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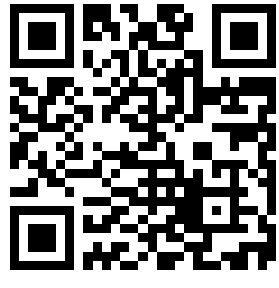

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TM 11-1318

WAR DEPARTMENT TECHNICAL MANUAL

TECHNICAL OPERATION

RADIO EQUIPMENTS RC-148, RC-148-B AND RC-148-C

GENERAL DESCRIPTION, OPERATING INSTRUCTIONS AND EQUIPMENT PERFORMANCE LOG

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TM 11-1318

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WAR DEPARTMENT 14 AUGUST 1944

United States Government Printing Office

Washington: 1944

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WAR DEPARTMENT,
WASHINGTON 25, D. C., 14 AUGUST 1944.

TM 11-1318, Radio Equipments RC-148, RC-148-B, and RC-148-C, Technical Operation Manual, is published for the information and guidance of all concerned.

[A. G. 300.7 (4 Jul 44).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

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

DISTRIBUTION:

As prescribed in paragraph 9a, FM 21-6:
Armies (5); SvC (5); Depts (5); Def Comds (2); IBn 44 (25); IC 4 (10) [1](2), 11, 44 (2); Arm & Sv Boards (2); Sig C Rep Shops (2).
IBn 44: T/O 44-135.
IC 4: T/O 4-260-1; T/O 4-68.
IC 11: T/O 11-107; 11-237; 11-287; 11-400, (C) Sig AW Orgn—Radar Rep Plat; 11-500, (EC) Sig Sv Orgn—Radar Maint Team; 11-587; 11-592; 11-597; 11-617.
IC 44: T/O 44-16; 44-17; 44-116; 44-117.

For explanation of symbols, see FM 21-6.

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CONTENTS

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WARNING

HIGH VOLTAGE

is used in the operation of this equipment.

DEATH ON CONTACT

may result if personnel fail to observe safety precautions.

Be careful not to contact high-voltage connections or 110–120–volt input connections when installing or operating this equipment.

When working inside the equipment, after the power has been turned off, always ground every part before touching it.

EXTREMELY DANGEROUS POTENTIALS

exist in the following units:

Power Supply RA–105–A.
Radio Receiver and Transmitter BC–1267–A.
Transmitter BC--1072–A.

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FIRST AID TREATMENT FOR ELECTRIC SHOCK

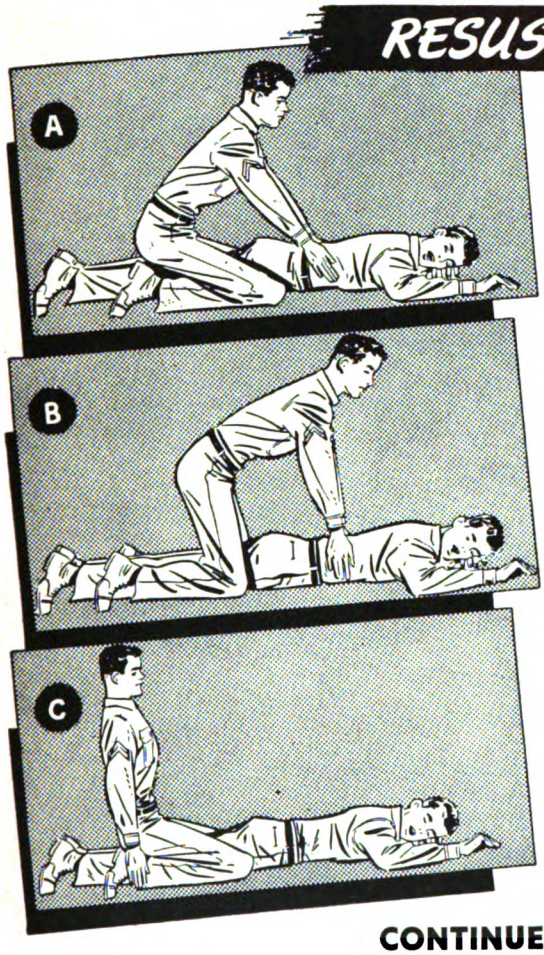
I. FREE THE VICTIM FROM THE CIRCUIT IMMEDIATELY.

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 **forhours**

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

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WARNING

HIGH VOLTAGE

is used in the operation of this equipment.

DEATH ON CONTACT

may result if personnel fail to observe safety precautions.

Be careful not to contact high-voltage connections or 110–120–volt input connections when installing or operating this equipment.

When working inside the equipment, after the power has been turned off, always ground every part before touching it.

EXTREMELY DANGEROUS POTENTIALS

exist in the following units:

Power Supply RA–105–A.
Radio Receiver and Transmitter BC–1267–A.
Transmitter BC--1072–A.

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REFERENCE NOTICE

This is one of three technical manuals on Radio Equipment RC–148, RC–148–B, and RC–148–C. The other two are—

TM 11–1418, Radio Equipments RC–148, RC–148–B, and RC–148–C, Preventive Maintenance Manual.

TM 11–1518, Radio Equipments RC–148, RC–148–B, and RC–148–C, Service Manual (Theory, Trouble Shooting, and Repair).

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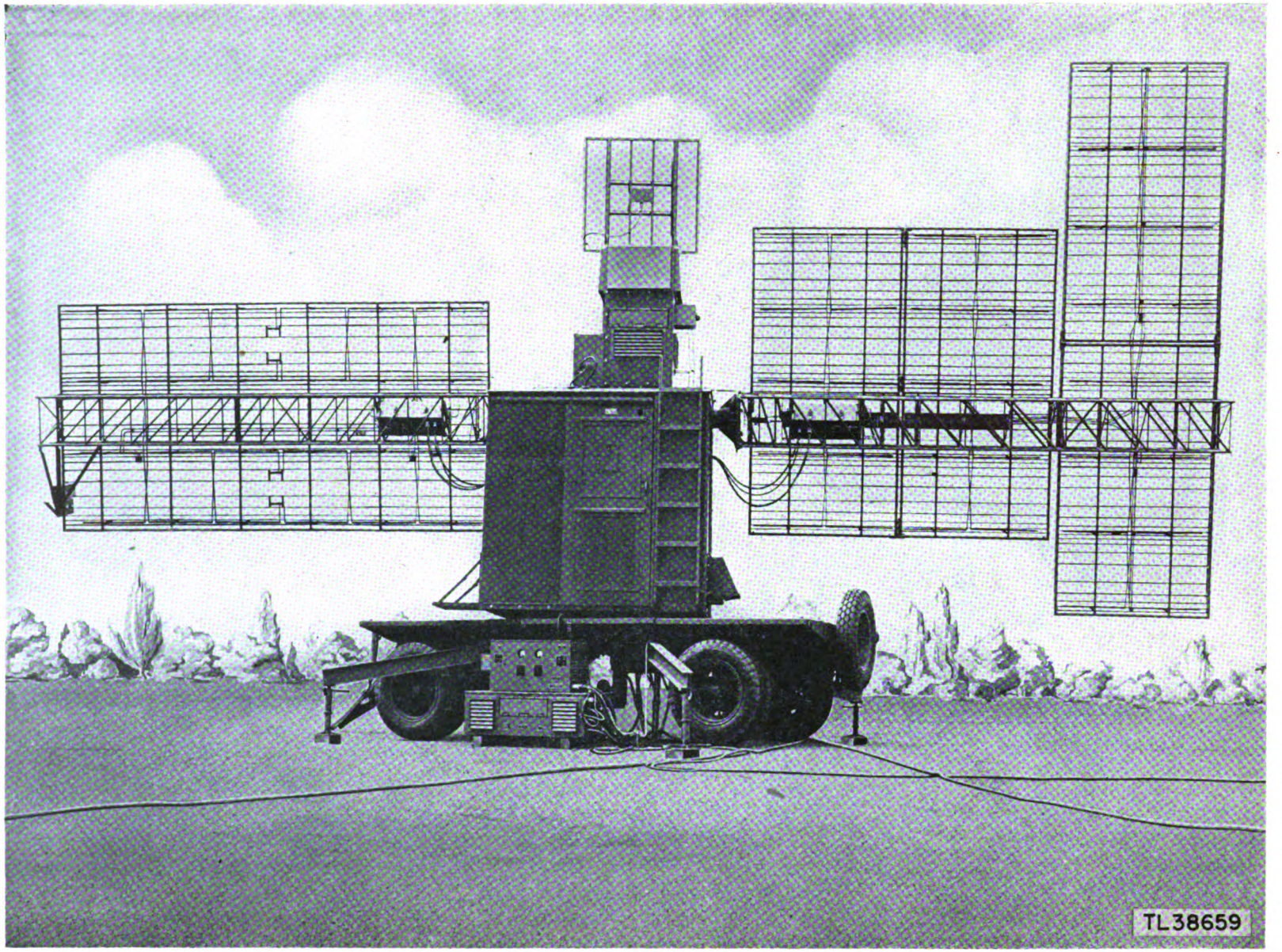

Frontispiece. Radio Equipment RC–148–B installed with Radio Set SCR–268–B.

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CHAPTER 1

GENERAL DESCRIPTION

Section I. PURPOSE OF THE EQUIPMENT

1. Purpose of Radio Equipments RC–148, RC–148–B, and RC–148–C

Radio Equipments RC–148, RC–148–B, and RC–148–C are small compact IFF sets that are designed to identify the planes detected by the Radio Sets SCR–268, SCR–268–B, and SCR–268–C. The equipments are placed on the operating mounts of the radio sets and are operated together with them. Any target appearing on the radio set range oscilloscope screen can be immediately identified as friend or foe by using this equipment.

2. Scope of Manual

a. This manual is prepared to acquaint radar operators and repair men with the general features and technical operation of Radio Equipments RC–148, RC–148–B, and RC–148–C. The chapters of the manual are as follows:

(1) General Description.
(2) Installation.
(3) Operation.
(4) Equipment Performance.
(5) Conversion for Travel.

b. This manual is concerned primarily with the installation and technical operation of the radio equipment. It is a practical guide on how to use the equipment. It presents an explanation of the chief function of each major group of components, but it omits discussions of circuit theory. A separate manual TM 11–1518, Service Manual, has been prepared on the theory and repair of the set.

c. The characteristics of normal equipment performance are given in chapter 4 and are tabulated on the Equipment Performance Log. The log calls for making systematic checks while the equipment is running and for recording information about performance. It specifies the conditions of efficient operation. By indicating the signs of normal functioning, it provides the basis for detecting abnormalities and for applying necessary corrective measures. The information on the log sheets, when carefully analyzed, should be useful to everyone concerned with the way the radio set performs.

d. Radio Equipment RC–148–C differs considerably in construction from Radio Equipments RC–148 and RC–148–B, although in principle the equipments are much alike. This manual treats the three different equipments, and it will be necessary for the reader to determine the model with which he is concerned, and read the section in this manual dealing with that model. The Equipment Performance Log, however, has been made up for all models.

NOTE. In this manual, references to RC–148 (*) will be used when Radio Equipments RC–148, RC–148–B and RC–148–C are meant, and to SCR–268 (*) when Radio Sets SCR–268, SCR–268–B, and SCR–268–C are meant, unless it is stated that only one model is meant. In most cases a particular model will be specified.

3. Radar Identification Systems

IFF equipment, Identification Friend or Foe, has been developed to give radar sets not only a means of detecting planes, but of identifying them. It serves the same purpose for the radar operator that a knowledge of aircraft recognition does for the individual soldier who must decide quickly whether the approaching plane is friendly or hostile. Radar will detect planes giving their direction and range, but provides no way to tell an enemy plane from a friendly one. Any delay in recognition may result in enemy planes not being intercepted before their mission is accomplished, or in our planes being fired at by our own men. With IFF equipment, the radar operator can identify the planes he picks up, thus avoiding the danger in a delayed recognition.

Section II. FUNCTIONING OF THE EQUIPMENT

4. Basic Radar Identification Systems

a. The RC–148–(*) works in a similar way to most other IFF equipment. It closely resembles a small radar set, radiating a short pulse of radio

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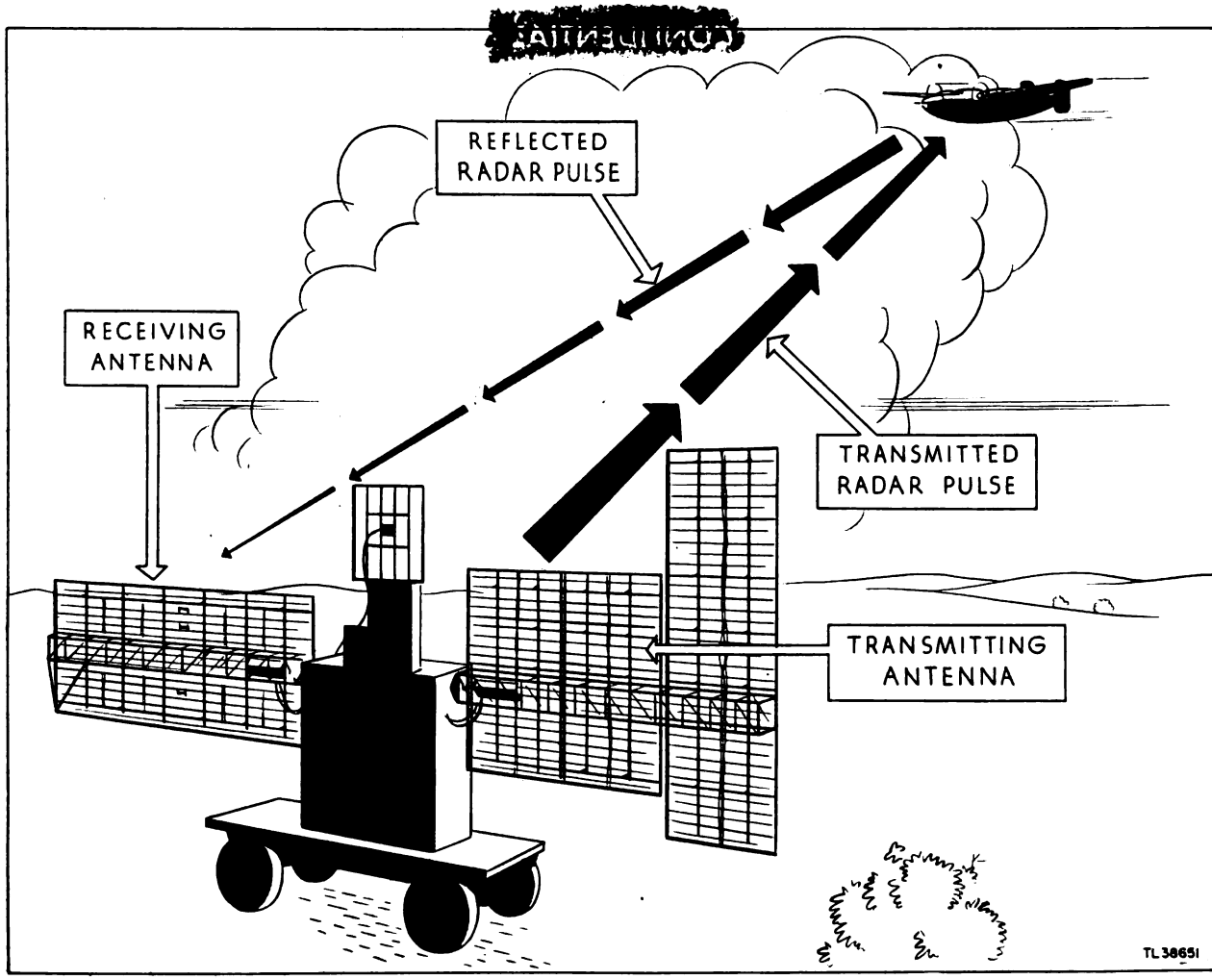

Figure 1. Principle of radar operation.

frequency energy in a narrow beam that travels to the target and is returned by it to the receiving equipment of the IFF set. Its narrow beam and rotating antenna enable it to examine space with radio waves in the same way as any radar set. However, while the radar set sends out a pulse which is merely *reflected* by the target, the pulse from the IFF is received by the plane (target) which in turn transmits another pulse back to the IFF receiver. There is a receiver-transmitter in the plane to accomplish this called a transpondor. Negligible time is lost in receiving and transmitting the pulse in the transpondor, and as in a radar set, the elapsed time between the original transmitted pulse and the return of the pulse from the plane can be used as an accurate measure of the range of the target.

b. (1) Figure 1 shows what takes place when a radar set detects a target; figure 2 shows how the IFF receives its reply. The two procedures are contrasted in the following table:

RADAR	IFF
(*a*) Transmits pulse.	(*a*) Transmits interrogation pulse.
(*b*) Pulse travels to plane.	(*b*) Pulse travels to plane.
(*c*) Pulse is *reflected* by plane.	(*c*) Pulse is received by transpondor in plane; received pulse triggers transpondor in plane; transpondor transmits pulse.
(*d*) Reflected pulse returns to receiver.	(*d*) Transpondor reply pulse returns to IFF receiver.
(*e*) Received pulse displayed on screen.	(*e*) Received pulse displayed on screen.

(2) It is the additional *push* given to the original pulse that enables the small IFF set to have the same range as the larger and more powerful radar set.

c. It should be remembered that identification

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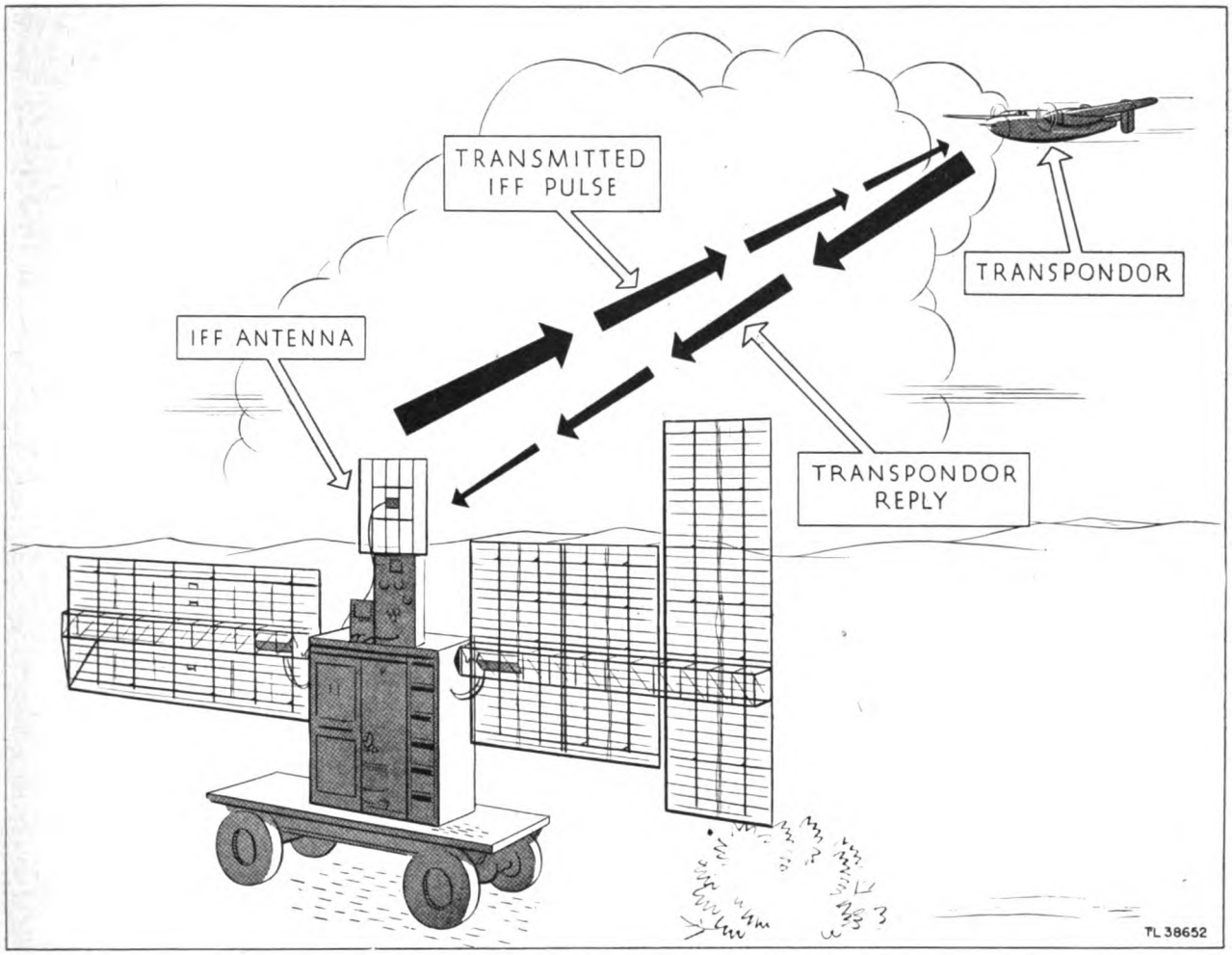

Figure 2. Principle of IFF operation.

using IFF equipment always depends upon the presence of the appropriate transpondor in the plane being challenged. All friendly planes in certain regions do not necessarily carry transpondors and those which are so equipped have the option of turning them on or off. For these reasons, the operating condition of the RC–148–(*) should never be judged by the presence or absence of identifying pulses from planes known to be friendly.

5. Data Presentation

a. The received pulses from the IFF receiver are displayed on the SCR–268–(*) range scope at the same time as the received radar echoes. It is possible to see both the original target echoes and the IFF pulses at the same time, providing immediate identification of the detected plane. The transmitted pulse of the SCR–268–(*) appears rising above the baseline on the range scope (at the left in fig. 3); the main pulse of the IFF will appear exactly below it, extending beneath the baseline. The received

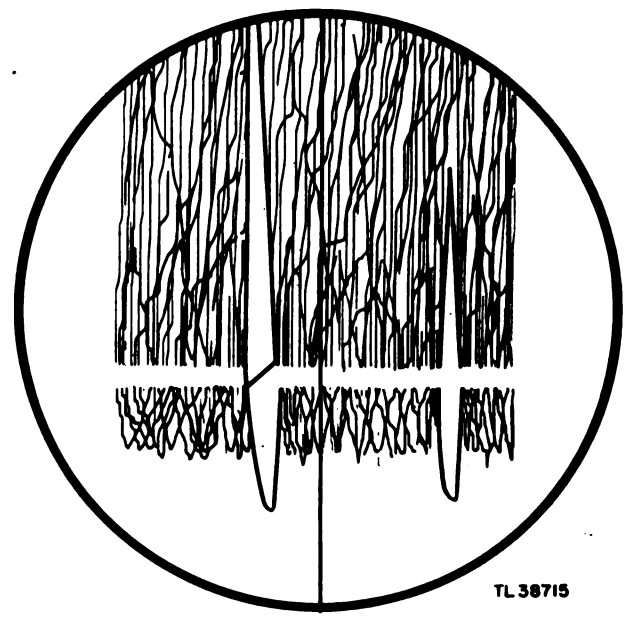

Figure 3. Radar and IFF data presentation.

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Radio Set SCR–268–(*) echo rises above the baseline at the distance from the main SCR–268–(*) pulse corresponding to the range of the target, and the IFF echo will appear directly below the SCR–268–(*) echo from the same target and extending below the baseline.

b. Normally, the SCR–268–(*) is operated without the identification information being displayed, and the range scope appears as it does in ordinary radar operation (fig. 4). When the operator wishes to identify a target, he switches the IFF equipment to OPERATE, and the IFF information immediately appears on the screen, as shown in figure 3.

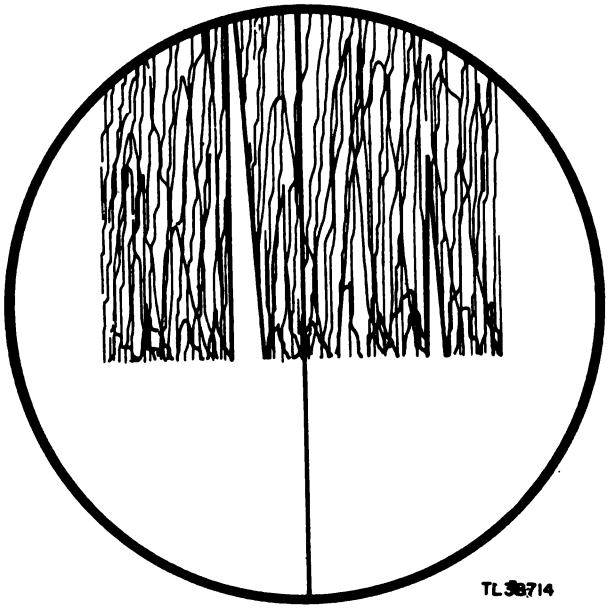

Figure 4. Radar data presentation.

6. Coding

Additional security is provided by having signal replies of two different widths transmitted by the transpondor in various sequences. (There is a third width, which is the widest, for emergency use only when the aircraft is in trouble.) The two widths are referred to as wide and narrow; the wide reply pip appears about three times as wide as the narrow reply pip. These two types of response, together with a blank (no signal at all), are used in several sequences to form a prearranged code. The identifying signal replies must appear in the correct sequence for the aircraft to be assumed friendly.

Section III. COMPONENTS OF THE EQUIPMENT

7. General

This section of the manual presents a general external description of the individual components comprising the RC-148-(*) and in broad outline also tells what each component does. A detailed theoretical treatment of the functioning of each component is presented in TM 11–1518, Service Manual, along with circuit diagrams. This section will be limited to a general explanation of what the different components accomplish and how they fit together to make up the entire radio equipment.

8. Electrical Input Requirements

The electrical requirements are as follows:

	RC–148, RC–148–B	RC–148–C
Voltage	117.5 volts, single phase	117.5 volts, single phase
Frequency	60 cycle	60 cycle

9. Control and Distribution of Power

a. The power for the RC-148-B is supplied through Cable 103 from Junction Box JB-22 mounted on the pedestal of Radio Sets SCR-268 and SCR-268-B. The power for the entire equipment is distributed through the transmitter and is controlled by means of a circuit breaker which is on the front panel of the transmitter. The components, however, have individual power switches.

b. The power for the RC-148-C is supplied from Junction Box JB-72, mounted on the SCR-268-C, and is distributed through Power Supply RA-105-A. It is controlled by two circuit breakers which are located on the front panel of the power supply.

c. To protect the personnel of the RC–148 and RC-148-B who may be required to adjust or repair units within the component, the transmitter has four protective interlock switches. These interlocks cause power to be cut off the entire set when the side panels, rear panels, or bottom plate of the transmitter are removed. The other components do not have interlocks.

d. There are two interlocks in the RC-148-C. The interlock in Power Supply RA-105-A is located at the rear of the chassis and removes the a-c input voltage when the chassis is pulled forward. The other is located in the center portion of the rear wiring channel of Rack FM-82 and is actuated by the slightest opening of the rear panel. Opening this switch removes all voltage to the various components.

10. Physical Specifications of Equipment

a. Radio Equipment RC-148 or RC-148-B com-

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plete with tubes and cables weighs about 450 pounds. The components are mounted on the corresponding SCR-268 and SCR-268-B trailer. The transmitter and receiver are mounted on a rack beneath the oscilloscope shelf; the antenna matching section is mounted directly beneath and to the rear of the oscilloscope shelf; and the control unit is mounted on the oscilloscope shelf between the azimuth and range oscilloscopes.

b. Radio Equipment RC-148-C, complete with tubes and cables, weighs about 450 pounds. The components are mounted on the SCR-268-C trailer. The transmitter and receiver contained in the same chassis are mounted with the power supply chassis in the rack beneath the oscilloscope shelf. The interconnector BC–1298 is mounted on the oscilloscope shelf between the azimuth and range oscilloscopes.

List of major components
RC–148 and RC–148–B

Description	Signal Corps designation
Control Unit: (Contains interconnector and wavemeter)	BC–1073–A
Receiver	BC–1068–A
Transmitter	BC–1072–A
Mounting Rack	
Antenna	AN–128–A
Antenna Matching Section	MC–295–A
Conversion kit for Oscilloscope BC–412	
Spare Parts Chests	CH–154 and CH–160

List of major components
RC–148–C

Description	Signal Corps designation
Interconnector	BC–1298
Radio Receiver and Transmitter	BC–1267–A
Power Supply	RA–105–A
Antenna	AN–128–A
Antenna Matching Section (contained in BC–1267–A)	
Mounting Rack	FM–82
Signal Generator	I–222–A
Conversion kit for Oscilloscope BC–412	
Spare Parts Chests	CH–224 and CH–237

11. Sizes and Weights of Components

In the tables below the dimensions and weights of each of the major components are given.

Sizes and weights of components RC–148 and RC–148–B

Component	Size (inches)			Weight (lb)
	Height	Length	Width	
Control Unit BC–1073–A	18⅝	27$^{3}/_{32}$	5$^{8}1/_{32}$	96
Receiver BC–1068–A	9$^{9}/_{16}$	15$^{15}/_{16}$	18$^{5}/_{32}$	89
Transmitter BC–1072–A	17$^{29}/_{32}$	18$^{5}/_{16}$	20$^{3}/_{16}$	163
Mounting Rack	34	22⅝	36	125
Antenna AN–128–A	47	18	47	43
Signal Generator I–198–A	7¾	10⅝	7$^{7}/_{16}$	13

Sizes and weights of components RC–148–C

Component	Size (inches)			Weight (lb)
	Height	Length	Width	
Interconnector BC–1298	11⅛	27¼	6¼	63.5
Radio Receiver and Transmitter BC–1267–A	10	23⅞	18$^{13}/_{32}$	64.5
Power Supply RA–105–A	10	23⅞	18$^{13}/_{32}$	118.5
Rack FM–82	20¾	24⅛	19½	67
Antenna AN–128–A	47	18	47	43
Signal Generator I–222–A	12	19½	7½	50

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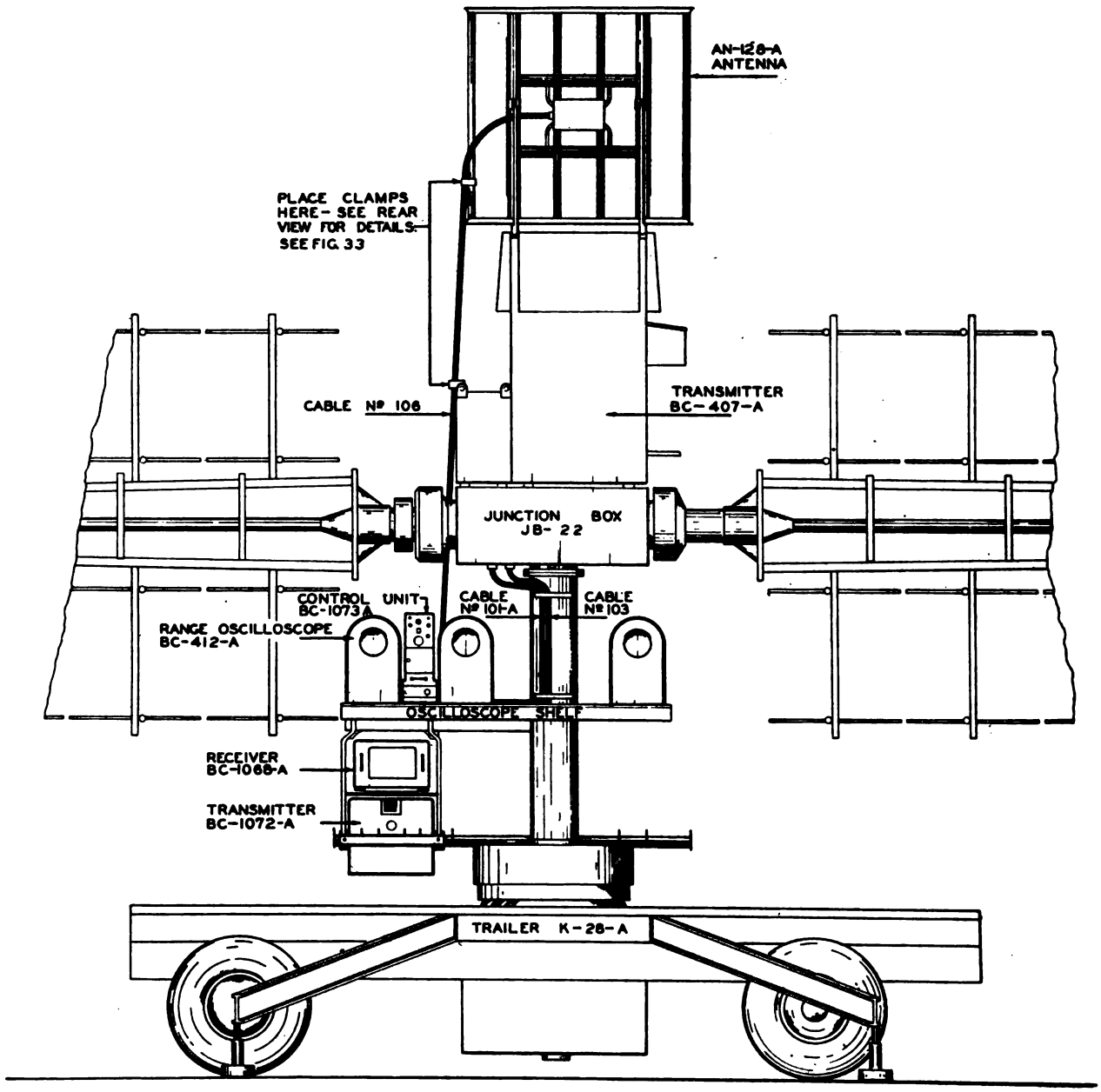

Figure 5. Radio Equipment RC–148–B mounted on Radio Set SCR–268–B.

12. Bracket Assembly for Radio Equipments RC–148 and RC–148–B

A mounting frame is provided for the transmitter and receiver. This mounting frame consists of two malleable iron Mounting Brackets FT-358 to which two shock mounting plates are attached, one for the transmitter and the other for the receiver. These are assembled and installed underneath the oscilloscope table (fig. 7).

13. Rack FM–82 for Radio Equipment RC–148–C

a. The rack (figs. 8 and 9) which is mounted on Radio Set SCR–268–C houses the radio receiver, transmitter, and power supply. The rack (FM–82) carries slide rails for the units which are mounted in it, interconnecting receptacles for these units, and interconnecting cables. It has been so designed that when any of the components is pushed into place electrical connections to that component are automatically made. The interconnecting receptacles and cables are at the rear of the rack and are permanently mounted. This arrangement facilitates quick assembly and disassembly of the equipment since there is very little external cabling.

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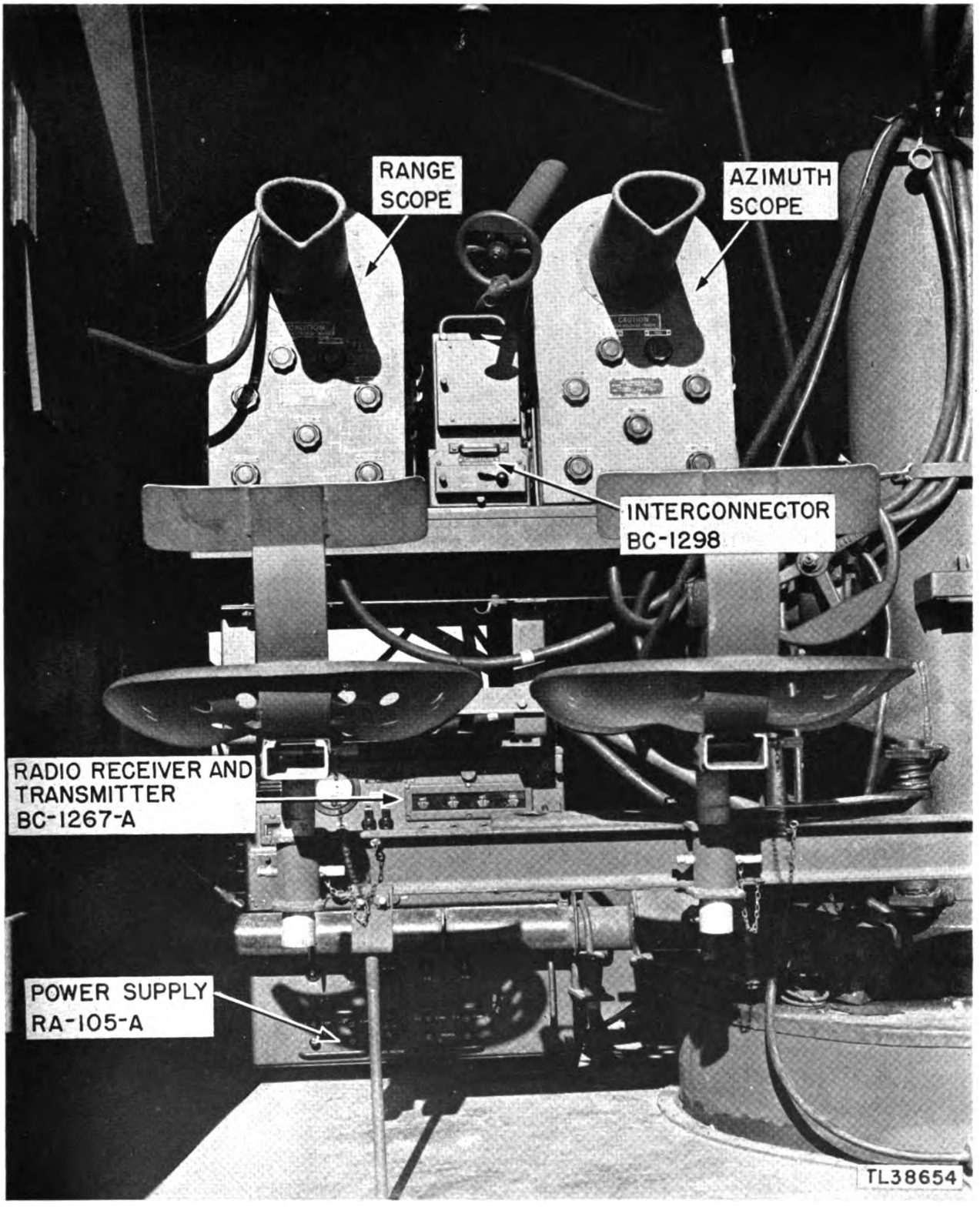

Figure 6. Radio Equipment RC-148-C mounted on Radio Set SCR-268-C.

b. The rack (fig. 8) is divided into two sections which contain the following components (from top to bottom):

(1) Radio Receiver and Transmitter BC-1267-A.

(2) Power Supply RA-105-A.

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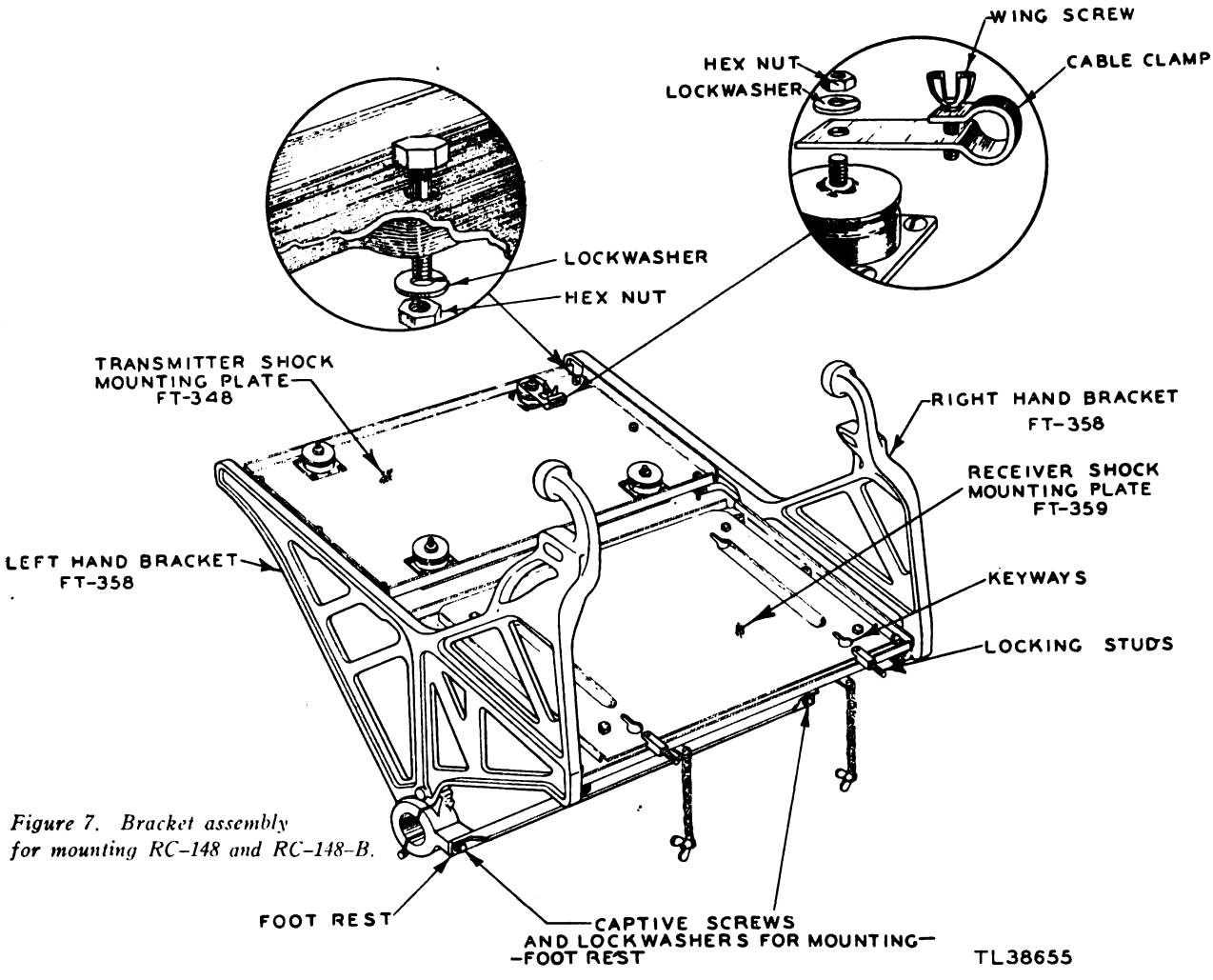

Figure 7. Bracket assembly for mounting RC–148 and RC–148–B.

c. For purposes of safety an interlock switch is included in the rack wiring. This switch, located in the center portion of the rear wiring channel, is actuated by the slightest opening of the rear panel immediately cutting off all voltage to the various components.

d. The rack is provided with six lifting handles. It is commonly shipped with all the components in place but without the external cords attached. In operation there are five external cords which are atttached to receptacles mounted on the rear of the rack (figs. 8 and 9).

14. Control Unit BC–1073–A for Radio Equipments RC–148 and RC–148–B

a. The interconnector of the control unit is the heart of the set. The following are its chief functions:

(1) To synchronize the operation of the identification equipment so as to permit simultaneous reproduction of the radar pulse and echo, and the IFF interrogating pulse and response.

(2) To receive a timing voltage from the SCR–268–(*) keyer, process it, and send it to the transmitter.

(3) To provide a single switch for switching the entire set from a stand-by position, in which the entire equipment is held in condition to function, to an operating position in which the equipment is actually functioning.

(4) To provide a means for routine testing and adjustment of the entire identification equipment.

b. The function of the wavemeter is to measure the transmitter and receiver frequencies.

c. The control switches on the interconnector section of the control unit (fig. 10) include an ON-OFF toggle switch, a SIGNAL WIDTH power toggle switch used in connection with the testing section, an indicator lamp, and the PHASE, GAIN, DIVISION, and BASELINE controls. There is

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Figure 8. Rack FM–82, front view.

also a 3-ampere fuse and a spare fuse. The STANDBY OPERATE switch and the seven position switch for testing purposes are in the lower section of the front panel. This lower section has a separate door with a connection to an external STANDBY OPERATE switch.

d. The upper portion of the control unit is the wavemeter. On the front panel there is an ON-OFF power switch and a REC-TRANS ALIGNMENT switch, an EYE ADJ knob, an AUX OSC tuning knob, a TUNING handwheel with a calibrated scale and a short transmitting antenna (ANT.). A hinged panel on the top of the control unit has a chart on it that is used with the wavemeter.

15. Interconnector BC–1298 for Radio Equipment RC–148–C

a. The functions of the interconnector for Radio Equipment RC–148–C are the same as those described for the RC–148 and RC–148–B discussed in paragraph 14*a* above. The wavemeter on the RC–148–C is omitted and a signal generator is used to measure the transmitter and receiver frequencies.

b. The control switches on the interconnector (fig. 97) include an ON-OFF toggle switch, an indicator lamp, and the PHASE, GAIN, DIVISION, and BASELINE controls. There is also a 3-ampere fuse and a spare fuse. The STANDBY OPERATE switch and the five position SELECTOR

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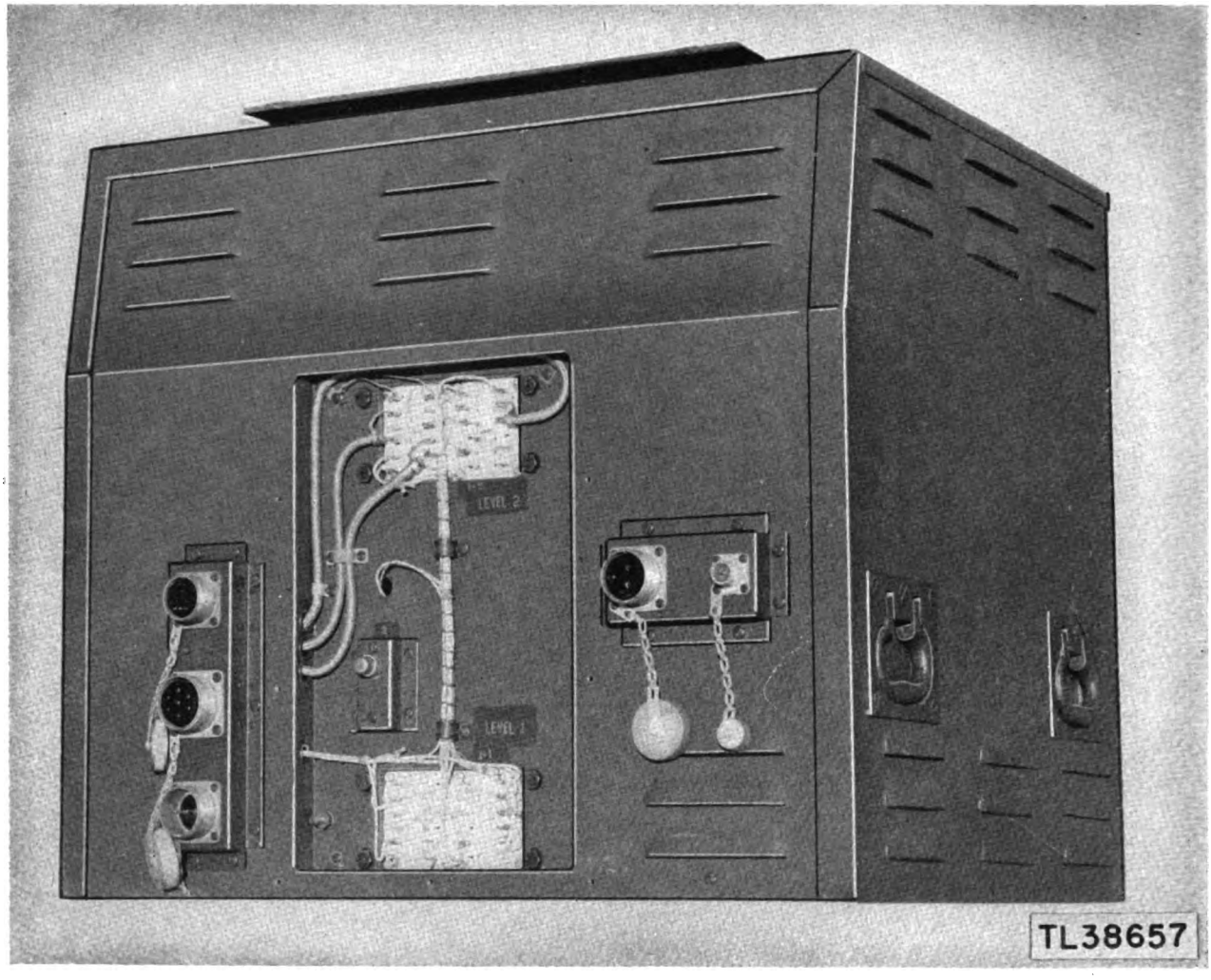

Figure 9. Rack FM–82, rear view.

switch for testing purposes are in the lower section of the front panel. This lower section has a separate door with a connection to an external STANDBY OPERATE switch.

16. Transmitter BC–1072–A for Radio Equipments RC–148 and RC–148–B and Transmitter for Radio Radio Equipment RC–148–C

a. The transmitter produces the pulses of radio energy that are sent out into space to trigger the transpondor in the airplane so that the identification signal can be returned to the ground IFF operator. To distinguish between transmitted and received signals, it is necessary to produce the radio energy in the form of short bursts or pulses at regular intervals in much the same manner as the parent radar set, so that between transmitted pulses there will be time to see the return reply pulse. This is accomplished in the transmitter by the combined action of the high-frequency oscillator and the modulator section. The modulator receives a timing voltage from the control unit, which has received it from the SCR–268–(*) keyer, gives this voltage the proper shape and amplitude, and turns the transmitting oscillator *on* and *off* a certain number of times per second. Each time the transmitting oscillator is *on*, a pulse goes out into space; each time it is *off* the equipment is prepared to receive the identification signal from the interrogated airplane.

b. In addition to the high frequency oscillator, the modulator section, and the power supplies, the transmitter contains a test circuit section. This section together with the test (range) scope, aids in determining whether or not the transmitter is operating properly.

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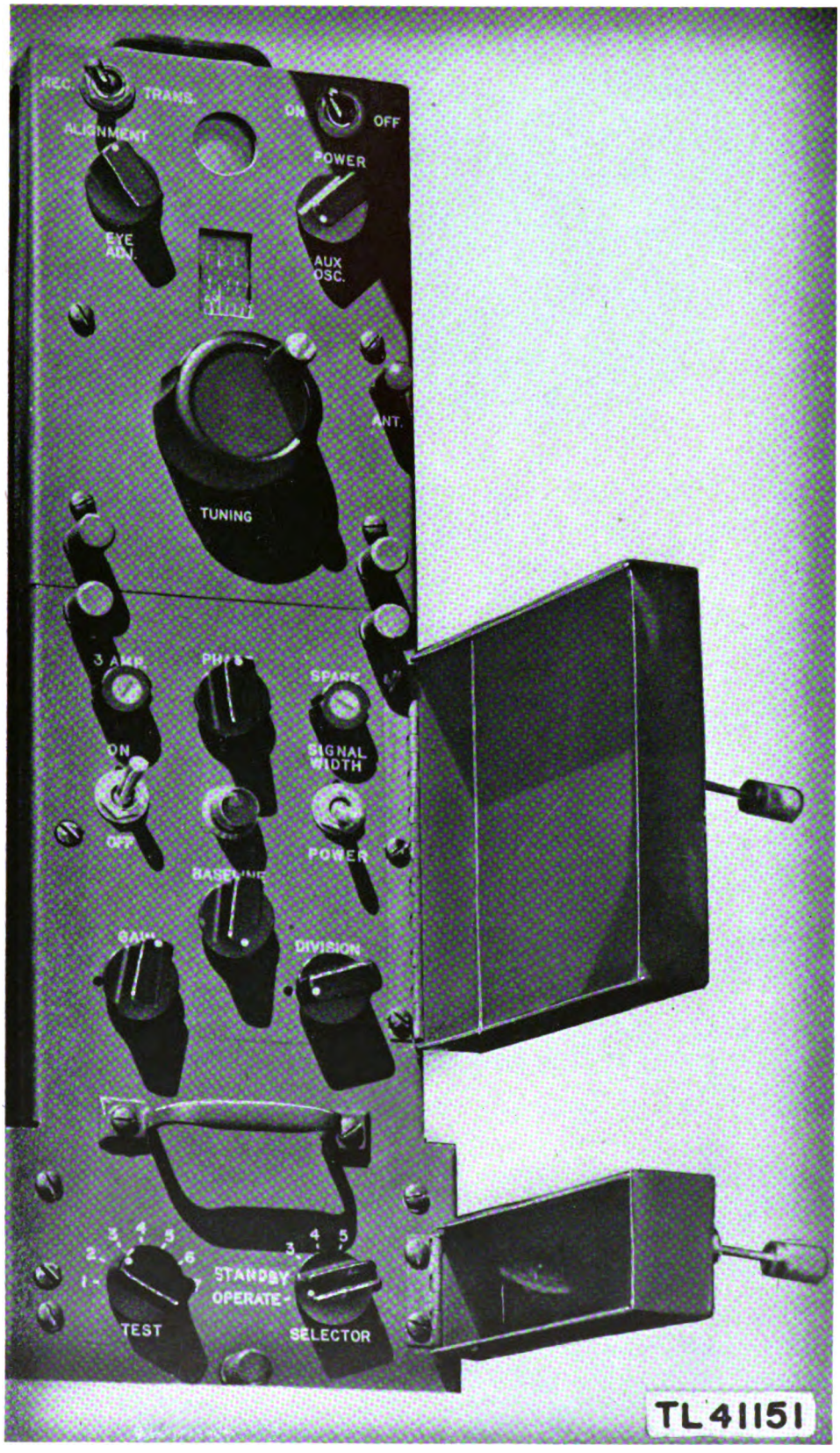

Figure 10. Control Unit BC-1073, front panel.

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Figure 11. Transmitter BC–1072–A, front panel.

c. In the RC–148 and RC–148–B, the electrical energy required to develop the radio waves of proper strength is furnished by a power supply incorporated in the transmitter. In the RC–148–C, the power supply is a separate unit mounted in Rack FM–82.

d. The controls in the transmitter used with the RC–148 and RC–148–B are illustrated in figure 11. The controls on the front panel include a circuit breaker which controls the power for the entire set, a high-voltage variac, five toggle switches, a d-c voltage current meter, a red indicator lamp, and two screw-driver adjustments. There is also a screw-driver adjustment in the rear of the transmitter chassis. The two screw-driver adjustments on the front panel are for vernier tuning and bias control. The rear screw-driver adjustment is part of the oscillator tuning section. In addition, there are two 5-ampere fuses, two spare fuses, and a meter light on the front panel. The five toggle switches are used as follows:

(1) To turn meter light ON and OFF.

(2) To shift meter from reading voltage to reading current.

(3) To turn low voltage ON and OFF.

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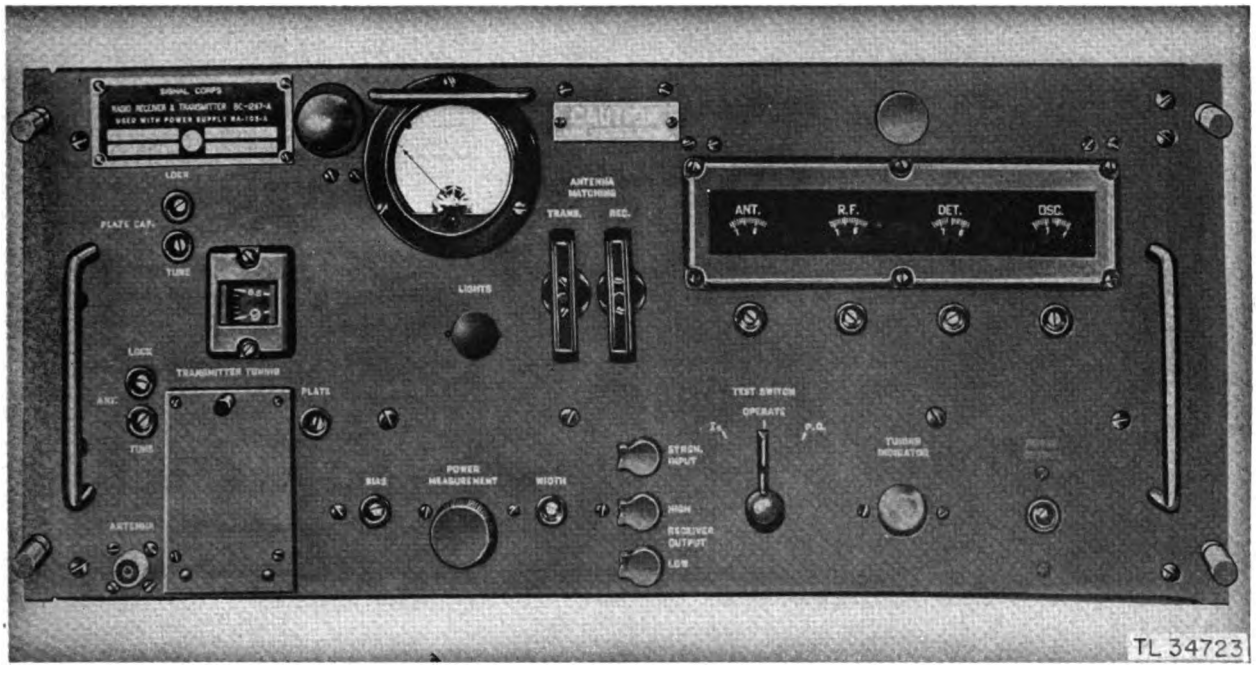

Figure 12. Radio Receiver and Transmitter BC–1267–A, front panel.

(4) To turn high voltage ON or OFF.

(5) To reset the overload relay.

e. The controls in the transmitter used with the RC–148–C are illustrated in figure 12. The receiver and antenna matching section controls are also on the same panel. The controls for the transmitter include PLATE CAP TUNE, ANT. TUNE, TRANSMITTER TUNING PLATE (transmitter tuning), BIAS, POWER MEASUREMENT, WIDTH, LIGHTS (dial light control), a d-c milliampere meter, TEST SWITCH OPERATE, SYNCH INPUT, and POWER OUTPUT. The antenna tuning control (ANT), the plate capacity control (PLATE CAP) have a locking device (LOCK) which must be released by turning it counterclockwise with a screw driver located above the receiver dials. This screw driver, which has a knurled knob handle, can be removed by unscrewing.

