TM 11-5820-672-12

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE MANUAL

RADIO SETS AN/GRC-158 AND AN/MRC-117

This copy is a reprint which includes current pages from Changes **No. 1.**

HEADQUARTERS, DEPARTMENT OF THE ARMY
1967

Change
No. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., *17 July 1973*

Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools List RADIO SETS AN/GRC-158 AND AN/MRC-117

TM 11-5820-672-12, 18 April 1967, is changed as follows:

1. New or changed material is indicated by a vertical bar in the margin opposite the changed material.
2. Remove old pages and insert new pages as indicated below:

Remove pages	*Insert pages*
i and ii	i and ii
1-1 through 1-4	1-1 through 1-4
2-5 and 2-6	2-5 and 2-6
None	2-6.1
2-7 and 2-8	2-7 and 2-8
3-5 and 3-6	3-5 and 3-6
None	3-6.1
B-1 through B-3	B-1

3. File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
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HISA (ECOM) (21)
USAREUR (10)
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USA Dep (2) except
Pirmaseans (10)
Sig Sec USA Dep (4)
Sig Dep (4)
Army Dep (1) except
SAAD (10)
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MAAG (1)
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Units org under fol TOE:
(1 copy each unit)
11-97
11-98
11-117
11-127
11-158
11-302
11-500 (AA-AC)
29-134
29-136

NG: None
USAR: None
For explanation of abbreviations used, see AR 310-50.

Technical Manual
No. 11-5820-672-12

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., *18 April 1967*

RADIO SETS AN/GRC-158 AND AN/MRC-117

Qty	Item	Fig. No.	Height (or length)	Depth (in.)	Width (in.)	Unit weight (lb)
1	Microphone, Carbon M-137/U	1-1				0.75
1	Headset, Electrical H-233/PRC-47	1-1				1.475
1	Cable Assembly, Special Purpose, Electrical CX-10366/G	1-1				0.125
1	Connector MS3106E-32-5S(C)	1-2				0.75
1	Connector MS3106E-22-22S (FSN 5935-660-5476)	1-2				0.65

c. Components Comprising the Operable End Item.

FSN	QTY	Nomenclature, part No., and mfr code
5820-915-9194	2	Adapter, Antenna to Antenna Base: 757-0503-001; 13499
	2	Antenna Kit: 553-6725-0000; 13499
5820-933-5688	1	Cabinet, Electrical Equipment: CY-6177/GRC
5995-889-1312	1	Cable Assembly-Special Purpose, Electrical; CX-10366/G
5995-933-5774	1	Cable Assembly-Special Purpose, Electrical; CX-10359/G
5995-933-5798	1	Cable Assembly-Special Purpose, Electrical; CX-10356/G
5995-933-5799	1	Cable Assembly-Special Purpose, Electrical; CX-10357/G
5995-933-5775	1	Cable Assembly-Special Purpose, Electrical; CX-10358/G
5935-687-1293	1	Connector, Plug, Electrical; MS3106E32-5S(C); 96906
5935-660-5476	1	Connector, Plug, Electrical; MS3106E22-22S; 96906
5820-933-5583	1	Control Monitor Group, C-7196/GRC c/o 1 ea Control-Monitor C-7186/GRC, 2 ea Control, Radio Set C-7207/GRC
5820-933-5582	1	Control, Monitor; C7186/GRC
5820-933-5684	2	Control, Radio; C7207/GRC
5985-939-7495	1	Coupler Antenna; CU-1669/GRC
	1	Extender Cable Set; 775-0361-001; 13499
5915-933-6504	1	Filter, Band Pass; F-1138/GRC
5965-985-3589	1	Headset, Electrical; H233PRC47
5805-984-0424	1	Key, Telegraph; KY-616/U
5965-068-1666	1	Microphone, Carbon; M-137/U
5820-933-5675	1	Power Supply; PP-4720/GRC
5820-933-5687	1	Power Supply; PP-4526/GRC-154
5820-933-5686	1	Power Supply; PP-4721/GRC
5821-954-0853	2	Receiver, Transmitter Radio; RT-698/ARC-102
5970-907-4761	1	Insulator-Antenna 553-6841-004

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual describes Radio Sets AN/GRC-158 (figs. 1-1 and 1-2) and AN/MRC-117 (fig. 1-6). It covers installation and operation. It also covers the operator and organizational maintenance, cleaning and inspecting the equipment, equipment repair, and replacement of the parts available to operator and organizational maintenance.

b. The basic issue items list appears in appendix B, the maintenance allocation chart appears in appendix C, and the repair parts and special tool lists appear in appendix C.1.

NOTE

Appendix B is current as of 10 January 1973. Appendixes C and D are current as of 3 April 1970.

1-2. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are Modification Work Orders (MWO's) pertaining to the equipment.

1-3. Maintenance Forms and Records

Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

1-3.1. Reporting of Errors

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028, Recommended Changes to Publications, and forwarded direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-C Fort Monmouth, NJ 07703.

Section II. DESCRIPTION AND DATA, RADIO SET AN/GRC-158

1-4. Purpose and Use, Radio Set AN/GRC-158

a. Radio Set AN/GRC-158 provides single-sideband (ssb) or amplitude-modulated (am.) communication within the frequency range of 2.000 to 29.999 megahertz (MHz). It is capable of continuous-wave (cw) or voice operation in 28,000 channels. It can alternately transmit and receive on the same frequency (half-duplex operation) or can simultaneously transmit on one frequency and receive on another frequency (duplex operation).

NOTE

The National Bureau of Standards has officially adopted the term HERTZ for cycles per second (abbreviated Hz). The table below provides the common equivalents.

Unit/quantity	*Old term*	*Old abbrev*	*New term*	*New abbrev*
Frequency	Cycles per second	cps	Hertz	Hz
10^3 cycles per second	Kilocycles per second	Kc	Kilohertz	kHz
10^6 cycles per second	Megacycles per second	Mc	Megahertz	MHz

Qty	Item	Fig. No.	Height (or length)	Depth (in.)	Width (in.)	Unit weight (lb)
1	Control-Monitor C-7186/GRC	1-4	13-1/8	13	14-7/16	32.5
2	Control, Radio Set C-7207/GRC	1-4	3-3/4	5-11/32	5-3/4	2.5

b. Minor Components. The minor components of Radio Set AN/GRC-158 are listed in the chart below. The Fig. No. column indicates the figure in which the minor component is shown.

Qty	Item	Fig. No.	Height (or length)	Depth (in.)	Width (in.)	Unit weight (lb)
2	Antenna Element At-1039/U	1-1	4 ft			0.125
2	Antenna Element AT-1040/U	1-1	4 ft			0.475
2	Antenna Element AT-1041/U	1-1	4 ft			0.625
2	Antenna Element AT-1042	1-1	4 ft			1.25
8	Antenna Element AT-1043/U	1-1	4 ft			1.625
2	Long-wire antenna adapter	1-1	6-1/2 in.			1
2	Rubber antenna insulator	1-1	29-1/2 in.			2.75
1	Cable Assembly, Special Purpose, Electrical CX-10356/G	1-2	100 ft			48.25
1	Cable Assembly, Special Purpose, Electrical CX-10357/G	1-2	100 ft			48.75
1	Cable Assembly, Special Purpose, Electrical CX-10358/G	1-2	100 ft			47
1	Cable Assembly, Special Purpose Electrical CX-10359/G	1-2	10 ft			12.5
1	Key, Telegraph KY-616/U	1-1				1

b. Radio Set AN/GRC-158 can be operated either mobile or fixed-station from any standard military alternating-current (ac) or direct-current (dc) power source, making its use very flexible. For description and data on Radio Set AN/GRC-158 when it is part of Radio Set AN/MRC-117, refer to paragraphs 1-9 and 1-10.

1-5. Technical Characteristics

a. General.

Ambient temperature range ..... -40°C (-40°F.) to + 50°C (+122°F.).
Ambient humidity range ..... 0 to 90 percent, relative.

b. Cabinet, Electrical Equipment CY-6177/GRC, and Internal Components.

Frequency range ..... 2.000 to 29.999 MHz.
Number of channels ..... 28,000 at 1-kilohertz intervals.
Types of transmission and reception. ..... Upper sideband, lower sideband, am., and cw.
Maximum power input ..... 1,820 watts.
Frequency stability ..... 0.8 part per million per month at any operating frequency.
Tuning ..... Automatic, 3 to 15 seconds.

c. Control-Monitor, Radio Set C-7186/GRC (fig. 1-4).

Audio input impedance ..... 100 ohms.
Audio output impedance:
Headset ..... 300 ohms.
Phone line ..... 600 ohms.

d. Power Supply PP-4721/GRC and Internal Components.

Input ..... 90 to 140 volts, 45 to 450 Hertz, single or three phase, or 90 to 140 volts dc.
Output power ..... 27.5 volts dc nominal 100 amperes.
Voltage regulation ..... + 0.5 volt dc.
Ripple voltage ..... Less than 0.25 volt rms.

1-6. Components of Radio Set AN/GRC-158

a. Major Components. The major components of Radio Set AN/GRC-158 are listed in the chart below. The Fig. No. column indicates the figure in which the major component is shown.

Qty	*Item*	*Fig. No.*	*Height (in.)*	*Depth (in.)*	*Width (in.)*	*Unit weight (lb)*
1	Cabinet, Electrical Equipment CY-6177/GRC	1-1	19-15/16	30	15-3/4	128.6
2	Receiver-Transmitter, Radio RT-698/ARC-102	1-3	7-55/64	22-1/2	10-17/64	50
1	Coupler, Antenna CU-1669/GRC	1-3	7-5/8	12-5/8	10-1/8	19.7
1	Filter, Bandpass F-1138/GRC	1-3	7-5/8	19-9/16	4-7/8	23.7
1	Power Supply PP-4720/GRC	1-3	7-5/8	13-3/32	3-11/16	16
1	Power Supply PP-4721/GRC	1-1	10-9/32	30	15-1/16	31
1	Power Supply PP-4526/GRC-154	1-5	7-5/8	19-9/16	10-1/2	85
1	Control-Monitor, Radio Set C-7196/GRC consisting of the following:	1-1	14-1/8	13-7/16	15-5/8	35

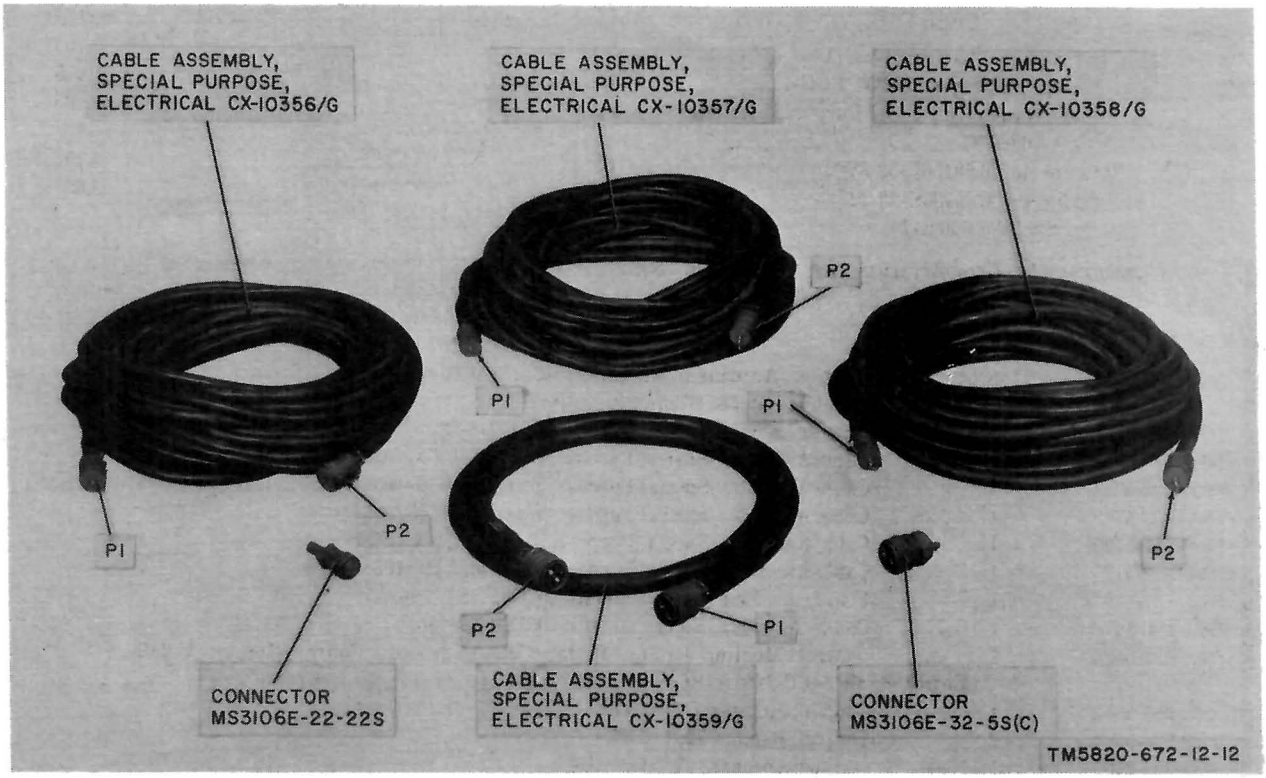


Figure 1-2. Cables and connectors.

1-7. Common Names, Nomenclature, and Contractor's Number

a. The chart below is a cross-reference between nomenclature assignments for components of Radio Set AN/GRC-158 and common names. The common names of the components will be used throughout this manual, except when referring to Radio Set AN/MRC-117 in paragraphs 1-9 and 1-10.

b. Main Case. Mounted within the main case are two transceivers, the preselector, the antenna coupler, and the power inverter as described in paragraph 1-8 and shown in figure 1-3. Refer to the outline and mounting dimensions given in figure D-1 to determine the proper mount and space required to install the main case.

c. Control Panel. Mounted within the control panel are two control units as shown in figure 1-4. Refer to the outline and mounting dimensions given in figure D-2 to determine the proper mount and space required to install the control panel.

d. Power Supply. Mounted with the power supply is a power converter as shown in figure 1-5. Refer to the outline and mounting dimensions given in figure D-3 to determine the proper mount and space required to install the power supply.

e. Fuses. The power converter is the only component of the radio set that contains fuses. Two fuses are located behind the front-panel screen as shown in figure 1-5. Insure that these two fuses are installed.

2-5. Interconnecting Equipment

CAUTION

The procedures outlined in *a* and *d* below, must be followed carefully to avoid breaking the wires located inside the connectors of the CX-10356/G, CX-10357/G, and CX-10358/G cables.

a. Remove the protective cap attached to the connector of the CX-10356/G, CX-10357/G, or CX-10358/G cable as follows (fig. 1-2):

(1) Grasp the lower portion of the connector in one hand, and the ring immediately below the protective cap in the other hand.

(2) Hold the lower portion firmly, and twist the ring *clockwise* (looking down from the top) approximately one-quarter of a turn. This releases the cap, which may now be lifted off.

b. Interconnect the control panel and main case as follows:

NOTE

The procedure for attaching the CX-10356/G, CX-10357/G, and CX-10358/G cables to the control panel and the main case is similar to the procedure for relacing the rotective cap on the cable connectors (*d* below).

(1) Connect P2 of the CX-10356/G cable to J1, control panel.

(2) Connect P2 of the CX-10357/G cable to J2, control panel.

(3) Connect P2 of the CX-10358/G cable to J3, control panel.

(4) Connect P1 of the CX-10358/G cable to J3, main case.

(5) Connect P1 of the CX-10357/G cable to J2, main case.

(6) Connect P1 of the CX-10356/G to J1 main case.

c. If the power supply is used, interconnect it and the main case as follows:

(1) Connect P1 of the CX-10359/G cable to J5, main case.

(2) Connect P2 of the CX-10359/G cable to J1, power supply.

d. Replacement of the protective cap on the connectors of the CX-10356/G, CX-10357/G, or CX-10358/G cable is as follows (fig. 1-2):

(1) Inspect the inside of the cap, and note the keyed slots. Match these slots with the raised keyed guide markers on the end of the connector.

(2) Place the cap on the connector. Rotate the ring *counterclockwise* (looking down from the top) until the three external pins on the cap fall into the three mated grooves on the ring.

(3) Grasp the lower portion of the connector firmly with one hand, and twist the ring *counterclockwise* with the other hand until a sharp click is heard. The cap is now firmly seated, insuring a watertight seal on the end of the connector.

e. The procedure for removing the CX-10356/G, CX-10357/G, and CX-10358/G cables from the control panel and the main case is similar to the procedure for removing the protective cap on the cable connectors (*a* above). The protective cap on the connectors of the CX-10359/G cable is a standard screwtype configuration and needs no special explanation for removal or replacement.

2-6. Connecting Primary Power

NOTE

Connection of the input power cable requires the use of a soldering iron. This may be performed at organizational maintenance category, or higher category of maintenance.

a. If the primary power source is three-phase, between 90 and 140 volts line to neutral, four-wire, make the connections to MS3106E-22-22S as shown in A, figure 2-2. Connect MS3106E-22-22S to J2 on the power supply.

b. If the primary power source is single-phase, between 90 and 140 volts line to neutral, three-wire, make the connections to MS3106E-22-22S as shown in B, figure 2-2. Connect MS3106E-22-22S to J2 on the power supply.

c. If the primary power source is single-phase, between 90 and 140 volts line to neutral, two-wire, make the connections to MS3106E-22-22S as shown in C, figure 2-2. Connect MS3106E22-22S to J2 on the power supply.

d. If the primary power source is between 90 and 140 volts dc, make the connections to MS3106E-22-22S as shown in A, figure 2-3. Connect MS3106E-22-22S to J2 on the power supply.

e. If the primary power source is 27.5 volts dc, make the connections to MS3106E-32-5S (C) as shown in B, figure 2-3. Connect MS3106E-32-5S(C) to J4 on the main case.

NOTE

If primary power is connected to both J2 on the power supply and J4 on the main case, the main case automatically disconnects the primary power connected to J4. If the power supply becomes disabled, the main case switches back to J4 for primary power after a delay of approximately 30 seconds.

WARNING

If the power cable is incorrectly connected users of the equipment can receive a severe electrical shock from touching the equipment while standing on damp ground. This can occur when Power Supply PP-4721/GRC is plugged into a commercial outlet or when a tactical generator is used. One lead-in wire from the ac input connectors is connected internally to the chassis of PP-4721/GRC. The equipment chassis will be "hot" if a hot wire is connected to pin D of P2 (MS3106E-22-22S).

f. To prevent incorrect wiring and possible electrical shock follow the procedures below:

(1) Determine by voltage and resistance measurements at the generator which of the output leads are "hot" to ground and which leads are grounded.

(2) With the PP-4721/GRC power switch off and the input power cable plugged into the PP-4721/GRC, carry the far end of the power cable back to the PP-4721/GRC. Measure with an ohmmeter to find which power lead is the one connected to the chassis.

(3) The power lead identified in (2) above must be connected to generator "neutral" or ground and must *not* be connected to any generator lead which measures "hot" to ground.

(4) When many vans are connected to a common generator source, care must be taken that the above is done at each van- to determine which lead is grounded before that van is connected into the system.

(5) If the PP-4721/GRC is plugged into commercial power, similar precautions must be taken. In this case, the wall socket or output connection must be marked to indicate which side is "hot" and which side is ground. The power plug on the power cord leading to the PP-4721/GRC must also be marked to show which side is the lead going back to the chassis as in (2) above. It is then safe so long as the plug is put into the wall socket so that the chassis goes to ground, not to the hot side.

g. After the above precautions are taken, the entire equipment chassis should be grounded. Before making the ground connection, check to see if any ac voltage appears between the equipment chassis and an actual good ground.

(1) If 110 volts ac appear between the equipment and ground, it means that the above instructions were *not* properly carried out. Do

not make the ground, but go back and find out what is wrong.

(2) If approximately 55 volts appear between the equipment and ground, it means that several other vans or pieces of equipment are connected and at least one of them has connected their "hot" wire to ground. Do not tie into such a system as the shock hazard will always be present and the generator may burn out. Each van or other equipment must be checked to remove the condition.

(3) If zero volts or a small voltage appears between equipment and ground, the condition is normal and the final ground connection should be made. The equipment should now be safe to operate.

2-7. Antenna Installation

(figs. 1-1 and 2-4)

CAUTION

Be careful when screwing the sections of the whip antenna together. Loose fragments of fiberglass may be attached to the ends of each antenna section. To reduce the risk of injury to the hands, a pair of heavy-duty gloves is recommended for use by the personnel joining the antenna sections together. All requirements of TB SIG 291 must be observed at all times.

a. General. Selection of the desired antenna will depend on deployment of the equipment. For direction and high gain, the dipole antenna will be used. For radiation in all directions (omnidirectional usage), a 16- or 32-foot whip antenna is used. The long-wire antenna is very good for receiving weak signals from long distances. Use two different antennas for each transceiver if desired, keeping in mind the varying characteristics of each type of antenna.

WARNING

Before attaching any antennas to the bases mounted on the main case, be sure that all power is OFF and disconnected.

b. Whip Antenna Kits. Packed with the equipment are two antenna kits (fig. 1-1). Two complete antenna kits allow the use of two whip antennas, one for the receive-only transceiver and the other for the transmit-receive transceiver. Each antenna kit is a 32-foot, eight-section, fiberglass whip antenna for use in the 2-30 MHz frequency range. Four tapered sections mount on the mast base, which is part of the main case, to form a 16-foot flexible whip antenna for vehicular use. The remaining four identical sections may be inserted between the 16-foot flexible portion and the base to form a 32-foot whip for stationary use. The long-wire antenna adapter (fig. 1-1) is packed in a pocket in the canvas antenna bag.

CAUTION

Do not use all eight sections (32 feet) of the whip antenna for mobile operation. Damage to whip antenna may result from stricking overhead object. Use only four sections (16 feet) for mobile operation. Assembly of the 16 foot antenna is described below.

(1) The 16-foot antenna can be used for either or both transceivers. The antenna mount for the receive-only transceiver is marked RECEIVE ANTENNA, and the mount for the transmit-receive transceiver is marked TRANSCEIVER ANTENNA. Erect a 16-foot whip antenna as follows:

(a) Screw together whip antenna sections AT-1042/U, AT-1041/U, AT-1040/U, and AT-1039/U, in that order.

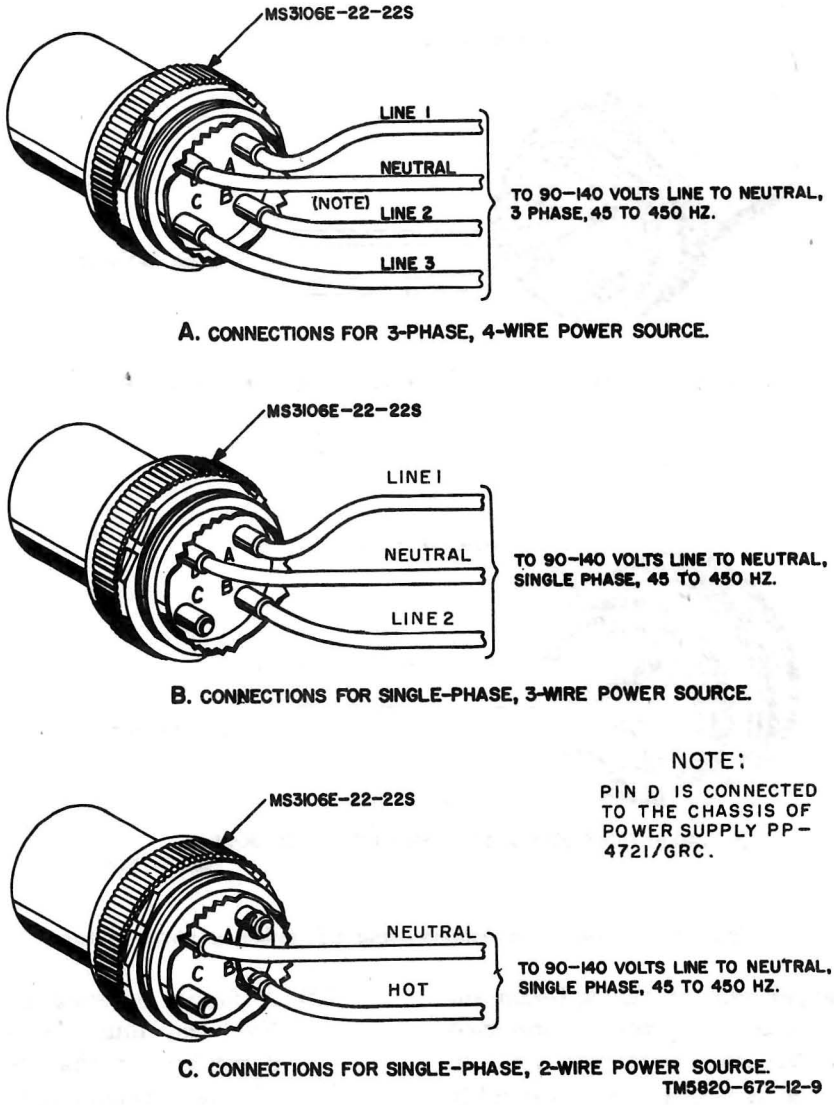


Figure 2-2. Power connections using an ac primary power source.

