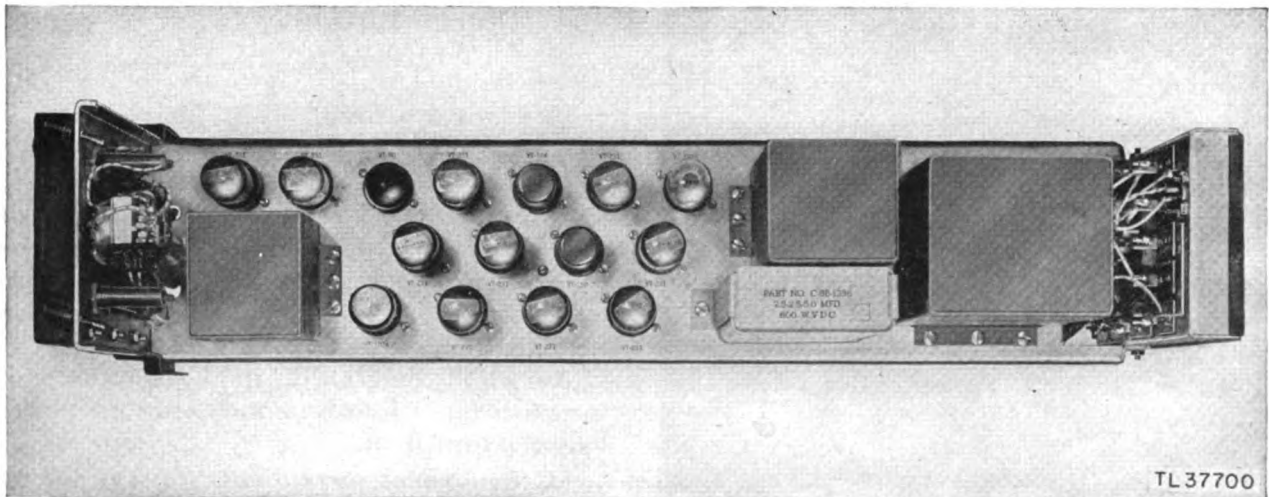


Figure 21. Interconnector—top.

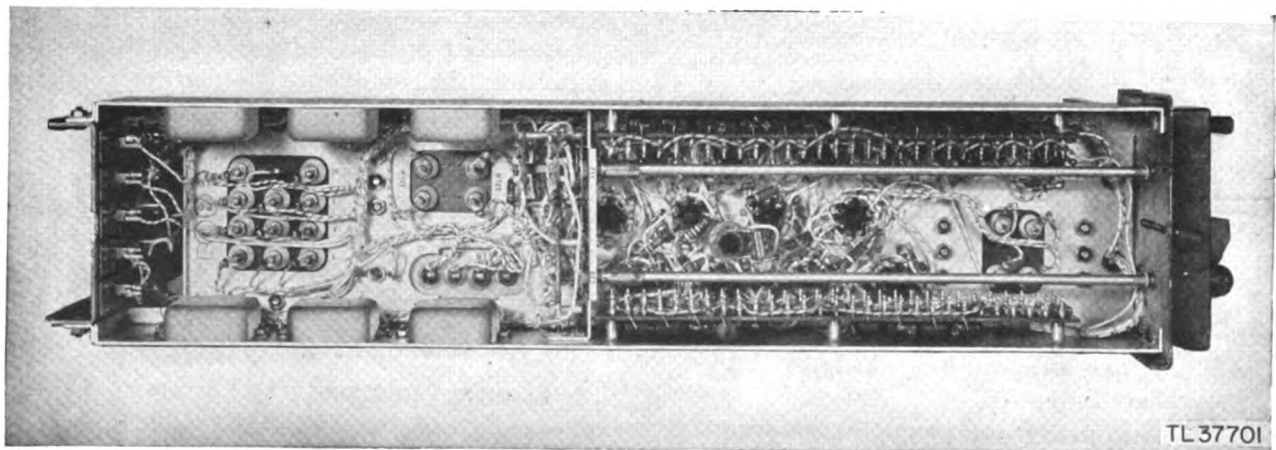


Figure 22. Interconnector—under side.

(5) Inspect the bodies of all resistors and capacitors with pig tail connections for excessive discoloration (pars. 23 and 24).

(6) Inspect all connections for proper soldering and tightness.

(7) Tighten all mountings, mountings screws, and tube sockets where necessary.

(8) Clean the under side of the interconnector when necessary.

**ITCL. FRONT PANEL OF INTERCONNECTOR (fig. 23).**

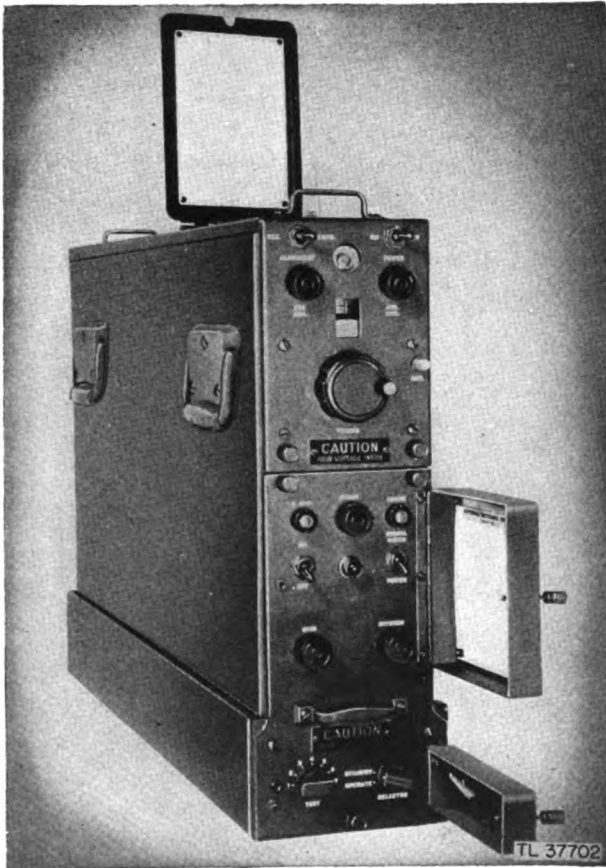


Figure 23. Interconnector—front panel.

(1) Inspect the mechanical operation of the potentiometers (par. 31).

(2) Inspect the pilot lamp for proper seating in socket.

(3) Inspect for presence and condition of spare fuse (par. 25).

(4) Inspect the mechanical operation of the toggle switches.

(5) Lubricate door hinges if necessary (par. 15).

(6) Tighten all mountings, locknuts, and set-screws where necessary.

(7) Clean the front panel of the interconnector.

**ITC. TUBES AND TUBE SOCKETS (par. 22).** *This is to be performed once every 3 months only.*

(1) Remove all tubes.

(2) Clean the envelopes, base pins, and sockets; if pins are corroded, use fine sandpaper.

(3) Test the tubes with tube checker.

(4) Replace tubes testing BAD and test the spare tubes to be used.

(5) Reinsert the tubes.

**d. REFERENCES.**

Page	( )	( )	( )	( )
Paragraph	( )	( )	( )	( )
TM 11-	( )	( )	( )	( )

**42. Item 2—Wavemeter (Control Unit BC-1162-A)**

**a. PREPARATORY STEPS.** (1) *Tools and materials needed.*

(a) Screw driver, 8-inch.

(b) Screw driver, 2 1/2-inch.

(c) Allen wrench No. 8.

(d) Allen wrench No. 6.

(e) Cleaning brush, 1-inch.

(f) Cloth, dry, clean.

(g) Solvent, dry-cleaning (or carbon tetrachloride).

(2) *Safety precautions.* (a) Be sure that all power is removed from the wavemeter unit by throwing the main circuit breaker on the transmitter to the OFF position (fig. 18), and remove the plug from the a-c outlet (fig. 19).

(b) Avoid contact with the hot envelopes of the tubes for at least 5 minutes after the power has been turned off.

(3) *Equipment precautions.* (a) Do not remove tubes from chassis except when scheduled.

(b) Do not allow wavemeter resonant line cylinder to become dented.

(c) Do not disturb any parts or wiring when inspecting the oscillator compartment of the wavemeter.

(d) Do not lubricate tuning gear assembly unless necessary (par. 15).

(e) Do not use water or steel wool for cleaning anything in the unit. The only cleaning agent to be used is the dry-cleaning solvent or carbon tetrachloride.

(4) *Location* (fig. 20).

**b. REMOVAL PROCEDURE.** (1) *To remove operating wavemeter from case.* (a) Remove cables 107 and 109 from the rear of the wavemeter chassis.

(b) Turn the knurled screws, located in the lower corners of the wavemeter front panel, until disengaged from the case.

(c) Grasp the handle on the top of the wavemeter and pull forward, sliding the wavemeter from its case.

(2) *To remove spare wavemeter from case.* Follow the procedure used to remove the operating wavemeter. No cables are attached to the spare wavemeter.

(3) *To mount spare wavemeter into operating position.* Reverse the removal procedure as in (1) above.

**c. MAINTENANCE PROCEDURE.**

**ITC. TOP OF WAVEMETER CHASSIS**  
(fig. 24).

(1) Inspect hinged panel and security of wavemeter chart.

(2) Tighten all mounting screws where necessary.

(3) Clean the top of wavemeter.

**ITC. UNDER SIDE OF WAVEMETER CHASSIS** (fig. 25).

(1) Inspect the tubes for proper seating in their sockets, including those in oscillator compartment. Remove side plates to make oscillator compartment accessible (par. 22).

(2) Inspect tuning gear assembly for corrosion.

(3) Inspect tuning gear assembly for mechanical operation.

(4) Inspect the pilot lamp for proper seating of bulb in its socket.

(5) Inspect the cable connector pins for corrosion.

(6) Inspect fastening of wavemeter diagram on inside of top panel for security.

(7) Inspect the bodies of resistors and capacitors with pig-tail connection for excessive discoloration (pars. 23 and 24).

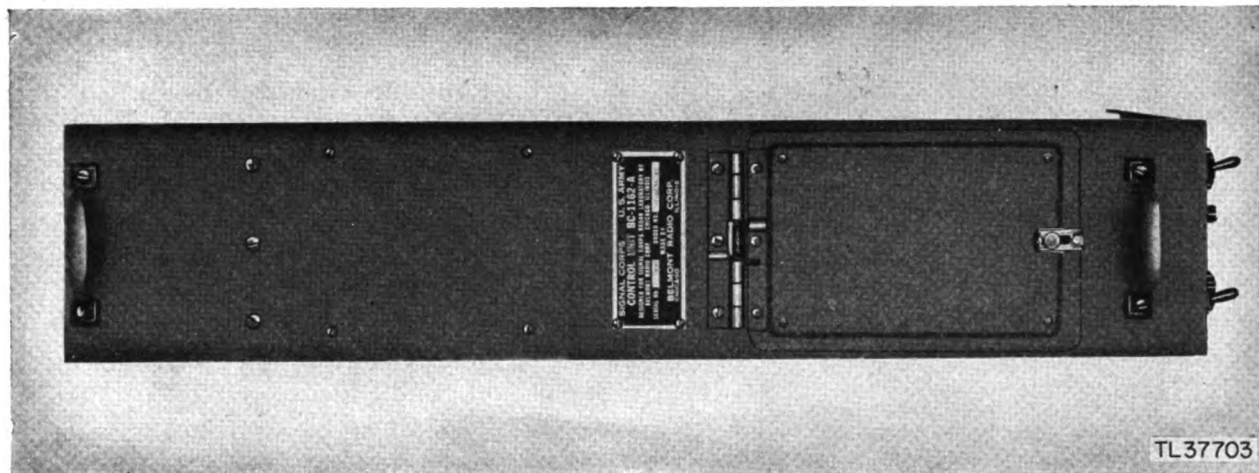


Figure 24. Wavemeter—top.

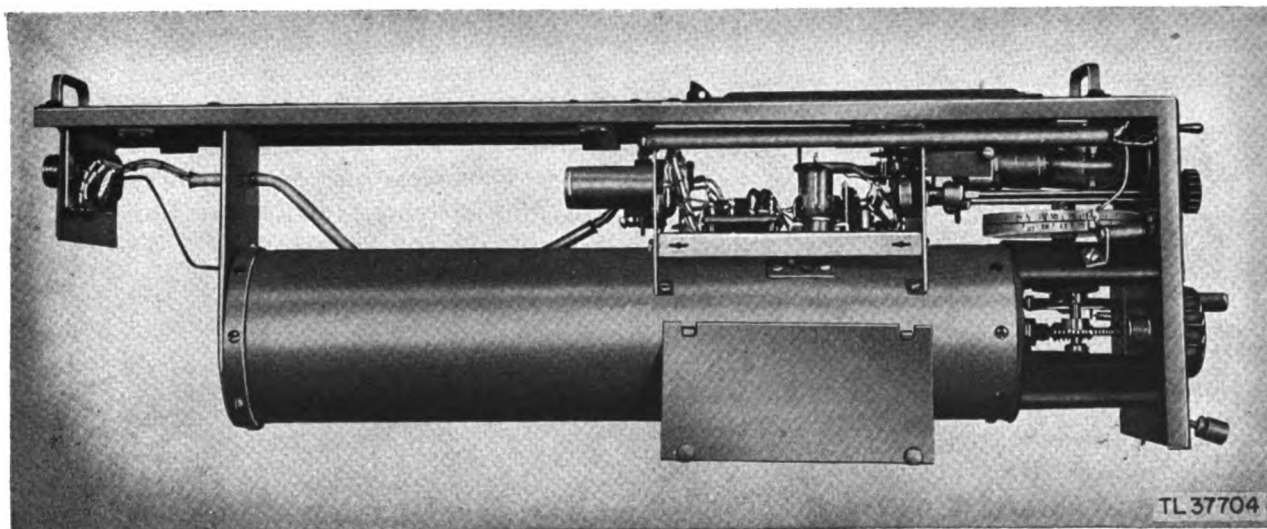


Figure 25. Wavemeter—under side.

- (8) Inspect the setscrews on the shaft of the potentiometer for tightness.
  - (9) Inspect the variable tuning capacitor for clearance of plates and mechanical operation.
  - (10) Inspect all connections for proper soldering and tightness.
  - (11) Tighten all mountings, screws, and holding brackets where necessary.
  - (12) Clean the under side of the wavemeter when necessary.
- ITC. FRONT PANEL OF WAVEMETER (fig. 26).

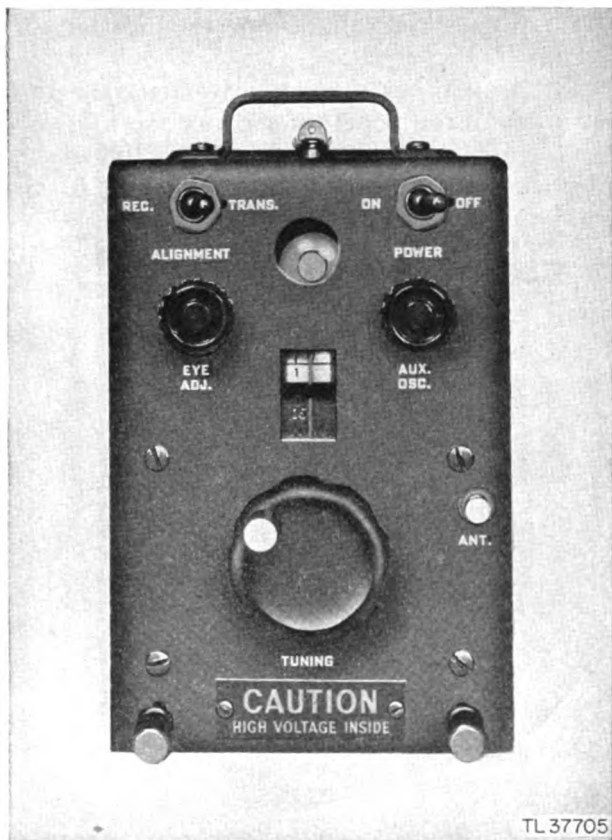


Figure 26. Wavemeter—front panel.

- (1) Inspect the mechanical operation of the toggle switches.
- (2) Inspect the antenna for corrosion.
- (3) Inspect the rubber grommet for proper seating.
- (4) Inspect the mechanical operation of the potentiometer, EYE ADJ control (par. 31).
- (5) Tighten all mountings and setscrews where necessary.
- (6) Clean the front panel of the wavemeter.

ITC. TUBE AND TUBE SOCKETS (par. 22). This is to be performed once every 3 months only.

- (1) Remove all tubes.
- (2) Clean the envelopes, base pins, and sockets; if pins are corroded, use fine sandpaper.
- (3) Test the tubes with tube checker.
- (4) Replace tubes testing BAD and test the spare tubes to be used.
- (5) Reinsert the tubes.

d. REFERENCES.

Page	( )	( )	( )	( )
Paragraph	( )	( )	( )	( )
TM 11-	( )	( )	( )	( )

### 43. Item 3—Antenna Matching Section MC-414-A

a. PREPARATORY STEPS. (1) Tools and materials needed.

- (a) Screw driver, 8-inch.
- (b) Screw driver, 2½-inch.
- (c) Pliers, side-cutting, 8-inch.
- (d) Crocus cloth.
- (e) Cleaning brush, 1-inch.
- (f) Cloth, dry, clean.
- (g) Solvent, dry-cleaning (or carbon tetrachloride).

(2) Safety precautions. Be sure that all power is removed from the unit by throwing the main circuit breaker on the transmitter to the OFF position (fig. 18) and by removing the plug from the a-c outlet (fig. 19).