17. Receiver BC–1068–A for Radio Equipments RC–148 and RC–148–B and Receiver for Radio Equipment RC–148–C

a. The receiver, like the transmitter, performs a basic function. It does what its name implies; it receives the identification signal sent by the transpondor in the airplane. When signals are picked up by the antenna, they are conducted through the transmission line to the antenna matching section and finally to the receiver where they are given the amplitude or strength required to operate the indicating oscilloscope. This receiver operates in a manner similar to any ordinary radio receiver. There are differences, of course, but the underlying process is identical. Radio waves are picked up and processed through amplifying circuits. They are then fed into an indicating system, the loudspeaker on the ordinary radio, or the scope on the identification set.

b. In addition to picking up identification signals from interrogated aircraft, the receiver accepts a portion of each transmitted pulse. By the nature of the IFF equipment, the interrogating pulse and the re-

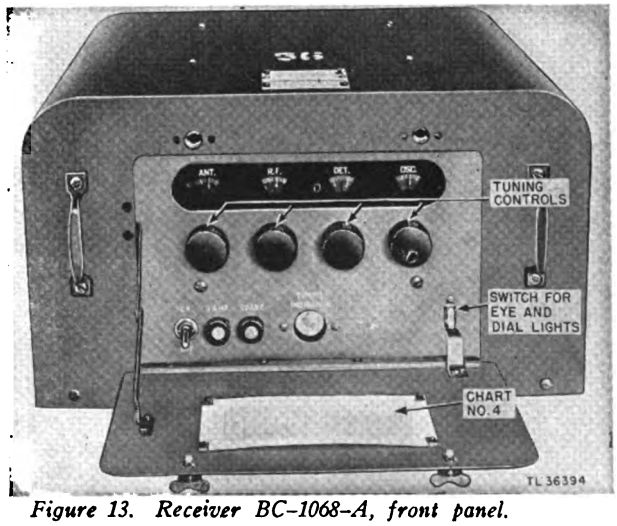

Figure 13. Receiver BC–1068–A, front panel.

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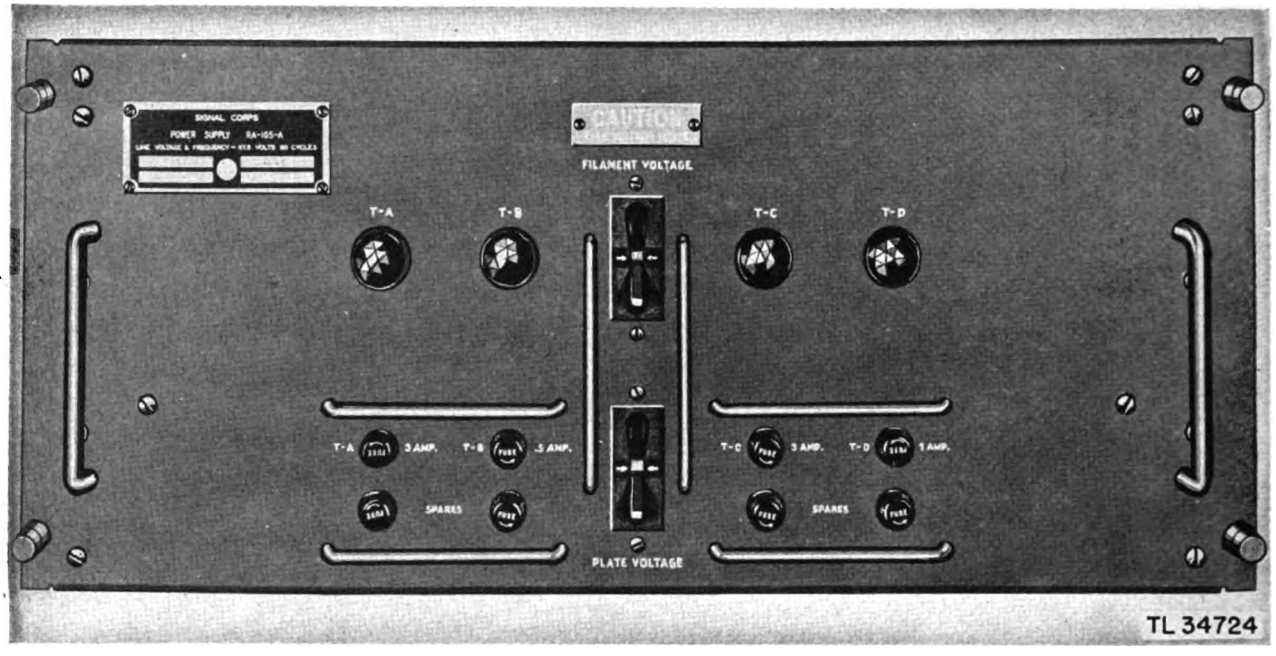

Figure 14. Power Supply RA–105–A, front panel.

turned identification signal are separated in time. In the associated radar set, the main pulse and the echoes are similarly separated in time. All the signals are fed into the radar (range) indicating scope, where by appearing simultaneously, the identification signal is immediately associated with the radar echo.

c. The controls in the receiver used with the RC–148 and RC–148–B are illustrated in figure 13. There are four tuning controls labelled ANT., R. F., DET. and OSC., an associated tuning eye indicator, an ON-OFF toggle switch, one 3-ampere fuse, and one spare fuse. There is also a panel light switch that is operated by the hinged door covering the front panel. On the inside of this hinged door, there is the chart used when tuning the receiver.

d. The controls in the receiver used with the RC–148–C are illustrated in figure 12. They are located on the same panel as the transmitter controls. There are four tuning controls labelled ANT., R. F., DET., OSC. which are adjusted by means of the small screw driver located just above these dials. There is also an associated tuning eye indicator as well as a high and low RECEIVER OUTPUT jack used to check db gain of the receiver.

18. Power Supply RA–105–A for Radio Equipment RC–148–C

Power Supply RA–105–A is a separate unit on Radio Equipment RC–148–C. It furnishes all the d-c and filament voltages used throughout the entire equipment. The power is taken from a 117.5-volt, 60-cycle line, making possible the use of this radio equipment either with a standard portable primary source of power or with power from any standard public utility source. Circuit breakers are used in both the high-voltage and filament circuits. All circuits are fused on the front panel (fig. 14).

19. Signal Generator I–222–A for Radio Equipment RC–148–C

a. This component is supplied with Radio Equipment RC–148–C to be used in place of the wavemeter with the RC–148–B. This piece of equipment is a combination signal generator and heterodyne type wavemeter. A 5-megacycle crystal oscillator is incorporated as a standard frequency calibrator. Also incorporated in the signal generator is an output attenuator. The entire unit is housed in a portable metal cabinet and operates from a 117.5-volt, 60-cycle line. This component is used to tune the receiver and transmitter to the operating frequency. The calibration of the unit itself can be checked and it can be placed back on calibration if it should vary from its original calibration.

b. On the panel of the Signal Generator I–222–A (fig. 15) there is an INPUT and R.F. OUTPUT connection, and a PHONES connection. The controls include RANGE, CALIBRATE, TEST-CRYSTAL, AUDIO GAIN, TUNING, MICRO-

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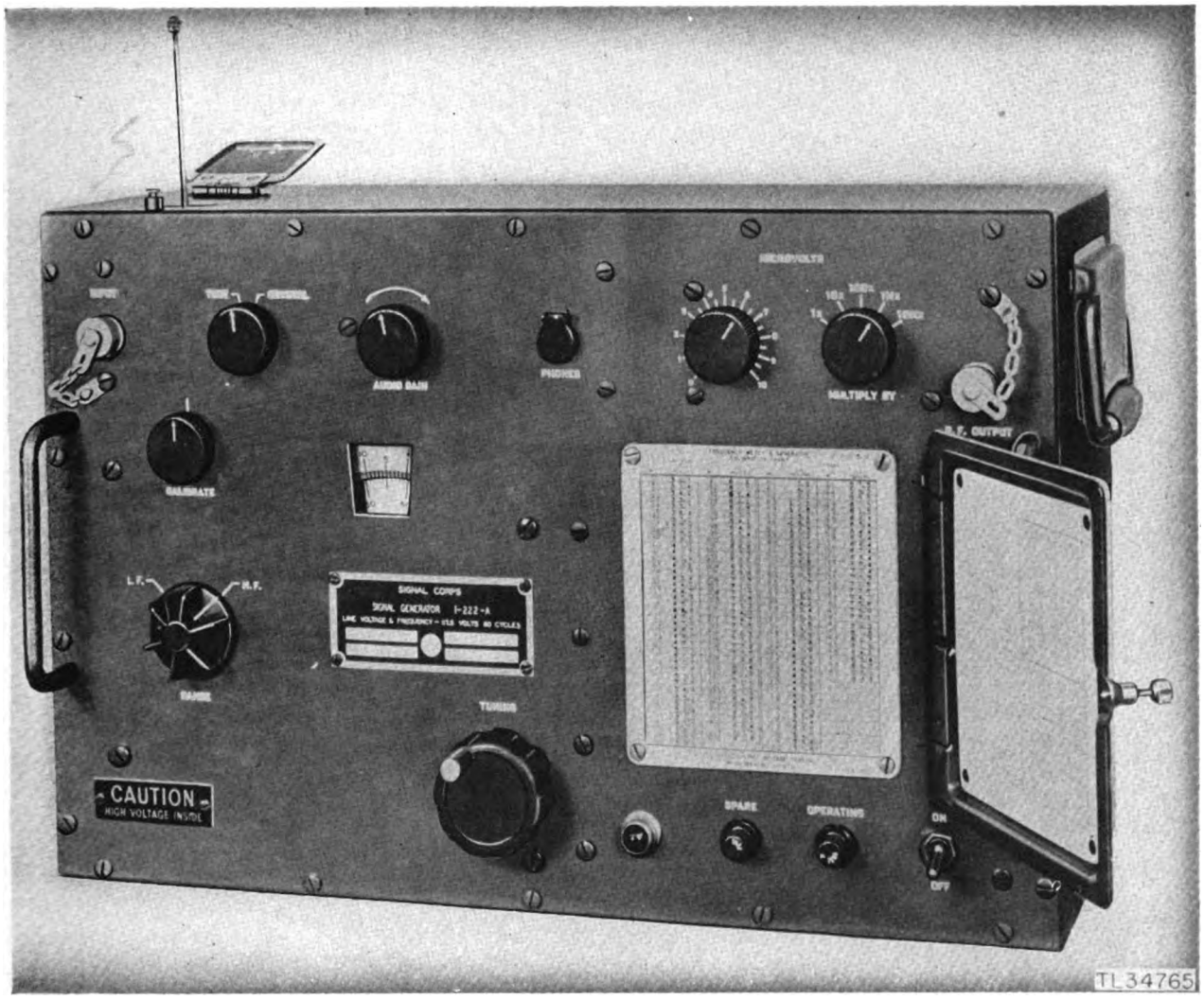

Figure 15. Signal Generator I–222–A, front panel.

VOLTS (controls input to the receiver), an ON-OFF toggle switch, an indicator lamp, a spare and an operating fuse. Underneath the hinged cover on the front panel is a chart giving calibration points for both the high- and low-frequency bands. On top is an antenna door, and when open the antenna rod can be pulled up out of the case.

20. Antenna and Antenna Matching Section

Antenna AN-128-A is used for all models of the radio equipment (fig. 16). It is mounted on top of the SCR-268-(*) transmitter. The antenna is vertically polarized and is designed to operate officially over a relatively wide frequency band. The radio energy that is developed in the transmitting oscillator is conducted to the antenna system through the antenna matching section and the r-f transmission lines. When the radio energy reaches the antenna, it is sent out into space as a directional radio beam. The antenna matching section (fig. 17) is used for the adjustment of the r-f lines between the antenna and the transmitter and the antenna and the receiver so that both receiver and transmitter can operate with the same antenna with maximum efficiency.

NOTE. On the RC–148–C the antenna matching section is included in the transmitter-receiver, and the controls are on the front panel.

21. Connecting Cables

A set of cords is furnished with this equipment. The cords are supplied with the proper connectors and each one is properly labelled so that the units may be readily connected for operating or test purposes.

22. Conversion Kit for Oscilloscope BC–412

Used with Radio Sets SCR-268-(*) are four Oscil-

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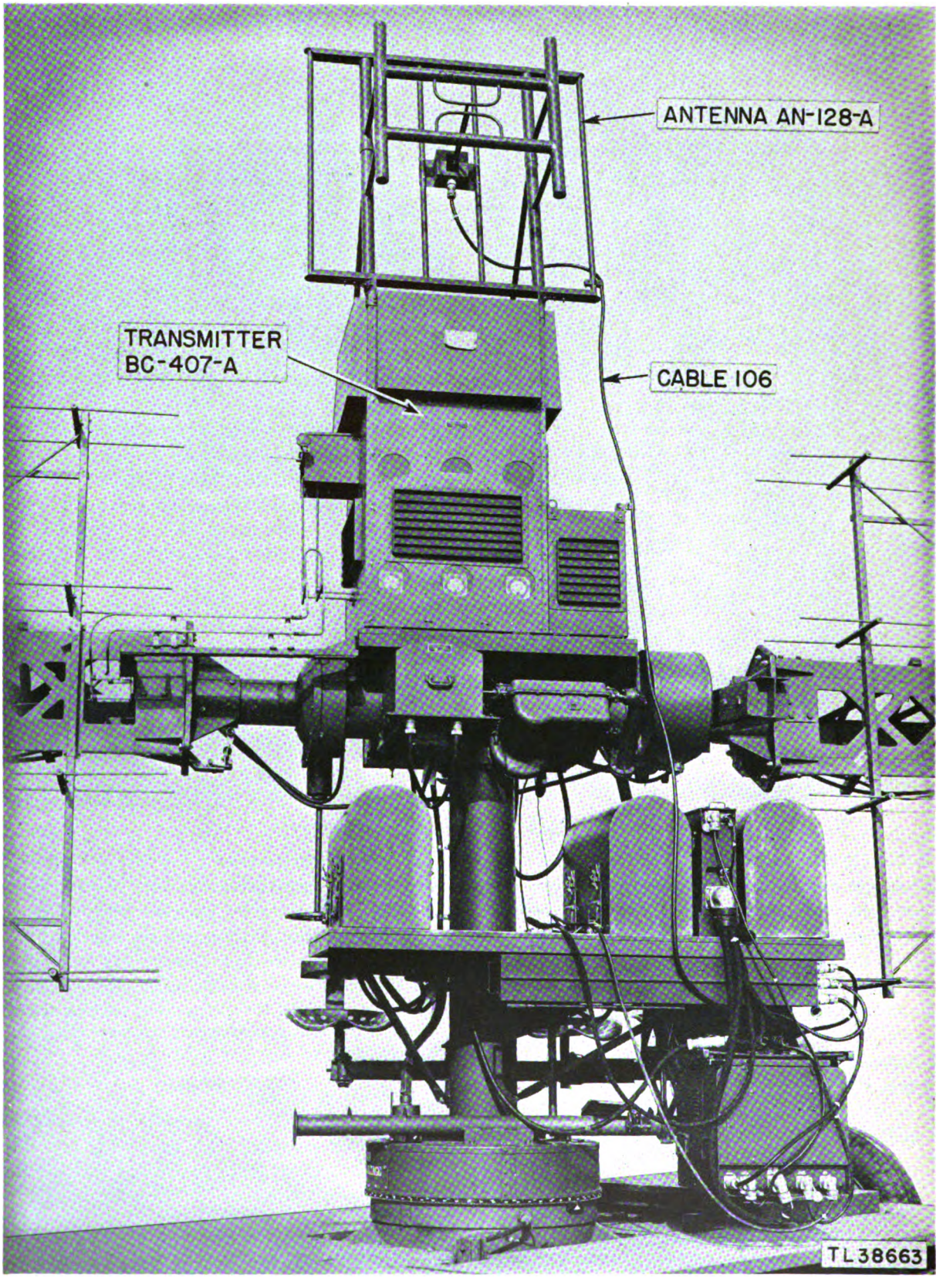

Figure 16. Antenna AN-128-A mounted on Transmitter BC-407-A.

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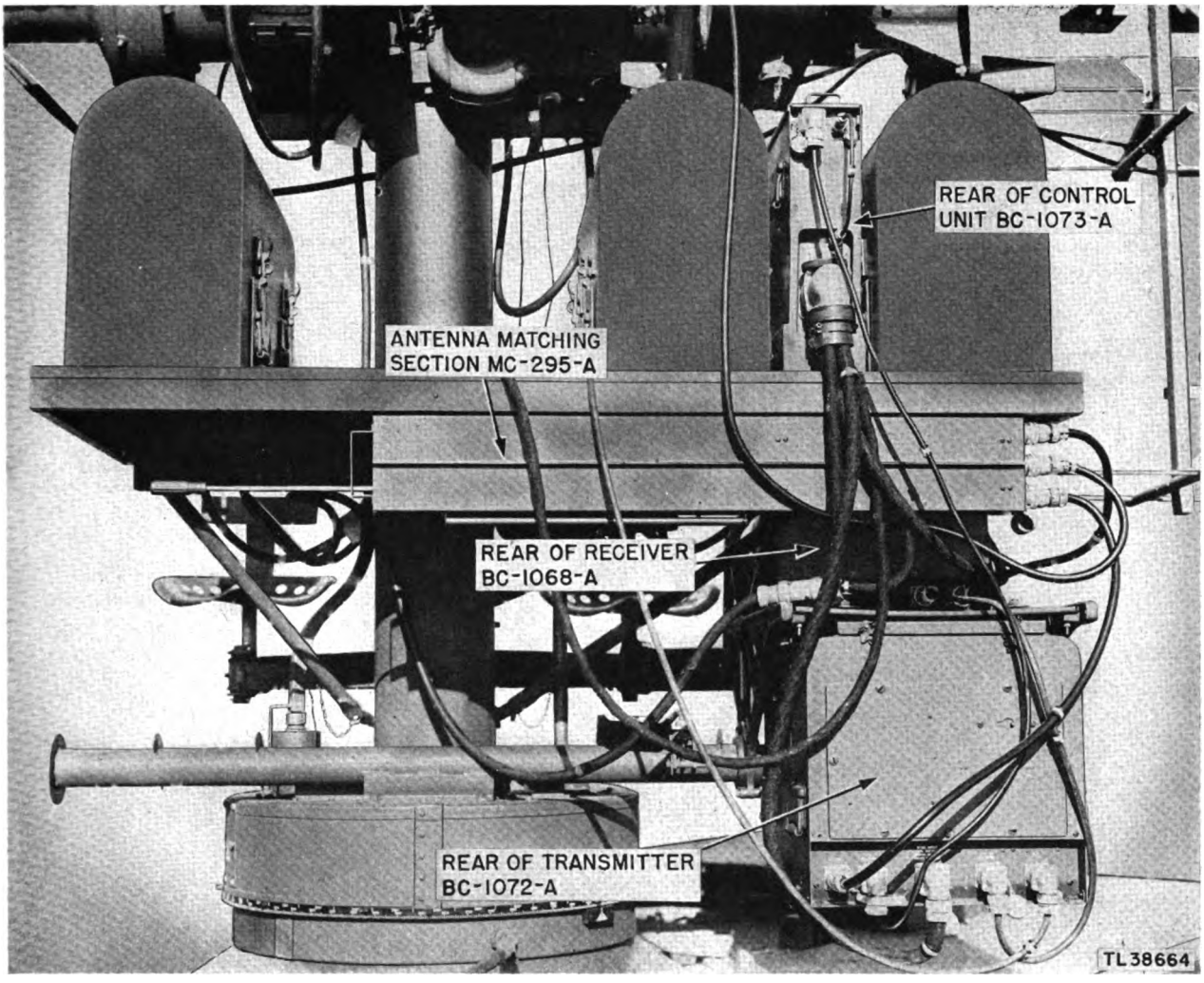

Figure 17. Antenna Matching Section MC–295–A of RC–148 and RC–148–B.

loscopes BC-412-A or BC-412-B. Three of these are in constant use; the fourth is a spare which can be used in any of the three positions. Two of the four oscilloscopes must be modified. One of them will be used as the range oscilloscope on which the IFF response is shown while the other can be used as the spare for the range scope. The conversion kit is used for this modification (fig. 18).

23. Tube Complements of Individual Components

RC–148 RC–148–B

Control Unit BC–1073–A Interconnector section			Wavemeter section		
Total equipment	Reference No.	Manufacturing type No.	Total equipment	Reference No.	Manufacturing type No.
8	VT–231	6SN7GT	1	VT–202	9002
2	VT–90	6H6	1		9006
1	VT–150	6SA7	1	VT–98	6U5/6G5
2	VT–107–A	6V6GT	1		6SF5
1	VT–197–A	5Y3GT			
1	VT–116	6SJ7			

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Transmitter BC–1072–A		
Total equipment	Reference No.	Manufacturing type No.
1	VT–231	6SN7GT
1	VT–94	6J5
2	VT–244	5U4G
1	VT–119	2x2/879
1	VT–100	807
2		9006
1	VT–202	9002
2		826

Receiver BC–1068–A		
Total equipment	Reference No.	Manufacturing type No.
1	VT–244	5U4G
1	VT–90	6H6
2	VT–176	6AB7/1853
3	VT–112	6AC7/1852
1	VT–215	6E5
1	VT–231	6SN7GT
3		6SH7
1	VT–94	6J5
1		9006

RC–148–C

Interconnector BC–1298		
Total equipment	Reference No.	Manufacturing type No.
8	VT–231	6SN7GT
2	VT–90	6H6
1	VT–150	6SA7
2	VT–107–A	6V6GT
1	VT–197–A	5Y3GT
1	VT–116	6SJ7

Signal Generator I–222–A		
Total equipment	Reference No.	Manufacturing type No.
1	VT–94	6J5
1		9006
2	VT–116	6SJ7
1	VT–202	9002
1	VT–197–A	5Y3GT/G

Transmitter		
Total equipment	Reference No.	Manufacturing type No.
1	VT–231	6SN7GT
2	VT–94	6J5
1		9006
1	VT–107–A	6V6GT
1		3E29
2		2C26

Receiver		
Total equipment	Reference No.	Manufacturing type No.
1	VT–90	6H6
7		6AG5
1		6C4
3		6AK5
1	VT–215	6E5

Power Supply RA–105–A		
Total equipment	Reference No.	Manufacturing type No.
1	VT–126–B	6X5GT
3	VT–244	5U4G
3	VT–119	2X2

24. Spare Parts Equipment

a. With the RC-148 and RC-148-B there are two spare parts Chests CH-154 and CH-160. CH-154 contains two oscilloscope adapter kits, a Signal Generator I-198-A, a spare blower, a log book and a complete set of spare tubes. Chest CH-160 contains complete set of spare parts.

b. With the RC-148-C are furnished two spare parts Chests CH-224 and CH-237. Chest CH-224 contains spare parts and spare tubes for the receiver and transmitter unit and for the power supply unit. Chest CH-237 contains a spare interconnecting unit, a spare oscilloscope modification kit, spare parts and spare tubes.

25. Facilities for Maintenance of Radio Equipments RC–148–(*)

Another matter of general interest relates to special facilities that have been provided for adjusting and servicing the equipment. An attempt has been made to construct the components so that their adjustment, operation, and repair will be as easy as possible. All of the switches and controls that are necessary for setting up and operating the radio equip-

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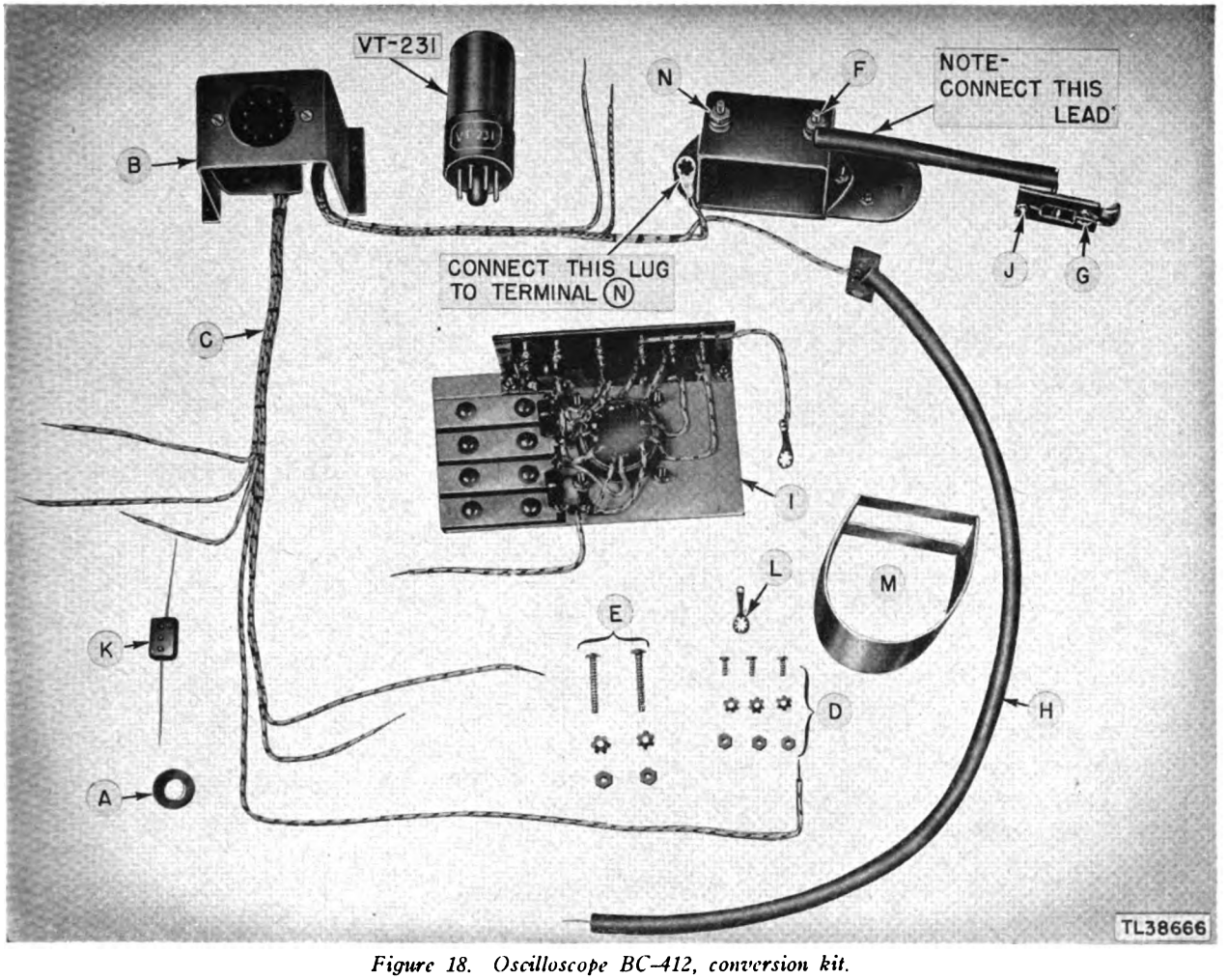

Figure 18. Oscilloscope BC–412, conversion kit.

ment have been made readily accessible. Beyond this, one of the components has screw-driver type controls on the front panel when additional circuit adjustments are required. These controls make it unnecessary to remove the components from their normal operating positions in order to adjust them. A test switch is also provided so that the repairman can test the operation of the set and locate troubles rapidly enabling him to make any necessary repairs without too much delay.

NOTE. On Radio Equipment RC–148–C the radio receiver and transmitter and antenna matching section are included in one cabinet.

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CHAPTER 2

INSTALLATION

Section I. GENERAL INSTALLATION

26. Introduction

The installation of Radio Equipments RC–148, RC–148-B, and BC-148-C is discussed in sections II to VII in this chapter. It will be of interest chiefly to those who receive the equipment from the manufacturer and who must install it on the corresponding Radio Set SCR–268. For those who are going to operate a set already installed, chapter 3 will be of greater interest. However certain parts of chapter 2 will be needed at various times; for example, the section on antenna installation for those who are going to take down and move Radio Set SCR-268 and the section on installing components and cabling for those who must remove components for servicing. The various parts in the remainder of this chapter are listed below.

a. INITIAL INSTALLATION. The installation of the mounting rack and components for use with Radio Set SCR–268 is described in sections II and III which give detailed instructions on installing the rack, placing other components in the rack, and completing the wiring to the primary power source.

b. ANTENNA INSTALLATION. Section IV describes the procedure for installing the antenna with Radio Set SCR-268 and removing it for transit. The preparation and mounting of the antenna cables are also described here.

c. CABLING. Sections V and VI describe the procedure for connecting the cables to the components after they are placed in the rack.

d. ELECTRICAL MODIFICATIONS. Necessary electrical modifications of the Oscilloscope BC-412 when it is used with Radio Equipment RC-148-(*) are described in section VII. Two of the oscilloscopes of Radio Set SCR-268-(*) must be modified so that either may be used as the range scope on the radar equipment.

27. Installation of Radio Equipments RC–148 and RC–148–B

Radio Equipments RC–148 and RC–148–B are mounted on Radio Sets SCR-268 and SCR-268-B respectively. Transmitter BC-1072-A and Receiver BC-1068-A are mounted on a malleable-iron bracket assembly which is attached to the footrest of the radar equipment. Control Unit BC-1073-A, containing the interconnecting unit and wavemeter, is mounted between the range and azimuth oscilloscopes of Radio Set SCR-268. Antenna Matching Section MC-295-A is mounted on the under side of the oscilloscope shelf of the radar equipment. Antenna AN-128-A is mounted on the top of Transmitter BC-407-A. Two complete Transmitters BC-1072–A, Receivers BC–1068–A, and Control Units BC-1073-A are furnished for each installation, one set being installed on Radio Set SCR-268 or SCR-268-B and the other set being held as a spare. Remove one complete set of identification equipment from the shipping chests leaving the spare set in the carrying chests until required. Figures 5, 19, and 20 show views of the various units of the identification equipment as installed on Radio Set SCR-268.

28. Installation of Radio Equipment RC–148–C

Radio Equipment RC–148–C is mounted on Radio Set SCR-268-C. Radio Receiver and Transmitter BC–1267–A and Power Supply RA–105–A are housed in Rack FM–82 which is suspended from a mounting hanger bolted to the supporting frame of the trailer. Interconnector BC-1298 is placed on the oscilloscope platform between the range and azimuth oscilloscopes. Antenna AN-128-A is mounted on the top of Transmitter BC-407-A of Radio Set SCR-268-C. Two complete sets of components, Radio Receiver and Transmitter BC-1267-A, Power Supply RA-105-A and Interconnector BC-1298 are supplied for each installation, one set being installed on Radio Set SCR-268-C and the other set being held as a spare. Remove one complete set of identification equipment from the shipping chests. Leave the spare set in the carrying chests until required.

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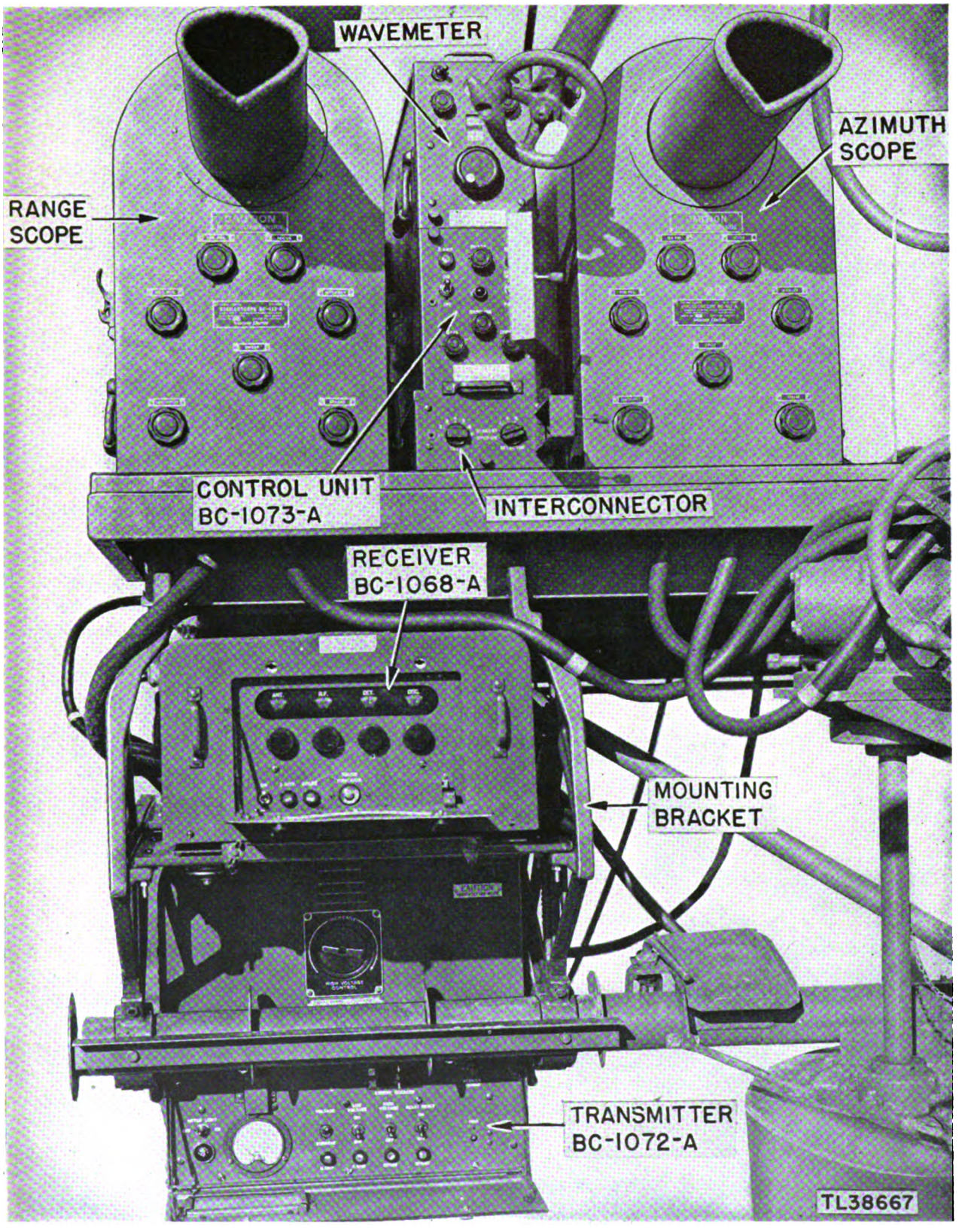

Figure 19. Radio Equipment RC-148 mounted on mounting bracket as assembled on Radio Set SCR-268.

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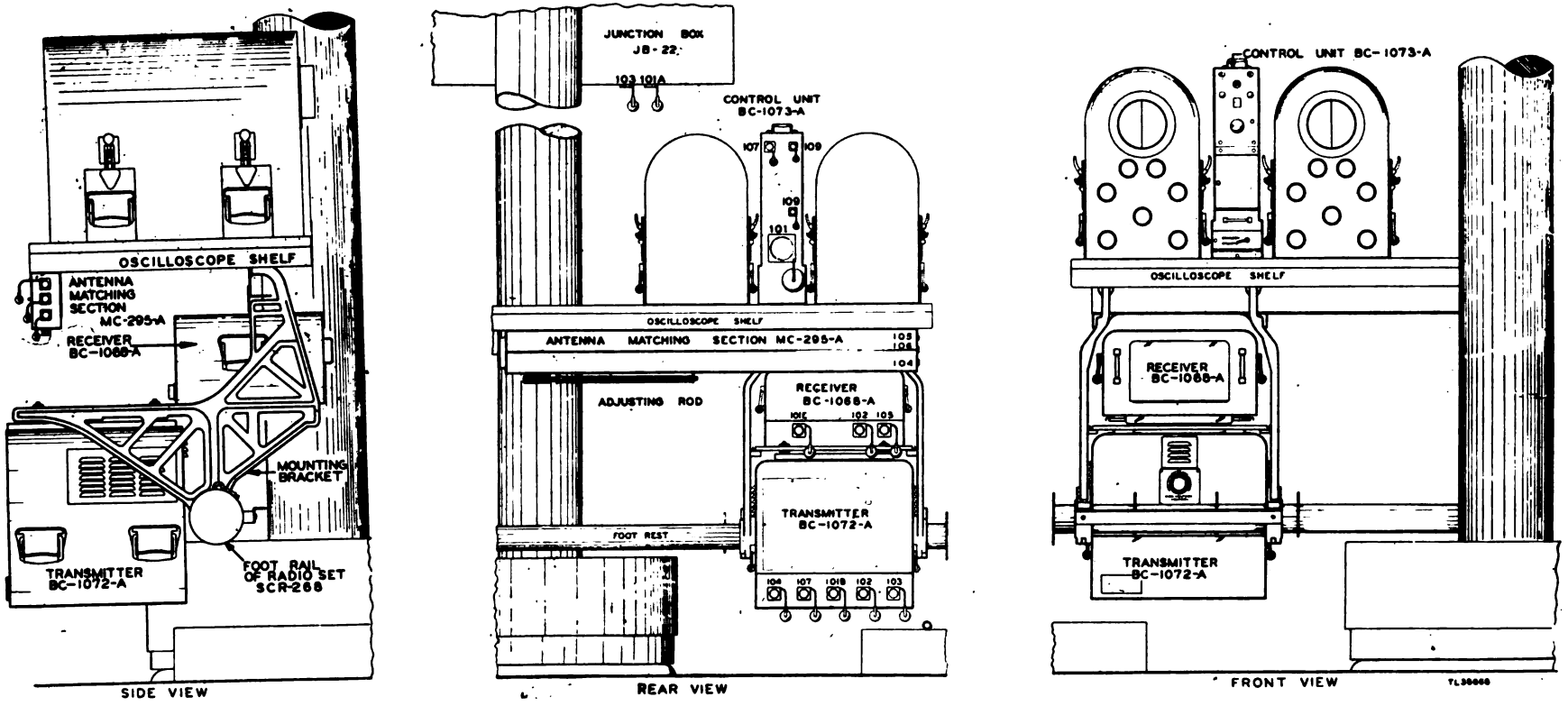

Figure 20. Front, rear, and side views of Radio Equipment RC–148 mounted on Radio Set SCR–268.

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Section II. INSTALLATION OF RADIO EQUIPMENTS RC–148 AND RC–148–B RACK AND COMPONENTS

29. Installation of Mounting Rack

A mounting rack is provided for the transmitter and receiver. This rack consists of two malleable-iron Brackets FT–358 to which two shock mounting plates are attached, one for the transmitter and the other for the receiver.

Mounting Bracket Equipment

1 Malleable-iron left-hand Mounting Bracket FT–358.
1 Malleable-iron right-hand Mounting Bracket FT–358.
1 Transmitter shock Mounting Plate FT–348.
1 Receiver shock Mounting Plate FT–359.
1 Tie bar.
1 Footrest.
1 Set of hardware.

a. After removing this equipment from the shipping chests, assemble it as a complete unit before mounting it on the footrest of Radio Set SCR–268 (fig. 20). The platform of Antenna Trailer K–28–A is a convenient place to assemble the mounting brackets, which may be placed in position from this platform without unnecessary lifting.

b. Place the left-hand and right-hand mounting brackets in their respective positions (fig. 7).

c. Place the transmitter shock mounting plate on the brackets as shown in figure 7. This shock mounting plate is the larger of the two plates and should be placed on the brackets with the mounting studs that hold the transmitter in a downward position.

d. Line up the holes in the shock mounting plate with those on the mounting brackets, and from the top, insert the six ¼–20 x 1½" hex bolts.

e. Place a ¼-inch lockwasher and a ¼–20 nut on each of these bolts and firmly tighten with a 7/16-inch hex socket wrench (fig. 7).

f. Place the receiver shock mounting plate on the mounting brackets, with the two locking studs toward the front and the four keyways in the mounting channel in the top position.

g. Line up the holes in the shock mounting plate with those on the mounting bracket, and from the top of the plate insert the six ¼–20 x 1⅛" hex bolts in these holes (fig. 7).

h. Place a ¼-inch lockwasher and a ¼–20 hex nut on each bolt and firmly tighten with a 7/16-inch hex socket wrench.

i. A short iron bar is provided for use as a footrest for the range position operator to replace that portion of the radar footrest which was used for mounting the identification equipment, figure 7.

j. Attach this angle-iron bar to the front of the malleable-iron mounting bracket as shown in figure 7. Line up the two holes of this footrail with those on the bracket, and tighten the two captive screws, thus holding this footrest in the correct position.

k. In the installation of cable 101D, which is described in a later paragraph, a clamp is used to hold this cable in position. Figure 7 shows this clamp mounted on one of the shock mountings of the transmitter mounting plate. In assembling the mounting

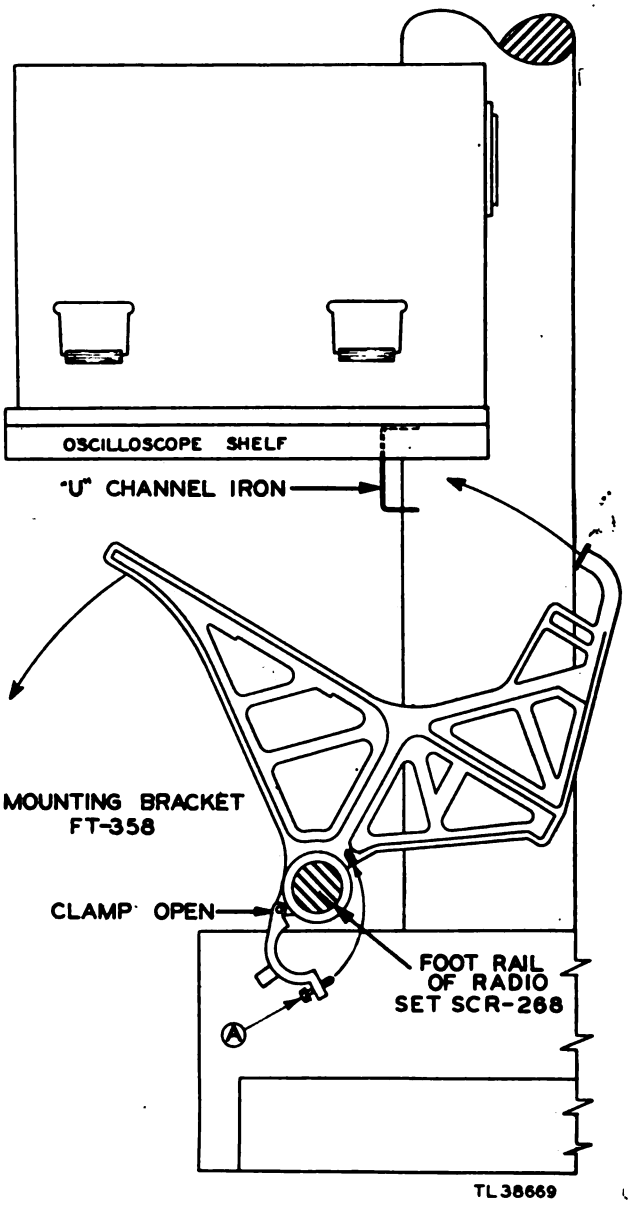

Figure 21. View showing mounting brackets being assembled on footrail.

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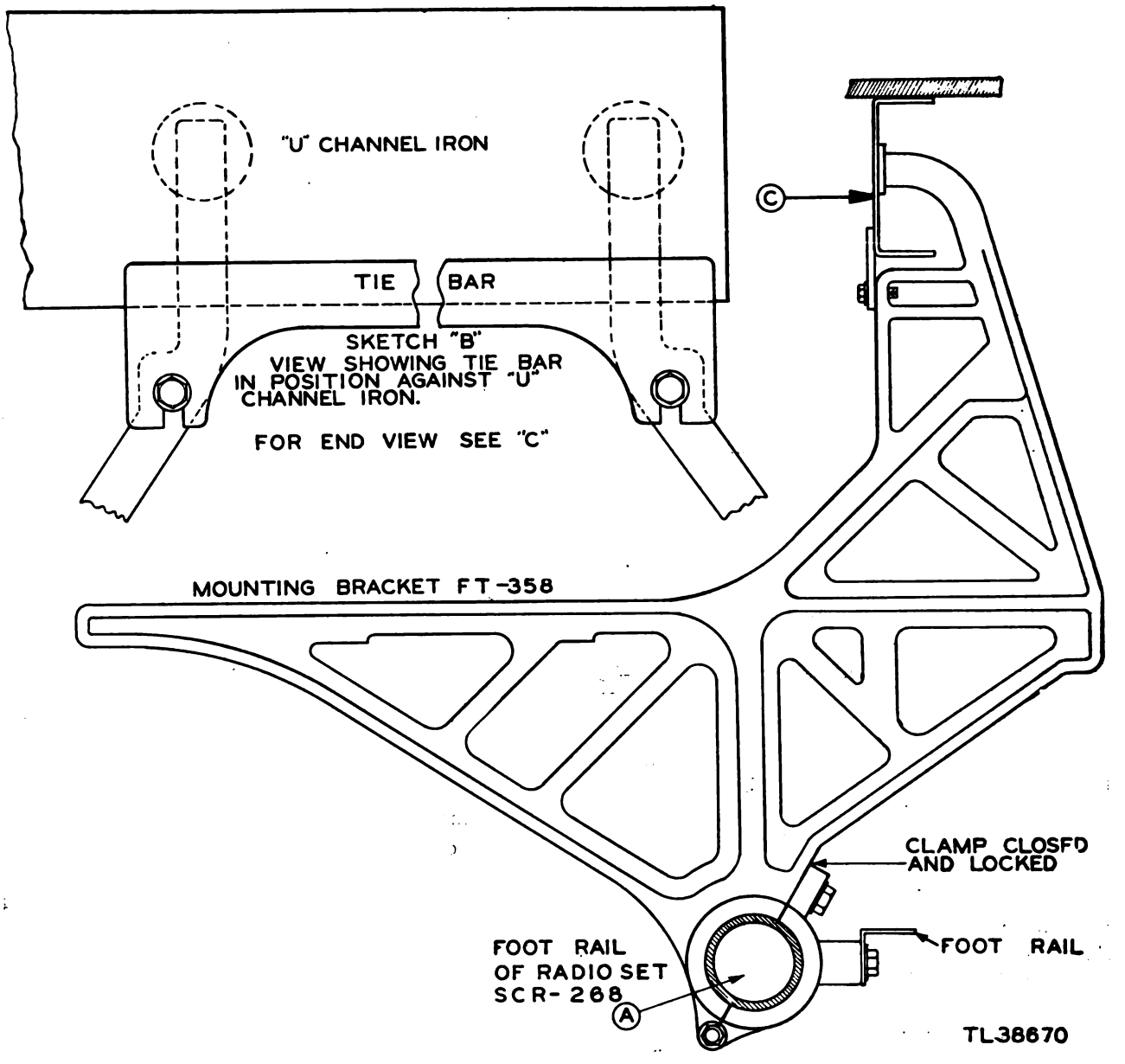

Figure 22. Mounting bracket assembled on footrail with bar in place.

bracket, care should be taken to see that this cable clamp is in its correct position as shown.

30. Installation of Mounting Brackets FT–358

The mounting brackets are now ready for assembly on the footrest of Radio Set SCR–268.

a. Open the large clamp (fig. 21), by loosening the two captive screws, A, which hold this clamp together.

b. Place the mounting brackets on the footrest of Radio Set SCR–268 as shown in figures 21 and 22.

c. Locate the mounting brackets on the footrest so that the right-hand bracket clears the foot-brake locking handle by at least ¼-inch. Place the top of this bracket against the U channel iron.

d. Close the two split clamps and tighten the two captive screws, thus holding the mounting brackets firmly in place, figure 22.

e. Place the tie bar B as shown in figure 22. Place lockwashers on the two ⅜–20 x 1⅛" hex bolts; insert the bolts in the screw holes of the tie bar and firmly tighten, using a 7/16-inch socket wrench. This tie bar holds the mounting brackets firmly against the U channel iron of the Radio Set SCR–268 oscilloscope shelf, and it also maintains the mounting brackets in a level position.

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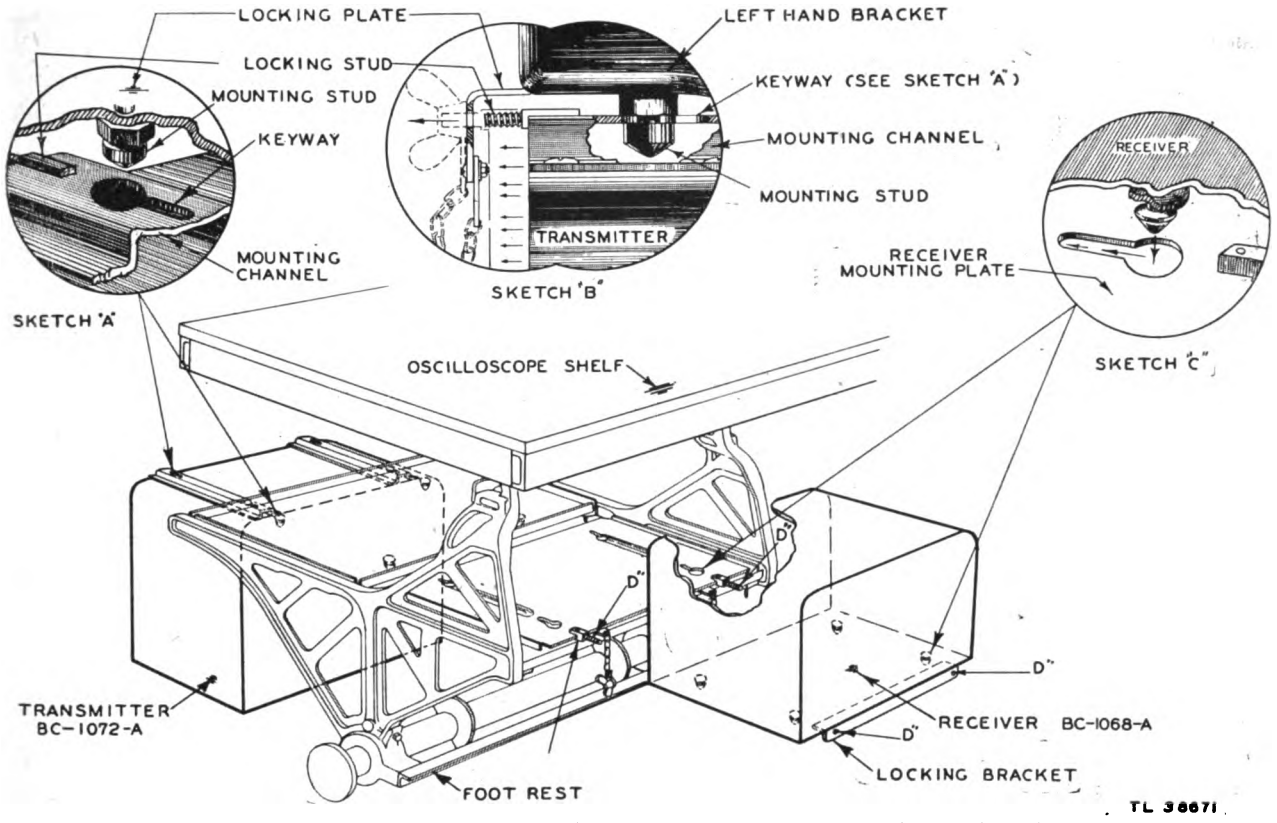

Figure 23. Assembly drawing showing method of mounting transmitter and receiver.

31. Installation of Transmitter BC–1072–A

Two men are required to set the transmitter in position on the under side of the mounting brackets (figs. 20 and 23).

a. With the front of the transmitter towards the operator, lift the unit by the four folding handles into position on the mounting brackets so that the four slotted keyways in the top of the transmitter case are directly beneath the four mounting studs on the transmitter shock mounting plate, sketch A (fig. 23).

b. Raise the transmitter until the studs slip into position in the keyways and pull towards the back of Radio Set SCR–268 until the two ¼" x 20 studs (welded to the mounting channel of the transmitter case) protrude through the two holes in the locking bracket of the shock mounting plate (fig. 23 sketch B).

c. Place the two ¼-inch wingnuts which are chained to the transmitter shock mounting plate on these studs and firmly tighten. No tools are required.

32. Installation of Receiver BC–1068–A

The receiver is mounted on its base and may be set in position from the front of the mounting brackets.

a. Place Receiver BC–1068–A in position as shown in figures 20 and 23 with the front of the receiver towards the operator.

b. Place the four mounting studs on the receiver case in the four slotted keyways on the receiver shock mounting plate (fig. 23 sketch C). Push the receiver back until the two ¼-inch x 20 studs D, welded to the lower section of the shock mounting plate, protrude through the two holes in the locking bracket of the receiver case, figure 23.

c. Place the two ¼-inch wingnuts chained to the shock mounting plate on these stud bolts and firmly tighten. No tools are required.

33. Installation of Control Unit BC–1073–A

The control unit is mounted on the oscilloscope shelf between the azimuth and range Oscilloscopes BC-412, which are at the left of the operator's position on Radio Set SCR-268 (fig. 20).

a. The front of the control unit should be in line with the two oscilloscopes. The front edge of the unit should be flush with the metal protecting edge of the oscilloscope shelf.

b. Control Unit BC–1073–A is of sufficient weight and is sufficiently well protected by the two oscillo-

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scopes on either side so that no fastening to the oscilloscope shelf is necessary.

34. Installation of Antenna Matching Section MC–295–A

The antenna matching section is mounted at the rear of and beneath the oscilloscope shelf of Radio Set SCR-268 as shown in figures 20 and 24.

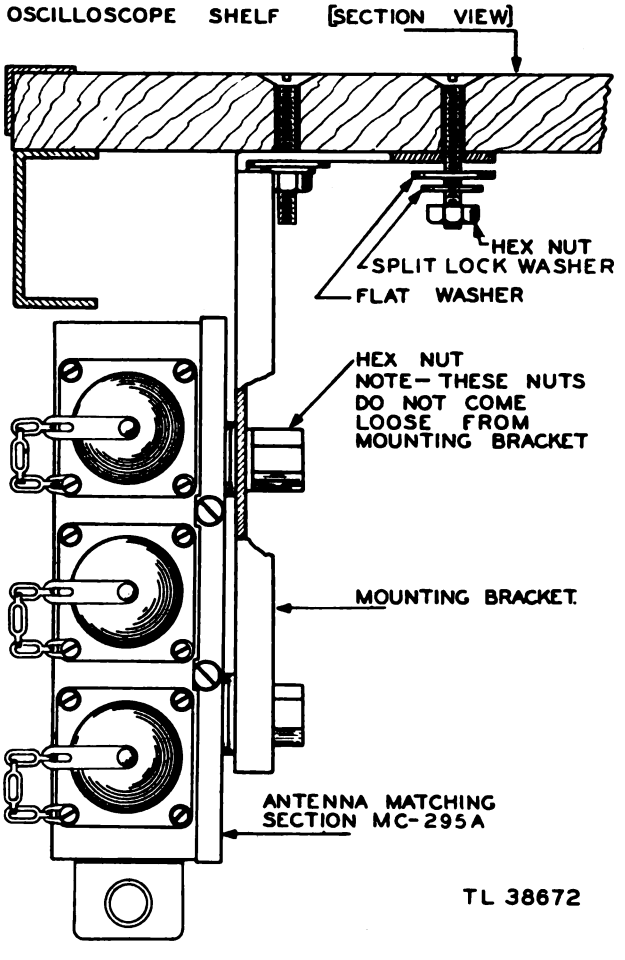

Figure 24. Antenna Matching Section MC–295–A mounted on oscilloscope shelf, end view.

a. Place the antenna matching section in position on the oscilloscope shelf as shown in figure 25.

b. Using the mounting brackets as a template, mark the positions of the six holes required for mounting the antenna matching section.

c. Drill these six holes with a ¼-inch drill.

d. Countersink these holes for 12–24 flathead screws.

e. Place the antenna matching section in position so that the holes of the mounting bracket line up with the holes drilled in the oscilloscope shelf.

f. From the top of the oscilloscope shelf insert six number 12–24 x 1¼-inch flathead bolts. Place a split lockwasher and a 12–24 nut on each bolt and tighten (fig. 24).

Section III. INSTALLATION OF RC–148–C RACK AND COMPONENTS

35. Mounting Bracket Assembly

A mounting bracket is necessary to suspend the rack from the supporting frame of the oscilloscope platform. The mounting bracket consists of one right- and one left-hand U shaped angle-iron hanger and three straight pieces of angle-iron for holding the two U-shaped hangers together (fig. 26). The short side of each U hanger is bolted to the front member of the oscilloscope platform supporting frame. The parts necessary for this mounting bracket assembly are as follows:

1 Right-hand angle-iron Mounting Hanger C–2D–4578.
1 Left-hand angle-iron Mounting Hanger C–2D–4577.
2 Hanger Tie Straps B–2H–4575.
1 Locking Bar Assembly B–202–989.
1 Set of hardware.

a. Remove this equipment from Chest CH–235.