(*b*) Slide the rubber antenna insulator over antenna section AT-1039/U. The larger end of the antenna insulator must be at the unconnected end of antenna section AT-1039/U.

(*c*) Screw this antenna assembly onto the desired antenna mount.

(*d*) Slide down the rubber antenna insulator so that it covers the antenna mount.

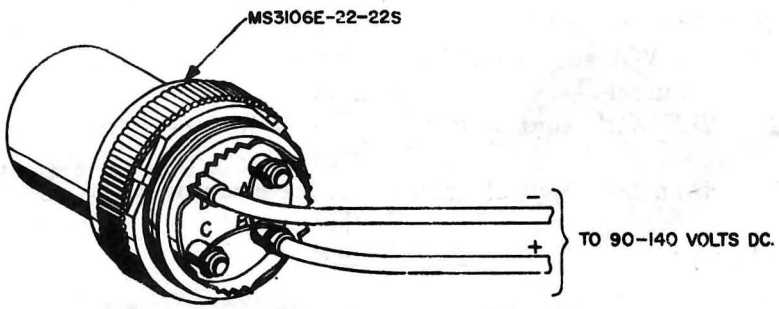
(2) The 32-foot whip antenna is used for fixed operation only. Erect it as follows:

(*a*) There are four identical base extension sections marked AT-1043/U. Screw these four sections together.

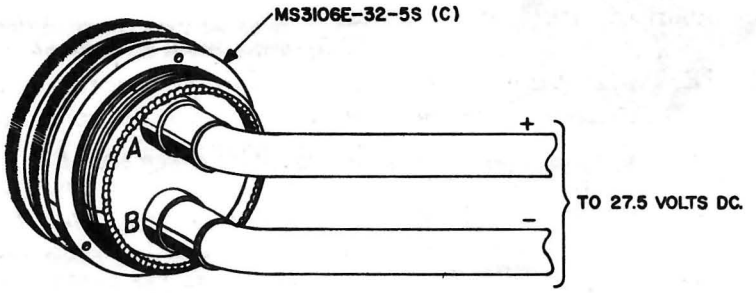
(*b*) Screw together whip antenna sections AT-1042/U, AT-1041/U, AT-1040/U, and AT-1039/U, in that order.

(*c*) Screw together the base extension assembly (assembled in (*a*) above) and the whip antenna assembly (assembled in (*b*) above).

(*d*) Slide the rubber antenna insulator over the first base extension section.



A. CONNECTION FOR A 90 TO 140-VOLT DC POWER SOURCE.



B. CONNECTIONS FOR A 27.5-VOLT DC POWER SOURCE.

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Figure 2-3. Power connections using a dc primary power source.

The larger end of the antenna insulator must be at the unconnected end of the base extension section.

(*e*) Screw the entire antenna assembly onto the desired antenna mount.

(*f*) Slide down the rubber antenna insulator so that it covers the antenna mount.

c. Dipole Antenna. A dipole antenna, which is a highly directional antenna, can be used for either or both transceivers. The dipole antenna connector for the receive-only transceiver is on the left side of the main case (viewed from the front), and the dipole antenna connector for the transmit-receive transceiver is on the right side. Erect a dipole antenna as follows:

(1) Refer to figure 2-4. Construct the dipole antenna using approximately #14 wire.

(2) A dipole antenna is frequency-sensitive and must be a certain length, depending on the operating frequency of the transceiver. Determine the length by using the following formula:

$$\text{Length (feet)} = \frac{468}{\text{Frequency (megahertz)}}$$

Example: If the operating frequency is 10 MHz, divide 10 into the constant 468. The answer is 46.8. Therefore, the dipole is 46.8 feet long for a frequency of 10 MHz.

(3) Use 75-ohm coaxial cable to connect the dipole antenna to the coaxial connector located under a protective arm on the side of the main case. Lift up on the arm to gain access to the coaxial connector.

d. Rotate the RF SENS control on both control units three-fourths clockwise.

e. Set the PHONE PATCH switch to OFF.

f. Rotate SPEAKER NO. 1 VOL and SPEAKER NO. 2 VOL controls fully counterclockwise.

g. Rotate the HEADSET VOL control fully counterclockwise.

h. Set the mode switch on both control units to AM.

WARNING

Performing the next procedure will violate any existing blackout orders imposed in a nighttime tactical situation. This manual does not authorize the violation of existing blackout orders imposed by any command. Death to personnel or heavy damage to equipment may result if unauthorized lights are illuminated.

i. Release the LAMP TEST pushbutton switch and adjust the PANEL LIGHTS control for the desired amount of panel illumination.

j. Set the TRANSCEIVER SELECT switch to NO. 1 XMIT & RECEIVE or to NO. 2 XMIT & RECEIVE to select the transceiver desired to operate in the transmit-receive mode.

NOTE

A potential cold weather starting problem may occur at temperatures approaching -40 degrees F. With no load, high ripple voltage on the *output* of PP-4721/GRC may trip the over voltage protection circuitry. This can be prevented by turning one of the C-7207/GRC controls to the ON position prior to switching the PP-4721/GRC AC circuit breaker to ON. This will provide a load and prevent the over-voltage condition from occuring. This procedure should *only* be used at extremely low temperatures and only when the PP-4721/GRC is used to power the system.

3-5. Half-Duplex Operating Procedures

a. Perform the starting procedures given in paragraph 3-4.

b. Perform the procedure given in *c* below for voice operation, or *d* below for cw operation.

c. Voice Operation.

(1) Remove the microphone, headset, and headset cable from the storage compartment in the control panel cover, and connect them to the proper AUDIO connectors on the monitor.

(2) On the control unit located above the transmit-receive indicator marked XMIT/RCVE, set the mode switch to USB, LSB, or AM to select the desired mode of rf transmission and reception.

(3) Set the four frequency selectors so that the desired operating frequency appears in the FREQ window.

(4) Refer to paragraph 3-9 for audio adjustments and rf transmission.

d. Cw Operation.

(1) Remove the telegraph key from the storage compartment in the control panel cover, and plug it into the KEY jack on the monitor.

(2) On the control unit located above the transmit-receive indicator marked XMIT/RCVE, set the mode switch to CW.

(3) Set the four frequency selectors so that the frequency appearing in the FREQ window is 1 kilohertz (kHz) below the assigned operating frequency.

(4) Refer to paragraph 3-9 for audio adjustments and rf transmission.

3-6. Phone Patch Operating Procedures

a. Perform the starting procedures given in paragraph 3-4.

b. Remove the microphone from the storage compartment in the control panel cover, and connect it to the MIC jack on the monitor.

c. Connect the telephone lines to the PHONE LINE terminals on the monitor.

d. On the control unit located above the transmit-receive indicator marked XMIT/RCVE, set the mode switch to AM.

e. Set the four frequency selectors so that the desired operating frequency appears in the FREQ window.

f. Adjust SPEAKER NO. 1 VOL control or SPEAKER NO. 2 VOL control until receiver background noise is heard. SPEAKER NO. 1 is used when the TRANSCEIVER SELECT switch is set to NO. 1 XMIT & RECEIVE, and SPEAK-

ER NO. 2 is used when the TRANSCEIVER SELECT switch is set to NO. 2 XMIT & RECEIVE.

g. Key the transmitter by momentarily pressing the push-to-talk switch on the microphone. This places the antenna coupler in the tune cycle. While the antenna coupler is tuning, a tune tone is heard from the speaker. When the tune tone ceases, the radio set is ready for rf transmission.

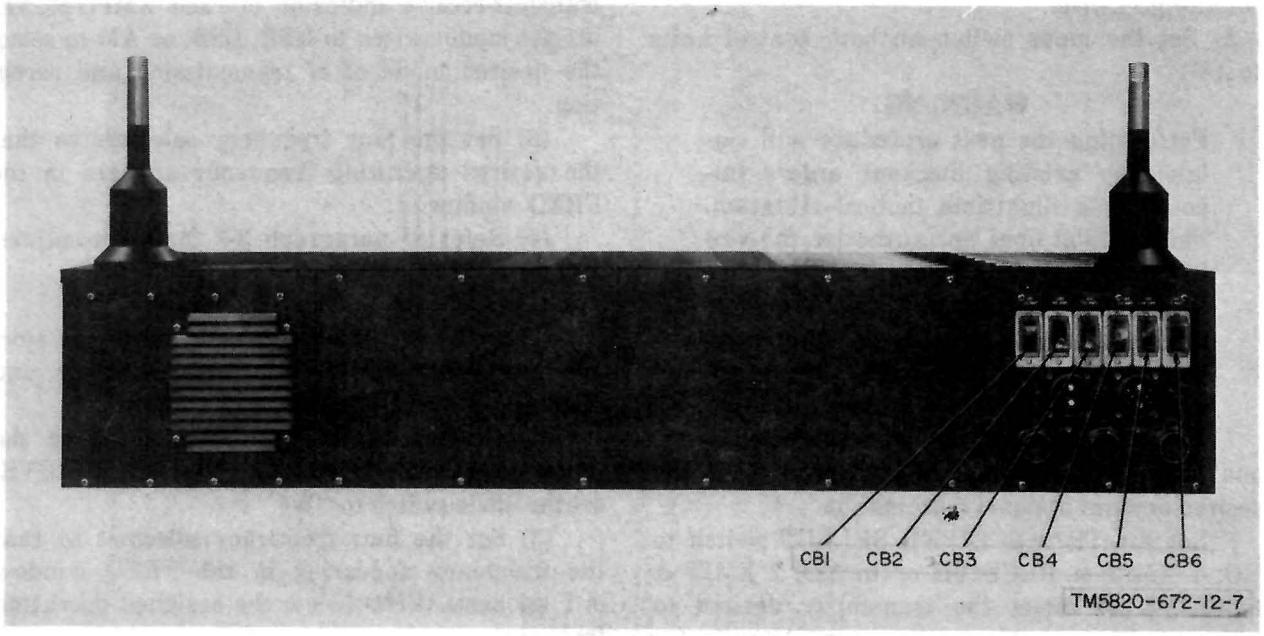

Figure 3-2. Circuit breaker on Cabinet, Electrical Equipment CY-6177/GRC, rear view.

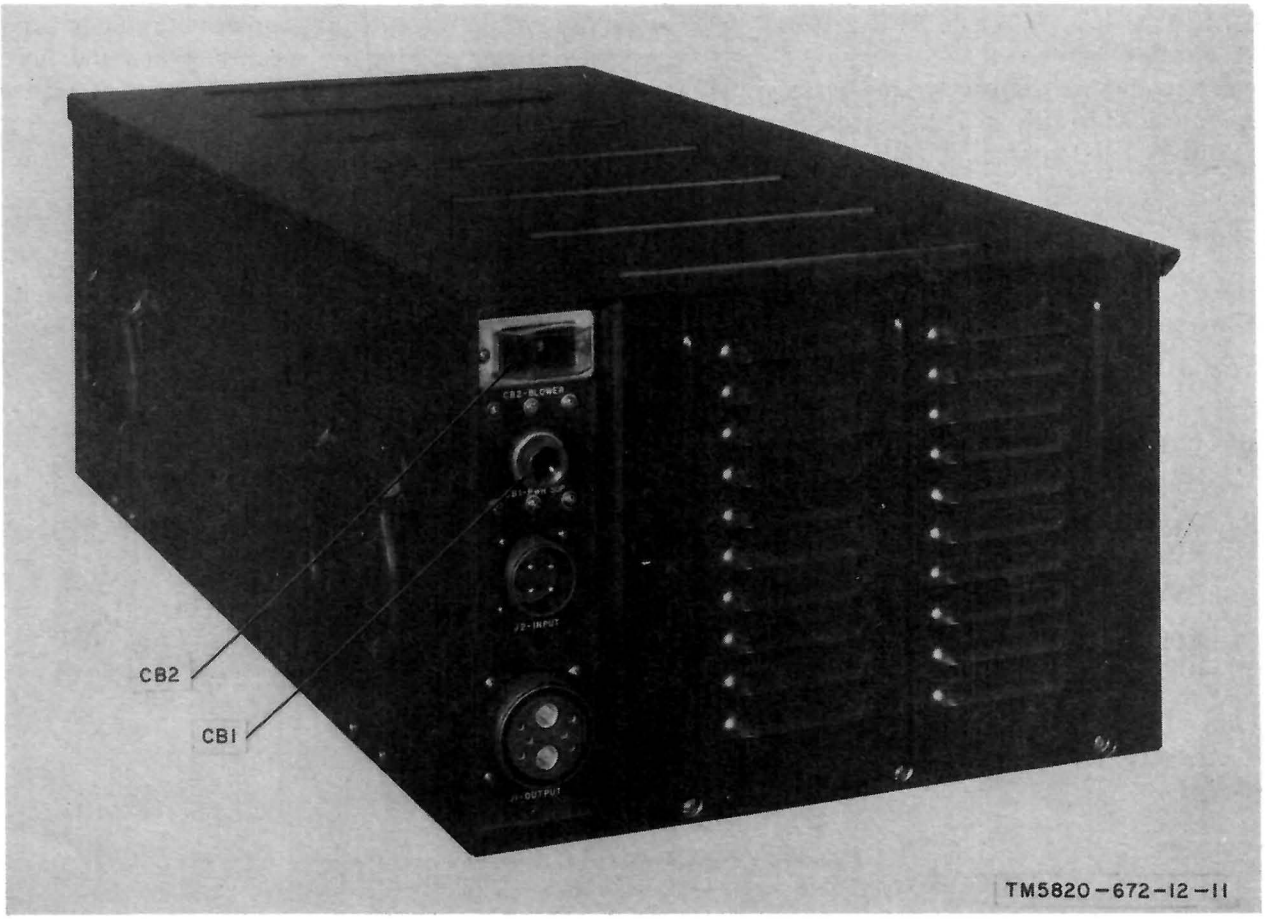

Figure 3-3. Circuit breakers on Power Supply PP-4721/GRC.

APPENDIX B
BASIC ISSUE ITEMS

DELETED

☆ U. S. GOVERNMENT PRINTING OFFICE: 1973--769620/1097

CHANGE
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *27 December 1967*

Operator and Organizational Maintenance Manual

Including Repair Parts and Special tools List

RADIO SETS AN/GRC-158 AND AN/MRC-117

TM 11–5820–672–12, 18 April 1967, is changed to include technical information and data on the International Harvester Crew/Cargo Travelette Model 1200–A commercial truck, which is used to house the AN/GRC–158 when it is part of the AN/MRC–117. Organizational repair parts and special tools list are also included.

1. Title is changed as shown above.

2. New or changed material is indicated by a vertical bar in the margin.

3. Remove and insert pages as indicated below.

Remove pages—	*Insert pages—*
1–1 and 1–2	1–1 and 1–2.
1–9 and 1–10	1–9 through 1–12.
2–9	2–9 and 2–10.
None	5–9.
A–1	A–1 and A–2.
None	C.1–1 through C.1–4.
D–1 and D–2	D–1 and D–2.

4. File this transmittal page in the front of manual for reference.

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

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USAREUR (10)
USASCS (40)
USASTRATCOM (10)
USASTRATCOM-CONUS (10)
USASTRATCOM-EUR (200)
SEVENTH USA (10)
Eighth USA (10)
Gen Dep (Europe) (5)
Sig Sec Gen Dep (Europe) (5)
Sig Dep (Europe) (12)
Sig FLDMS (Europe) (2)
11th Sig Gp (5)
505th Sig Co (5)

NG: State AG (3).

USAR: None.

For explanation of abbreviations use, see AR 320-50.

TECHNICAL MANUAL
No. 11–5820–672–12

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D. C. 18 April 1967

RADIO SETS AN/GRC–158 AND AN/MRC–117

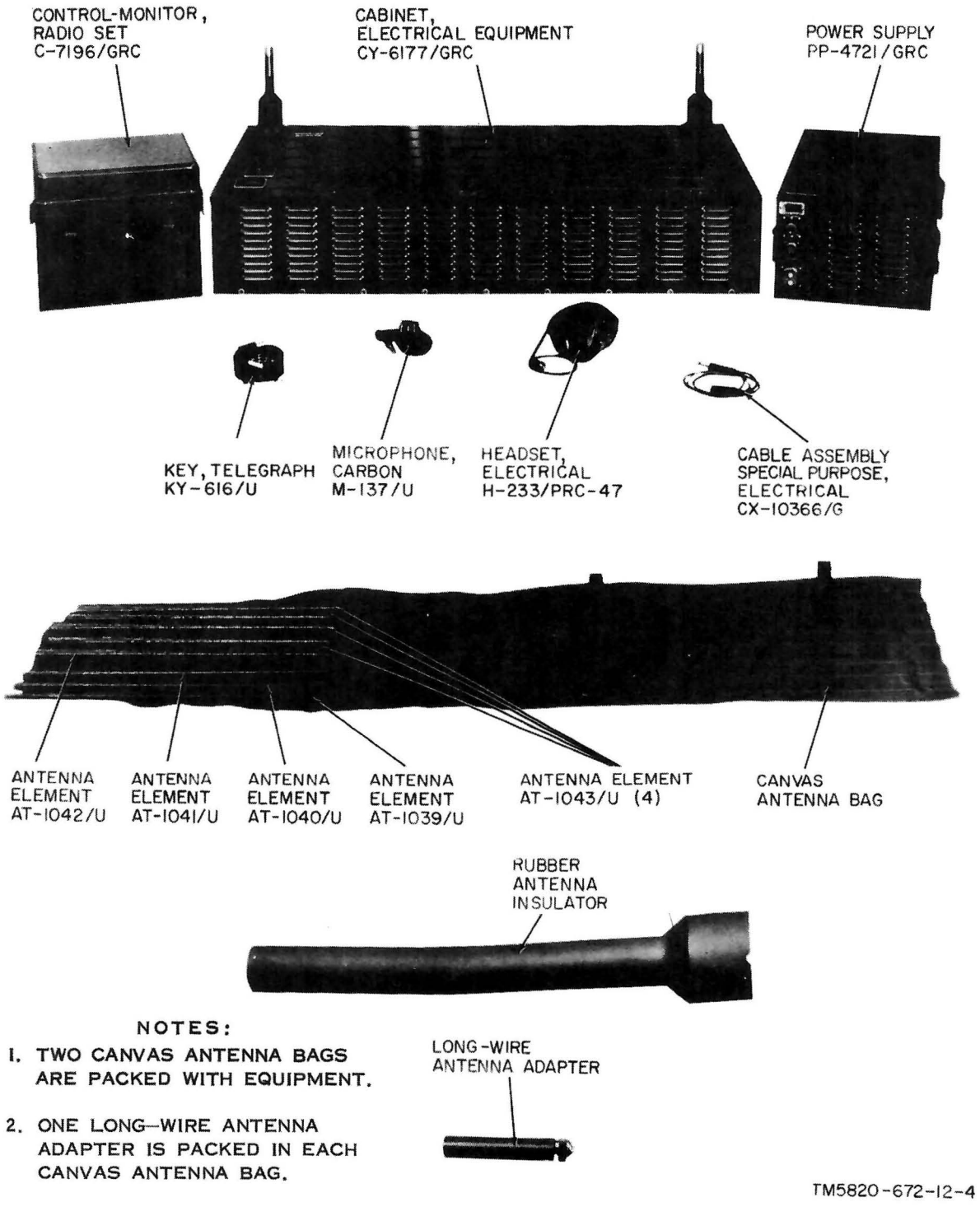


Figure 1-1. Communication components of Radio Set AN/GRC-158.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1–1. Scope

a. This manual describes Radio Sets AN/GRC–158 (fig. 1–1 and 1–2) and AN/MRC–117 (fig. 1–6 and 1–7). It covers installation, operation, operator and organizational maintenance, and replacement of the parts available to organizational maintenance.

b. The maintenance allocation chart (MAC) is included in appendix C. Organizational repair parts are described in appendix C.1.

1–2. Indexes of Publications

a. DA Pam 310–4. Refer to the latest issue of DA Pam 310–4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310–7. Refer to DA Pam 310–7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

1–3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with instructions given in TM 383750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700–59 (Army, NAVSUP Publication 378 (Navy), AFR 71–4 (Air Force), and MCO P4610–5 (Marine Corps).

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF361) as prescribed in AR 55–38 (Army), NAVSUP Publication 459 (Navy), AFM 75–34 (Air Force), and MCO P4610–5 (Marine Corps).

d. Reporting of Equipment Manual Improvements. Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to Commanding General, U.S. Army Electronics Command, ATTN: AMSEL–ME–NMP–CR, Fort Monmouth, N.J. 07703.

Section II. DESCRIPTION AND DATA, RADIO SET AN/GRC-158

1–4. Purpose and Use, Radio Set AN/GRC–158

a. Radio Set AN/GRC–158 provides single-sideband (ssb) or amplitude-modulated (am) communication within the frequency range of 2.000 to 29.999 megahertz (MHz). It is capable of continuous-wave (cw) or voice operation in 28,000 channels. It can alternately transmit and receive on the same frequency (half-duplex operation) or can simultaneously transmit on one frenquency and receive on another frequency (duplex operation).

Note. The National Bureau of Standards has officially adopted the term HERTZ for cycles per second (abbreviated Hz). The chart below provides the common equivalents.

Unit/quantity	*Old term*	*Old abbrev*	*New term*	*New abbrev*
Frequency	Cycles per second.	Cps	Hertz	Hz
10^3 cycles per second	Kilocycles per second.	Kc	Kilohertz	kHz
10^6 cycles per second	Megacycles per second.	Mc	Megahertz	MHz

b. Radio Set AN/GRC-158 can be operated either mobile or fixed-station from any standard military alternating-current (ac) or direct-current (dc) power source, making its use very flexible. For description and data on Radio Set AN/GRC-158 when it is part of Radio Set AN/MRC-117, refer to paragraphs 1-9 and 1-10.

1-5. Technical Characteristics

a. General.

Ambient temperature range. -40° C (-40° F) to +50° C (+122° F).
Ambient humidity range. 0 to 90 percent, relative.

b. Cabinet, Electrical Equipment CY-6177/GRC, and Internal Components.

Frequency range. 2.000 to 29.999 MHz.
Number of channels. 28,000 at 1-kilohertz intervals.
Types of transmission and reception. Upper sideband, lower sideband, am., and cw.
Maximum power input. 1,820 watts.
Frequency stability. 0.8 part per million per month at any operating frequency.
Tuning. Automatic, 3 to 15 seconds.

c. Control-Monitor, Radio Set C-7186/GRC (fig. 1-4).

Audio input impedance. 100 ohms.
Audio output impedance:
Headset. 300 ohms.
Phone line. 600 ohms.

d. Power Supply PP-4721/GRC and Internal Components.

Input. 90 to 140 volts, 45 to 450 Hertz, single or three phase, or 90 to 140 volts dc.
Output power. 27.5 volts dc nominal 100 amperes.
Voltage regulation. ±0.5 volt dc.
Ripple voltage. Less than 0.25 volt rms.

1-6. Components of Radio Set AN/GRC-158

a. Major Components. The major components of Radio Set AN/GRC-158 are listed in the chart below. The *Fig. No.* column indicates the figure in which the major component is shown.

Qty	Item	Fig. No.	Height (in.)	Depth (in.)	Width (in.)	Unit weight (lb)
1	Cabinet, Electrical Equipment CY-6177/GRC	1-1	19-15/16	30	15-3/4	128.6
2	Receiver-Transmitter, Radio RT-698/ARC-102	1-3	7-55/64	22-1/2	10-17/64	50
1	Coupler, Antenna CU-1669/GRC	1-3	7-5/8	12-5/8	10-1/8	19.7
1	Filter, Bandpass F-1138/GRC	1-3	7-5/8	19-9/16	4-7/8	23.7
1	Power Supply PP-4720/GRC	1-3	7-5/8	13-3/32	3-11/16	16
1	Power Supply PP-4721/GRC	1-1	10-9/32	30	15-1/16	31
1	Power Supply PP-4526/GRC-154	1-5	7-5/8	19-9/16	10-1/2	85
1	Control-Monitor, Radio Set C-7196/GRC consisting of the following:	1-1	14-1/8	13-7/16	15-5/8	35

Qty	Item	Fig. No.	Height (in.)	Depth (in.)	Width (in.)	Unit weight (lb)
1	Control-Monitor C-7186/GRC	1-4	13-1/8	13	14-7/16	32.5
2	Control, Radio Set C-7207/GRC	1-4	3-3/4	5-11/32	5-3/4	2.5

b. Minor Components. The minor components of Radio Set AN/GRC-158 are listed in the chart below. The *Fig. No.* column indicates the figure in which the minor component is shown.