(3) Equipment precautions. (a) When removing the coaxial lines from the antenna matching section, handle them carefully (par. 34).

- (b) Do not oil any part of matching section.
- (4) Location (fig. 20).

b. REMOVAL PROCEDURE. (1) To remove the antenna matching section from the rack. (a) Remove cables 104, 105, and 106 from the lower end of the matching section.

(b) Remove the four bolts holding the antenna matching section to the rack.

(2) To remove the cover from the antenna matching section. (a) Remove the 16 screws from the sides of the case.

(b) Remove the one screw from the top center of the case.

(c) Lift the cover off.

(3) To replace antenna matching section. Reverse removal procedure listed above.

Note. Complete the F, I, T, C, A, L operations on the antenna matching section before starting on the receiver and transmitter, and replace the matching section after spare receiver and transmitter have been put into operating position.

**ITC. INSIDE OF ANTENNA MATCHING SECTION (fig. 27).**

(1) Inspect the trombones for dirt or signs of corrosion.

(2) Inspect the three soldered connections at the bottom of the case.

(3) Tighten all bolts and mountings where necessary.

(4) Clean the inside of the case.

**ITC. OUTSIDE OF ANTENNA MATCHING SECTION (fig. 28).**

(1) Tighten the screws on the outside of the case when necessary.

(2) Clean the outside of the case.

**44. Item 4—Receiver BC-1161-A**

**a. PREPARATORY STEPS.** (1) *Tools and materials needed.*

(a) Screw driver, 8-inch.

(b) Screw driver, 2½-inch.

(c) Allen wrench, No. 6.

(d) Allen wrench, No. 8.

(e) Cleaning brush, 1-inch.

(f) Cloth, dry, clean.

(g) Solvent, dry-cleaning (or carbon tetrachloride).

(2) *Safety precautions.* (a) Be sure that all power is removed from the receiver unit by throwing the main circuit breaker on the transmitter to the OFF position (fig. 18) and remove plug from a-c outlet (fig. 19).

(b) Avoid contact with the hot envelopes of the tubes for at least 5 minutes after the power has been turned off.

(3) *Equipment cautions.* (a) Do not remove tubes from chassis except when scheduled.

(b) Do not stand receiver chassis on amphenol plugs in rear or on side with nameplate attached.

(c) Do not oil the gear assemblies unless necessary (par. 15).

(d) Never use water or steel wool for cleaning anything in the unit. Carbon tetrachloride or dry-cleaning solvent is the only cleaning agent to be used (par. 15).

(4) *Location* (fig. 20).

**b. REMOVAL PROCEDURE.** (1) *To remove operating receiver from rack and chassis from case.*

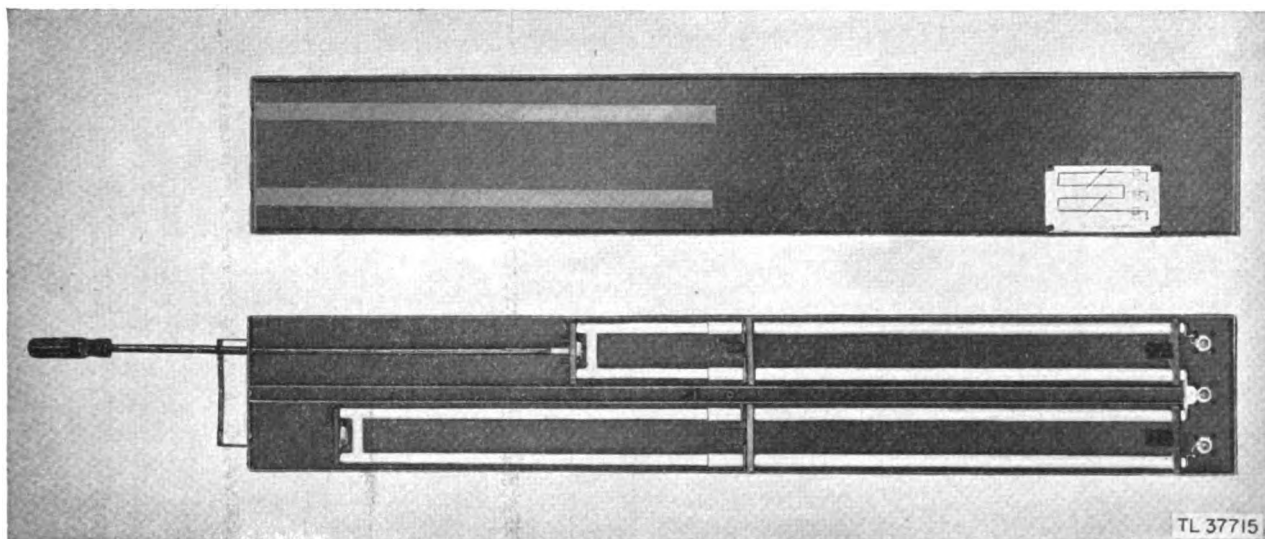


Figure 27. Antenna matching section—inside.

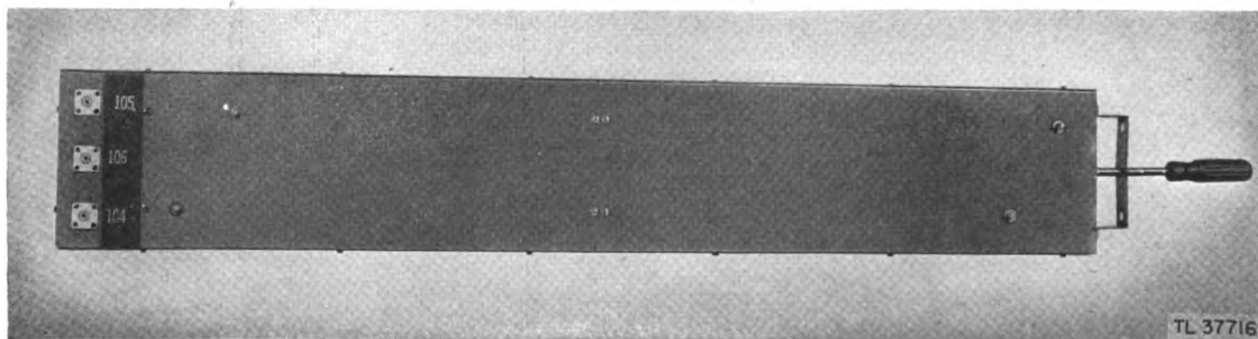


Figure 28. Antenna matching section—outside.

(a) Disconnect cables 101-E, 102, and 105 from rear panel.

(b) Remove the two wingnuts from the lower front of the receiver.

(c) Pull the receiver forward to disengage the two mounting screws on the lower front of the panel.

(d) Lift the receiver to disengage the four mounting studs from the key-ways and pull out through side of frame where the antenna matching section has been removed.

(e) To remove receiver chassis from case, unscrew the four screws at the extreme bottom of the front of the case and three screws at the extreme bottom of each side. Also remove the four screws from the rear of case just above the cable outlet panel.

(f) Lift case evenly off chassis, making sure front panel door is closed.

(g) The bottom plate may now be taken off by removing the 14 screws holding this baseplate to the chassis.

(2) To remove spare receiver from rack. (a) The receiver front is facing the center of the rack.

(b) Remove wingnuts from front of receiver and push forward to clear the keyways. Lift up and out.

(3) To place spare receiver in operating position. Reverse the removal procedure as described in (1) above, placing the receiver in position after the transmitter has been replaced as described in Item 5.

### c. MAINTENANCE PROCEDURE.

FIG. 29. TOP OF RECEIVER CHASSIS (fig. 29).

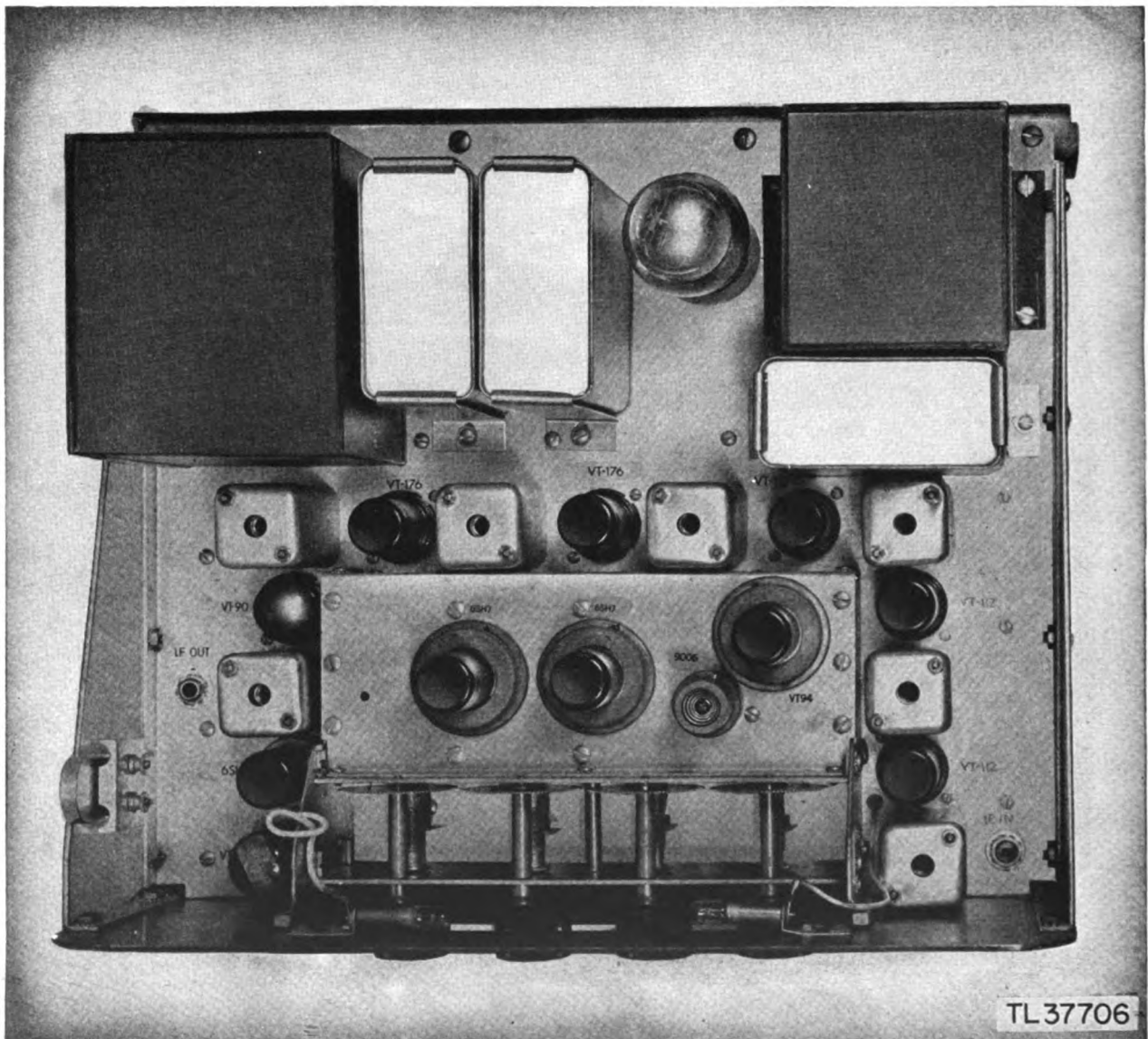


Figure 29. Receiver—top.

(1) Feel transformer and choke for overheating. This is to be done immediately after removal of the receiver case, and as soon as possible after the power has been shut-off (par. 30).

(2) Inspect transformer and choke for signs of overheating.

(3) Inspect for tightness both the metal lock rings and the shields which hold the tubes on top of the r-f compartment (par. 22).

(4) Inspect oil-filled capacitors for leakage (par. 23).

(5) Inspect the r-f tuning assembly for mechanical action. Do not lubricate unless necessary.

(6) Inspect moving parts for corrosion.

(7) Inspect dial lights for proper seating in socket.

(8) Inspect all connections for proper soldering and tightness.

(9) Tighten all mountings, screws, and holding brackets where necessary.

(10) Clean the top side of the receiver when necessary.

#### ITC. UNDER SIDE OF RECEIVER CHASSIS (fig. 30).

(1) Inspect oil-filled capacitors for leakage (par. 23).

(2) Inspect the bodies of resistors and capacitors with pig tail connections for discoloration (pars. 23 and 24).

(3) Inspect stand-off insulators for cleanliness.

(4) Inspect the small r-f heater choke coils for cleanliness.

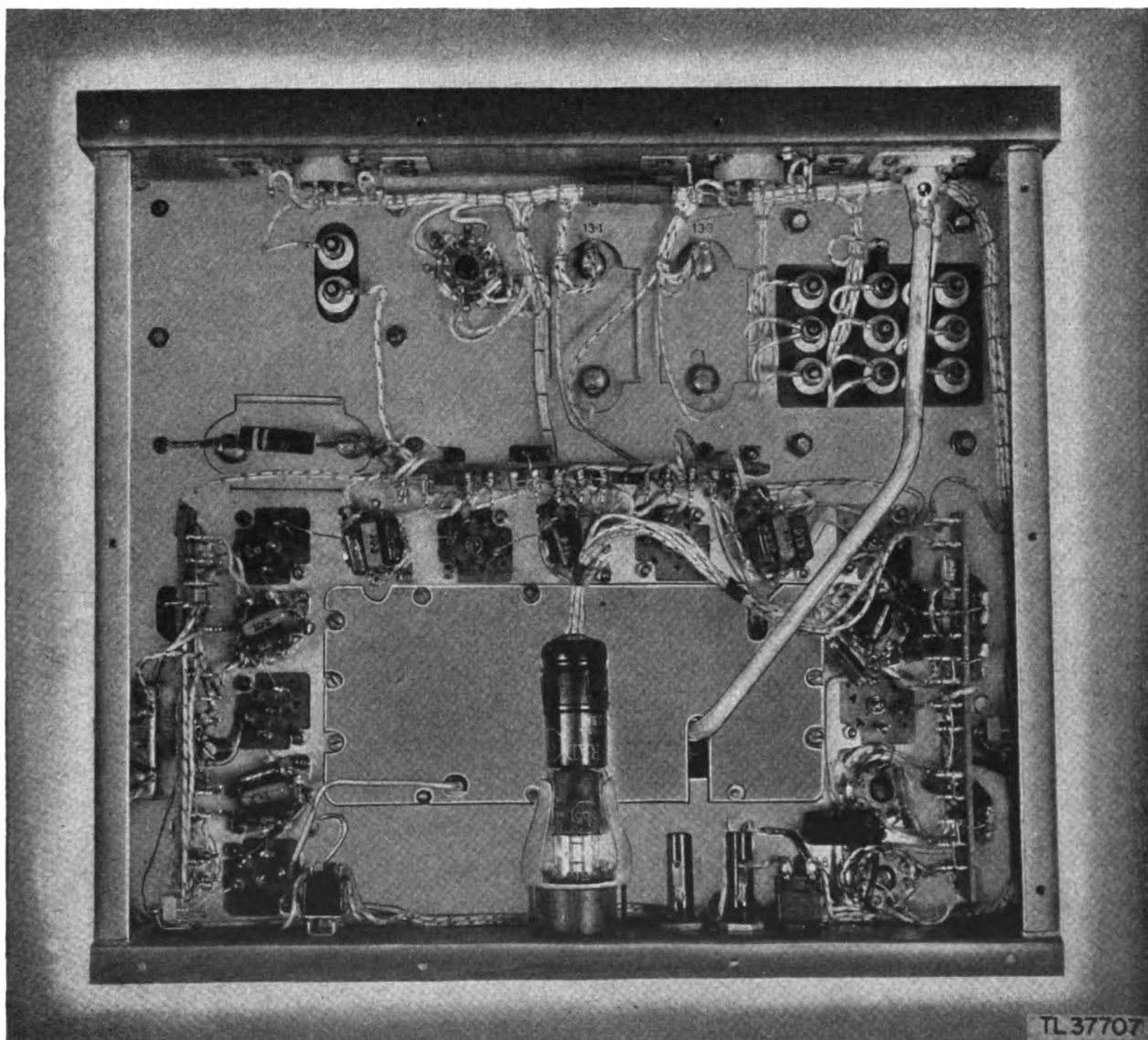


Figure 30. Receiver—under side.



(5) Inspect the cable connector pins for corrosion.

(6) Inspect all connections for proper soldering and tightness.

(7) Tighten all mountings, screws, and holding brackets where necessary.

(8) Clean the under side of the receiver where necessary.

#### ITC. FRONT PANEL OF RECEIVER

(fig. 31).

(1) Inspect switches for mechanical operation (par. 28).

(2) Inspect for presence and condition of spare fuse (par. 25).

(3) Tighten all mountings, screws, and set-screws on tuning knobs where necessary.

(4) Clean the front panel of the receiver.

#### ITC. TUBE AND TUBE SOCKETS (par. 22). *This is to be performed once every 3 months only.*

(1) Remove all tubes.

(2) Clean the envelopes, base pins, and sockets; if pins are corroded, use fine sandpaper.

(3) Test the tubes with tube checker.

(4) Replace tubes testing BAD and test the spare tubes to be used.

(5) Reinsert the tubes.

#### d. REFERENCES.

Page	( )	( )	( )	( )
Paragraph	( )	( )	( )	( )
TM 11-	( )	( )	( )	( )

#### 45. Item 5—Transmitter BC-1160-A

a. PREPARATORY STEPS. (1) *Tools and materials needed.*

(a) Screw driver, 8-inch.

(b) Screw driver, 2½-inch.

(c) Oil, lubricating.