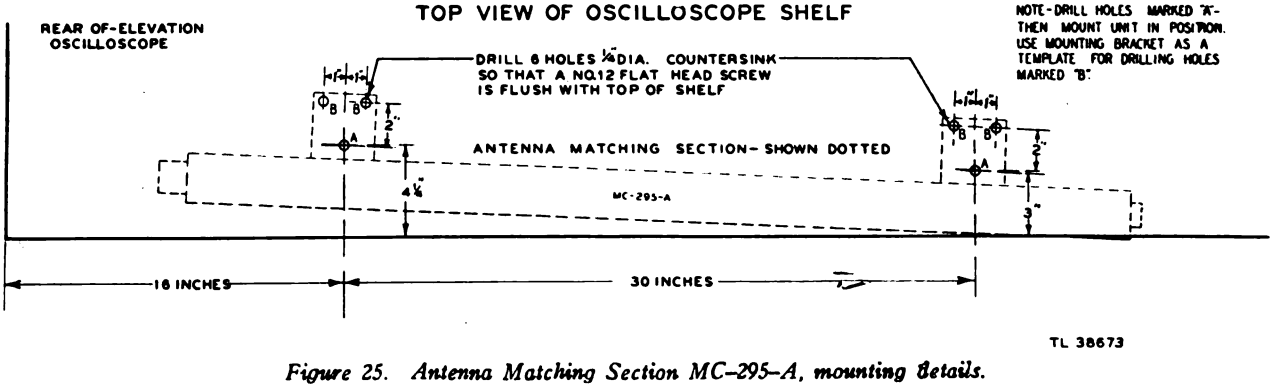

Figure 25. Antenna Matching Section MC–295–A, mounting details.

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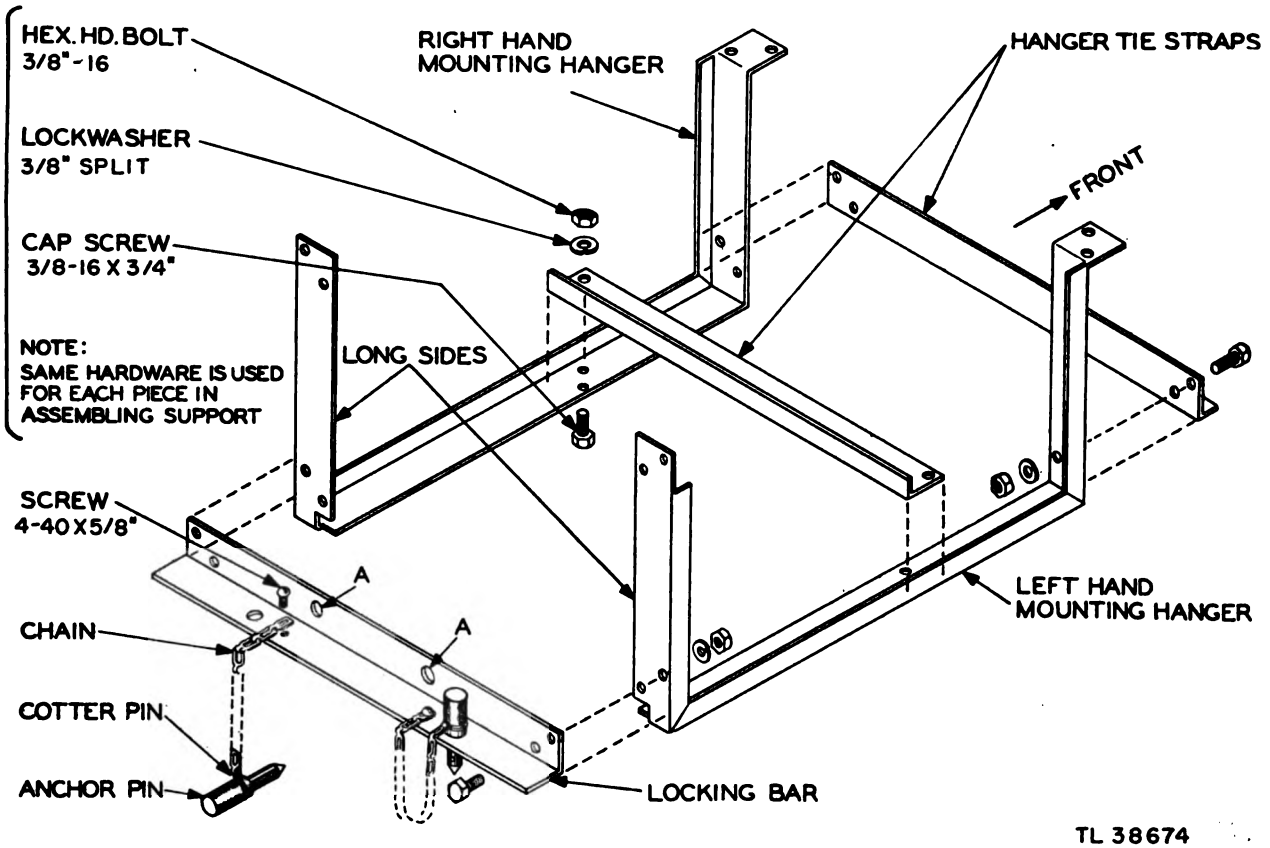

Figure 26. Rack mounting bracket assembly.

The mounting bracket is assembled before it is mounted on Radio Set SCR–268–C.

b. The stationary platform of Radio Set SCR–268–C makes a convenient bench for assembling the mounting bracket. Place the two U–shaped mounting hangers on the platform of Radio Set SCR–268–C with the bottom of the U resting on the platform (fig. 26). These U–shaped pieces are placed so that the long sides of each hanger are farthest away from the assembly and the sides of the angle-irons provided with holes are towards each other.

c. Place the straight angle-iron locking bar assembly, with the chained anchor pins attached, just above the bend on the long side of the hanger.

NOTE. This piece has an extra set of holes A (fig. 26) in which the anchor pins are placed so they will not interfere with the installation of the rack. Place the two pins in these holes.

Line up the two holes at each end of the locking bar with the holes in the hangers.

d. Insert a 3/8–16 x 3/4" hex head bolt in each hole. Place a 3/8 inch split lockwasher and a 3/8–16 hex nut on each bolt and tighten securely (fig. 26).

e. Place one of the hanger tie straps so that each end rests on the ledge formed by one side the angles of each U–shaped hanger. Line up the two holes at each end with the holes in the bottom portion of the U–shaped hangers (fig. 26).

f. Insert a 3/8–16 x 3/4" hex head bolt in each hole. Place a 3/8 inch split lockwasher and a 3/8–16 hex nut on the bolt and tighten securely (fig. 26).

g. Place the other hanger tie strap above the bend of the U on the short side of the U-shaped hanger. Line up the two holes in each end of the hanger tie strap with the holes in the U-shaped mounting hanger.

h. Insert a 3/8–16 x 3/4" hex head bolt in each hole. Place a 3/8 inch split lockwasher and a 3/8–16 hex nut on each bolt and tighten securely (fig. 26).

i. Take a hacksaw from the tool chest and saw two of the footrail fins off flush with the top of the rail (fig. 27).

36. Installation of Mounting Bracket

NOTE. If Radio Set SCR–268–C is equipped with an operators' shelter, the back right hand side of this shelter must be removed until the installation has been completed. The side is then replaced.

The mounting bracket is now ready to be mounted

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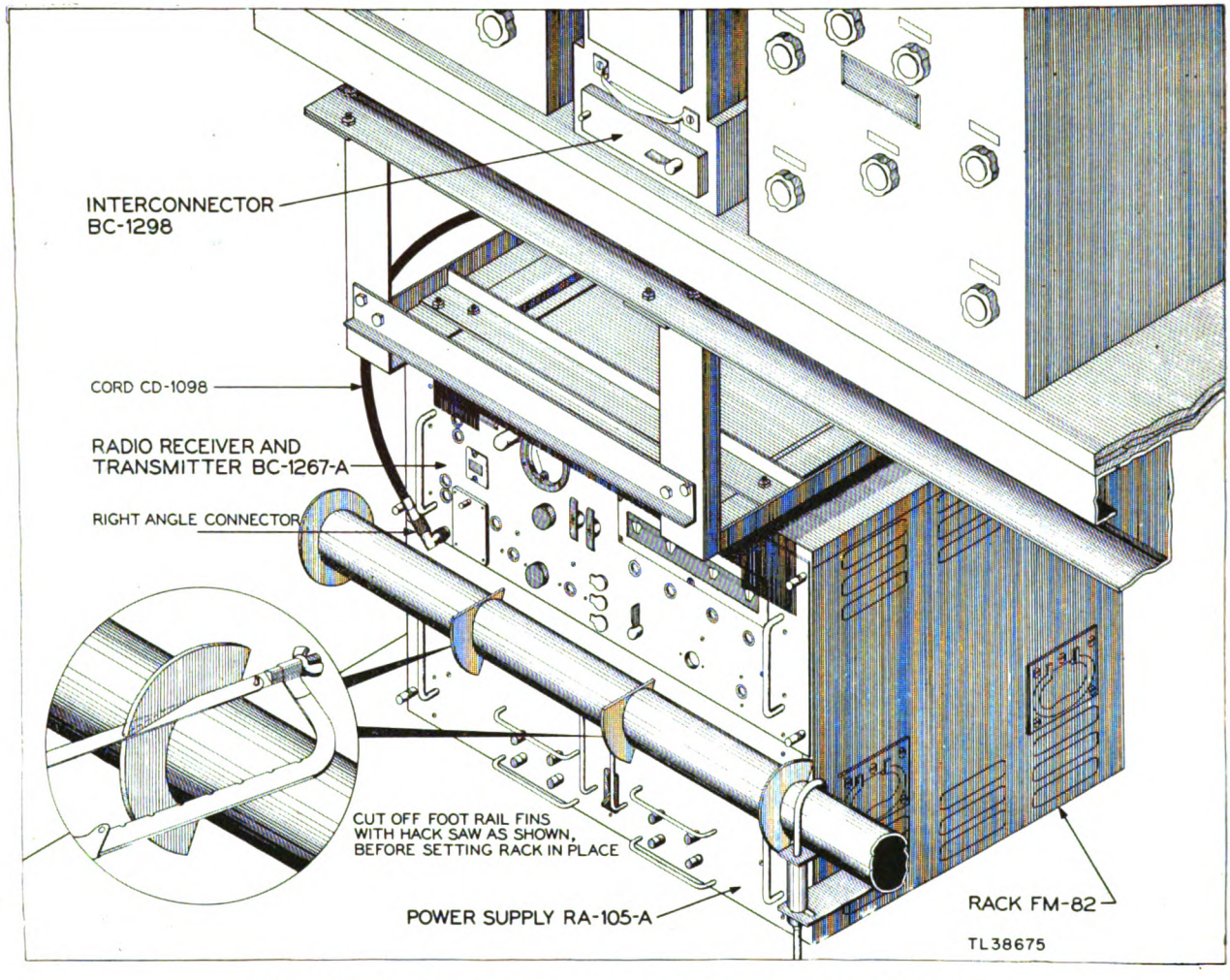

Figure 27. Cutting off the fins from footrail of Radio Set SCR–268–C.

on Radio Set SCR–268–C. Place the assembled mounting bracket on the stationary platform of Radio Set SCR–268–C under the platform on which the range and azimuth oscilloscopes are placed. Set the assembled mounting bracket in such a position that the short sides of the U-shaped hangers are towards the operators' seats. The method of installation of the mounting bracket is dependent upon having ample clearance for the brake assembly when the Rack FM–82 is in place.

a. First level the SCR–268 antenna trailer.

b. One man holds a straight edge at a right angle to the footrest at the edge of the brake assembly (edge nearest the range scope of the oscilloscope platform).

c. The second man moves a weighted string along the back of the channel web until the string just touches the straight edge.

d. The first man then marks the point where the string touches the bottom edge of the channel (fig. 28).

e. From this point measure 3¼ inches along the bottom edge of channel toward the range scope.

f. Draw a line on the bottom of the channel at a right angle to the back edge of the channel at this 3¼-inch mark.

g. Measure along this line 1½ inches from back of channel to a point on the line. Mark the point with center punch for drilling.

h. Remove cable clamp and hold cable aside to avoid damage in drilling.

i. Drill hole with 7/16 inch or Y drill.

j. Raise mounting bracket into position as shown in figure 29, and with one man holding bracket, insert and fasten bolt through the drilled hole and the hole nearest the end in the right-hand mounting hanger.

k. Mark positions where the other holes in

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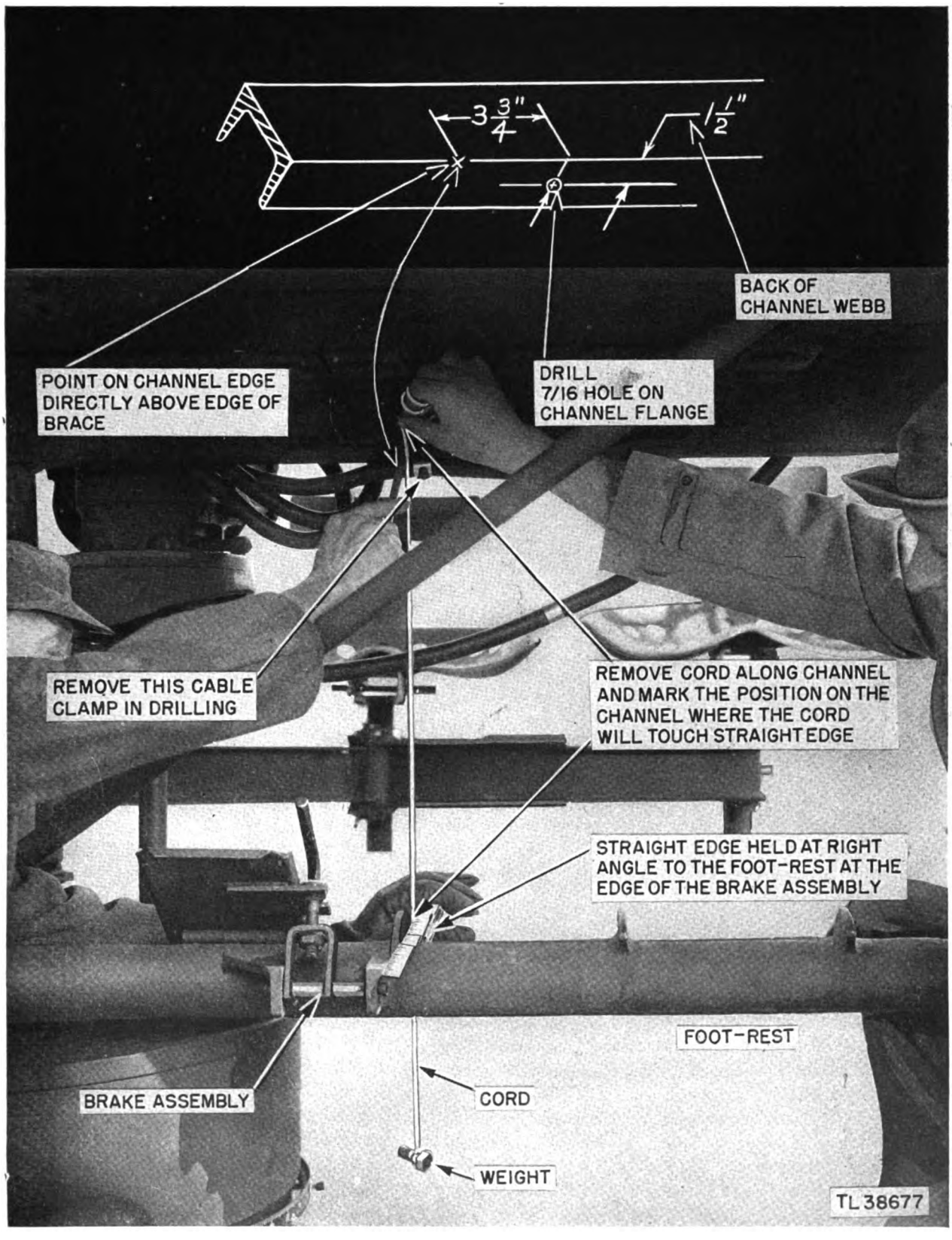

Figure 28. Determination of point on channel directly above brake assembly.

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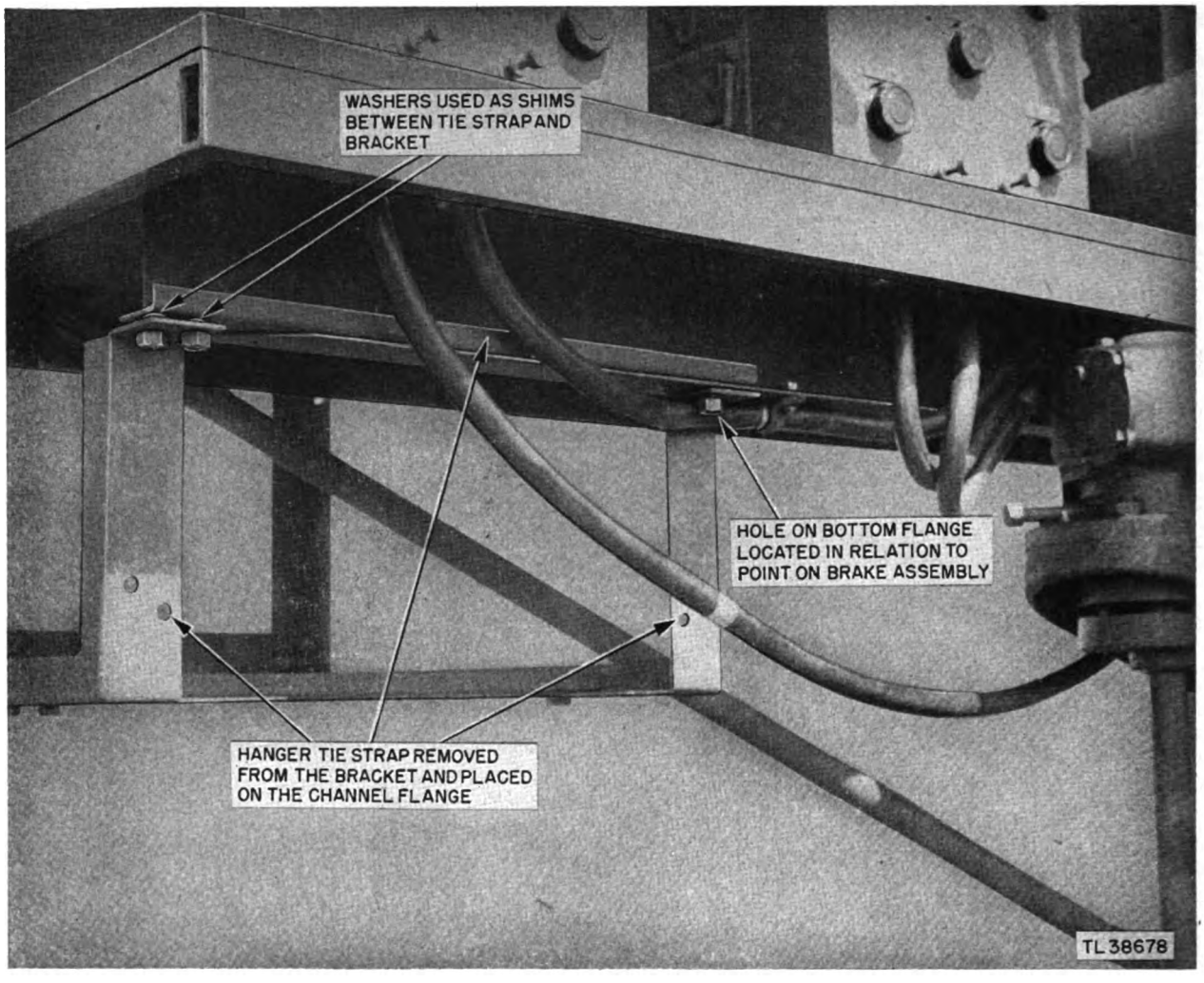

Figure 29. Use of the front hanger tie strap as a channel extension.

bracket will be located on the channel and back of scope platform.

l. Remove mounting bracket and drill 7/16-inch holes at points located.

m. If the left-hand mounting hanger is noted to be beyond the end of the channel flange, remove the hanger tie strap from the bracket and place it on top of the channel flange as shown in figure 29.

n. Again place the mounting bracket in position, reset bolt in the first drilled hole (through corresponding hole in tie strap). Complete installation by inserting a ⅜ inch–16 x ¾" hex head bolt in each of the seven remaining holes. Place a ⅜-inch split washer and a ⅜-inch–16 hex nut on each bolt and tighten securely, figure 29. Use a lockwasher as a shim where a spacer is required between the left-hand mounting hanger and the tie strap.

o. Replace cable clamp holding cable in its normal position.

37. Installation of Rack FM–82

Rack FM–82 (fig. 27) containing Radio Receiver and Transmitter BC–1267–A on the second level, and Power Supply RA–105–A on the first level, can now be installed on Radio Set SCR–268–C.

a. Remove the radio receiver and transmitter from the rack and set it to one side.

NOTE. After the rack has been installed, the power supply cannot be removed from the rack without first removing the rack from the mounting bracket.

Caution: When interchanging Power Supply RA–105–A, make certain that the rack bolt, which actuates the plunger interlock switch in the rear of the power supply, is of the correct length. The bolt is made accessible for adjustment by removing the rear rack cover.

b. Unscrew the captive screws which hold the power supply in place. Remove the power supply from the rack.

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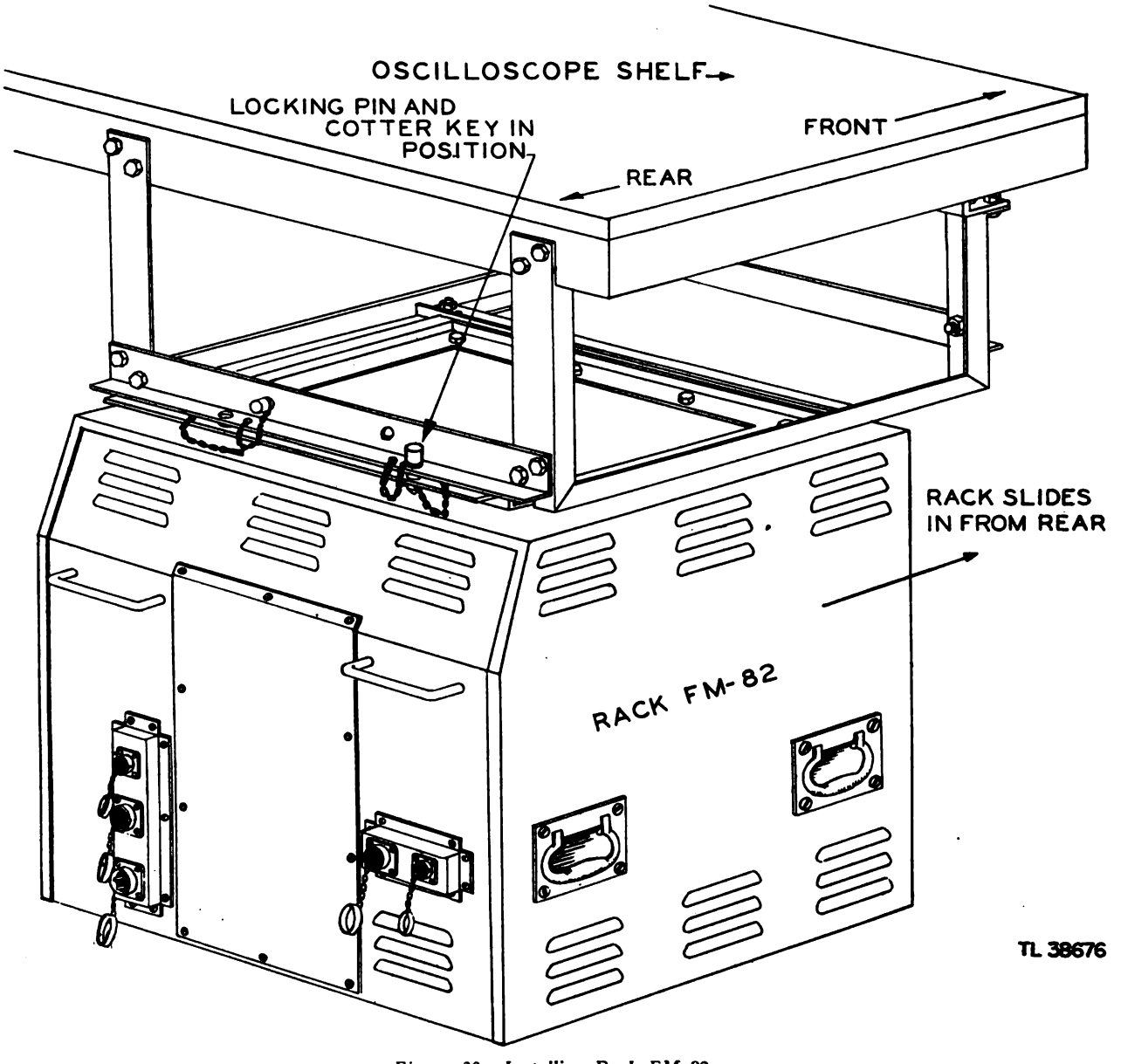

Figure 30. Installing Rack FM–82.

c. Remove the plate cap from tube 7 and place it on the insulated dummy cap.

d. Remove tubes 2 and 7 from their respective sockets on the chassis of the power supply.

e. Replace the power supply in the rack and tighten the captive screws.

f. Raise the rack up to the stationary platform from the side of Trailer K–28–C opposite the operators' seats. Set it so that the front of the rack is facing the operators' seats.

g. Raise the rack up to the bottom of the mounting bracket. The angle iron at the bend is notched out to allow the ledge which is at each end of the angle-iron frame and bolted to the top of the rack to slip through it. One side of each angle of the mounting hanger serves as a rail on which the rack slides into position (fig. 30).

h. Push the rack suspension frame through the slots in the mounting hangers and slide the rack forward as far as it will go. Line up the two holes in the rack suspension frame with the holes in the locking bar bolted to the mounting hangers.

i. Insert the two anchor pins in these holes. Insert the two captive cotter pins in the holes in the anchor pins. These two anchor pins lock the rack in place (fig. 30). If it is found that the knurled captive screws or the antenna connector, on the receiver-transmitter, touch the foot rail making it im-

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possible to lock the rack in position with the anchor pins, mark the outline of the points of contact of the screws or antenna connector on the foot rail.

(1) Remove the rack from the mounting bracket.

(2) Using a hacksaw cut along the edge of the marked outline on the foot rail.

(3) Using a hammer and a chisel, knock out the remainder of the outlined section.

(4) Again install the rack in the mounting bracket.

(5) The knurled nuts and the antenna connector should now enter the required distance into these cut-away sections of the foot rail so that the rack may be locked into position with the anchor pins.

j. Carry the radio receiver and transmitter to the front of the rack and slide it into position in the rack.

k. Place the captive screws in position and lock them in place.

38. Installation of Interconnector BC–1298

The interconnector is mounted on the oscilloscope shelf between the azimuth and range Oscilloscopes BC–412, which are at the left of the operator's position on Radio Set SCR–268–C (fig. 6).

a. The front of the interconnector should be in line with the two oscilloscopes. The front edge of the unit should be flush with the metal-protecting edge of the oscilloscope shelf.

NOTE. It may be necessary to adjust the position of the interconnector slightly in order to allow the multiple cable connector (fig. 31) to clear the rear of the operators' shelter.

b. Interconnector BC–1298 is of sufficient weight and is well enough protected by the two oscilloscopes on either side so that no fastening to the oscilloscope shelf is necessary.

Section IV. INSTALLATION OF ANTENNA AN–128–A

39. Installation of Antenna

The antenna of the identification equipment is used for receiving and transmitting as described in paragraph 20. This antenna is mounted on top of the transmitter of Radio Set SCR–268–(*) at an angle of 75° from the base of the transmitter, as shown in figure 32. Before mounting the antenna, the mounting brackets and braces should be attached to

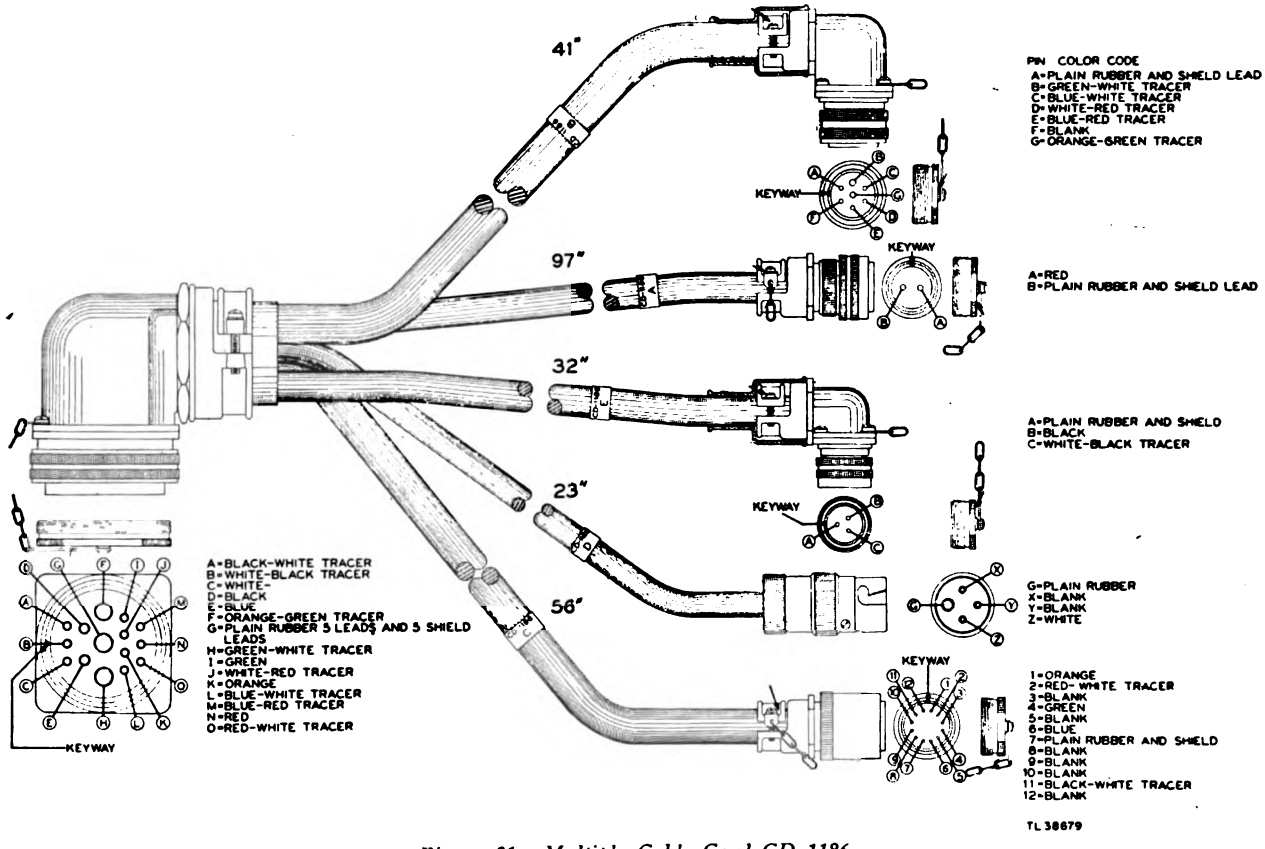

Figure 31. Multiple Cable Cord CD–1186.

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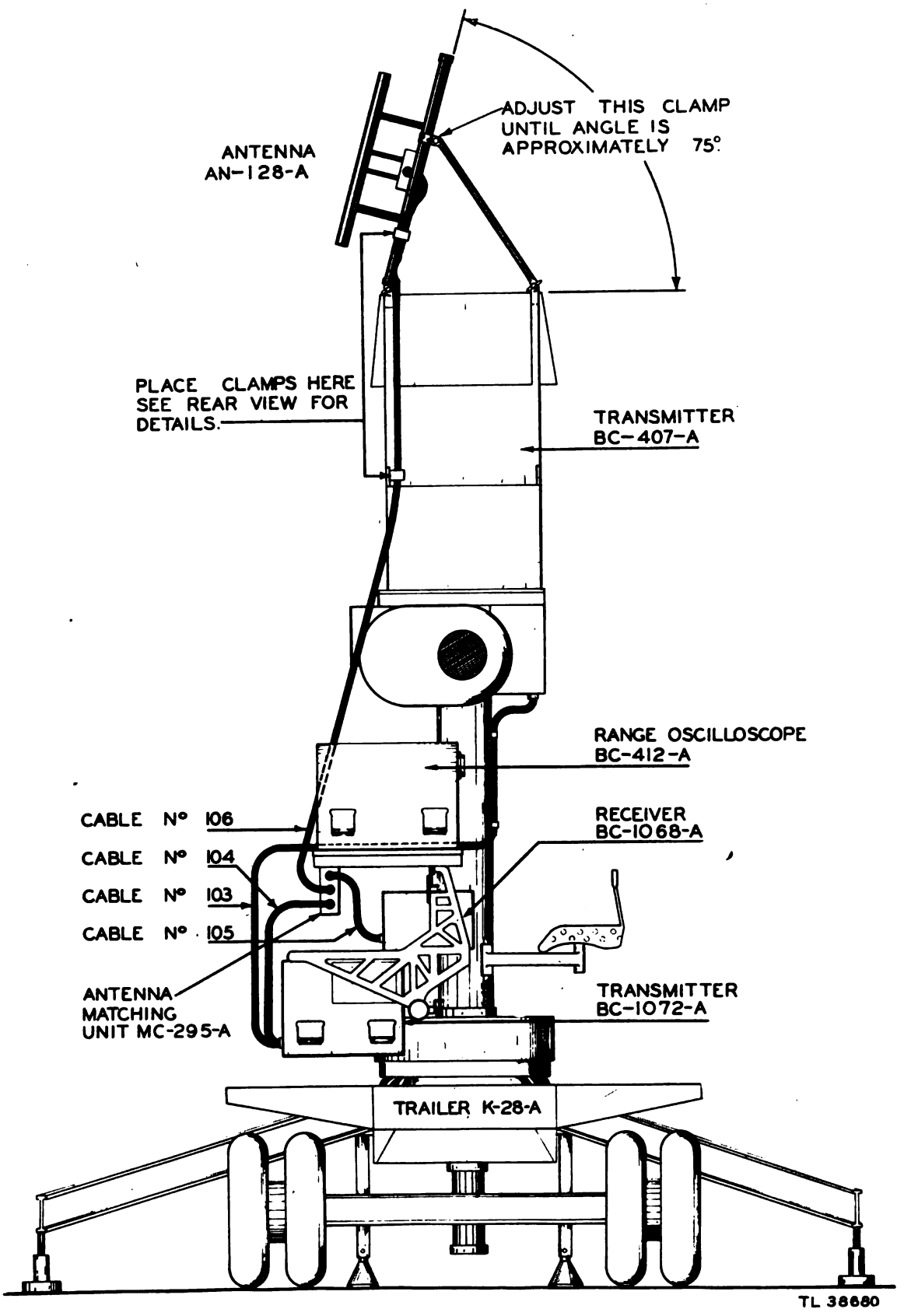

Figure 32. Radio Equipment RC-148 mounted on Radio Set SCR-268, end view.

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the antenna frame. The platform of Trailer K–28–A is a convenient place for this operation.

a. Assemble the two small left- and right-hand brackets in their respective positions on the bottom of the antenna frame. Place a split washer and nut on the bolts and tighten after the adjustments described below have been made.

b. The mounting holes of these brackets are elongated so as to permit them to be fastened easily to the lifting lugs of the transmitter. Adjust these brackets so that the mounting holes of the brackets and those of the lifting lugs will be in correct position to admit the fastening bolts when Antenna AN–128–A is raised to the top of the transmitter.

c. Snap the two clamps B (fig. 33) around the two back tubular supports of the antenna, approximately 27 inches from the base of the frame, as shown in figure 33. The proper setting of these clamps will automatically place the antenna in its correct angular position when mounted.

d. Place the two left and right tubular braces in position on the outside of the clamps. Insert two ⅜"–16 x 1½" bolts with ⅜-inch split lockwashers through the holes of the braces and the two holes of the clamps.

NOTE. These bolts may be identified from the other mounting bolts by the fact that they are threaded all the way to the head of the bolt.

Place ¾-inch flat washers and ⅜"–16 wingnuts on these bolts and tighten as shown in figure 33, sketch B.

e. Raise the antenna carefully to the top of the transmitter.

f. Place the two front mounting brackets in position as shown in figure 33, sketch C.

g. The four lifting lugs of the transmitter have 1-inch holes which must be reduced before the antenna is mounted. Insert two conical reducing bushings from the outside face of the two front lifting lugs.

h. Place split lockwashers on the hex bolts and insert clamps from the inside faces of the mounting brackets. Tighten the thumbnuts as shown in figure 33, sketch C.

i. Place the two tubular braces on the outside of the lifting lugs of the transmitter. Insert the conical reducing bushings from the inside face of the lifting lugs.

j. Place the holes of the two tubular braces in line with the two rear holes of the lifting lugs of the transmitter. Insert two ⅜"–16 x 1½" bolts with split washers, from the inside faces of the lifting lugs. Place wingnuts on these bolts and tighten.

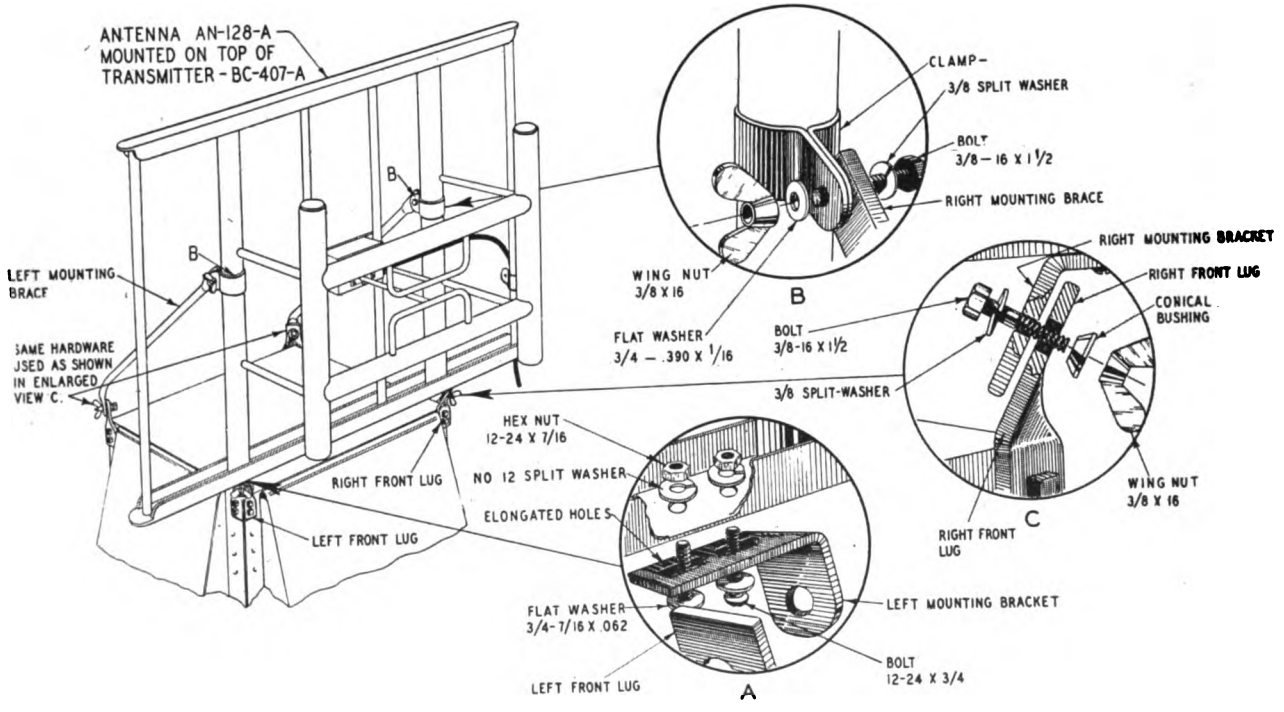

Figure 33. Antenna mounting assembly details. TL 38681

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k. The antenna, if properly mounted, should be tilted approximately 75° from the base of the transmitter, viewed from the side of Radio Set SCR-268-(*). If the antenna is not in this angular position, it may be adjusted to the correct position by loosening the two clamps on the back tubular supports and sliding these clamps in either direction until the 75° angle is obtained (fig. 32).

NOTE. Extreme care should be used in raising Antenna AN-128-A from the ground to its position on the transmitter, so that none of the parts of the antenna will be disturbed, bent, or in any way pushed out of position.

Section V. CABLING ON RADIO EQUIPMENTS RC-148 AND RC-148-B

40. Installation of Cables

a. GENERAL. (1) Before attempting to place the various cables in their respective positions, it is necessary to study the drawings, figures 34, 35, 36, 37, and 38, showing these cable arrangements. There are ten cables completely wired and assembled with their respective cable connectors, male-end plugs being designated P, female plugs marked by the letter

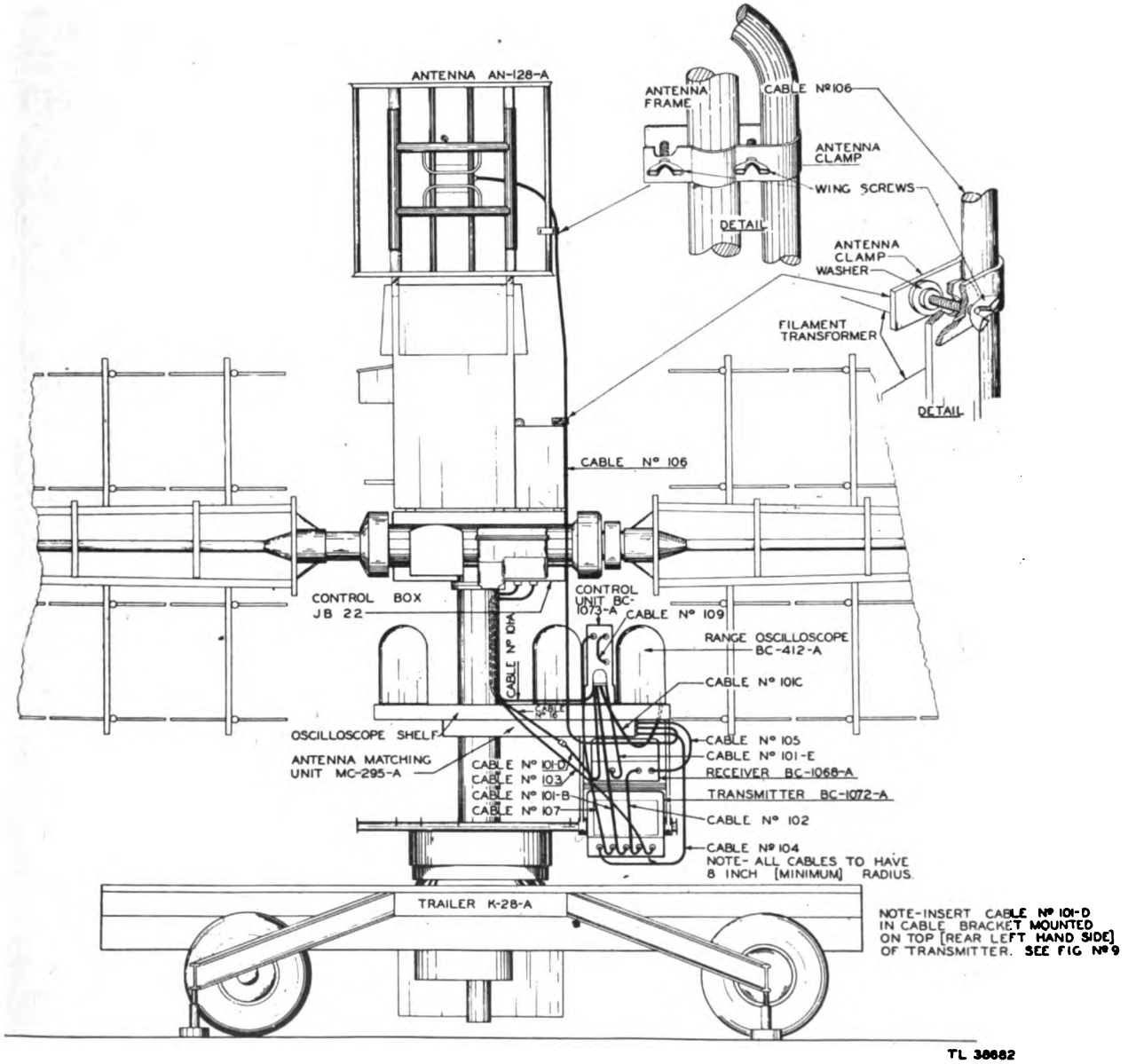

Figure 34. Arrangement of cables for Radio Equipment RC-148 and RC-148-B.

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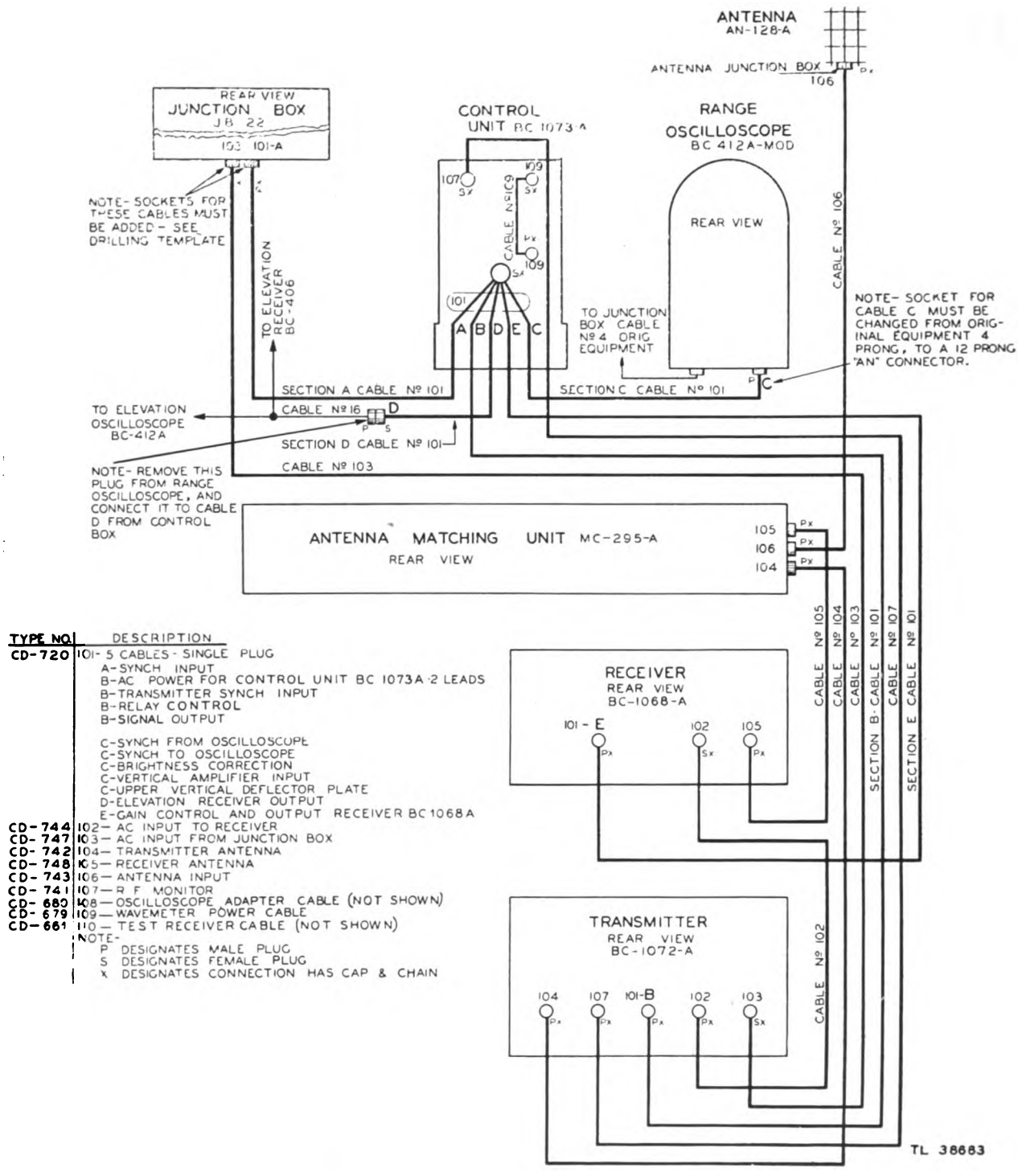

Figure 35. Block diagram of cabling arrangement.

S. All receptacles designated by the additional letter X are equipped with cap and chain and must be kept covered for weather protection when cables are not connected.

(2) In figure 35, a block diagram of eight of these cables is shown. Cables are numbered from 101 to 110, and for convenience in locating their various terminating positions on the drawing, the terminals are so marked. Cables 108 and 110 are not shown in position on the block diagram or in figure 32. Further information for use of these cables is given in the maintenance section of this manual.

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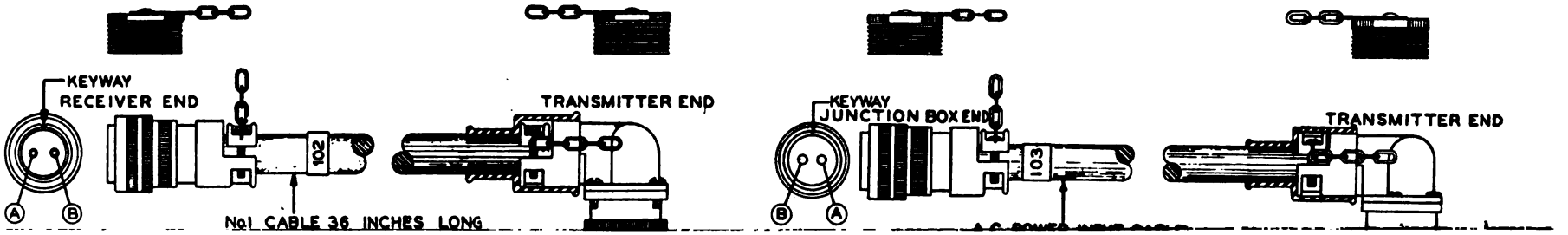

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Caution: During cold weather, all connectors and cables must be handled carefully during installation, especially cables with Vinylite composition.

(3) Cables 102 to 109 inclusive, with one exception, are equipped with Amphenol plugs on both ends. Cable 108 is equipped with one Amphenol and one Russell and Stoll connector.

(4) Cable 101 differs from the other cables, as it consists of five branches, which are numbered 101A to 101E respectively.

Important: Before any attempt is made to connect these cables to the equipment, the power switch of Junction Box JB–22 of Radio Set SCR–268 or SCR–268–B must be off.

NOTE. All connectors and receptacles are so designed and constructed that no connector will fit a receptacle other than the one for which it is designed. DO NOT FORCE THESE FITTINGS TOGETHER. If these fittings do not go together easily, the wrong cable or end is being used. When these cables are placed in position on Radio Set SCR–268 or Radio Set SCR–268–B, they will form a natural bend with sufficient slack. Extreme care should be taken that no sharp bends are made. Particular care should be given to the three cables that are attached to the antenna matching section. Figure 34 shows how these cables are connected to the radar and IFF equipments.

b. INSTALLATION. (1) Connect cable 106 between the antenna junction box and the ANTENNA receptacle (106) of the antenna matching section (fig. 35). Carefully connect this cable as shown in figures 32 and 34, and with the two clamps provided fasten the cable as shown in figure 34.

(2) Connect cable 105 between the top receptacle marked RECEIVER (105) of Antenna Matching Section MC–295–A and the receptacle marked ANTENNA of Receiver BC–1068–A (figs. 35 and 37). Complete details of cable assembly and plug connectors are shown in figure 36.

(3) Connect cable 104 between the bottom receptacle (104) of the antenna matching section, and the receptacle on the transmitter marked ANTENNA (figs. 38 and 35). Complete details of cable assembly and plug connectors are shown in figure 36.

(4) Cable 101 is a multiple type cable consisting of five individual cables terminating in one common connector. Complete details of the construction, wiring arrangements, and assemblies of the connectors are shown in figure 39.

(*a*) Connect the large common connector (cable 101) to the large receptacle at the back of Control Unit BC–1073–A, figures 35 and 40.

(*b*) Connect the free end of cable 101A to Receptacle AN–3102–22–1S of Junction Box JB–22 (figs. 35 and 54).

(*c*) Connect the free end of cable 101B to the receptacle marked SYNC. INPUT, the middle connector of Transmitter BC–1072–A (fig. 38).

(*d*) Cable 16 of Radio Set SCR–268 or Radio Set SCR–268–B was originally connected to the receptacle 45–1 of the range oscilloscope. Connect the free end of cable 101D, which is equipped with a Russell and Stoll plug, to the free end of cable 16 as shown in figures 34 and 35.

(*e*) On the left-hand corner of the transmitter shock mounting will be found a cable clamp (fig. 7). Place the 101D cable in this clamp, allowing the cable to form a natural bend.

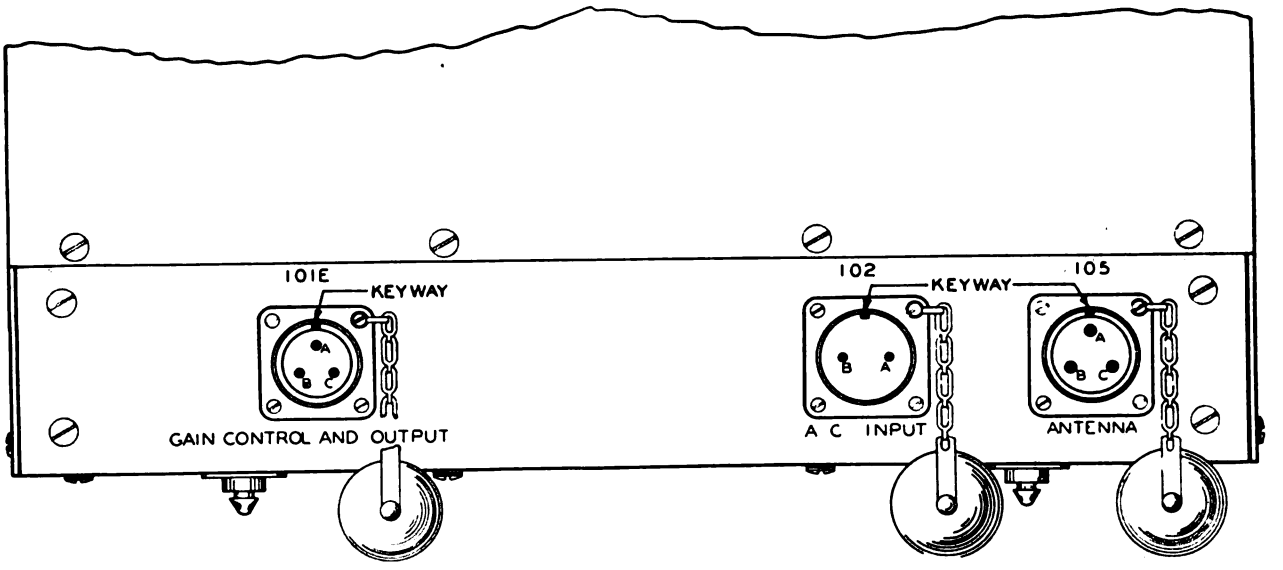

Figure 37. Rear view of Receiver BC–1068–A.

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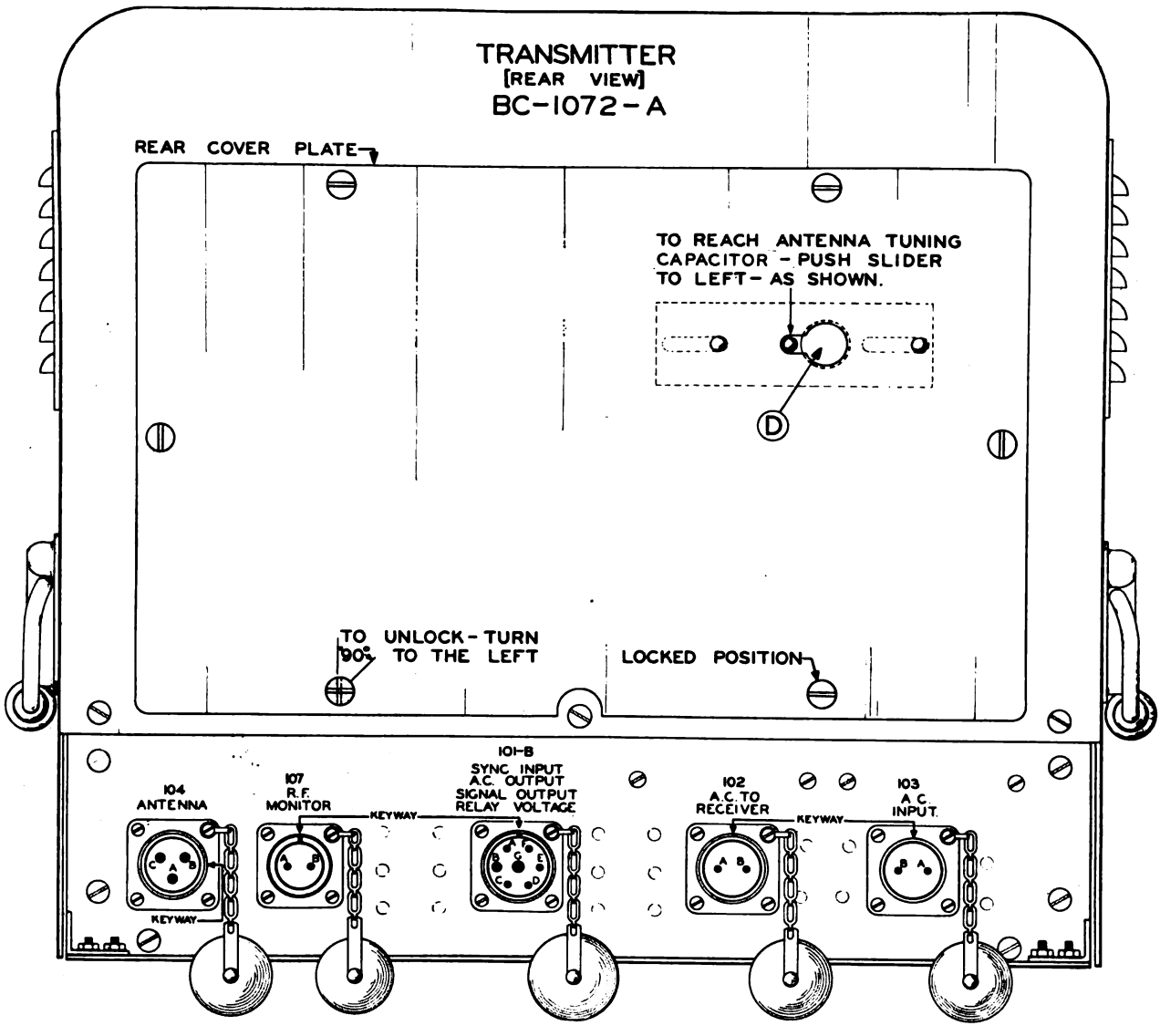

Figure 38. Rear view of Transmitter BC-1072-A.