Qty	Item	Fig. No.	Height (or length)	Depth (in.)	Width (in.)	Unit weight (lb)
2	Antenna Element At-1039/U	1-1	4 ft			0.125
2	Antenna Element AT-1040/U	1-1	4 ft			0.475
2	Antenna Element AT-1041/U	1-1	4 ft			0.625
2	Antenna Element AT-1042	1-1	4 ft			1.25
8	Antenna Element AT-1043/U	1-1	4 ft			1.625
2	Long-wire antenna adapter	1-1	6-1/2 in.			1
2	Rubber antenna insulator	1-1	29-1/2 in.			2.75
1	Cable Assembly, Special Purpose, Electrical CX-10356/G	1-2	100 ft			48.25
1	Cable Assembly, Special Purpose, Electrical CX-10357/G	1-2	100 ft			48.75
1	Cable Assembly, Special Purpose, Electrical CX-10358/G	1-2	100 ft			47
1	Cable Assembly, Special Purpose Electrical CX-10359/G	1-2	10 ft			12.5
1	Key, Telegraph KY-616/U	1-1				1

Qty	Item	Fig. No.	Height (or length)	Depth (in.)	Width (in.)	Unit weight (lb)
1	Microphone, Carbon M–137/U	1–1				0.75
1	Headset, Electrical H–233/PRC–47	1–1				1.475
1	Cable Assembly, Special Purpose, Electrical CX–10366/G	1–1				0.125
1	Connector MS3106E–32–5S(C)	1–2				0.75
1	Connector MS3106E–22–22S (FSN 5935–660–5476)	1–2				0.65

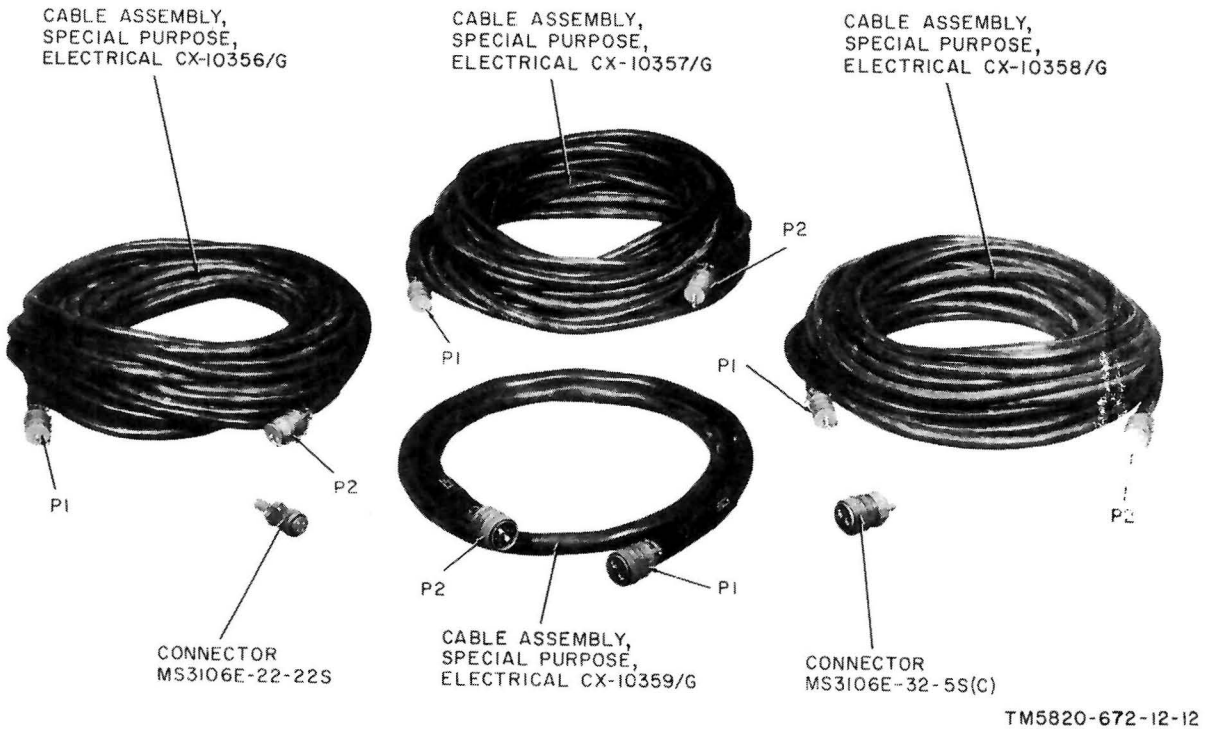


Figure 1–2. Cables and connectors.

1–7. Common Names, Nomenclature, and Contractor's Number

a. The chart below is a cross-reference between nomenclature assignments for components of Radio Set AN/GRC–158 and common names. The common names of the components will be used throughout this manual, except when referring to Radio Set AN/MRC–117 in paragraph 1–9 and 1–10.

Nomenclature	Common name
Radio Set AN/GRC-158	Radio set
Cabinet, Electrical Equipment CY-6177/GRC	Main case
Receiver-Transmitter, Radio RT-698/ARC-102	Transceiver
Filter, Bandpass F-1138/GRC	Preselector
Coupler, Antenna CU-1669/GRC	Antenna coupler
Power Supply PP-4720/GRC	Power inverter
Control-Monitor, Radio Set C-7196/GRC	Control panel
Control-Monitor C-7186/GRC	Monitor
Control, Radio Set C-7207/GRC	Control unit
Power Supply PP-4721/GRC	Power supply
Power Supply PP-4526/GRC-154	Power converter

b. The chart below lists the nomenclature and the contractor's number.

Note: These equipments were furnished on order No. FR 28-043-I6-22750(E).

Nomenclature	Contractor's Number
Radio Set AN/GRC-158	Same
Cabinet, Electrical Equipment CY-6177/GRC	Same
Receiver-Transmitter, Radio RT-698/ARC-102	618T-3
Filter, Bandpass F-1138/GRC	635V-1
Coupler, Antenna CU-1669/GRC	490T-1
Power Supply PP-4720/GRC	426T-1
Control-Monitor, Radio Set C-7196/GRC	Same
Control-Monitor C-7186/GRC	Same
Control, Radio Set C-7207/GRC	714E-5
Power Supply PP-4721/GRC	Same
Power Supply PP-4526/GRC-154	426U-2

1-8. Description of Radio Set AN/GRC-158

The main components of the radio set are the main case, the control panel, and the power supply (fig. 1-1). Three 100-foot cables (fig. 1-2) electrically connect the control panel to the main case, and a 10-foot cable connects the power supply to the main case.

a. Description of Main Case.

(1) *Physical Characteristics.*

(*a*) The main case (fig. 1-3) is subdivided into five compartments. For convenience, they will be numbered from 1 through 5, beginning on the left.

(*b*) Compartment 1 houses both the power inverter and the preselector. The power inverter furnishes 110 volts, 400 Hertz (Hz), for the two transceivers, the antenna coupler, and the blowers. The preselector allows the receive-only transceiver to be tuned as close as 10 percent above or below the frequency of the transmit-receive transceiver.

(*c*) Compartment 2 houses the No. 1 transceiver.

(*d*) Compartment 3 is normally empty. A spare transceiver, which is not a component part of the radio set, may be stored in this compartment.

(*e*) Compartment 4 houses the No. 2 transceiver.

(*f*) Compartment 5 houses the antenna coupler. The coupler allows the transmit-receive transceiver to send out maximum radiofrequency (rf) power regardless of the frequency and power output being sent.

(2) *Miscellaneous features.*

(*a*) The components of each compartment are keyed for exact position by two locating pins, and one or more connectors. The pins position each component, and the connectors provide power and signal paths required for operation.

(*b*) The platforms supporting each component are raised slightly above the bottom surface of the case. This allows forced air to circulate from the louvered front intakes out through the rear exhaust port, to prevent the components from overheating during normal operation.

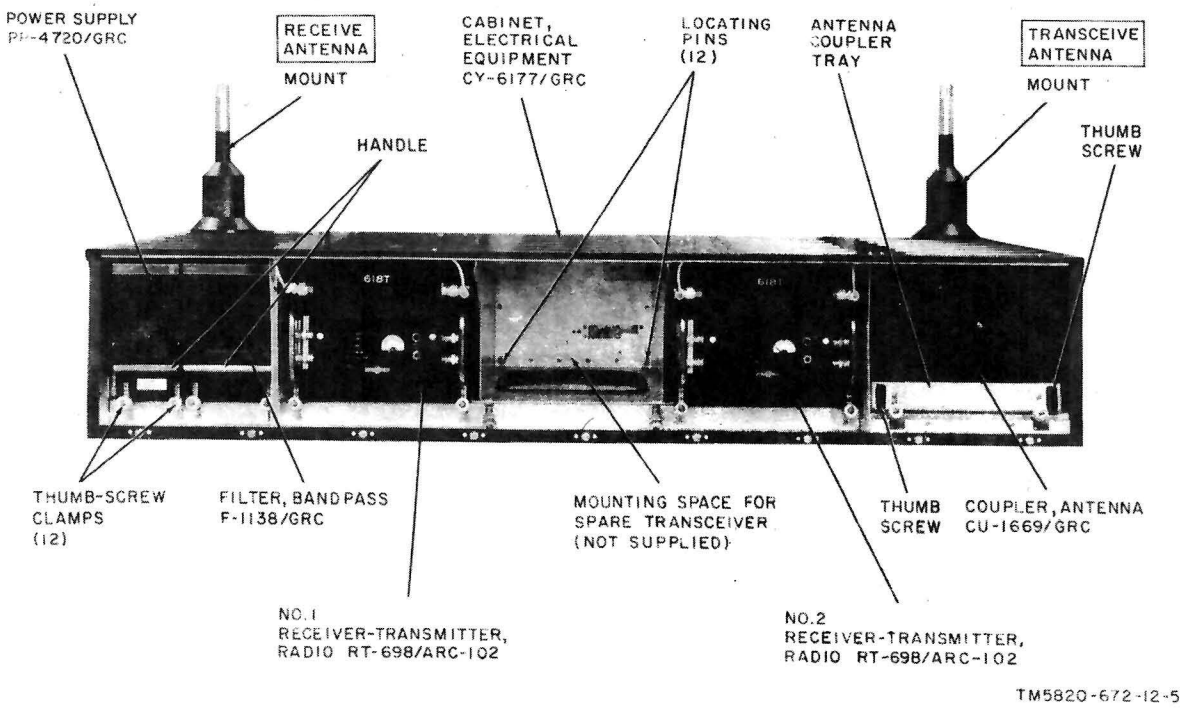


Figure 1–3. Cabinet, Electrical Equipment CY–6177/GRC, with front panel removed.

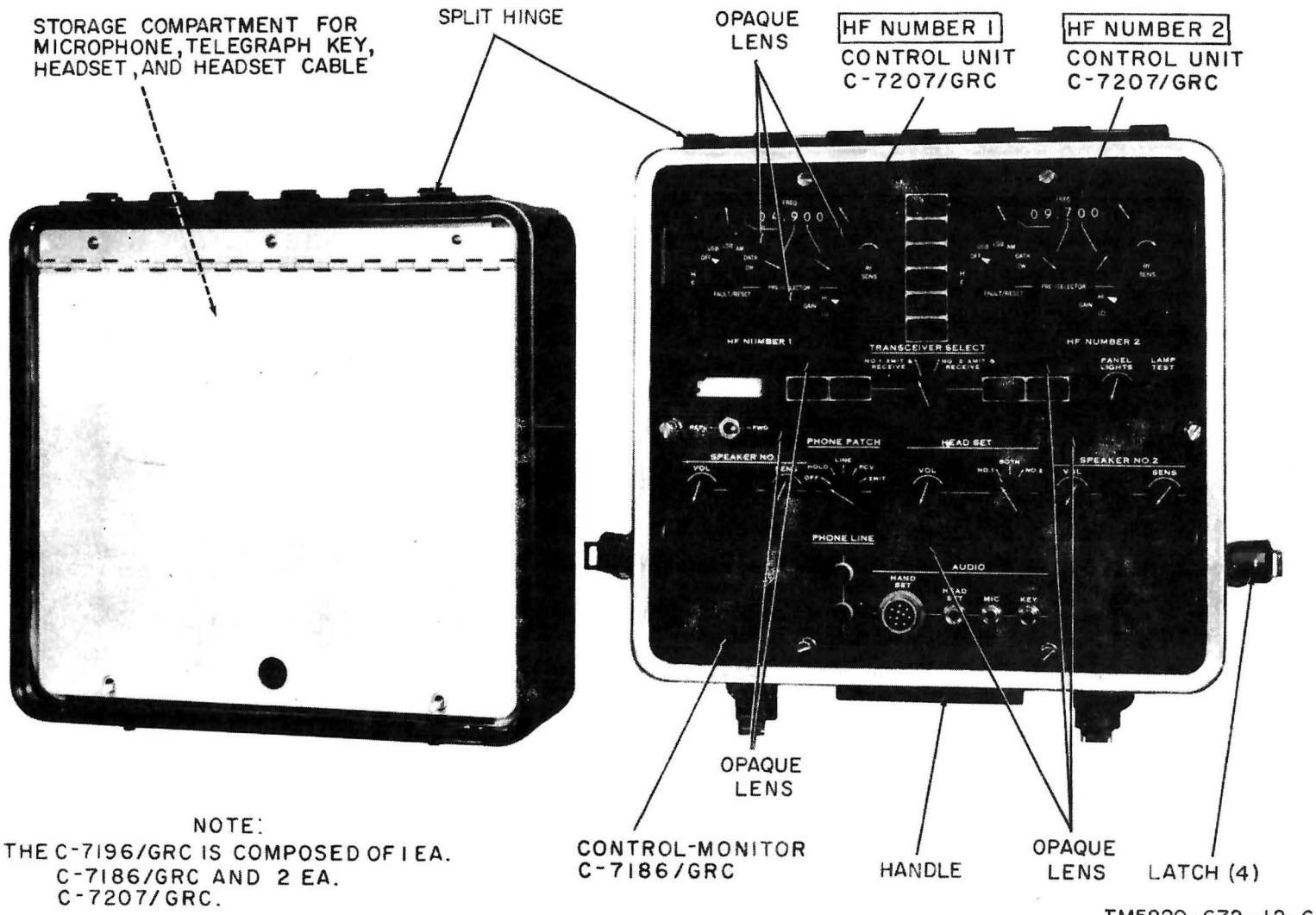
(*c*) A RECEIVE ANTENNA (left rear corner) and a TRANSCEIVE ANTENNA (right rear corner) may support either two whip antennas, or the two long-wire antenna adaptors. Installation of the antennas is covered in paragraph 2–7.

(*d*) Six circuit breakers and four connectors are mounted on the rear panel of the main case (fig. 3–2). All power and signal-control paths are coupled through the four connectors.

b. Description of Control Panel. The control panel (fig. 1–4) consists of the monitor in which HF NUMBER 1 and HF NUMBER 2 control units are mounted. It provides complete control of the entire radio set. With the cover secured in place by the four latches, the control panel case provides waterproof protection for the control panel. To open the cover, the air relief valve located by the carrying handle must be opened to relieve any pressure or vacuum in the case. When opened, the split hinge on the cover allows it to be separated from the case. A storage compartment inside the cover is provided for the telegraph key, the microphone, the headset, and the headset cable.

(1) The monitor provides a visual display of the fault-indicating functions and the monitoring functions. Connections are also provided for the input and output audio cabling into and from the radio set. Provisions are available for selecting one of the transceivers to operate in the transmit-receive mode, while the other transceiver is automatically placed in the receiver-only mode.

(2) Each transceiver has its own control unit. HF NUMBER 1 unit controls transceiver 1 (compartment 2), and HF NUMBER 2 unit controls transceiver 2 (compartment 4). The control unit operating the receive-only transceiver controls the preselector, while the control unit operating the transmit-receive transceiver controls the antenna coupler.



NOTE:
THE C-7196/GRC IS COMPOSED OF 1 EA. C-7186/GRC AND 2 EA. C-7207/GRC.

Figure 1-4. Control-Monitor, Radio Set C-7196/GRC.

c. Description of Power Supply.

(1) The power supply (fig. 1–5), which consists of a power converter mounted in a case, provides regulated 27.5 volts dc required by the radio set. The power converter changes dc or ac power (between 90 and 140 volts) into 27.5 volts dc. At the rear of the platform, which is part of the power supply case, are two locating pins that correctly position the power converter.

(2) A forced air system provides the necessary air for cooling the equipments similar to the procedure described in *a* above.

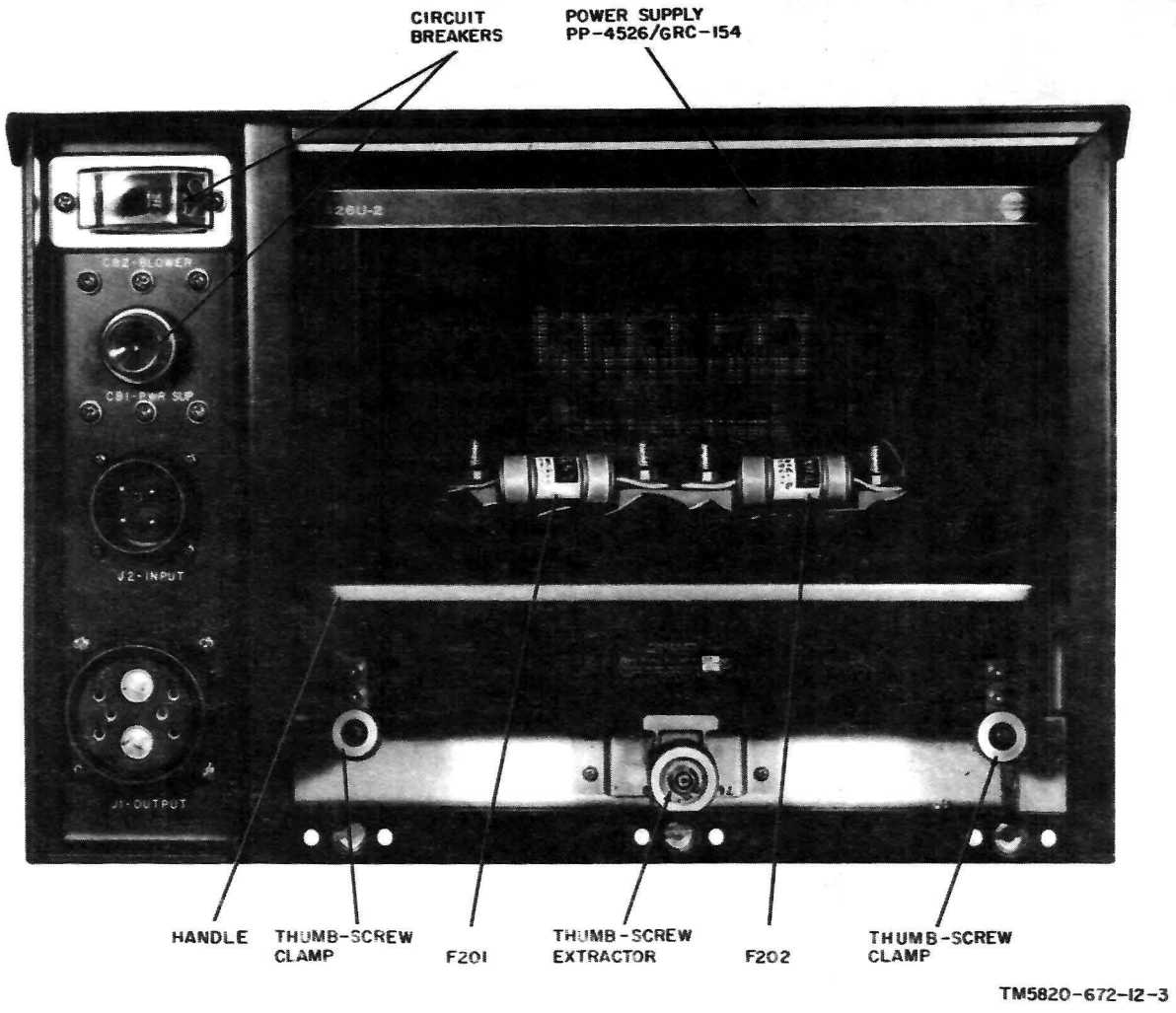


Figure 1–5. Power Supply PP–4721/GRC, with front panel removed.

Section III. DESCRIPTION AND DATA, RADIO SET AN/MRC-117

1–9. Purpose and Use

a. Radio Set AN/MRC–117 consists of Radio Set AN/GRC–158 mounted in a crew/cargo vehicle. The purpose and use of Radio Set AN/GRC–158 is discussed in paragraphs 1–4 through 1–8.

b. Radio Set AN/MRC–117 is designed so that the equipment may be operated either from within a crew/cargo vehicle or at a distance from the vehicle.

c. Power Unit PU–666/G is used with, but not part of, Radio Set AN/MRC–117. A description of this portable power unit is given in paragraph 1–10*e*. Also, any ac or dc power source capable of supplying 90 to 140 volts, or 28 volts dc, with a total minimum power output of 1,820 watts, may be used.

1–10. Description
(fig. 1–6 and 1–7)

a. The main components of Radio Set AN/MRC–117 are—

(1) Radio Set AN/GRC–158 (para 1–8).

(2) International Harvester, Crew/Cargo Travellette Model 1200–A commercial truck.

b. The International Harvester Crew/Cargo Travellette Model 1200–A commercial truck is a six-passenger, four-door vehicle. With the exception of the control panel, all components of Radio Set AN/GRC–158 are housed in the storage bed. A battery box, which is not part of the installation, is also housed on the bed. The control panel is installed in the center of the rear seat of the vehicle (fig. 1–7). All necessary hardware and mounting plates for supporting Radio Set AN/GRC–158 are known as the *installation kit*. The installation kit also includes the interconnecting cables, the single exception is Cable Assembly, Special Purpose, Electrical CX–10359/G (fig. 1–2) which is part of the AN/GRC–158 and not permanently installed on the vehicle. This cable may be detached from the main case mount if required. Removal and replacement procedures for Radio Set AN/GRC–158 are given in paragraph 5–11.

c. With the AN/GRC– 158 installed in the vehicle, the radio set is operated from the rear seat by a qualified radio operator. All necessary cabling is permanently secured to the chassis and is not removed. Procedures for connecting and disconnecting cables and connectors are given in paragraph 2–5.

d. Power Unit PU–666/G supplies 28 volts dc to the AN/GRC–158 when the equipment is operated in a fixed or semifixed mode. Two engine generators are on the bed of the trailer. Using the generator transfer switch (not shown) mounted on the trailer bed, either generator may be used to furnish power to the AN/GRC–158 to permit around-the-clock operation. Components of the PU–666/G are as collows:

(1) Trailer, Cargo: ¾-ton, 2-wheel M101A1 (FSN 2230–898–6779).

(2) Two Generator Sets, Gasoline Engine, 3 Kw, Dc, 28 V (MIL Model DC 3.0 MD/28), FSN 6115–017–8239.

(3) Four Drums, Fuel, 5 Gallon (FSN 7240–222–3088).

(4) Four Brackets, Assembly for holding four fuel drums.

(5) One extinguisher, Fire, Monobromotrifluoromethane (CF_3Br), 2¾ lb (FSN 4210–555–8837).

(6) Two Spouts, Flexible (FSN 7240–177–6154).

(7) Two Adaptors, Assembly, Fuel Drum FSN 2910–066–1235).

(8) Two Mounting Brackets, Fuel Adaptor.

(9) Two Ground Rods, Drive Sectional, 9 ft, type II, style 2 (FSN 5925–642–8927).

(10) One Hammer, Hand (FSN 5120–251–4489).

(1) One permanently attached 35-foot power cable.

e. If commercial power is applied to J2 on Power Supply PP–4721/GRC (fig. 1–7) and the power supply is connected to the main case and turned on, the PU–666/6 will be unable to supply 28 volts dc to the AN/GRC–158 because the cir-

cuitry in the main case favors the power supply input. Disconnect the power supply from the main case to insure operation when using the PU–666/G. For further information, refer to paragraph 2–8.

f. For additional information on the 28-volt dc generator set, refer to TM 5–6115–271–15 and TM 5–6115–271–20P. Information on the M101A1 is given in TM 9–2330–202–14P.

g. The three main components of the AN/GRC–158 are: the main case, the control unit, and the power supply. These components may be removed from the 1200–A truck (para 5–11) and operated in a cleared, out-of-doors location, or inside a building.

(1) When the equipment is operated out-of-doors, the main case may be located as far as 100 feet from the control panel. This distance is governed by the length of cables furnished with the equipment (g. 1–2). These cables are part of Radio Set AN/GRC–158 and are stored in the vehicle only when the vehicular cable system is in use. Refer to paragraphs 2–3 and 2–4 for additional information on installation and siting when using the equipment out-of-doors.

(2) When the equipment is operated in a building, external antennas for the transmit-receive transceiver and the receive-only transceiver are required. Refer to appendix A for a partial listing of the technical manuals covering these external antennas; these antennas are not a component part of Radio Sets AN/MRC–117 and AN/GRC–158.

(3) Any power source may be used which furnishes dc or ac voltages of 90 to 140 volts, or 28 volts dc. The minimum power requirement of the voltage source is 1,820 watts, whether the equipment is operated out-of-doors, in a building, or in International Harvester, Crew/Cargo Travellette Model 1200–A commercial truck.