(d) Cleaning brush, 1-inch.

(e) Cloth, dry, clean.

(f) Solvent, dry-cleaning (or carbon tetrachloride).

(2) *Safety precautions. Failure to observe the following warnings may result in serious injury or death.* (a) Be sure that all power is removed from the transmitter unit by throwing the main circuit breaker on the transmitter to the OFF position (fig. 18), and removing the plug from the a-c outlet (fig. 19).

(b) Short the high-voltage terminal of capacitor No. 11 to ground before performing maintenance on the under side of the transmitter.

(c) Avoid contact with the hot envelopes of

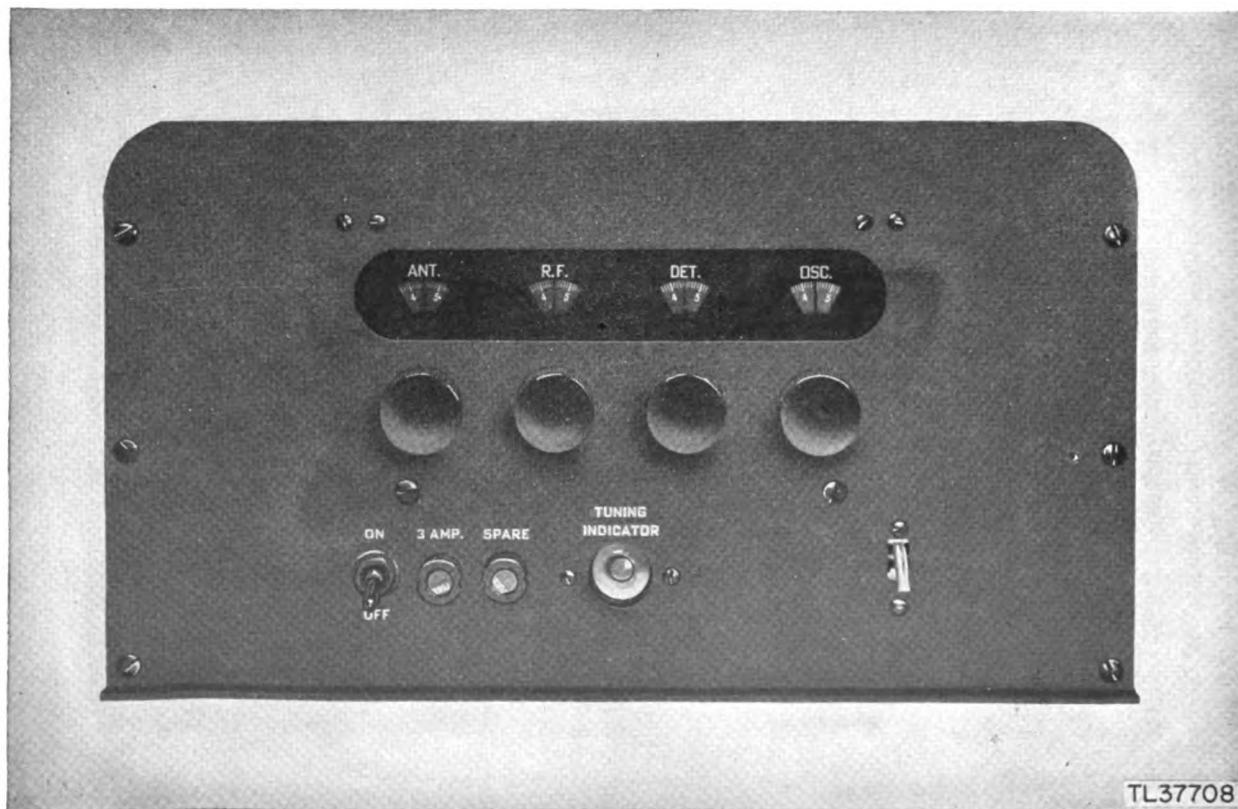


Figure 31. Receiver—front panel.

the tubes for at least 5 minutes after the power has been turned off.

(3) *Equipment cautions.* (a) Do not remove tubes from chassis unless scheduled.

(b) Never use water for cleaning anything within the unit. The only cleaning agent to be used is carbon tetrachloride or dry-cleaning solvent (par. 15).

(c) When inspecting the resistors and capacitors with pig tails, the soldered connections, or the wiring on the under side of the transmitter chassis, do not shift the position of the leads or parts.

(4) *Location* (fig. 20).

#### b. REMOVAL PROCEDURE.

(1) *To remove operating transmitter from rack.* (a) Both the antenna matching section and the operating receiver should be removed from the rack before attempting to remove the transmitter.

(b) Remove cables 102, 103, 104, 107, and 101-B from rear of the transmitter.

(c) Loosen wingnut at rear right of rack and slide the locking bar back to release the mounting studs of the transmitter. The transmitter may then be removed from the rack.

(d) *To remove the transmitter from its case:*

1. Take off the right-hand vent panel by turning the four shock-proof fasteners 90° counterclockwise. Reach inside the cabinet and disconnect the a-c plug of the blower motor by turning it one-half turn counterclockwise and pulling it out.
2. Remove the screw in the center of the HIGH-VOLTAGE CONTROL knob and remove the knob.
3. Remove the four mounting studs from the side (lower edge) of the case.
4. Remove the four screws from the sides (lower edge) of the case.
5. Remove three screws from rear of case (just above cable outlets).
6. Lift case off evenly.
7. Remove bottom plate by placing the transmitter on its side and removing the six screws from front bottom and rear bottom of transmitter (below cable outlets).

(2) *To remove spare transmitter from rack.*

(a) Unlock wingnuts on runners and slide locking assembly until slots are open.

(b) Lift the transmitter from its position in the rack.

(3) *To install spare transmitter in operating*

*position.* Reverse removal procedure given under (1) above and replace receiver and antenna matching section after maintenance has been performed on the latter.

#### FITC. TOP OF TRANSMITTER CHASSIS (fig. 32).

(1) Feel the transformers and chokes for signs of overheating. This must be done as soon as possible after the power is turned off.

(2) Inspect transformers and chokes for signs of overheating (par. 30).

(3) Inspect tubes for firmness of mounting in sockets and tightness of cap connections and tube shields (par. 22).

(4) Inspect the variac for general condition of winding and general condition of brush (par. 32).

(5) Inspect the tension of the variac brush.

(6) Inspect the interlock switches for mechanical operation (par. 28).

(7) Inspect the mechanical operation of the vernier tuning shaft.

(8) Remove covers from relays and inspect the relays for mechanical operation. Do not disturb the tension of the spring settings (par. 27).

(9) Inspect the condition of the relay contacts.

(10) Inspect all connections for proper soldering and tightness.

(11) Tighten all mountings, setscrews, and holding brackets where necessary.

(12) Clean the top of the transmitter where necessary.

#### FITC. UNDER SIDE OF TRANSMITTER CHASSIS (fig. 33).

(1) Feel power transformer for signs of overheating.

(2) Inspect power transformer for signs of overheating (par. 30).

(3) Inspect high-voltage capacitor No. 11 for signs of overheating (par. 27).

(4) Clean the porcelain high-voltage bushing of capacitor No. 11 (par. 23).

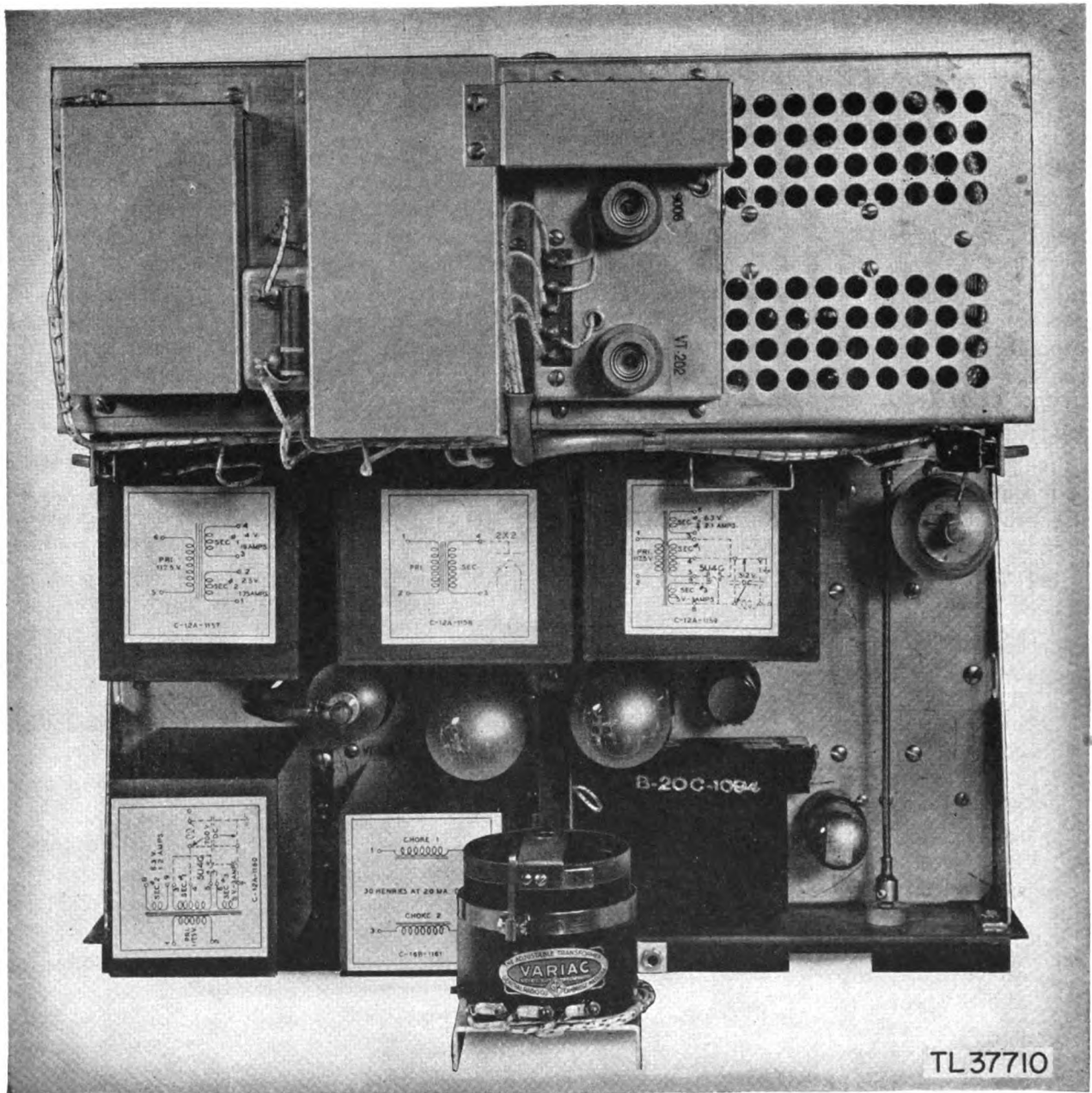
(5) Clean the porcelain high-voltage bushings on transformers Nos. 130, 131, 132, 133, 134, and 135 (par. 30).

(6) Clean the porcelain terminal board.

(7) Inspect the oil-filled capacitors for signs of leakage (ch. 3, par. 23).

(8) Inspect the interlock switch for mechanical operation (par. 28).

(9) Inspect resistors and capacitors with pig tail connections for excessive discoloration (pars. 23 and 24).



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Figure 32. Transmitter—top.

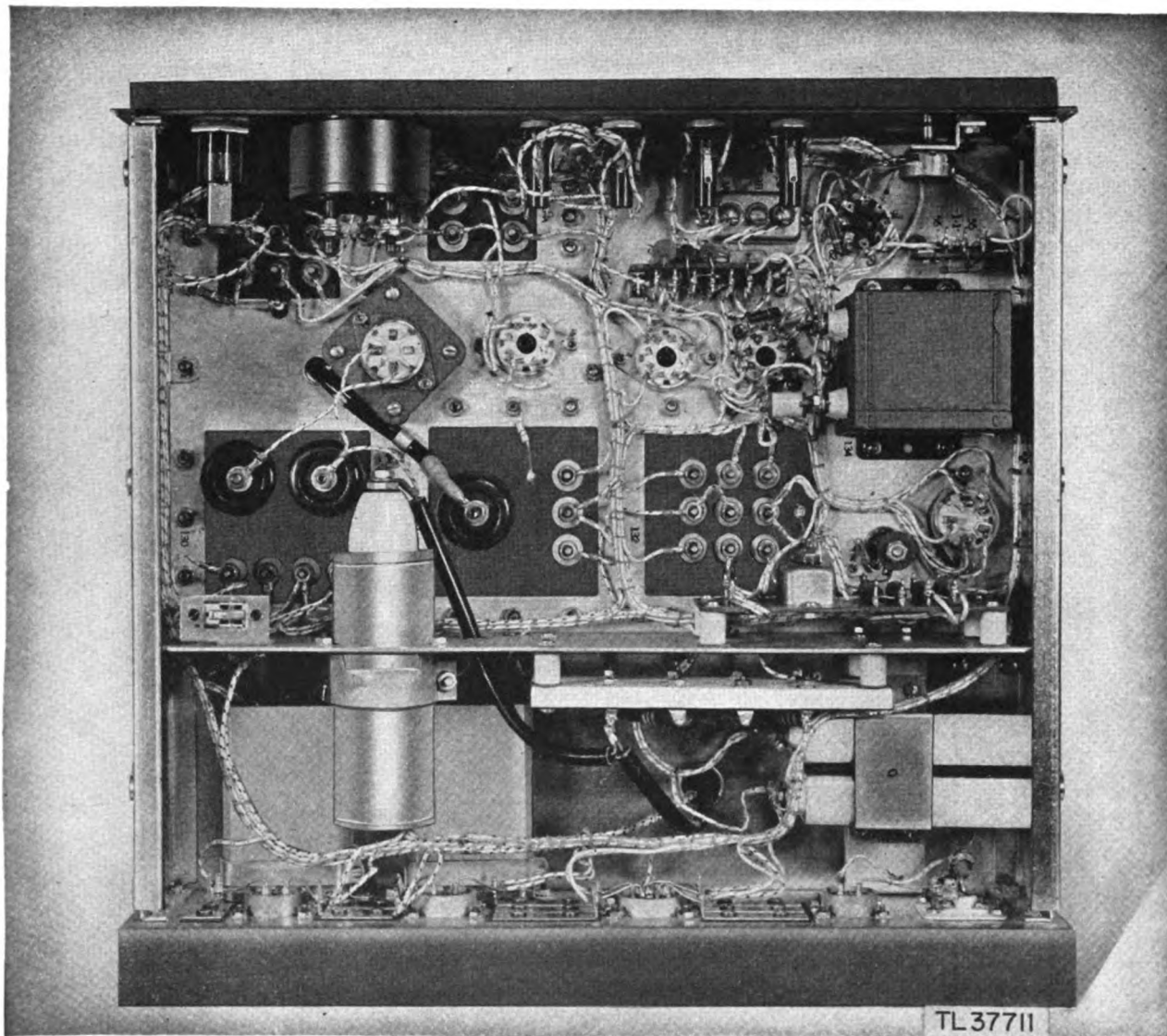


Figure 33. Transmitter—under side.

(10) Inspect the pilot-light lamp for proper seating in socket (par. 35).

(11) Tighten all mountings, setscrews, and holding brackets where necessary.

(12) Clean the bottom side of the transmitter chassis where necessary.

#### ITC. BACK OF TRANSMITTER CHASSIS (fig. 34).

(1) Remove cover of oscillator compartment and clean the procelain high-voltage bushings and supports (par. 26).

(2) Inspect the lecher lines for signs of corrosion.

(3) Inspect the mechanical action of the interlock switch (par. 28).

(4) Inspect resistors and capacitors with pig tail connections for signs of overheating (pars. 23 and 24).

(5) Inspect the two oscillator tubes for firmness of mounting in sockets (par. 22).

(6) Inspect all connections for proper soldering and tightness.

(7) Tighten all mountings, setscrews, and holding brackets where necessary.

(8) Clean the back of the transmitter chassis where necessary.

#### ITCA. FRONT PANEL OF TRANSMITTER CHASSIS (fig. 35).

(1) Inspect the meter lamp for proper seating in socket (par. 35).

(2) Inspect the mechanical action of the toggle switches and the circuit breaker (par. 28).

(3) Adjust the zeroing of the meter (par. 38).

(4) Inspect the fuses for tightness in holder and check for presence of spare fuses (par. 25).