(*f*) Connect the free end of cable 101C to the 12-pin receptacle of the range oscilloscope as shown in figures 34 and 35. To install the receptacle attached to cable 101C raise the front of the oscilloscope, making certain the antenna flange of the Radio Sets SCR-268 or SCR-268-B is in a position to allow the oscilloscope to be raised 4 or 5 inches in height. With the aid of a small block, hold the scope in this raised position. Since there is enough slack in the 101C cable to allow the 12-point plug to extend 5 or 6 inches above the oscilloscope table, the plug can be drawn through as far as necessary to correspond to the desired height of the oscilloscope. The oscilloscope should be blocked up sufficiently to allow the receptacle to be grasped above the table top and to observe the alignment of the plug with its corresponding receptacle in the oscilloscope. It should be possible to align the pin in the cable plug with the groove in the oscilloscope receptacle and readily make the connection. Tilt the oscilloscope slightly, so as to remove the block. With a resisting upward pressure, allow the oscilloscope to come to rest in its normal operating position using care to insure that the cable plug clears the hole in the table.

(*g*) Connect the free end of cable 101E to the

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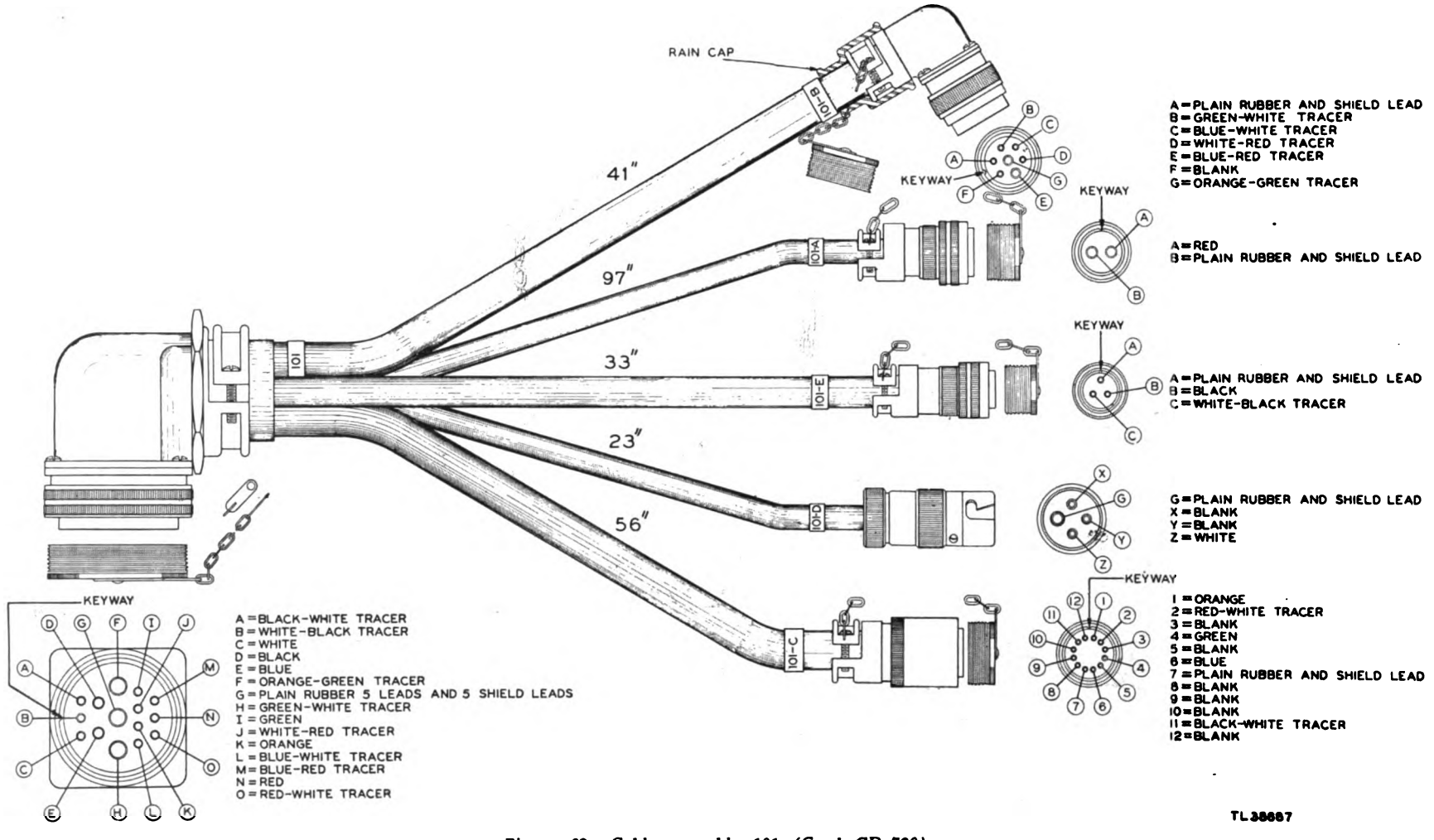

Figure 39. Cable assembly 101 (Cord CD-720).

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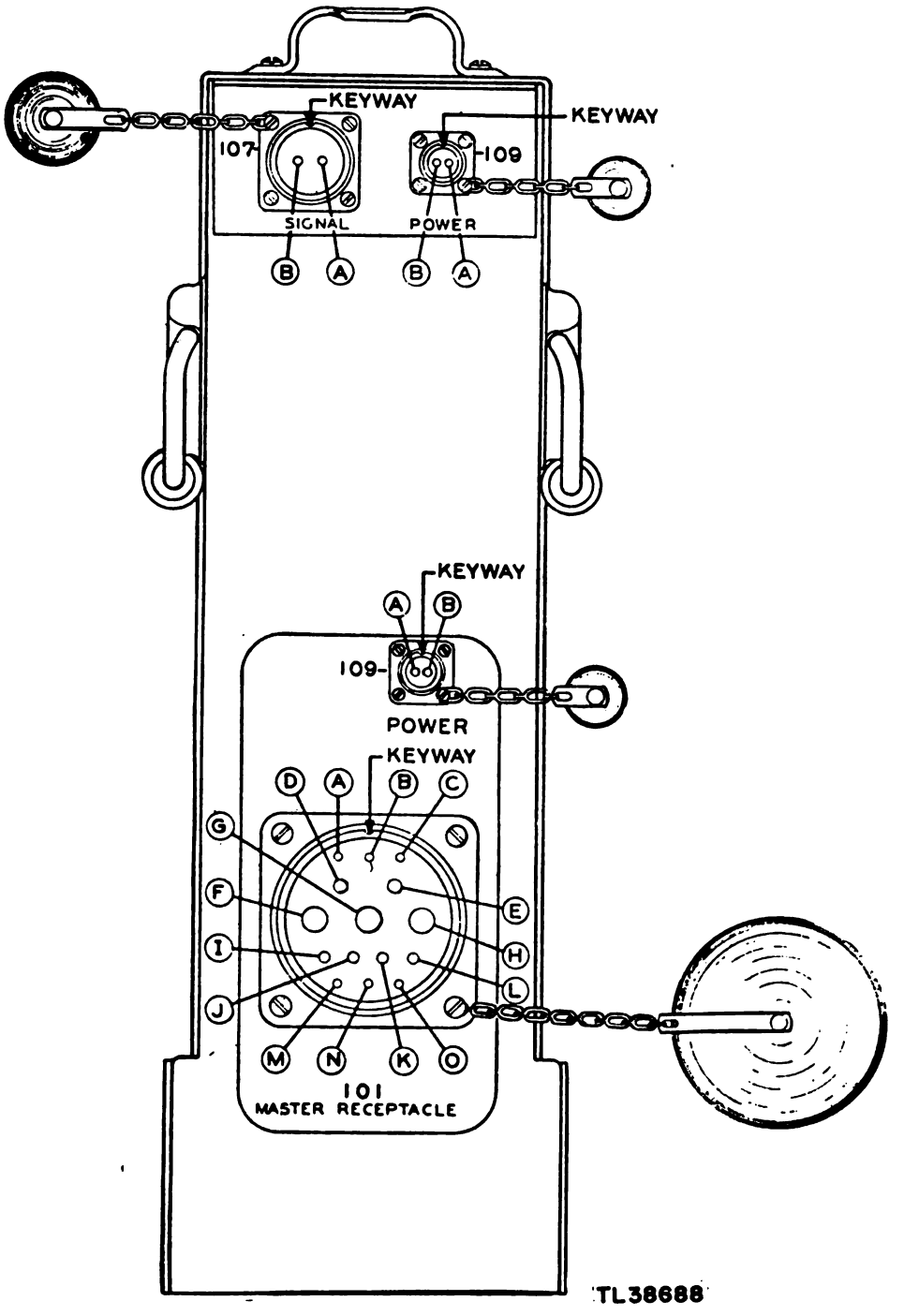

Figure 40. Rear view of Control Unit BC–1073–A.

receptacle marked GAIN CONTROL AND OUTPUT on Receiver BC–1068–A (figs. 37 and 35).

(5) Connect cable 103 between Receptacle AN–3102–22–8S of Junction Box JB–22 and the receptacle marked AC INPUT of Transmitter BC–1072–A, (figs. 5, 38, and 54). Details of the cable and assemblies of the connectors are shown in figure 36.

(6) Connect cable 102 between the receptacle marked AC INPUT of Receiver BC–1068–A and the receptacle on the Transmitter BC–1072–A marked AC TO RECEIVER (figs. 37 and 38). Details of cable and assembly of the connectors are shown in figure 36.

(7) Connect cable 107 between the receptacle marked SIGNAL of Control Unit BC–1073–A and

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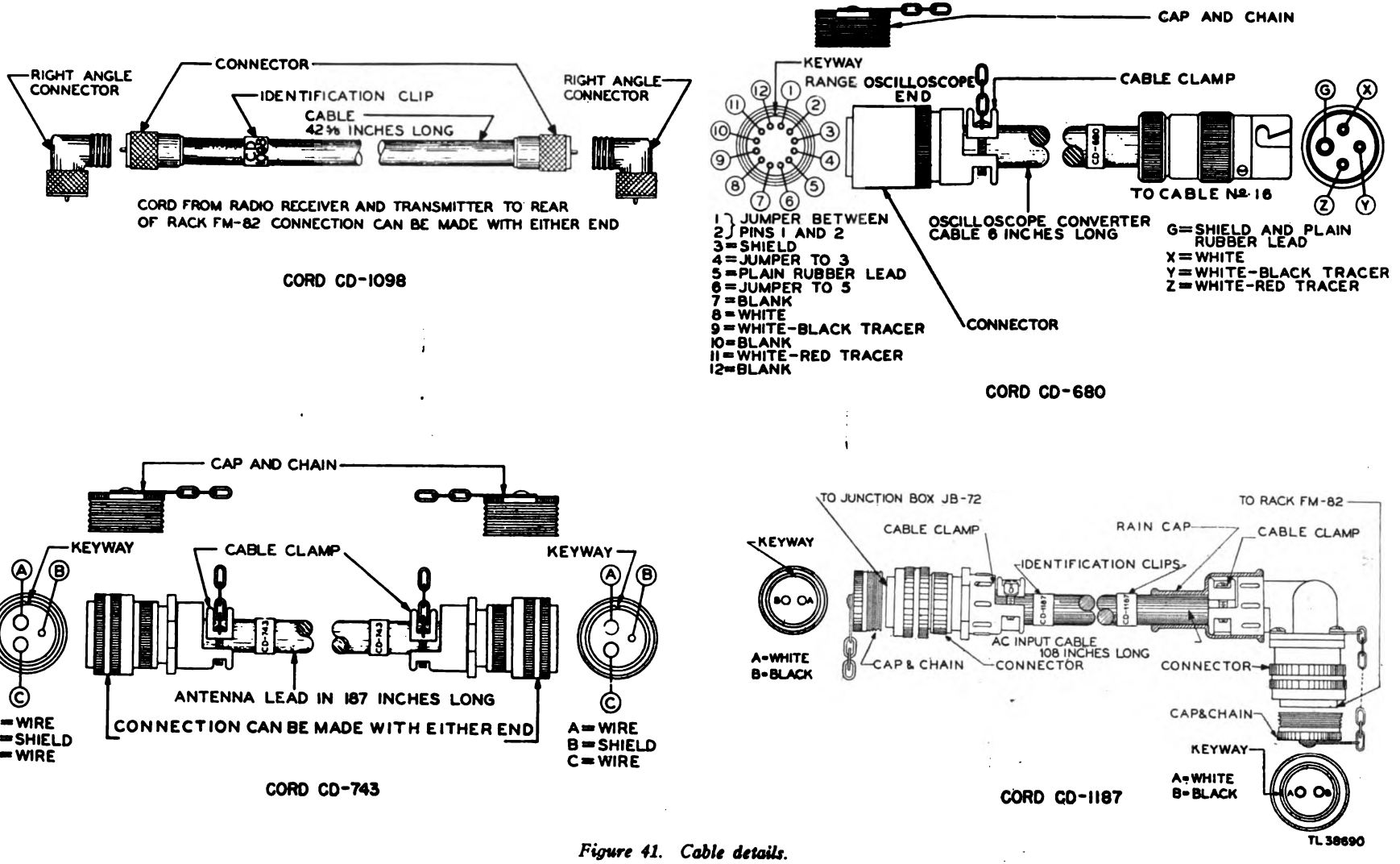

Figure 41. Cable details.

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the receptacle marked R. F. MONITOR of Transmitter BC–1072–A. Refer to figures 38, 35, and 40. Details of cable and assembly of the connectors are shown in figure 36.

(8) Connect the short jumper cable 109 between the receptacle marked POWER of the interconnecting unit and the small receptacle marked POWER of the wavemeter unit (figs. 35 and 40). Details of this cable and assemblies of the connectors are shown in figure 36.

(9) This completes the installation of the various cables for the operation of the identification equipment. Radio Sets SCR–268 or SCR–268–B may be operated separately or in conjunction with the Radio Equipments RC–148 or RC–148–B without further wiring or cable changes. With all equipment and cables in place, connect Radio Equipments RC–148 or RC–148–B to a source of power only after someone familiar with the operation and adjustment of this equipment has carefully inspected and checked the cable connections.

Section VI. CABLING ON RADIO EQUIPMENT RC–148–C

41. Installation of Cables

a. GENERAL. (1) Before laying out the cables for connection, carefully study the drawings showing cable connections (figs. 41, 31, 42, and 43). There are five cables with the proper terminals attached. Male end plugs are marked P and female plugs are marked S. All receptacles marked with the letter X are equipped with a chained cap for protection against the weather when not in use.

(2) Figure 43 is a block diagram of cable connections. These cords are properly labeled to avoid confusion. Cord CD–1186 is a multiple cable con-

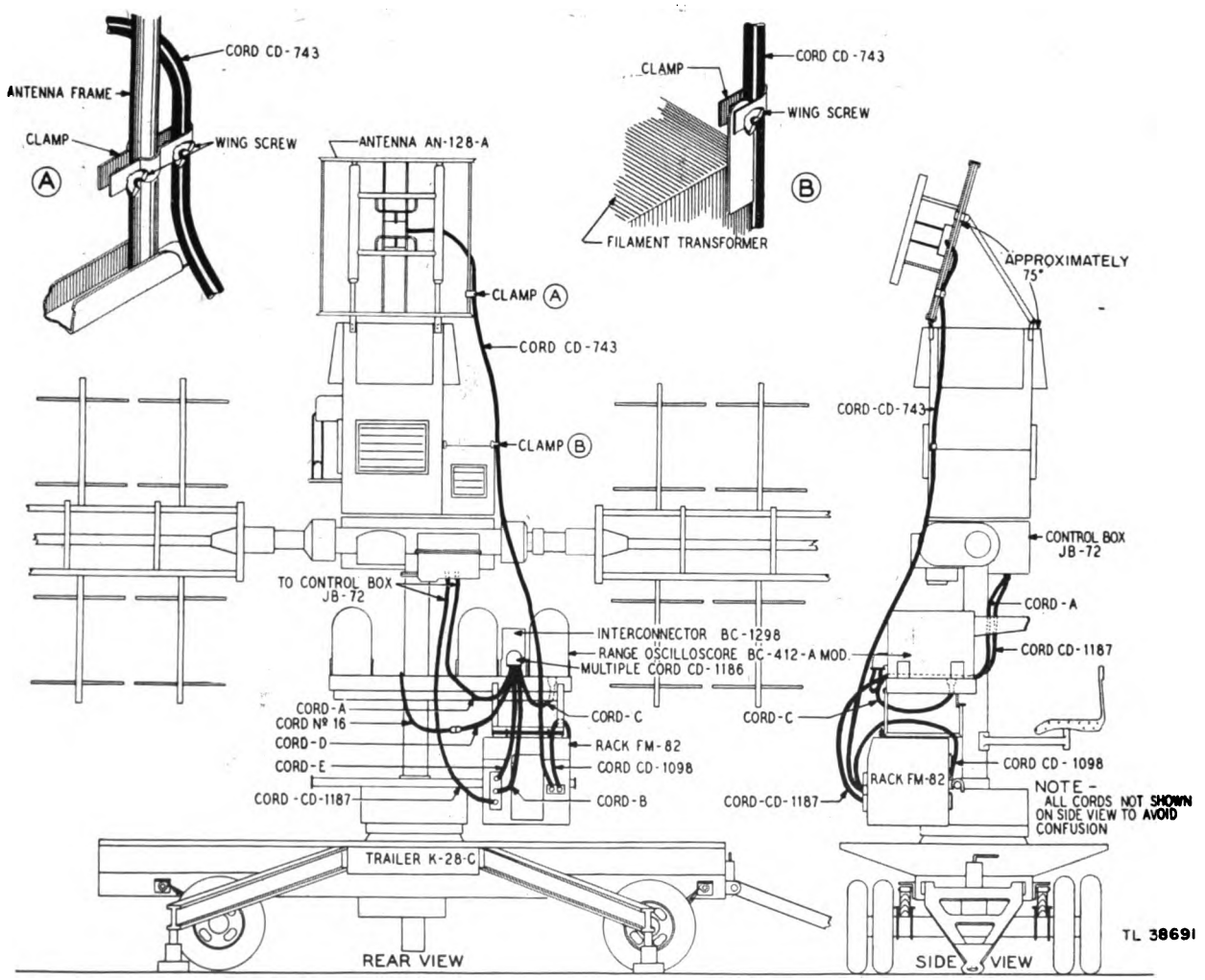

Figure 42. Arrangement of cables for Radio Equipment RC–148–C on Radio Set SCR–268–C.

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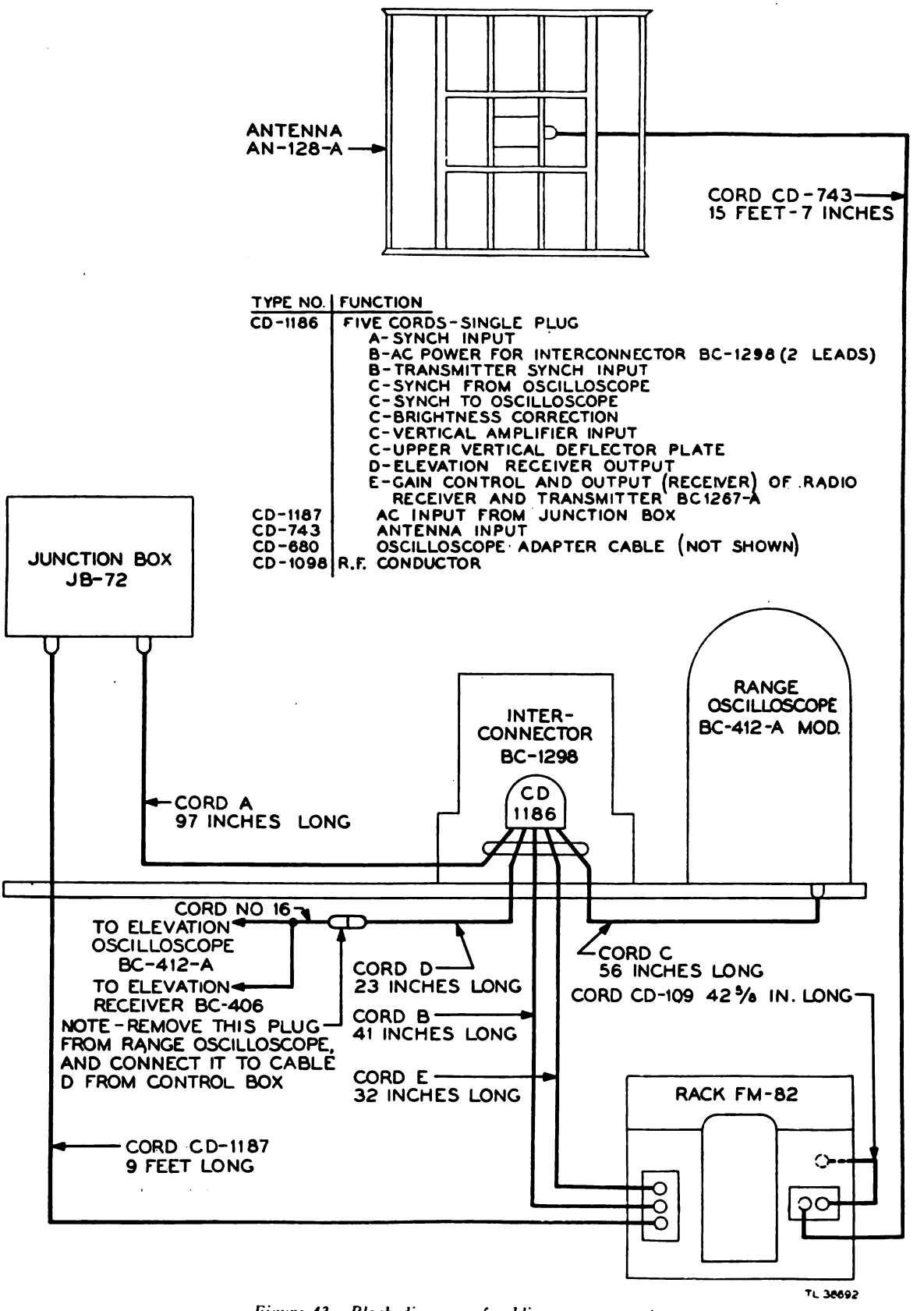

Figure 43. Block diagram of cabling arrangement.

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sisting of five cables identified by A, B, C, D, and E. The cables not shown will be described in the maintenance section.

Caution: During cold weather, all connectors and cables must be handled carefully during installation especially cables with Vinylite composition.

(3) Cords CD–1187 and CD–743 are equipped with Amphenol plugs on both ends. Cord CD–680, the oscilloscope adapter cable, is equipped with one Amphenol and one Russell and Stoll connector.

NOTE. Cord CD–1187 used on Radio Equipment RC–148 and RC–148–B may be used on Radio Equipment RC–148–C if the following conversion is made.

Unscrew the four screws on the right-angle connector AN–3108W–22–8S (fig. 41); turn 90° counterclockwise and tighten the screws again.

b. INSTALLATION.

NOTE. The design of the cable connectors is such that no connection can be made to the wrong receptacle. Do not force any connections. If trouble is encountered, check for the proper cable or cable terminal. Do not allow the cable to be bent sharply since the length of each cable is ample when connected to the proper receptacles. Figure 42 shows the cable connections to the SCR–268–C and RC–148–C.

(1) Connect cord CD–743 between the antenna junction box and the large receptacle marked 7 at the right of the rack wiring cover, figure 9. Clamp the cable to the antenna and filament transformer housing by means of the clamps provided for that purpose (fig. 42). Details of this cable assembly are shown in figure 41.

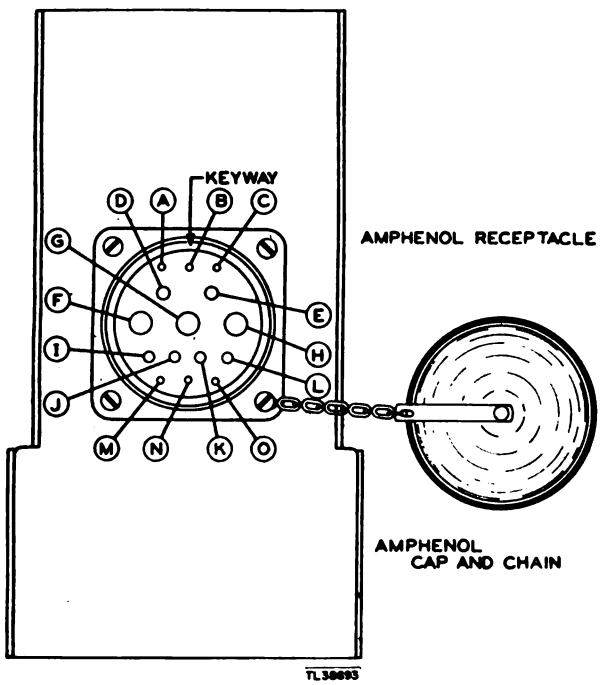

Figure 44. Rear view of Interconnector BC–1298.

(2) Cord CD–1186 is a multiple-type cable consisting of five individual cables terminating in one common connector. Details of the construction, wiring arrangements, and assemblies of the connectors are shown in figure 31.

(*a*) Connect the large common connector of Cord CD–1186 to the large receptacle at the back of Interconnector BC–1298, figure 44.

(*b*) Connect the end of cable A to receptacle AN–3102–22–1S of Junction Box JB–72 (fig. 43).

(*c*) Connect the end of cable B to the large receptacle marked 4 at the rear of the track. Refer to figures 9 and 45.

(*d*) Connect cable C to the 12-pin receptacle of the range oscilloscope (fig. 43).

(*e*) Connect cable D to cable 16 of Radio Set SCR–268–C (fig. 43).

(*f*) Connect cable E to the receptacle marked 5 at the rear of the rack (fig. 9).

(3) Connect one end of Cord CD–1187 to the Junction Box JB–72 and the other end to the receptacle marked 3 at the rear of the rack (figs. 43 and 9).

(4) Connect one end of Cord CD–1098, with a right-angle connector at each end (fig. 41), to the receptacle marked 6 at the rear of the rack and the other end to the receptacle marked ANTENNA on the front panel of the Radio Receiver and Transmitter BC–1267–A (figs. 9 and 12).

(5) This completes the installation of the cables for the operation of Radio Equipment RC–148–C with Radio Set SCR–268–C.

Section VII. ELECTRICAL MODIFICATIONS FOR RC–148–(*)

42. Oscilloscope Modifications

Associated with Radio Sets SCR–268–(*) are four oscilloscopes, BC–412–A or BC–412–B, three of which are in constant use, the fourth being a spare which can be used in any of the three positions. Two of the four oscilloscopes must be modified so that either may be used as the range oscilloscope.

NOTE. These oscilloscopes will herein be referred to as Oscilloscope BC–412. Installing the Radio Equipment RC–148–(*) equipment on SCR–268–(*) requires that two of these oscilloscopes be converted by certain modifications which are herein described. After the completion of these modifications, one of the converted oscilloscopes should be used in the range position on Radio Set SCR–268–(*). The spare oscilloscope may be used in the range position or in either the elevation or azimuth positions by using adapter Cord CD–680, which is furnished with Radio Equipment RC–148–(*). Figure 18 shows the parts that are used in the modification of the oscilloscopes.

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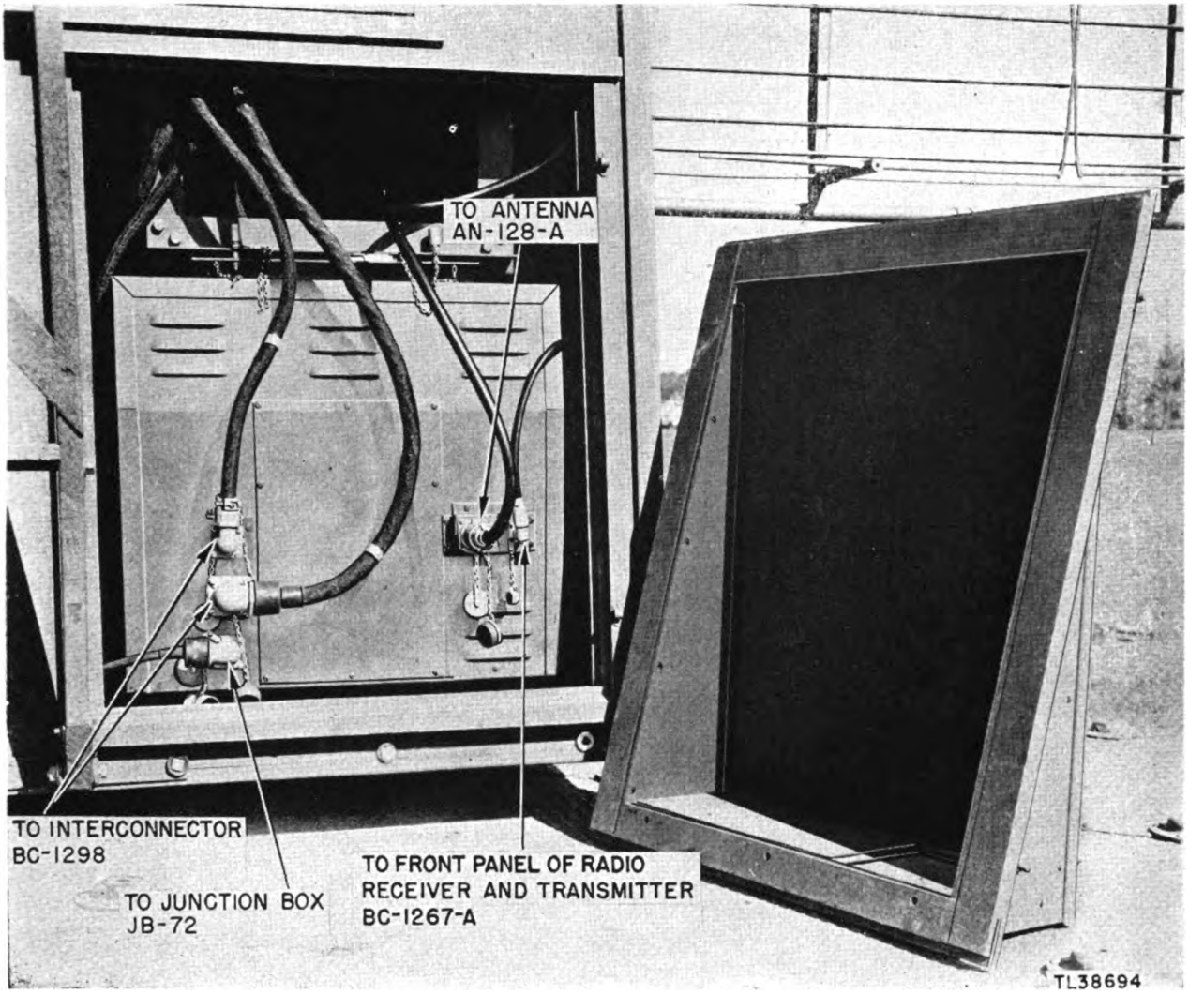

Figure 45. Rear view of Rack FM–82 with cables connected.

a. PRELIMINARY CHANGES. Two major changes are necessary for the modification of the oscilloscopes. These alterations involve both changes in wiring and the addition of some new parts. The left-hand cable receptacle, looking at the front of the chassis, is removed and replaced by a new amphenol receptacle; also a one-tube chassis is added to the top left-hand corner of the oscilloscope chassis.

(1) Place the drilling template which is furnished with the oscilloscope conversion kit in position on top of the oscilloscope chassis as shown in figure 46.

(2) Drill three holes in the top of the oscilloscope chassis with a No. 30 drill and drill one ½-inch hole, as shown in figure 46.

(3) Insert one ½-inch rubber grommet in the ½-inch hole.

(4) Place the retrace blockout chassis (fig. 18, B) on the oscilloscope chassis as shown in figure 47.

(5) Feed the six-lead cable (fig. 18, C) through the ½-inch grommet (fig. 46, A) on the oscilloscope chassis.

(6) Place three 4–40 screws (fig. 18, D) through the holes in the top of the retrace blockout and the oscilloscope chassis, and place lockwashers and lug L (fig. 18) under the right front screw, as shown in figure 48, A. On the under side of the oscilloscope chassis, place lockwashers and nuts on these screws and tighten.

(7) Move the 100,000-ohm resistor, which is connected to a ground lug mounted on the capacitor adjacent to the blockout chassis (fig. 48) to the new ground lug L installed under the screw of the block-

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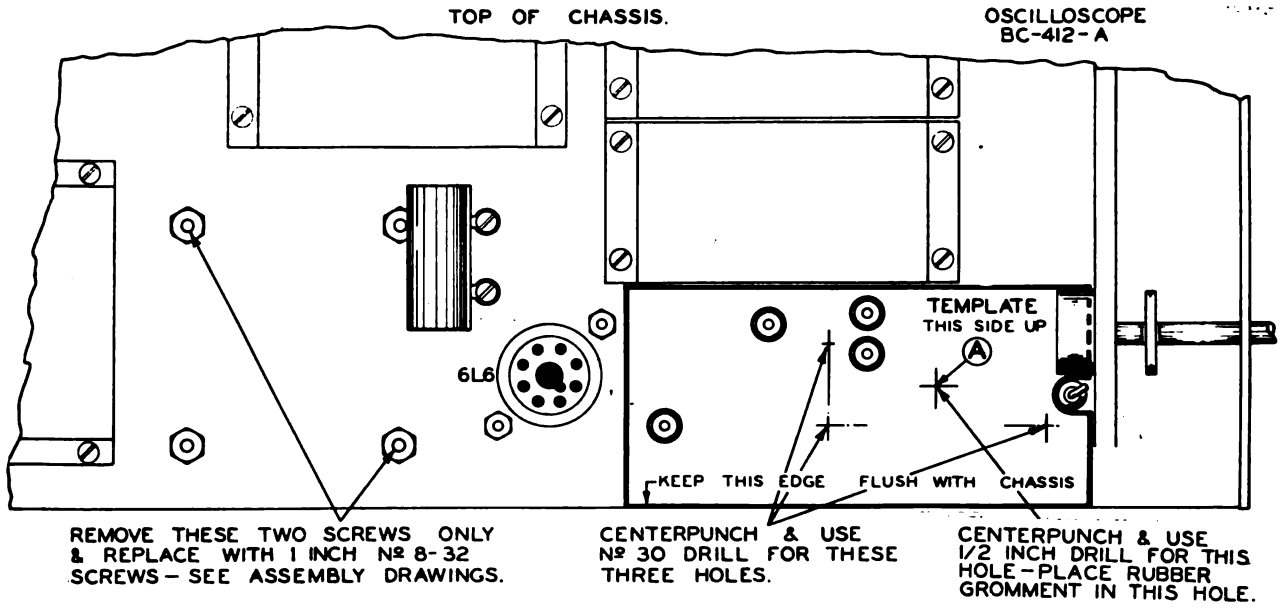

Figure 46. Drilling template for mounting blockout chassis on Oscilloscope BC–412.

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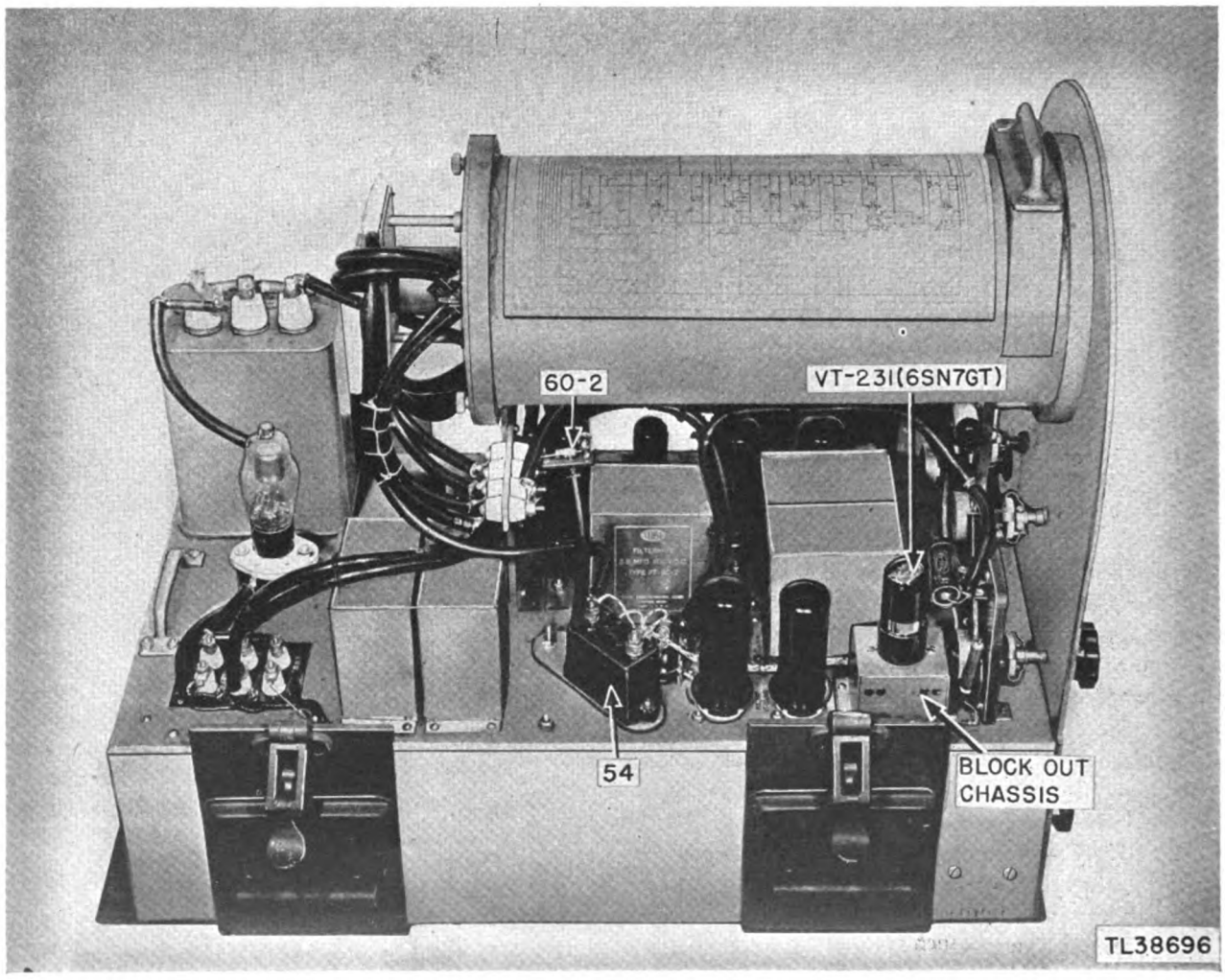

Figure 47. Side view of Oscilloscope BC–412 after conversion.

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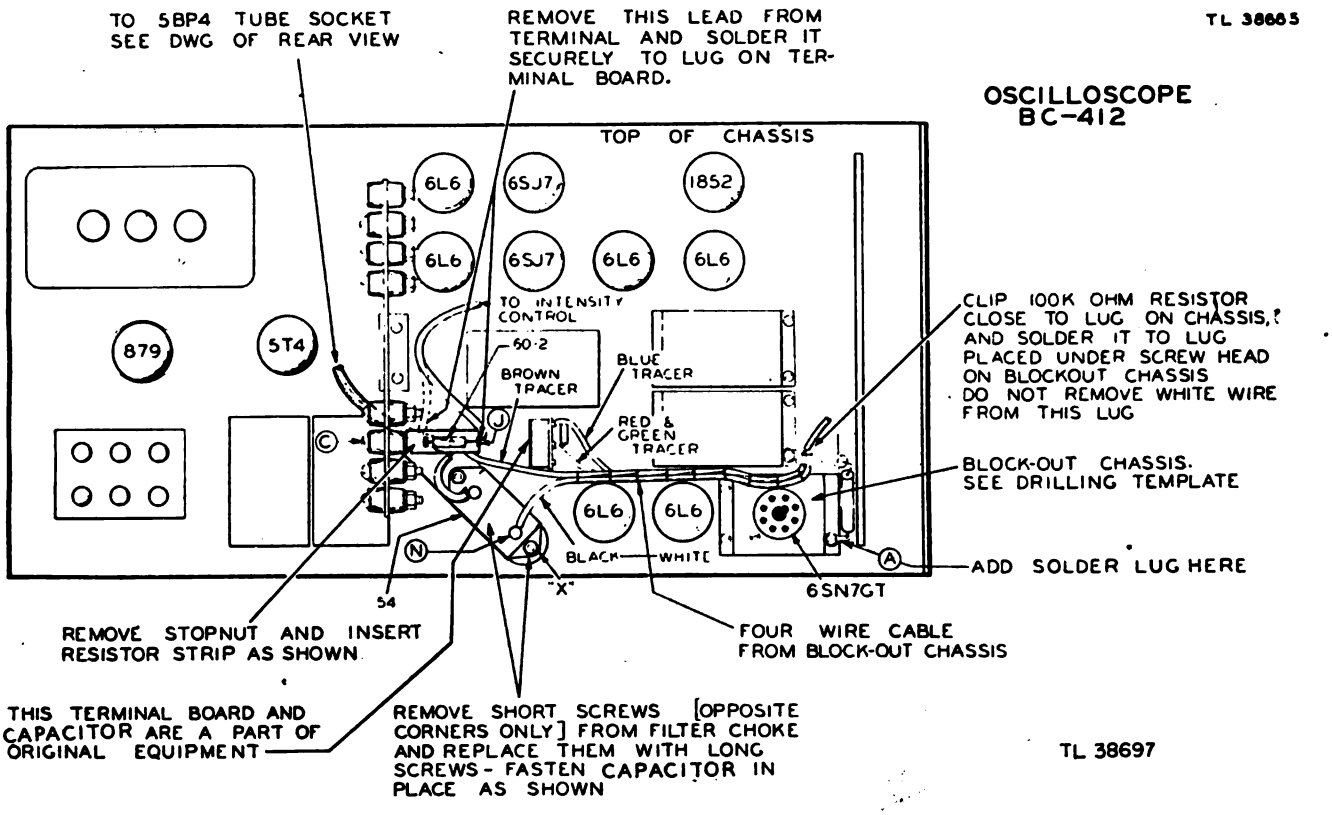

Figure 48. Wiring of blockout chassis on Oscilloscope BC–412.

out chassis. Clip the lead at the lug and solder this lead to the new lug provided.

NOTE. Do not remove the white lead connected to this ground lug! (fig. 48).

(8) Remove the two diagonal mounting screws marked X, which hold the choke (part No. 44–1 of the oscilloscope) as shown in figure 46. Replace these screws with the two 8–32 x 1" screws (fig. 18, E) using the original nuts and washers, and tighten the choke in place.

(9) Fasten the terminal strip (fig. 49, A) to which the white-brown lead from the blockout chassis and the long high-voltage lead are attached, to the high-voltage capacitor marked 54.

b. WIRING CHANGES. (1) Connect the free end of the white-black lead from the blockout chassis with the solder lug attached to the high-voltage capacitor, terminal N as indicated in figures 18 and 48.

(2) Connect the high-tension lead to the terminal F of the high-voltage capacitor, as shown in figure 18.

(3) Mount the 0.005 microfarad, 5,000-volt high-voltage mica capacitor with the F and N terminals directly above the choke, using the 8–32 x 1" screws for mounting, as outlined in paragraph 42, *a*, (8).

(4) Place lockwashers and nuts on these screws and tighten.

(5) Unsolder the lead connected to the front lug of the feed line through insulator C (fig. 48) which connects to the grid of the tube VT–111 (5BP4), and remove the soldering lug.

(6) Mount the single resistor mounting (fig. 18, G) on this insulator.

(7) Solder the lead that was removed from the insulator C to the open end of the resistor marked J in figure 48.

NOTE. On all Radio Sets SCR–268–B having a serial number greater than 601, the strip containing the porcelain insulator C has been replaced by a pressed bakelite strip through which the wires are passed. Cut the wire which leads from the grid of the Tube VT-111 (5BP4) to the intensity control at a point near the right side of the bakelite strip (when viewing the chassis as shown in figure 48). Attach the resistor mounting, (fig. 18, G) to the bakelite strip. Solder the lead from the intensity control to the resistor terminal marked J in figure 48. Solder the lead from the Tube VT–111 to the other terminal.

(8) This operation has, in effect, placed a 100,000-ohm resistor between Tube VT–111 (5BP4) grid and the intensity control.

(9) Remove the strap between pins 6 and 7 of Tube VT–111 (5BP4) socket (fig. 49).

(10) The capacitor shown in figure 49 connected

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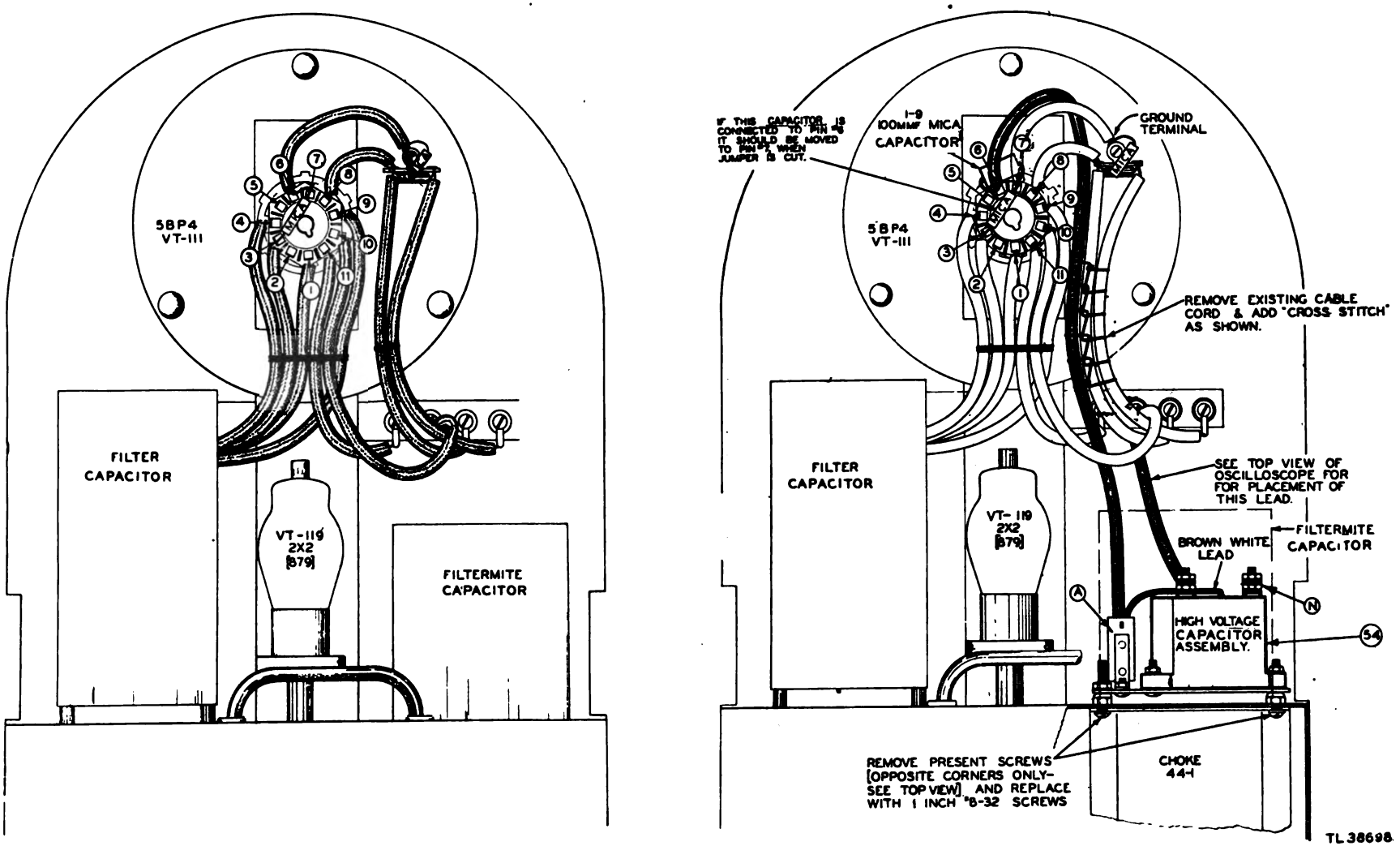

Figure 49. Wiring of Tube VT-111 (5BP4) of Oscilloscope BC-412 before and after conversion.

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between pins 3 and 7 should remain in this position. If found connected to pin 6, it should be moved to pin 7.

(11) Connect the ground lead now connected to pin 6 to pin 7 of Tube VT–111 (5BP4) socket (fig. 49).

NOTE. Do not use pin 5 for any connection.

(12) Connect the 100 micromicrofarad capacitor, (fig. 18, K) between pins 6 and 7 of Tube VT–111 (5BP4) socket, figure 49.

(13) Connect the free end of the long high-tension lead, H in figure 18, from terminal strip A to pin 6 of Tube VT–111 (5BP4) socket as shown in figure 49.

(14) Two more leads are to be soldered above the oscilloscope chassis. They are the blue and the red-green tracer leads which form part of the cable from the blockout chassis. The blue lead is soldered to the right-hand connection of the terminal board, as shown in figure 48. The red-green lead is soldered to the center terminal of the same board.

c. REMOVAL OF FOUR-PIN RECEPTACLE. The present left-hand four-pin connector of the oscilloscope must be removed and a new 12-pin Amphenol connector and filter assembly I (fig. 18) installed in its place.

(1) To permit ease of wiring, shafts A and B (fig. 50) of the two controls beneath the chassis should be removed. These shafts are easily removed by loosening the setscrews at the flexible couplings of these controls.

(2) The small cardboard (fig. 18, M) should be bent in the form of a cylinder and held with scotch tape. Place the cardboard tube over the input transformer 48–1 (48–2) of the oscilloscope (fig. 50, D). The cardboard will protect the transformer during the conversion changes and, at the completion of these changes, should be removed.

(3) Remove the four thumbscrews (fig. 50, C) which hold the plug connector bracket on the under side of the oscilloscope chassis.

(4) Remove the two L-shaped brackets which support this plug connector bracket. Invert the bracket and remove the wiring, miscellaneous capacitors, and resistors which are connected to the 45–1 receptacle.

(5) The shielded red lead, two brown leads, and two black leads should be disconnected from the receptacle and tagged for future reference. The lug which is attached to the two black wires, removed from terminal G of the 45–1 receptacle, should be left attached to the black leads. The capacitors, resistors, and the 45–1 receptacle, which can be removed by withdrawing the two mounting screws, are no longer used.

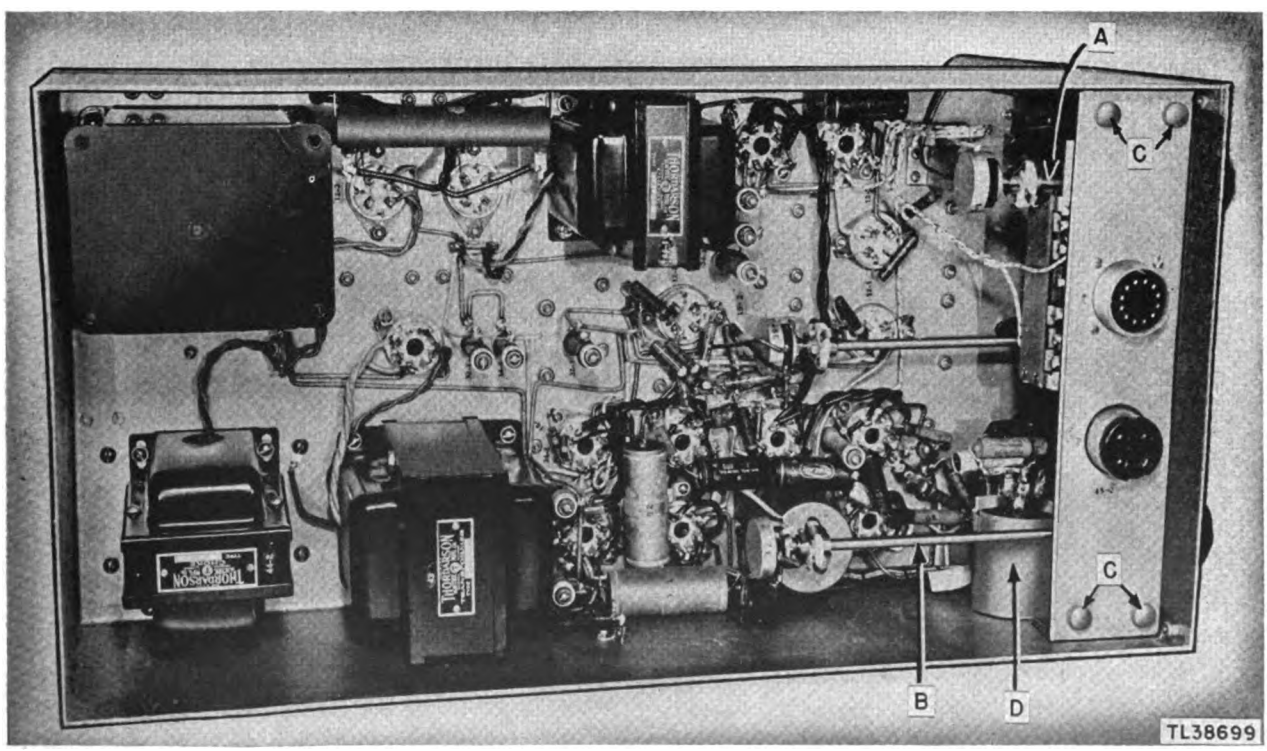

Figure 50. Bottom view of Oscilloscope BC–412 after conversion.

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d. INSTALLATION OF THE 12-PIN AMPHENOL CONNECTOR. The 12-pin receptacle mounting, figure 18, I, may be used as its own drilling template.

(1) Remove the four screws holding the 12-pin connector to the filter assembly plate.

(2) Place the Amphenol connector assembly in the hole left vacant by the removal of the No. 45–1 receptacle.

(3) With the keyway of this receptacle in position (fig. 51) mark the position of the four holes that are to be drilled in the bracket. Fasten this bracket temporarily and with a No. 32 drill, drill these four holes, H, figure 51.

(4) Place the 4–40 binder headscrews through the receptacle mounting bracket and the mounting plate of the 12-pin receptacle.

(5) On the under side of the mounting bracket, place lockwashers and nuts on the binder head screws. Place the Amphenol receptacle and its associated chassis as close to the front panel as the mounting holes and screws will permit. Then tighten the nuts.

(6) Do not place this receptacle bracket in position until the wiring of the receptacle, described in paragraph 42 *e* (1) to (12) inclusive, has been completed.

e. WIRING OF THE 12-PIN AMPHENOL CONNECTOR. The wiring of the new 12-pin receptacle requires that the leads which were removed from the 45–1 receptacle and the leads from the retrace blockout chassis be reconnected. The 12-pin receptacle is wired to the filter assembly terminals; therefore, all connections to this receptacle must be made to the terminal connections (fig. 52).

(1) Remove the green lead from terminal Y of the 45–2 receptacle and connect it to terminal 21 of the filter assembly (fig. 52).

(2) Connect the lead from terminal 20 of the filter assembly to terminal Y of receptacle 45–2.

(3) Connect the black lead of the six-wire cable, C in figure 18, from the retrace blockout chassis to terminal 22 of the filter assembly as shown in figure 52.

(4) Connect the brown lead of the six-wire cable, in figure 18, C from the retrace blockout chassis to terminal 13 of the filter assembly as shown in figure 52.

(5) Connect the red shielded lead, removed from terminal X of the 45–1 receptacle, to terminal 18 of the filter assembly as shown in figure 52.