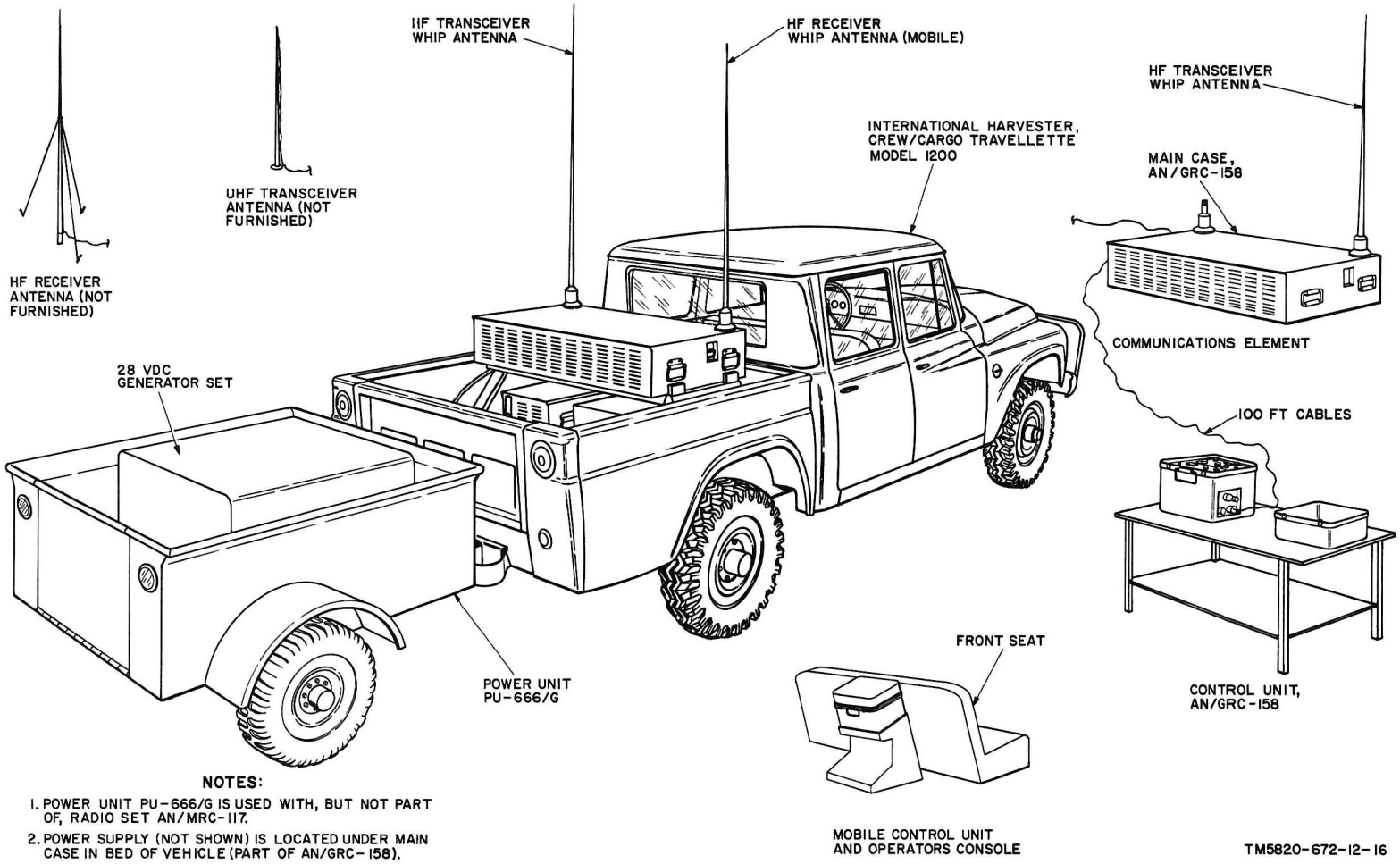


Figure 1-6. Radio Set AN/MRC-117, with Power Unit PU-666/G.

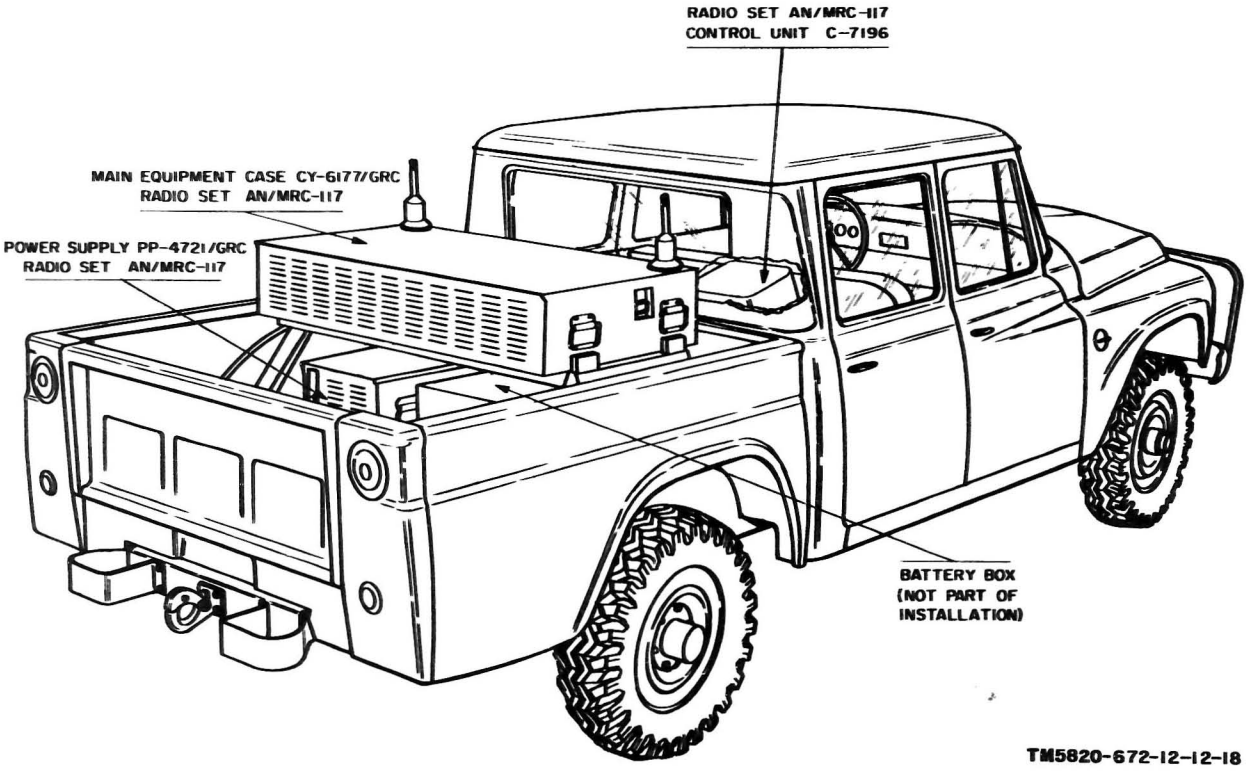


Figure 1-7. Radio Set AN/GRC-158 mounted in Radio Set AN/MRC-117.

CHAPTER 2

INSTALLATION

2-1. Unpacking Radio Set AN/GRC-158

a. Packaging Data. When packed for shipment, the components of Radio Set AN/GRC-158 are placed in three triwall cardboard boxes and one wooden box.

Dimensions (in.)	Volume (cu ft)	Unit weight (lb)	Contents of box
62 x 38 x 31	42.28	510	Main case, two ship antennas, two long-wire antenna adapters, and two rubber antenna insulators.
25 x 19 x 22	6.01	49	Control panel.
37 x 22 x 19	8.91	132	Power supply.
29 x 26 x 20	8.77	139	Cables.
	Total weight	830	

b. Removing Contents. Removing the control panel, power supply, and cables from the shipping boxes is very simple and needs no explanation. However, the box containing the main case is more complex and is illustrated in figure 2-1. Perform the following procedure to remove the main case from the box.

(1) Cut and remove the two metal straps around the box.

(2) Use a nailpuller to remove the nails that secure the top to the box. Remove the top two short boards, and then remove the longer boards in the top center. The remaining two boards on the top are nailed to the sides; remove these two boards last.

(3) Cut the tape around the two antenna bags.

(4) Remove either long side of the wooden box.

(5) The contents of the box can now be removed.

Note. Save the packing materials to the maximum possible extent. These materials may then be used for equipment shipment or limited storage.

2-2. Checking Equipment

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6 (para 1-3).

b. See that the equipment is complete as listed on the packing slip. If a packing slip is not available, check the equipment against the list of Radio Set AN/GRC-158 components (para 1-6). Report all discrepancies in accordance with TM 38-750. Shortage of a minor assembly or part that does not affect proper functioning of the equipment should not prevent use of the equipment.

c. If the equipment has been used or reconditioned, see whether it has been changed by a modification work order (MWO). If the equipment has been modified, the MWO number will appear near the nomenclature plate. Check to see whether the MWO number (if any) and appropriate notations concerning the modification have been entered in the equipment manual.

Note: Current MWO's applicable to the equipment are listed in DA PAM 310-4.

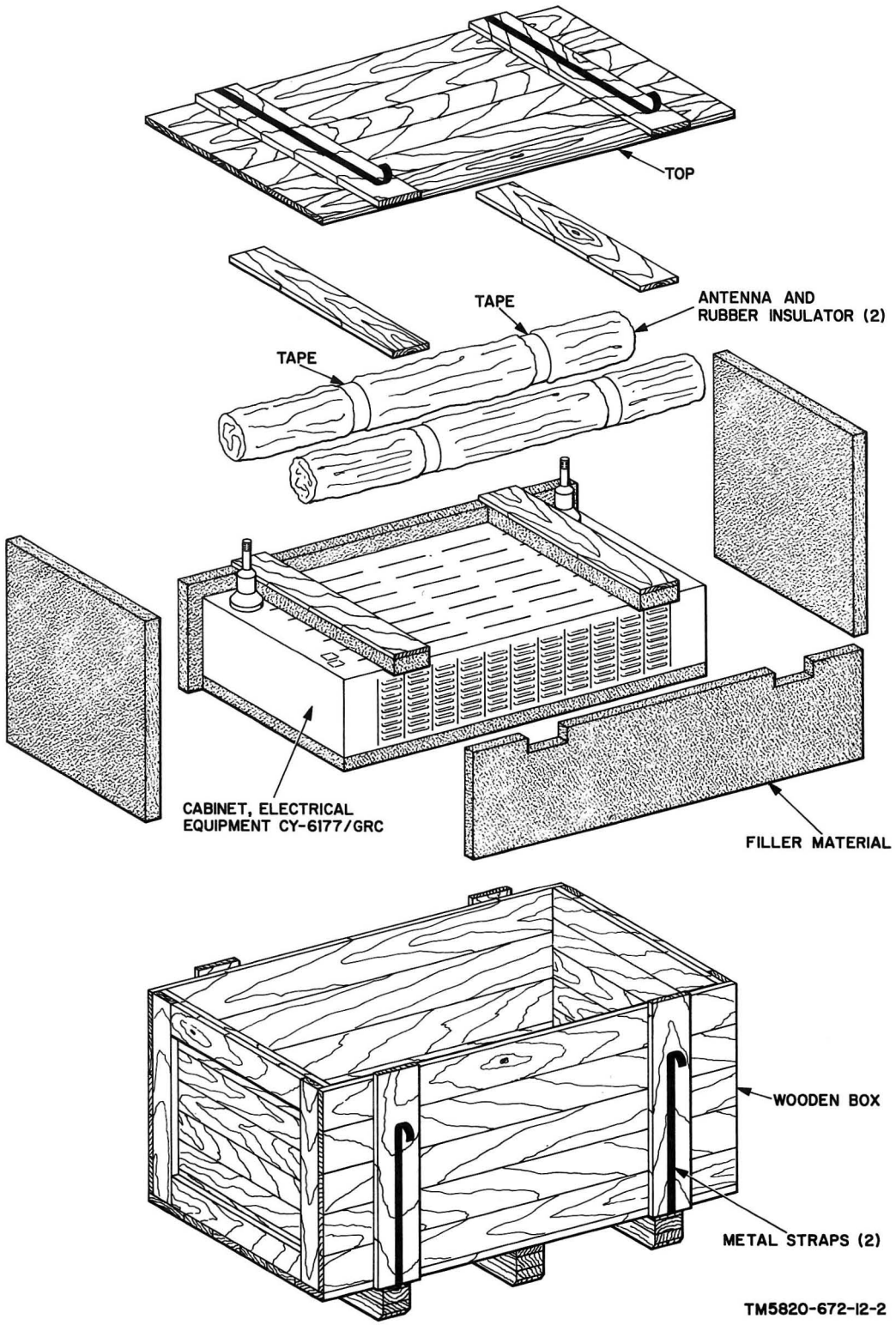


Figure 2-1. Packaging diagram of main case, antennas, and rubber antenna insulator.

2-3. Siting and Shelter Requirements

a. When selecting a site for the radio set, consider antenna location and primary power availability. Primary power must be available at either the main case (28-volt dc input) or the power supply, which converts 90 to 104-volts (ac or dc) to 28 volts dc. If using the whip antennas mounted directly on the main case, the location of the main case must be either out-of-doors or on the vehicles. When using antennas other than the case-mounted whip antennas, locate the main case as near as possible to the external antennas. Consider the following for antenna location:

(1) *Groundwave transmission.*

(*a*) Transmission is generally by groundwave; the stronger the rf output of the transmitter, the greater is the distance covered. However, the groundwave tends to *bend* (refract) in a forward direction. That is, the top of the transmitted radio wave moves slightly more rapidly than the bottom; eventually, the signal bends to such a degree that a further increase in signal strength causes, for all practical purposes, no further increase in distance by groundwave. Therefore, these is a practical limit to groundwave transmission, particularly at the lower frequencies of the transmitting transceiver.

(*b*) At the higher end of the frequency range (near 30 MHz), line-of-sight characteristics become more prominent, and less bending of the signal occurs. Generally speaking, lesser obstructions (trees, low buildings, small hills, etc) have little effect on the groundwave propagation of high frequency (hf) radio signals over the entire frequency range of the radio set.

(2) *Skywave transmission.*

(*a*) Another consideration of propagation is *ionospheric transmission.* In this case, the skywave strikes the ionized layers of atmosphere above the earth and is refracted back toward the earth. The lower the frequency, the greater the index of refraction, and the shorter the distance covered by the skywave from the transmitter to the distance receiver.

(*b*) Near the high end of the frequency range of the radio set, the refracting of the skywave is less pronounced, and distances between the transmitter and remote receiver may increase to hundreds, or even thousands, of miles. However, the antenna of the equipment does not favor directional, long-distance, skywave transmission since it radiates rf energy in all directions, although this propagation possibility cannot be ruled out.

(*c*) At night, the ionospheric layers rise, and signals travel even further distances than they do during the daytime hours. This means that both hostile and friendly forces, some distance from the transmitter, are capable of intercepting traffic sent from the transmitting site. This includes am. (voice) and frequency-shift keying (fsk) (teletype), as well as sideband transmissions.

(*d*) A final consideration is that with a given rf power output, sideband transmission propagates with a higher signal quality for greater distances than does conventional am.

(3) *Antenna height.* The height of the antenna above ground does have a definite effect on the distance of the transmission by groundwave, particularly near the high end (30 MHz) of the frequency range of the transmitter. A simple formula for line-of-sight frequencies is stated below that gives the distance of the radiated signal (on relatively flat or sightly hilly terrain) when the antenna height above the ground is known:

$$D = \sqrt{2H}$$

where D is the distance in miles, and H is the height of the antenna in feet. However, this formula is not applicable below, say, 20 MHz, where line-of-sight characteristics decrease sharply as the frequency is decreased.

Example: If the transmitted frequency is 28 MHz, and the antenna height is given as 32 feet, then 32 X 2 = 64. The square root of 64 is 8. Therefore, with a 32-foot antenna, line-of-sight distance for radio signals is approximately 8 miles. If the frequency is 10 MHz, with the same antenna, the distance would be much greater, and the formula cannot be used.

(4) *Other factors.*

(*a*) If operating near dense woods, try several sites a short distance apart and select the one that gives the best results.

(*b*) In mountainous terrain, the following may be used as sitting guides:

1. Locate the radio set on the side of a hill facing the distant station and high enough to provide a line-of-sight path, if possible.

2. If line-of-sight locations are not available, choose a site as far as possible from the base of the obstruction.

3. River valleys and gaps between mountains may provide transmission paths devoid of high intervening hills.

4. Experimentation with the exact location and orientation of the vehicle or radio set may produce a better signal.

(*c*) In flat country, select any slight rise of terrain in the vicintiy; avoid depressions.

(*d*) In jungles, raising the antenna above the jungle growth will give the best results.

(*e*) In general, transmission and reception are best over water or level ground.

b. Frequency Separation.

(1) Frequency separation between the transmit-receive transceiver and the receive-only transceiver is required at all times. The amount of separation required is 10 percent of the *higher* of the two frequencies.

(2) For example, if the higher of the two frequencies is 20 MHz, 10 percent of 20 MHz is 2 MHz. This means that the other frequency cannot be a frequency closer than 2 MHz to the 20 MHz frequency. Accordingly, the second frequency cannot be one within 18 to 20 MHz if the first frequency is 20 MHz.

(3) Any attempt to operate both frequencies within this 10 percent tolerance limit will cause the preselector to be activated. This, in turn, causes the receive-only transceiver to be inoperative. That is, whenever the transmit-receive transceiver is keyed, the preselector does not allow the receive-only transceiver to receive any rf signals. The preselector must then be cleared manually to allow the receive-only transceiver to function. The manual clearing operation of the preselector is discussed in paragraphs 3–2 and 3–8.

(4) Testing for normal operation of the preselector is discussed in paragraph 4–5, sequence No. 14.

c. The main case is weatherproof and requires no shelter considerations.

d. The control panel can be located as far as 100 feet from the main case. It also is weatherproof and needs no shelter considerations.

e. The power supply can be located as far as 10 feet away from the main case with no shelter considerations.

2–4. Installation Procedures

a. General. Once the equipment is installed as described in paragraphs 2–5, 2–6, and 2–7, the equipment is ready for operation.

b. Main Case. Mounted within the main case are two transceivers, the preselector, the antenna coupler, and the power inverter as described in paragraph 1–8 and shown in figure 1–3. Refer to the outline and mounting dimensions given in figure D–1 to determine the proper mount and space required to install the main case.

c. Control Panel. Mounted within the control panel are two control units as shown in figure 1–4. Refer to the outline and mounting dimensions given in figure D–2 to determine the proper mount and space required to install the control panel.

d. Power Supply. Mounted with the power supply is a power converter as shown in figure 1–5. Refer to the outline and mounting dimensions given in figure D–3 to determine the proper mount and space required to install the power supply.

e. Fuses. The power converter is the only component of the radio set that contains fuses. Two fuses are located behind the front-panel screen as shown in figure 1–5. Insure that these two fuses are installed.

2–5. Interconnecting Equipment

Caution: **The procedures outlined in *a* and *d* below, must be followed carefully to avoid breaking the wires located inside the connectors of the CX–10356/G, CX–10357/G, and CX–10358/G cables.**

a. Remove the protective cap attached to the connector of the CX–10356/G, CX–10357/G, or CX–10358/G cable as follows (fig. 1–2):

(1) Grasp the lower portion of the connector in one hand, and the ring immediately below the protective cap in the other hand.

(2) Hold the lower portion firmly, and twist the ring *clockwise* (looking down from the top) approximately one-quarter of a turn. This releases the cap, which may now be lifted off.

b. Interconnect the control panel and main case as follows:

Note. **The procedure for attaching the CX–10356/G, CX–10357/G, and CX–10358/G cables to the control panel and the main case is similar to the procedure for replacing the protective cap on the cable connectors (*d* below).**

(1) Connect P2 of the CX–10356/G cable to J1, control panel.

(2) Connect P2 of the CX–10357/G cable to J2, control panel.

(3) Connect P2 of the CX–10358/G cable to J3, control panel.

(4) Connect P1 of the CX–10358/G cable to J3, main case.

(5) Connect P1 of the CX–10357/G cable to J2, main case.

(6) Connect P1 of the CX–10356/G to J1, main case.

c. If the power supply is used, interconnect it and the main case as follows:

(1) Connect P1 of the CX–10359/G cable to J5, main case.

(2) Connect P2 of the CX–10359/G cable to J1, power supply.

d. Replacement of the protective cap on the connectors of the CX–10356/G, CX–10357/G, or CX–10358/G cable is as follows (fig. 1–2):

(1) Inspect the inside of the cap, and note the keyed slots. Match these slots with the raised keyed guide markers on the end of the connector.

(2) Place the cap on the connector. Rotate the ring *counterclockwise* (looking down from the top) until the three external pins on the cap fall into the three mated grooves on the ring.

(3) Grasp the lower portion of the connector firmly with one hand, and twist the ring *counterclockwise* with the other hand until a sharp click is heard. The cap is now firmly seated, insuring a watertight seal on the end of the connector.

e. The procedure for removing the CX–10356/G, CX–10357/G, and CX–10358/G cables from the control panel and the main case is similar to the procedure for removing the protective cap on the cable connectors (*a* above). The protective cap on the connectors of the CX–10359/G cable is a standard screw-type configuration and needs no special explanation for removal or replacement.

2-6. Connecting Primary Power

Note. Connection of the input power cable requires the use of a soldering iron. This may be performed at organizational maintenance category, or higher category of maintenance. The color coding of the wire shown in B and C, figure 2-2 follows the Underwriters Laboratory code for commercial wiring of power cables; however, local practices may require a variation in the wiring color code.

a. If the primary power source is three-phase, between 90 and 140 volts line to neutral, four-wire, make the connections to MS3106E-22-22S as shown in A, figure 2-2. Connect MS3106E-22-22S to J2 on the power supply.

b. If the primary power source is single-phase, between 90 and 140 volts line to neutral, three-wire, make the connections to MS1306E-22-22S as shown in B, figure 2-2. Connect MS3106E-22-22S to J2 on the power supply.

c. If the primary power source is single-phase, between 90 and 140 volts line to neutral, two-wire, make the connections to MS3106E-22-22S as shown in C, figure 2-2. Connect MS3106E22-22S to J2 on the power supply.

d. If the primary power source is between 90 and 140 volts dc, make the connections to MS3106E-22-22S as shown in A, figure 2-3. Connect MS3106E-22-22S to J2 on the power supply.

e. If the primary power source is 27.5 volts dc, make the connections to MS3106E-32-5S(C) as shown in B, figure 2-3. Connect MS3106E-32-5S(C) to J4 on the main case.

Note. If primary power is connected to both J2 on the power supply and J4 on the main case, the main case automatically disconnects the primary power connected to J4. If the power supply becomes disabled, the main case switches back to J4 for primary power after a delay of approximately 30 seconds.

2-7. Antenna Installation

(fig. 1-1 and 2-4)

Caution: **Be careful when screwing the sections of the whip antenna together. Loose fragments of fiberglass may be attached to the ends of each antenna section. To reduce the risk of injury to the hands, a pair of heavy-duty gloves is recommended for use by the personnel joining the antenna sections together. All requirements of TB SIG 291 must be observed at all times.**

a. General. Selection of the desired antenna will depend on deployment of the equipment. For direction and high gain, the dipole antenna will be used. For radiation in all directions (omnidirectional usage), a 16- or 32-foot whip antenna is used. The long-wire antenna is very good for receiving weak signals from long distances. Use two different antennas for each transceiver if desired, keeping in mind the varying characteristics of each type of antenna.

Warning: **Before attaching any antennas to the bases mounted on the main case, be sure that all power is OFF and disconnected.**

b. Whip Antenna Kits. Packed with the equipment are two antenna kits (fig. 1-1). Two complete antenna kits allow the use of two whip antennas, one for the receive-only transceiver and the other for the transmit-receive transceiver. Each antenna kit is a 32-foot, eight-section, fiberglass whip antenna for use in the 2-30 MHz frequency range. Four tapered sections mount on the mast base, which is part of the main case, to form a 16-foot flexible whip antenna for vehicular use. The remaining four identical sections may be inserted between the 16-foot flexible portion and the base to form a 32-foot whip for stationary use. The long-wire antenna adapter (fig. 1-1) is packed in a pocket in the canvas antenna bag.

Caution: **Do not use all eight sections (32 feet) of the whip antenna for mobile operation. Damage to whip antenna may result from stricking overhead object. Use only four sections (16 feet) for mobile operation. Assembly of the 16 foot antenna is described below.**

(1) The 16-foot antenna can be used for either or both transceivers. The antenna mount for the receive-only transceiver is marked RECEIVE ANTENNA, and the mount for the transmit-receive transceiver is marked TRANSCEIVER ANTENNA. Erect a 16-foot whip antenna as follows:

(*a*) Screw together whip antenna sections AT-1042/U, AT-1041/U, AT-1040/U, and AT-1039/U, in that order.