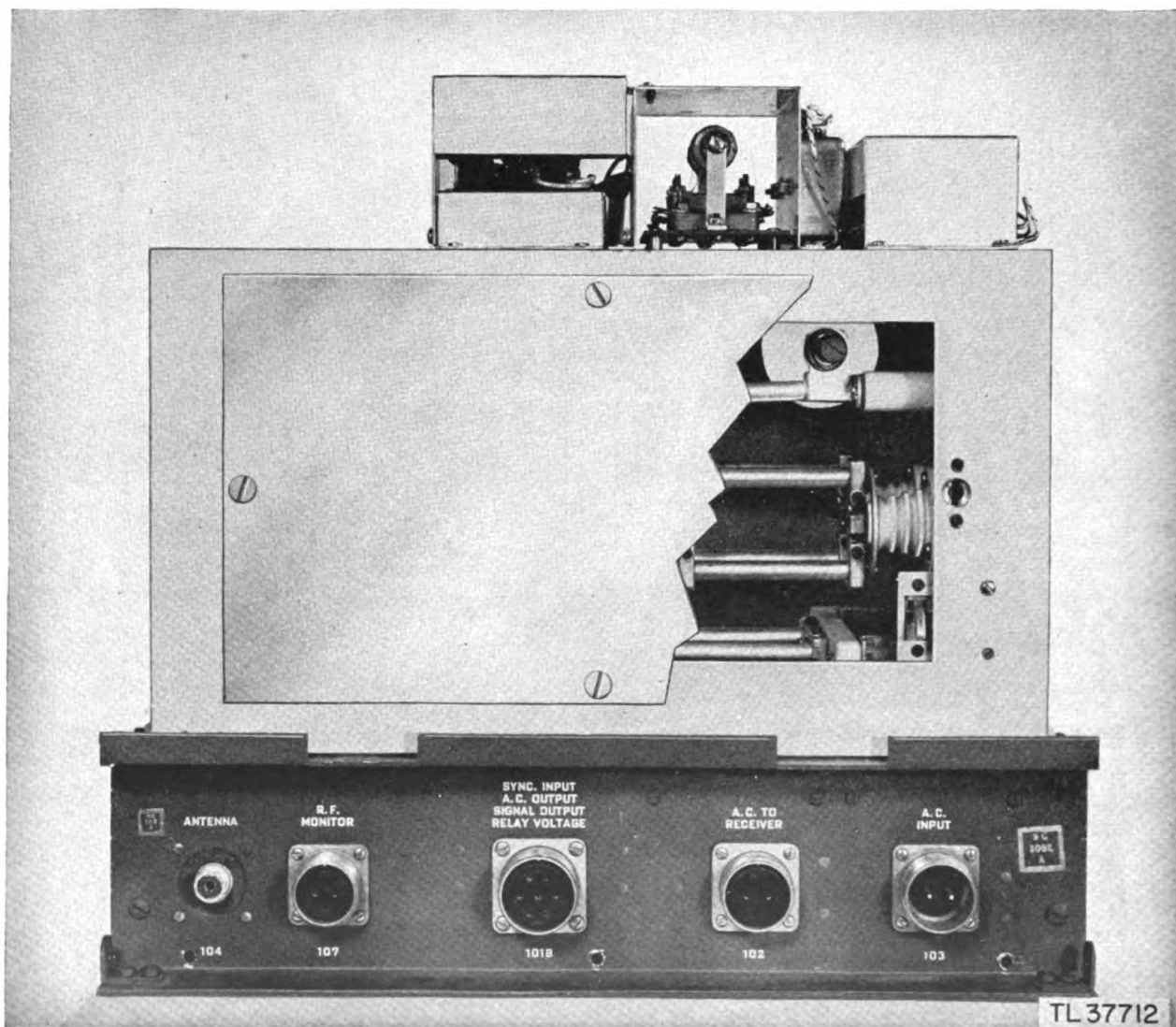


Figure 34. Transmitter—back.

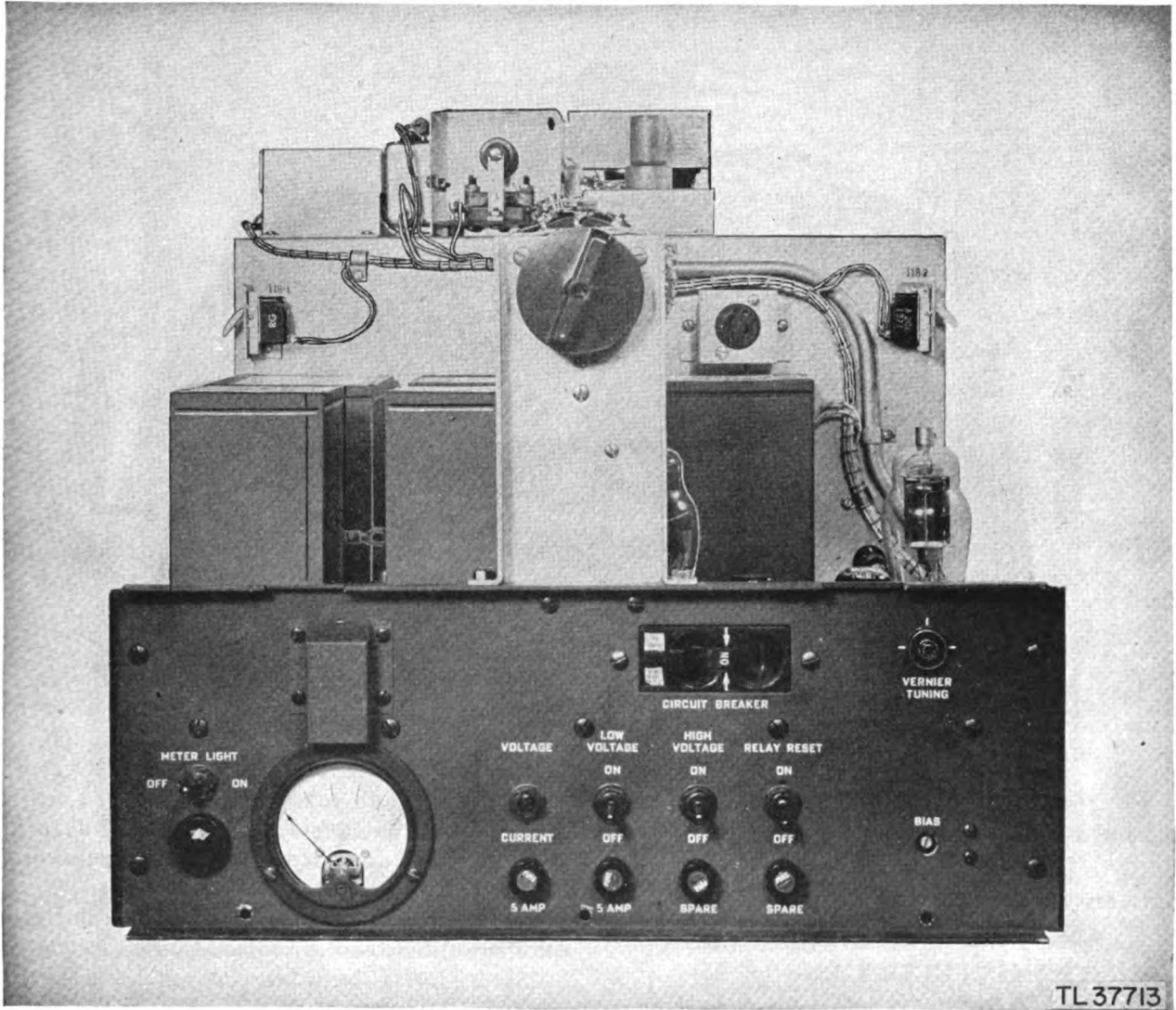


Figure 35. Transmitter—front panel.

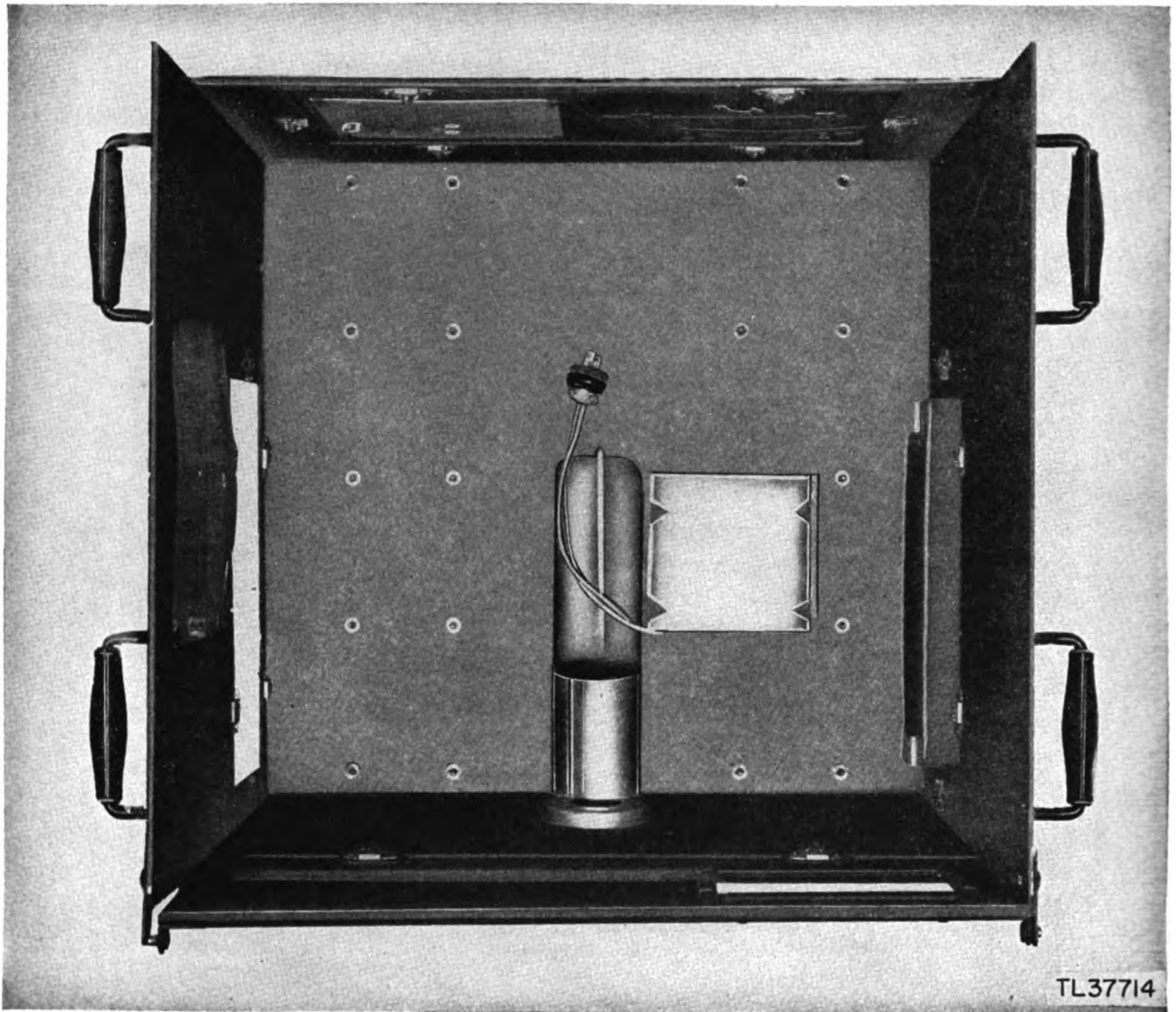


Figure 36. Transmitter case.

(5) Inspect the bias control and vernier tuning for mechanical action (par. 31).

(6) Tighten all mountings, screws, and brackets where necessary.

(7) Clean the front of the transmitter chassis.

**ITC. TRANSMITTER CASE (fig. 36).**

(1) Inspect the blower motor for signs of overheating. This must be done as soon as possible after the power is turned off (par. 29).

(2) Inspect the air filters for dirt accumulation (par. 36).

(3) Clean the inside and outside of the case.

(4) Tighten all mountings, screws, and brackets where necessary.

**ITC. TUBES AND TUBE SOCKETS IN THE TRANSMITTER (par. 22).** *This is to be performed once every 3 months only.*

(1) Remove all tubes.

(2) Clean the envelopes, base pins, and sockets; if pins are corroded, use fine sandpaper.

(3) Test the tubes with tube checker.

(4) Replace tubes which test BAD and test the spare tubes used as replacement.

(5) Re-insert the tubes.

**L. BLOWER MOTOR.** Once every 3 months only.

(1) Remove the four screws holding motor and bracket to top of case and lift out the entire mounting.

(2) Lubricate blower motor (par. 15 and par. 29).

**c. REFERENCES.**

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Paragraph	( )	( )	( )	( )
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## 46. Item 6—Test Oscilloscope, I-134-B

**a. PREPARATORY STEPS.** (1) *Tools and materials needed.*

- (a) Screw driver, 21/2-inch.
- (b) Cleaning brush, 1-inch.
- (c) Cloth, dry, clean.

(2) *Safety precautions. Failure to observe the following warnings may result in serious injury or death.* (a) Be sure that all power is removed from the test scope by removing the plug from the a-c outlet (fig. 19).

(b) Remove the three leads from the interconnector to the scope (fig. 20).

(3) *Equipment cautions.* (a) Do not remove tubes from chassis unless scheduled.

(b) Do not use water for cleaning anything in the oscilloscope. Use only dry-cleaning solvent or carbon tetrachloride (par. 15).

(4) *Location* (fig. 20).

**b. REMOVAL PROCEDURE.** (1) *To remove test scope from its case.* (a) A-c cable and leads have been removed as in (2) (a) and (b) above.

(b) Remove the two screws from the back of the case.

(c) Remove the seven small round head screws from around the edge of the upper part of the front panel and carefully slide the chassis out of the case.

(2) *To replace test scope in case.* Reverse the procedure in (1) above.

**ITCA. FRONT PANEL OF SCOPE** (fig. 37).

(1) Inspect the switches and potentiometers for proper mechanical action (pars. 28 and 31).

(2) Inspect the pilot light for cracked shield.

(3) Inspect for presence and condition of fuse (par. 25).

(4) Tighten all knobs and mounting screws where necessary.

(5) Clean front panel and face of cathode-ray tube.

(6) Adjust plastic screen on face of cathode-ray tube for proper centering.

**ITC. CASE OF SCOPE AND A-C CORD.**

(1) Inspect the case for general condition.

(2) Inspect the condition of the handle and buckles on top of case.

(3) Inspect the a-c cord for worn insulation.

(4) Tighten all mounting bolts where necessary.

(5) Clean case.

**ITC. TOP AND BACK PANEL OF SCOPE CHASSIS** (fig. 38). *This is to be performed once every 3 months only.*

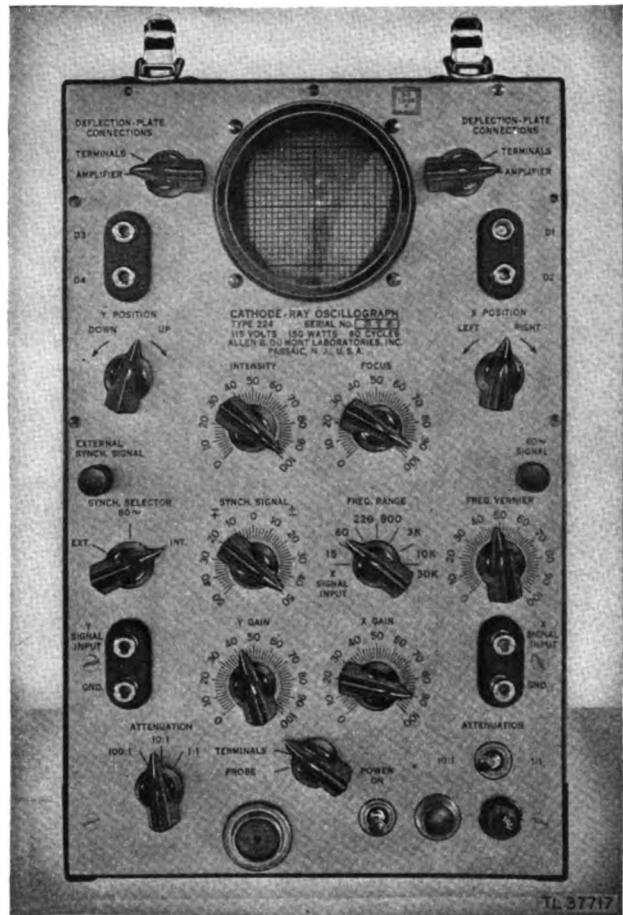


Figure 37. Test scope—front panel.

(1) Tubes and tube sockets (par. 22).

(a) Remove all tubes.

(b) Clean the envelopes, base pins, and sockets; if the pins are corroded use fine sandpaper.

(c) Test the tubes with tube checker.

(d) Replace tubes which check BAD and test the spare tubes to be used.

(e) Re-insert the tubes.

(2) Inspect oil-filled capacitors for leakage.

(3) Inspect the bodies of all resistors and capacitors with pig tail connections for signs of overheating (pars. 23 and 24).