(6) Connect the white-black lead, which is connected to one of the screws holding the 12-pin con-

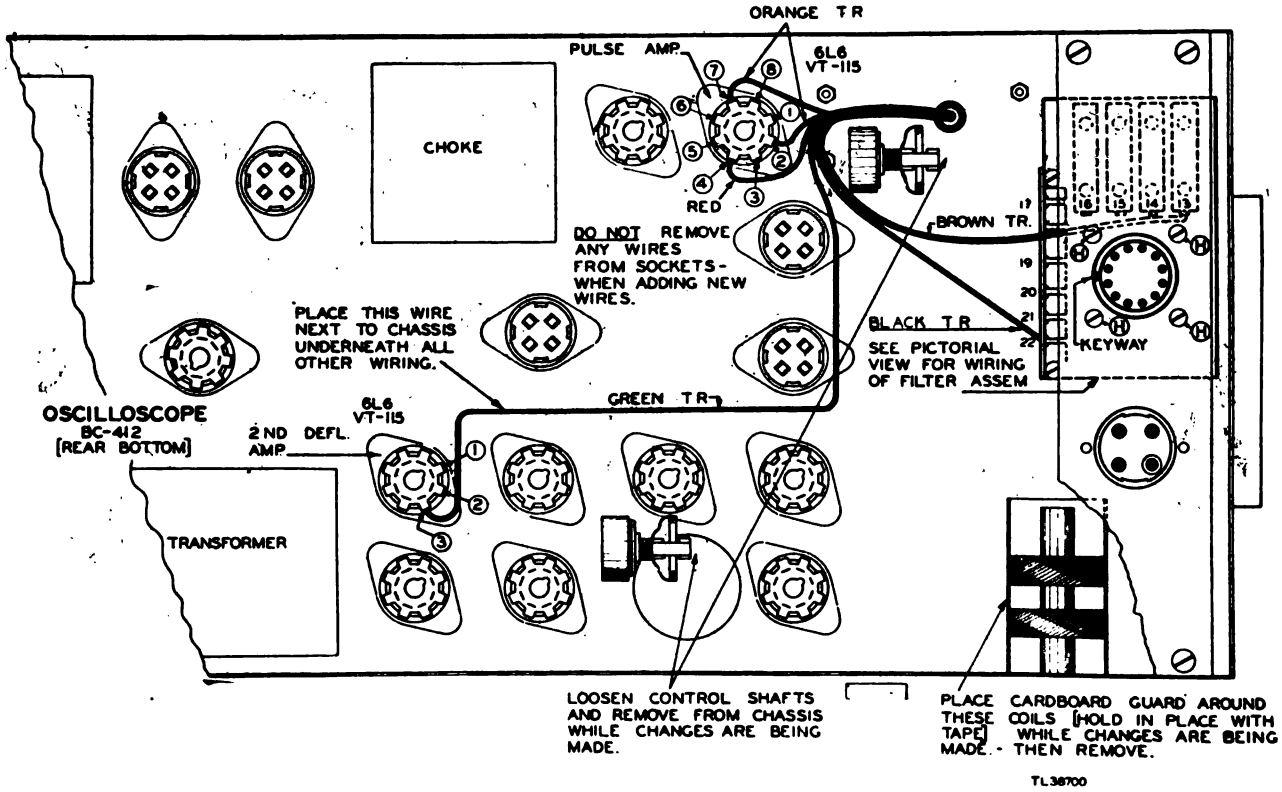

Figure 51. Bottom view of wiring changes on Oscilloscope BC–412.

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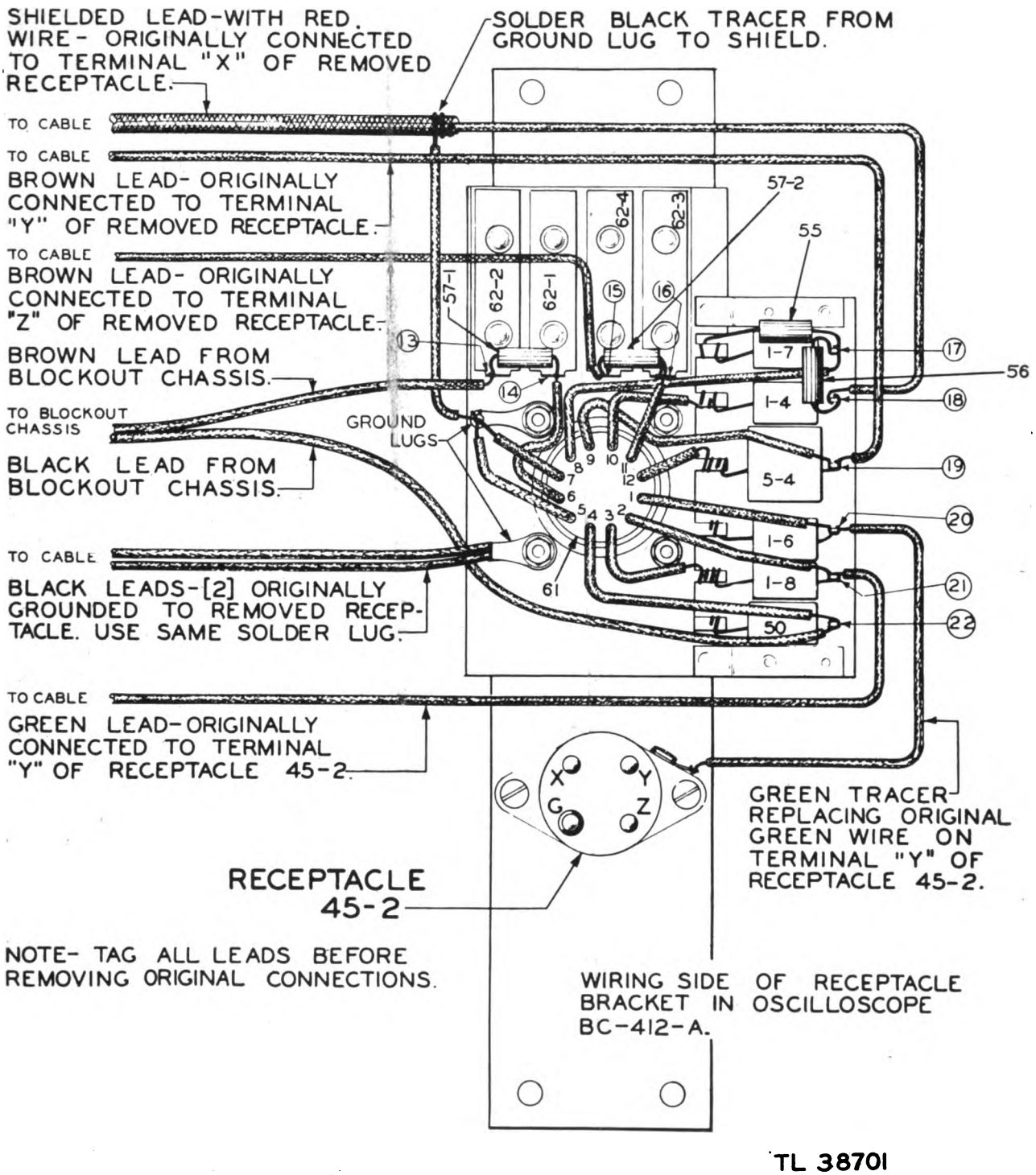

Figure 52. Wiring of 12-pin receptacle on Oscilloscope BC-412.

nector, to the shield braid on the red lead referred to in the foregoing paragraph.

(7) Connect the brown lead previously connected to terminal Y of the 45–1 receptacle to terminal 19 of the filter assembly as shown in figure 52.

(8) Connect the brown lead previously connected to terminal Z of the 45–1 receptacle to terminal 15 of the filter assembly as shown in figure 52.

(9) Place the lug (connected to the black leads) which was removed from terminal G of the 45–1 receptacle, under the lockwasher and nut of the grounding screw holding the 12-pin receptacle.

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(10) Connect the two orange leads from the six-wire cable C to pins 2 and 7 of the socket of pulse amplifier Tube VT–115 (6L6) as shown in figure 51.

(11) Connect the red lead from the six-wire cable C to pin number 4 of the socket of pulse amplifier Tube VT–115 (6L6) as shown in figure 51.

(12) Connect the green lead of the six-wire cable C to pin number 3 of the socket of Tube VT–115 (6L6), which is the second deflecting amplifier tube on the right side of the chassis (fig. 51). Place this wire next to the chassis underneath all other wiring. This operation concludes the wiring necessary to modify the oscilloscope.

(13) Place the brackets which will support the new 12-pin receptacle in their original positions. Tighten the four thumbnuts to hold brackets in place.

(14) Replace shafts A and B, and remove cardboard D (fig. 50).

f. COMPLETING THE MODIFICATION. The following operations are required to complete the modification of the oscilloscope:

(1) It will be necessary to enlarge the hole in the outside case of the Oscilloscope BC–412 to permit the insertion of the new 12-prong receptacle. Use a bastard file which is part of the tool kit of the Radio Set SCR–268–(*).

(2) On Radio Sets SCR–268–B and SCR–268–C this hole may be enlarged by using the reamer which is part of the tool kit of the equipment.

(3) Glue the revised print of the oscilloscope schematic circuit, furnished with kit, over the present print on the shield which houses the cathode-ray Tube VT–111 (5BP4) (fig. 47).

(4) At the completion of the modification of the oscilloscope, the two nameplates (fig. 53) furnished with the conversion kit must be fastened to the converted unit. One should be attached to the front panel and the other to the chassis. To mount the former, select a convenient location near the present nameplate and, using the new nameplate as a template, mark the position of the holes required for mounting it. Drill the holes with a No. 43 drill and tap them for a 4–40 thread. Care must be taken that the drill does not hit any electrical components on the rear of the panel. Mount the nameplate with the 4–40 screws furnished with the kit. The other nameplate can be attached to any part of the oscilloscope chassis.

(5) Set the oscilloscope chassis on its mounting. Place the cover in positon and fasten.

(6) The two oscilloscopes which were modified

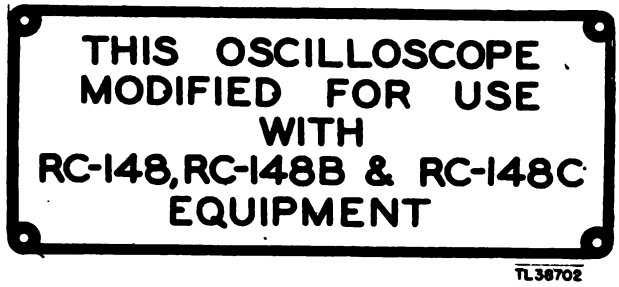

Figure 53. Nameplate to be attached to chassis and case of Oscilloscope BC-412.

by the wiring changes as described in paragraph 42 are designed to work in the range position with both Radio Set SCR–268–(*) and Radio Equipment RC–148–(*). One of these oscilloscopes is used as a spare and either may be used in the elevation or azimuth position of Radio Set SCR–268–(*). Adapter Cord CD–680 is furnished, which permits the present cables of the elevation or azimuth oscilloscope to be connected to the new 12-pin receptacle.

43. Changes in Junction Box JB–22 and JB–72

a. All a-c power is furnished to the RC–148–(*) equipment through the main terminal board of Junction Box JB–22 or Junction Box JB–72 of Trailer K–28–(*) (figs. 54 and 56). Before the cables for Radio Equipment RC–148 are placed in position, two additional Amphenol receptacles must be installed in this junction box.

(1) Remove the ten screws which hold the inner panel of the junction box in place as shown in figure 54.

(2) Raise this panel to one side and support temporarily.

NOTE. Since wires are connected to the apparatus mounted on the panel, this unit cannot be entirely removed.

(3) Drill and cut two $1\frac{5}{16}$-inch holes in the bottom of the junction box as shown in figure 55.

(4) The Amphenol receptacles supplied with Radio Equipment RC–148 may be used as templates for locating the mounting holes.

(5) Place Receptacle AN–3102–22–1S in the left-hand position of the junction box with the keyway in the position as shown in figure 56, and locate the four mounting holes.

(6) Place Receptacle AN–3102–22–8S in the right-hand position of the junction box with the keyway in the position shown in figure 56, and locate the four mounting holes.

(7) With a No. 31 drill, drill the eight mounting holes.

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(8) Place the two Amphenol receptacles in their correct positions as indicated (par. 43*a*(5) and (6)). Place 4–40 screws with lockwashers and nuts in the eight holes and fasten the receptacles to the junction box.

NOTE. In fastening Receptacle AN–3102–22–1S, a soldering lug should be placed in position as shown in figure 56.

b. When wiring the Amphenol receptacles to the various terminals referred to in figure 41, other wires with lugs attached will be found underneath the heads of the screws on the terminal board. These lugs are not to be removed. The additional wires with lugs attached are to be placed underneath the heads of these screws as indicated in figure 56.

(1) Connect the shielded leads with the lugs attached between terminal A of Receptacle AN–3102–22–1S and the number 8 left-hand IN terminal as shown in figure 56.

(2) Connect the longer of the two black leads with the lugs attached between terminal B of Receptacle AN–3102–22–1S and the number 6 terminal as shown in figure 56.

(3) Connect the other black lead with lug attached between B terminal of Receptacle AN–3102–22–8S and the number 7 terminal as shown in figure 56.

(4) Connect the white lead with lug attached between the A terminal of the AN–3102–22–8S and the V. M. terminal (fourth terminal from the right as shown in figure 56).

NOTE. If the connections have been made as specified and no calibrating pattern can be obtained on the oscilloscope, the white and the black leads on Receptacle AN–3102–22–8S should be reversed.

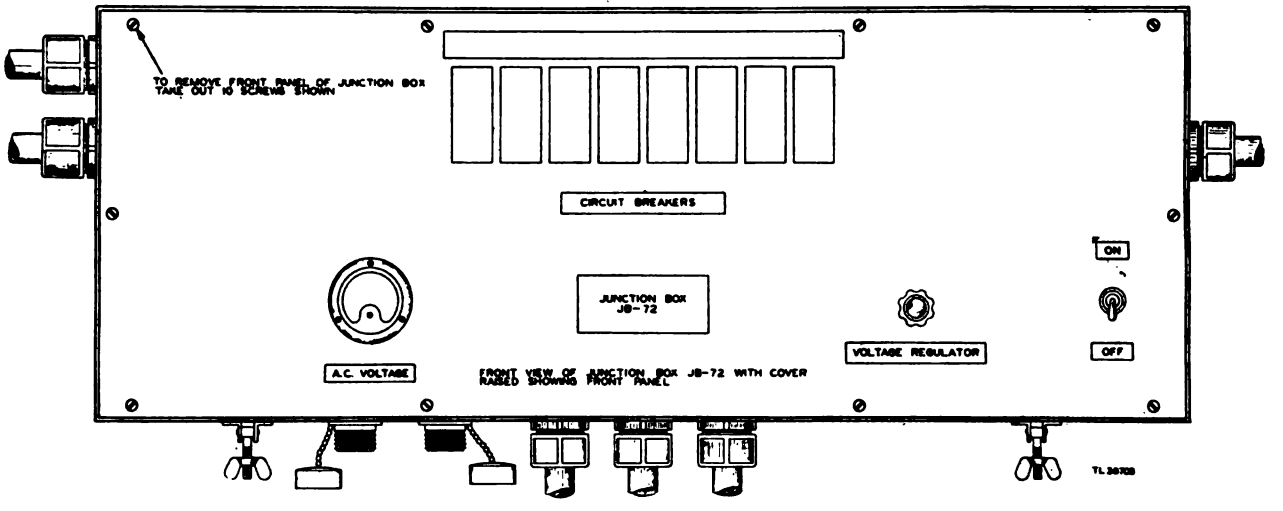

Figure 54. Front view of Junction Box JB–72 with cover open.

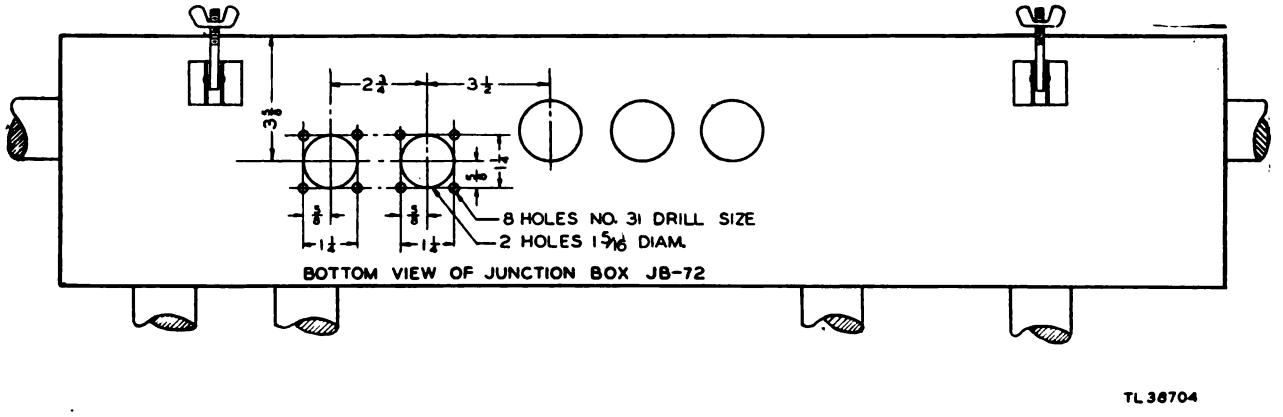

Figure 55. Drilling information for adding two Amphenol receptacles in Junction Box JB–72.

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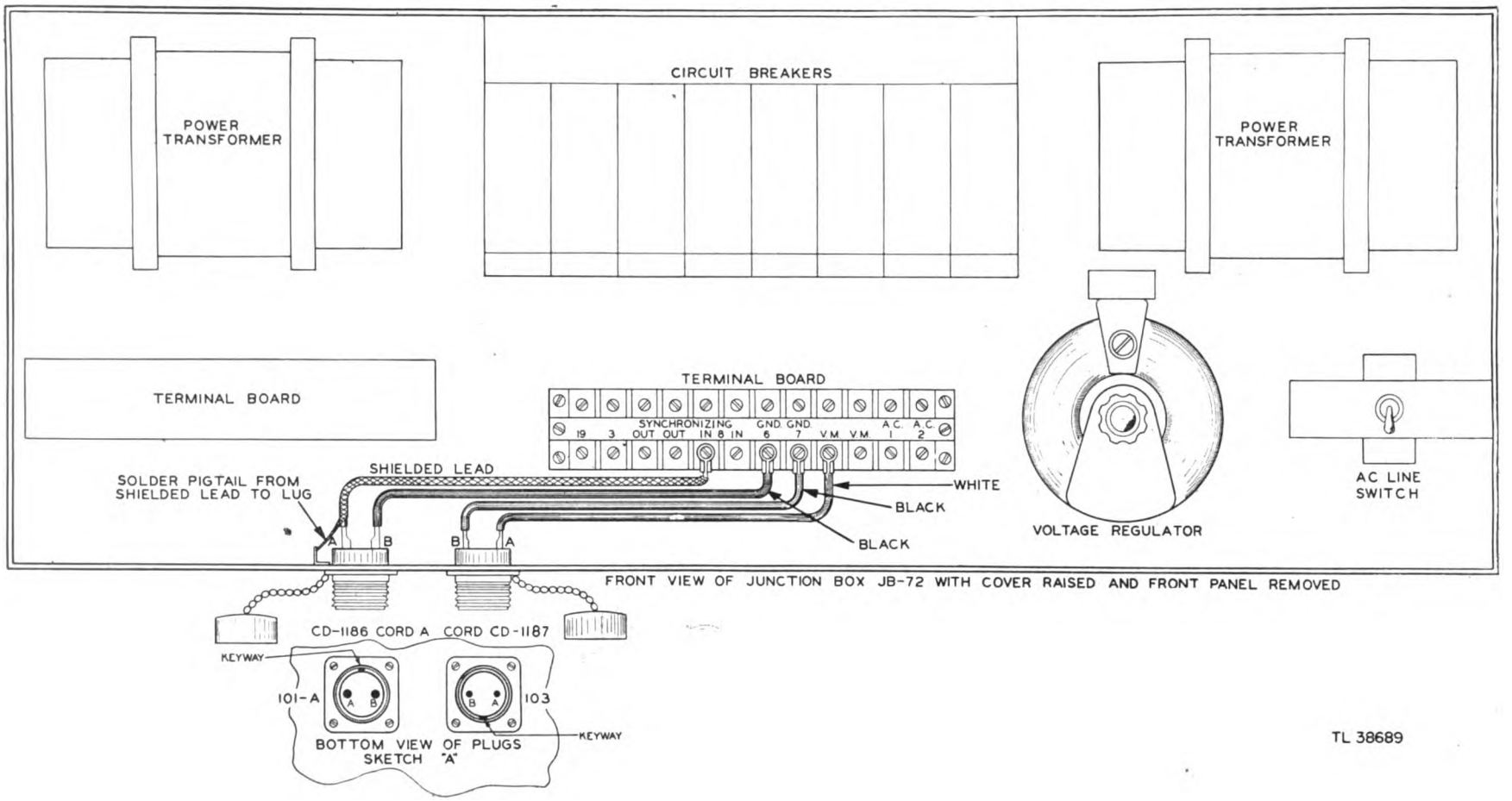

Figure 56. Arrangement of additional wiring in Junction Box JB-72.

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CHAPTER 3

OPERATION

Section I. GENERAL INTRODUCTION

44. General

This chapter is divided into five sections. The first section is a general introduction. Sections II and III describe preliminary tests and adjustments, normal starting procedure, final adjustments, technical operation, and the stopping procedure for Radio Equipment RC–148 and RC–148–B. Sections IV and V contain similar information for Radio Equipment RC–148–C.

45. Checking the Equipment

Following the initial installation, and after the equipment has been moved from one location to another, it is necessary to test, check, and adjust the components to be certain that they are capable of operating correctly. Before placing the equipment in operation, make a few general checks on installation.

a. Check antenna for proper installation; see that cables are fastened securely.

b. Check to see that every cable and plug is in its correct position and that the threaded collars of these plugs have been screwed up tight (figs. 34 and 43).

c. Make a mechanical check to be certain that all the components are correctly mounted, that the rack is placed in its proper position, and that the two components of the RC–148–C in Rack FM–82 are properly seated in the rack so that all terminal prongs make positive connection with terminal blocks in the rear of the rack. A positive connection is insured if the component is given a sharp thrust before the component front panel is flush with the front edge of the rack. Be sure the captive screws which hold the components in place are tight.

d. Be sure that power is supplied to the unit. The power source for the radar unit also supplies power to the IFF. Check to see that power is supplied to the radar antenna trailer and then through Junction Box JB–72 or JB–22 to the IFF equipment.

Section II. PRELIMINARY TUNING OF RADIO EQUIPMENTS RC–148 AND RC–148–B

46. Preliminary Tuning

a. When the set is placed in operation for the first time, or the frequency of the set is to be changed, the transmitter must be tuned to the proper frequency. This frequency will be designated by the person in charge. The tuning procedure is given below.

Warning: Operation of the transmitter involves the use of high voltages which are dangerous to human life. Do not change tubes or make any adjustments inside the transmitter with the high voltage supply on. Do not depend on interlocks for protection. During adjustment, installation, or trouble shooting, turn off the CIRCUIT BREAKER on the transmitter panel and disconnect the power supply cable at the AC INPUT receptacle on the transmitter rear panel.

(1) Throw the transmitter CIRCUIT BREAKER to the OFF position.

(2) Disconnect the a-c power supply cable 103 at the AC INPUT receptacle at the rear of the transmitter.

(3) Remove the cover plate at the rear of the transmitter. This can be done by turning the six shakeproof fasteners a quarter-turn to the left with a screwdriver. Remove the outer plate; behind it, on the oscillator housing is a similar plate, behind which is the tuning mechanism. Remove this second plate, which is held in place by four fasteners.

Caution: Whenever the oscillator housing is opened for making adjustments to the transmitter unit, ground all high-voltage capacitors and circuits to prevent electrical shock that may be caused by a defective bleeder circuit. Do this by placing the safety shorting bar (described in TM 11–1418, Preventive Maintenance Manual) firmly against the transmitter case and touching the bar to the plate contact of the oscillator (826) tube, which is the second contact to the left facing the tuning assembly. Ground the grid tuning line in a similar manner.

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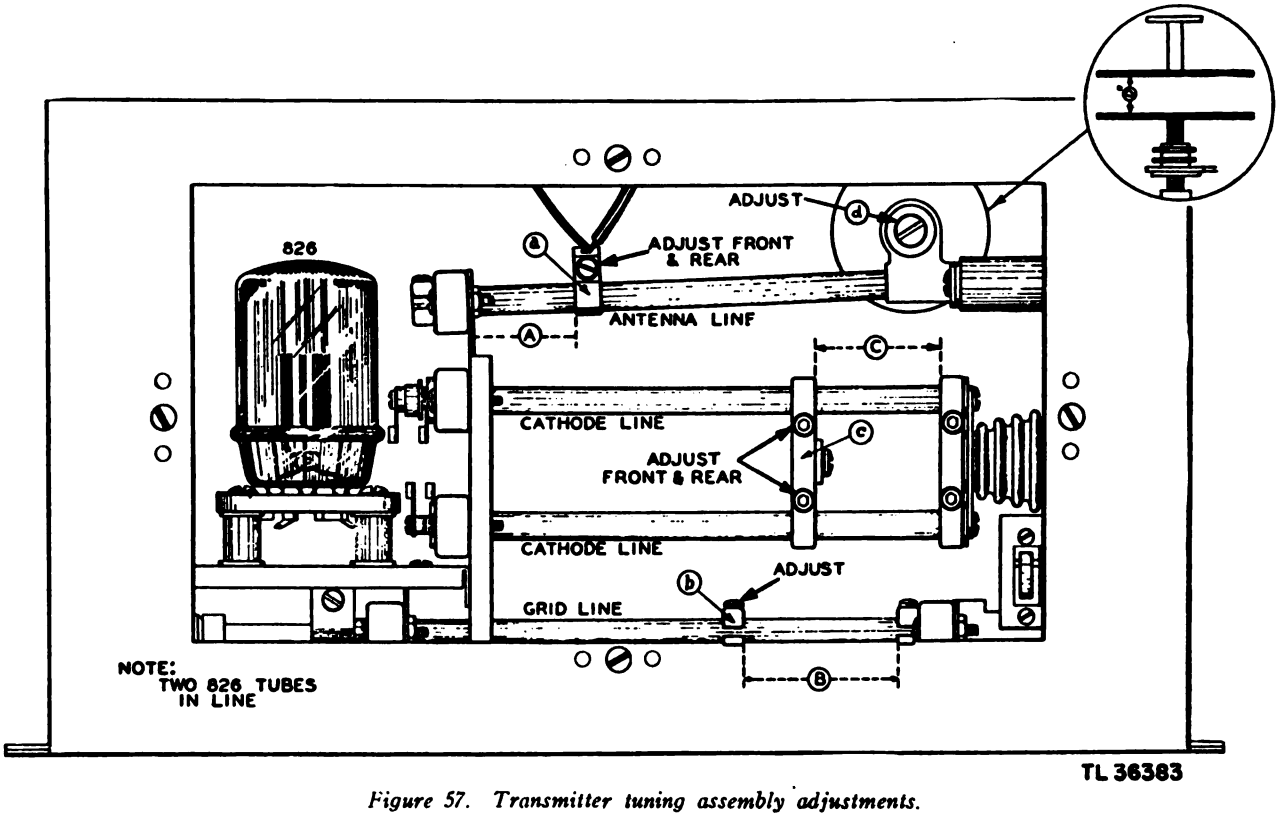

Figure 57. Transmitter tuning assembly adjustments.

(4) When the set is placed in operation for the first time, remove the transmitting tubes from their carton (shipped on top of the oscillator housing) and insert them in their sockets.

(5) Adjust the transmitter frequency by sliding shorting bars *b* and *c* and antenna taps *a* of the transmitter tuning assembly to positions corresponding to the operating frequency (fig. 57). These positions can be determined from chart No. 1, which is fastened to the inside of the transmitter backplate. This chart contains the assigned frequency and the corresponding settings of the shorting bars (in inches). A scale, calibrated in tenths of an inch, and an Allen wrench, are attached to the same face of the backplate; these are supplied for making the transmitter adjustments.

(6) Using the Allen wrench, loosen the Allen setscrews which hold shorting bars *b* and *c* so that the bars may be readily moved along the supporting rods.

(7) Adjust the grid (lower) line by sliding shorting bar *b* to a distance *B* corresponding to the desired frequency, as shown on the chart. Note the points from which the distance *B* is measured in figure 57. On the chart, the left-hand scale covers the frequency range of the transmitter in megacycles, and the bottom scale indicates the distances in inches at which the shorting bars and taps are to be placed. To read the chart, find the desired frequency on the left-hand scale, then, going directly to the right, find the point on the appropriate curved line (A, B, C, or D) opposite the frequency. Directly beneath this point on the lower scale will be found the distance of the setting in inches.

(8) Adjust the cathode line by sliding shorting bars *c* (front and rear) to the distance *C* corresponding to the desired frequency.

(9) Adjust antenna taps *a* (front and rear) by loosening the screws and sliding the taps to the distance *A* corresponding to the desired frequency.

(10) Adjust the spacing of antenna capacitor *d* to the distance *D*, indicated on chart No. 1, for the desired frequency.

(11) Tighten the Allen-head setscrews on the shorting bars and tighten the screws on the antenna taps.

(12) Having made these adjustments, replace the scale and Allen wrenches in their holders. Put on the inside and outside covers. Then tighten the shakeproof fasteners by turning them a quarter-turn to the right.

b. When the set is placed in operation, the exact frequency of the transmitter can be determined. If it is within a few megacycles of the desired fre-

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quency, it can be tuned exactly by adjusting the VERNIER TUNING control on the front panel of the transmitter while the set is in operation.

Section III. OPERATIONAL PROCEDURES FOR RADIO EQUIPMENTS RC–148 AND RC–148–B

47. Preliminary Adjustments

a. The preliminary adjustments listed in this paragraph are to be made whenever the set is placed in operation. The various steps which are designated in figure 58 correspond to the numbers in the text. The radar set should be operating normally.

Open all doors on the equipment:

(1) Lower the transmitter hinge cover, which is on the front lower section of the transmitter case, by turning the two thumbnuts a quarter-turn to the left.

(2) Open the receiver hinge cover in the same manner.

(3) Open doors on control unit by unscrewing knurled hand screws.

At the transmitter:

(4) The CIRCUIT BREAKER must be OFF.

(5) HIGH VOLTAGE CONTROL must be in extreme counterclockwise position.

(6) HIGH VOLTAGE switch OFF.

(7) LOW VOLTAGE switch OFF.

(8) METER LIGHT switch ON.

At the receiver:

(9) ON-OFF switch to OFF position.

At the control unit:

(10) STANDBY OPERATE switch on STANDBY.

(11) The ON-OFF switch on interconnector to OFF position.

(12) Power switch on wavemeter OFF.

b. The radar range oscilloscope should be adjusted as described in this paragraph:

(1) Adjust the FOCUS and INTENSITY controls so that a baseline of satisfactory brilliance appears on the screen.

(2) Adjust the SWEEP control so that the length of the baseline occupies approximately three-quarters of the screen.

(3) Adjust the VERTICAL and HORIZONTAL positioning controls so that the baseline is centered horizontally and approximately three-quarters

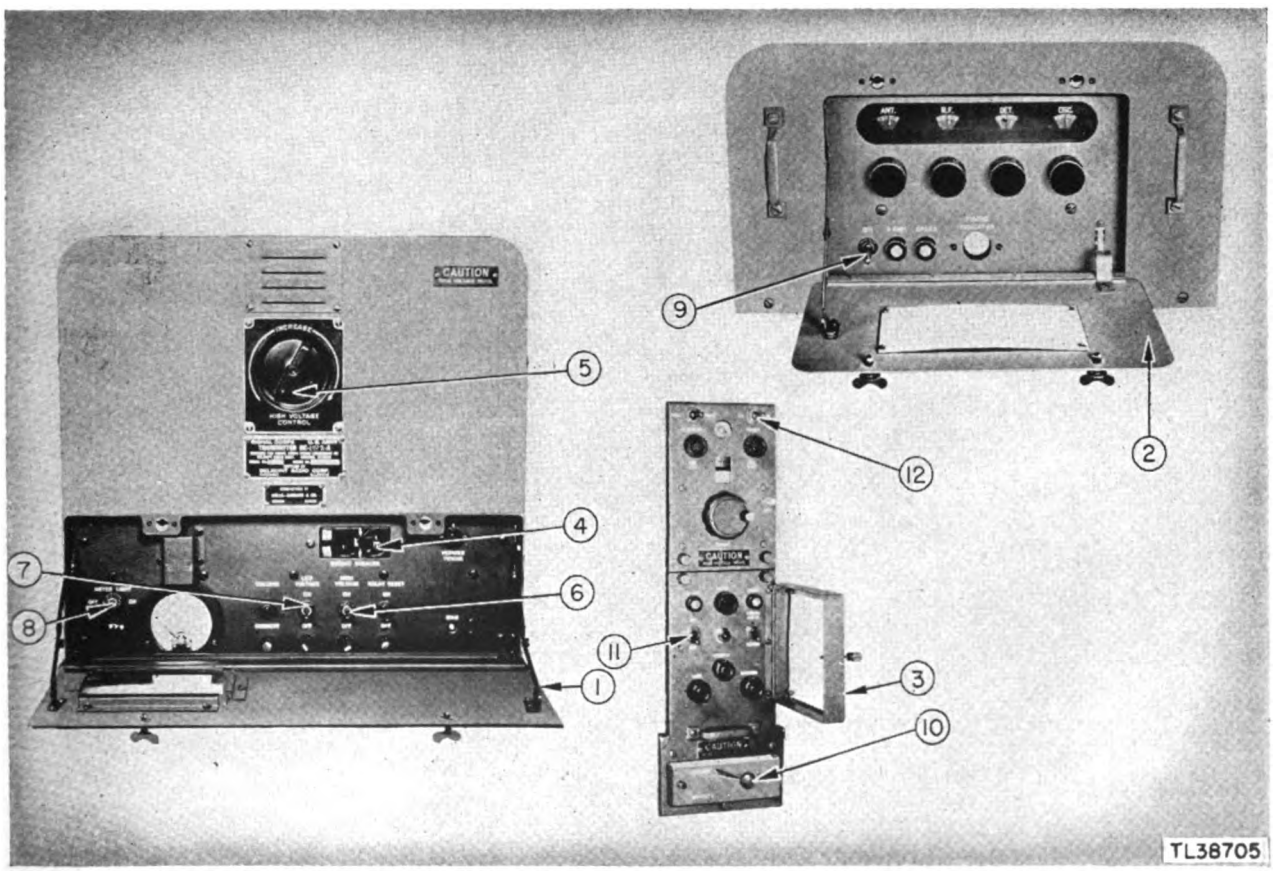

Figure 58. Preliminary equipment adjustments.

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of an inch below the center of the oscilloscope screen.

48. Normal Starting Procedure

The detailed steps in the starting procedure are listed below. Learn them thoroughly. For convenience, refer to figures 59 to 67 inclusive.

STEP NO. 1

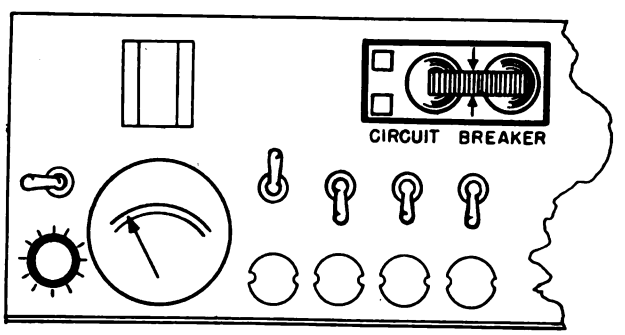

Figure 59. Starting procedure, step No. 1.

Turn CIRCUIT BREAKER on transmitter ON. Red indicator light on panel lights.

STEP NO. 2

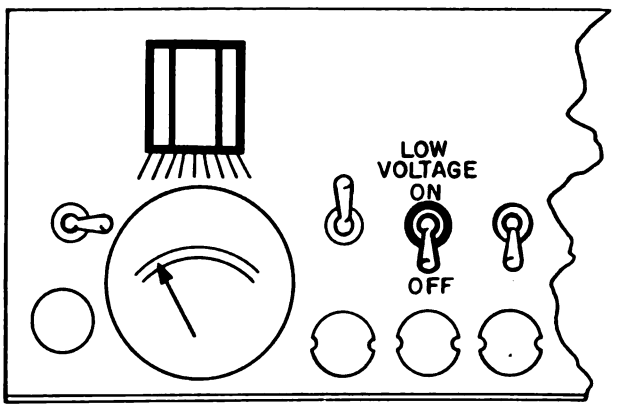

Figure 60. Starting procedure, step No. 2.

Set the LOW VOLTAGE switch to the ON position. The light above the meter lights, and the blower motor in the transmitter can be heard. To be sure the blower is on, place your hand over vent at top of front panel.

STEP NO. 3

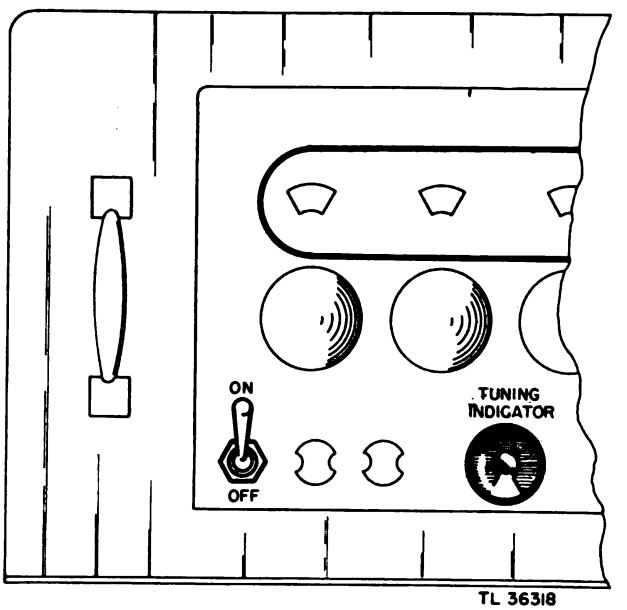

Figure 61. Starting procedure, step No. 3.

Turn on receiver by switching receiver ON-OFF switch to ON position. Dial lights light and TUNING INDICATOR lights after a few seconds.

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STEP NO. 4

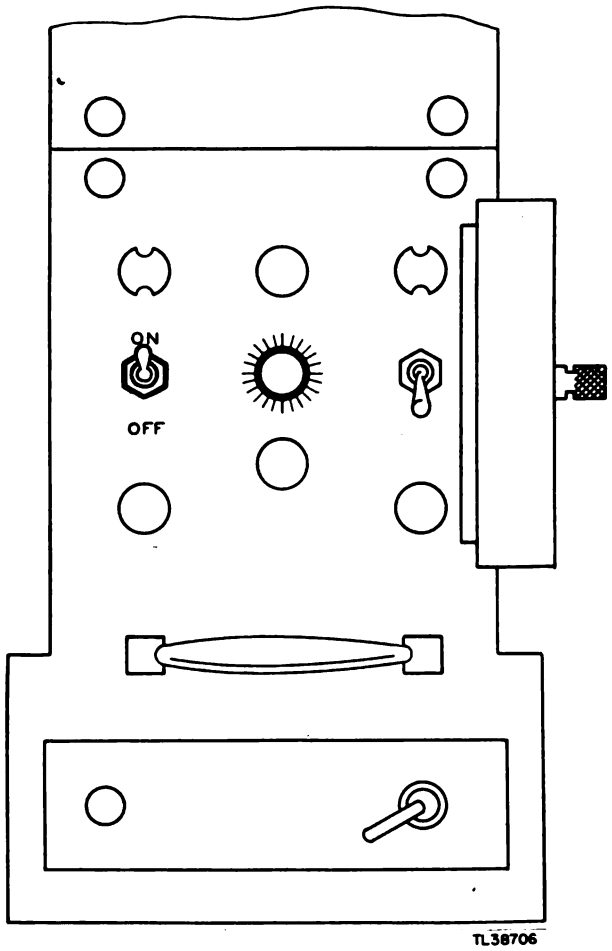

Figure 62. Starting procedure, step No. 4.

Turn on the interconnector by switching interconnector ON-OFF switch to the ON position. Red indicator lamp lights.

STEP NO. 5

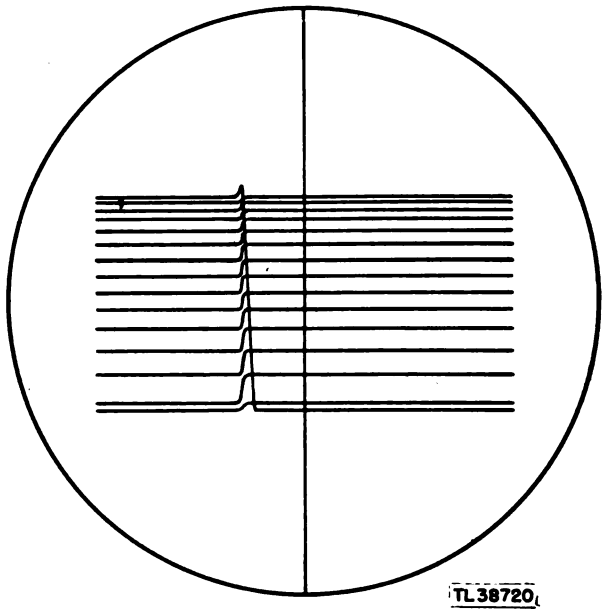

Figure 63. Division pattern.

With the SELECTOR switch turned to position 4, rotate the TEST switch on the control unit to position 2. A series of horizontal lines appear on the screen of the oscilloscope. Adjust the DIVISION control knob on the control unit until 15 horizontal lines appear on the range oscilloscope screen. The two bottom lines are very close together and may be mistaken for one. Check the count carefully.

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STEP NO. 6

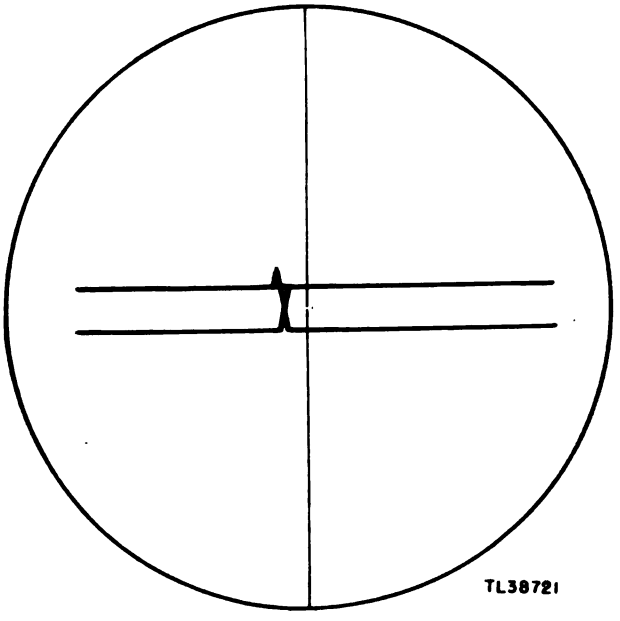

Figure 64. Baseline, normal pattern.

a. With the SELECTOR switch in position 4, turn the TEST switch to position 1. Starting with the BASELINE control in the counterclockwise position, turn the control clockwise until a double baseline is obtained with a sharp cross-over between the lines as shown in figure 64. This cross-over roughly represents the letter X. At this point it will be observed that the adjustment of the BASELINE control has the effect of peeling some lines off the top trace and piling them up on the lower. The BASELINE control is adjusted correctly when only one line has been removed (peeled off). The correct adjustment will leave a definite break in the center of the lower trace (fig. 64). It may be necessary to decrease the sensitivity of the radar signal to see the radar baseline clearly.

b. If necessary, rotate the PHASE control until the X or cross-over is near the vertical cross-hair on the screen. If this cannot be done even when the PHASE CONTROL is rotated over its full range of adjustment, turn it fully to one stop or the other, and at one of the stops, use a little extra pressure which will actuate a switch. After this, the PHASE control covers a new span of adjustment and positioning is possible.

STEP NO. 7

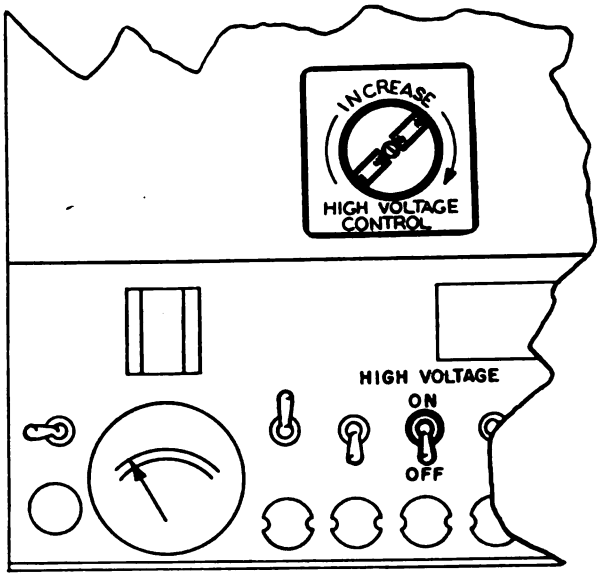

Figure 65. Starting procedure, step No. 7.

Be sure that at least 30 seconds have elapsed since the transmitter LOW VOLTAGE switch was turned ON, and be certain that the HIGH VOLTAGE CONTROL is in extreme counterclockwise position; then turn the HIGH VOLTAGE toggle switch to the ON position.

STEP NO. 8

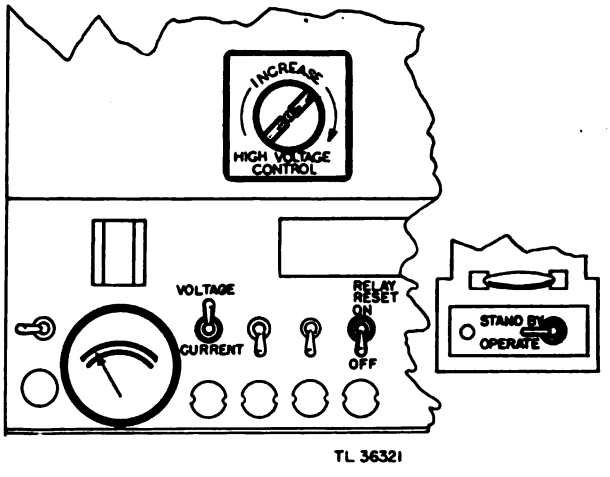

Figure 66. Starting procedure, step No. 8.

Place SELECTOR switch in the OPERATE position. Then rotate the HIGH VOLTAGE CONTROL in a clockwise direction until the meter reads

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3.5 kilovolts. (The upper scale on the meter is the kilovolt scale.) Immediately after turning up the HIGH VOLTAGE CONTROL, press down VOLTAGE CURRENT switch on the transmitter panel to the CURRENT position. Read the current on lower scale of meter. Current should read approximately 2 milliamperes (ma). If the meter shows either zero or full-scale deflection, return the HIGH VOLTAGE CONTROL to its original position, and adjust transmitter BIAS as described in paragraph 51. If the meter shows full-scale deflection, turn down the high voltage *immediately.*

NOTE. If rotation of HIGH VOLTAGE CONTROL has not caused any rise in the voltage meter reading, turn the control back to its original position. Then press the RELAY RESET switch to the ON position and hold it there for a second. This will reset the overload relay which may have opened. After releasing the switch, turn up HIGH VOLTAGE CONTROL again. If no reading is obtained this time, call the radar repairman.

Return the SELECTOR switch to the STANDBY position. Close all doors opened as described in preliminary adjustments. The IFF can be operated by using the external STANDBY OPERATE (SELECTOR) switch.

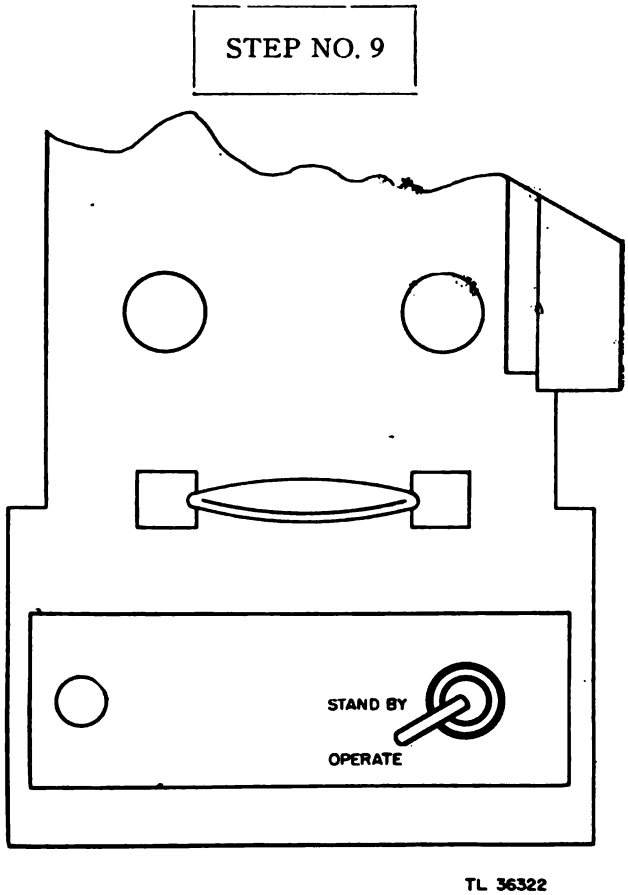

Figure 67. Starting procedure, step No. 9.

Turn SELECTOR switch to OPERATE position. The normal radar display with the IFF display beneath it should appear on the range oscilloscope. Return the switch to STANDBY position. Make any of the final tests and adjustments described in the following paragraphs that are necessary. The IFF is normally left in a non-operating condition until the operator wishes to identify a target, which he does as described in paragraph 58 on technical operation.

49. Final Adjustments of Radio Equipments RC–148 and RC–148–B

a. When the steps described in paragraph 47 have been completed, it may be necessary to make several additional adjustments for proper operation. To insure proper functioning of the equipment, these adjustments should be completed each time prior to actual operation. While these adjustments are being made, if the person in charge so designates, insert the dummy antenna in the center receptacle (106) of the antenna matching section in place of the antena trasmission cable which must be in the socket during normal operation. The bulb in the dummy antenna will light when the transmitter is working normally. This provides a visible indication of the output of the transmitter and, in addition, prevents an excessive radiation of energy which could reveal the location and characteristics of the set to the enemy.

b. In this chapter, it has been assumed so far that the radar set is operating normally. However, it need not be operating, but only the range scope turned on so that the IFF display and test voltages can be seen. In case it is not desired to have the radar operating, the procedure given for these final adjustments can be followed except that when instructions are given for using the TEST switch with the SELECTOR switch in position 4, it will be necessary to place the SELECTOR switch in position 5 instead. This supplies the 4098 cps synchronizing voltage from the test oscillator in the interconnector unit, while in position 4 the 4098 cps synchronizing voltage from the radar set is used.

50. Additional Test Positions

a. With the SELECTOR switch on position 4, turn the TEST switch to position 3. A pattern of the synchronizing voltage sent to the IFF transmitter from the interconnector will appear on the range oscilloscope screen (fig. 68).

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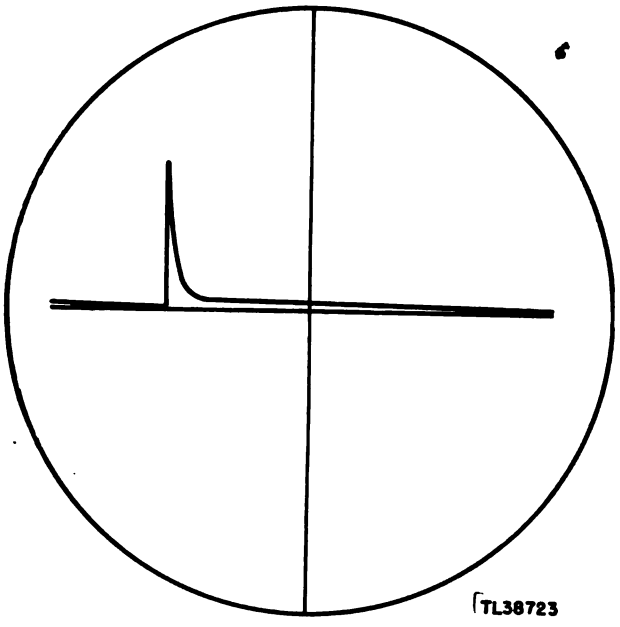

Figure 68. Transmitter synchronizing signal pattern.

b. TEST position 5 is used to show the output of the transmitter. The use of position 5B to show the shape of the transmitter pulse, is described under BIAS adjustments. Position 5A, used to show the output power of the transmitter, is described after the tuning of the system has been discussed. Position 4 is used to calibrate position 5A.

c. Turn the TEST switch to position 6. A pattern will appear on the range oscilloscope as shown in figure 69. The appearance of this pattern will indicate that there is a 4098 cps sine wave input (synchronizing voltage) to the interconnector.

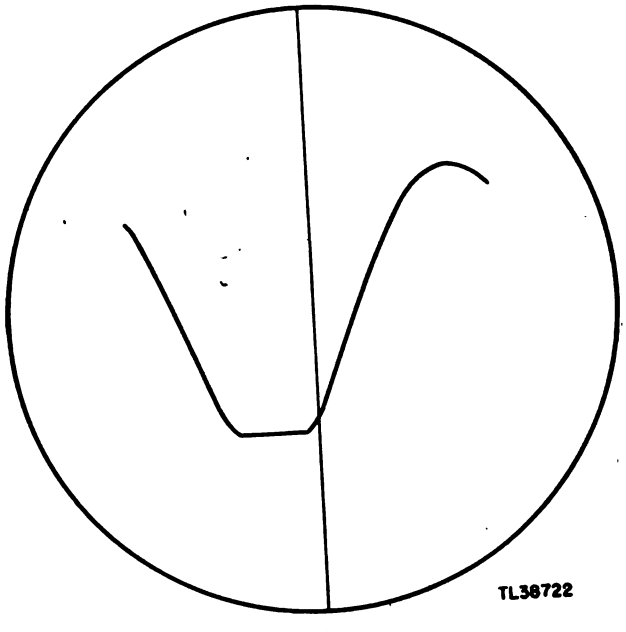

Figure 69. Synchronizing voltage pattern.

d. Position 7 of the TEST switch selects the output of the IFF receiver and applies it directly to the range scope, so that the receiver output may be observed before it passes through the interconnector. The receiver output pattern is shown in figure 70.

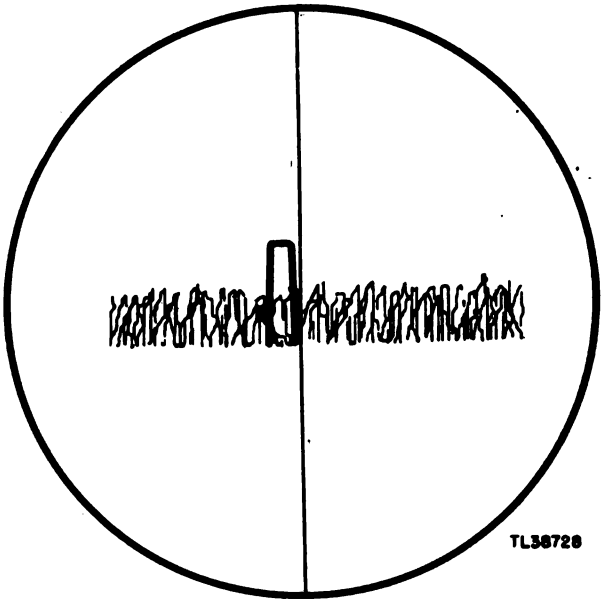

Figure 70. Receiver output pattern.

51. Bias Adjustment

When turning up the HIGH VOLTAGE CONTROL, as described in step No. 8 in paragraph 48, press down the VOLTAGE CURRENT switch on the transmitter to the CURRENT position; then read the current on the meter. It should read approximately 2 ma with the STANDBY OPERATE switch in the OPERATE position. If the meter reads either zero or full-scale deflection, return the HIGH VOLTAGE CONTROL to its extreme counterclockwise position, and using a screw driver, turn the BIAS adjustment to the extreme counterclockwise position. There are two methods of adjusting the BIAS, given in *a* and *b* below.

a. With the BIAS in the extreme counterclockwise position, and the STANDBY OPERATE switch in OPERATE position, turn the HIGH VOLTAGE CONTROL up to 3.5 kv. Then, holding the VOLTAGE CURRENT switch in the CURRENT position, carefully rotate the BIAS control in a clockwise direction until the meter reads approximately 2 milliamperes. This must be done cautiously since the setting of the control is often critical.

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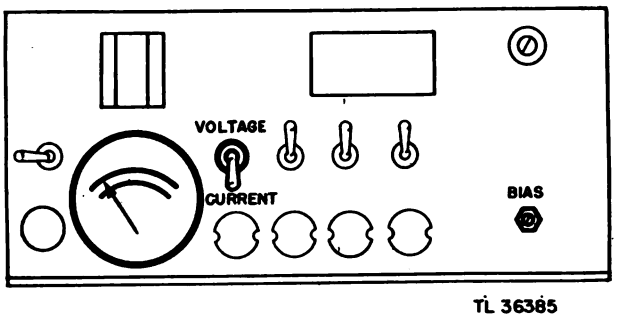

Figure 71. Adjusting the transmitter bias.

b. The BIAS may also be adjusted while observing the pattern on the range oscilloscope, with the SELECTOR switch in position 4 and the TEST switch in position 5. Hold the SIGNAL WIDTH POWER switch on the interconnector in the POWER position. This will give test position 5B. Turn the BIAS control carefully in a clockwise direction until a steady, well-shaped pulse appears on the oscilloscope screen (fig. 72).

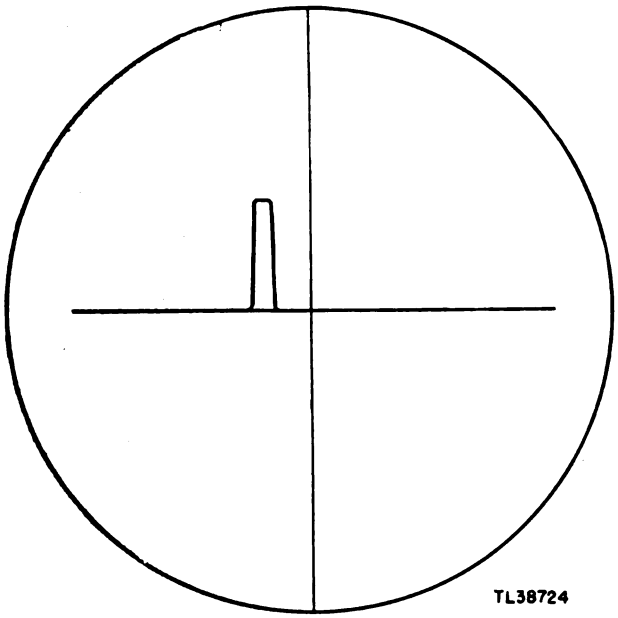

Figure 72. Pattern showing r-f envelope.

c. If, in making this adjustment, the meter swings to full-scale deflection and immediately returns to zero, check to see if the voltage has also returned to zero. If so, the overload relay has probably opened and must be reset. To do this, return the HIGH VOLTAGE CONTROL and the BIAS control to the extreme counterclockwise position and depress the RELAY RESET switch momentarily. Then return the HIGH VOLTAGE CONTROL to 3.5 kv and again adjust BIAS as before.

d. When the BIAS is correctly adjusted, the current in the OPERATE position should read approximately 2 milliamperes; in the STANDBY position, however, it should be zero.