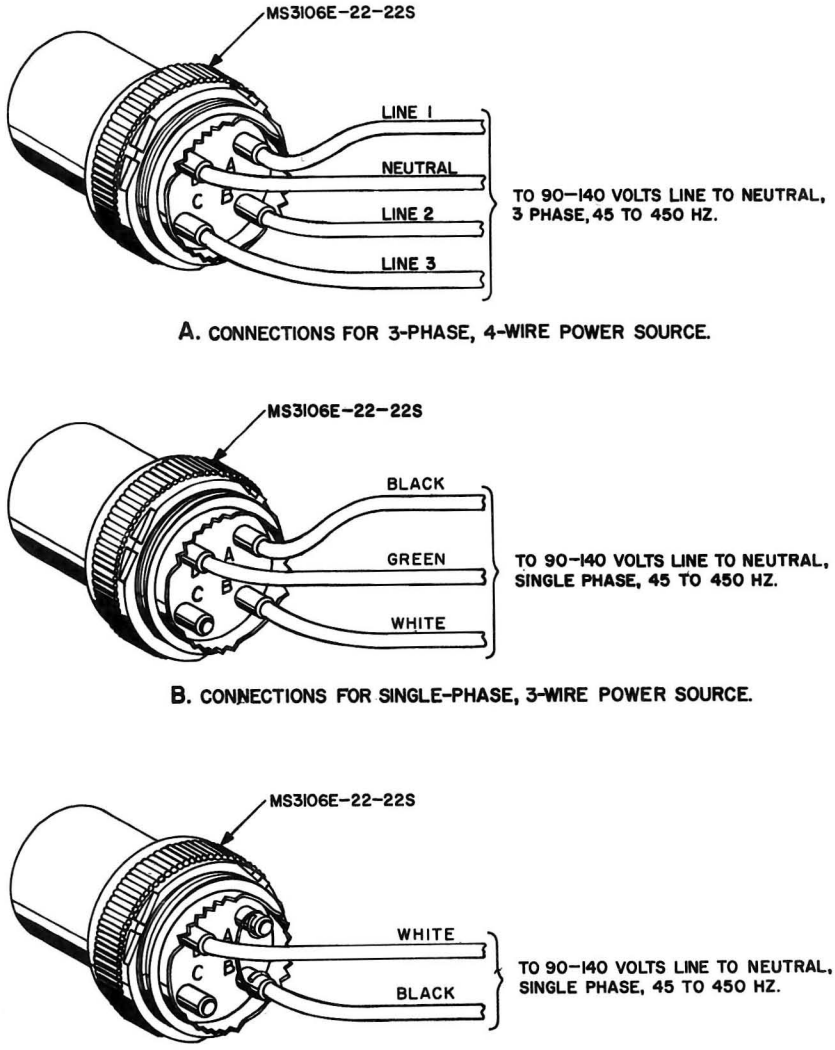


Figure 2-2. Power connections using an ac primary power source.

(*b*) Slide the rubber antenna insulator over antenna section AT-1039/U. The larger end of the antenna insulator must be at the unconnected end of antenna section AT-1039/U.

(*c*) Screw this antenna assembly onto the desired antenna mount.

(*d*) Slide down the rubber antenna insulator so that it covers the antenna mount.

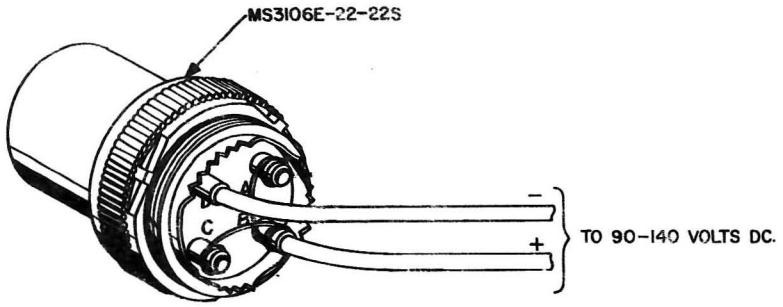
(2) The 32-foot whip antenna is used for fixed operation only. Erect it as follows:

(*a*) There are four identical base extension sections marked AT-1043/U. Screw these four sections together.

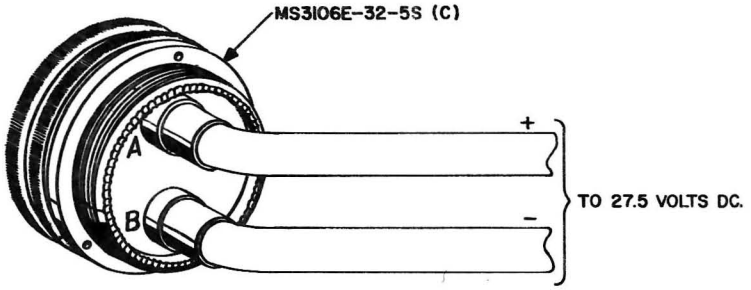
(*b*) Screw together whip antenna sections AT-1042/U, AT-1041/U, AT-1040/U, and AT-1039/U, in that order.

(*c*) Screw together the base extension assembly (assembled in (*a*) above) and the whip antenna assembly (assembled in (*b*) above).

(*d*) Slide the rubber antenna insulator over the first base extension section.



A. CONNECTION FOR A 90 TO 140-VOLT DC POWER SOURCE.



B. CONNECTIONS FOR A 27.5-VOLT DC POWER SOURCE.

TM5820-672-12-10

Figure 2-3. Power connections using a dc primary power source.

The larger end of the antenna insulator must be at the unconnected end of the base extension section.

(*e*) Screw the entire antenna assembly onto the desired antenna mount.

(*f*) Slide down the rubber antenna insulator so that it covers the antenna mount.

c. Dipole Antenna. A dipole antenna, which is a highly directional antenna, can be used for either or both transceivers. The dipole antenna connector for the receive-only transceiver is on the left side of the main case (viewed from the front), and the dipole antenna connector for the transmit-receive transceiver is on the right side. Erect a dipole antenna as follows:

(1) Refer to figure 2-4. Construct the dipole antenna using approximately #14 wire.

(2) A dipole antenna is frequency-sensitive and must be a certain length, depending on the operating frequency of the transceiver. Determine the length by using the following formula:

$$\text{Length (feet)} = \frac{468}{\text{Frequency (megahertz)}}$$

Example: If the operating frequency is 10 MHz, divide 10 into the constant 468. The answer is 46.8. Therefore, the dipole is 46.8 feet long for a frequency of 10 MHz.

(3) Use 75-ohm coaxial cable to connect the dipole antenna to the coaxial connector located under a protective arm on the side of the main case. Lift up on the arm to gain access to the coaxial connector.

2–8. Installation Information, Radio Set AN/MRC–117

(fig. 1–6)

a. General. When received by the user, Radio Set AN/GRC–158 is installed on International Harvester Crew/Cargo Travellette Model 1200–A commercial truck, and all cabling and equipment mountings have been installed in the vehicle. Power Unit PU–666/G (para 1–10*d*) is connected to the vehicle pintle; this equipment is used with, but not part of, Radio Set AN/GRC–158 or AN/MRC–117. The PU–666/G supplies power to Radio Set AN/GRC–158 when the equipment is in a fixed or semifixed mode of operation; however, the AN/GRC–158 is so designed that all commercial power must be disconnected from the equipment so that the PU–666/G may supply power to the AN/GRC–158.

b. Input Power Requirements. Radio Set AN/GRC–158 may be operated from various voltage sources. The following voltage inputs may be used:

(1) 90 to 140 volts, 45 to 450 Hertz, single-phase.

(2) 90 to 140 volts, 45 to 450 Hertz, three-phase.

(3) 90 to 140 volts dc.

(4) 27.5 volts dc.

c. 27.5-Volt Dc Input. The output of Power Unit PU–666/G is 27.5 volts dc. Two generators, capable of supplying the required power, are mounted on an M–416 trailer; a generator transfer switch allows either generator to supply power to the radio set. Operation of the generator transfer switch is described in TM 5–6115–365–15. Power connections are as follows:

(1) Connect the AN/MRC–117 to the PU–666/G with the 35-foot cable attached to the generator transfer switch. Connector P1 connects to J5 on the main case.

(2) Insure that Power Supply PP–4721/GRC is disconnected from J2 on the main case. If commercial power is applied to J2, and 27.5 volts dc is applied to J4 at the same time, the 27.5-volt dc input is automatically disconnected from the main case. Disconnect all power cables from J4 so that the PU–666/G can furnish power to the main case.

(3) Operate the generator transfer switch as described in TM 5–6115–365–15. Operation and maintenance of the 28-volt dc generator sets is described in TM 5–6115–271–15 and TM 5–6115–271–25P.

(4) For operation of Radio Set AN/GRC–158, refer to paragraphs 3–1 through 3–10.

(5) To shut down the 27.5-volt dc operation, turn the generator transfer switch box to OFF and disconnect the 35-foot cable from the connector on the main case.

d. Operatin from Commercial Power. Paragraphs 2–5 and 2–6 describe equipment interconnection and connection of primary power.

e. Installation and Removal of Radio Set AN/GRC–158. Procedures for installing and removing Radio Set AN/GRC–158 are given in paragraph 5–11.

CHAPTER 3

OPERATING INSTRUCTIONS, RADIO SET AN/GRC-158

Section I. OPERATOR'S CONTROLS, INDICATORS, AND JACKS

3-1. Control Panel

All controls, indicators, and jacks used by the operator are located on the control panel. Figure 3-1 illustrates these controls, indicators, and jacks, and paragraph 3-2 describes their functions.

3-2. Control Panel Controls, Indicators, and Jacks

Control, indicator, or jack	Function
Rf power meter	Indicates the amount of rf output power, either forward or reflected, depending upon the position of the meter switch.
Meter switch	Determines whether the rf power meter indicates forward power or reflected power.
	Sw pos: REFL — Connects the rf power meter into the circuit to indicate reflected power (lower scale).
	Sw pos: FWD — Connects the rf power meter into the circuit to indicate forward power (upper scale).
SPEAKER NO. 1 VOL control	Controls the volume of the audio signal received by number 1 transceiver.
Receiver 1 signal indicator	Flashes when number 1 transceiver is receiving a signal. This indicator is not affected by the setting of SPEAKER NO. 1 VOL control.
No. 1 SENS control	Controls the amount of audio signal required to make receiver 1 signal indicator flash.
PHONE PATCH switch	Controls phone patch operation of radio set.
	Sw pos: OFF — Disables phone patch operation.
	Sw pos: HOLD — Simulates an off-the-hook condition for external telephone equipment. In this position, normal communication is possible with radio set, but communication with external telephone equipment is not possible.
	Sw pos: LINE — Allows two-way communications between radio set and external telephone equipment. Rf transmission and reception is disabled.
	Sw pos: RCV — Allows rf reception, and connects audio output of radio set to external telephone equipment.
	Sw pos: XMIT — Allows rf transmission of audio signal from external telephone equipment.
PHONE LINE terminals	Provides a connection for a pair of telephone lines which are connected to external telephone equipment.
HANDSET connector	Connects a handset into the audio input and output circuits.
HEADSET jack	Connects headset into audio output circuit.

Control, indicator, or jack	Function
MIC jack	Connects microphone into audio input circuit.
KEY jack	Connects telegraph key into transceiver key circuit.
HEADSET VOL control	Controls amplitude of audio signal applied to headset.
HEADSET input selector switch (3-position rotary)	Determines which transceiver applies an audio signal to the headset.
	Sw pos: NO. 1 — Connects audio output of number 1 transceiver to headset.
	BOTH — Connects audio outputs of both transceivers to headset.
	NO. 2 — Connects audio output of number 2 transceiver to headset.
SPEAKER NO. 2 VOL control	Controls volume of audio signal received by number 2 transceiver.
Receiver 2 signal indicator	Flashes when number 2 transceiver is receiving a signal. This indicator is not affected by the setting of SPEAKER NO. 2 VOL control.
NO. 2 SENS control	Controls amount of audio signal required to make receiver 2 signal indicator flash.
LAMP TEST pushbutton switch	Enables a check to be made of panel lamps and all indicators.
PANEL LIGHTS control	Controls brightness of panel lights.
TRANSCEIVER SELECT switch (2-position rotary)	Determines which transceiver operates in normal transmit-receive mode and which transceiver operates in receive-only mode.
	Sw pos: NO. 1 XMIT & RECEIVE — Permits number 1 transceiver to operate in normal transmit-receive mode, and locks number 2 transceiver in receive-only mode.
	NO. 2 XMIT & RECEIVE — Permits number 2 transceiver to operate in normal transmit-receive mode, and locks number 1 transceiver in receive-only mode.
No. 1 transmit-receive indicators	Indicates whether HF NUMBER 1 control unit controls transmit-receive transceiver or receive-only transceiver.
No. 2 transmit-receive indicators	Indicates whether HF NUMBER 2 control unit control unit controls transmit-receive transceiver or receive-only transceiver.
XCVR 1 BREAKER indicator	Indicates when number 1 transceiver circuit breakers trip.
XCVR 2 BREAKER indicator	Indicates when number 2 transceiver circuit breakers trip.
COUPLER FAULT indicator	Indicates when antenna coupler fails to tune antenna within 8 to 10 seconds after a new operating frequency is set up.
INVERTER BREAKER indicator	Indicates when power inverter circuit breaker trips.
CONVERTER FAULT indicator	Indicates when power supply has an overload, a high or low input voltage, a high or low output voltage, or a blown fuse. It also indicates when power supply circuit breakers trip.
PRESELECTOR BREAKER indicator	Indicates when preselector circuit breaker trips.

Note: Because the two control units are identical, only the controls and indicators on HF NUMBER 1 control unit are described below.

Control, indicator, or jack	Function
1-MHz frequency selector (28-position rotary)	Adjusts operating frequency in 1-MHz steps.
100-kHz frequency selector switch (10-position rotary)	Adjusts operating frequency in 100-kHz steps.
10-kHz frequency selector switch (10-position rotary)	Adjusts operating frequency in 10-kHz steps.
1-kHz frequency selector switch (10-position rotary)	Adjusts operating frequency in 1-kHz steps.
Mode switch (6-position rotary)	Selects transceiver mode of operation. Except for OFF position, all positions turn on transceiver in addition to the described function.
	Sw pos — Function
	OFF — Removes power from transceiver.
	USB — Sets transceiver in upper-sideband mode.
	LSB — Sets transceiver in lower-sideband mode.
	AM — Sets transceiver in amplitude-modulation mode.
	DATA — Sets transceiver in data mode (FSK).
	CW — Sets transceiver in continuous-wave (telegraph) mode.
RF SENS control	Adjusts rf sensitivity of transceiver.
FAULT/RESET indicator-switch[a]	Indicates when on-frequency rf power is intense enough to overload preselector. When momentarily pressed, it restores preselector to normal operation unless rf overload is still present.
GAIN switch (2-position rotary)[a]	Controls gain of preselector.
	Sw pos — Function
	HI — Permits preselector to provide its normal amplification to incoming rf signal.
	LO — Allows preselector to attenuate incoming rf signal 35 db.

[a]These switches are activated only on the control unit that controls the receive-only transceiver.

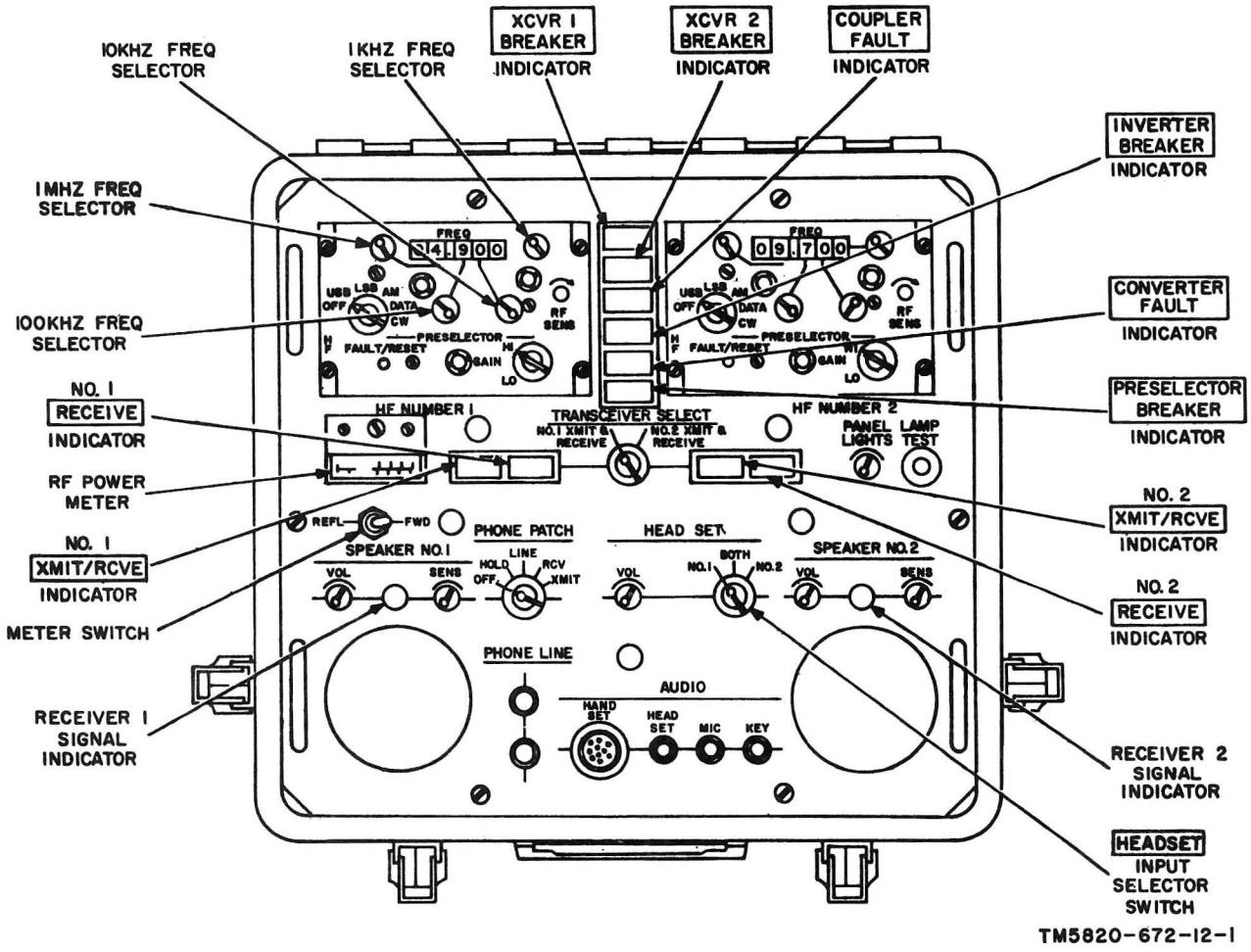


Figure 3–1. Control panel of Control-Monitor, Radio Set C–7196/GRC, showing controls, indicators, and jacks.

Section II. OPERATING PROCEDURES

3–3. General

Radio Set AN/GRC–158 can alternately transmit and receive on one frequency (half-duplex operation) on simultaneously transmit on one frequency and receive on another frequency (duplex operation). A phone patch function built into the radio set enables it to transmit any audio obtained from a pair of telephone lines or to connect audio obtained from rf reception to a pair of telephone lines. When operating half duplex or phone patch, the radio set can constantly monitor a signal other than the operating signal. Refer to paragraph 3–5 for half-duplex operation, paragraph 3–6 for phone patch operation, paragraph 3–7 for adding a constant monitor function to half-duplex or phone operation, or refer to paragraph 3–8 for duplex operation.

3–4. Starting Procedure

a. Remove the cover from the control panel.

b. Make sure that the mode switch on each control unit is set in the OFF position.

c. On the main case, turn on circuit breakers CB1 through CB6 (fig. 3–2). On the power supply, turn on circuit breakers CB1 and CB2 (fig. 3–3).

d. Rotate the RF SENS control on both control units three-fourths clockwise.

e. Set the PHONE PATCH switch to OFF.

f. Rotate SPEAKER NO. 1 VOL and SPEAKER NO. 2 VOL controls fully counterclockwise.

g. Rotate the HEADSET VOL control fully counterclockwise.

h. Set the mode switch on both control units to AM.

Warning: **Performing the next procedure will violate any existing blackout orders imposed in a nighttime tactical situation. This manual does not authorize the violation of existing blackout orders imposed by any command. Death to personnel or heavy damage to equipment may result if unauthorized lights are illuminated.**

i. Release the LAMP TEST pushbutton switch and adjust the PANEL LIGHTS control for the desired amount of panel illumination.

j. Set the TRANSCEIVER SELECT switch to NO. 1 XMIT & RECEIVE or to NO. 2 XMIT & RECEIVE to select the transceiver desired to operate in the transmit-receive mode.

3–5. Half-Duplex Operating Procedures

a. Perform the starting procedures given in paragraph 3–4.

b. Perform the procedure given in *c* below for voice operation, or *d* below for cw operation.

c. Voice Operation.

(1) Remove the microphone, headset, and headset cable from the storage compartment in the control panel cover, and connect them to the proper AUDIO connectors on the monitor.

(2) On the control unit located above the transmit-receive indicator marked XMIT/RCVE, set the mode switch to USB, LSB, or AM to select the desired mode of rf transmission and reception.

(3) Set the four frequency selectors so that the desired operating frequency appears in the FREQ window.

(4) Refer to paragraph 3–9 for audio adjustments and rf transmission.

d. Cw Operation.

(1) Remove the telegraph key from the storage compartment in the control panel cover, and plug it into the KEY jack on the monitor.

(2) On the control unit located above the transmit-receive indicator marked XMIT/RCVE, set the mode switch to CW.

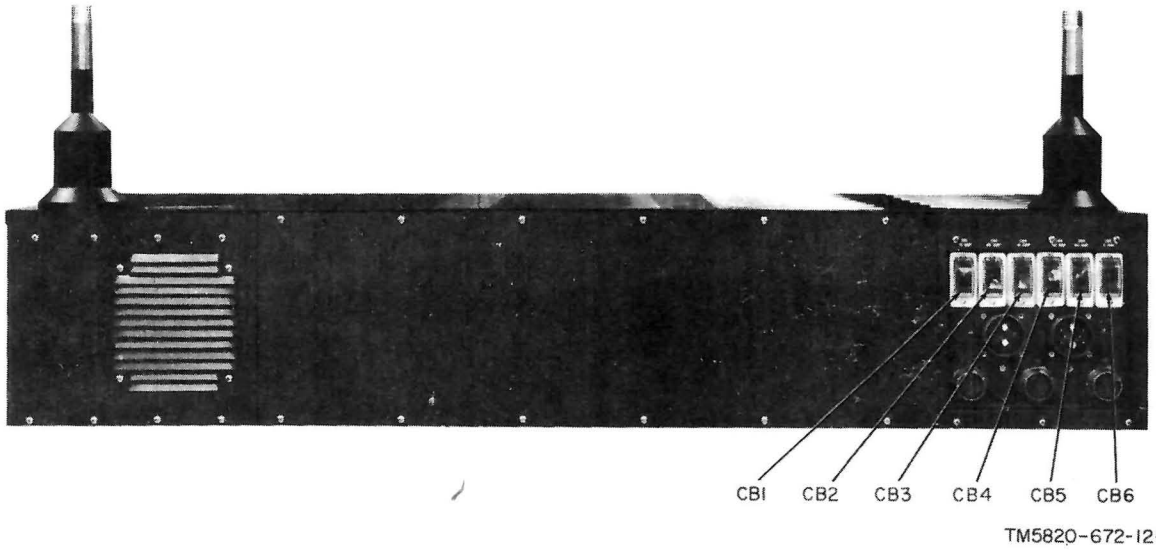


Figure 3–2. Circuit breaker on Cabinet, Electrical Equipment CY–6177/GRC, rear view.

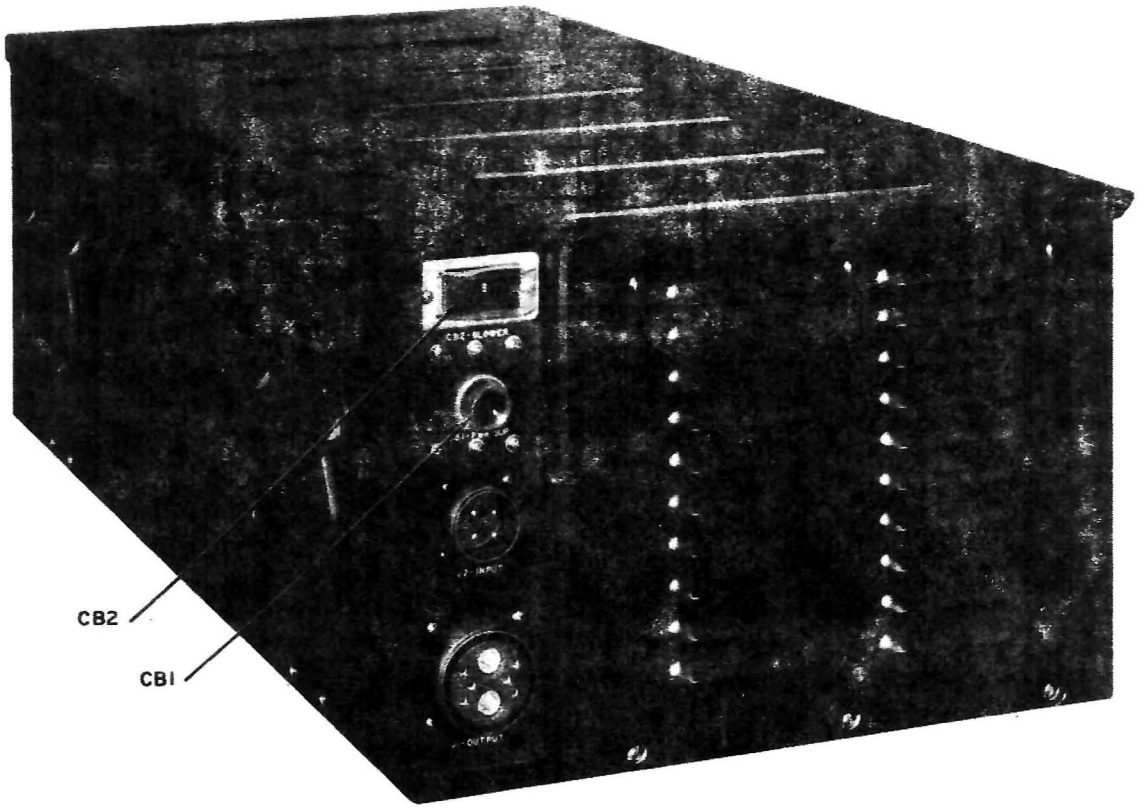


Figure 3-3. Circuit breakers on Power Supply PP-4721/GRC.