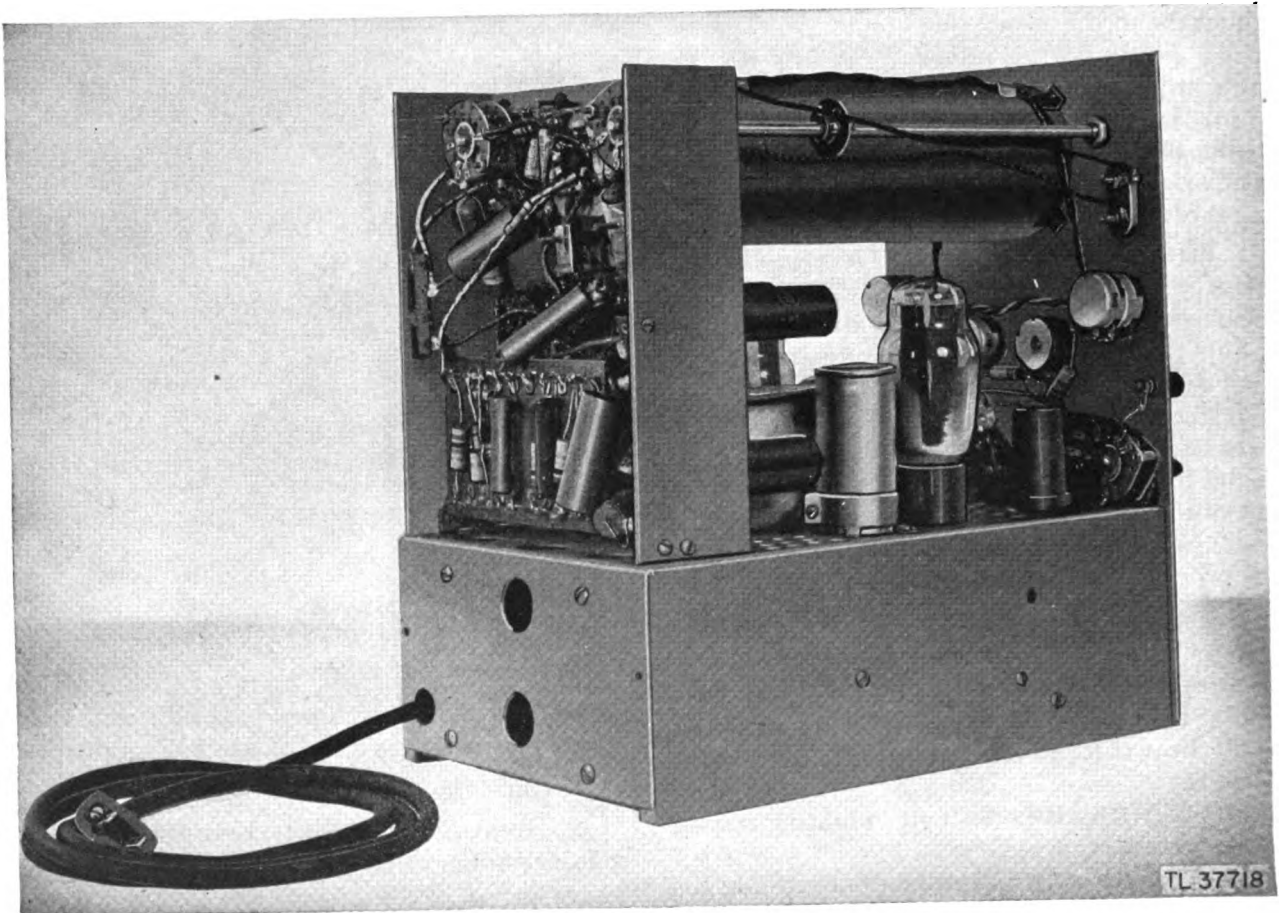
(4) Inspect the gang switch for mechanical operation and tightness of contacts (par. 28).

(5) Inspect all connections for proper soldering and tightness.

(6) Tighten all mountings, mounting brackets, setscrews, and locknuts where necessary.

(7) Clean the top and back panel of the chassis.





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*Figure 38. Test scope—rear.*

ITC. UNDER SIDE OF SCOPE (fig. 39)  
*This is to be performed once every 3 months only.*

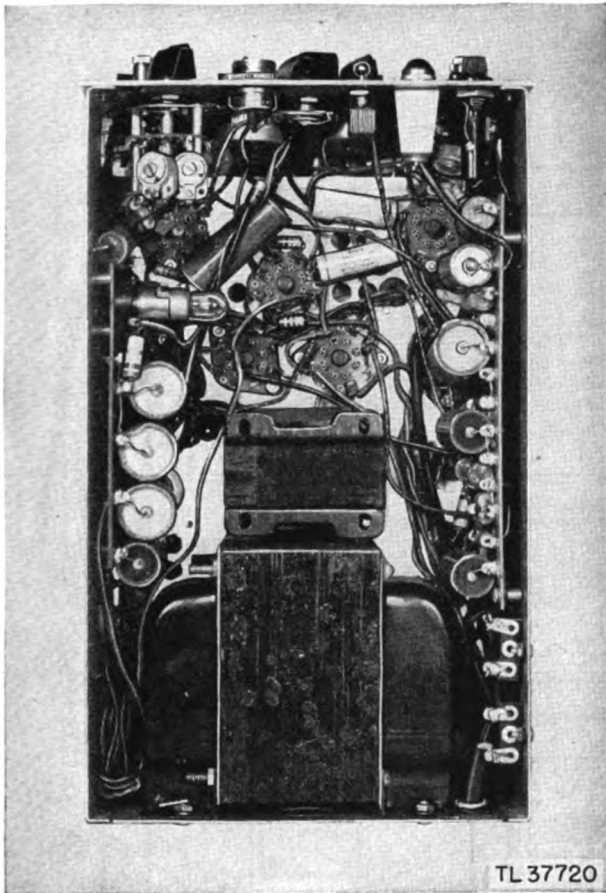


Figure 39. Test scope—under side.

(1) Inspect the transformer and choke for signs of overheating (par. 30). This must be done as soon as possible after power is turned off.

(2) Inspect the gang switch for mechanical operation and tightness of contacts (par. 28).

(3) Inspect the neon bulb and pilot lamp for proper seating in the socket.

(4) Inspect all connections for proper soldering and tightness.

(5) Tighten all mountings, mounting brackets, setscrews, and locknuts where necessary.

(6) Clean the under side of the chassis.

#### 47. Item 7—Cords and Cables

(Nos. 101-B, C, D, E, 102, 103, 104, 105, 106, 107, and 109). (par. 34).

##### a. PREPARATORY STEPS.

(1) *Tools and materials needed.*

(a) Cleaning brush, 1-inch.

(b) Sandpaper, #0000.

(2) *Safety precautions.* Be sure that all power is removed from the unit by throwing the main circuit breaker on the transmitter to the OFF position (fig. 18), and by removing the plug from the a-c outlet (fig. 19).

(3) *Equipment cautions.* (a) During the performance of this item, do not remove any of the cable connections to the components.

(b) During cold weather, all connectors and cables must be handled carefully. Before handling cable with Vinylite composition (flexible coaxial line), they must be heated to avoid breaking if the temperature is lower than 5 degrees above zero.

(c) Do not use a wrench to tighten any of the cable connectors. These connectors should be tightened only finger-tight.

(4) *Location* (Fig. 40).

##### b. MAINTENANCE PROCEDURE

ITC. CORDS AND CABLES ON REAR OF RACK FM-71 or FM-72 (fig. 40).

(1) Inspect the condition of insulation.

(2) Inspect for improper support and kinks in the lines.

(3) Tighten the connections to the component.

(4) Inspect the outside of the connectors for signs of corrosion.

(5) Clean ends, cables, and connector.

ITC. COAXIAL TRANSMISSION LINE (fig. 41).

(1) Inspect the condition of the insulation.

(2) Inspect for improper support or kinks in the line.

(3) Tighten the connections to the antenna matching section and to the rotary coupling.

(4) Inspect the connections for signs of corrosion.

(5) Clean coaxial line and connector.

#### 48. Item 8—Coupling MC-398-B, Cable No. 111, and Antenna An-125-A or An-126-A

a. **PREPARATORY STEPS.** (1) *Tools and materials needed.*

(a) Pliers, side-cutting, 8-inch.

(b) Sandpaper, # 0000.

(c) Cleaning brush, 1-inch.

(2) *Safety precautions.* Failure to observe the following warnings may result in serious injury or death. (a) Be sure that Radio Set SCR-270 or SCR-271 is off the air.

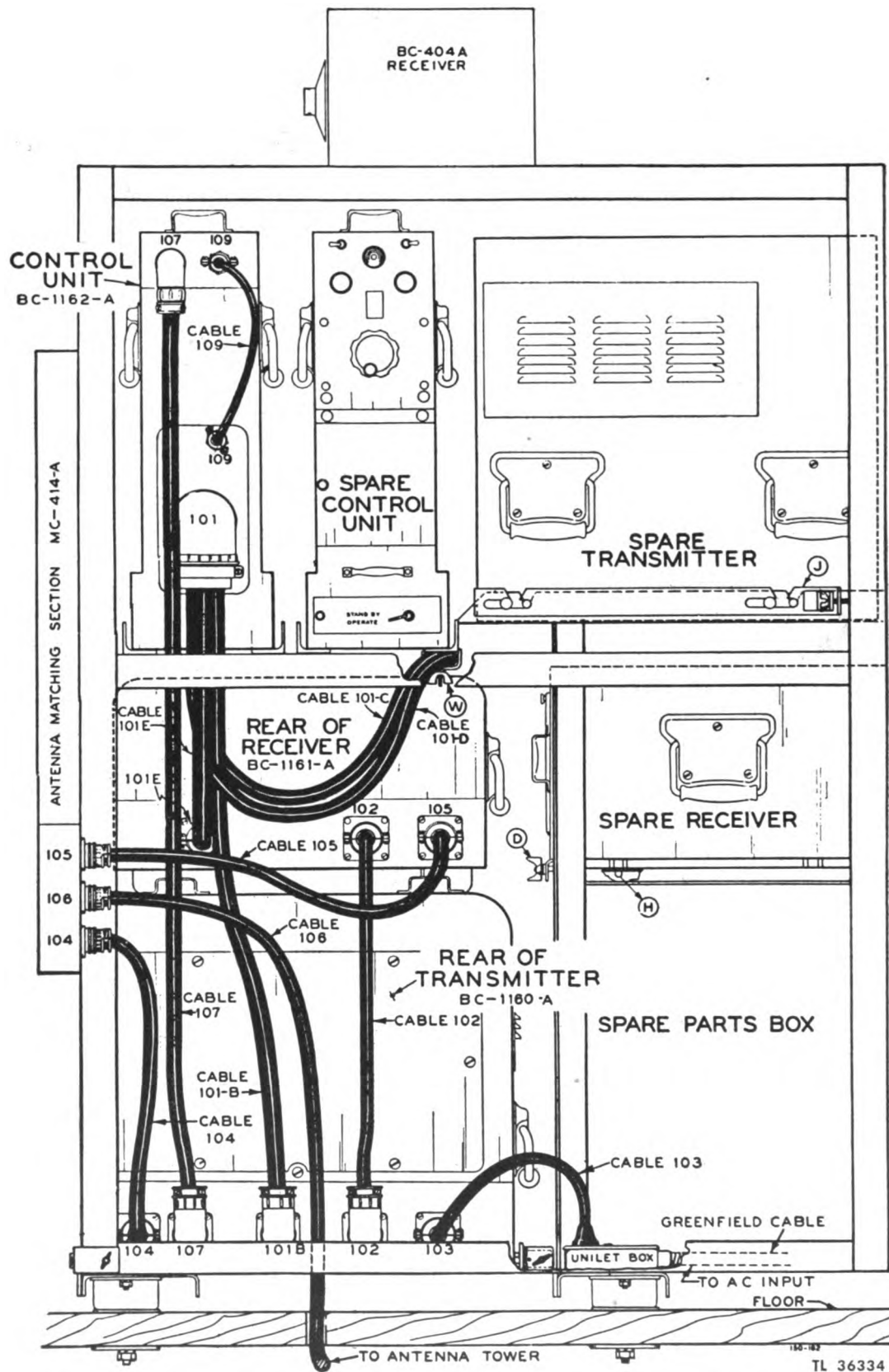
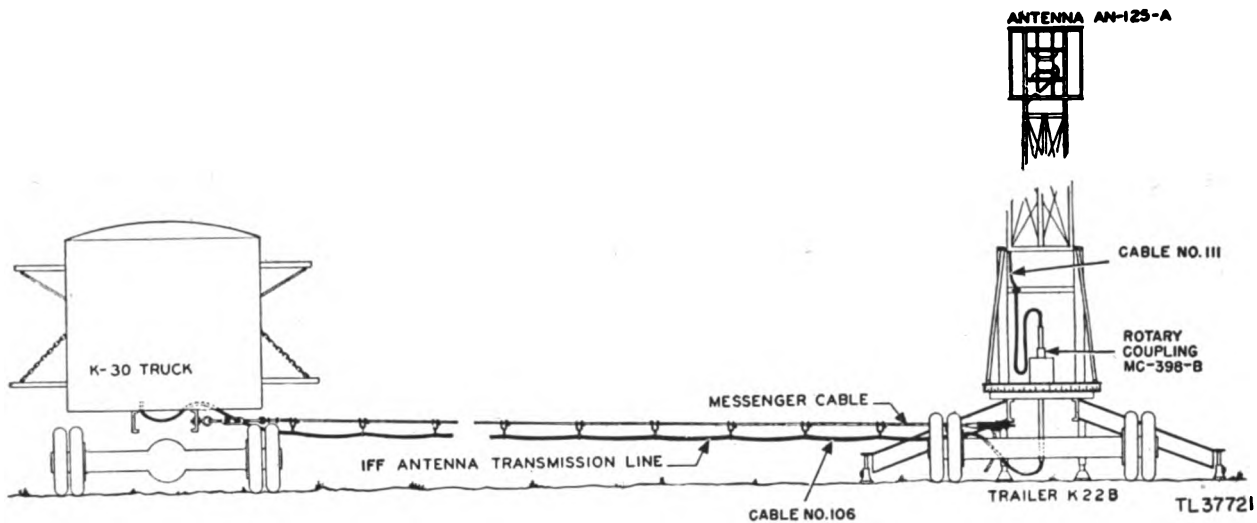
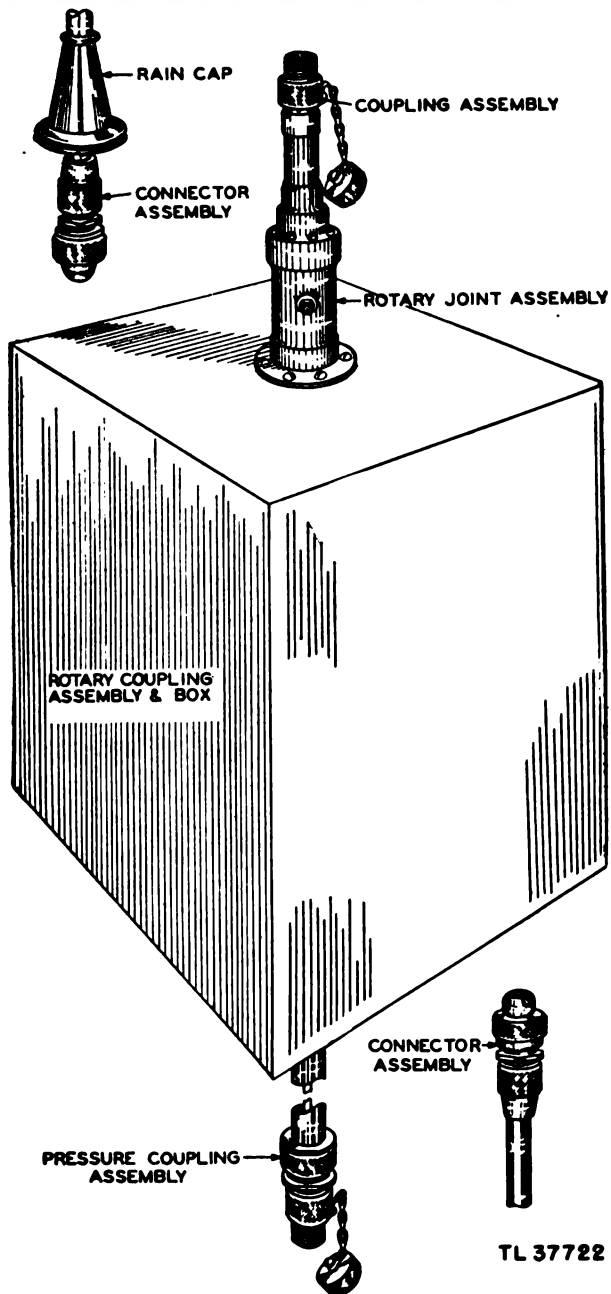


Figure 40. Radio Equipment RC-150—rear view showing cables.



↑ Figure 41. Operating van, cable 106, Coupling MC-398-B, cable 111 and Antenna AN-125-A.



(b) Be sure that all power has been removed from Radio Equipment RC-150 by throwing the main circuit breaker on the transmitter to the OFF position and removing the plug from the a-c outlet (figs. 18 and 19).

(3) *Equipment cautions.* Do not open coupling box or use wrench to tighten cable connectors.

(4) *Location* (fig. 41).

**b. MAINTENANCE PROCEDURE.**

**ITC. COUPLING MC-398-B** (fig. 42).

(1) Inspect coupling box for general condition.

(2) Inspect connectors at top and bottom of coupling box for corrosion.

(3) Tighten (only finger-tight) coaxial cable connectors and top and bottom of coupling box (par. 34).

(4) Clean coupling box and connectors.

**IT. CABLE NO. 111** (fig. 24).

(1) Inspect cable for kinks, condition of insulation, and proper support.

(2) Tighten support clamps if necessary.

**IT. ANTENNA AN-125-A OR AN-126-A.**

(1) Inspect IFF antenna for tightness.

(2) Tighten (only finger-tight) cable No. 111 connector.

← Figure 42. Coupling MC-398-B.

**49. Item 9—Rack FM-71 or FM-72**

**a. PREPARATORY STEPS.** (1) *Tools and materials needed.*

- (a) Pliers, side-cutting, 8-inch.
- (b) Screw driver, 2½-inch.
- (c) Cleaning brush, 1-inch.
- (d) Cloth, dry, clean.
- (e) Solvent, dry-cleaning (or carbon tetrachloride).

(2) *Location* (fig. 41).

**b. MAINTENANCE PROCEDURE.**

**ITC. RACK.**

- (1) Inspect component locking bars for freedom of mechanical operation.
- (2) Tighten shock mountings at bottom of rack.
- (3) Clean rack.

## CHAPTER 5

# PREVENTIVE MAINTENANCE SCHEDULE AND ASSIGNMENT SHEETS

### 50. General

This section of the manual describes the preventive maintenance schedule and the assignment sheets. The maintenance schedule tells *when* and *what* work is to be done. The assignment sheets show *who* is to do it.