52. Phase Control Adjustment

With both Radio Set SCR–268 and the identification equipment operating, the leading edge of the main pulse from the IFF must be placed directly under the leading edge of the main radar pulse. This is done by adjusting the PHASE control located behind the large door on the interconnector unit. The leading edge of the pulse is the left-hand edge, the zero range point. Only when the zero point of both pulses is synchronized, will the IFF reply be directly beneath the radar echo from the airplane which is being identified. An identification reply is assumed to be from a particular airplane only when it is directly underneath the radar echo from that airplane; a reply on any other point on the screen would not be associated with that airplane. The detailed procedure is as follows:

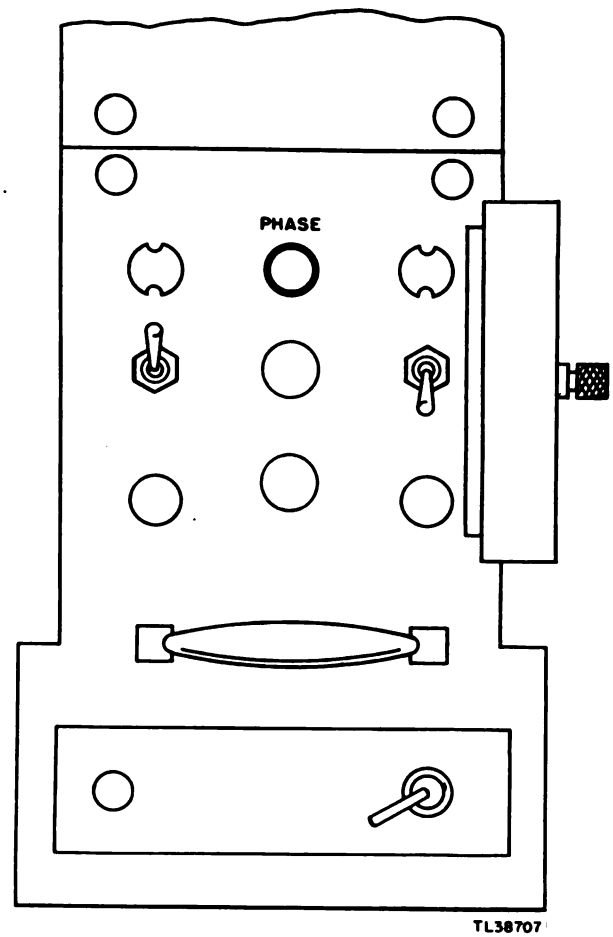

Figure 73. Phase control adjustment.

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a. Place the IFF set in operation by turning the STANDBY OPERATE switch to the OPERATE position. The radar should be operating normally.

b. Rotate the PHASE control on the interconnector to bring the leading edge of the main pulse from the identification transmitter directly below the leading edge of the main pulse from the radar transmitter (fig. 3).

c. At certain times it may be possible to align the two leading edges of the transmitter pulses simply by rotating the PHASE control. In that case rotate the control in that direction which will allow it to operate the associated reversing switch. The adjustment can then be made.

53. Gain Control and Pulse Width Adjustment

a. With the identification transmitter operating and the STANDBY OPERATE switch on OPERATE, vary the receiver GAIN control within the limits of its rotation. This control is located behind the large door on the interconnector. As the control is varied, the grass on the identification portion of the radar oscilloscope will vary from a thin straight baseline with only the main pulse showing to a maximum field of grass. Adjust the GAIN for optimum operation, setting it near the point of maximum grass.

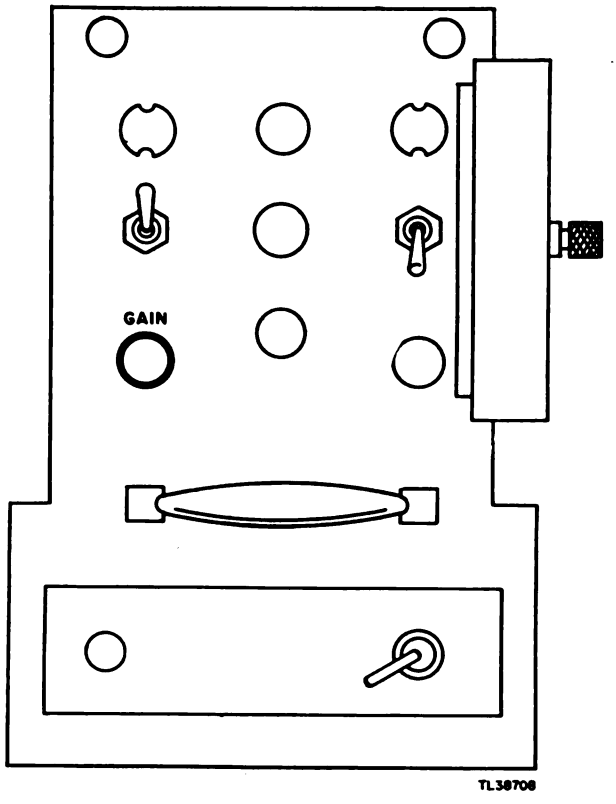

Figure 74. Gain control adjustment.

b. The following procedure will check the pulse width of the transmitter unit:

(1) With the SELECTOR switch in position 4 and the TEST switch in position 5, raise and hold the SIGNAL WIDTH POWER switch in the SIGNAL WIDTH position. The pattern on the range oscilloscope is shown in figure 72. The pulse width at the base will be approximately ¼ inch when the baseline is adjusted to a length of approximately 4 inches by the SWEEP control on the range oscilloscope.

(2) The pulse width may also be measured by means of the RANGE WHEEL on the radar set. To measure the pulse width proceed as follows:

(*a*) Turn the range handwheel to the zero position, and adjust the PHASE control so that the leading edge of the pulse crosses the vertical hairline one-half way up the side of the pulse.

(*b*) Rotate the range handwheel so that when the pulse is shifted horizontally across the screen of the oscilloscope the vertical hairline crosses the pulse one-half the distance up its trailing (right) edge.

(*c*) The width of the pulse will determine the corresponding reading of the distance in yards on the range dial of the radar set. This distance should be approximately 1,280 yards.

54. Checking Transmitter Tuning

The preliminary tuning of the transmitter, which has already been described in paragraph 46, will give the approximate frequency that is desired. Three more tuning adjustments follow: first, check the transmitter frequency and make fine adjustments on it; second, adjust the antenna matching section to that frequency in order to obtain the most efficient operation of the set; and third, tune the receiver to the transmitter frequency.

a. It is assumed that the transmitter has been placed in operation with the operating voltage at 3.5 kv, and the bias correctly adjusted. Place the SELECTOR switch in position 4 and the TEST switch in position 5.

b. Snap the POWER switch on the wavemeter (fig. 75) to the ON position and allow it to warm up for at least 30 seconds.

c. Snap the ALIGNMENT switch to the TRANS position.

d. Turn the HIGH VOLTAGE CONTROL on the transmitter to the extreme counterclockwise position.

e. Adjust the EYE ADJ control on the wavemeter until the eye starts to close. Figure 76 shows

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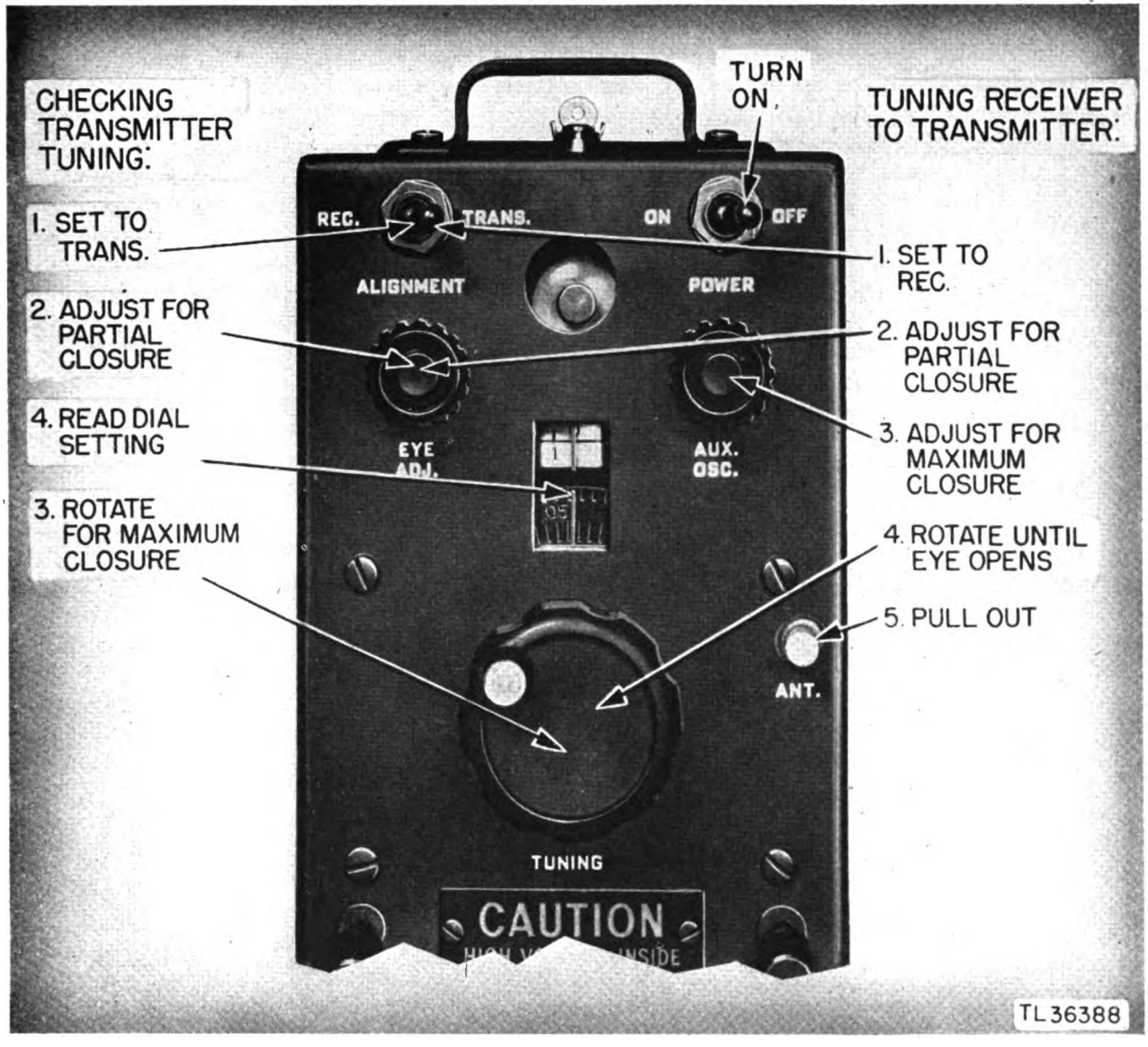

Figure 75. Wavemeter adjustments.

the eye fully open, partly closed, and fully closed without overlap.

f. Return the HIGH VOLTAGE CONTROL on the transmitter to its normal position.

g. Refer to chart No. 2 for the handwheel setting on the wavemeter corresponding to the desired frequency of the transmitter. Chart No. 2 is found on the inside of the hinged cover on top of the wavemeter. On this chart, it will be found that there are four curves corresponding to four frequency ranges, that the vertical lines can have a value of any one of four frequencies, and that the horizontal lines can be any one of four dial settings. The left-hand curve on the chart corresponds to the row of frequencies nearest the chart and to the dial divisions nearest the chart; the second curve corresponds to the second row of frequencies and dial divisions from the chart, and likewise with the third and fourth curves. Thus, to find the dial setting for a certain frequency, locate that frequency on the bot-

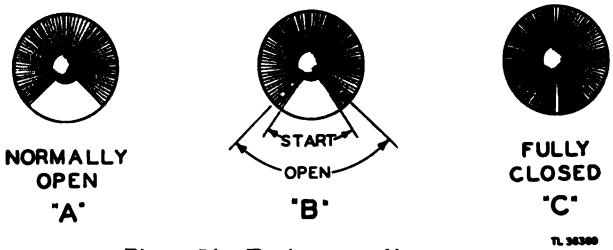

Figure 76. Tuning eye adjustments.

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tom of the chart. If, for example, it is on the second row from the chart, find the point on the second curve directly above that frequency, and from that point go to the left and read the dial setting in the second row from the chart.

h. Set the tuning handwheel dial to the setting obtained from the chart.

i. Rotate the handwheel to the left or right of this setting until the position is found where the tuning eye closes. If the tuning eye should overlap, turn the EYE ADJ control until it opens and continue adjusting handwheel for maximum closure. Maximum closure means *maximum closure without overlap.*

j. Refer to chart No. 2 for the frequency corresponding to this setting. This is the frequency to which the transmitter is actually tuned.

k. If this frequency deviates too far from the desired frequency, changes of a few megacycles may be made by adjusting the VERNIER TUNING control on the transmitter front panel (fig. 77).

(1) Rotate the wavemeter handwheel to the correct position for the desired frequency.

(2) Loosen the locking thumbnut on the VERNIER TUNING control by turning it to the left.

(3) Using a screwdriver, turn the VERNIER TUNING control either to the left or right until the tuning eye on the wavemeter is at maximum closure. If rotating the VERNIER TUNING two turns does not bring the transmitter to the desired frequency, as indicated by maximum closure of the tuning eye, further rotation is of no use, because the frequency cannot be varied sufficiently by this control.

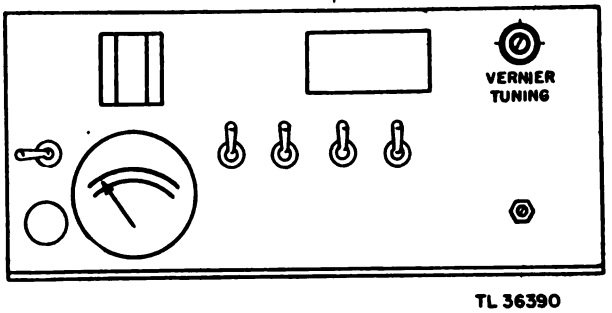

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Figure 77. Vernier tuning control adjustment.

l. If transmitter is still not on frequency after making the adjustments described in *k*, it will be necessary to readjust the shorting bars in the rear of the transmitter. For their location refer to figure 57 and paragraph 46. Only the grid and cathode shorting bars will require readjustment. Move the bars in equal steps of approximately 1/10 inch until the correct frequency is obtained. The measured distances of these bars are shortened to increase the frequency and lengthened to decrease the frequency. Before rechecking the frequency each time, the transmitter backplates should be replaced. If, in making the adjustments, the desired frequency has been passed through, move the shorting bars in steps of 1/20 inch in the reverse direction.

55. Adjusting Antenna Matching Section

Now that the transmitter has been tuned, the transmitter and receiver matching sections (fig. 78) should be adjusted.

a. Look at the chart (No. 3) on the inside of the large door of the interconnector to find the length in inches to which the matching section should be adjusted for the frequency of the transmitter.

b. Remove the calibrated rod from the center hole (its holder) and insert the rod in the lower half of the matching section, marked TRANSMITTER. Slide it in and rotate it until the catch on the slide is felt to grasp. Adjust the rod to the setting given on the chart. The position of the rod is read on the calibrated scale on the rod at the point where it crosses the frame at the top of the matching section.

c. Carefully remove the calibrated rod, after turning it a quarter-turn, without disturbing the adjustment of the matching section.

d. Insert the rod in the upper half of the matching section, marked RECEIVER, and adjust the matching section in the same way as the transmitter matching section was adjusted to the length given in chart No. 3 for receiver.

56. Tuning Receiver

In tuning the receiver to the frequency of the transmitter, the steps given in paragraphs 54 and 55 are assumed to be completed. The following steps continue from that point (figs. 75 and 79).

a. Turn the HIGH VOLTAGE CONTROL to the extreme counterclockwise position.

b. Snap the ALIGNMENT switch on wavemeter to the REC position.

c. With the tuning handwheel at the setting it was left in, adjust the EYE ADJ control on the wavemeter until the eye starts to close (fig. 76).

d. Adjust the AUX OSC control for maximum closure of the tuning eye. It may be necessary to readjust the EYE ADJ control if the eye overlaps.

e. Rotate the handwheel through several turns (the eye should fully open) and pull out wavemeter ANT.

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f. Adjust the four dials on receiver panel to the settings which correspond to the transmitter frequency given on chart No. 4 on the inside of the receiver cover. These are the approximate settings for the frequency at which the transmitter is now tuned. (It will be found that the settings for ANT., RF, and DET are the same.)

g. Adjust the receiver OSC control for maximum closure of the TUNING INDICATOR on the receiver. If the eye overlaps, adjust the GAIN control, behind the large door on the interconnector, until the eye opens, and continue adjusting the OSC control.

h. Repeat the process used in g with the DET control, the RF control, and, finally, with the ANT. control.

i. Snap the POWER switch on wavemeter to the OFF position; push in wavemeter ANT.

j. Return the HIGH VOLTAGE CONTROL to its normal position.

k. The RC–148 is now tuned and ready for operation.

57. Adjusting Output of Transmitter

a. Adjustment of the transmitter output is made by varying the insulated screw inside the small sliding panel at the upper right corner of the rear of the transmitter. This should be made while the pattern is being observed on the range oscilloscope with the TEST switch on position 5A (SELECTOR switch on position 4 or 5). Adjust the screw for maximum height of pattern on the oscilloscope. After making the adjustment, check the frequency of the transmitter to see that it has not been changed by the adjustment. If so, it will be necessary to readjust the frequency. Adjustment of the frequency and of the power output must be made so that the transmitter is on correct frequency and at maximum power output.

b. The power output can be given a relative meas-

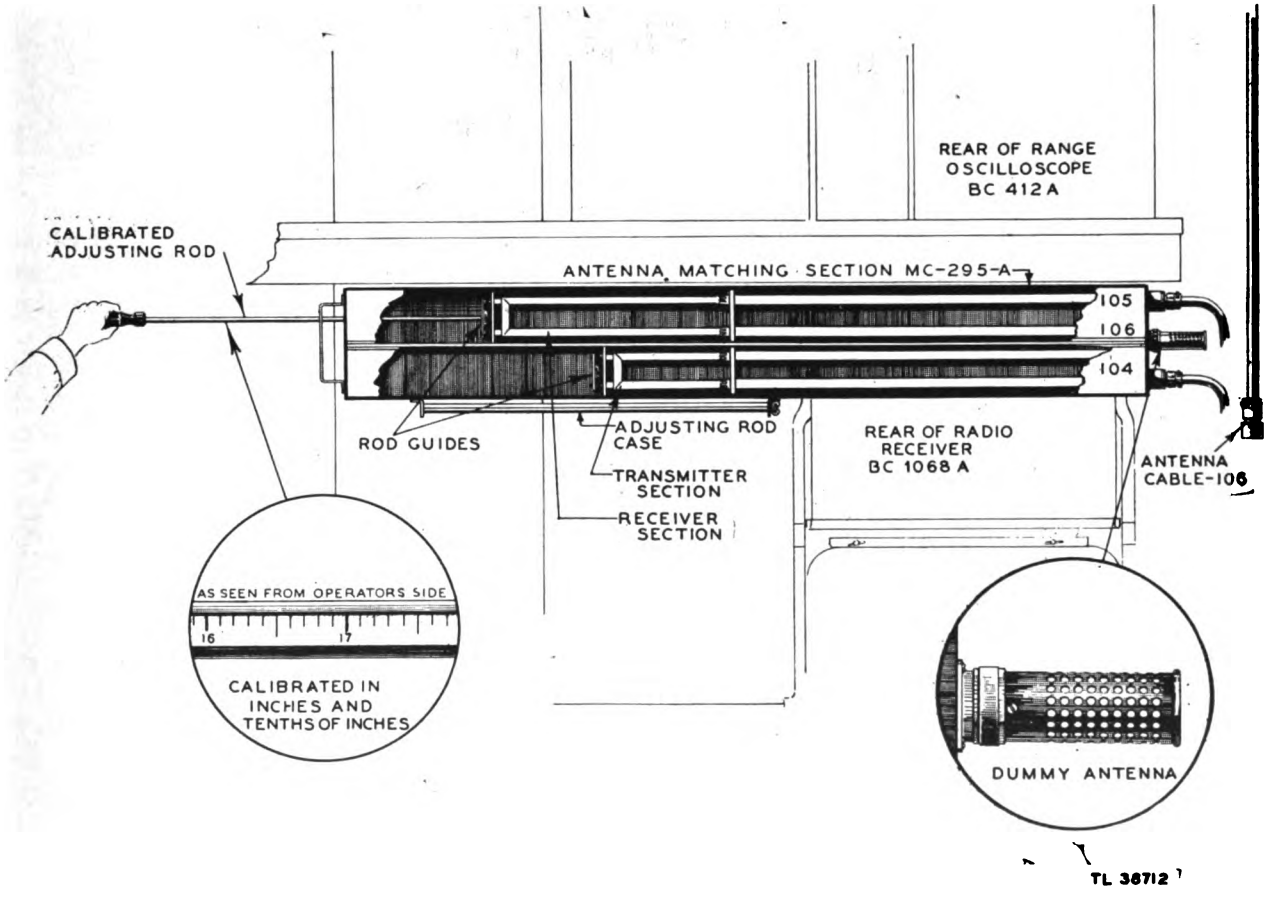

Figure 78. Antenna matching section adjustments.

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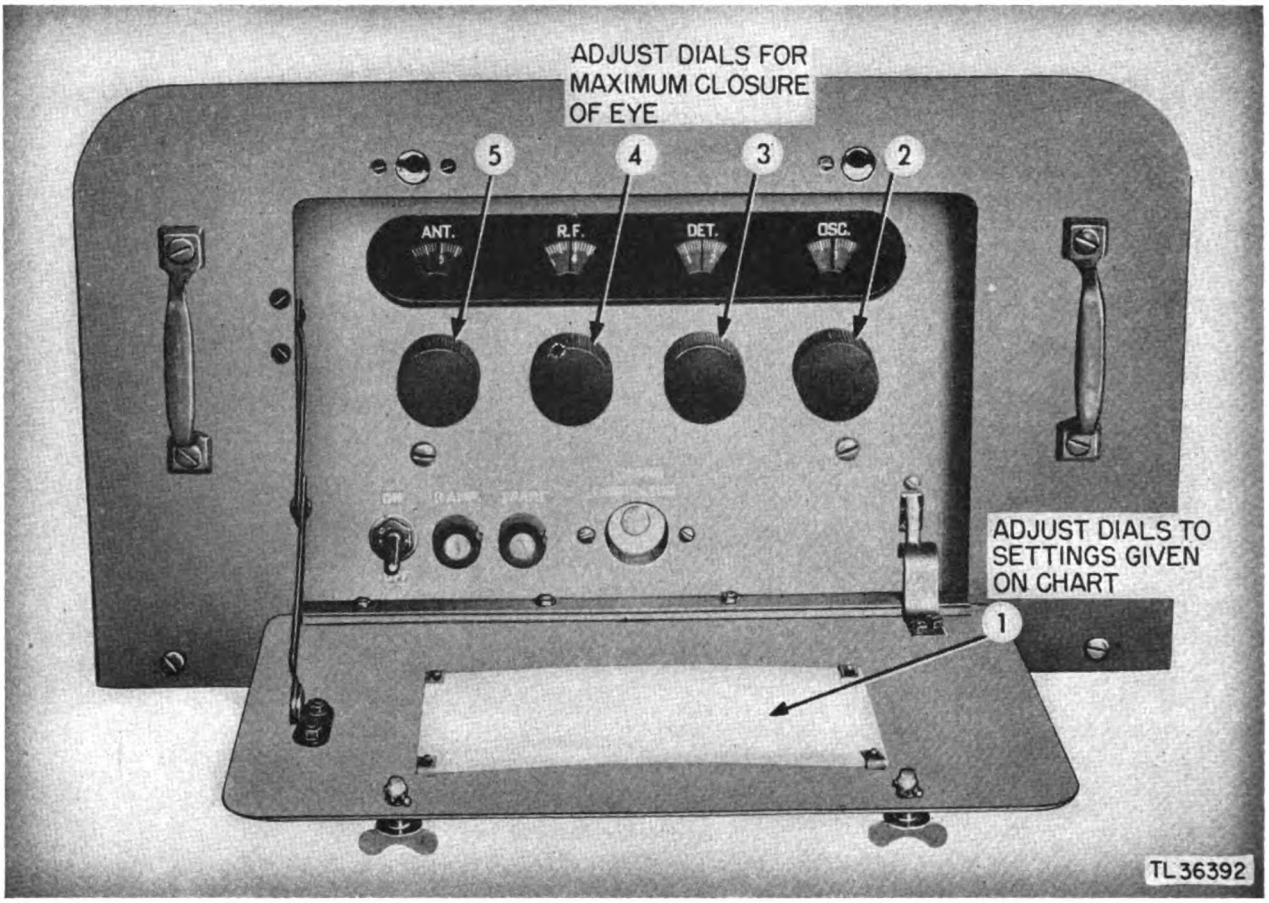

Figure 79. Receiver tuning adjustments.

ure by turning the TEST switch to position 6 and applying a standard calibrating voltage to the range oscilloscope. Turn the TEST switch back to position 5 and compare the height of the power output pattern with that of the calibrating signal. It should be at least one-half as high as the calibrating signal.

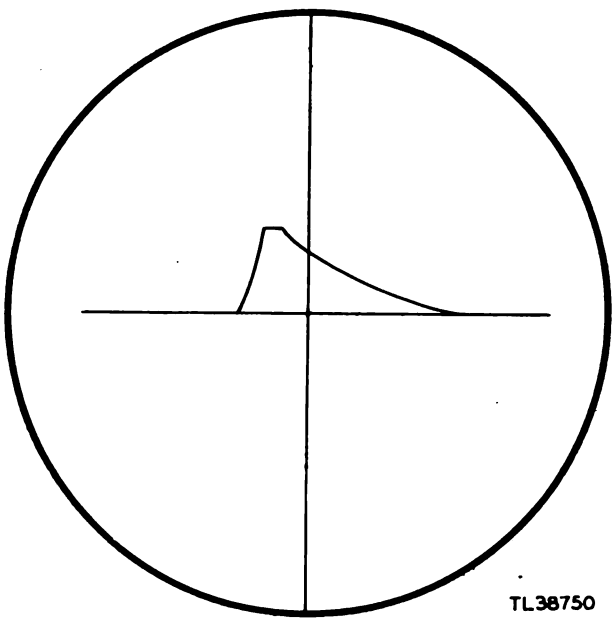

Figure 80. Transmitter power pattern.

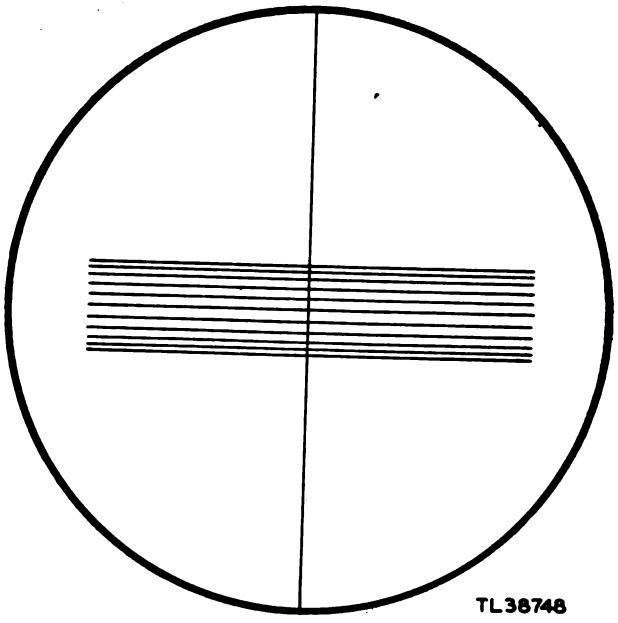

Figure 81. Calibration pattern.

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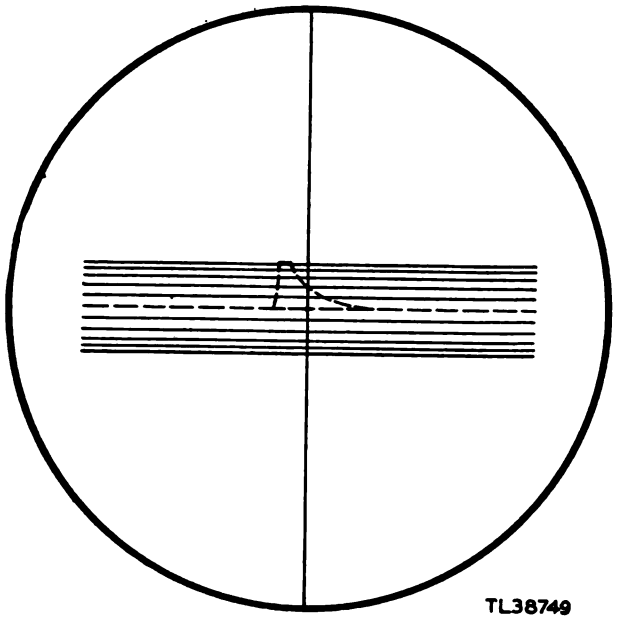

Figure 82. Composite pattern, measuring power output.

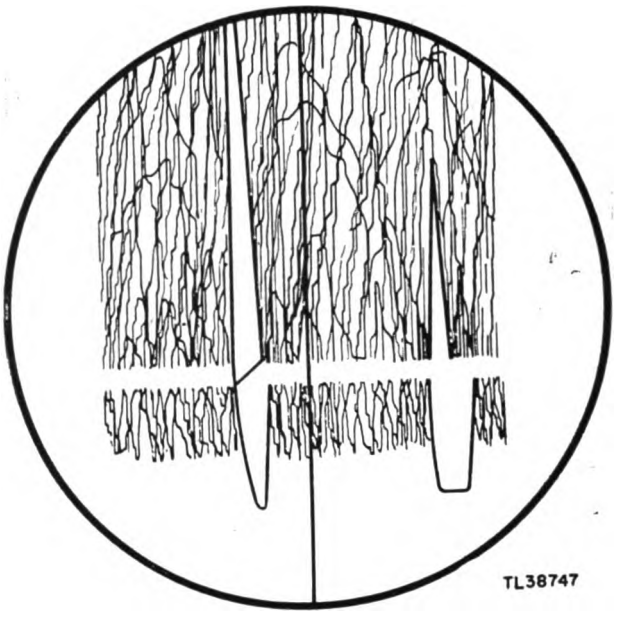

Figure 83. Pattern showing IFF reply from a friendly airplane.

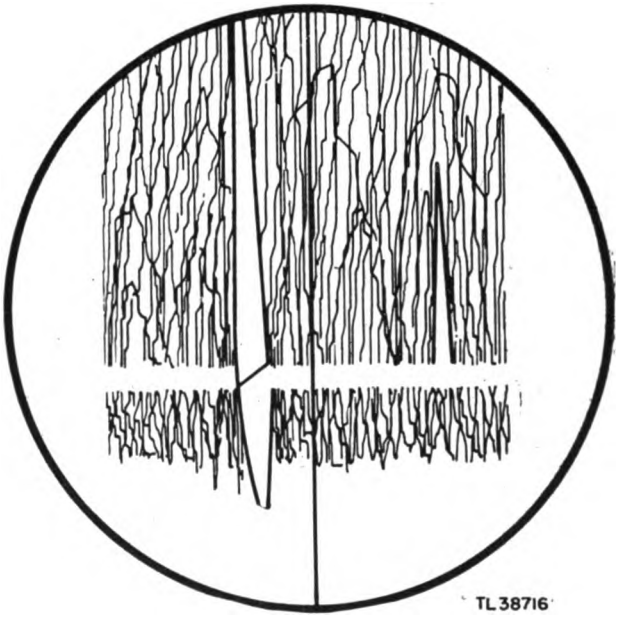

Figure 84. Pattern with no reply from airplane.

58. Technical Operation of Radio Equipments RC–148 and RC–148–B

a. The equipment is now operating normally. The SELECTOR switch on the lower cover will fit into the groove of the SELECTOR knob, thus allowing the cover to close. Tighten the captive screws to hold the cover in place.

b. With the switch in the STANDBY position on the control unit, the normal pulse pattern from Radio Set SCR–268 will appear on the range oscilloscope screen as shown in figure 4, chapter 1.

c. To recognize aircraft, throw the STANDBY OPERATE switch to the OPERATE position. If the reply is from a friendly plane, a properly coded signal will appear directly beneath the radar pulse echo from the challenged plane on the sceen of the range oscilloscope (fig. 83 and 84). If no response is seen when the operator has thrown the STANDBY OPERATE switch to the OPERATE position, it can be assumed that the aircraft is unfriendly.

d. Under certain conditions the operator may desire to increase the range of the IFF, as seen on the radar scope screen. If it is desired to double the range adjust the BASELINE control to peel off 2 lines; to triple the range peel off 3 lines. Refer to step No. 6 of the starting procedure for adjustment of the BASELINE control.

59. Stopping Procedure

The following procedure is recommended for stopping the equipment. Use this procedure in all cases other than emergencies.

a. Place STANDBY OPERATE switch in the STANDBY position.

b. Open large door on control unit, receiver door, and transmitter door.

c. Turn down HIGH VOLTAGE CONTROL to extreme counterclockwise position. The meter reading will fall to zero.

d. Turn HIGH VOLTAGE switch on transmitter panel OFF.

e. Turn LOW VOLTAGE switch on transmit-

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ter panel OFF. The meter light goes out and the blower motor stops.

f. Turn ON-OFF switch on interconnector unit OFF. The red indicator light will go out.

g. Turn ON-OFF switch on receiver OFF. Dial lights and TUNING INDICATOR will go out.

h. Set the CIRCUIT BREAKER on the transmitter panel to the OFF position. Red indicator lamp will go out.

i. Close all doors on equipment.

j. Radar oscilloscope should be left on unless radar is not being operated.

60. Emergency Stopping Procedure

The following procedure is suggested only when an emergency situation requires the fastest shut-down. *Turn CIRCUIT BREAKER on the transmitter panel OFF.*

Section IV. PRELIMINARY TESTS AND ADJUSTMENTS FOR RADIO EQUIPMENT RC–148–C

61. Preliminary Adjustments

a. Preliminary adjustments, as listed in this paragraph, are necessary when the equipment is placed in operation for the first time or after a long interval. On other occasions some of the adjustments here, and some of those described in the paragraphs on final adjustments are not needed.

b. Set the WIDTH control of the transmitter to its extreme counterclockwise position. This corresponds to the minimum width. The range of pulse width available with this control is approximately 3 microseconds in the range of 4 to 12 microseconds.

NOTE. This and the following controls should be adjusted with the screw driver which is located above the receiver dials. This screw driver, which has a knurled knob handle, can be removed by turning counterclockwise.

c. Set the POWER MEASUREMENT control to its extreme counterclockwise position. This control varies the voltage applied to the cathode of the diode voltmeter circuit and has a range of zero to 400 volts. This corresponds to a power range of zero to 1 kilowatt.

d. Set the BIAS control to its extreme counterclockwise position. This control varies the bias voltage on the 3E29 modulator tube and has a range of -120 to -145 volts. This is necessary because the cut-off bias is not the same for all commercial 3E29 tubes. Maximum bias is obtained when the BIAS control is in the extreme counterclockwise position.

e. Set the POWER OUTPUT control to its extreme clockwise position, which corresponds to maximum power. This control varies the screen voltage of the 3E29 modulator tube and affords a smooth variation in power from 1 kilowatt to 50 watts.

f. The control marked LIGHTS, which controls the illumination of the dials and meter, may be left in any position, depending on the illumination required.

g. The receiver and transmitter dials should be set to the positions corresponding to the frequency desired. (The transmitter dial is rotated by means

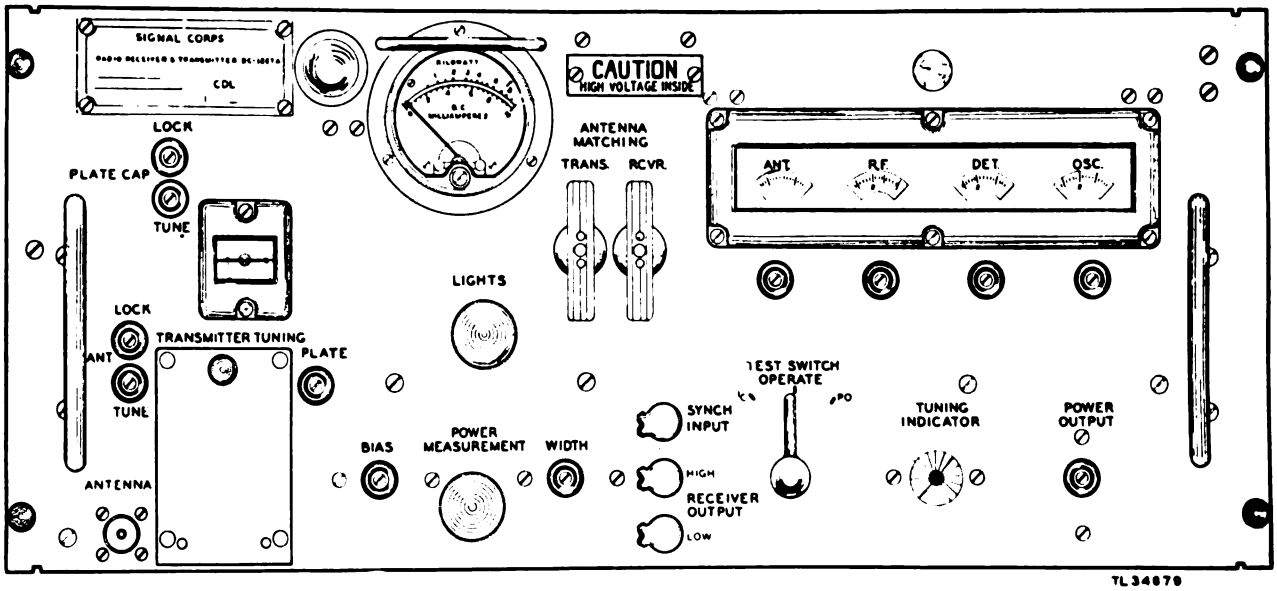

Figure 85. Radio Receiver and Transmitter BC–1267–A.

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of the control marked PLATE). These positions are obtained from the calibration chart just below the transmitter dial. It is important that the oscillator and detector circuits of the receiver be set to the same dial setting initially, as there is some interlocking between them.

h. The antenna tuning control (ANT) has a locking device (LOCK) on it which must be released by turning it counterclockwise with a screw driver, before adjustment can be made. This control is set to any position and is properly tuned later.

i. The PLATE CAP. control also has a locking device which must be released before adjustments are made. The setting of this control depends on the tubes used. The PLATE CAP. control is used to correct for variation in the inter-electrode capacity of the 2C26 tubes. If the calibration of the transmitter frequency is not correct, as shown by a wavemeter, the PLATE CAP. control may be varied to correct the calibration. The control is set when the transmitter leaves the factory and need not be reset except when the tubes are changed.

j. The ANTENNA MATCHING section is used to enable the receiver and transmitter to work into a common antenna (fig. 86). The settings should correspond roughly to maximum length, zero on the scale, for the low-frequency end of the band and minimum length, 7.5 on the scale, for the high-frequency end.

k. The control adjustments which must be made before plate voltage is applied may be summarized as follows:

(1) PLATE CAP. (plate capacity) is pre-set for tubes at the factory.

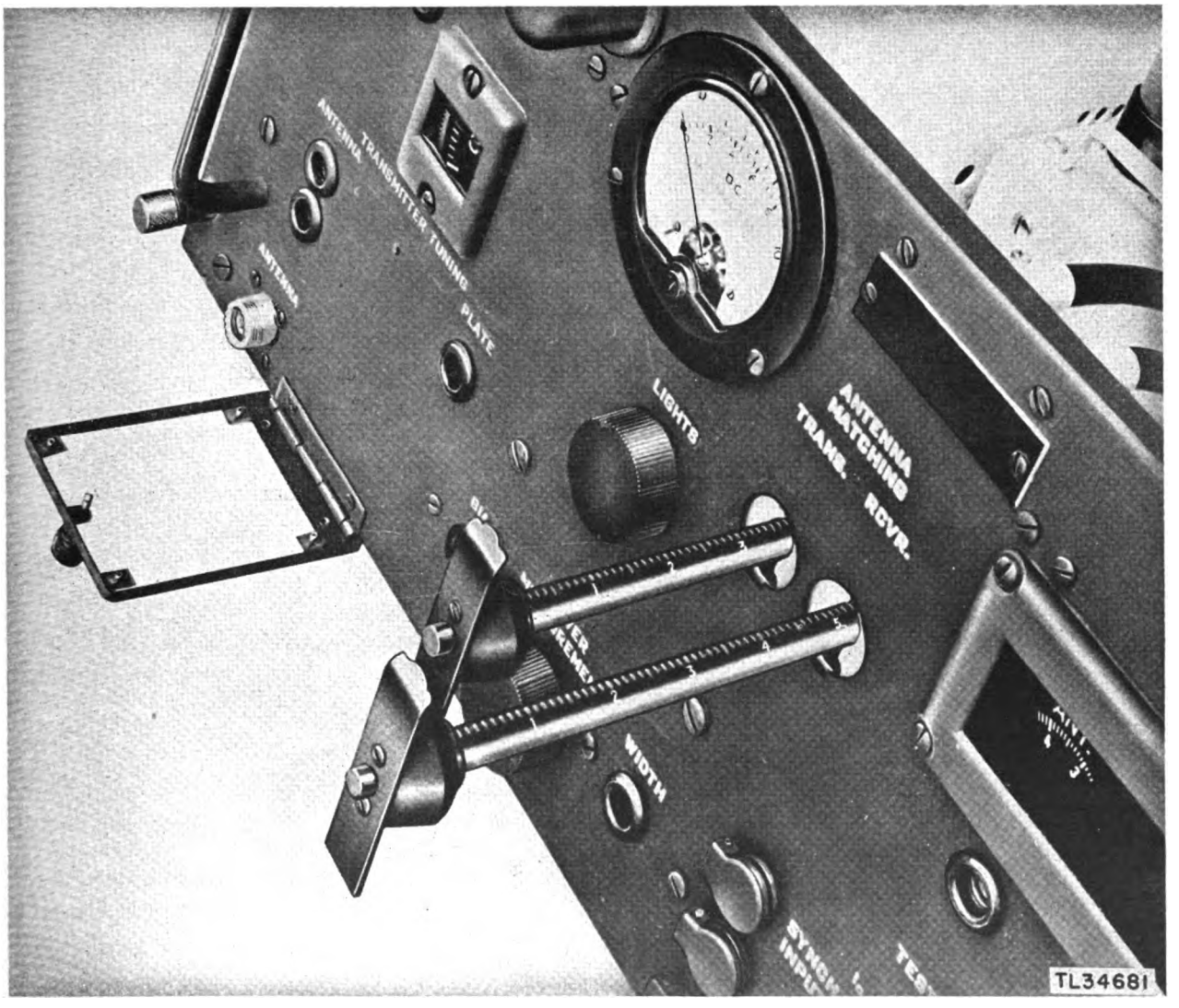

Figure 86. Adjusting rods of antenna matching section.

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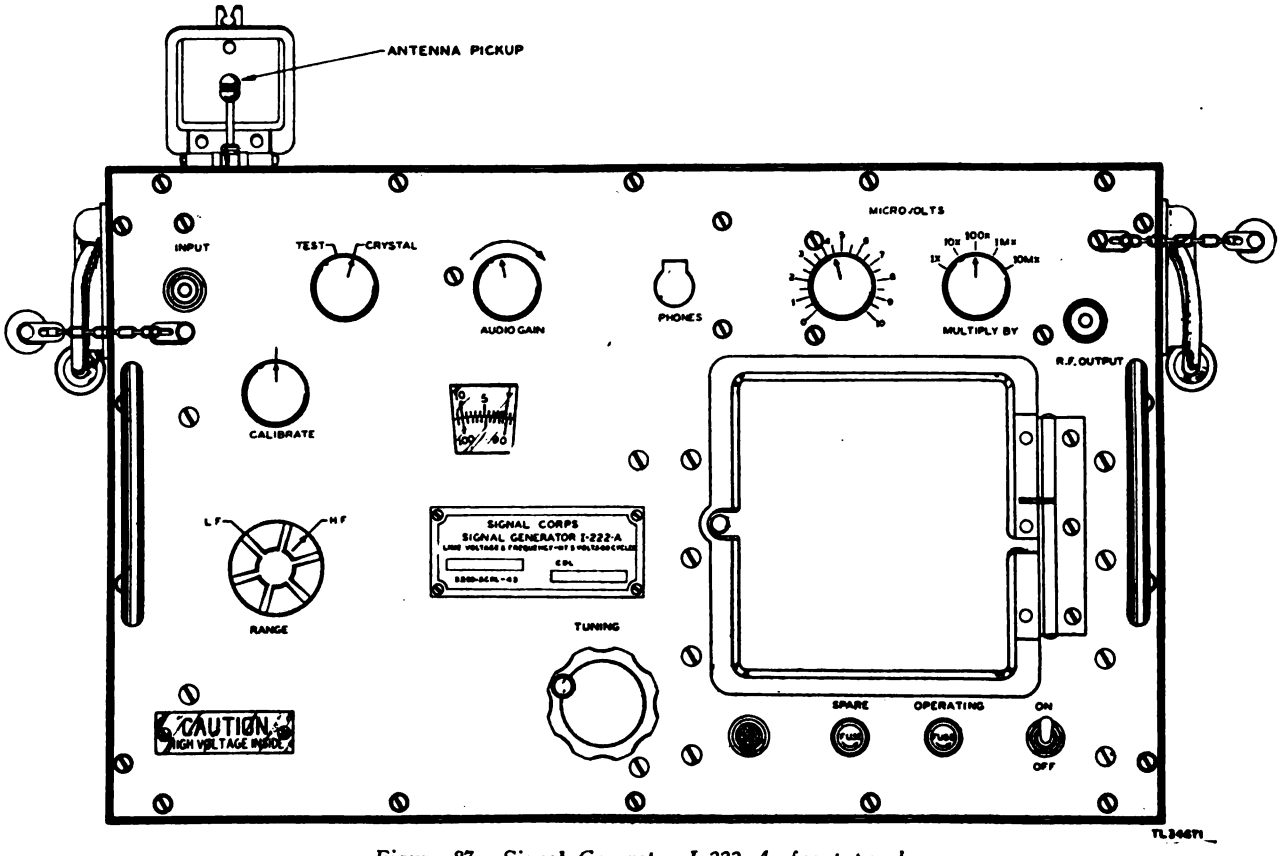

Figure 87. Signal Generator I–222–A, front panel.

(2) ANT. (antenna tuning) is set at any position and peaked for desired frequency according to detailed instructions which follow.

(3) PLATE (transmitter tuning) is set for desired frequency.

(4) ANT., RF, DET, and OSC (receiver tuning) are set for desired frequency. Be sure that the oscillator and detector circuits are set at the same reading of the dials.

(5) ANTENNA MATCHING is set approximately at desired frequency.

(6) LIGHTS (dial lights control) is set at any position.

(7) WIDTH is set at extreme counterclockwise position.

(8) POWER MEASUREMENT is set at extreme counterclockwise position.

(9) BIAS is set at extreme counterclockwise position.

(10) TEST SWITCH is set to OPERATE position (normal position as this switch is spring loaded).

(11) POWER OUTPUT is set at extreme clockwise position.

l. Place Signal Generator I–222–A on the floor of the trailer to the left of the rack and supply primary power to it. Before the transmitter and receiver frequencies can be checked, the following adjustments must be made on the signal generator. (Refer to figure 87 for the location of the various controls.)

(1) Plug the headphones into the jack marked PHONES.

(2) Snap the ON-OFF toggle switch to the ON position.

(3) Turn the operating switch, TEST-CRYSTAL, to the position marked CRYSTAL. Allow 15 minutes for warm-up before using the signal generator.

(4) Turn the RANGE switch to the H. F. position.

m. The radar range oscilloscope should be adjusted as described in this paragraph every time the set is turned on:

(1) Adjust the FOCUS and INTENSITY controls so that a base line of satisfactory brilliance appears on the screen.

(2) Adjust the SWEEP control so that the length of the baseline occupies approximately three-quarters of the screen.

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(3) Adjust the VERTICAL and HORIZONTAL positioning controls so that the baseline is centered horizontally and approximately ¾ inch below the center of the oscilloscope screen.

Section V. OPERATIONAL PROCEDURES FOR RADIO EQUIPMENT RC–148–C

62. Normal Starting Procedure

The starting procedure should be followed each time the equipment is placed in operation.

STEP NO. 1

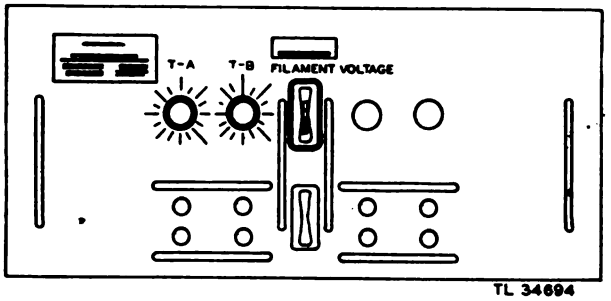

Figure 88. Starting procedure, step No. 1.

Place the STANDBY OPERATE switch in the STANDBY position. Place the FILAMENT VOLTAGE circuit breaker of the power supply in the ON position. Pilot lights T–A and T–B will light.

STEP NO. 2

Snap the ON-OFF toggle switch on the interconnector to the ON position (fig. 59).

STEP NO. 3

Turn the SELECTOR switch to position 4 and turn the TEST switch to position 2. A series of horizontal lines will appear on the range oscilloscope. Adjust the DIVISION control until 15 horizontal lines appear on the range oscilloscope screen. The two bottom lines are very close together and may be mistaken for one. Check the count carefully (fig. 63).

STEP NO. 4

a. With the SELECTOR switch in position 4, turn the TEST switch to position 1. Starting with the BASELINE control in the counterclockwise position, turn in a clockwise direction until a double baseline is obtained with a sharp cross-over between the lines, as shown in figure 64. This cross-over roughly represents the letter X. At this point it will be observed that the adjustment of the baseline control has the effect of peeling some lines off the top trace and piling them up on the lower trace. The BASELINE control is adjusted correctly when only one line has been removed (peeled off). The correct adjustment will leave a definite break in the lower trace. It may be necessary to reduce the radar sensitivity, to reduce the noise on the radar oscilloscope screen and allow the baseline to be clearly seen.

b. If necessary, rotate the PHASE control until the X or cross-over is near the vertical cross-bias on the screen. If this cannot be done even when the PHASE control is rotated over its full range of adjustment, turn it fully to one stop or the other, and at one of the stops, use a little extra pressure which will actuate a switch. After this the PHASE control covers a new span of adjustment and positioning is possible.

STEP NO. 5

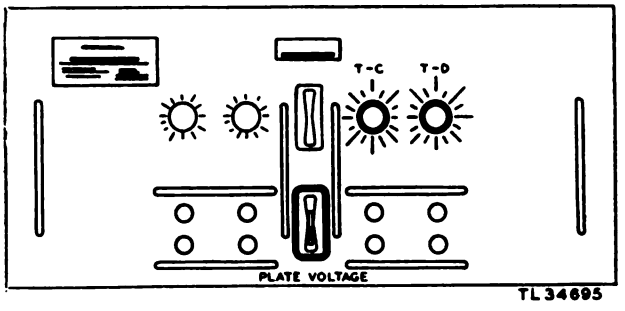

Figure 89. Starting procedure, step No. 5.

Making sure that 30 seconds have elapsed since the FILAMENT VOLTAGE circuit breaker was turned ON, turn the PLATE VOLTAGE circuit breaker to the ON position. Pilot lights T–C and T–D will light.

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Caution: Do not turn on the PLATE VOLTAGE circuit breaker until the FILAMENT VOLTAGE circuit breaker has been on for at least 30 seconds.

STEP NO. 6

Turn the SELECTOR switch to STANDBY position (fig. 85). Hold the TEST SWITCH in the Ic position and adjust the BIAS control until the 3E29 modulator cathode current is at cut-off as indicated by the meter on the panel. (It is best to set this current at a very small value, about from 0.25 to 1 milliampere to avoid going too far beyond cut-off.) Apply the synchronizing voltage to the transmitter by turning the SELECTOR switch of the interconnector unit to the OPERATE position. Again hold the TEST SWITCH in the Ic position and read the cathode current of the modulator tube. This should read between 4 and 7.5 milliamperes.

STEP NO. 7

Turn SELECTOR switch to OPERATE position (fig. 67). The normal radar display with the IFF display beneath it should appear on the range oscilloscope. Return the switch to STANDBY position. Make any of the final tests and adjustments described in the following paragraphs that are necessary. The IFF is normally left in a non-operating condition until the operator wishes to identify a target, as described in paragraph 70 on technical operation.

63. Final Adjustments of Radio Equipment RC–148–C

a. When the steps described in paragraph 62 have been completed it may be necessary to make several additional adjustments for proper operation. To insure proper functioning of the equipment, these adjustments should be completed each time prior to actual operation. While these adjustments are being made, if the person in charge so designates, the dummy antenna may be used instead of the normal antenna. This will prevent excessive radiation of energy which could reveal the location and characteristics of the equipment to the enemy. The dummy antenna is inserted as follows:

(1) Disconnect Cable CD–1098 from the ANTENNA receptacle on the transmitter.

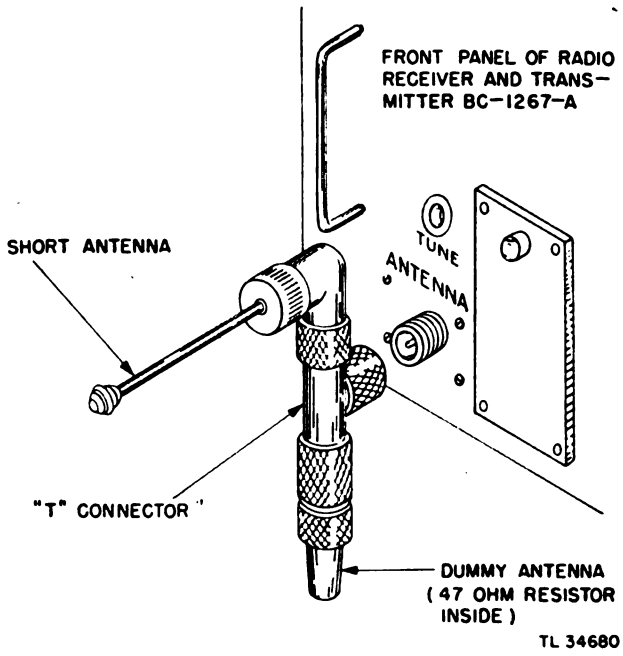

Figure 90. Dummy antenna and test antenna being installed on RC–148–C transmitter.

(2) In its place, connect the T-shaped connector as shown in figure 90.

(3) Connect the short test antenna, which is mounted on a right-angle connector to the upper branch of the T-connector, figure 90.

(4) Connect the dummy antenna to the lower branch of the T-shaped connector.

b. In this chapter, it is assumed so far that the radar set is operating normally. However, it need not be operating, but only the range scope turned on so that the IFF display and test voltages are visible. In case it is not desired to have the radar operating, the procedure given for these final adjustments can be followed except that when instructions are given for using the TEST switch with the SELECTOR switch in position 4, it will be necessary to place the SELECTOR switch in position 5 instead. This supplies the 4098 cps synchronizing voltage from the test oscillator in the interconnector unit, while in position 4 the 4098 cps synchronizing voltage from the radar set is used.

c. In tuning the transmitter and receiver, it may be found that satisfactory results cannot be obtained with the radar set operating. In that case, turn off the radar transmitter, turn the SELECTOR switch to position 5, and continue with the normal tuning procedure.

64. Additional Test Positions

a. With the SELECTOR switch on position 4,

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turn the TEST switch to position 3. A pattern of the synchronizing voltage sent to the IFF transmitter appears on the range oscilloscope screen (fig. 68).

b. Turn the TEST switch to position 4. A pattern appears on the range oscilloscope as shown in figure 69. The appearance of this pattern indicates that there is a 4098 cps sine wave input (synchronizing voltage) to the interconnector. With the SELECTOR switch on position 4, this voltage comes from the radar set; with the SELECTOR switch on position 5, it comes from the test oscillator in the interconnector.

c. Turn the TEST switch to position 5. A pattern of the receiver output pulse and noise appears on the range oscilloscope screen (figs. 70 and 72). Turn the TEST SWITCH of the radio receiver and transmitter to the P.O. position. A picture of the envelope of the r–f pulse, appears on the screen of the range oscilloscope. Adjust the antenna tuning control (ANT.), and receiver and transmitter portions of the antenna-matching section for maximum amplitude of the pulse.

NOTE. The antenna-matching sections are adjusted by pulling the rods out to the desired position. When this position is reached, press in the button in the center of the rod handle and push the rod in as far as it will go.

If the height of the power output pulse increases on the screen of the range oscilloscope when the tuning adjustments are made, it indicates that the power output is increasing. It is necessary to check the power output adjustment after the tuning has been checked (par. 67).