(3) Set the four frequency selectors so that the frequency appearing in the FREQ window is 1 kilohertz (kHz) below the assigned operating frequency.

(4) Refer to paragraph 3-9 for audio adjustments and rf transmission.

3-6. Phone Patch Operating Procedures

a. Perform the starting procedures given in paragraph 3-4.

b. Remove the microphone from the storage compartment in the control panel cover, and connect it to the MIC jack on the monitor.

c. Connect the telephone lines to the PHONE LINE terminals on the monitor.

d. On the control unit located above the transmit-receive indicator marked XMIT/RCVE, set the mode switch to AM.

e. Set the four frequency selectors so that the desired operating frequency appears in the FREQ window.

f. Adjust SPEAKER NO. 1 VOL control or SPEAKER NO. 2 VOL control until receiver background noise is heard. SPEAKER NO. 1 is used when the TRANSCEIVER SELECT switch is set to NO. 1 XMIT & RECEIVE, and SPEAKER NO. 2 is used when the TRANSCEIVER SELECT switch is set to NO. 2 XMIT & RECEIVE.

g. Key the transmitter by momentarily pressing the push-to-talk switch on the microphone. This places the antenna coupler in the tune cycle. While the antenna coupler is tuning, a tune tone is heard from the speaker. When the tune tone ceases, the radio set is ready for rf transmission.

h. Set the meter switch to FWD. Press the push-to-talk switch on the microphone. The rf power meter should indicate not less than 80 watts (read on the upper scale).

i. Release the push-to-talk switch, and set the meter switch to REFL. Press the push-to-talk switch. The rf power meter should indicate not more than 10 watts (read on the lower scale). Release the push-to-talk switch.

j. Select one of the following modes of the PHONE PATCH switch:

(1) Set the PHONE PATCH switch to HOLD to keep the external telephone line open. With the PHONE PATCH switch in this position, no phone patch transmission or reception can be accomplished, nor can communication be established between the radio operator and the external telephone operator. However, the radio operator can transmit and receive normally.

(2) Set the PHONE PATCH switch to LINE to establish communication between the radio operator and the external telephone operator. To talk to the external telephone operator, press the push-to-talk switch on the microphone and speak into the microphone. Release the push-to-talk switch to listen to the external telephone operator. Normal rf transmission and reception is not possible with the PHONE PATCH switch in this position.

(3) Set the PHONE PATCH switch to RCV so that the external telephone operator can hear the audio signal received by the radio set. Adjustment of the RF SENS control may be necessary to provide a good listening level for the external telephone operator.

(4) Set the PHONE PATCH switch to XMIT to allow transmission of the audio from the external telephone equipment. At the same time, the radio operator can transmit by pressing the push-to-talk switch on the microphone and speaking into the microphone.

(5) Set the PHONE PATCH switch to OFF when the phone patch operation is complete or if it is not to be used.

3–7. Adding a Constant Monitor Function to Half-Duplex or Phone Patch Operating Procedure

a. Perform the procedures given in paragraph 3–5 or 3–6.

b. On the control unit located above the transmit-receive indicator marked RECEIVE, set the mode switch to USB, LSB, AM, or CW to select the desired mode of rf reception.

c. Set the four frequency selectors so that the desired frequency appears in the FREQ. window. When operating in the cw mode, set the frequency 1 kHz below the assigned frequency.

Caution: **The monitoring frequency must be separated from the transmit frequency by at least 10 percent. If this separation is not present, the preselector will overload and give a FAULT indication on the control unit located above the transmit-receive indicator marked RECEIVE. When this occurs, separate the transmit and receive frequency by at least 10 percent and press the FAULT/RESET indicator-switch to restore the preselector to normal operation.**

d. Refer to paragraph 3–9*a*, *b*, and *c* for the audio adjustment.

3–8. Duplex Operating Procedure

Perform the starting procedures given in paragraph 3–4, and then perform the procedures given in *a* below for voice operation, or *b* below for cw operation.

a. Voice Operation.

(1) Remove the microphone, headset, and headset cable from the storage compartment in the control panel cover, and connect them to the proper AUDIO connectors on the monitor.

(2) On the control unit located above the transmit-receive indicator marked XMIT/RCVE, set the mode switch to USB, LSB, or AM to select the desired mode of rf transmission.

(3) On the control unit located above the transmit-receive indicator marked RECEIVE, set the mode switch to USB, LSB, or AM to select the desired mode of rf reception.
(4) Select the transmit frequency on the control unit located above the transmit-receive indicator marked XMIT/RCVE.
(5) Select the receive frequency on the control unit located above the transmit-receive indicator marked RECEIVE.

Caution: **The receive frequency must be separated from the transmit frequency by at least 10 percent. If this separation is not present, the preselector will overload and give a FAULT indication on the control unit located above the transmit-receive indicator marked RECEIVE. When this occurs, separate the transmit and receive frequency by at least 10 percent, and push the FAULT/RESET indicator-switch to restore the preselector to normal operation.**

(6) Refer to paragraph 3–9 for audio adjustment and rf transmission.

b. Cw Operation.
(1) Remove the telegraph key from the storage compartment in the control panel cover, and plug it into the KEY jack on the monitor.
(2) Set the mode switch on both control units to CW.
(3) Select the transmit frequency on the control unit located above the transmit-receive indicator marked XMIT/RCVE. To be on the assigned transmit frequency, set the four frequency selector switches so that the frequency indicated in the FREQ window is 1 kHz below the assigned transmit frequency.
(4) Select the receive frequency on the control unit located above the transmit-receive indicator marked RECEIVE. To be on the assigned receive frequency, set the four frequency selector switches so that the frequency indicated in the FREQ window is 1 kHz below the assigned receive frequency.

Caution: **The receive frequency must be separated from the transmit frequency by at least 10 percent. If this separation is not present, the preselector will overload and give a FAULT indication on the control unit located above the transmit-receive indicator marked RECEIVE. When this occurs, separate the transmit and receive frequency by at least 10 percent, and push the FAULT/RESET indicator-switch to restore the preselector to normal operation.**

(5) Refer to paragraph 3–9 for audio adjustment and rf transmission.

3–9. Audio Output Adjustments and Rf Transmission

a. To use the speakers in the monitor, adjust the following controls:
(1) SPEAKER NO. 1 VOL control for the desired level of audio from number 1 transceiver.
(2) SPEAKER NO. 2 VOL control for the desired level of audio from number 2 transceiver.

b. To use the headsets, set the HEADSET input selector switch to one of the following positions:
(1) NO. 1 if the audio from number 1 transceiver is desired.
(2) NO. 2 if the audio from number 2 transceiver is desired.
(3) BOTH if the audio from both number 1 and number 2 transceivers is desired.

c. Adjust the HEADSET VOL control for the desired level of audio from the headsets.

d. Key the transmitter by holding the telegraph key down for approximately 1 second, or by momentarily pressing the push-to-talk switch on the microphone. This places the antenna coupler in the tune cycle. While the antenna coupler is tuning, the transceiver operat-

ing in the transmit-receive mode produces a tune tone which is heard from the headset or applicable speaker. When the tune tone ceases, the radio set is ready for rf transmission.

e. Check the output power as follows:

(1) On the control unit located above the transmit-receive indicator marked XMIT/RCVE, set the mode switch to AM.

(2) On the monitor, set the meter switch to FWD.

(3) Press the push-to-talk switch on the microphone. The rf power meter should indicate not less than 80 watts (read on the upper scale).

(4) Release the push-to-talk switch, and set the meter switch to REFL.

(5) Press the push-to-talk switch. The rf power meter should indicate no more than 10 watts (on the lower scale).

(6) Release the push-to-talk switch, and return the mode switch to its original setting (USB, LSB, CW, or AM).

f. For voice operation, transmit by pressing the push-to-talk switch on the microphone and speaking into the microphone. Sidetone should be heard from the speaker (or headset) while speaking. For cw operation, transmit by operating the telegraph key. Sidetone should be heard from the speaker (or headset) while operating the telegraph key.

g. When operating half duplex, receive a signal by releasing the push-to-talk switch, or stop operating the telegraph key. Make fine adjustments on the applicable RF SENS and speaker VOL controls.

h. When operating duplex, receive a signal by making fine adjustments to the RF SENS and speaker VOL controls of the transceiver operating in the receive-only mode.

i. While listening to the audio from SPEAKER NO. 1, adjust the No. 1 SENS control until the receiver 1 signal indicator blinks with the audio signal.

j. While listening to the audio from SPEAKER NO. 2, adjust the No. 2 SENS control until the receiver 2 signal indicator blinks with the audio signal.

3–10. Stopping Procedures

a. Set the mode switch on both control units to OFF.

b. Turn off circuit breakers CB1 through CB6 on the main case and circuit breakers CB1 and CB2 on the power supply.

c. Store the microphone, telephone key, headset, and headset cable in the control panel cover.

d. Place the cover over the control panel, and secure with the four latches.

CHAPTER 4

OPERATOR'S MAINTENANCE, RADIO SET AN/GRC-158

4-1. General

The maintenance duties assigned to the operator of Radio Set AN/GRC-158 are listed below with a reference to the paragraph covering the specific maintenance function.

a. Operator's daily preventive maintenance checks and services (para 4-5).

b. Cleaning (para 4-6).

c. Troubleshooting (para 4-7).

4-2. Operator's Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

a. Systematic Care. The procedures given in paragraphs 4-3 through 4-7 cover routine systematic care and cleaning essential to proper upkeep and operation of the equipment.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services chart (para 4-5) outline functions to be performed at daily intervals. These checks and services are to maintain Army electronic equipment in a combat serviceable condition; that is, in good general (physical) condition and in good operating condition. To assist operators in maintaining combat serviceability, the chart indicates what to check, how to check, and what the normal conditions are; the *References* column lists the illustrations, paragraphs, or manuals that contain detailed repair or replacement procedures. If the defect cannot be remedied by the operator, higher category of maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

4-3. Materials Required for Operator's Maintenance

a. Cleaning Compound (Federal stock No. 7930-395-9542).

b. Cleaning cloths.

c. Soft-bristled brush.

4-4. Operator's Preventive Maintenance Checks and Services Period

Operator's preventive maintenance checks and services of the radio set are required daily. Paragraph 4-5 specifies checks and services that must be accomplished daily, or under the special conditions listed below:

a. Before the radio set is sent on a mission.

b. When the radio set is initially installed.

c. When the equipment is reinstalled after removal for any reason.

d. At least once each week if the radio set is maintained in standby condition.

Warning: **Set the mode switch on both control units to OFF before performing any physical checks and services. High voltages are present at some of the connections and at the whip antenna. Make certain that all instructions covering whip antennas in TB SIG 291 are met when inspecting the radio set.**

4-5. Operator's Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	References
		Physical checks	
1	Components of radio set --------	See that radio set is complete. Replace all missing items.	Para 1-6.

Sequence No.	Item to be inspected	Procedure	References
2	Cables and connectors	Check cables and cable connectors for cracks and breaks. Be sure that connectors do not have bent pins or cracked insulation.	Fig. 1-2.
3	Interconnect cabling	See that the interconnect cabling is securely fastened to the radio set equipment.	Para 2-5.
4	Whip antennas and rubber antenna insulators.	Inspect the whip antenna for loose, dirty, or corroded joints. Inspect the rubber antenna insulators for cracks.	Fig. 1-1.
		Operational checks	
5	Knobs, dials, and switches	While making operating checks (items 6 through 15), observe that the mechanical action of each knob, dial, and switch is smooth and that there are no signs of binding or looseness. *Note.* If a fault or breaker indicator lamp lights while making the following operating checks, refer to the trouble-shooting chart given in paragraph 4-7.	Fig. 3-1.
6	Preliminary	Perform the preliminary starting procedures.	Para 3-4.
7	LAMP TEST pushbutton switch	Press the LAMP TEST pushbutton switch, and note that all control panel lamps and all indicator lamps on the control panel light.	Para 4-7.
8	Blowers	Be sure that the blowers in the main case and the power supply are operating by placing the hand near the air exhaust port on both units and noting the exhausting air.	Para 4-7.
9	SPEAKER NO. 1 VOL control	Adjust clockwise and counterclockwise, and note that noise varies from SPEAKER NO. 1.	Para 4-7 and fig. 3-1.
10	SPEAKER NO. 2 VOL control	Adjust clockwise and counterclockwise, and note that noise varies from SPEAKER NO. 2.	Para 4-7 and fig. 3-1.
11	HEADSET controls	*a.* Plug the headsets into the HEADSET jack. Set the HEADSET input selector switch to NO. 1, and adjust the HEADSET VOL control clockwise and counterclockwise. Note that the noise varies from the headsets.	Para 4-7 and fig. 3-1.
		b. Set the HEADSET input selector switch to NO. 2, and adjust the HEADSET VOL control clockwise and counterclockwise. Note that the noise varies from the headset.	Para 4-7 and fig. 3-1.
		c. Set the HEADSET input selector switch to BOTH, and note that noise from both transceivers is heard in the headsets.	Para 4-7 and fig. 3-1.
12	HF NUMBER 1 transmit function.	*a.* Set the TRANSCEIVER SELECT switch to NO. 1 XMIT & RECEIVE.	Fig. 3-1.
		b. Set the frequency on HF NUMBER 1 control unit to 6.444 MHz and the frequency on HF NUMBER 2 control unit to 3.222 MHz.	Fig. 3-1.

Sequence No.	Item to be inspected	Procedure	References
	***Warning*: The following maintenance procedure requires the breaking of radio silence. This manual does not authorize the breaking of radio silence imposed by any command. Death to personnel and severe damage to equipment may result if the transmitter is keyed inadvertently.**		
		c. Press push-to-talk switch on microphone. Note that a *tune tone* is heard from a speaker while the radio set is tuning.	Para 4–7 and fig. 3–1.
		d. Set meter switch to FWD, and press the push-to-talk switch on the microphone. Note that the rf power meter indicates no less than 80 watts.	Para 4–7 and fig. 3–1.
		e. Set meter switch to REFL, and press push-to-talk switch. Note that rf power meter indicates no more than 10 watts.	Para 4–7 and fig. 3–1.
13	HF NUMBER 2 transmit function.	Set the TRANSCEIVER SELECT switch to NO. 2 XMIT & RECEIVE, and repeat steps *c*, *d*, and *e* of item 12 above.	Fig. 3–1.
14	Preselector in main case ------	*a.* Set the frequency on HF NUMBER 1 control unit to 3.544 MHz, and press the push-to-talk switch on the microphone. Note that the FAULT/RESET indicator-switch on HF NUMBER 1 control unit does not light.	Para 4–7 and fig. 3–1.
		b. Set the frequency on HF NUMBER 1 control unit to 3.222 MHz, and press the push-to-talk switch on the microphone. Note that the FAULT/RESET indicator-switch lamp on HF NUMBER 1 control unit lights.	Para 4–7 and fig. 3–1.
		c. Release push-to-talk switch, and press the FAULT/RESET indicator switch. Note that FAULT/RESET indicator switch lamp no longer lights.	Para 4–7 and fig. 3–1.
15	PHONE PATCH switch --------	*Note:* Perform the following precedures only if external telephone equipment is available.	
		a. Connect the external telephone equipment to the PHONE LINE terminals.	
		b. Set PHONE PATCH switch to LINE, and use the microphone to establish two-way communication with the external telephone equipment.	Para 4–7 and fig. 3–1.
		c. Set PHONE PATCH switch to RCV, and note that noise is heard from a speaker. Verify that noise is also heard at external telephone equipment.	Para 4–7 and fig. 3–1.
		d. Set PHONE PATCH switch to XMIT, and set the frequency control knobs on HF NUMBER 2 control unit to a new frequency. Note that a tune tone is heard from a speaker as the radio set tunes.	Para 4–7 and fig. 3–1.
		e. Set PHONE PATCH switch to OFF.	

4-6. Cleaning Exterior Surfaces

a. Remove dust and loose dirt with a clean, soft cloth.

Warning: **Cleaning compound is flammable and its fumes are toxic. Provide adequate ventilation. Do not use near a flame.**

b. Remove ground-in dirt, grease, and fungus from the surfaces; use a cloth dampened (not wet) with cleaning compound.

c. Remove dust and dirt from plugs and jacks with a brush.

Caution: **Do not press on the meter and indicator faces (glass) when cleaning; the meter or indicator may become damaged.**

d. Clean the front panels, meters, control knobs, and switches; use a clean, soft cloth. If dirt is difficult to remove, dampen the cloth with water; mild soap may be used for more effective cleaning.

4-7. Troubleshooting Chart

Item No.	Trouble symptom	Probable trouble	Check and corrective measures
1	Radio set completely inoperative, or radio set operates but CONVERTER FAULT indicator lamp lighted.	Either or both fuses defective in power converter.	Refer to trouble to higher category of maintenance for repair.
2	XCVR 1 BREAKER indicator lamp lighted.	Circuit breaker CB1 (or CB2) on main case tripped.	Turn on circuit breaker CB1 (or CB2). If the circuit breaker continues to trip, refer trouble to a higher category of maintenance for repair.
3	XCVR 2 BREAKER indicator lamp lighted.	Circuit breaker CB3 (or CB4) on main case is tripped.	Turn on circuit breaker CB3 (or CB4). If circuit breaker continues to trip, refer trouble to a higher category of maintenance for repair.
4	COUPLER FAULT indicator lamp lighted.	Antenna coupler is overheated ____	Let radio set operate in receive mode for a few minutes. If the COUPLER FAULT indicator lamp continues to light, refer trouble to a higher category of maintenance for repair.
5	INVERTER BREAKER indicator lamp lighted.	Circuit breaker CB5 on main case is tripped.	Turn on circuit breaker CB5. If circuit breaker continues to trip, refer trouble to a higher category of maintenance for repair.
6	Radio set is inoperative and CONVERTER FAULT indicator lamp lighted.	An overvoltage occurred on primary power input, or circuit breaker CB1 and/or CB2 on power supply is tripped.	Set mode switch on both control units to OFF. Turn off circuit breakers CB1 and CB2 on power supply. Return circuit breakers back to on, and set mode switch on both control units to AM. If CONVERTER FAULT indicator lamp continues to light, refer trouble to higher category of maintenance for repair.
7	Entire control panel does not light when LAMP TEST pushbutton switch is pressed.	Burned out or loose lamps in control panel.	Refer trouble to higher category of maintenance for repair.

Item No.	Trouble symptom	Probable trouble	Check and corrective measures
8	Main case blowers do not operate.	Interlock switches in main case not enabled.	Be sure that plate covering antenna coupler at rear of main case is in place and is secure. If main case blowers are still inoperative, refer trouble to higher category of maintenance for repair.
9	Noise cannot be heard from SPEAKER NO. 1.	Number 1 transceiver in main case is defective, or control panel is defective.	Refer trouble to higher category of maintenance for repair.
10	Noise cannot be heard from SPEAKER NO. 2.	Number 2 transceiver in main case is defective, or control panel is defective.	Refer trouble to higher category of maintenance for repair.
11	Adjustment of SPEAKER NO. 1 VOL control does not cause noise to vary from SPEAKER NO. 1.	Defective control panel	Refer trouble to higher category of maintenance for repair.
12	Adjustment of SPEAKER NO. 2 VOL control does not cause noise to vary from SPEAKER NO. 2.	Defective control panel	Refer trouble to higher category of maintenance for repair.
13	Adjustment of HEADSET VOL control does not cause noise to vary from headset.	Defective control panel	Refer trouble to higher category of maintenance for repair.
14	Noise cannot be heard from headsets when HEADSET input selector switch is in one of its positions.	Defective control panel	Refer trouble to higher category of maintenance for repair.
15	Tune tone is not heard when radio set is tuning.	Defective transceiver in main case	Refer trouble to higher category of maintenance for repair.
16	Rf power meter gives an incorrect indication.	Defective transceiver in main case or a defective control panel.	Refer trouble to higher category of maintenance for repair.
17	FAULT/RESET indicator-switch lamp lighted.	Receiver frequency is within 10 percent of transmit frequency.	Separate receive frequency 10 percent or more from transmit frequency. Momentarily press FAULT/RESET indicator-switch. If FAULT/RESET indicator-switch lamp is still lighted, refer trouble to higher category of maintenance for repair.
18	Two-way communication cannot be established between radio set operator and telephone operator in phone patch operation.	Defective control panel	Refer trouble to higher category of maintenance for repair.
19	Noise cannot be heard from a speaker or external telephone equipment with PHONE PATCH switch set to RCV.	Defective control panel	Refer trouble to higher category of maintenance for repair.
20	Tune tone not heard with PHONE PATCH switch set to XMIT and radio set tuning to a new frequency.	Defective control panel	Refer trouble to higher category of maintenance for repair.

CHAPTER 5

ORGANIZATIONAL MAINTENANCE, RADIO SET AN/GRC–158

Section I. MAINTENANCE INSTRUCTIONS

5–1. Scope of Organizational Maintenance

a. This chapter contains instructions which cover organizational maintenance of Radio Set AN/GRC–158. It includes instructions for performing preventive and periodic maintenance services and repair functions by the organizational repairman.

b. Lubrication of the radio set is not required at the organizational category of maintenance.

c. Organizational maintenance of the radio set includes the following:

(1) Quarterly preventive maintenance (para 5–4 and 5–5).
(2) Cleaning of air filters (para 5–6).
(3) Cleaning and touchup painting (para 5–7).
(4) Troubleshooting (para 5–9).
(5) Replacement of components, air filters, and lamps (para 5–10).

5–2. Tools and Materials Required for Organizational Maintenance

a. Tools. Tool Kit, Operations Central TK–101/G is the authorized kit for organizational maintenance.

b. Materials.

(1) Cleaning Compound (Federal stock No. 7930–395–9542)
(2) Cleaning cloths.
(3) Fine sandpaper.
(4) Paint, olive drab.

5–3. Organizational Preventive Maintenance

a. Preventive maintenance is the systematic care, inspection, and servicing of equipment to maintain it in a serviceable condition, prevent breakdowns, and assure maximum operational capability. Preventive maintenance is the responsibility of all categories of maintenance concerned with the equipment and includes the inspection, testing, and repair of units that inspection and tests indicate would probably fail before the next scheduled periodic service. Preventive maintenance checks and services of Radio Set AN/GRC–158 are made quarterly, or monthly if directed by the commanding officer.

b. Maintenance forms and records to be used and maintained on this equipment are specified in TM 38–750.

5–4. Quarterly Maintenance

Quarterly preventive maintenance checks and services on Radio Set AN/GRC–158 are required. Periodic daily (or weekly) services constitute a part of the quarterly preventive maintenance checks and services and must be performed concurrently. All deficiencies or shortcomings will be recorded in accordance with the requirements of TM 38–750. Perform all the checks and services listed in the quarterly preventive maintenance checks and services chart (para 5–5) in the sequence listed.

5–5. Organizational Quarterly Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	References
1	Completeness	See that the equipment is complete	Para 1–6.
2	Installation	See that the equipment is installed properly	Para 2–4 thru 2–7.
3	Cleanliness	See that the equipment is clean	Para 4–6.