**a. MAINTENANCE SCHEDULE.** The information given in the schedule is as follows:

- (1) The specific item on which work is to be done.
- (2) The day of the week when the job is to be done.
- (3) The number of times the work is done each month.

(4) Code letters (F, I, T, C, A, L) which specify the particular maintenance operations to be performed. F=Feel; I=Inspect; T=Tighten; C=Clean; A=Adjust; L=Lubricate.

**b. ASSIGNMENT SHEETS.** The assignment sheets are used by the person in charge of the equipment to assign the various maintenance operations to the men who are to perform them. Spaces are also provided on the sheets for short routine comments by those who do the maintenance work and for the initials of the person who checks the work. There is one assignment sheet for each of the three daily maintenance schedules. Each assignment sheet contains enough blank spaces for 1 year of operation.

### 51. How To Use Schedule

**a.** Item numbers on the schedule correspond to the item numbers in chapter 4. In this way maintenance men may refer to the specific item for instructions when doing the particular job called for. The complete maintenance schedule for all work is given on the three schedule sheets.

**b.** Each schedule sheet consists of eight vertical columns. The first column in the schedule for each day gives the item number; the second column gives the code letter (F, I, T, C, A, L) of the maintenance operation to be performed; the third, the item title. Columns 4, 5, 6, 7, and 8 indicate the frequency at which the items are to be performed. For example, blank spaces across all five columns indicate that the particular item

is to be performed once a week. Shaded spaces indicate that the item is not performed during the week shaded. An asterisk (\*) in column 4, or column 6 indicates that that item is performed on that particular day of the week only once in 3 months.

*Note.* Operating conditions, as shown by the Equipment Performance Log or other records, might indicate that certain maintenance operations should be performed more often than specified in the schedule. More frequent scheduling of items is left to the discretion of the person in charge.

### 52. How To Use Assignment Sheet

**a.** The assignment sheet is used in conjunction with the schedule. Three assignment sheets combine with three maintenance schedule sheets. There is a Monday assignment sheet for the Monday schedule sheet, a Wednesday assignment sheet for the Wednesday schedule sheet, and a Friday assignment sheet for the Friday schedule. Used together, the schedule and the assignment sheet enable the scheduling of all maintenance jobs to be performed during the course of a year.

**b.** The assignment sheet is divided into 12 main blocks, each block representing 1 month. Months are divided into weeks by means of the numbering under column 14. On the Monday sheet these figures indicate the first, second, third, fourth, and fifth Mondays of a month; on the Wednesday sheet, they represent the first, second, third, fourth, and fifth Wednesdays of the month, etc.

**c.** The assignment of specific men on the crew to particular items of maintenance can be made in columns 9, 10, and 11. The upper spaces under ASSIGNMENTS are used for entering the initials of the men assigned to the various jobs. The lower spaces under assignments are used for entering the numbers of the items to be performed by each man.

**d.** Column 12, DISPOSITION, is used to record any jobs that have not been completed or that have been performed unsatisfactorily. The item number and initials of the maintenance man are to be recorded here in case of an incompleted job.

**e.** Column 13 is for the approval of the person in charge of the station.

## SCHEDULE FOR MONDAY

1	2	3	4	5	6	7	8
ITEM NO.	OPERATIONS <sup>1</sup>	ITEMS	MAINTENANCE TO BE DONE				
			FIRST MON.	SECOND MON.	THIRD MON.	FOURTH MON.	FIFTH MON.
1	FITC	INTERCONNECTOR (Control Unit BC-1162-A) Top of interconnector chassis.		XXX		XXX	XXX
1	ITC	Under side of interconnector chassis.		XXX		XXX	XXX
1	ITCL	Front panel of interconnector.		XXX		XXX	XXX
1	ITC	Tubes and tube sockets.	*	XXX	*	XXX	XXX
2	IC	WAVEMETER (Control Unit BC-1162-A) Top of wavemeter chassis.		XXX		XXX	XXX
2	ITC	Under side of wavemeter chassis.		XXX		XXX	XXX
2	ITC	Front panel of wavemeter.		XXX		XXX	XXX
2	ITC	Tubes and tube sockets.	*	XXX	*	XXX	XXX

<sup>1</sup>F—Feel; I—Inspect; T—Tighten; C—Clean; A—Adjust; L—Lubricate.

\* Perform this operation the first and third Monday of every third month only, making sure that major components are rotated every two weeks as described in Chapter 4, paragraph 40c. This will insure that this operation is performed only once each three months on each major component.

X indicates no operation to be performed.

### ASSIGNMENTS FOR MONDAY

MONTH	9	10	11	12	13	14	9	10	11	12	13	MONTH
	ASSIGNMENTS			DISPOSITION	CHECKED BY		ASSIGNMENTS			DISPOSITION	CHECKED BY	
JANUARY						FIRST MON.						JULY
						SECOND MON.						
						THIRD MON.						
						FOURTH MON.						
						FIFTH MON.						
FEBRUARY						FIRST MON.						AUGUST
						SECOND MON.						
						THIRD MON.						
						FOURTH MON.						
						FIFTH MON.						
MARCH						FIRST MON.						SEPTEMBER
						SECOND MON.						
						THIRD MON.						
						FOURTH MON.						
						FIFTH MON.						
APRIL						FIRST MON.						OCTOBER
						SECOND MON.						
						THIRD MON.						
						FOURTH MON.						
						FIFTH MON.						
MAY						FIRST MON.						NOVEMBER
						SECOND MON.						
						THIRD MON.						
						FOURTH MON.						
						FIFTH MON.						
JUNE						FIRST MON.						DECEMBER
						SECOND MON.						
						THIRD MON.						
						FOURTH MON.						
						FIFTH MON.						



SCHEDULE FOR WEDNESDAY

1	2	ITEMS	4	5	6	7	8
ITEM NO.	OPERATIONS <sup>1</sup>		MAINTENANCE TO BE DONE				
			FIRST WED.	SECOND WED.	THIRD WED.	FOURTH WED.	FIFTH WED.
3	ITC	ANTENNA MATCHING SECTION MC-414-A Outside of antenna matching section.		XXX		XXX	XXX
3	ITC	Inside of antenna matching section.		XXX	XXX	XXX	XXX
4	FITC	RECEIVER BC-1161-A Top of receiver chassis.		XXX		XXX	XXX
4	ITC	Under side of receiver chassis.		XXX		XXX	XXX
4	ITC	Front panel of receiver.		XXX		XXX	XXX
4	ITC	Tubes and tube sockets.	*	XXX	*	XXX	XXX
5	FITC	TRANSMITTER BC-1160-A Top of transmitter chassis.		XXX		XXX	XXX
5	FITC	Under side of transmitter chassis.		XXX		XXX	XXX
5	ITC	Back of transmitter chassis.		XXX		XXX	XXX
5	ITCA	Front panel of transmitter.		XXX		XXX	XXX
5	ITC	Transmitter case.		XXX		XXX	XXX
5	ITC	Tubes and tube sockets.	*	XXX	*	XXX	XXX
5	L	Blower motor.	*	XXX	*	XXX	XXX

<sup>1</sup> F—Feel; I—Inspect; T—Tighten; C—Clean; A—Adjust; L—Lubricate.

\* Perform this operation the first and third Wednesday of every third month only, making sure that major components are rotated every two weeks as described in Chapter 4, paragraph 40c. This will insure that this operation is performed only once each three months on each major component.

X indicates no operation to be performed.

### ASSIGNMENTS FOR WEDNESDAY

MONTH	9	10	11	12	13	14	9	10	11	12	13	MONTH
	ASSIGNMENTS			DISPOSITION	CHECKED BY		ASSIGNMENTS			DISPOSITION	CHECKED BY	
JANUARY						FIRST WED.						JULY
						SECOND WED.						
						THIRD WED.						
						FOURTH WED.						
						FIFTH WED.						
FEBRUARY						FIRST WED.						AUGUST
						SECOND WED.						
						THIRD WED.						
						FOURTH WED.						
						FIFTH WED.						
MARCH						FIRST WED.						SEPTEMBER
						SECOND WED.						
						THIRD WED.						
						FOURTH WED.						
						FIFTH WED.						
APRIL						FIRST WED.						OCTOBER
						SECOND WED.						
						THIRD WED.						
						FOURTH WED.						
						FIFTH WED.						
MAY						FIRST WED.						NOVEMBER
						SECOND WED.						
						THIRD WED.						
						FOURTH WED.						
						FIFTH WED.						
JUNE						FIRST WED.						DECEMBER
						SECOND WED.						
						THIRD WED.						
						FOURTH WED.						
						FIFTH WED.						

**SCHEDULE FOR FRIDAY**

1	2	3	4	5	6	7	8
ITEM NO.	OPER- ATIONS <sup>1</sup>	ITEMS	MAINTENANCE TO BE DONE				
			FIRST FRI.	SECOND FRI.	THIRD FRI.	FOURTH FRI.	FIFTH FRI.
6	ITCA	TEST OSCILLOSCOPE I-134-B Front panel of test scope.		XXX		XXX	XXX
6	ITC	Case of test scope and a-c cord.		XXX		XXX	XXX
6	ITC	Top and back panel of test scope chassis.	*	XXX	XXX	XXX	XXX
6	ITC	Under side of test scope chassis.	*	XXX	XXX	XXX	XXX
		<b>CORDS AND CABLES</b>					
7	ITC	Cords and cables on rear of Rack FM-71 or FM-72.		XXX	XXX	XXX	XXX
7	IC	Coaxial transmission Line No. 106.		XXX	XXX	XXX	XXX
		<b>COUPLING MC-398-B, CABLE NO. 111 AND ANTENNA AN-125-A OR AN-126-A</b>					
8	ITC	Coupling.	*	XXX	XXX	XXX	XXX
8	IT	Cable No. 111.	*	XXX	XXX	XXX	XXX
8	ITC	Antenna.	*	XXX	XXX	XXX	XXX
		<b>RACK FM-71 OR FM-72</b>					
9	ITC	Rack.	*	XXX	XXX	XXX	XXX

<sup>1</sup> F—Feel; I—Inspect; T—Tighten; C—Clean; A—Adjust; L—Lubricate.  
 \* First Friday of every third month only.  
 X indicates no operation to be performed.

### ASSIGNMENTS FOR FRIDAY

MONTH	9	10	11	12	13	14	9	10	11	12	13	MONTH
	ASSIGNMENTS			DISPOSITION	CHECKED BY		ASSIGNMENTS			DISPOSITION	CHECKED BY	
JANUARY						FIRST FRI.						JULY
						SECOND FRI.						
						THIRD FRI.						
						FOURTH FRI.						
						FIFTH FRI.						
FEBRUARY						FIRST FRI.						AUGUST
						SECOND FRI.						
						THIRD FRI.						
						FOURTH FRI.						
						FIFTH FRI.						
MARCH						FIRST FRI.						SEPTEMBER
						SECOND FRI.						
						THIRD FRI.						
						FOURTH FRI.						
						FIFTH FRI.						
APRIL						FIRST FRI.						OCTOBER
						SECOND FRI.						
						THIRD FRI.						
						FOURTH FRI.						
						FIFTH FRI.						
MAY						FIRST FRI.						NOVEMBER
						SECOND FRI.						
						THIRD FRI.						
						FOURTH FRI.						
						FIFTH FRI.						
JUNE						FIRST FRI.						DECEMBER
						SECOND FRI.						
						THIRD FRI.						
						FOURTH FRI.						
						FIFTH FRI.						

## APPENDIX

# MOISTUREPROOFING AND FUNGIPROOFING OF RADIO EQUIPMENTS RC-150 AND RC-151

### 1. General

Equipment failures commonly occur when Signal Corps equipment is operated in tropical areas where temperature and relative humidity are extremely high. The following problems are typical:

- a. Resistors and capacitors fail.
- b. Electrolytic action takes place in coils, chokes, and transformer windings, causing eventual break-down.
- c. Hook-up wire and cable insulation break-down. Fungus growth accelerates deterioration.
- d. Moisture forms electrical leakage paths on terminal boards and insulating strips causing flash-overs.

### 2. Treatment

A moistureproofing and fungiproofing treatment has been devised which, if properly applied, provides a reasonable degree of protection against fungus growth, insects, corrosion, salt spray, and moisture. The treatment involves the use of a moisture-resistant and fungi-resistant varnish applied by means of a spray gun. A kit is furnished which contains complete materials, including heating lamps, for performing this treatment. A brief description of the method of application follows:

- a. Make all repairs and adjustments necessary for the proper operation of the equipment.
- b. Thoroughly clean equipment to be processed of all dirt, dust, rust, fungus, oil, and grease.
- c. Partially disassemble the equipment and cover certain points with masking tape such as relay contacts, open switches, air capacitors, sockets, and bearings.
- d. Thoroughly dry the equipment by heat to expel moisture which the circuit elements have absorbed.
- e. Spray or paint all circuit elements and all parts of the equipment with three coats of moistureproofing and fungiproofing varnish.

f. Give the equipment a final operational check; radio equipments should receive a 24- to 36-hour aging period, when time permits, before final adjustment.

### 3. Step-by-step Instructions for Control Unit BC-1162-A

a. **DISASSEMBLY.** Disconnect the cables from the rear of the unit.

(1) Loosen the two knurled knobs on the front panel of the top chassis (wavemeter) and the three knurled knobs on the front panel of the bottom chassis (interconnector). Slide both chassis from the case.

(2) Remove the small shields covering the oscillator compartment (one on either side of the top chassis).

b. **MASKING.** (1) On the top chassis, mask around the shaft bearing of potentiometer 63, the gears actuating the variable air capacitor, the capacitor itself, and the clutch on the end of the AUX OSC control shaft.

(2) On the bottom chassis, cover with paper and masking tape, switches 112 and 113, the bottoms of all octal type tube sockets, and the bearings of the switch control shafts.

c. **DRYING.** Dry the two chassis for 2 to 3 hours at 160°F.

d. **VARNISHING.**

(1) Apply three coats of moistureproofing and fungiproofing varnish.

(2) Brush-coat the insulation and wiring to switches 128 and 127 on the top chassis, keeping the varnish out of the holes in the switch cases. Spray all visible, unmasked surfaces inside and at the rear of the shielded section on the top chassis, as well as the soldered connections and insulating materials on the inside of the rear plate which forms a mounting for plugs 107 and 109. Brush-coat the bakelite pieces on the side of the cylindrical shield.

(3) On the bottom chassis, spray all visible unmasked surfaces and objects on the under side of

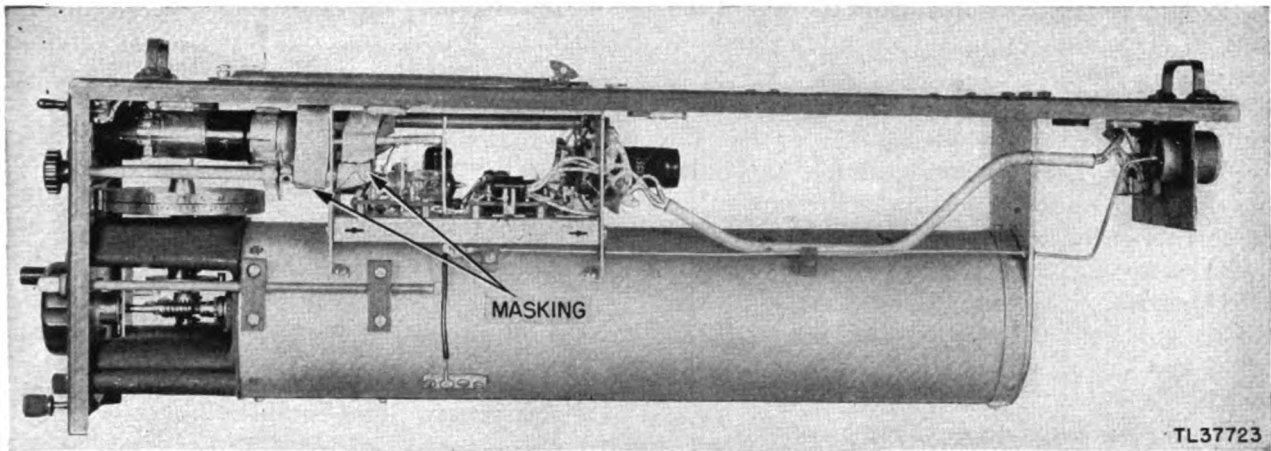


Figure 43. Control unit, wavemeter—right side.

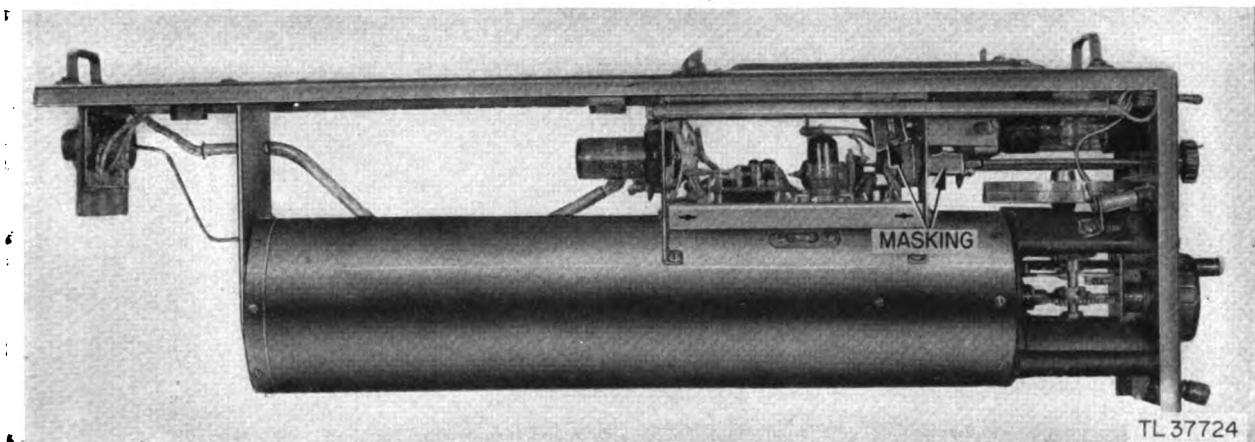


Figure 44. Control unit, wavemeter—left side.