65. Setting Transmitter Frequency with Signal Generator I–222–A

The transmitter and receiver are now ready to be accurately tuned to the desired frequency, using the signal generator. A chart, giving calibration points for both the high- and low-frequency bands, will be found underneath the hinged cover on the right side of the signal generator panel. This cover may be opened by turning the captive locking screw in a counterclockwise direction.

NOTE. Figures in *red* on the chart indicate crystal reference points for restoring the calibration of the unit to the value indicated on the calibration chart. This adjustment can be made by setting the dial (by means of the TUNING knob) to these reference points, and listening for the zero beat in the headphones when the control marked CALIBRATE is rotated in a clockwise or counterclockwise direction. Checking the calibration is accomplished by selecting the crystal point that is closest to the frequency to be monitored. When this frequency is unknown, check the calibration at the center of the band as given by the chart. Six crystal points are given on the H.F. band. Select the crystal point that is closest to the desired frequency when checking the calibration.

a. Snap the antenna door open and pull the antenna rod up out of the case. The transmitter is coupled to the wavemeter by means of the short antenna assembly (fig. 77) which radiates a signal to the wavemeter antenna.

Caution: It is imperative that the input of the unknown frequency source be adjusted to the correct level for monitoring. This is accomplished by listening to the received signal with the headphones and adjusting its level by sliding the antenna pick-up rod in and out of the case until a very weak signal is obtained. This adjustment is made with the control marked AUDIO GAIN rotated to its extreme clockwise position.

NOTE. The detector used in the unit is of the untuned type. Therefore, when monitoring a pulse modulated signal, the repetition rate will be heard throughout the range of the monitoring oscillator; when monitoring a sine wave modulated signal, a continuous audio note will be heard.

b. Set the dial to the desired frequency by turning the TUNING knob. It is assumed that the nearest crystal point has been checked as explained in NOTE above.

c. Rotate the operating switch (TEST-CRYSTAL) to the TEST position.

d. Adjust the transmitter frequency control plate until the note of the repetition rate (buzzing noise), as heard in the headphones, is interrupted. Be sure that the interruption is sharp and can be approached from both directions of rotation of the transmitter frequency control.

e. Turn the SELECTOR switch of the interconnector unit to the STANDBY position. Remove the antenna cable, or, if it is connected, remove the T-connector, containing the short antenna and dummy antenna, from the ANTENNA receptacle. Leave the signal generator set at the value just determined and connect its R–F output to the ANTENNA receptacle by means of the r–f test Cord CD–1104 (fig. 91).

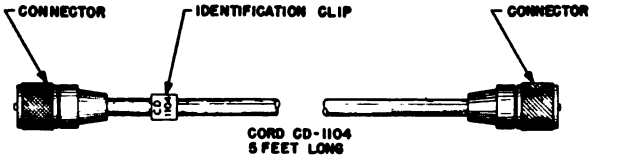

Figure 91. Cord CD–1104.

66. Setting Receiver Frequency with Signal Generator I–222–A

a. Check the h-f oscillator on the signal generator

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with the reference crystal point nearest to the desired frequency (see NOTE in par. 65).

b. Set the receiver to the approximate frequency setting shown on the receiver calibration chart and make the final adjustments by obtaining maximum closure of the receiver tuning eye. The desired input to the receiver can be controlled by the two dials marked MICROVOLTS. The control on the right is for coarse adjustment, and the one on the left is for fine adjustment.

NOTE. The impedance of the attenuator on Signal Generator I–222–A is not constant. Therefore, for final adjustment of the receiver tuning, use the IMx position of the attenuator, since this position gives the output impedance of 50 ohms. The receiver GAIN control on the interconnector may be varied to give the proper shadow angle on the TUNING INDICATOR.

c. In tuning the receiver controls for maximum closure of the tuning indicator eye, the order of tuning is to start from the oscillator control and work to the antenna control. If the eye overlaps, the input from the signal generator should be reduced or if sufficient attentuation cannot be obtained by this means, the receiver gain control should be turned counterclockwise.

d. After the receiver has been tuned, check the transmitter tuning.

NOTE. Be sure to disconnect the r–f cable from the signal generator before turning the SELECTOR switch of the interconnector from the STANDBY position.

e. The receiver and transmitter tuning adjustments should be rechecked several times because of the interaction of the antenna circuits. The antenna tuning (ANT.) control and the ANTENNA MATCHING section should be readjusted as described in the next paragraph.

67. Power Output Adjustments

a. Turn the SELECTOR switch to position 4 and the TEST switch to position 5.

b. Throw the transmitter TEST SWITCH to the P.O. position. The pulse will appear on the radar range oscilloscope.

c. Turn the POWER MEASUREMENT control clockwise until the pulse just disappears. The power can now be read on the meter.

d. The power output of the transmitter can be decreased by turning the POWER OUTPUT control counterclockwise.

e. If the antenna T-connector has been inserted, remove it and replace with the antenna cable, Cable CD–1098.

f. A slight readjustment of the transmitter antenna tuning control and the matching sections may be necessary. These adjustments are made while observing the pulse height on the range oscilloscope screen with the transmitter TEST SWITCH in the P.O. position, the SELECTOR switch in position 4, and the TEST switch in position 5.

68. Pulse Width Adjustment

The pulse width may be measured by means of the range handwheel. Two operators are required for this adjustment.

a. Set the range handwheel at zero range position.

b. Turn the SELECTOR switch to position 4 and the TEST switch to position 5.

c. Hold the transmitter TEST switch in the P.O. position. A picture of the envelope of the r-f pulse will appear on the screen of the range oscilloscope.

d. Adjust the PHASE control so that the leading edge of the pulse crosses the vertical hairline one-half way up the side of the pulse.

e. Rotate the range handwheel so that when the pulse is shifted horizontally across the screen of the oscilloscope the vertical hairline cross the pulse one-half the distance up its trailing edge.

f. The width of the pulse will determine the corresponding reading of the distance in yards on the range dial of the radar set. This distance should be approximately 1,280 yards.

g. If the distance in yards is not correct, adjust the WIDTH control on the transmitter to get the pulse width that will give a range reading of 1,280 yards, as measured in *d* above.

69. Phase and Gain Control Adjustment

With both Radio Set SCR–268 and the identification equipment operating, the leading edge of the main pulse from the IFF must be placed directly under the leading edge of the main radar pulse. This is done by adjusting the PHASE control located behind the large door on the interconnector unit. The leading edge of the pulse is the left-hand edge, the zero point. Only when the zero point of both pulses is synchronized will the IFF reply be directly beneath the radar echo from the airplane which is being identified. An identification reply is assumed to be from a particular airplane only when it is directly underneath the radar echo from that airplane; a reply on any other point on the screen would not be associated with that airplane. The detailed procedure is as follows (fig. 73):

a. Place the IFF set in operation by turning the OPERATE STANDBY switch to the OPERATE

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position. The radar should be operating normally.

b. Rotate the PHASE control on the interconnector to bring the leading edge of the main pulse from the identification transmitter directly below the leading edge of the main pulse from the radar transmitter (fig. 3).

c. At certain times it may not be possible to align the two leading edges of the transmitter pulses simply by rotating the PHASE control. In that case rotate the control in that direction which will allow it to operate the associated reversing switch. The adjustment can then be made.

d. Gain Control Adjustment. Wih the identification transmitter operating and the STANDBY OPERATE switch on OPERATE, vary the receiver GAIN control within the limits of its rotation (fig. 74). This control is located behind the large door on the interconnector. As the control is varied, the grass on the identification portion of the radar oscilloscope will vary from a thin straight baseline with only the main pulse showing to a maximum field of grass. Adjust the GAIN for optimum operation, setting it near the point of maximum grass.

70. Technical Operation of Radio Equipment RC–148–C

a. The equipment is now operating normally. The SELECTOR switch on the lower cover will fit into the groove of the SELECTOR knob, thus allowing the cover to close. Tighten the captive screws to hold the cover in place.

b. With the switch in the STANDBY position on the control unit, the normal pulse pattern from Radio Set SCR–268 will appear on the range oscilloscope screen as shown in figure 4, chapter 1.

c. To recognize friendly aircraft, throw the STANDBY OPERATE switch to the OPERATE position. If the reply is from a friendly plane, a properly coded signal appears directly beneath the radar pulse echo from the challenged plane on the screen of the range oscilloscope (figs. 83 and 84). If no response is seen when the operator has thrown the STANDBY OPERATE switch to the OPERATE position, assume that the aircraft is unfriendly.

d. Under certain conditions the operator may desire to increase the range of the IFF, as seen on the radar scope screen. If it is desired to double the range, adjust the BASELINE control to peel off 2 lines; to triple the range peel off 3 lines. Refer to step No. 6 of the starting procedure for adjustment of the BASELINE control.

71. Stopping Procedure

a. NORMAL PROCEDURE. The following procedure is recommended for shutting down the equipment when preparing to change sites and when going off the air for a temporary period.

(1) Place the STANDBY OPERATE switch on the control unit in the STANDBY position.

(2) Place the HIGH VOLTAGE circuit breaker of the power supply to the OFF position. The pilot lights T–C and T–D should not be lighted when this circuit breaker is in the OFF position.

(3) Place the FILAMENT circuit breaker of the power supply to the OFF position. With the circuit breaker in this position, pilot lights T–A and T–B should not be lighted.

b. EMERGENCY STOPPING PROCEDURE. The following procedure is suggested only when an emergency situation requires the fastest shut down: *Turn the FILAMENT VOLTAGE circuit breaker on the power supply panel to the OFF position.*

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CHAPTER 4

EQUIPMENT PERFORMANCE

Section I. GENERAL ASPECTS OF EQUIPMENT PERFORMANCE

72. Equipment Performance Log

a. GENERAL. An Equipment Performance Log has been developed to insure the most efficient technical operation of RC–148–(*). The front of the log sheet is shown in figure 92 and the reverse side is shown in figure 93. Regular and conscientious use of this *chart of technical operation* will assure the most efficient functioning of the equipment.

b. FUNCTIONS OF THE LOG SHEET. The Equipment Performance Log has several functions, as follows:

(1) It directs routine and systematic checks of the equipment while it is on the air and eliminates careless and haphazard methods of technical operation.

(2) It presents the conditions of normal equipment performance and indicates the operating tolerances outside of which meter readings should not be permitted to go, except under circumstances of emergency.

(3) It reveals the signs of abnormal functioning and indicates the need for the application of corrective measures. Therefore, it trains operating personnel to recognize the evidences of abnormality and to apply corrective measures where possible while the equipment is on the air.

(4) It aids in the prevention of major breakdowns. When signs of irregular operation are discovered, total break-down may often be avoided if the set is turned off immediately and the necessary repair is made.

(5) It provides complete records of equipment performance while the set is on the air since checks are required several times during the operating period of the day. This visible record gives each succeeding crew an itemized picture of the functioning of all components. In addition, the log sheet fixes responsibility for any particular set of operating conditions, provides information valuable for obtaining continuous performance data of the radio equipment, and forms the basis for maintenance to be performed during shut-down periods. The more important information on the log may be transferred each day to the Station Record Book, where it can be studied when occasion demands.

(6) The log will be returned periodically to a central headquarters where it will be carefully analyzed, along with logs from other RC–148–(*) installations, to provide over-all information on the technical operation of the set and possible improvements in design. Also, because the log lists all faults and repairs, full details on the number and causes of parts failure are obtained.

73. Description of Log

The Equipment Performance Log comes in pad form and consists of the following parts:

a. ABRIDGED INSTRUCTIONS. For easy reference, an abridged and simplified form of the major instructions for using the Equipment Performance Log is given in the front of each log pad.

b. WORK-TO-BE-DONE SECTION. At the back of the log pad a work-to-be-done section is provided which should be used to keep notes on repairs that must be done at the earliest opportunity, but that do not require an emergency shut-down of the equipment.

c. LOG SHEETS. There are 35 regular log sheets, enough for 15 weeks of operation, in each log pad. Each sheet is divided into sections. These sections are divided into items which appear on the front and back of the log sheet.

(1) *Front of log sheet.* The front of the log sheet (fig. 92) contains the heading, which consists of Roman numeral items I through VII, and the main part of the log sheet, which consists of Arabic numeral items 1 through 57. Items 1 through 57 may be grouped as indicated below:

(*a*) *Four-times-a-day Items.* Items 1–4, 6, 8, 10, 18–29, 35–37, and 39 are to be filled in four times a day.

(*b*) *Once-daily Items.* Items 13–15, and 32–33

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are filled in once a day. For identification these items are followed by (X) on the log sheet.

(c) Blank Item Spaces. These lines are provided for item entries directed by the person in charge.

(d) Operating Time Items. Items 40–43 are filled in as required.

(e) Three-day Summary Items. Items 45 and 46 are filled in at the end of each three-day period.

(f) Signature of Person Keeping Log. Items 52 through 56 provide space for the technician to sign his name and log the time he comes on and goes off duty.

(g) Numbering Log Sheet. Item 57 provides a space for numbering the log sheet.

(2) *Back of log sheet.* The back of the log sheet (fig. 93) is divided into the following parts:

(a) Heading. Items I through VI form the heading.

(b) Section A. This space, labeled NOTES, is provided for the description of any abnormal condition and an explanation of the steps that were taken to correct that condition.

(c) Sections B and C. This space is provided for a report on the components and the parts installed or removed from the set. Section B is labeled COMPONENT RECORD; section C is labeled PART RECORD.

(d) Section D. This space is provided on the back of the log sheet for the recording of any ideas, suggestions, recommendations, or remarks that the unit radar officer considers suitable for transmittal to higher authority.

74. General Instructions for Filling in Log Sheet

Specific instructions for filling in the separate items and sections of the log sheet are given in section II of this chapter. However, the following general rules apply to filling in all items:

a. Location. The exact location of the component or the particular equipment is referred to in each item.

b. Normal Condition. The condition of the equipment is considered to be normal if it is operating within the normal tolerance values. Keep the set operating between the points designated by the instructions.

c. Log Entries. Make the proper entries on the log sheet at the correct time intervals and according to the instructions given for each item. Use one log sheet for each 3-day period. The condition of the reading *seen* is the one to be recorded on the log sheet, regardless of whether the reading is normal or abnormal. If an entry cannot be made, or if an abnormal condition is found while readings are being taken, enter an asterisk (*) in the appropriate space on the front of the log sheet. Notify the person in charge if the condition is likely to cause damage to equipment. On the reverse side of the log sheet in section A, explain the reason for the asterisk and state what was done to correct the condition. If an abnormal condition is discovered at any time other than when the readings are being taken, make a note in section A, but omit the asterisk on the front of the log sheet. In general, a meter reading is to be considered abnormal if it is not within the range of values (tolerances) shown in the bracket to the right of the item title on the front of the log sheet. In addition, any sudden shift in a meter reading, even though it is still within the tolerance range, is to be regarded with suspicion, investigated thoroughly, and explained in section A on the back of the log sheet.

d. Method of Making Entries. Make all entries with ink or indelible pencil if either is available. If a mistake is made, do not erase it. Cross out the incorrect entry, and make a new one above it. Do not use ditto marks. Write as neatly as possible; the log sheet is a part of the permanent record. Accuracy is of primary importance, and the entries must be legible enough to be used as a reference. In section II of this chapter, examples of the log entry are given for each item.

e. Model Letters. Several items on the front of the log sheet are followed by the letters (A and B) or (C). These items are applicable only to certain models of Radio Equipment RC–148–(*). Items followed by (A and B) are filled in only when the log is being used with Radio Equipment RC–148 or RC–148–B. Items followed by (C) are filled in only when the log is being used with Radio Equipment RC–148–C.

f. Optimum Values. Enter the optimum operating values, the meter indications that represent most efficient operation, to the right of the brackets in the column of empty parentheses provided. These values will be determined by the person in charge.

g. Tolerances. Tolerances may be defined as the low and high values for normal operation. They appear in the brackets to the right of the item titles. Do not permit meter indications to go above the stated limits. By using specified corrective measures and adhering to the indicated tolerances, operators will be able to keep break-downs at a minimum.

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EQUIPMENT PERFORMANCE LOG

III. Organization _____

I. Radio Equipment RC-148 Ser. No. _____ IV. Address _____ VI. Dates: From _____ Through _____ 19____

II. Assigned Frequency _____ Megacycles V. Location _____ VII. Signature _____
(Person in charge)

Month: Year: Day:															
Start first set of log entries 15 minutes after equipment goes on the air.				A	B	C	D	A	B	C	D	A	B	C	D
1 Log Starting Time	[ ]	( )	(Hr.-Min.)												
2 Weather Conditions	[ ]	( )	(Symbols)												
3 Temperature Outside	[ ]	( )	(°F)												
4 Humidity	[ ]	( )	(Abbrev.)												
5	[ ]	( )	( )												
6 *Line Voltage* (SCR-268 Ser.)	[115–120]	( )	(Volts)												
7	[ ]	( )	( )												
8 Baseline Separation	[¼-⅓]	( )	(Inches)												
9	[ ]	( )	( )												
10 Power Supply Ser. ( ) (C)	[Oper Cond.]	( )	(OK-N*)												
11	[ ]	( )	( )												
12 Control Unit Ser ( )	[ ]	( )	( )												
13 Division Control Adjustment (X)	[ ]	( )	(OK-N*)												
14 Baseline Control Adjustment (X)	[ ]	( )	(OK-N*)												
15 Transmitter Sync. Pattern (X)	[ ]	( )	(OK-N*)												
16	[ ]	( )	( )												
17 Transmitter Ser. ( )	[ ]	( )	( )												
18 Blower (A and B)	[ ]	( )	(OK-N*)												
19 *Plate Voltage* (Operate) (A and B)	[3.3–3.7]	( )	(Kv.)												
20 High Voltage Control (A and B)	[Mark]	( )	(OK-N*)												
21 *Plate Current* (Operate) (A and B)	[2.5–4]	( )	(Ma.)												
22 *Plate Current* (Standby) (A and B)	[0]	( )	(Ma.)												
23 Bias Adjustment (Standby) (C)	[1]	( )	(Ma.)												
24 *Modulator Cathode Current* (C)	[4–7]	( )	(Ma.)												
25 Pulse Width	[1280]	( )	(Yd.)												
26 Power Output (A and B)	[½ or more]	( )	(Ratio)												
27 Power Output (C)	[1]	( )	(Kw.)												
28 Frequency Check	[±1]	( )	(Mc.)												
29 Antenna Tuning (C)	[ ]	( )	(OK-N*)												
30	[ ]	( )	( )												
31 Receiver Ser. ( )	[ ]	( )	( )												
32 Receiver Tuning (X)	[ ]	( )	(OK-N*)												
33 Receiver Output (X)	[ ]	( )	(OK-N*)												
34	[ ]	( )	( )												
35 Operating Condition	[ ]	( )	(OK-N*)												
36 *System Sensitivity* (Aa. Ba. S.)	[80–100]	( )	(%)												
37 *Signal-to-Noise Ratio*	[25]	( )	(Ratio)												
38	[ ]	( )	( )												
39 Log Finishing Time	[ ]	( )	(Hr.-Min.)												
40 Operating Time, On			(Hr.-Min.)												
41 Operating Time, Off			(Hr.-Min.)												
42 Operating Time, Total			(Hr.-Min.)												
43 Break-down Time, Total			(Hr.-Min.)												

44 THREE-DAY SUMMARY		Totals
45 Hours of Operation	(Hr.-Min.)	
46 Break-down Time	(Hr.-Min.)	
47	( )	
48	( )	
49	( )	
50	( )	

51 SIGNATURE OF PERSON KEEPING LOG					
52 Signature	53 Rank	54 Date	55 On	56 Off	

SIGNATURE OF PERSON KEEPING LOG				
Signature	Rank	Date	On	Off

Make entries in ink or indelible pencil, if available. Do not use ditto marks. Do not erase. In case of error, strike out the mistake and make the correct entry. Place an asterisk (*) after an abnormal entry.

W. D., A. G. O. Form No. 88-120
2 June 1944

57 Sheet No. ____

TL 38729

Figure 92. Front of Equipment Performance Log sheet.

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I. RADIO EQUIPMENT RC-148 SER. NO. _____ III. ORGANIZATION _____ V. LOCATION _____

II. DISTANCE FROM SEA _____ IV. ADDRESS _____ VI. ELEVATION _____

Sections A, B, C, and D

SECTION B — COMPONENT RECORD — SECTION B

MAKE ENTRIES IN THIS PANEL WHEN A COMPONENT IS TAKEN OUT OR PUT IN

COMPONENT		1 NAME OF COMPONENT	2 NAMEPLATE TYPE No.	3 NAMEPLATE SER. No.	4 NAMEPLATE ORDER No.	5 SERVICE DATES IN	6 SERVICE DATES OUT	7 HOUR METER READINGS IN	8 HOUR METER READINGS OUT	9 HOUR METER READINGS TOTAL	10 REASON FOR REMOVING COMPONENT	11 DISPOSITION OF REMOVED COMPONENT	12 WORK DONE BY—
TAKEN OUT	A												
" "	B												
" "	C												
PUT IN	A												
" "	B												
" "	C												

SECTION C — PART RECORD — SECTION C

MAKE ENTRIES IN THIS PANEL WHEN PART OR TUBE IS TAKEN OUT OR PUT IN

PART		1 NAME OF COMPONENT CONTAINING PART	2 TYPE No. COMPONENT	3 SER. No. COMPONENT	4 ORDER No. COMPONENT	5 SCHEMATIC PART No.	6 NAME OF PART	7 DESCRIPTION OF PART (MANUFACTURER—TYPE—SERIAL No.—ELECTRICAL RATING—USE)	8 FUNCTION OF PART AND LOCATION FROM SCHEMATIC	9 NEW, USED, OR REBUILT	10 DISPOSITION OF PART TAKEN OUT
TAKEN OUT	A										
" "	B										
" "	C										
PUT IN	A										
" "	B										
" "	C										

PART		11 SERVICE DATES IN	12 SERVICE DATES OUT	13 HOUR METER READINGS IN	14 HOUR METER READINGS OUT	15 HOUR METER READINGS TOTAL	16 HOURS AT SET	17 WHERE DID YOU GET THE PART?	18 SYMPTOM OF FAILURE	19 FAULT	20 WHAT CAUSED THE FAULT?	21 ACTION TAKEN AND RESULTS	22 WORK DONE BY—
TAKEN OUT	A												
" "	B												
" "	C												
PUT IN	A												
" "	B												
" "	C												

SECTION D — REMARKS — RADAR OFFICER

SECTION A — NOTES — SECTION A

ENTER EACH ABNORMAL CONDITION FOUND AND STEPS TAKEN TO CORRECT IT. | TIME AND DATE | FREQ. MC

SEE TM 11-1318 FOR SAMPLE ENTRIES AND FOR DETAILED EXPLANATION OF DATA WANTED.

ELECTRONICS SECTION
GROUND SIGNAL MAINTENANCE BRANCH
QUALITY CONTROL DIVISION, SCOSA
CAMP EVANS, BELMAR NEW JERSEY

WHEN COMPLETED SEND LOG SHEET TO UNIT RADAR OFFICER.

IF ADDITIONAL SPACE IS REQUIRED TEAR OUT ANOTHER LOG SHEET AND ATTACH TO THIS ONE.

SHEET No. ____

TL 38730

Figure 93. Back of Equipment Performance Log sheet.

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h. UNITS. Make all daily and four-times-daily entries in terms of the units (volts, degrees, hours, etc.) given in the last column of parentheses to the right of the item titles.

i. ITALICIZED ITEMS. Check the items printed in *italics* more often than four times a day. Keep these items under close watch; they tend to standardize operating conditions by providing a general check on the over-all efficiency of the equipment. Apply corrective measures whenever necessary.

j. HOW TO OBTAIN THE INFORMATION. Instructions for searching the pertinent data from which the log entry is made are given for each item in section II of this chapter.

k. REMARKS. Pertinent facts or miscellaneous information regarding an item are given under the REMARKS heading.

l. REFERENCES. At the end of each item in the log, a series of open parentheses, with the heading REFERENCES is to be found. These parentheses are furnished the technician for the purpose of cross-indexing the several books on this equipment. In other words, if the technician wishes to put a reference to a paragraph in another book, he can make the entry in the parentheses provided in the manual.

75. Corrective Measures

Specific corrective measures to be taken while the equipment is on the air are not described in the log pad. In section II of this chapter they are presented in detail with the discussions of specific procedures for each log item.

76. General Corrective Steps

In contrast to specific corrective measures that are applied while the equipment is running, there are certain general corrective steps that should be taken. These general steps are as follows:

a. GENERAL CLEANLINESS. The routine cleaning of outside surfaces of the components of the equipment, including meter glasses, is covered in TM 11–1418, Preventive Maintenance Manual. Every operator of Radio Equipment RC–148–(*) should take all necessary steps to keep the unit and its contents clean at all times. However, the process of making the log entries and performing specific corrective measures is not to be interrupted to permit cleaning.

b. BROKEN METER-COVER GLASSES. The repair of cracked or broken meter-cover glasses is done in connection with routine preventive maintenance. However, if a meter glass becomes cracked or broken during operation, it is usually desirable to make temporary repair immediately. This can be done with adhesive tape or similar material, but care should be taken not to cover the meter scale with any opaque substance.

c. PILOT LIGHTS. Pilot lights are often used in Radio Equipment RC–148–(*) to indicate that certain elements in the system are operating as required. Consequently, if a pilot light is not glowing when it should be, an important fault may be present, or the pilot light bulb may be burned out. If a light goes out during operation, replace the bulb with a new one as a first and immediate step. If the new bulb does not light, and if equipment performance seems satisfactory, simply make a note so that repair will be made during a shut-down period. If the new bulb does not light, and equipment performance is faulty, the person in charge should be informed immediately and asked for instructions relative to shut-down.

d. CRACKED OR BROKEN KNOBS AND SWITCH BUTTONS. Ordinarily, broken knobs and switch buttons are repaired during a period of routine preventive maintenance. However, if a knob or button is cracked or broken, temporary repair can sometimes be effected by using tape or a similar material. In some cases it may be possible to replace a broken knob while the equipment is operating, but care must always be taken to avoid any changes in equipment operation.

77. Reading Meters

Reading meters accurately is a matter of common sense plus carefulness (fig. 94). The following rules and cautions will help prevent errors:

a. SCALE NUMBERING. In reading a meter, observe how the scale is numbered; that is, whether the numbering is 1-2-3, 2-4-6, 5-10-15, 10-20-30, 20-40-60, or in some other sequence.

b. OBTAINING VALUE OF SUBDIVISION. Count the divisions of scale space between the two main-numbered graduations on each side of the needle. Divide the numerical difference between the two numbers by the number of divisions of scale space. This process gives the value of each subdivision, as illustrated in figure 94.

c. SCALE READING ACCURACY. In general, the construction of the pointer and the graduation of the scale are such that, under steady conditions, the position of the pointer may be read by estimation to one-tenth of a scale division.

d. AVOIDING PARALLAX ERROR. Guard against the error caused by parallax. To prevent this error,

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stand directly in line with the meter. If possible, have the eye on the same level as the meter; if this is impossible, be sure the eye is on the plane of the meter needle and the needle axis.

e. Linear Scales. In reading a meter, observe, whether or not the scale is linear; that is, whether the needle deflection is directly proportional to the quantity being measured or not. A-c ammeters and voltmeters usually have scales in which the graduations are not directly proportional to the measured quantity. Linear scales are usually found on d-c instruments.

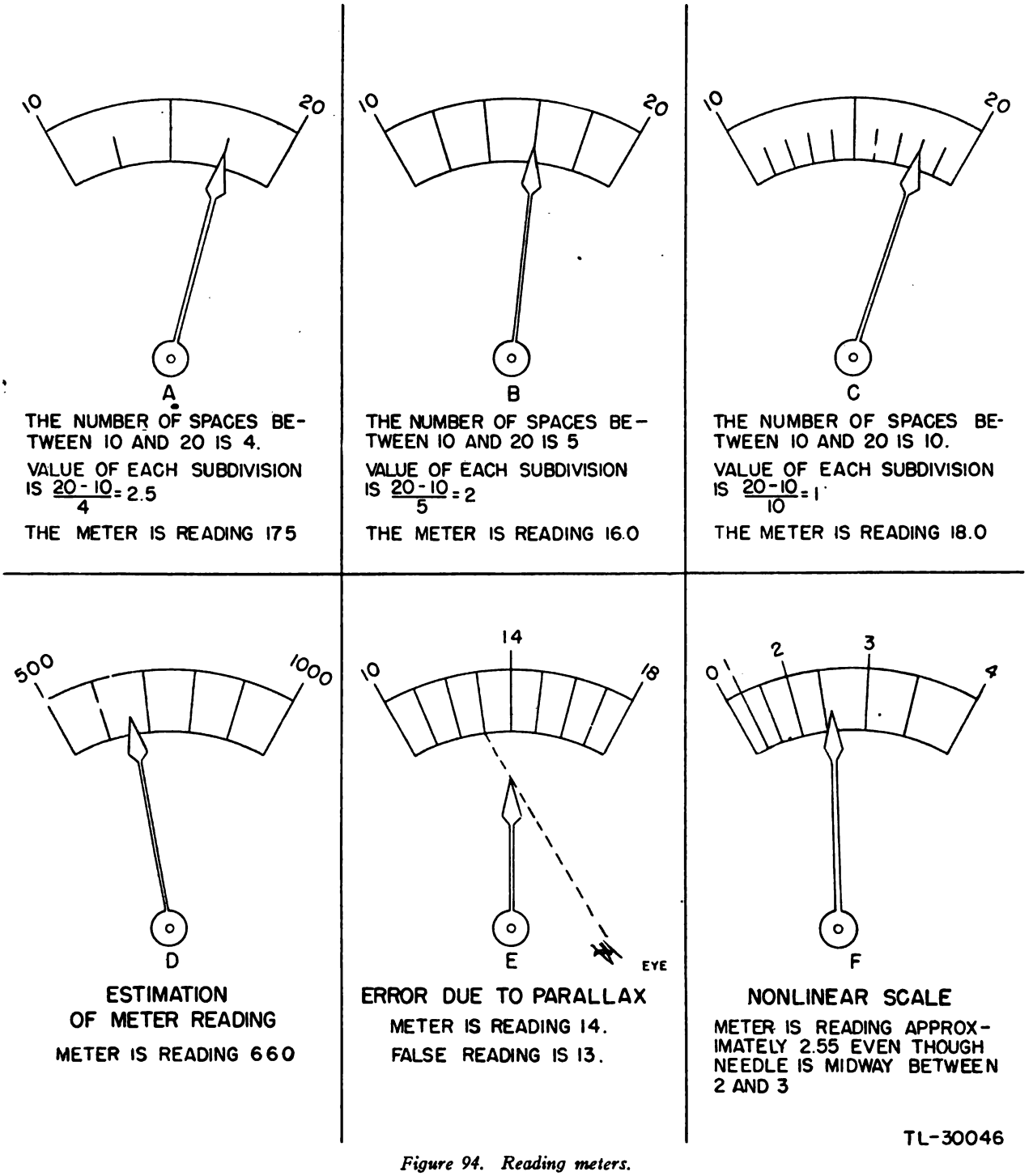

Figure 94. Reading meters.

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f. NONLINEAR SCALES. One meter using a nonlinear scale is known as the current-squared type. The needle deflection on this type of meter is proportional to the square of the current. This nonlinearity must be considered when estimating the reading on such a meter. For instance, when the needle is halfway between 2 and 3 on the meter, the reading is not 2.5, but approximately 2.55. During operation of the *unit* some fluctuations in the readings may occur, but the readings usually can be averaged mentally.

78. Adjusting Meters

a. CHECKING. Normally, all meters on the equipment should read zero when the unit is inoperative. Make an inspection of the zero setting of the meters during the shut-down period. The zero settings cannot be checked while the radio equipment is in operation.

b. OVERCOMING STARTING FRICTION. Tap lightly on the meter case with the tips of the fingers before deciding that a meter needs readjusting. This enables the needle to overcome the slight starting friction of the bearing which sometimes prevents an otherwise normal meter from resting at zero.

c. ZERO SHIFT. 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 settings of meters be checked and readjusted *only after the unit has been off the air for some time.*

d. ADJUSTING SCREW. Adjust the zero setting of any meter only if it fails to return to its zero mark. Turn the adjusting screw on the front of the meter with a small screwdriver while tapping lightly on the meter case with the tips of the fingers.

Section II. SPECIFIC LOG PROCEDURES AND SPECIFIC CORRECTIVE MEASURES

79. General

a. As already indicated, an abridged form of the instructions for using the Equipment Performance Log is found in the front of each log pad. In the following paragraphs, a more complete discussion of procedures is given. Normal and abnormal conditions of operation, specific corrective measures, along with sample entries for each of the principal items on the front of the log sheet are discussed. In most cases, three sample entries are included; two are normal, and the other, which follows, is abnormal and is marked with an asterisk (*).

b. The log emphasizes normal operating conditions. It also stresses the use of corrective measures whenever they can be applied. Furthermore, the log provides for keeping a complete record of abnormal conditions. Whenever an abnormal condition is encountered, an asterisk (*) is to be entered on the front of the log sheet, and a description of the condition is to be written in NOTES, section A, on the back of the log sheet. In the itemized discussion which follows, the instruction to keep a record of abnormalities in section A may sometimes not be given specifically, but entries in section A should always be made when anything unusual concerning the equipment is observed.

80. How to Fill in Front of Log

a. Fill in items I–VI at the beginning of each log period. The person in charge examines the log sheet at the end of the period and signs his name in item VII.

b. In the first line at the top of the main body of the log fill in the month, year, and day.

(1) With the exception of blank items and items marked (X), fill in items 1 to 39 four times a day.

(2) Items marked (X) are filled in once a day as a part of the first set of entries.

(3) Fill in items 40 through 43 as required.

(4) Fill in items 45 and 46 at the end of the three-day period.

(5) Fill in items 52 through 56 each time a new shift reports for duty.

(6) Number the log sheet in item 57. Sheets are to be numbered in sequence.

81. Item I—Radio Equipment RC–148 Serial No.—— Enter the serial number of the radio equipment. This number is found on the invoice sent to the person in charge.

82. Item II—Assigned Frequency———Megacycles Enter the frequency (in megacycles) at which the set operates. Obtain this information from the person in charge.

83. Item III—Organization——— Enter the official designation of the company, platoon, regiment, or other organization charged with the operation of the unit.

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84. Item IV—Address _____

Enter the complete official mailing address of the organization. The Army Post Office number must be entered on all overseas log sheets.

85. Item V—Location _____

Enter the geographic location for all installations within the limits of the continental United States. No entry should be made for overseas installations.

86. Item VI—Dates: From ____ Through ____ 19____

Enter the dates of the period covered by the log sheet. Write the dates in the following sequence: day, month, year.

87. Item VII—Signature _____
(Person in Charge)

After the log sheet has been completed, the person charged with the responsibility for operation of the radio equipment signs his name.

88. Item 1—Log Starting Time _____

SAMPLE ENTRY.

1. Log Starting Time [ ] ( ) (Hr.-Min.)	0600	1200	2100

LOG ENTRY. When the log is started, enter the time in hours and minutes, using the 24-hour system. Refer to figure 95 for a guide when converting ordinary time readings to their equivalents in the 24-hour system.

REMARKS. There are four columns (A, B, C, and D) provided on the log sheet for each day's operation. Begin the first set of log entries in column A about 15 minutes after the starting procedure is completed. Make entries in column D just before applying the stopping procedure. Ordinarily, if the operating period is 3 hours or less, fill in only columns A and D. If the operating period is to be more than 3 hours, columns B and C will be used at the discretion of the person in charge, to provide for a third and fourth set of entries.

89. Item 2—Weather Conditions

SAMPLE ENTRY.

2. Weather Conditions [ ] ( ) (Symbols)	●	R	ZR

LOG ENTRY. Enter one of the following symbols or abbreviations to indicate the general condition of the weather:

Clear sky .....O
Overcast sky .....●
Fog .....F
Haze .....H
Smoke .....K
Dust .....D
Mist .....M
Rain .....R
Snow .....S
Freezing rain .....ZR
Sleet .....E
Hail .....AP
Thunderstorm .....$\overline{\leq}$
Lightning visible .....$\leq$

Record any unusual weather conditions under NOTES on the back of the log sheet.

90. Item 3—Temperature Outside

SAMPLE ENTRY.

3. Temperature Outside [ ] ( ) (° F.)	82	84	110*

LOG ENTRY. Enter the outside temperature in degrees Fahrenheit. If the reading seems incorrect, mark the entry with an asterisk (*) and make an entry under NOTES.

CORRECTIVE MEASURES. If the reading seems incorrect check the following:

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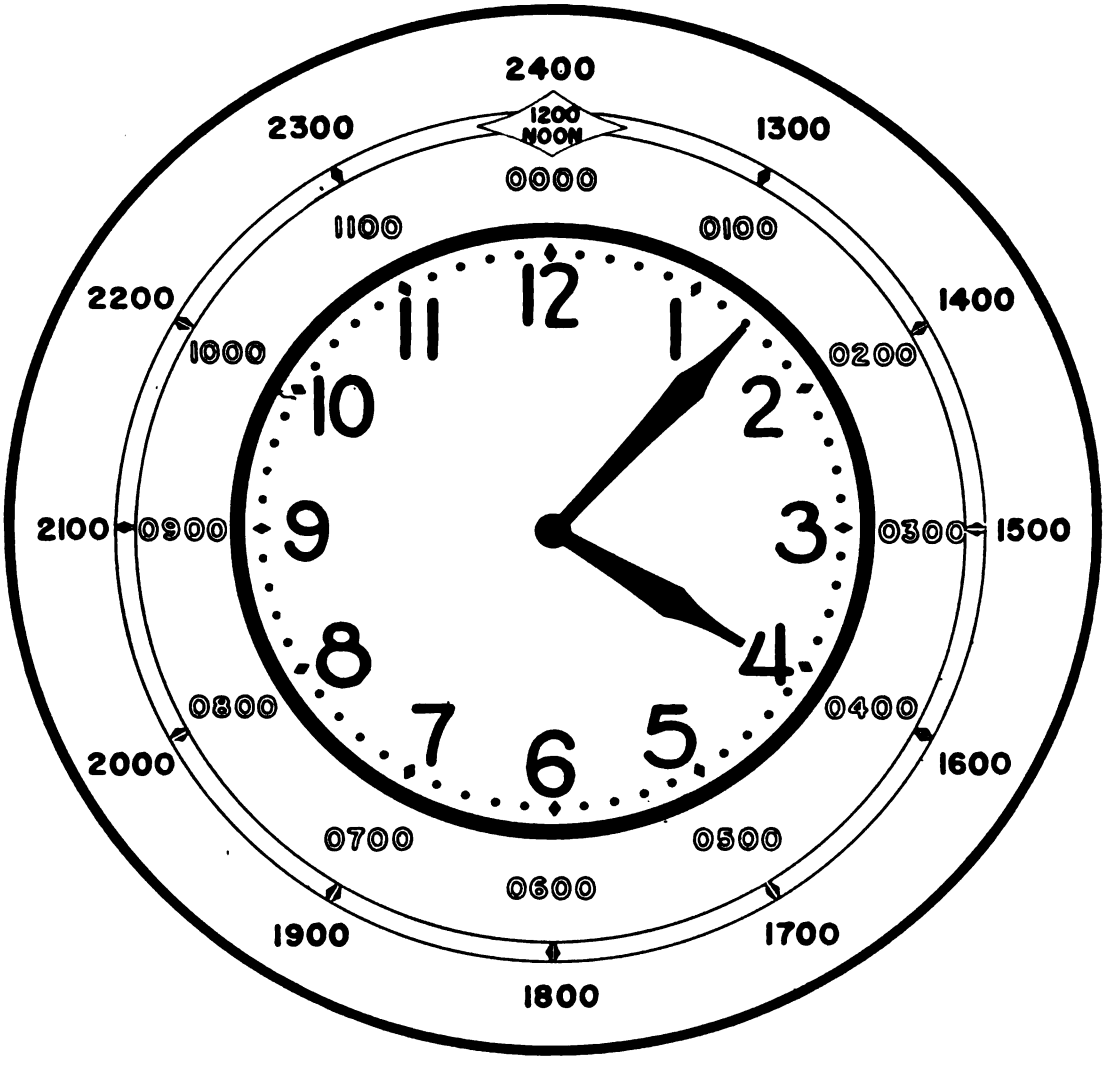

24 HOUR TIME CLOCK

DESCRIPTION

THE INNER CIRCLE REPRESENTS A STANDARD 12 HOUR CLOCK.
THE MIDDLE SECTION (WHITE NUMERALS) COVERS THE A.M. PERIOD FROM MIDNIGHT (0000) TO NOON (1200).
THE OUTER SECTION (BLACK NUMERALS) COVERS THE P.M. PERIOD FROM NOON (1200) TO MIDNIGHT (2400).

INSTRUCTIONS

TIME READINGS ON THE 24-HOUR CLOCK ARE IDENTICAL TO THE STANDARD 12-HOUR CLOCK READINGS DURING THE FIRST TWELVE HOURS (A.M.) OF THE DAY, EXCEPT THAT THE RECORDING DOES NOT SHOW ANY MINUTE NOTATION.
EXAMPLES: AT 7:00 A.M. WRITE: 0700. AT 11:17 A.M. WRITE: 1117.
AFTERNOON (P.M.) READINGS ARE SHOWN IN THE OUTER SECTION. THEY BEGIN WITH 1201 AND END WITH 2400 (MIDNIGHT) WHICH IS THE SAME AS 0000.
EXAMPLES: AT 3:26 P.M. WRITE: 1526. AT 9:02 P.M. WRITE 2102.

CLOCK READING

IF A.M., THE FIGURE READS 0407. IF P.M. THE FIGURE READS 1607. TL30528A

Figure 95. Time conversion table.

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a. Thermometer may be in direct rays of the sun or in the rain, if so, relocate thermometer.

b. Damaged or inaccurate thermometer. Replace if necessary.

SAMPLE ENTRY UNDER NOTES:

Item	Time and Date	NOTES
3	2100	Outside temperature high. Column of thermometer was cracked. After
	15 May	replacement reading was 85° F.E.O.

91. Item 4—Humidity

SAMPLE ENTRY.

4. Humidity [ ] ( ) (Abbrev.)	M	L	H

LOG ENTRY. Enter the relative humidity as indicated by a psychrometer. If no instrument is available for measuring the humidity, estimate it and enter one of the following abbreviations:

Very low (air very dry).....VL
Moderate .....M
Very high (air very damp).....VH
Low (air dry).....L
High (air damp).....H

REMARKS. The word *humidity* refers to the amount of water vapor in the air. At the low extreme of humidity, the air is very dry; at the high extreme, it is very damp or moist. In areas where there is very little rainfall such as desert country, the humidity is almost always very low. The air as well as the ground is quite dry. In places where rainfall is heavy, the humidity is usually high. On a hot, very humid day, the air seems oppressive and heavy. On such a day, enter the symbol VH in the log. In contrast, on a hot day in an arid region, even if a heavy rain has just stopped, the air seems fresh and light. Enter the symbol L. Use care in making estimates.

92. Item 5 (Blank)

93. Item 6—Line Voltage (Scr–268 Ser.)

SAMPLE ENTRY.

6. Line Voltage (SCR–268–B Ser. 9) [115–120] ( ) (Volts)	117	117	113*

LOCATION. The line voltage is read from the meter located on the junction box of Radio Set SCR–268–(*).

NORMAL CONDITION. The line voltage is normal if the reading is between 115 and 120 volts.

LOG ENTRY. In the first parentheses to the right of the item title enter the serial number of the SCR–268–(*) with which the RC–148–(*) is being used. In the log space enter the reading of the voltmeter to the nearest volt. If the voltage is incorrect, follow the entry with an asterisk (*) and make an entry under NOTES.

CORRECTIVE MEASURES.

a. Check the adjustment of the voltage regulator on the junction box.

b. Check the voltage at the SCR–268–(*) power unit.

c. If the trouble is not apparent after these steps, notify the person in charge.

REFERENCES.

Page ( ) ( ) ( ) ( )
Paragraph ( ) ( ) ( ) ( )
TM 11– ( ) ( ) ( ) ( )

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
6	2130	Line voltage low. Adjusted voltage regulator and reading was normal.
	16 May	R.J.M.

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94. Item 7 (Blank)

95. Item 8—Base-Line Separation

SAMPLE ENTRY.

8. Baseline Separation [¼–½] ( ) (Inches)	¼	⅜	¾*

NORMAL CONDITION. The baseline separation is normal if it is between ¼ and ½ inch.

LOG ENTRY. Enter on the log sheet the baseline separation to the nearest ⅛ inch. If the separation is incorrect place an asterisk (*) after the log entry and explain under NOTES.

HOW TO OBTAIN THE INFORMATION. Turn the GAIN control on the interconnector to the minimum (extreme counterclockwise) position. Leave all other controls in the normal operating position. Measure the separation between the radar baseline and the IFF baseline.

CORRECTIVE MEASURES. If the baseline separation is incorrect and the equipment is normal otherwise, record the condition in the Work-To-Be-Done section.

REFERENCES.

Page ( ) ( ) ( ) ( )
Paragraph ( ) ( ) ( ) ( )
TM 11– ( ) ( ) ( ) ( )

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
8	0930	Separation ¾". Abnormal condition entered in Work-To-Be-Done Sec-
	17 May	tion for adjustment during shutdown period. F.M.W.

96. Item 9 (Blank)

97. Item 10—Power Supply Ser. ( )

SAMPLE ENTRY.

10. POWER SUPPLY Ser. (18) (C) [Oper. Cond.] ( ) (OK–N*)	OK	OK	N*

LOCATION. The power supply is the bottom unit located in Rack FM–82.

NORMAL CONDITION. The power supply is normal if it is operating satisfactorily and all four pilot lights are glowing.

LOG ENTRY. In the first parentheses to the right of the item title enter the serial number of the power supply. In the log space enter OK if the operation of the power supply is normal; otherwise enter N* and explain under NOTES.

CORRECTIVE MEASURES.

a. Replace any pilot light bulbs that do not light.

b. Notify the person in charge if the power supply is not operating normally.

REMARKS. Draw a line through this item when using the log sheet with Radio Equipment RC–148 or RC–148–B, as this power supply is used only on the RC–148–C.

REFERENCES.

Page ( ) ( ) ( ) ( )
Paragraph ( ) ( ) ( ) ( )
TM 11– ( ) ( ) ( ) ( )

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
10	0620	Pilot light T–A did not light. Replaced bulb. R.A.A.
	12 Sept	

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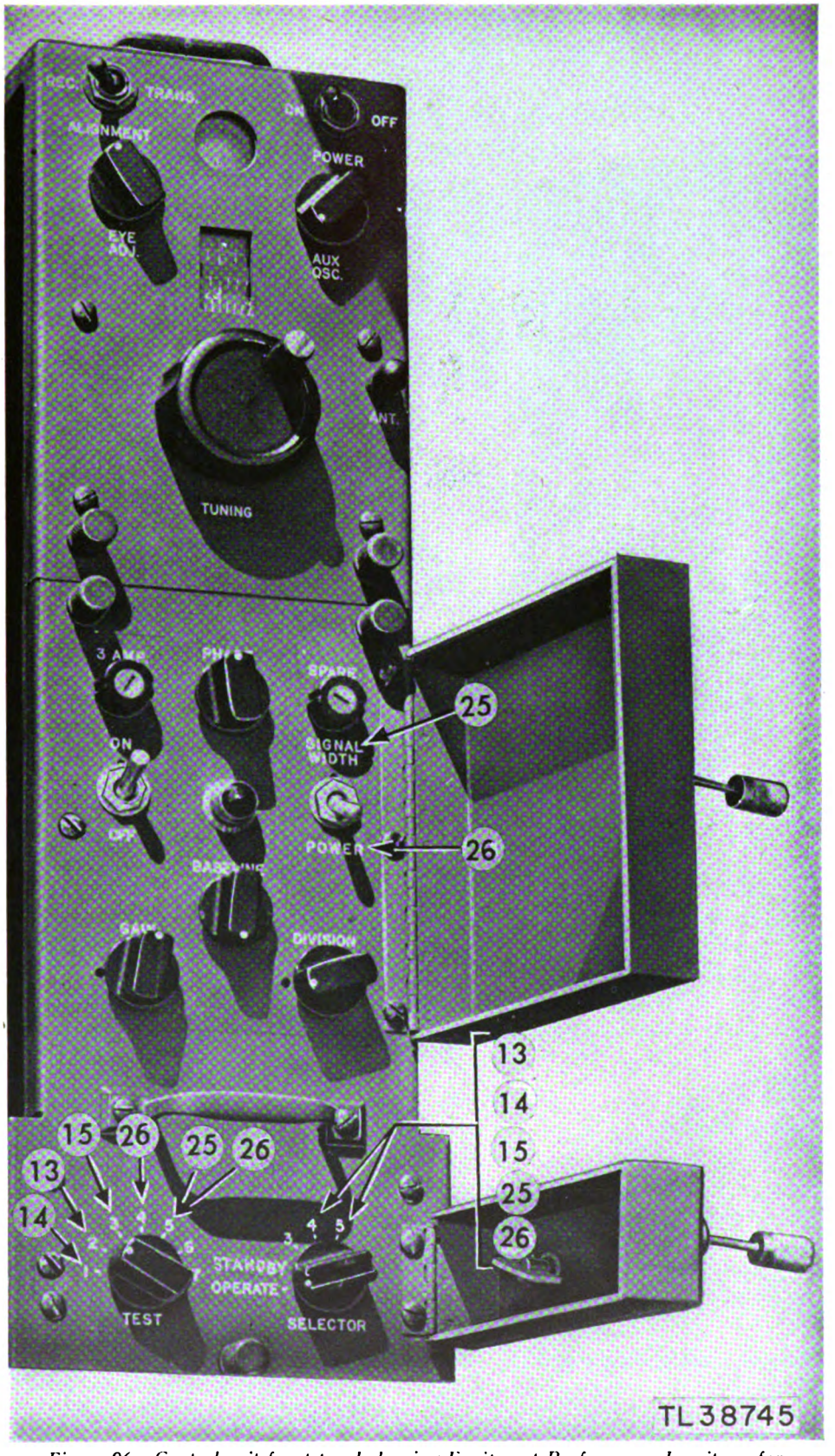

Figure 96. Control unit front panel showing Equipment Performance Log items for RC-148-B.

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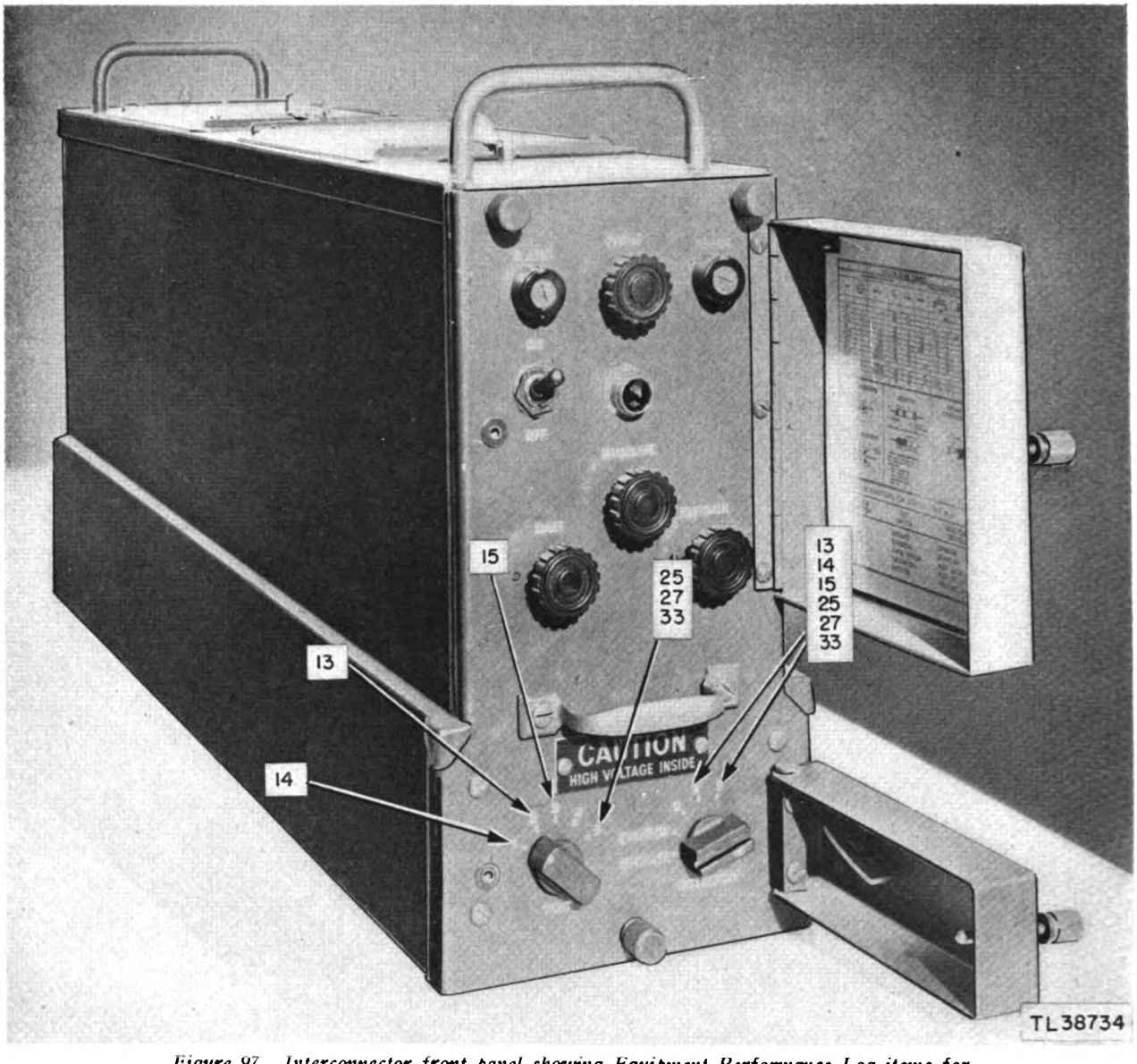

Figure 97. Interconnector front panel showing Equipment Performance Log items for RC-148-C.

98. Item 11 (Blank)

99. Item 12—Control Unit Ser. ( )
SAMPLE ENTRY.

12. CONTROL UNIT Ser. (15) [ ] ( ) ( )			

LOG ENTRY. Enter the serial number of the control unit in the first parentheses to the right of the item title.

100. Item 13—Division Control Adjustment (X)
SAMPLE ENTRY.

13. Division Control Adjustment (X) [ ] ( ) (OK-N*)	OK	OK	N*

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LOCATION. The scope pattern observed for this item appears on the range scope of the SCR–268–(*). The controls used are on the front of the interconnector unit.

NORMAL CONDITION. The adjustment of the division control is normal if fifteen lines are seen on the oscilloscope screen.

LOG ENTRY. Enter OK in the log space if the division pattern is normal; otherwise enter N* and explain under NOTES.

HOW TO OBTAIN THE INFORMATION.

a. Turn the SELECTOR switch to either position 4 or 5, and the TEST switch to position 2 (figs. 96 and 97).

b. Count the number of horizontal lines that appear on the screen of the SCR–268–(*) range scope (fig. 63).

CORRECTIVE MEASURES. If the wrong number of lines appear on the range scope, adjust the DIVISION control knob until 15 lines appear. If no pattern is seen or 15 lines cannot be obtained, notify the person in charge.

REMARKS. The two bottom lines are very close together and may be mistaken for one. Check the count carefully.

REFERENCES.

Page	(	)	(	)	(	)	(	)
Paragraph	(	)	(	)	(	)	(	)
TM 11–	(	)	(	)	(	)	(	)

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
13	1730	Only 14 lines on scope. OK after DIVISION control adjustment.
	19 June	E.C.C.

101. Item 14—Baseline Control Adjustment (X)

SAMPLE ENTRY.

14. Baseline Control Adjustment (X) [ ] ( ) (OK–N*)	OK	OK	N*

LOCATION. All controls used for this item are located on the front of the interconnector unit. The scope pattern appears on the SCR–268–(*) range scope.

NORMAL CONDITION. The BASELINE control adjustment is normal if a dual baseline is seen with a distinct cross-over in the center. This pattern is shown in figure 64.

LOG ENTRY. Enter OK if the normal pattern is seen on the scope; otherwise enter N* and make an entry under NOTES.

HOW TO OBTAIN THE INFORMATION.

a. Turn the SELECTOR switch to either position 4 or 5, and the TEST switch to position 1.

b. Note the pattern obtained on the scope screen.

CORRECTIVE MEASURES.

a. If the pattern is not of the proper shape adjust the BASELINE control until the proper shape is obtained.

b. If the cross-over is not in the center readjust the PHASE control.

c. Notify the person in charge if the correct pattern cannot be obtained.

REFERENCES.

Page	(	)	(	)	(	)	(	)
Paragraph	(	)	(	)	(	)	(	)
TM 11–	(	)	(	)	(	)	(	)

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
14	0630	Crossover on left end of pattern. Readjusted PHASE control. F.M.W.
	12 Apr	

102. Item 15—Transmitter Sync. Pattern (X)

SAMPLE ENTRY.

15. Transmitter Sync, Pattern (X) [ ] ( ) (OK–N*)	OK	OK	N*

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NORMAL CONDITION. The transmitter synchronizing pattern is normal if a pulse approximately 1 inch high appears on the SCR–268–(*) range scope.
LOG ENTRY. Enter OK if the pattern is normal; otherwise enter N* and make an entry under NOTES.
HOW TO OBTAIN THE INFORMATION.
a. Turn the SELECTOR switch to either position 4 or 5, and the TEST switch to position 3.
b. Observe the pattern seen on the scope screen (fig. 68).
CORRECTIVE MEASURES. If the proper pattern is not obtained, notify the person in charge.
REFERENCES.