Sequence No.	Item to be inspected	Procedure	References
4	Preservation	Check all surfaces for evidence of fungus. Remove rust and corrosion, and spot-paint bare spots.	Para 5-7.
5	Publications	See that all publications are complete, serviceable, and current.	DA Pam 310-4.
6	Modifications	Check DA Pam 310-4 to determine whether new applicable MWO's have been published. All URGENT MWO's must be applied immediately. All ROUTINE MWO's must be scheduled.	TM 38-750 and DA Pam 310-4.
7	Air filters	Remove the front panel from the main case and power supply. Inspect the air filters mounted behind the front panels. Also inspect the air filters in the two transceivers. Clean them if necessary. *Note:* The air filters should be inspected and, if necessary, cleaned weekly or daily if the radio set is operated in extremely dusty or dirty areas.	Para 5-6.
8	Knobs, dials, and switches	While making the following operating checks (items 10 through 15), observe that the mechanical action of each knob, dial, and switch is smooth, and that there is no external or internal binding. *Note:* If a fault or breaker indicator lamp lights while making the following operational checks, refer to the troubleshooting chart (para 5-9).	
9	Panel lamps	Perform the starting procedures (para 3-4), and press the LAMP TEST pushbutton switch. All control panel lamps should light.	Para 5-9.
10	Blowers	Check blowers as described in item 8, paragraph 4-5.	Para 5-9.
11	SPEAKER NO. 1 VOL and SPEAKER NO. 2 VOL controls.	Check the two VOL controls as described in items 9 and 10, paragraph 4-5.	Para 5-9.
12	HEADSET controls	Check the HEADSET control as described in item 11, paragraph 4-5.	Para 5-9.
13	HF NUMBER 1 and HF NUMBER 2 transmit functions.	Check the transmit functions as described in items 12 and 13, paragraph 4-5.	Para 5-9.
14	Preselector	Check the preselector in the main case as described in item 14, paragraph 4-5.	Para 5-9.
15	PHONE PATCH switch	Check the PHONE PATCH switch as described in item 15, paragraph 4-5.	Para 5-9.

5-6. Cleaning Air Filters

a. Remove the air filter from the main case or power supply (para 5-10*g*), or from the transceivers.

b. Slowly immerse the filter, dirty side up, in warm water to which a mild detergent has been added.

c. Remove the dirt with a slight up-and-down motion of the filter.

d. Rinse the air filter in clear water and allow it to air-dry.

e. Replace the air filter (para 5-10*g*).

5-7. Cleaning and Touchup Painting

Note: Refer to the applicable cleaning and refinishing practices specified in TB SIG 364.

a. Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper.

b. Brush two thin coats of paint (para 5-2*b*) on the bare metal to protect it from further corrosion.

Section II. TROUBLESHOOTING

5-8. General

Organizational troubleshooting of the radio set is based on the operational checks contained in the quarterly preventive maintenance checks and services chart. To troubleshoot the radio set, perform all functions starting with sequence No. 9 in the chart (para 5-5), and proceed through the subsequent procedures until an abnormal condition or result is observed. When an abnormal condition or result is observed, refer to the applicable trouble symptom in the troubleshooting chart (para 5-9). Perform the checks and corrective measures indicated for that trouble symptom in the troubleshooting chart. If the corrective measures indicated do not result in correction of the trouble, higher category of maintenance is required.

5-9. Troubleshooting Chart

Item No.	Trouble symptom	Probable trouble	Checks and corrective measures
1	Radio set completely inoperative, or radio set operates but CONVERTER FAULT indicator lamp lighted.	Either or both fuses defective in power supply.	Remove the power supply front panel, and the power converter front screen. Replace the defective fuse or fuses (para 5-10*i*).
2	XCVR 1 BREAKER indicator lamp lighted.	Circuit breaker CB1 (or CB2) on main case is tripped.	Turn on circuit breaker CB1 (or CB2). If curcuit breaker continues to trip, replace number 1 transceiver (para 5-10*b*).
3	XCVR 2 BREAKER indicator lamp lighted.	Circuit breaker CB3 (or CB4) on main case is tripped.	Turn on circuit breaker CB3 (or CB4). If circuit breaker continues to trip, replace number 2 transceiver (para 5-10*b*).
4	COUPLER FAULT indicator lamp lighted.	Main case antenna coupler overheated.	Let radio set operate in the receive mode for a few minutes. If COUPLER FAULT indicator continues to light, replace antenna coupler (para 5-10*c*).
5	INVERTER BREAKER indicator lamp lighted.	Circuit breaker lamp CB5 in the main case is lighted.	Turn on circuit breaker CB5. If the circuit breaker continues to trip, replace power inverter in main case (para 5-10*d*).
6	Radio set is inoperative, and CONVERTER FAULT indicator lamp lighted.	An overvoltage occurred on the primary power input, or circuit breaker CB1 (or CB2) on the power supply is tripped.	Set mode switch on both control units to OFF. Turn off circuit breakers CB1 and CB2 on the power supply. Return circuit breakers back to on. and set mode switch on both control units to AM. If CONVERTER FAULT indicator continues to light, replace power converter in power supply (para 5-10*f*).
7	Entire control panel does not light when LAMP TEST pushbutton switch is pressed.	Burned out lamps in control panel.	Replace burned out lamps as described in paragraph 5-10*h*.

Item No.	Trouble symptom	Probable trouble	Checks and corrective measures
8	Main case blowers do not operate.	Interlock switches in main case not enabled, or power inverter in main case is defective.	Be sure that the plate covering the antenna coupler at the rear of the main case is in place and is secure. Remove the front panel of the main case. Be sure that the plate covering the front of the antenna coupler is in place and is secure. If the blowers are still inoperative, replace the power inverter in the main case (para 5–10*d*).
9	Noise cannot be heard from SPEAKER NO. 1.	Number 1 transceiver in main case is defective, or control panel is defective.	Interchange number 1 transceiver and number 2 transceiver in the main case. If noise is now heard from SPEAKER NO. 1, replace number 1 transceiver (para 5–10*b*). If noise is not heard, refer trouble to higher category of maintenance for repair.
10	Noise cannot be heard from SPEAKER NO. 2.	Number 2 transceiver in main case is defective, or control panel is defective.	Interchange number 2 transceiver and number 1 transceiver in the main case. If noise is now heard from SPEAKER NO. 2, replace number 2 transceiver (para 5–10*b*). If noise is not heard, refer trouble to higher category of maintenance for repair.
11	Adjustment of SPEAKER NO. 1 VOL control does not cause noise to vary from SPEAKER NO. 1.	Defective control panel ----------	Refer trouble to higher category of maintenance for repair.
12	Adjustment of SPEAKER NO. 2 VOL control does not cause noise to vary from SPEAKER NO. 2.	Defective control panel ----------	Refer trouble to higher category of maintenance for repair.
13	Adjustment of HEADSET VOL control does not cause noise to vary from the headset.	Defective headset or defective control panel.	Replace headset. If trouble still exists, refer to higher category of maintenance for repair.
14	Noise cannot be heard from the headset when HEADSET input selector switch is in one of its positions.	Defective control panel ----------	Refer trouble to higher category of maintenance for repair.
15	Tune tone is not heard when radio set is tuning.	One of transceivers in the main case is defective, or the antenna coupler in the main case is defective.	Key the radio set with TRANSCEIVER SELECT switch in the NO. 1 XMIT & RECEIVE position. If the tune tone is not heard with the switch in either position, replace the antenna coupler (para 5–10*c*). If it is heard with the switch in the NO. 1 XMIT & RECEIVE position only, replace the number 2 transceiver (para 5–10*b*). If it is heard with the switch in the NO. 2 XMIT & RECEIVE position only, replace the number 1 transceiver (para 5–10*b*).

Item No.	Trouble symptom	Probable trouble	Checks and corrective measures
16	Rf power meter gives an incorrect indication.	Defective transceiver in main case, or a defective control panel.	Key radio set with TRANSCEIVER SELECT switch in NO. 1 XMIT & RECEIVE position, and then in NO. 2 XMIT & RECEIVE position. If meter indication is incorrect with switch in NO. 1 XMIT & RECEIVE position only, replace number 1 transceiver (para 5–10*b*). If indication is incorrect with the switch in NO. 2 XMIT & RECEIVE position only, replace number 2 transceiver (para 5–10*b*). If meter indication is incorrect with switch in either position, refer trouble to higher category of maintenance for repair.
17	FAULT/RESET indicator-switch lamp lighted.	Receiver frequency is within 10 percent of transmit frequency, or preselector in main case is defective.	Separate receive frequency 10 percent or more from transmit frequency. Momentarily press FAULT/RESET indicator-switch. If FAULT/RESET indicator-switch lamp is still lighted, replace preselector (para 5–10*d*).
18	Two-way communication cannot be established between radio set operator and telephone operator in phone patch operation.	Defective control panel ----------	Refer trouble to higher category of maintenance for repair.
19	Noise cannot be heard from a speaker or external telephone equipment with PHONE PATCH switch set to RCV.	Defective control panel ----------	Refer trouble to higher category of maintenance for repair.
20	Tune tone not heard with PHONE PATCH switch set to XMIT and radio set tuning to a new frequency.	Defective control panel ----------	Refer trouble to higher category of maintenance for repair.

5–10. Replacement Procedures

a. Main Case and Power Supply Front Panels.

(1) *Removal.*

(*a*) Loosen the fasteners located across the bottom of the main case or the power supply.

(*b*) Pull the bottom of the front panel away from the main case or power supply, and pull down on front panel to remove it.

(2) *Replacement.*

(*a*) Lean the top edge of the front panel against the front of the main case or power supply, and slide the front panel up into a groove along the top of the main case or power supply.

(*b*) Secure the front panel with the fasteners located across the bottom of the front panel.

b. Transceiver.

(1) *Removal.*

(*a*) Remove the front panel from the main case (*a* above).

(*b*) Disconnect the coaxial cables connected to each side of the transceiver.

(*c*) Loosen the two thumbscrew clamps (fig. 1–3) in front of the transceiver until the clamps disengage from the transceiver.

(*d*) Grasp the handles of the transceiver, and pull it out of the main case.

(2) *Replacement.*

(*a*) Insert the transceiver into the proper tray of the main case, and slowly push the transceiver into the main case.

(*b*) Make sure that the two locating pins and the connectors at the rear of the main case mate with the transceiver.

(*c*) Engage the two thumbscrew clamps with the transceiver holddown studs, and tighten the clamps.

(*d*) Reconnect the two coaxial cables to the sides of the transceiver.

(*e*) Replace the front panel on the main case (*a* above).

c. Antenna Coupler.

(1) *Removal.*

(*a*) Remove the front panel from the main case (*a* above).

(*b*) Remove the panel in front of the antenna coupler by loosening the two twist-type fasteners.

(*c*) Loosen the two thumbscrew clamps (fig. 1–3) in front of the antenna coupler until the clamps disengage from the antenna coupler tray.

(*d*) Grasp the lip of the antenna coupler tray, and pull it out of the main case.

(*e*) Disconnect the three cables connected to the rear of the antenna coupler.

(*f*) Loosen the two thumbscrews that secure the antenna coupler in the antenna coupler tray.

(*g*) Lift the antenna coupler out of its tray.

(2) *Replacement.*

(*a*) Place the antenna coupler in the tray so that the circular disk on the rear of the antenna coupler is toward the connector on the tray.

(*b*) Capture the lip at the rear of the antenna coupler under the two beveled blocks on the tray.

(*c*) Secure the antenna coupler by tightening the two thumbscrews at the front of the tray.

(*d*) Connect the three cables to the rear of the antenna coupler.

(*e*) Insert the antenna coupler and its tray into the proper location in the main case (fig. 1–3). Slowly push the antenna coupler into the case until the locating pins and connector of the main case mate with the antenna coupler tray.

(*f*) Engage the two thumbscrew clamps with the holddown studs on the antenna coupler tray, and tighten the clamps.

(*g*) Replace the panel in front of the antenna coupler, and secure it with the two twist-type fasteners.

(*h*) Replace the front panel on the main case (*a* above).

d. Preselector or Power Inverter.

(1) *Removal.*

(*a*) Remove the front panel from the main case (*a* above).

(*b*) Loosen the two thumbscrew clamps in front of the unit to be removed.

(*c*) Lift up the handle (fig. 1–3) of the unit, and use the handle to pull the unit out of the main case.

(2) *Replacement.*

(*a*) Insert the unit to be replaced in the proper tray of the main case.

(*b*) Slowly push the unit into the main case, and make sure that the two locating pins and the connectors at the rear of the main case mate with the unit.

(*c*) Engage the two thumbscrew clamps with the unit's holddown studs, and tighten the clamps.

(*d*) Replace the front panel on the main case (*a* above).

e. HF NUMBER 1 or HF NUMBER 2 Control Unit.

(1) *Removal.*

(*a*) Loosen the Dzus fasteners located at the corners of the control unit.

(*b*) Slide the control unit out until the connectors at the rear of the control unit are accessible.

(*c*) Disconnect the two cables from the rear of the control unit.

(2) *Replacement.*

(*a*) Bring the two cables for the control unit through the control unit mounting hole.

(*b*) Connect the two cables to the control unit.

(*c*) Slide the control unit into its mounting hole, and secure it with the Dzus fasteners.

f. Power Converter.

(1) *Removal.*

(*a*) Remove the front panel from the power supply (*a* above).

(*b*) Loosen the two thumbscrew clamps (fig. 1–5) until they are disengaged from the power converter.

(*c*) Extract the power converter by rotating the center thumbscrew counterclockwise.

(*d*) Lift up the front of the power converter far enough to disengage the thumbscrew extractor from the power converter.

(*e*) Lift up the power converter handle (fig. 1–5), and use it to pull out the power converter.

(2) *Replacement.*

(*a*) Insert the power converter in the tray of the power supply.

(*b*) Slowly push the power converter into the power supply until the front of the power converter is inside of the power supply.

(*c*) Lift up the front of the power converter far enough to place the groove of the thumbscrew extractor over the bottom edge of the power converter.

(*d*) Rotate the center thumbscrew clockwise to push the power converter into place.

(*e*) Engage the two thumbscrew clamps with the power converter's hold-down studs, and tighten the clamps.

(*f*) Replace the front panel on the power supply (*a* above).

g. Air Filters.

(1) *Main case and power supply.*

(*a*) Remove the front panel (*a* above).

(*b*) With the panel laying front side down, lift up on the wire braces that hold the filter in place.

(*c*) Lift out the air filter.

(*d*) Place the air filter in the rear of the front panel.

(*e*) Secure the air filter with the wire braces.

(*f*) Replace the front panel (*a* above).

(2) *Transceiver.*

(*a*) Remove the front panel from the main case (*a* above).

(*b*) Loosen the two fasteners that secure the transceiver filter mounting, and remove the filter mounting.

(*c*) Lift the filter out of the mounting.

(*d*) Replace the filter in the mounting.

(*e*) Replace the mounting on the transceiver, and secure with the two fasteners.

(*f*) Replace the front panel on the main case (*a* above).

h. Lamps.

(1) *Fault, breaker, transmit/receive, and receive indicators.*

(*a*) Firmly grasp the indicator, and pull it out of the control panel.

(*b*) Pull the defective lamp or lamps out of the indicator, and insert the new lamp or lamps.

(*c*) Replace the indicator by pressing it into the control panel.

(2) *Rf power meter lamp.*

(*a*) Remove the large screw located in the center of the rectangular piece above the rf power meter.

(*b*) Pull out the defective lamp from the rear of the large screw, and insert the new lamp.

(*c*) Replace the large screw above the rf power meter.

(3) *Receiver signal indicators and control panel lamps.* There are five control panel lamps, each covered with an opaque lens. Figure 1–4 illustrates the location of these opaque lenses.

(*a*) Unscrew the lens, and remove it from the control panel.
(*b*) Pull out the defective lamps from the rear of the lens, and insert the new lamp.
(*c*) Screw the lens back into the control panel.

(4) *HF NUMBER 1 and HF NUMBER 2 control unit lamps.* There are three control unit lamps, each covered with an opaque lens. Figure 1–4 illustrates the location of these lenses.
(*a*) Unscrew the lens and remove it from the control unit.
(*b*) Pull out the defective lamp from the rear of the lens, and insert the new lamp.
(*c*) Screw the lens back into the control unit.

i. Fuses. The power converter is the only unit containing fuses. Replace them as follows:
(1) Remove the front panel from the power supply (*a* above).
(2) Loosen the two fasteners that secure the screened panel to the front of the power converter, and remove the screened panel.
(3) Remove the nuts that secure the defective fuse or fuses (fig. 1–5), and remove the fuse or fuses.
(4) Replace the defective fuse or fuses with new fuses.
(5) Secure each fuse with two nuts.
(6) Replace the screened panel on the power converter, and secure it with the two fasteners.
(7) Replace the front panel on the power supply (*a* above).

5–11. Removal and Replacement of Radio Set AN/GRC–158

a. Control Panel.

(1) *Removal.*

(*a*) Make sure that the control panel cover is in place and locked (fig. 1–4).

(*b*) Disconnect the three cables mounted on the vehicle from connectors J1, J2, and J3.

(*c*) Install the protector caps on the connectors of the control panel and the cables (para 2–5).

(*d*) Unlatch the four locks which hold the control panel to its mounting frame, and remove the control panel from the rear seat of the vehicle (fig. 1–7).

(2) *Replacement.*

(*a*) Make sure that the control panel is complete and that the cover is on and locked (fig. 1–4).

(*b*) Set the control panel in place and latch the four locks.

(*c*) Remove the protector caps from connectors of the control panel and the cable (para 2–5).

(*d*) Match the keys on the connectors on the control panel and cables, and fasten the cables to the control panel at J1, J2, and J3.

(*e*) Tape all the protector caps to the cnotrol panel and the cables with electrician's tape (p/o Tool Kit, Operations Central TK–101/G).

b. Main Case.

(1) *Removal.*

(*a*) Disconnect the four cables from connectors J1, J2, J3, and J5 on the main case. These connectors are directly below circuit breakers CB1 through CB6 (fig. 3–2).

(*b*) Install the protector caps on the connectors of the main case and the cables (para 2–5).

(*c*) Unlatch the four locks and remove the main case from the mount (fig. 1–7).

(2) *Replacement.*

Caution: **Make sure that the locks are in the open position.**

(*a*) Set the main case on the mount with the two locating pins (not shown) to properly position the main case.

(*b*) Latch the four locks.

(*c*) Match the keys on the connectors on the main case and the cables, and fasten the cables to the main case at connectors J1, J2, J3, and J5 (para 2–5).

(*d*) Tape all the protector caps to the main case and the cables with electrician's tape.

c. Power Supply.

(1) *Removal.*

(*a*) Disconnect the cable from connector J1 on the power supply (fig. 1–5).

(*b*) Install the protector caps on the connectors of the power supply.

(*c*) Unlatch the four locks, and remove the power supply from the mount (not shown).

(2) *Replacement.*

Caution: **Make sure that the locks are in the open position.**

(*a*) Set the power supply on the mount with the two locatınng pins (not shown) to properly position the power supply.

(*b*) Latch the four locks.

(*c*) Match the keys on the connectors, and fasten the cable to the power supply (para 2–5).

(*d*) Tape all the protector caps to the power supply and the cable with electrician's tape.

d. If the Radio Set AN/GRC–158 is to be packaged for storage or shipment, the CX–10359/G must be removed from the main case mount. This cable connects J5 on the main case to J1 on the power supply; it is an integral part of Radio Set AN/GRC–158 and not part of the installation kit on the AN/MRC–117.

CHAPTER 6

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

6-1. Disassembly of Equipment

a. Disconnect the primary power source connected to J2 on the power supply.

b. Disconnect the primary power source connected to J4 on the main case.

c. Remove the cable connected between the power supply and the main case.

d. Disconnect the cables connected to J1, J2, and J3 of the main case.

e. Remove the antennas from the main case.

f. Dismantle the whip antennas and place the sections in the canvas antenna bag in the order shown in figure 1-1.

g. Make sure that the long-wire antenna adapters are placed in the small pouch in the canvas antenna bag.

h. Roll up and secure the canvas antenna bags.

i. Disconnect the cables connected to J1, J2, and J3 on the control panel.

j. Roll up each 100-foot cable and the 10-foot cable. Wrap and tie cord around the cables to secure each roll. Do not tie the cord tight enough to pinch the insulation.

k. Disconnect the microphone, headset, and telegraph key from the AUDIO jacks on the monitor.

l. Place the microphone, telegraph key, headset, and headset cable in the storage compartment located in the control panel cover.

m. Place the cover over the control panel; make sure that the hinge is engaged. Secure the cover with the four latches.

6-2. Repackaging for Shipment or Limited Storage

If the equipment is to be transported over short distances under control of the using unit for immediate reuse, perform the disassembly and storing procedure (para 6-1); this can be done by the operator. Equipment that is to be removed from service for periods exceeding approximately 2 weeks, or equipment that is to be shipped for use by other personnel or activities, is normally repackaged by organizational repairmen. The exact packaging procedure used by organizational repairmen depends on the material available and the conditions under which the equipment is to be shipped or stored. Use the packaging procedures outlined below. The information concerning the original packaging (para 2-1) will also be helpful.

a. Disassemble the equipment as described in paragraph 6-1.

b. Package the cables in a corrugated box.

c. Package the power supply and the control panel in the two corrugated boxes.

d. Package the main case, the two whip antennas, and the rubber antenna insulators in a wooden box which is lined with pads of filler material.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

6-3. Authority for Demolition

a. The demolition procedures given in paragraph 6-4 will be used to prevent the enemy from using or salvaging this equipment. Demolition of the equipment will be accomplished only upon the order of the commander.

b. Thorough demolition of equipment will be accomplished through the use of procedures

outlined in International Standardization Agreement-STANAG 2113, Destruction of Military Technical Equipment. Methods of destruction should achieve such damage to equipment and essential spare parts that it will not be possible to restore the equipment to a usable condition in the combat zone either by repair or cannibalization. The reporting of the destruction of equipment is to be done through command channels.

c. If a destruction plan is not provided by higher authority, one should be prepared by the organization using the equipment. In this plan, personnel should be assigned specific destruction tasks, but all personnel in the using organization should be familiar with all aspects of the complete destruction plan. The plan must be adequate and easily carried out in the field and must provide for as complete a destruction as available time, equipment, and personnel will permit. Because the time required for complete destruction may not always be available, the destruction plan must establish priorities so that essential parts of the equipments will be destroyed in the order of their importance. Systematic destruction of the same important units of equipment of a given type will prevent the enemy from learning the important features of the equipment or assembling a complete equipment by cannibalization of partially destroyed equipment. Adequate destruction of some units of equipment should always be accomplished rather than partial destruction of all units. Which of the methods listed in paragraph 6–4 is to be used depends on the time available for destruction.

6–4. Methods of Destruction

a. Destruction Priority. STANAG 2113 outlines the general priorities for any equipment which is to be destroyed. These priorities, as applied to Radio Set AN/GRC–158, are listed below in the order stated:

(1) Both transceivers, both control-monitors, radio set control, all three power supplies.

(2) Antenna coupler, preselector, all antenna elements, microphone, headset, telegraph key.

b. Smash. Smash the controls, resistors, capacitors, switches, antenna, and other interior parts; use sledges, hammers, axes, crowbars, and other heavy tools.

c. Cut. Cut the cords, cables, and wiring; use axes, handaxes, or machetes.

d. Burn. Burn the cords, wiring, manuals, and components; use gasoline, kerosene, oil, flamethrowers, or incendiary grenades.

e. Bend. Bend the panels, casing, and connectors.

***Warning:* Be extremely careful with explosive and incendiary devices. Use items only when the need is urgent.**

f. Explosives. If explosives are necessary, use firearms, grenades, or TNT.

g. Disposal. Burn or scatter the destroyed parts in slit trenches, foxholes, or other holes, or throw them into nearby streams.

APPENDIX A
REFERENCES

Following is a list of applicable references available to the personnel concerned with Radio Set AN/GRC–158 and AN/MRC–117.

DA Pam 310–4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9) Supply Bulletins, and Lubrication Orders.
DA Pam 310–7	Index of Modification Work Orders.
TB SIG 291	Safety Measures Observed when Installing and Using Whip Antennas, Field Type Masts, Towers, Antennas, and Metal poles that are Used with Communication, Radar and Direction Finder Equipment.
TB SIG 364	Field Instruction for Painting and Preserving Electronics Command Equipment.
TM 5–6115–271–15	Organizational, DS, GS, and Depot Maintenance Manual: Generator Set, Gasoline Engine: 3 KW (Less Engine) 3 KW, AC, 400 Cycle (Military Model H F3.0 MD) FSN 6115–075–1638 and FSN 6115–012–1993; 3 KW, AC, 60 Cycle (Military Model SF 3.0 MD) FSN 6115–075–1640 and FSN 6115–913–9290; 3 KW, DC, 28 V (Military Model DC 3.0 MD/28V) FSN 6115–012–1997.
TM 5–6115–271–25P	Organizational, DS, GS, and Depot Maintenance Repair Parts and Special Tool Lists: Generator Sets, Gasoline Engine, 3 KW (Less Engine) 3 KW, AC 400 Cycle (Military Model HF 3.0 MD) FSN 6115–075–1638– and FSN 6115–012–1993; 3 KW, AC, 60 Cycle (Military Model SF 3.0 MD) FSN 6115–075–1640 and FSN 6115–913–9290; 3 KW, DC, 28V (Military Model DC 3.0 MD/28 V) FSN 6115–012–1997.
TM 5–6115–365–15	Organizational, DS, GS, and Depot Maintenance Manual; Including Repair Parts: Generator Sets, Gasoline and Diesel Engine Driven, Trailer Mounted PU–236A/G, PU–236/G FSN 6115–393–1709, PU–236B/G FSN 6115–738–6334, PU–253A/U, PU–253/U FSN 6115–697–2402, PU–332/G FSN 6115–577–8471, PU–332A/G FSN 6115–738–6336, PU–375A/G, PU–375/G FSN 6115–753–2231, PU–401/M FSN 6115–823–2217, PU–402/M FSN 6115–722–3760, PU–406/M FSN 6115–738–6342, PU–

TM 5–6115–365–15 Continued	409/M FSN 6115–702–3348, PU–409A/M FSN 6115–738–6338, PU–495/G FSN 6115–823–2218, PU–551/G FSN 6115–889–1307, PU–564A/G FSN 6115–738–6341, PU–617/M FSN 6115–738–6335, PU–618/M FSN 6115–738–6337, PU–619/M FSN 6115–738–6339, PU–620/M FSN 6115–738–6340.
TM 9–2330–202–14P	Operator, Organizational, and Field Maintenance Instructions, Repair Parts and Special Tools List for Trailer, Cargo: ¾-Ton, 2-Wheel, M101-(2320–738–9509) M101-A1 (FSN 2330–898–6779); Chassis: Trailer: ¾-Ton, 2-Wheel, M116 (2330–542–5987) and M116A1 (2330–898–6780).
TM 11–2651	Antenna Groups AN/GRA–4 and AN/GRA–12.
TM 11–5820–467–15	Operator, Organizational, Field and Depot Maintenance Manual: Antenna Group AN/GRA-50.
TM 11–5820–467–25P	Organizational, Field and Depot Maintenance Repair Parts and Special Tool Lists: Antenna Group AN/GRA–50.
TM 11–5820–514–12	Organizational Maintenance Manual, including Repair Parts and Special Tools Lists: Radio Set AN/MRC–95.
TM 11–5821–248–12	Organizational Maintenance Manual: Radio Set AN/ARC–102.
TM 11–5821–248–20P	Organizational Maintenance Repair Parts and Special Tools Lists: Radio Set AN/ARC-102.
TM 11–5821–271–15	Organizational, DS, GS, and Depot Maintenance Manual: Couplers, Antenna CU–1658/A and CU–1669/GRC.
TM 11–6625–682–15	Organizational, DS, GS, and Depot Maintenance (Including Repair Parts and Special Tools List): Meter, Field Strength ME–61/GRC.
TM 38–750	Army Equipment Record Procedures.