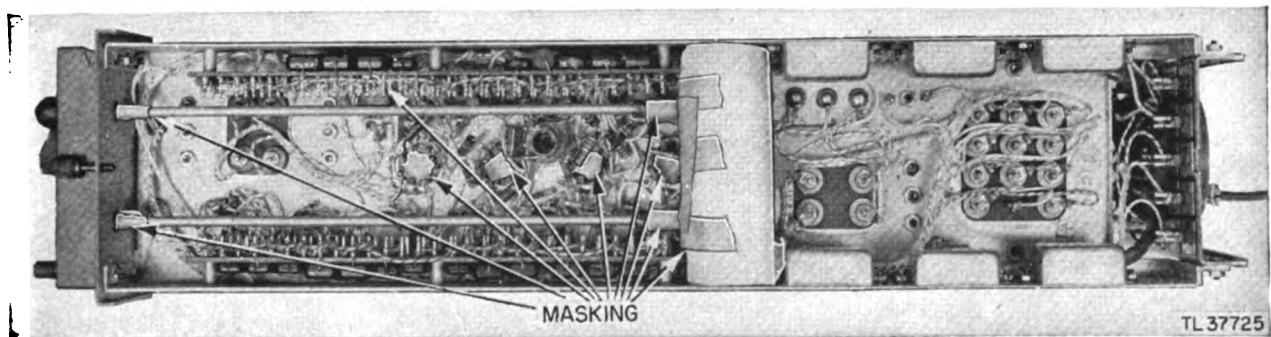


Figure 45. Control unit, interconnector—under side.

the chassis, behind the front panel and inside the rear panel. Touch-up-brush the wiring, terminals, insulating materials, etc., around switches 112 and 113 after removing masking.

**Caution:** Varnish spray may have toxic effects. Use respirator if available; otherwise fasten cheesecloth or other cloth material over nose and mouth.

**e. REASSEMBLY.** Reassemble and test operation.

**f. MARKING.** Mark MFP and date of treatment. Example: MFP-2/28/44.

#### 4. Step-by-step Instructions for Receiver BC-1161-A

**a. DISASSEMBLY.** (1) Disconnect the cables from the rear of the unit.

(2) Remove the unit from Rack FM-71 or FM-72.

(3) Remove the 14 screws from the bottom edge of the cover of the unit and take off the cover.

(4) Remove the 14 screws from the bottom of the unit and take off the bottom plate.

(5) Unscrew the two nuts from the top of the cans covering the seven coil assemblies and remove these cans.

(6) Remove the two screws holding the tuning indicator tube in place.

(7) Remove the two screws and five nuts holding the cover under r-f section of the unit. Remove this cover, and then replace the tuning indicator tube.

**b. MASKING.** (1) On the under side of the chassis, mask all octal type tube sockets, jacks 129-1 and 129-2, and the holes in the interlock switch.

(2) On the top side of the chassis, mask the holes in the ends of the seven coil assemblies and the openings to jacks 129-1 and 129-2.

**c. DRYING.** Dry the chassis for 2 to 3 hours at 160°F.

**d. VARNISHING.** (1) Apply three coats of moistureproofing and fungiproofing varnish.

(2) On the top of the chassis, spray the seven coil assemblies and brush-coat the wiring and insulation of the two dial lamps. Keep the varnish out of the gears and moving parts behind the center section of the front panel.

(3) On the bottom of the chassis, spray all visible unmasked surfaces.

**e. REASSEMBLY.** Reassemble and test operation.

**f. MARKING.** Mark MFP and date of treatment. Example: MFP-2/28/44.

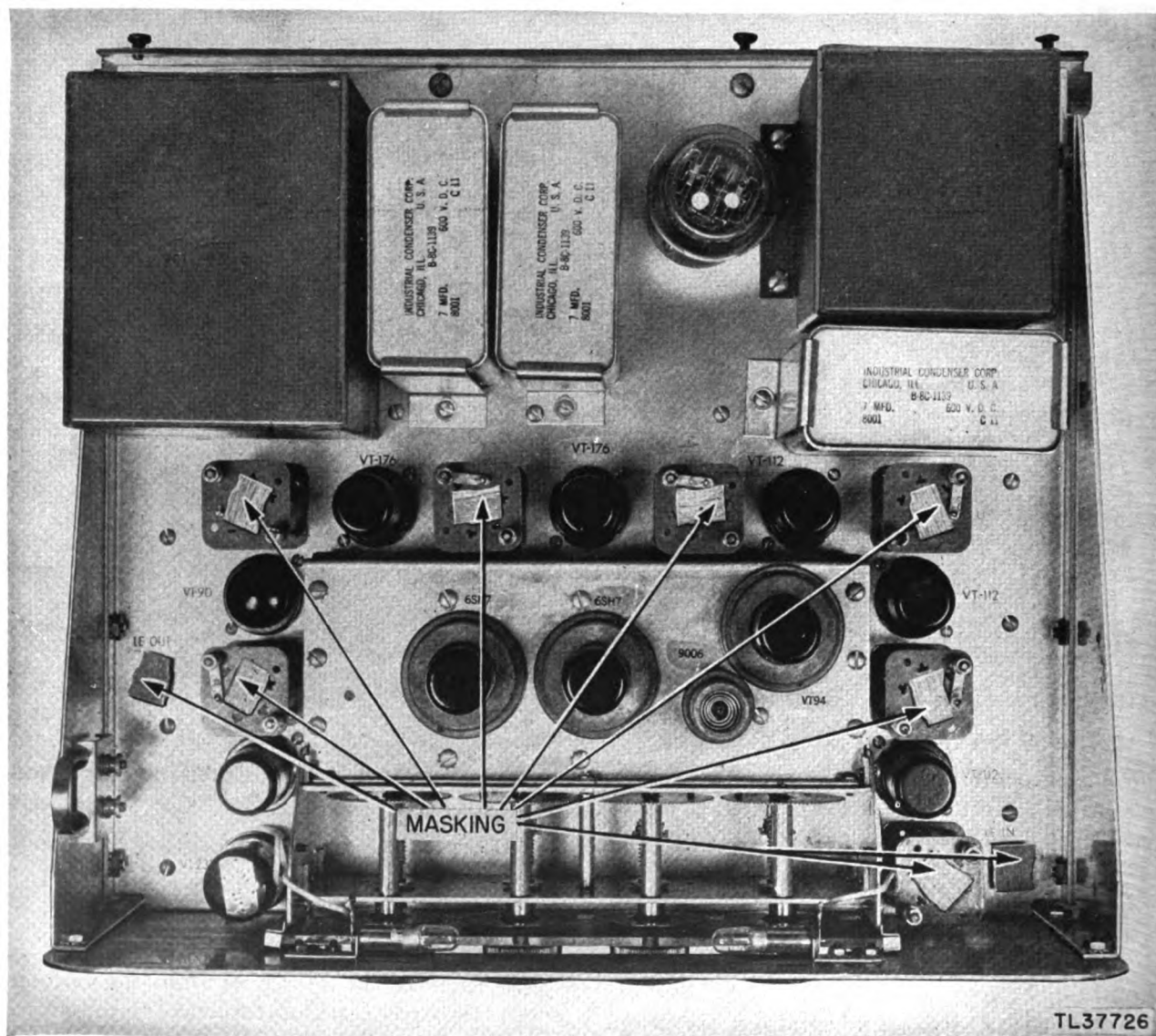


Figure 46. Receiver—top.

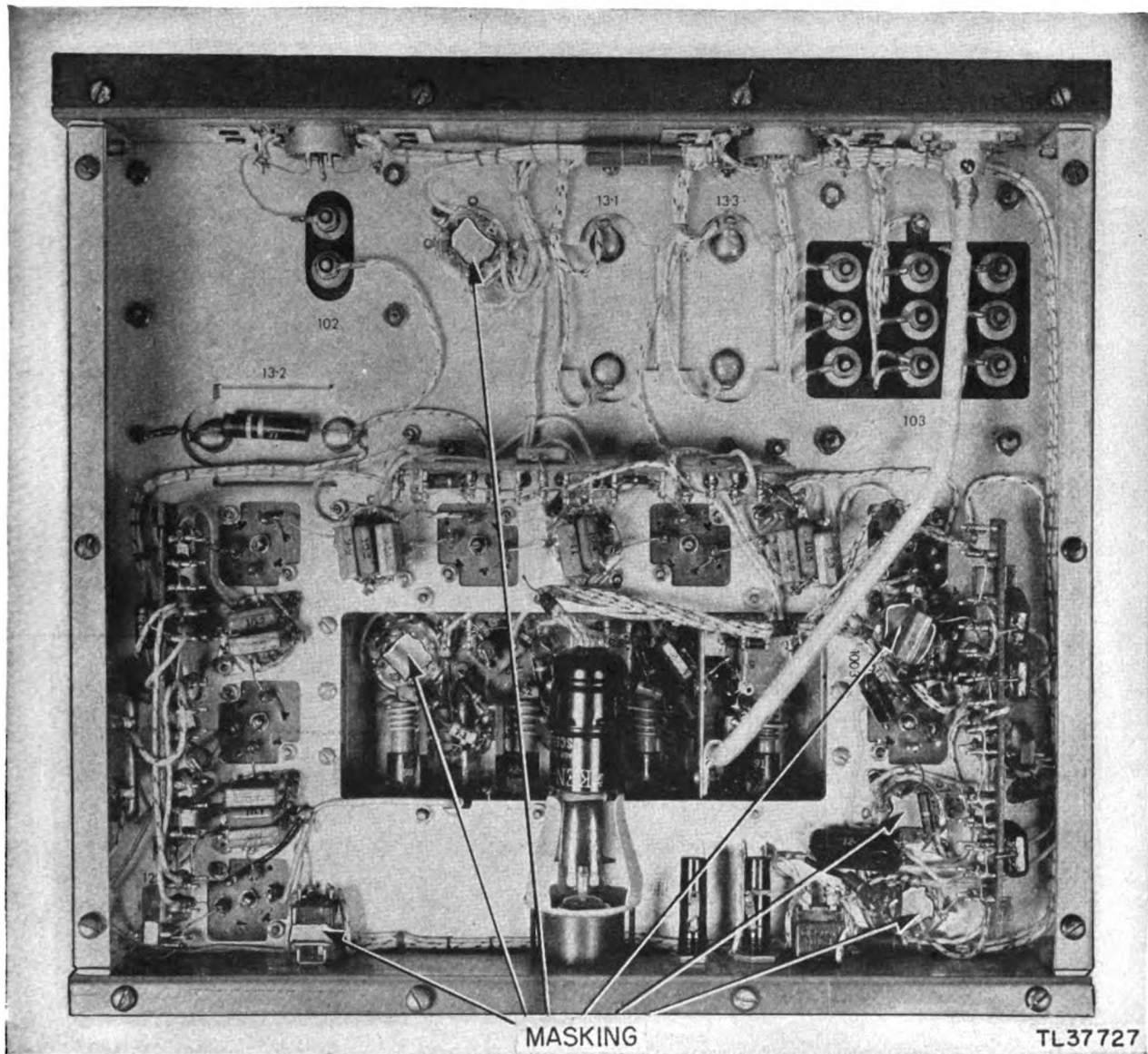


Figure 47. Receiver—under side.

## 5. Step-by-step Instructions for Transmitter BC-1160-A

**a. DISASSEMBLY.** (1) Disconnect the cables from the rear of the unit.

(2) Remove the unit from Rack FM-71.

(3) Remove the air filter from the right side of the unit.

(4) Disconnect the blower-motor power supply plug.

(5) Loosen the setscrew in the HIGH VOLTAGE CONTROL knob and remove the knob.

(6) Remove the screws and mounting studs from the bottom of the sides and rear of the cover and pull the cover off the chassis.

(7) Remove the six screws from the lower edges (front and rear) of the chassis and remove the bottom cover.

(8) Remove the cover of the oscillator section at the rear of the chassis.

(9) Remove the four screws and the dust cap from relay 139 on top of the oscillator section, and the four screws and cover from relay 138.

(10) Disconnect meter leads and remove meter 137. (See maintenance section of TM 11-479 for treatment of meters when published.)

**b. MASKING.** (1) On the top side of the chassis, mask the brush and contact surfaces of the high-voltage control variac 136, the plate connectors



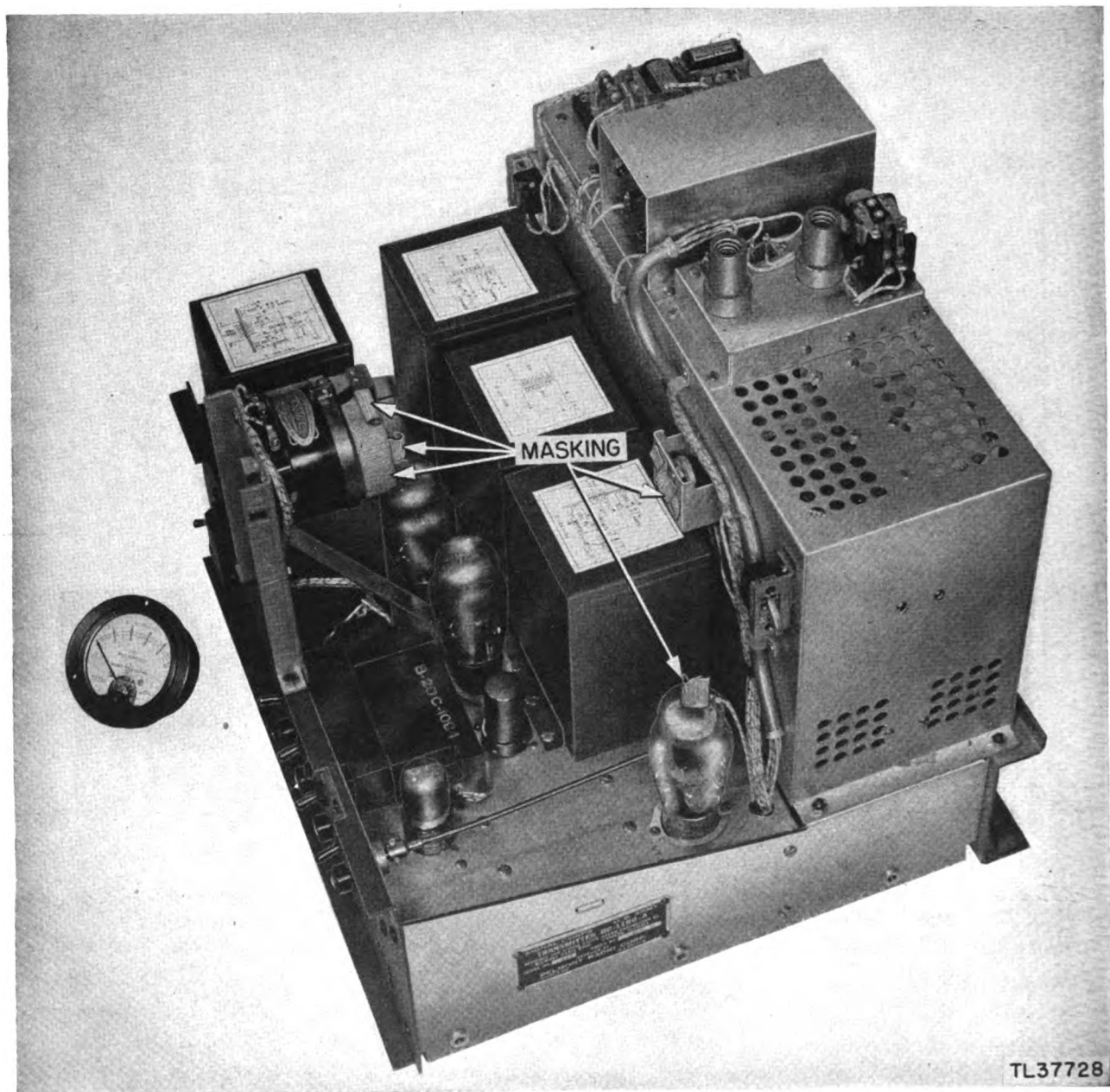


Figure 48. Transmitter—top view.