Page	( )	( )	( )	( )
Paragraph	( )	( )	( )	( )
TM 11–	( )	( )	( )	( )

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
15	0530 12 Sept	Sync signal very weak. Notified person in charge. F.M.W.

103. Item 16 (Blank)

104. Item 17—Transmitter Ser. ( )

SAMPLE ENTRY.

17. TRANSMITTER Ser. (9) [ ] ( ) ( )			

LOG ENTRY. In the first parentheses to the right of the item title enter the serial number of the transmitter. If the log sheet is being used with the RC–148–C enter the serial number of the receiver-transmitter.

105. Item 18—Blower (A and B)

SAMPLE ENTRY.

18. Blower (A and B) [ ] ( ) (OK–N*)	OK	OK	N*

LOCATION. The blower is located on the underside of the top of the transmitter case.
NORMAL CONDITION. The blower is operating properly if a stream of air is felt through the vent holes in the transmitter and the motor is running smoothly and quietly.
LOG ENTRY. Enter OK if the condition of the blower is normal; otherwise enter N* and explain under NOTES.
HOW TO OBTAIN THE INFORMATION.
a. Place hand in front of the vents on the transmitter. A stream of warm air should be felt.
b. Listen in front of the vents for the sound of the motor.
CORRECTIVE MEASURES. If the blower is not functioning properly, notify the person in charge.
REMARKS. Draw a line through this item if the log sheet is being used with Radio Equipment RC–148–C, as no blower is used on this model.
REFERENCES.

Page	( )	( )	( )	( )
Paragraph	( )	( )	( )	( )
TM 11–	( )	( )	( )	( )

SAMPLE ENTRY.

Item	Time and Date	NOTES
18	0720 18 Oct	Air stream from vent very weak. Notified person in charge. G.J.

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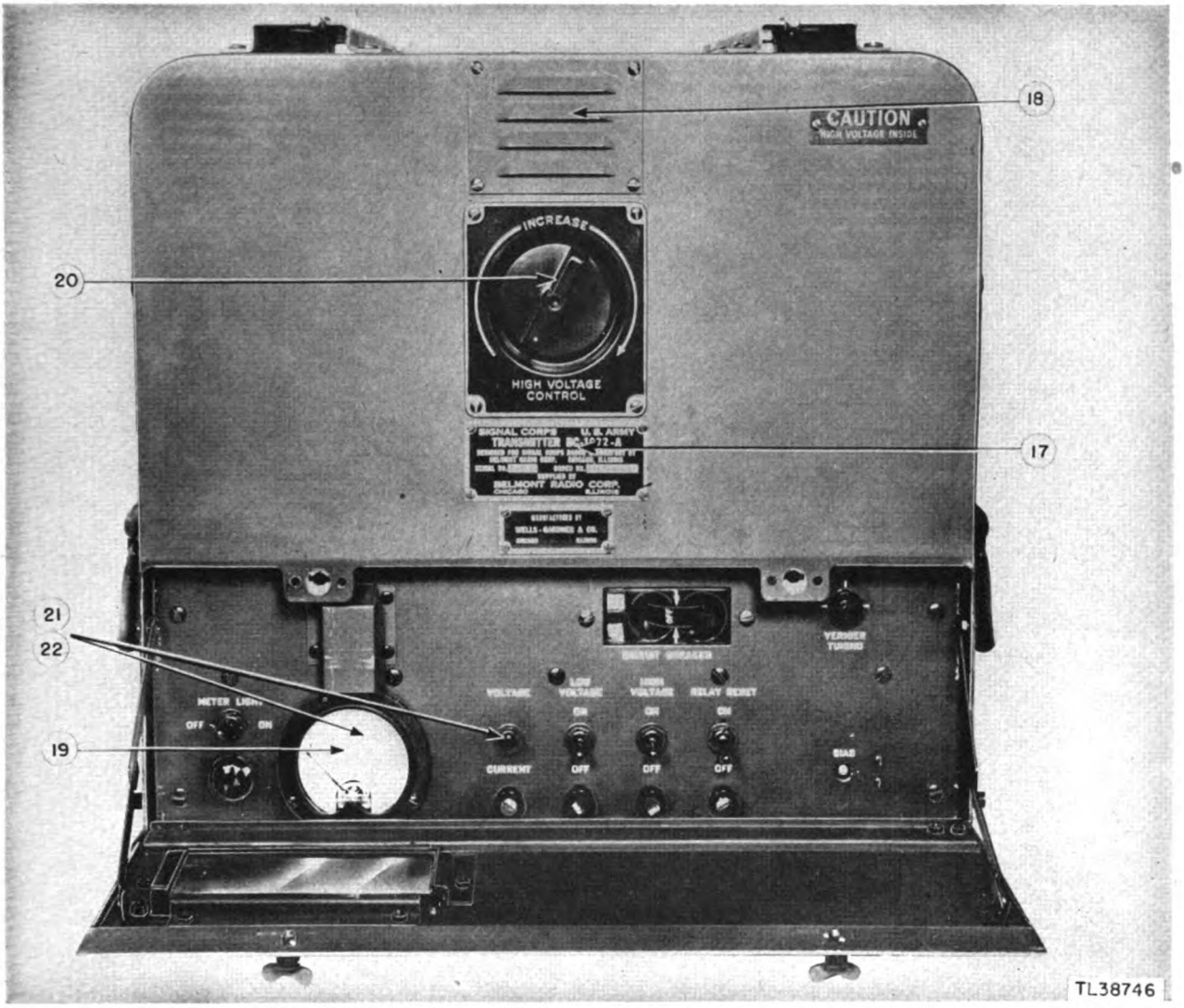

Figure 98. Transmitter front panel, showing Equipment Performance Log items for RC–148–B.

106. Item 19—Plate Voltage (Operate) (A and B)

SAMPLE ENTRY.

19. PLATE VOLTAGE (Operate) (A and B) [3.3–3.7] ( ) (kv.)	3.3	3.5	3*

LOCATION. The plate voltage is read from the meter on the front of the transmitter.

NORMAL CONDITION. The plate voltage is normal if the reading is between 3.3 and 3.7 kilovolts (kv).

LOG ENTRY. Enter on the log sheet the operating plate voltage to the nearest one-tenth kilovolt. If the condition is abnormal place an asterisk (*) after the entry and make an explanation under NOTES.

HOW TO OBTAIN THE INFORMATION. Turn the STANDBY OPERATE switch to the OPERATE position and read the meter on the transmitter panel (fig. 98).

CORRECTIVE MEASURES.

a. Check item 20.

b. If item 20 is normal and the voltage is not within the designated tolerances, notify the person in charge.

REMARKS. Draw a line through this item when using the log sheet with Radio Equipment RC–148–C.

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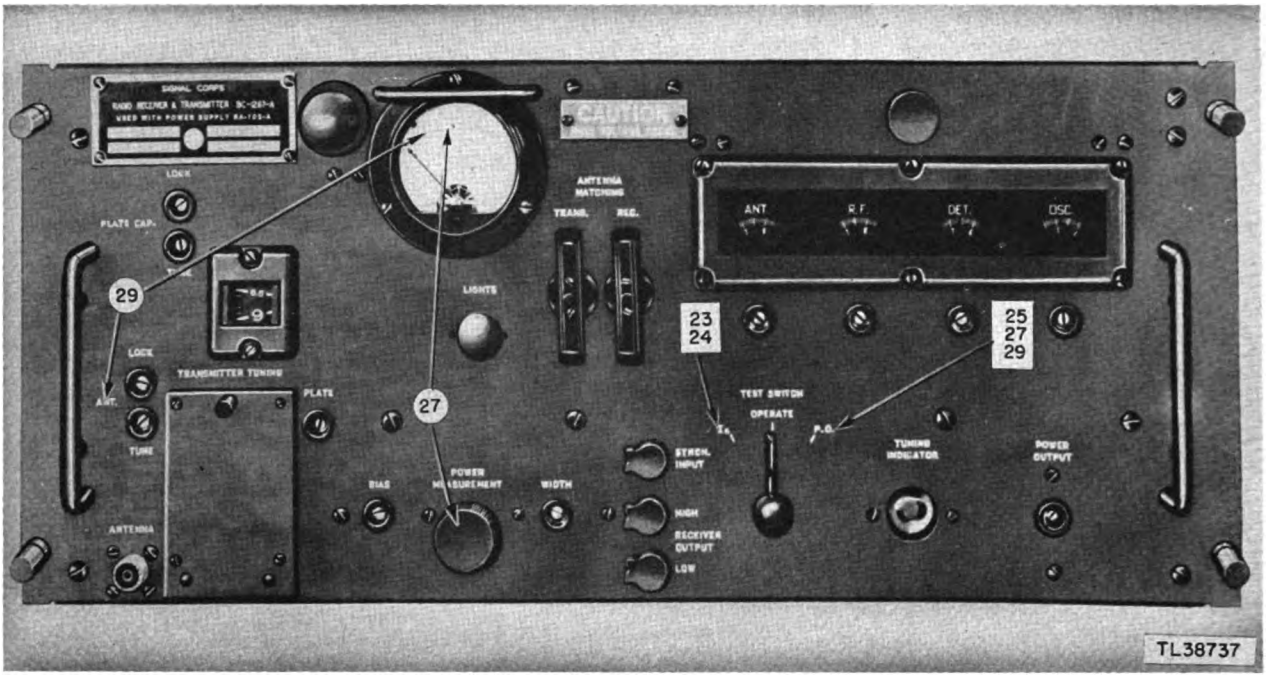

Figure 99. Transmitter-Receiver front panel, showing Equipment Performance Log items for RC–148–C.

REFERENCES.
Page ( ) ( ) ( ) ( )
Paragraph ( ) ( ) ( ) ( )
TM 11– ( ) ( ) ( ) ( )

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
19	1220	Voltage reads 3 kv. Notified person in charge. R.D.A.
	8 Dec	

107. Item 20—High Voltage Control (A and B)

SAMPLE ENTRY.

20. High Voltage Control (A and B) [Mark] ( ) (OK–N*)	OK	OK	N*

LOCATION. The HIGH VOLTAGE CONTROL is located on the front of the transmitter just above the control panel (fig. 98).
NORMAL CONDITION. The HIGH VOLTAGE CONTROL setting is normal if the mark and the white dot on the HIGH VOLTAGE CONTROL lines up when the meter reads between 3.3 and 3.7 kilovolts.
LOG ENTRY. Enter OK if the control is in the normal position. If abnormal enter N* and make an entry under NOTES.
HOW TO OBTAIN THE INFORMATION. Since there are no calibrations on this dial, the normal setting should be indicated by a mark on a strip of adhesive tape which should line up with the white dot on the control. This should be done by the person in charge of the equipment.
CORRECTIVE MEASURES. If the setting of the control is abnormal, notify the person in charge.
REMARKS. Draw a line through this item when using the log sheet with Radio Equipment RC–148–C.
REFERENCES.
Page ( ) ( ) ( ) ( )
Paragraph ( ) ( ) ( ) ( )
TM 11– ( ) ( ) ( ) ( )

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SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
20	1640 12 Dec	High voltage control ½ inch out of line when meter reads 3.5 kv. Notified person in charge. A.A.P.

108. Item 21—Plate Current (Operate) (A and B)

SAMPLE ENTRY.

21. Plate Current (Operate) (A and B) [2.5–4] ( ) (Ma.)	3	3	8*

LOCATION. The plate current is read from the meter on the front panel of the transmitter.

NORMAL CONDITION. The operating plate current is normal if the meter reads between 2.5 and 4 milliamperes (ma).

LOG ENTRY. Enter on the log sheet the operating plate current to the nearest one-tenth milliampere. If not within the normal tolerances place an asterisk (*) after log entry and make an entry under NOTES.

HOW TO OBTAIN THE INFORMATION. Turn the STANDBY OPERATE switch to the OPERATE position. Hold the VOLTAGE CURRENT switch in the CURRENT position, and read the meter (fig. 98).

CORRECTIVE MEASURES.

a. Check the bias adjustment.

b. If adjustment of the bias does not correct the condition notify the person in charge.

REMARKS. Draw a line through this item when using the log sheet with Radio Equipment RC–148–C.

REFERENCES.

Page ( ) ( ) ( ) ( )
Paragraph ( ) ( ) ( ) ( )
TM 11– ( ) ( ) ( ) ( )

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
21	0930 12 Oct	Current reading too high. Corrected bias and remedied faulty condition. J.C.C.

109. Item 22—Plate Current (Standby) (A and B)

SAMPLE ENTRY.

22. Plate Current (Standby) (A and B) [0] ( ) (Ma.)	0	0	5*

LOCATION. The plate current is read from the meter on the front of the transmitter.

NORMAL CONDITION. The plate current in STANDBY position is normal if the meter reads zero milliamperes (ma). The current should never be more than zero milliamperes.

LOG ENTRY. Enter on the log sheet the current to the nearest 1/10 milliampere. If the reading is not zero, place an asterisk (*) after the log entry and make an entry under NOTES.

HOW TO OBTAIN THE INFORMATION. Turn the STANDBY OPERATE switch to the STANDBY position. Hold the VOLTAGE CURRENT switch in the CURRENT position and read the meter (fig. 98).

CORRECTIVE MEASURES. If the current is other than zero, use the corrective measures suggested in item 21.

REMARKS. Draw a line through this item when using the log sheet with Radio Equipment RC–148–C.

REFERENCES.

Page ( ) ( ) ( ) ( )
Paragraph ( ) ( ) ( ) ( )
TM 11– ( ) ( ) ( ) ( )

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SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
22	0740	Current 5 Ma. Bias insufficient. Notified person in charge. E.C.C.
	15 Jan	

110. Item 23—Bias Adjustment (Standby) (C)

SAMPLE ENTRY.

23. Bias Adjustment (Standby) (C) [1] ( ) (Ma.)	1	1	4*

LOCATION. This current is read from the meter on the front of the receiver-transmitter unit. The BIAS control is also located on this unit.

NORMAL CONDITION. The bias adjustment is correct if the reading in STANDBY position is one milliampere (ma).

LOG ENTRY. Enter on the log sheet the reading of the meter to the nearest 1/10 milliampere. If abnormal follow the entry with an asterisk (*) and make an entry under NOTES.

HOW TO OBTAIN THE INFORMATION. Turn the STANDBY OPERATE switch to the STANDBY position. Hold the TEST SWITCH in the I_c position and read the meter (fig. 99).

CORRECTIVE MEASURES.

a. Check the adjustment of the BIAS control.

b. If adjustment of the bias does not correct the fault, notify the person in charge.

REMARKS. Draw a line through this item when using the log sheet with either Radio Equipment RC–148 or RC–148–B.

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
23	2000	Current reading 4 Ma. Adjusted bias and reading was 1 Ma. M.F.
	12 Sept	

111. Item 24—Modulator Cathode Current (C)

SAMPLE ENTRY.

24. Modulator Cathode Current (C) [4–7] ( ) (Ma.)	5	5	8*

LOCATION. This current is read from the meter on the front of the receiver-transmitter.

NORMAL CONDITION. The modulator cathode current is normal if the reading is between 4 and 7 milliamperes (ma).

LOG ENTRY. Enter in the log space the reading of the meter to the nearest 1/10 milliampere. If abnormal place an asterisk after the log entry and make an entry under NOTES.

HOW TO OBTAIN THE INFORMATION. Turn the STANDBY OPERATE switch to the OPERATE position. Hold the TEST SWITCH in the I_c position and read the meter (fig. 99).

CORRECTIVE MEASURES.

a. Check item 25, pulse width.

b. If item 25 is normal and the reading is still abnormal, notify the person in charge.

REMARKS. Draw a line through this item when using the log sheet with either Radio Equipment RC–148 or RC–148–B.

REFERENCES.

Page ( ) ( ) ( ) ( )
Paragraph ( ) ( ) ( ) ( )
TM 11– ( ) ( ) ( ) ( )

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
24	0600	Current reading too high. Adjusted pulse width and remedied faulty
	17 Dec	condition. P.J.F.

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112. Item 25—Pulse Width

SAMPLE ENTRY.

25. Pulse Width [1280] ( ) (Yd.)	1280	1280	2000*

NORMAL CONDITION. The pulse is normal if it is approximately 1280 yards wide.

LOG ENTRY. Enter the width of the pulse, as measured on the range dial of the SCR–268–(*), to the nearest yard (yd). If the width is incorrect place an asterisk (*) after the log entry and make an entry under NOTES.

HOW TO OBTAIN THE INFORMATION.

a. Radio Equipment RC–148 or RC–148–B.

(1) Turn the SELECTOR switch to either position 4 or 5, and the TEST switch to position 5 (fig. 96).

(2) Hold the SIGNAL WIDTH POWER switch in the SIGNAL WIDTH position. A pulse should appear on the screen of the SCR–268 or the SCR–268–B range oscilloscope (fig. 72).

(3) Adjust the SWEEP CONTROL on the oscilloscope until the baseline is about 4 inches long. The pulse width at the base should be approximately ¼ inch, which corresponds to a distance of 1280 yards.

(4) An alternative method of measuring the pulse width is given in paragraph 53.

b. Radio Equipment RC–148–C. Follow the same steps as given above, except, instead of step (2), hold the TEST SWITCH on the receiver-transmitter unit in the P.O. position (figs. 99 and 72, par. 68).

CORRECTIVE MEASURES. If the pulse width is abnormal on RC–148–C check the adjustment of the WIDTH control. In the case of RC–148 or RC–148–B, notify the person in charge.

REMARKS. This item applies to all models of the RC–148, but the method of obtaining information for RC–148–C is different from that used for RC–148 and RC–148–B. Both methods are given above.

REFERENCES.

Page	( )	( )	( )	( )
Paragraph	( )	( )	( )	( )
TM 11–	( )	( )	( )	( )

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
25	0700	Pulse width too wide. Notified person in charge. C.A.M.
	12 May	

113. Item 26—Power Output (A and B)

SAMPLE ENTRY.

26. Power Output (A and B) [½ or more] ( ) (Ratio)	½	½	1/3*

NORMAL CONDITION. The power output is normal if the pulse is at least one half as high as the calibrating voltage.

LOG ENTRY. Enter in the log space the height of the output pulse as compared with the calibration voltage.

a. Turn the SELECTOR switch to either position 4 or 5.

b. Turn the TEST switch to position 4, the calibration pattern should appear on the scope screen.

c. Turn the TEST switch to position 5 and leave the SIGNAL WIDTH POWER switch in the POWER position. Compare the height of the pulse obtained with the height of the voltage seen in step *b* above (figs. 80, 81, and 82).

CORRECTIVE MEASURES.

a. Check tuning of the capacitor at the rear of the transmitter (par. 57).

b. If the output is still abnormal, notify the person in charge.

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REMARKS. Draw a line through this item when using the log sheet with Radio Equipment RC–148–C.

REFERENCES.
Page ( ) ( ) ( ) ( )
Paragraph ( ) ( ) ( ) ( )
TM 11– ( ) ( ) ( ) ( )

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
26	1700	Power output below normal. Adjusted capacitor and remedied fault.
	25 Nov	C.A.F., Jr.

114. Item 27—Power Output (C)

SAMPLE ENTRY.

27. Power Output (C) [1] ( ) (kw.)	1	1	.5*

LOCATION. The power output of the RC–148–C is read directly from the meter on front of the receiver-transmitter unit.
NORMAL CONDITION. The power output is normal if it is 1 kilowatt.
LOG ENTRY. Enter the meter reading to the nearest 1/10 kilowatt (kw). If it is abnormal place an asterisk after the log entry and explain under NOTES.
HOW TO OBTAIN THE INFORMATION.

a. Turn the SELECTOR switch to either position 4 or 5, and the TEST switch to position 5.

b. Throw the transmitter TEST SWITCH to the P.O. position. The pulse should appear on the range scope of the SCR–268–(*) (fig. 80).

c. Turn the POWER MEASUREMENT control clockwise until the pulse just disappears, and read the power on the meter (fig. 99).
CORRECTIVE MEASURES.

a. Check the adjustment of the POWER OUTPUT control (par. 67).

b. If the POWER OUTPUT control does not correct the condition, notify the person in charge.
REMARKS. Draw a line through this item when using the log sheet with Radio Equipment RC–148 and RC–148–B.
REFERENCES.
Page ( ) ( ) ( ) ( )
Paragraph ( ) ( ) ( ) ( )
TM 11– ( ) ( ) ( ) ( )

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
27	1500	Power output low. Increased to 1 kw with POWER OUTPUT con-
	29 Mar	trol. P.J.F.

115. Item 28—Frequency Check

SAMPLE ENTRY.

28. Frequency Check [1] ( ) (Mc.)	166	166	167.5*

NORMAL CONDITION. The frequency is normal if it is within 1 megacycle of the assigned frequency.
LOG ENTRY. Enter the measured frequency to the nearest 1/10 megacycle (mc).
HOW TO OBTAIN THE INFORMATION.

a. Radio Equipment RC–148 or RC–148–B. Check the frequency of the transmitter with the wavemeter. This procedure is described in paragraph 54.

b. Radio Equipment RC–148–C. Check the frequency of the transmitter with Signal Generator I–222–A. Instructions for checking frequency with the signal generator are given in paragraph 65.

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CORRECTIVE MEASURES.

a. RADIO EQUIPMENT RC–148 AND RC–148–B. Adjust the VERNIER TUNING on the front of the transmitter (fig. 77).

b. RADIO EQUIPMENT RC–148–C. Adjust the TRANSMITTER TUNING control on the front of the receiver-transmitter unit (fig. 99).

c. If the transmitter cannot be tuned to the correct frequency, notify the person in charge.

REMARKS. This item applies to all models of Radio Equipment RC–148, but the method of obtaining information and the corrective measures are different for each model. Instructions for all models are given above.

REFERENCES.

Page	( )	( )	( )	( )
Paragraph	( )	( )	( )	( )
TM 11–	( )	( )	( )	( )

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
28	1800	Frequency high. Adjusted vernier tuning and obtained correct fre-
	13 Feb	quency. W.F.M.

116. Item 29—Antenna Tuning (C)

SAMPLE ENTRY.

29. Antenna Tuning (C). [ ] ( ) (OK–N*)	OK	OK	N*

LOCATION. The ANT. TUNE control is located on the front of the receiver-transmitter unit.

NORMAL CONDITION. The antenna tuning is normal if the power output is at a maximum.

LOG ENTRY. Enter OK if the antenna tuning is normal; otherwise enter N* and make an entry under NOTES.

HOW TO OBTAIN THE INFORMATION.

a. Throw the TEST SWITCH to the P.O. position.

b. Unlock the ANT. TUNE control and vary it slightly. If the antenna tuning is correct the meter reading should decrease when the control is varied (fig. 99).

c. Relock the ANT. TUNE control.

CORRECTIVE MEASURES. If the antenna tuning is abnormal, adjust the ANT. TUNE control for maximum reading of the meter.

REMARKS. Draw a line through this item when using the log sheet with Radio Equipments RC–148 or RC–148–B.

REFERENCES.

Page	( )	( )	( )	( )
Paragraph	( )	( )	( )	( )
TM 11–	( )	( )	( )	( )

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
29	1900	Antenna tuning abnormal. Adjusted ANT. TUNE control. F.M.W.
	25 Aug	

117. Item 30 (Blank)

118. Item 31—Receiver Ser. ( )

SAMPLE ENTRY.

31. RECEIVER Ser. (45) [ ] ( ) ( )

LOG ENTRY. In the first parenthesis to the right of the item title, enter the serial number of the receiver. If the log sheet is being used with the RC–148–C, enter the serial number of the receiver transmitter.

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119. Item 32—Receiver Tuning (X)

SAMPLE ENTRY.

32. Receiver Tuning (X) [ ] ( ) (OK–N*)	OK	OK	N*

NORMAL CONDITION. The frequency adjustment of the receiver is normal if it is tuned to the assigned frequency.
LOG ENTRY. Enter OK if the condition is normal; otherwise enter N* and explain under NOTES.
HOW TO OBTAIN THE INFORMATION.

a. Check the receiver tuning of RC–148 and RC–148–B with the wavemeter as described in paragraph 56.

b. Use the signal generator to check the tuning of RC–148–C. Instructions for tuning RC–148–C receiver are given in paragraph 66.

CORRECTIVE MEASURES. If the receiver is not tuned to the transmitter frequency, record the condition in the Work-To-Be-Done section. Retune the receiver at the next shut-down period.
REFERENCES.

Page	( )	( )	( )	( )
Paragraph	( )	( )	( )	( )
TM 11–	( )	( )	( )	( )

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
32	1720 15 May	Receiver was off frequency. Made note in W.T.B.D. Section. C.A.M.

120. Item 33—Receiver Output (X)

SAMPLE ENTRY.

33. Receiver Output (X) [ ] ( ) (OK–N*)	OK	OK	N*

NORMAL CONDITION. The receiver output is normal when the receiver grass and transmitter pulse are seen on the screen of the SCR–268–(*) range scope.
LOG ENTRY. Enter OK if the receiver output is normal; enter N* if it is abnormal.
HOW TO OBTAIN THE INFORMATION. Turn the SELECTOR switch to position 4 or 5, and TEST switch to position 7 for RC–148 and RC–148–B, and to position 5 for RC–148–C (figs. 96 and 97). Observe the pattern on the scope. It may be necessary to decrease the GAIN to see the transmitted pulse clearly.
CORRECTIVE MEASURES. If the transmitter is working and no pulse is seen, retune the receiver. If no grass is seen notify the person in charge.
REFERENCES.

Page	( )	( )	( )	( )
Paragraph	( )	( )	( )	( )
TM 11–	( )	( )	( )	( )

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
33	1500 12 July	No grass seen. Notified person in charge. C.A.M.

121. Item 34 (Blank)

122. Item 35—Operating Condition

SAMPLE ENTRY.

35. Operating Condition [ ] ( ) (OK–N*)	OK	OK	N*

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NORMAL CONDITION. The normal condition is the satisfactory operation of all components in use. The identification equipment in general, is normal if;

a. The pilot lights and dial lights on all components are glowing.

b. The tuning eyes on the receiver and wavemeter glow with normal brilliancy, and are firmly seated in position.

c. All toggle switches on all components are working smoothly and effectively.

d. All controls work smoothly and without binding.

LOG ENTRY. Enter OK in the log space if the condition of the operating components is normal. If not normal enter N*.

HOW TO OBTAIN THE INFORMATION. Observe the general condtion of the identification equipment while checking the other items on the log.

CORRECTIVE MEASURES.

a. If an indicator light is out, replace the bulb.

b. If any faults are found that cannot be corrected without interfering with the operation of the equipment, make an entry in the Work-To-Be-Done section.

REFERENCES.

Page	( )	( )	( )	( )
Paragraph	( )	( )	( )	( )
TM 11–	( )	( )	( )	( )

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
35	1750	Red pilot light on interconnector was out. Replaced bulb with new
	20 Nov	one. C.A.M.

123. Item 36—System Sensitivity

SAMPLE ENTRY.

36. System Sensitivity (Az. 9° Ra. 7 Mi. S. Mark) [80–100] ( ) (%)	85	90	70*

NORMAL CONDITION. The system sensitivity is normal if the height of the echo observed is at least 80 percent of the height of the standard reference echo.

LOG ENTRY. Enter in the first parenthesis to the right of the item title, the known azimuth range of the fixed reference target and the setting of the GAIN control designated by the person in charge. Enter in the second parenthesis, in inches, the standard height of the reference echo for the designated GAIN control setting. Enter in the log space the height of the observed echo in percentage of the standard echo height for the same setting.

HOW TO OBTAIN THE INFORMATION. Locate the fixed target and set the GAIN control at the designated setting. Note the height of the echo.

CORRECTIVE MEASURES.

a. Check item 32.

b. If item 32 is normal and the system sensitivity is below normal notify the person in charge.

REMARKS.

a. Since the receiver GAIN control on this equipment has no calibration, the person in charge should mark the setting used for checking the system sensitivity.

b. If there is no fixed target at the site to check this item, draw a line through the log space.

REFERENCES.

Page	( )	( )	( )	( )
Paragraph	( )	( )	( )	( )
TM 11–	( )	( )	( )	( )

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
36	1300	System sensitivity low. Found receiver tuning abnormal. Made note in
	20 May	W.T.B.D. section for receiver tune-up. F.M.W.

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124. Item 37—Signal-to-Noise Ratio

SAMPLE ENTRY.

37. Signal-to-Noise Ratio [25%] (3/1) (Ratio)	3/1	3/1	1/1*

NORMAL CONDITION. The signal-to-noise ratio is normal if the variation is not more than 25 percent from the ratio designated by the person in charge.

LOG ENTRY. Enter in the first parenthesis the ratio between the height of the normal reference signal and the height of the acceptable noise or grass as decided upon by the person in charge. Enter in the log space the observed ratios. If the ratio is abnormal place an asterisk (*) after the log entry and make an entry under NOTES.

HOW TO OBTAIN THE INFORMATION. Locate the same target that was used in item 36 and note the height of the echo and grass.

CORRECTIVE MEASURES. If the ratio is abnormal, notify the person in charge.

REFERENCES.

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

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
37	1400 25 Oct	Noise level too high. Notified person in charge. F.M.W.

125. Item 38 (Blank)

126. Item 39—Log Finishing Time

SAMPLE ENTRY.

39. Log Finishing Time [ ] ( ) (Hr.-Min.)	1030	0645	1430*

LOG ENTRY. Enter the log finishing time in hours and minutes, using the 24-hour system. If, for any reason, the log cannot be finished, enter the time with an asterisk (*) and explain under NOTES.

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
39	1430 20 May	Station ordered to shut down immediately. Could not finish taking log. C.A.M.

127. Item 40—Operating Time, On

SAMPLE ENTRY.

40. Operating Time, On (Hr.-Min.)		0600

LOG ENTRY. Enter the time, according to the 24-hour system, at which the equipment is put into operation after each shut-down. If it is in continuous operation, enter the time each day at which the first crew comes on duty. There are four columns for each day's operation, providing sufficient space for entries if the set is not turned on more than four times. If additional space is needed, make additional entries under NOTES.

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128. Item 41—Operating Time, Off

SAMPLE ENTRY.

41. Operating Time, Off	(Hr.-Min.)	1800

LOG ENTRY. Enter the time, according to the 24-hour system, at which the station is shut down. If operation ends at midnight, enter 2400 and not 0000. Place the time the set is turned off directly under the time (item 40) it was last turned on. If additional space is required, make further entries under NOTES.

129. Item 42—Operating Time, Total

SAMPLE ENTRY.

42. Operating Time, Total	(Hr.-Min.)	12:00

LOG ENTRY. Determine the amount of time the station has been on the air prior to the last shut-down. This figure can be computed from the values in items 40 and 41. Enter the total elapsed time in hours and minutes in the space provided for each of the periods of operation. If there have been more than four such periods, make further entries under NOTES. If there have been three or less periods of operation for the day, the fourth column can be used as the total hours of operation for the day, adding the entries for the separate periods of operation.

130. Item 43—Break-Down Time, Total

SAMPLE ENTRY.

43. Break-down Time, Total	(Hr.-Min.)	2:30

LOG ENTRY. Enter the time spent in repairing each break-down for the day. Make an entry under NOTES each time a break-down occurs, explaining what happened each time, what the cause was, and what corrective measures were taken. If more than four break-downs occur during the day, the time spent in repairing the fault must be entered under NOTES.

SAMPLE ENTRY UNDER NOTES.

Item	Time and Date	NOTES
43	0950	Transmitter inoperative. Replaced high-voltage rectifier. C.A.J.
	16 Apr	

131. Item 44—3-Day Summary

The technician in charge during the last shift of the 3-day period is to fill in items 45 and 46. These items provide a summary for the cumulative items of the log sheet. No entry is to be made in item 44.

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132. Item 45—Hours of Operation

SAMPLE ENTRY.

45. Hours of Operation	(Hr.-Min.)	64:00

LOG ENTRY. Find the total amount of time the station has been operating during the three-day period from the entries in item 42 during the entire period. Make an entry in hours and minutes.

133. Item 46—Break-Down Time

SAMPLE ENTRY.

46. Break-down Time	(Hr.-Min.)	4:25

LOG ENTRY. Find the total amount of time spent for break-down repairs during the entire period, from the entries in item 43. Enter the value in the log space, giving hours and minutes.

134. Item 47 (Blank)

135. Item 48 (Blank)

136. Item 49 (Blank)

137. Item 50 (Blank)

138. Items 51–56, Signature of Person Keeping Log

SAMPLE ENTRY.

51.	SIGNATURE OF PERSON KEEPING LOG			
52. Signature	53. Rank	54. Date	55. On	56. Off
Philip Finn	T/4	2/29	0600	1200

LOG ENTRY. Enter the signature of the technician keeping the log (52). Signature is to be entered when he reports for duty. The rank of the technician is to be entered in item 53. Enter the date (54). Enter the time (24-hour system) the technician comes on duty (55) and the time (24-hour system) that he goes off duty (56).

139. Item 57—Sheet No. In the space provided at the lower right corner of the sheet, enter the number of the log sheet.

140. How to Fill in Back of Log

a. HEADING, ITEMS I TO VI. Fill in the heading at the start of each new log sheet. Items I, III, IV, and V may be taken from the corresponding items on the front of the log sheet. Information for items II and VI may be obtained from the person in charge.

b. SECTION A, NOTES. When an asterisk (*) is used on the front of the log sheet, indicating an abnormal condition, give the following information under NOTES in section A.

(1) The item number.

(2) The time and date the abnormal condition was found.

(3) A description of the condition together with the cause.

(4) What was done about it.

(5) Initials of the technician making the note.

c. SECTION B, COMPONENT RECORD. (1) General. Fill in section B whenever a component is removed and whenever a component is installed. No entries

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are required in spaces blanked out by diagonal rulings. Entries for the component removed are to be made on one of the three lines marked TAKEN OUT: A, B, and C. Entries for the components installed are to be made on one of the three lines marked PUT IN: A, B, and C. Some examples of components are: transmitter, receiver, interconnector, and power supply.

(2) *Columns 1 to 4.* Record the name, type, serial and order numbers of each component—the component TAKEN OUT and the component PUT IN. Find the *name, type, serial number,* and *order number* on the nameplate of the component.

(3) *Column 5—Service dates, in.* In column 5 enter the date that the component TAKEN OUT was originally installed. Find the date of the original installation in the station records. In the case of a component PUT IN, simply enter the date on which the installation was made.

(4) *Column 6—Service dates, out.* In this space record the date that the component is taken out.

(5) *Column 7—Hour meter readings, in.* In this space enter the hour meter reading at the time the component TAKEN OUT was originally placed in service. Get the information from the Station Record Book. In the case of a component being PUT IN, simply enter the hour meter reading at the time the installation is made. This hour meter is located on the front panel of the SCR-268-(*) high-voltage rectifier.

(6) *Column 8—Hour meter readings, out.* In column 8 enter the hour meter reading at the time the component is TAKEN OUT. This reading is usually the same as that entered in the PUT IN space in column 7.

(7) *Column 9—Hour meter readings, total.* In column 9, record the total time the component TAKEN OUT has been in use. To get this figure, subtract the time recorded in column 7 from the time recorded in column 8. Enter the difference in column 9.

(8) *Column 10—Reason for removing component.* In this space, explain briefly why the component was removed. For example, it may have failed or it may have been running below optimum performance, or it may have been removed for inspection or servicing.

(9) *Column 11—Disposition of removed component.* In this space, explain exactly what was done with the component after it was removed.

(10) *Column 12—Work done by.* This space is provided for the signature of the technician who removed or installed the component.

d. Section C—Part Record. (1) *General.* Fill in section C whenever a part or tube is *removed* or *installed.* In addition enter all repairs made on spare equipment. No entries are required in spaces blanked out by diagonal rulings. Entries for a part or tube which has been *removed* are to be made on one of the three lines marked TAKEN OUT: A, B, and C. Entries for a part or tube *installed* are to be made on one of the three lines marked PUT IN: A, B, and C. The description of a part or tube entered on line A, B, or C in column 1 through 10 must be continued on the corresponding line in column 11 through 22.

(2) *Column 1 to 4.* Record the *name, type, serial number,* and *order number* of the component from which the part or tube was removed or in which the part or tube was installed. Find this information on the nameplate or in the Station Record Book.

(3) *Column 5—Schematic part number.* In column 5 write down the schematic part number of the part or tube PUT IN or TAKEN OUT. Find this number from the schematic drawing of the component concerned or on the part itself.

(4) *Column 6—Name of part.* In this space record the name of the part PUT IN or TAKEN OUT. Find the name of the part on the schematic of the component concerned.

(5) *Column 7—Description of part.* In this space give a brief description of the part PUT IN or TAKEN OUT. Some of this information may be obtained from the parts list. Additional information may be found on the part itself. In this description of the part the name of the manufacturer, the manufacturer's type or catalogue number, the electrical rating of the part, its size, etc., must be included.

(6) *Column 8—Function of part and location from schematic.* In this column enter the function of the part or tube PUT IN or TAKEN OUT and its location. In describing the location of electrical parts, locate them in relation to other parts or tubes with which they are associated. Example: first i-f plate-load resistor, bypass capacitor in first r-f.

(7) *Column 9—New, used or rebuilt.* Tell whether the part or tube which has been PUT IN is new, used, or rebuilt.

(8) *Column 10—Disposition of part taken out.* Tell exactly what was done with the part or tube after it was removed. Example: part destroyed, returned to depot, repaired for spare, etc.

(9) *Column 11—Service dates, in.* In column

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11 enter the date that the part or tube TAKEN OUT was originally installed. Find the date of the original installation in the Station Record Book. In the case of a part or tube being PUT IN, simply enter the date on which the installation is made.

(10) *Column 12—Service dates, out.* In this space record the date on which the part or tube is TAKEN OUT.

(11) *Column 13—Hour meter readings, in.* In this space enter the hour meter reading at the time the part or tube TAKEN OUT was *originally* placed in service. Find this reading in the Station Record Book. In the case of a part or tube being PUT IN, simply enter the hour meter reading at the time the installation is made. This hour meter is located on the front panel of the SCR–268–(*) high-voltage rectifier.

(12) *Column 14—Hour meter readings, out.* In column 14 enter the hour meter reading at the time the part or tube is taken out.

(13) *Column 15—Hour meter readings, total.* Under total in column 15, record the total time the part or tube TAKEN OUT has been in use. To get this figure, subtract the time in column 13 from the time in column 14. Enter the difference in column 15.

(14) *Column 16—Spares at set.* In column 16 give the number of spares of the part or tube PUT IN that are on hand at the set after the installation is made.

(15) *Column 17—Where did you get the part?* Answer this question as clearly as possible. Find out where the part PUT IN came from and explain in the space provided. Example of entries that might be made are: had part here at set; from Lexington Signal Depot; from another set in this area.

(16) *Column 18—Symptom of failure.* In the case of a part or tube failure, describe the first indications that the part or tube was faulty. Symptoms are first evidences of trouble and usually can be detected through the senses of sight, smell, hearing, or touch. Some examples are: abnormal meter reading, the odor of burning insulation, smoke, the hissing noise of an arc, and the heat of an overloaded part.

(17) *Column 19—Fault.* In this space describe exactly what fault developed in the part or tube that was removed. Some examples of vacuum-tube faults are: open filament, low emission, shorted elements, gassy tube, and microphonic tube. Some examples of electrical faults are: dielectric leak, dielectric break-down, insulation break-down, open circuit, short circuit, arcing, and sticking contacts. Some mechanical faults are: a broken, bent or cracked part, frayed leads, frozen bearings, and stripped threads. This column refers only to a part or tube that has been TAKEN OUT.

(18) *Column 20—What caused the fault?* In column 20 explain what caused the fault to occur, using additional space in section A if necessary. Describe any external condition which may have contributed to the fault. Indicate the first or primary cause if it is known. Some examples of causes of faults are: wear and tear in operation, shelf wear, excessive heat, excessive current (overload), high humidity, careless handling, lack of lubrication, improper operation, corrosion, excessive strain, improper adjustment, defective material, accidental damage, error in wiring, lack of ventilation, failure of some other part, and loose connections.

(19) *Column 21—Action taken and results.* In this column describe what was done about the fault. In adddition, explain briefly what results were obtained.

(20) *Column 22—Work done by.* The technician who performed the repair or replacement will sign his name in this column.

e. SECTION D. REMARKS. The daily operation of this equipment is of significant interest to numerous agencies. The interested personnel include engineers in the development laboratories, manufacturers of equipment, and those associated with the actual use of the apparatus. Few of these personnel, however, have the opportunity of continuous observation or operation of the equipments under field conditions. Those closest to the apparatus are the men actually in the field. Since they are in daily contact with equipment, operators and maintenance men cannot help but discover weaknesses in equipment design and inconveniences in operation. Such information is of no value unless it reaches the proper agencies which can initiate the necessary steps for correction. No suggestion or idea is considered too trivial. These ideas or suggestions should be submitted to the unit radar officer. If these are considered suitable and proper authority so directs, the radar officer can make the necessary entries in the space provided in section D. If a component or part is found to be faulty because of damage in transit, handling at the station, or defective manufacture, enter this information as a REMARK in section D.

f. SHEET NUMBERS. Enter the sheet number at the bottom right-hand corner. This number must be the same as the number on the front of the log.

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CHAPTER 5

CONVERSION FOR TRAVEL

Section I. DISASSEMBLY OF RADIO EQUIPMENTS RC–148 AND RC–148–B FOR TRAVEL

141. Removal of Interconnecting Cords

a. Disconnect and remove all interconnecting cables.

b. Stow the cables in Chest CH-141.

142. Removal of Antenna AN–128–A

a. Remove the wingnuts, split lockwashers, hex bolts, and conical reducing bushings from the four lifting lugs of Transmitter BC-407-A.

b. Carefully lower the antenna to the ground, and fasten it with 4 clamps to the plywood base provided, as shown in figures 100, 101, and 102.

143. Removal of Antenna Matching Section MC–295–A

a. Remove the hex nuts that fasten Antenna Matching Section MC-295-A to the mounting bracket. The nuts do not come loose from the mounting bracket.

b. Remove the antenna matching section and stow it in Chest CH-141.

144. Removal of Receiver BC–1068–A

a. Remove the two ¼-inch wingnuts from the stud bolts protruding through the locking bracket of the receiver case.

b. Slide the receiver forward until the stud bolts no longer protrude through the locking bracket.

c. Lift the receiver out of the mounting brackets.

d. Stow Receiver BC-1068-A in Chest CH-143.

145. Removal of Transmitter BC–1072–A

a. Remove the two ¼-inch wingnuts from the stud bolts protruding through the holes in the locking bracket at the rear.

b. Holding the transmitter by the folding handles on the sides, slide it in the direction of the operators' seats until the stud bolts no longer protrude through the holes. Hold the transmitter carefully, for at this point it drops out of the mounting brackets.

c. Lower the transmitter carefully and stow it in Chest CH-144.

146. Removal of Mounting Brackets FT–358

a. Using a 7/16-inch socket wrench, remove the ⅜-20 x 1⅛" hex bolts which hold the tie bar in place, and remove the tie bar.

b. Loosen the two captive screws that tighten the split clamps around the footrail of Radio Set SCR-268-B. Open the split clamps and remove the mounting brackets.

c. Stow Mounting Brackets FT-358 in Chest CH-141.

147. Removal of Control Unit BC–1073–A

Lift the control unit off the oscilloscope shelf and stow it in Chest CH-142.

Section II. STORAGE OF CHESTS CONTAINING RADIO EQUIPMENT RC–148–B

NOTE. No provision is made for the storage and transportation of Radio Equipment RC–148 and RC–148–C. Transportation facilities will have to be furnished by the Arm using the equipment.

148. Storage of Radio Equipment RC–148–B Chests and Antenna in Radio Set SCR–268–B Vans

During travel all the chests are stored in the rectifier truck and the work truck.

a. The chests that go into the rectifier truck are two Chests CH-142. The IFF antenna goes into the rectifier truck.

b. The chests that go into the work truck are Chests CH-160, CH-143, CH-154, CH-141, and two Chests CH-144.

c. The positions in which the chests and antenna are stowed in the vans will differ, depending on the serial number of the radar unit.

(1) If the serial number of Radio Set SCR-268-B

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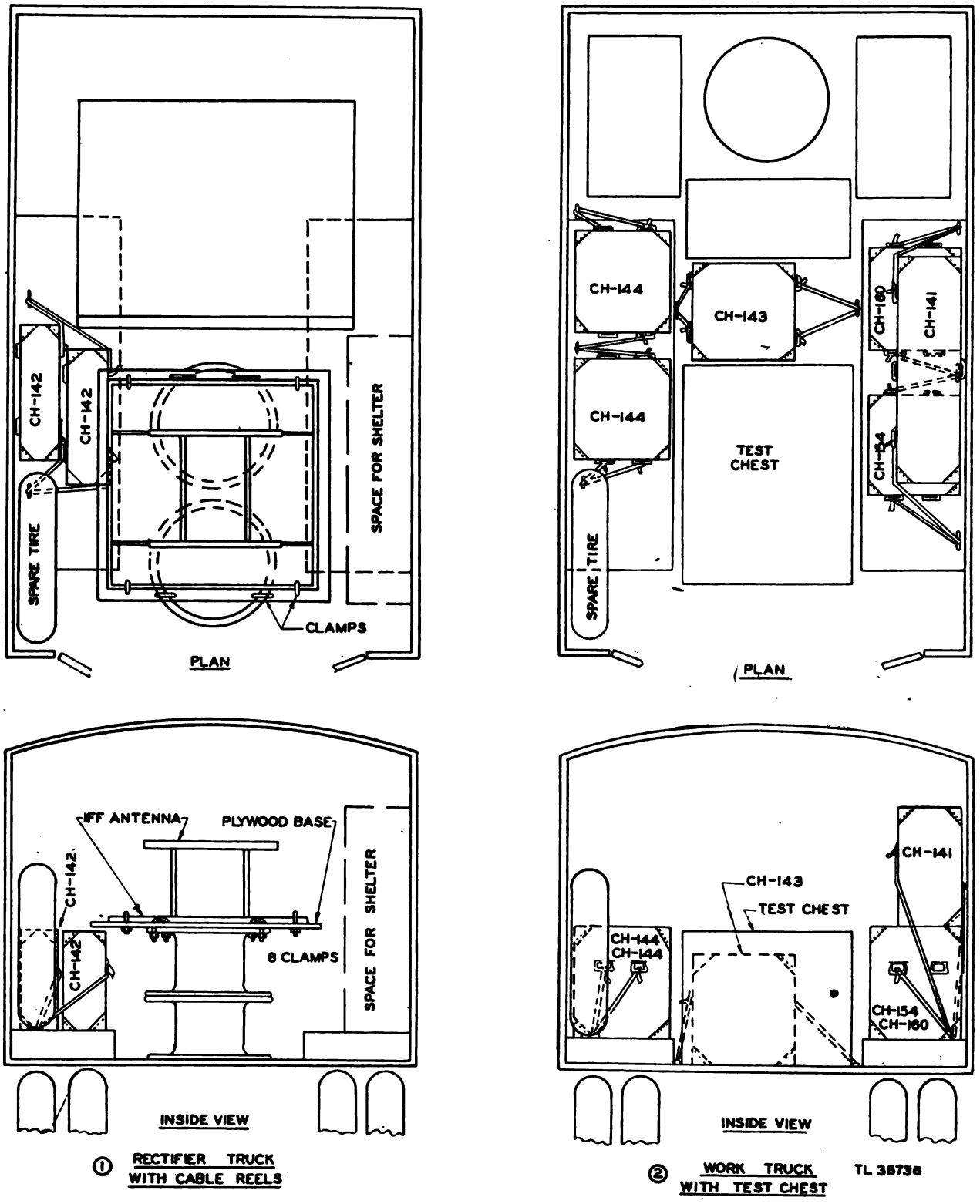

Figure 100. Storage of IFF components in Radio Set SCR-268-B vans with serial numbers from 1 to 600.

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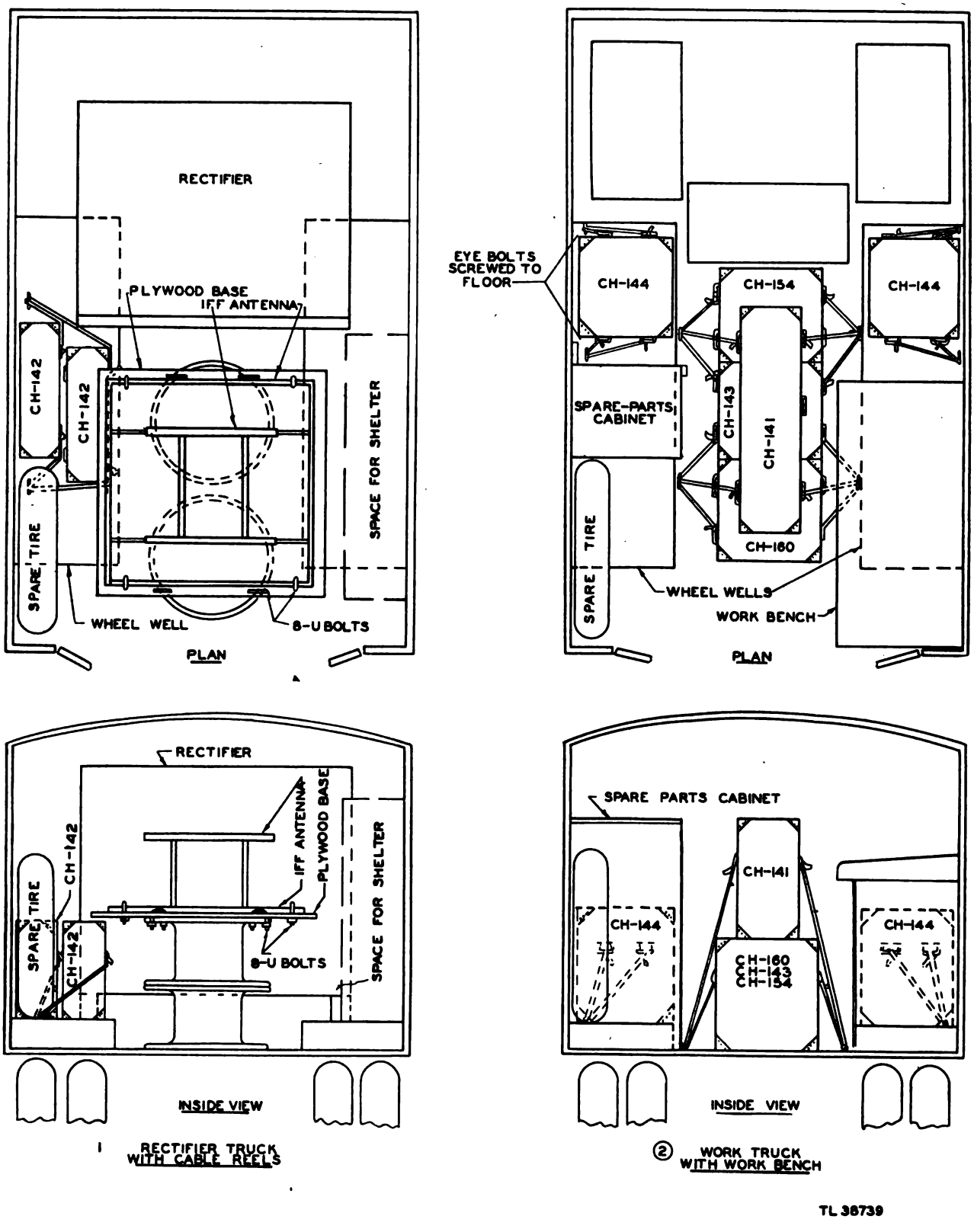

Figure 101. Storage of IFF components of Radio Set SCR-268-B vans with serial numbers from 600 to 1100.

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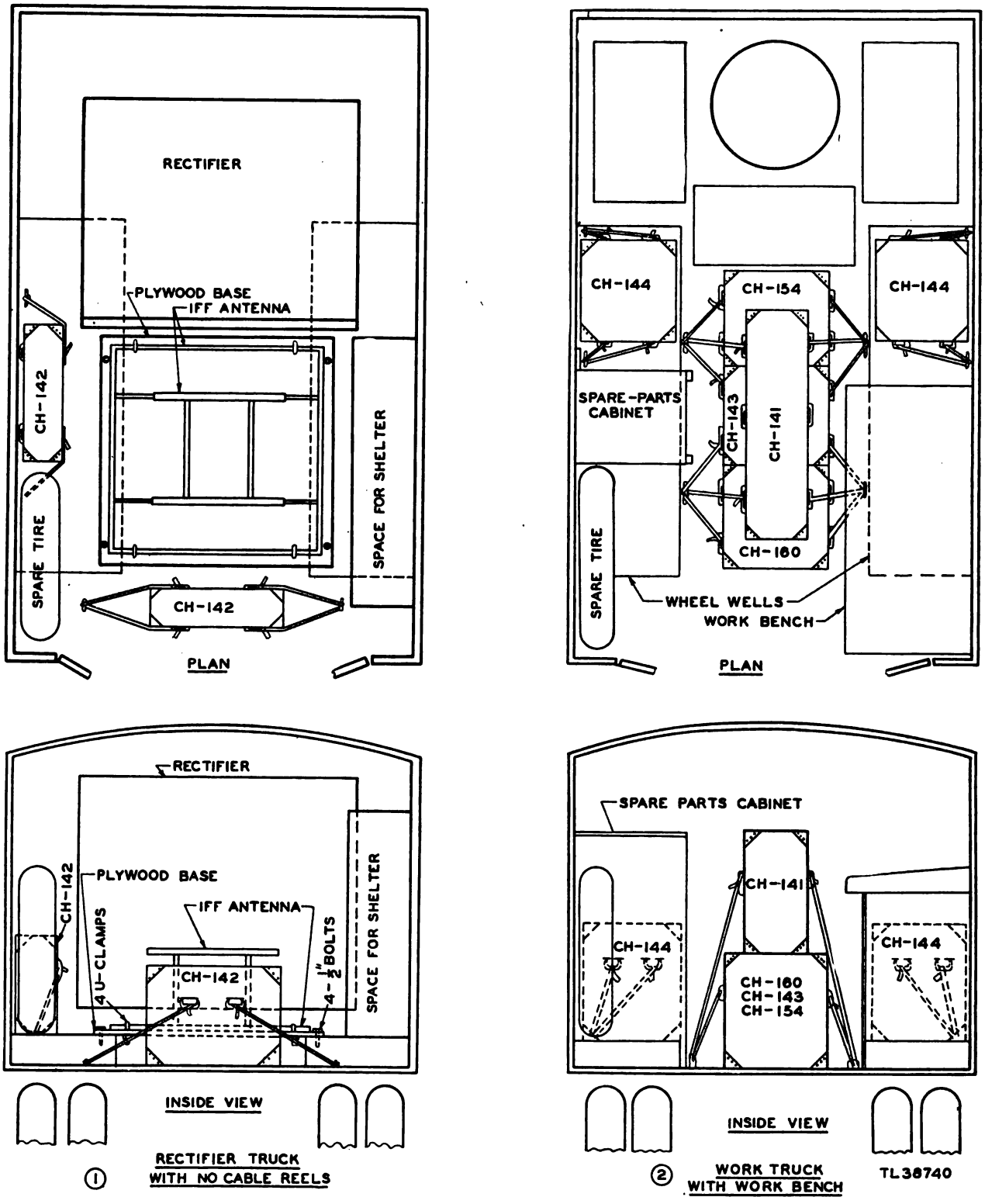

Figure 102. Storage of IFF components of Radio Set SCR-268-B vans with serial number higher than 1100.

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is from 1 to 600, the chests and Antenna AN-128-A will be stored in the vans as shown in figure 100.

(2) If the serial number of Radio Set SCR-268-B is from 600 to 1100 the chests and Antenna AN-128-A will be stored in the vans as shown in figure 101.

(3) If the serial number of Radio Set SCR-268-B is higher than 1100 the chests and Antenna AN-128-A will be stored in the vans as shown in figure 102.

1—Hold-down equipment consists of rope, hooks, and rope tighteners supplied in kits, as made by the Evans Products Co., Detroit, Michigan.

2—Hold-down equipment attaches to handles of cases and eyebolts screwed into the floor of trucks.

3—IFF antenna attaches to plywood base which clamps to top of cable reels.

Table I. Weights and dimensions of carrying cases for Radio Equipment RC-148-B.

Case	Weight (lb.)	Dimensions (in)		
		Length	Width	Height
CH-144	243	23	22	25¾
CH-154	226	23	22	25¾
CH-143	259	23	22	25¾
CH-160	139	23	22	25¾
CH-142	150	30¾	9⅜	22
CH-141	295	51	14	27

Section III. DISASSEMBLY OF RADIO EQUIPMENT RC-148-C

149. Removal of Interconnecting Cords

a. Disconnect and remove all interconnecting cables.

b. Stow the cables in Chest CH-236.

150. Removal of Antenna AN-128-A

a. Remove the wingnuts, split lockwashers, hex bolts, and conical reducing bushings from the four lifting lugs of Transmitter BC-407-A.

b. Carefully lower the antenna to the ground.

151. Removal of Rack FM-82

Before removing the rack from the mounting brackets, the chassis of Radio Receiver and Transmitter BC-1267-A may be removed in order to lighten the rack assembly.

a. Remove the mounting screws on the front panel of Radio Receiver and Transmitter BC-1267-A.

b. Pull the receiver and transmitter unit forward and remove it from the rack.

c. Remove the two anchor pins from the rear of the rack.

d. Slide the rack backwards on the mounting brackets, lift it off, and place it on the mount platform. Use sufficient manpower for this operation, as the rack assembly is heavy.

e. Replace Radio Receiver and Transmitter BC-1267-A in Rack FM-82.

f. Stow Rack FM-82 in Chest CH-235.

152. Removal of Interconnector BC-1298

Lift Interconnector BC-1298 off the oscilloscope shelf and stow it in Chest CH-236.

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