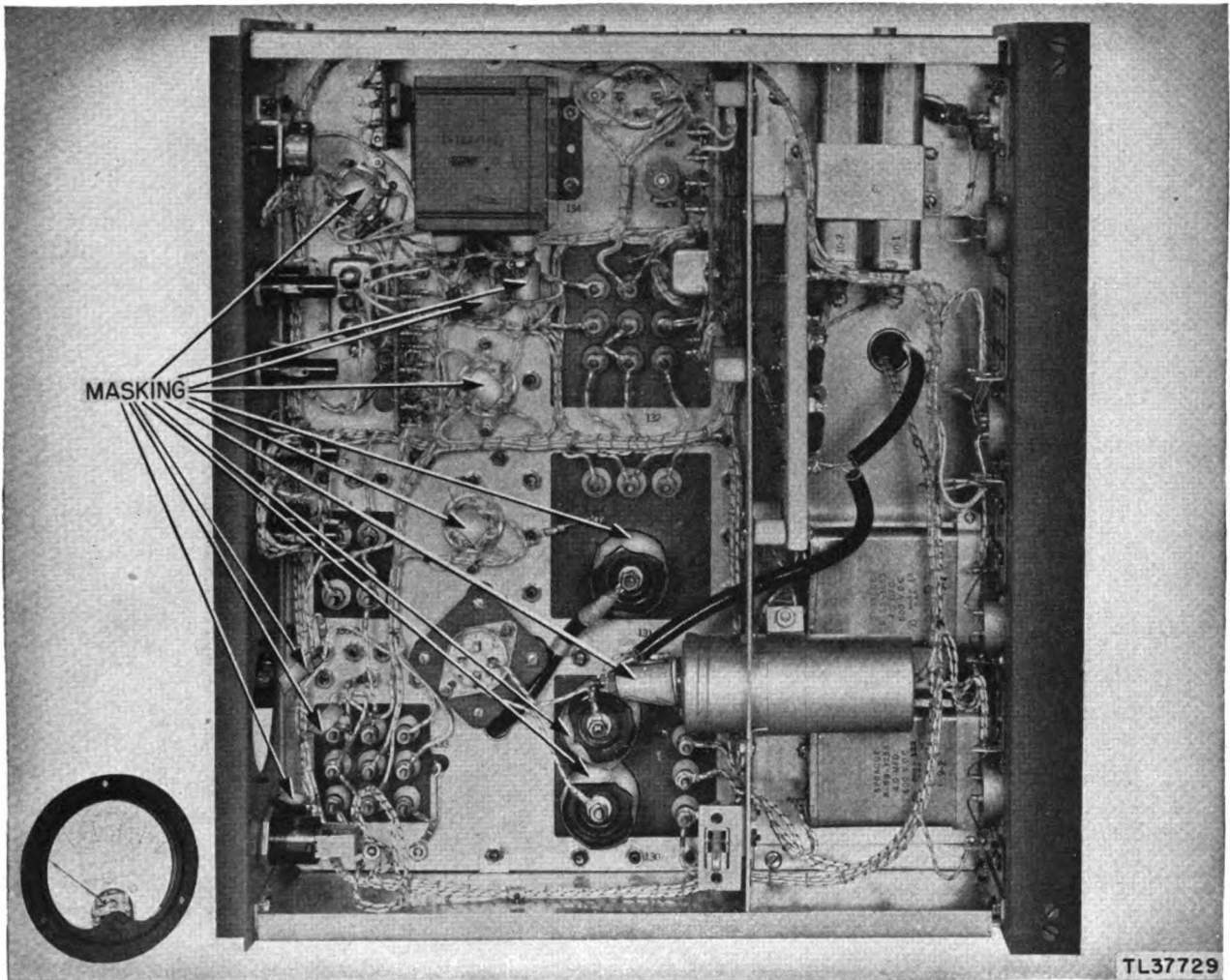


Figure 49. Transmitter—under side.

on Tubes VT-100 and VT-119, and the blower power-supply socket.

(2) On the bottom of the chassis, mask the high-voltage bushings on transformers 130 and 131, the bottoms of all octal-type tube sockets, the meter lead terminals, the holes in switch 114-1, the high-voltage bushing on transformer 134, and the ceramic bushing on capacitor 11.

c. **DRYING.** Dry the chassis for 2 to 3 hours at 160°F.

d. **VARNISHING.** (1) Apply three coats of moistureproofing and fungiproofing varnish.

(2) Spray all visible, unmasked surfaces on the under side of the chassis except the interlock switch. Touch-up the switch case by brush.

(3) On the top side of the chassis, spray the terminal of the cable connected to the plate of Tube VT-119, variac 136 and wiring, case of

switch 117 and wiring, the interconnecting wiring along the front side of the oscillator section, the coils, capacitors, and bakelite materials, and inside the dust cover on top of the oscillator section. Keep varnish out of the relays and interlock switches. Brush-coat the relay windings, the bakelite parts around the relays, the cases of the interlock switches 118-1 and 118-2, and any wiring, bakelite materials, or small circuit elements not previously covered.

(4) Inside the oscillator section, brush-coat all braided wire insulation, soldered connections, bakelite materials, and small circuit elements.

e. **REASSEMBLY.** Reassemble and test operation.

f. **MARKING.** Mark MFP and date of treatment. Example: MFP-2/28/44.

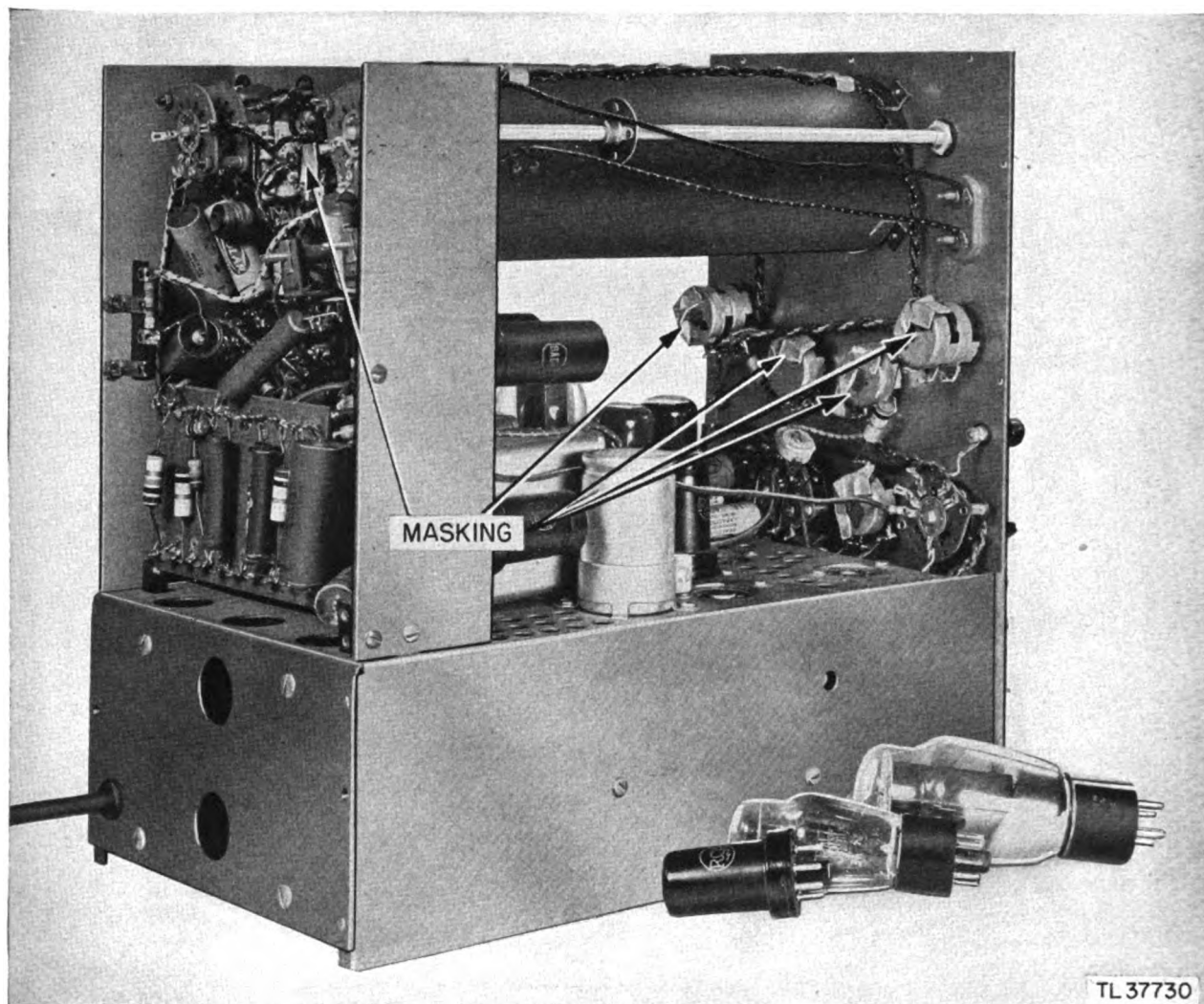


Figure 50. Test Scope, DuMont type 224—three-quarter rear view.

## 6. Step-by-step Instructions for DuMont type 224 Cathode-ray Oscilloscope (Test Scope)

*a. DISASSEMBLY.* Remove seven roundhead screws from the front panel, two screws from the rear, loosen the power cord, and slide the chassis from the case.

*b. MASKING.* (1) Mask the holes in the cases of the control potentiometers.

(2) Mask the rear of the cathode-ray tube socket.

(3) On the under side of the chassis, mask the rear of the clear plastic feed-through bushing.

*c. DRYING.* Dry the chassis for 2 to 3 hours at 160°F.

*d. VARNISHING.*

(1) Apply three coats of moistureproofing and fungiproofing varnish.

(2) Spray all visible unmasked surfaces on the top, bottom, sides, and rear of the chassis, keeping a heavy coat out of the switches. Operate the switches before the varnish dries to clear the contacts of the coating varnish.

*e. REASSEMBLY.* Reassemble and test operation.

*f. MARKING.* Mark MFP and date of treatment. Example: MFP 2/28/44.

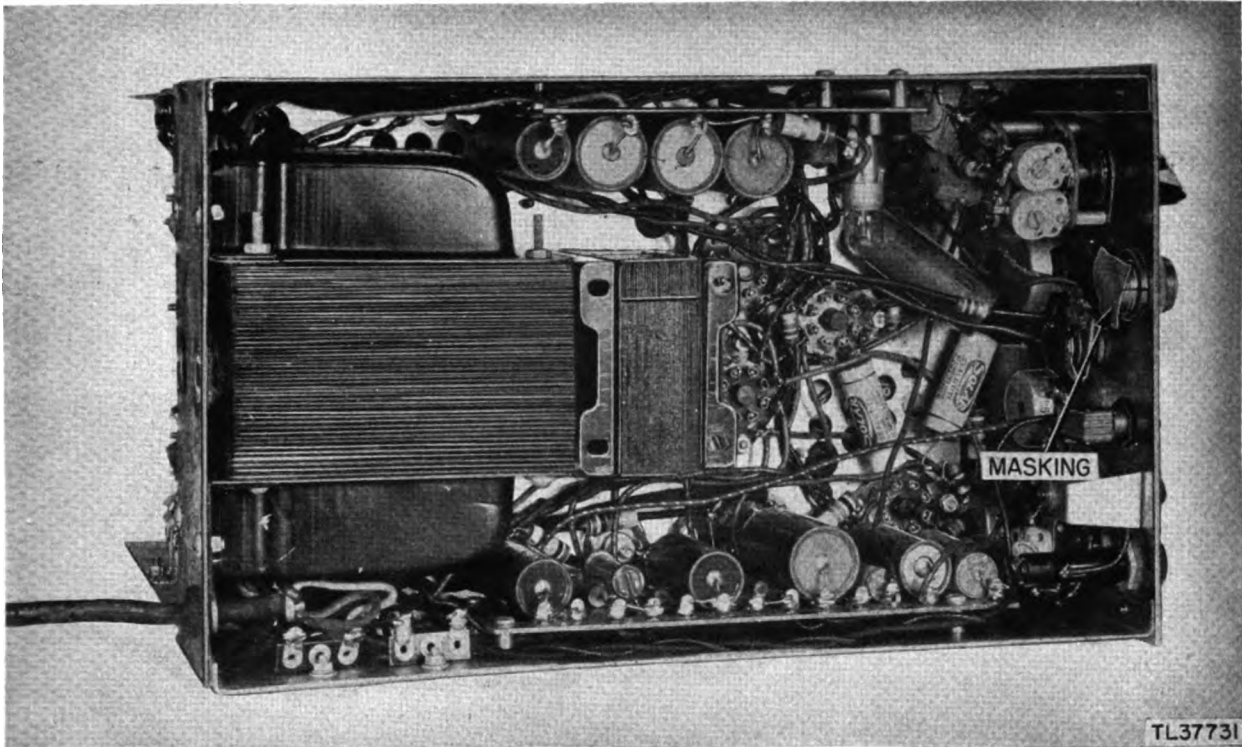


Figure 51. Test Scope, DuMont type 224—under side.

## 7. Step-by-step Instructions for Signal Generator I-198-A

**a. DISASSEMBLY.** (1) Remove the ten screws from the front edges of the case, the three screws from the rear of the case, and slide the chassis from the case.

(2) Remove the ten screws from the shield on the top left of the chassis and take off the shield.

(3) Remove the three friction-held cans on the under side of the chassis.

(4) Remove the two nuts from the top of the oscillator coil, the two nuts holding the can in place, and the can shielding the coils.

**b. MASKING.** (1) Mask the terminal of the ground connection which fastens to the rear of the case.

(2) Mask the large variable air capacitor on the top of the chassis.

**c. DRYING.** Dry the chassis for 2 to 3 hours at 160°F.

**d. VARNISHING.** (1) Apply three coats of moistureproofing and fungiproofing varnish.

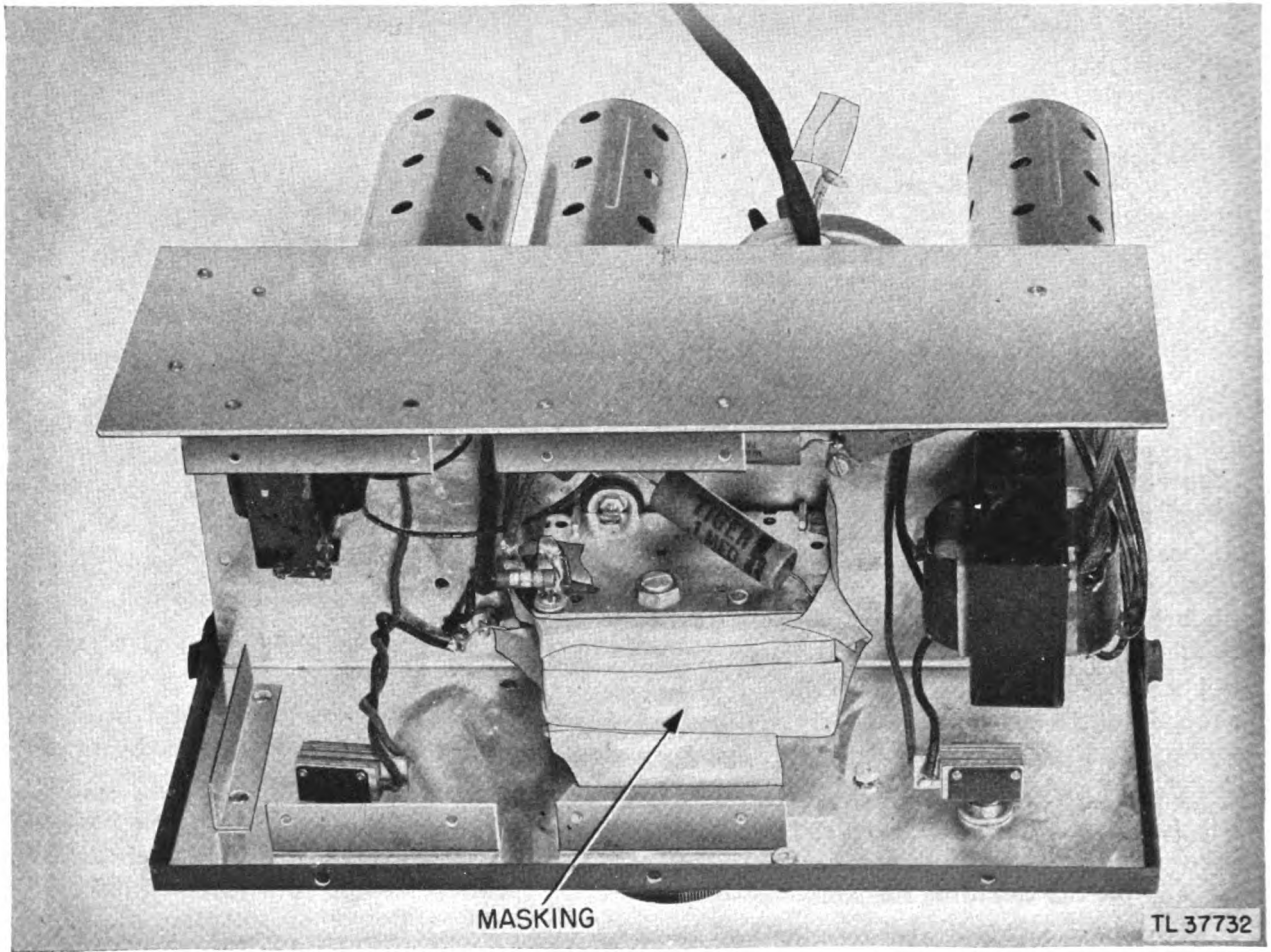
(2) Spray all visible unmasked surfaces on the top side of the chassis.

(3) Dip-coat the power cord and brush-coat the parts of the insulation not covered by dipping.

(4) On the under side of the chassis, spray the coils, wiring, and capacitors in the filter section. Spray the wiring and case of the potentiometer, the shielded oscillator coil, and brush-coat the edges of the wafer-switch insulation, the wiring, and resistors mounted behind the switch.

**e. REASSEMBLY.** Reassemble and test operation.

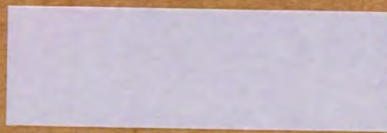
**f. MARKING.** Mark MFP and date of treatment. Example: MFP 2/28/44.



*Figure 52. Signal Generator I-198-A—three-quarter under side.*











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