APPENDIX B

BASIC ISSUE ITEMS

Section I. INTRODUCTION

B-1. General

This appendix lists items for Radio Sets AN/GRC-158 and AN/MRC-117, the component items comprising it, and the items which accompany it, or are required for installation, operation, or operator's maintenance.

B-2. Explanation of Columns

An explanation of the columns in section II is given below.

a. Source, Maintenance, and Recoverability Codes (Column 1).

(1) *Source code, column 1a.* This selection status and source for the listed item is noted here. The source code used is:

Code	Explanation
P	Applies to repair parts which are stocked in or supplied from the GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories.
A	Applies to assemblies that are not procured or stocked as such but are made up of two or more units, each of which carry individual stock numbers and descriptions and are procured and stocked and can be assembled by units at indicated maintenance categories.

(2) *Maintenance code, column 1b.* The lowest category of maintenance authorized to install the listed item is noted here. The maintenance code used is as follows:

Code	Explanation
C	Operator/Crew
O	Organizational Maintenance

(3) *Recoverability code, column 1c.* The information in this column indicates whether unserviceable items should be returned for recovery or salvage. Recoverability code and its explanation are as follows:

Note: When no code is indicated in the recoverability column, the part will be considered expendable.

Code	Explanation
R	Applies to repair parts and assemblies that are economically repairable at DSU and GSU activities and are normally furnished by supply on an exchange basis.

b. Federal Stock Number, Column 2. The Federal stock number for the item is indicated in this column.

c. Description, Column 3. The Federal item name, a five-digit manufacturer's code, and a part number are included in this column.

d. Unit of Issue, Column 4. The unit used as a basis of issue (e.g. ea, pr, ft, yd, etc) is noted in this column.

e. Quantity Incorporated in Unit Pack, Column 5. Not used.

f. Quantity Incorporated in Unit, Column 6. The total quantity of the item used in the equipment is given in this column.

g. Quantity Authorized, Column 7. The total quantity of an item required to be on hand and necessary for the operation and maintenance of the equipment is given in this column.

h. Illustration, Column 8.

(1) *Figure number, column 8a.* The number of the illustration in which the item is shown is indicated in this column.

(2) *Item or symbol number, column 8b.* The call out number used to reference the item in the illustration appears in this column.

B-3. Federal Supply Codes

This paragraph lists the Federal supply code with the associated manufacturer's name.

Code	Manufacturer
13499	Collins Radio Co, Cedar Rapids Division
14310	Ault Inc
94154	Tung-Sol Electric Co
96906	Military Standards Promulgated by Standardization Div, Directorate of Logistic Services DSA

SECTION II. BASIC ISSUE ITEMS LIST

(1) SOURCE CD (A)	(1) MAINT. CD (B)	(1) REC. CODE (C)	(2) FEDERAL STOCK NUMBER	MODEL 1	2	3	4	5	6	(3) DESCRIPTION	(4) UNIT OF ISSUE	(5) QTY INC IN UNIT PACK	(6) QTY INC IN UNIT	(7) QTY AUTH	(8) ILLUSTRATIONS (A) FIGURE NUMBER	(8) ILLUSTRATIONS (B) ITEM OR SYMBOL NUMBER
										RADIO SET AN/GRC-158 AND RADIO SET AN/MRC-117						
			5820-933-5685							RADIO SET AN/GRC-158: (This item is nonexpendable)	ea				1-1	
			5820-926-7306							RADIO SET AN/MRC-117: (This item is nonexpendable) c/o Radio Set AN/GRC-158 mtd on 3/4 ton vehicle	ea				1-6	
										TM 11-5820-672-12	ea		1	1		
										Requisition through pinpoint account number if assigned; otherwise through nearest Adjutant General facility.						
										NOTE: A quantity of 1 technical manual is packed with each equipment. Where a valid need exists, additional copies may be requisitioned and kept on hand.						
	C		5985-733-6042							ANTENNA ELEMENT AT-1039/U	ea		2	2	1-1	
	C		5985-733-6043							ANTENNA ELEMENT AT-1040/U	ea		2	2	1-1	
	C		5985-733-6044							ANTENNA ELEMENT AT-1041/U	ea		2	2	1-1	
	C		5985-783-6045							ANTENNA ELEMENT AT-1042/U	ea		2	2	1-1	
	C		5985-733-6046							ANTENNA ELEMENT AT-1043/U	ea		8	8	1-1	
A	O	R	5820-933-5688							CABINET, ELECTRICAL EQUIPMENT CY-6177/GRC	ea		1	1	1-3	
A	C	R	5995-933-5798							CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL CX-10356/G: 100 ft lg	ea		1	1	1-2	
A	C	R	5995-933-5799							CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL CX-10357/G: 100 ft lg	ea		1	1	1-2	
A	C	R	5995-933-5775							CABLE ASSEMBLY, SPECIAL PURPOSE ELECTRICAL CX-10358/G: 100 ft lg	ea		1	1	1-2	

(1)			BASIC ISSUE ITEMS LIST														(8) ILLUSTRATIONS	
(A) SOURCE CD	(B) MAINT. CD	(C) REC. CODE	(2) FEDERAL STOCK NUMBER	MODEL 1	2	3	4	5	6	(3) DESCRIPTION	(4) UNIT OF ISSUE	(5) QTY INC IN UNIT PACK	(6) QTY INC IN UNIT	(7) QTY AUTH	(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER
										AN/GRC-158; AN/MRC-117 (continued)						
A	C	R	5995-933-5774							CABLE ASSEMBLY, SPECIAL PURPOSE ELECTRICAL CX-10359/G: 10 ft lg	ea		1		1-2	
A	C	R	5995-889-1312							CABLE ASSEMBLY, SPECIAL PURPOSE ELECTRICAL CX-10366/G: 5 ft 6 in lg; u/w H-233/PRC-47	ea		1	1	1-1	
A	C	R	5820-933-5583							CONTROL-MONITOR, RADIO SET C-7196/GRC: c/o 1 ea Control-Monitor C-7186/GRC, 2 ea Control, Radio Set C-7207/GRC	ea		1	1	1-1	
A	C	R	5820-933-5582							CONTROL-MONITOR C-7186/GRC	ea		1		1-4	
A	C	R	5820-933-5684							CONTROL, RADIO SET C-7207/GRC	ea		2		1-4	
A	C	R	5985-939-7495							COUPLER, ANTENNA CU-1669/GRC	ea		1	1	1-3	
P	O		5960-556-1470							ELECTRON TUBE: 94154; 5687	ea		2	1		V1, V2
A	C	R	5915-933-6504							FILTER, BAND PASS F-1138/GRC	ea		1	1	1-3	
P	O		5920-782-6923							FUSE, CARTRIDGE: 14310; 622-1005	ea		2	3	1-5	F201, F202
A	C		5965-985-3589							HEADSET, ELECTRICAL H-233/PRC-47	ea		1	1	1-1	
	C		5970-907-4761							INSULATOR, ANTENNA: 13499; 553-6841-004	ea		2	2	1-1	
A	C		5805-984-0424							KEY, TELEGRAPH KY-616/U	ea		1	1	1-1	
P	O		6240-155-7836							LAMP, INCANDESCENT: 96906; MS18209-387	ea		31	5		DS1 thru DS31
A	C		5965-068-1666							MICROPHONE, CARBON M-137/U	ea		1	1	1-1	
A	C	R	5820-933-5675							POWER SUPPLY PP-4720/GRC	ea		1	1	1-3	
A	C	R	5820-933-5686							POWER SUPPLY PP-4721/GRC: c/o Power Supply PP-4526/GRC-154; Cable Assembly CX-10359/G	ea		1	1	1-1	
A	C	R	6130-902-2082							POWER SUPPLY PP-4526/GRC-154	ea		1		1-5	

(1) (A) SOURCE CD	(1) (B) MAINT. CD	(1) (C) REC. CODE	BASIC ISSUE ITEMS LIST (2) FEDERAL STOCK NUMBER	MODEL 1	2	3	4	5	6	(3) DESCRIPTION	(4) UNIT OF ISSUE	(5) QTY INC IN UNIT PACK	(6) QTY INC IN UNIT	(7) QTY AUTH	(8) ILLUSTRATIONS (A) FIGURE NUMBER	(8) ILLUSTRATIONS (B) ITEM OR SYMBOL NUMBER
										AN/GRC-158; AN/MRC-117 (continued)						
A	C	R	5821-954-0853							RECEIVER-TRANSMITTER, RADIO RT-698/ARC-102	ea		2	2	1-3	
										ACCESSORIES, TOOLS, AND TEST EQUIPMENT						
	C		5820-915-9194							ADAPTER, ANTENNA TO ANTENNA BASE: 13499; 757-0503-001	ea		2	2	1-1	
P			5935-687-1293							CONNECTOR, RECEPTACLE ELECTRICAL: 96906; MS3106E-32-5S(C)	ea		1	1	1-2	J1
P			5935-660-5476							CONNECTOR, RECEPTACLE ELECTRICAL: 96906; MS3106E-22-22S(C)	ea		1	1	1-2	J2
										THE FOLLOWING ITEMS AND THEIR QUANTITIES ARE MOUNTED IN OR ON EQUIPMENT LISTED FOR STORAGE PURPOSES						
A	C	R	5820-933-5583							CONTROL-MONITOR, RADIO SET C-7196/GRC: 1					1-4	
A	C	R	5995-889-1312							CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL CX-10366/G: 1	ea				1-4	
A	C		5965-985-3589							HEADSET, ELECTRICAL H-233/PRC-47: 1	ea				1-4	
A	C		5805-984-0424							KEY TELEGRAPH KY-616/U: 1	ea				1-4	
P	O		6240-155-7836							LAMP, INCANDESCENT: 5	ea					
A	C		5965-068-1666							MICROPHONE, CARBON M-137/U: 1	ea				1-4	
A	C	R	5820-933-5686							POWER SUPPLY PP-4721/GRC	ea		1	1	1-5	
P	O		5920-782-6923							FUSE, CARTRIDGE: 3	ea				1-5	

APPENDIX C

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature for Radio Set AN/GRC-158. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C-2. Explanation of Format for Maintenance Allocation Chart

a. Group Number. Group numbers correspond to the reference designation prefix assigned in accordance with ASA Y32.16, Electrical and Electronics Reference Designations. They indicate the relation of listed items to the next higher assembly.

b. Component Assembly Nomenclature. This column lists the item names of component units, assemblies, subassemblies, and modules on which maintenance is authorized.

c. Maintenance Function. This column indicates the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to perform that function at higher categories. The codes used represent the various maintenance catergories as follows:

Code	Maintenance Category
C	Operator/Crew
O	Organizational Maintenance
F	Direct Support Maintenance
H	General Support Maintenance
D	Depot Maintenance

d. Tools and Equipment. The numbers appearing in this column refer to specific tools and equipment which are identified by these numbers in section III.

e. Remarks. Self explanatory.

C-3. Explanation of Format for Tool and Test Equipment Requirements

The columns in the tool and test equipment requirements chart are as follows:

a. Tools and Equipment. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool for the maintenance function.

b. Maintenance Category. The codes in this column indicate the maintenance category normally allocated the facility.

c. Nomenclature. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

d. Federal Stock Number. This column lists the Federal stock number.

e. Tool Number. Not used.

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1	RADIO SET AN/GRC-158	O											22	Visual
			O										19,22	Tubes, cable continuity
			F										6,9,12,13,14, 15,17,18,19	Basic trouble shooting, test point checks, voltage and resistance measurements
			H										1 thru 8, 10 thru 21, 26 thru 31	All tests not requiring depot equipment
			D										All test equip	Plus shop facilities
				O									22	Daily maintenance
				F									24	Cables
					F								6,9,12,13,14, 15,17,18,19	Operational adjustments
					H								1 thru 8, 10 thru 21, 26 thru 31	Major system adjustments
					D								All test equip	All system and component adjustments.
										O			22	By replacement of running spares
										F			23,24	By replacement major modules and subassemblies
										H			23,24	All major repairs
										D			23,24	Plus shop facilities
1	ANTENNA COUPLER, CU-1658/A (49CT-1/1A)									#				See TM 11-5821-271-15
1	CABLE ASSEMBLIES	O											22	Visual
		F											23	
			F										12	Continuity checks
										F			23,24	Breaks, soldering connection
												H	23,24	

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS												TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD			
	AN/GRC-158 (Continued)														
1a	MICROPHONE, CARBON M-137/U	0												22	Visual inspection
			F											9,12	All tests
				0										22	
										H				23,24	All repairs
												D		23,24	Plus shop facilities
1	POWER SUPPLY PP-4720/GRC			0										22	
			F											12,15,27,32	Troubleshooting, checks at test points
			H											6,12,15,16,32	All tests
										F				23,24	Cables, broken component leads
										H				23,24	All repairs
												D		23,24	Plus shop facilities
1	POWER SUPPLY PP-4526/GRC-154			0										22	Check cables
			F											12,15,27	
			H											6,12,15,16	All tests
										F				23	
										H				23,24	All repairs
												D		23,24	Plus shop facilities
1	RECEIVER FILTER 635 V-1, F-1138/GRC	0												22	
			F											12,15	Basic trouble shooting, checks at test points
				F										24	Cables
			H											6,10,12,16, 27	All tests
										H				23,24	All repairs
												D		23,24	Plus shop facilities

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
	AN/GRC-158 (continued)													
1	CASE CY-6177/GRC	0	F							F H			22 11,12 23,24 23,24	Continuity checks Cable repair All repairs
1	CONTROL MONITOR C-7196/GRC	0	F							F H			22 11,12 23,24 23,24	Continuity and voltage tests Cable breaks, visual component repairs All repairs
1	RT-698/ARC-102									#				See TM 11-5820-514-12
	WHIP, ANTENNA KIT AND MAST SECTION									#				See TM 11-5820-514-12
1b	KEY, TELEGRAPH J-45, KY-616/U									#				See TM 11-5820-514-12
1c	HEAD SET ELECTRICAL H-233/PRC-47									#				See TM 11-5820-514-12

NOTE: # Indicates that maintenance guidance will be found in documents referenced in remarks column.

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
		AN/GRC-158 (continued)		
1	H,D	ANALYZER SPECTRUM TS-723B/U	6625-668-9418	
2	F,H,D	ANTENNA COUPLER TEST SET AN/ARN-109		
3	F,H,D	AUDIO OSCILLATOR AN/URM-127	6625-783-5965	
4	H,D	ATTENUATOR, VARIABLE, 874-GAO	5950-752-3144	
5	H,D	ELECTRICAL LOAD, DUMMY DA-75/U	5985-280-3480	
6	H,D	FREQUENCY METER AN/USM-207	6625-911-6368	
7	H,D	WATTMETER AN/URM-120	6625-813-8430	
8	F,H,D	COAXIAL PROBE (HP11042A)	6625-713-4356	
9	F,H,D	GENERATOR, SIGNAL SG-71/FCC	6625-669-0255	
10	H,D	GENERATOR, SIGNAL AN/GRM-50	6625-543-1356	
11	O	MULTIMETER AN/URM-105	6625-581-2036	
12	F,H,D	MULTIMETER 26B/U	6625-646-9409	
13	F,H,D	ELECTRONIC EQUIPMENT MK-722/ARC-102		
14	F,H,D	*CONTROL UNIT 7140E-5, C-7207/GRC	5820-933-5684	
15	F,H,D	OSCILLOSCOPE AN/USM-50B	6625-532-4288	
16	H,D	OSCILLOSCOPE AN/USM-81	6625-701-4038	
17	O,F,H	R.F. SIGNAL GENERATOR AN/URM-250	6625-309-5381	
18	F,H,D	TEST RADIO AN/URM-157	6625-766-4685	
19	O	TEST SET, ELECTRON TUBE TV-7/U	6625-376-4939	
20	F,H,D	TEST SET, ELECTRON TUBE TV-2/U	6625-699-0263	

TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
		AN/GRC-158 (continued)		
21	H,D	TEST SET, TRANSISTOR TS-1836/U	6625-893-2628	
22	O	TOOL KIT TK-101/G	5180-064-5178	
23	F,H,D	TOOL KIT, TK-100/G	5180-605-0079	
24	F,H,D	TOOL KIT TK-105/G	5180-610-8177	
25	F,H,D	RECEIVER R-390A/URR	5820-538-7555	
26	F,H,D	VOLTMETER, ELECTRONIC AN/USM-98A	6625-753-2115	
27	F,H,D	VOLTMETER ME-30A/U	6625-643-1670	
28	H,D	VOLTMETER ELECTRONIC AN/URM-145	6625-973-3986	
29	F,H,D	*RT-698/ARC-102, RECEIVER TRANSMITTER	5821-954-0853	
30	H,D	Q METER TS-6171/U	6625-546-6664	
31	H,D	TEST FIXTURE AND POWER CABLE (R.F. COIL DRIVE SHAFT WRENCH)		
32	F,H,D	POWER SUPPLY PP-3514( )/U	6625-445-6933	
		NOTE: * Part of end item		

APPENDIX C.1
ORGANIZATIONAL REPAIR PARTS

Section I. INTRODUCTION

C.1–1. General

This appendix contains a list of repair parts required for the performance of organizational maintenance for Radio Sets AN/GRC–158 and AN/MRC–117.

Note. No special tools, test, and support equipment are required.

C.1–2. Explanation of Sections

This repair parts list is divided into sections.

a. Prescribed Load Allowance List (PLA), Section II. The PLA is a consolidated listing of repair parts allocated for initial stockage at organizational maintenance. This is a mandatory minimum stockage allowance.

b. Repair Parts, Organizational Maintenance, Section III. Repair parts authorized for organizational maintenance is included in this section.

C.1–3. Explanation of Columns

An explanation of the columns in Section II and III is given below.

a. Source, Maintenance, and Recoverability Codes, Column 1, Sections II and III.

(1) *Source code, column 1a.* The selection status and source for the listed items is noted here. Source code and its explanation is as follows:

Code	*Explanation*
P	Applies to repair parts that are stocked in or supplied from the GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories.

(2) *Maintenance code, column 1b.* The lowest category of maintenance authorized to install the listed item is noted here.

Code	*Explanation*
O	Organizational Maintenance

(3) *Recoverability code, column 1c.* Not used.
Note. When no code is indicated in the recoverability column, the part will be considered expandable.

b. Federal Stock Number, Column 1, Section II, Column 2, Section III. The Federal stock number for the item is indicated in this column.

c. Description, Column 2, Section II, Column 3, Section III. The Federal item name, a five-digit manufacturer's code and a part number are included in this column.

d. Unit of Issue, Colum 4, Section III. The unit used as a basis of issue, e.g., ea. pr, ft, yd, etc. is indicated in this column.

e. Quantity Incorporated in Unit Pack, Column 4, Section II; Column 5, Section III. Not used.

f. Quantity Incorporated in Unit, Column 6, Section III. Not used.

g. Maintenance Allowances, Column 3, Section II; Column 7, Section III.

(1) The allowance columns are divided into subcolumns. Indicated in each subcolumn, where applicable, is the total quantity of items authorized for the number of equipments supported.

(2) The quantitative allowances for organization category of maintenance represents one initial prescribed load for a 15-day period for the number of equipments supported. Units and organizations authorized additional prescribed loads will multiply the number of prescribed loads authorized by the quantity of repair parts reflected in the appropriate density column to obtain the total quantity of repair parts authorized.

(3) Subsequent changes to organizational allowances will be limited as follows: No change in the range of items is authorized. If additional items are considered necessary, recommendation should be forwarded to Commanding General, U.S.

Army Electronics Command, ATTN: AMSEL–ME–NMP–CR, Fort Monmouth, N.J. 07703, for exception or revision to the allowance list. Revisions to the range of items authorized will be made by the USA ECOM National Maintenance Point based upon engineering experience, demand data, or TAERS information.

h. Illustration, Column 8, Section III. Not used.

C.1–4. Location of Repair Parts

a. When the Federal stock number is unknown, follow the procedures given in (1) and (2) below.

(1) Locate the appropriate appendix of the repair parts list.

(2) If the item, symbol, and figure number are not known, check the description column (column 3) in the repair parts list to locate the part.

b. When the Federal stock number is known, use the repair part listing to find the repair part.

C.1–5. Federal Supply Codes

This paragraph lists the Federal supply code and the associated manufacturer's name.

Code	*Manufacturer's Name*
13499	Collins Radio Co., Cedar Rapids Division
71424	Chase Shawnut Co.

PRESCRIBED LOAD ALLOWANCE

(1) FEDERAL STOCK NUMBER	(2) DESCRIPTION	(3) 15—DAY ORG. MAINT. ALLOWANCE (A) 1—5	(B) 6—20	(C) 21—50	(D) 51-100	(4) QTY INC IN UN PK
	CONTROL PANEL					
6240-155-7836	LAMP, INCANDESCENT: 13499; 262-0179-000			17	68	
	EQUIPMENT CASE CY-6177/GRC 5820-933-5688					
6240-731-5071	LAMP, INCANDESCENT: 13499; 262-0679-000			1	4	
	FILTER, BAND PASS F-1138/GRC 5915-933-6504					
5960-577-3078	ELECTRON TUBE: 13499; 255-0224-000			1	4	
	POWER SUPPLY PP-4526/GRC-154 6130-902-2082					
5920-782-6923	FUSE, CARTRIDGE: 71424; AMPTRAP A25 X 50			2	8	
	REMOTE CONTROL C-7207/GRC					
6240-155-7836	LAMP: 13499; 262-0179-000			5	20	

SECTION III. REPAIR PARTS, ORGANIZATIONAL MAINTENANCE

(1) (A) SOURCE CD	(1) (B) MAINT. CD	(1) (C) REC. CODE	REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE (2) FEDERAL STOCK NUMBER	MODEL 1	2	3	4	5	6	(3) DESCRIPTION	(4) UNIT OF ISSUE	(5) QTY INC IN UN PK	(6) QTY INC IN UNIT	(7) 15 DAY ORG. MAINT. ALW. (A) 1–5	(B) 6–20	(C) 21–50	(D) 51–100	(8) ILLUSTRATIONS (A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER
			5820-933-5685							RADIO SET AN/GRC-158 (This item is nonexpendable)									
			5820-926-7306							RADIO SET AN/MRC-117 (This item is nonexpendable) c/o Radio Set AN/GRC-158 mounted on 3/4 ton truck									
										CONTROL PANEL									
P	O		6240-155-7836							LAMP, INCANDESCENT: 13499; 262-0179-000	ea					17	68		
										EQUIPMENT CASE CY-6177/GRC 5820-933-5688									
P	O		6240-731-5071							LAMP, INCANDESCENT: 13499; 262-0679-000	ea					1	4		
										FILTER, BAND PASS F-1138/GRC 5915-933-6504									
P	O		5960-577-3078							ELECTRON TUBE: 13499; 255-0224-000	ea					1	4		
										POWER SUPPLY PP-4526/GRC-154 6130-902-2082									
P	O		5920-782-6923							FUSE, CARTRIDGE: 71424; AMPTRAP A25 X 50	ea					2	8		
										REMOTE CONTROL C-7207/GRC									
P	O		6240-155-7836							LAMP: 13499; 262-0179-000	ea					5	20		

APPENDIX D
FOLDOUT ILLUSTRATIONS

D–1. General

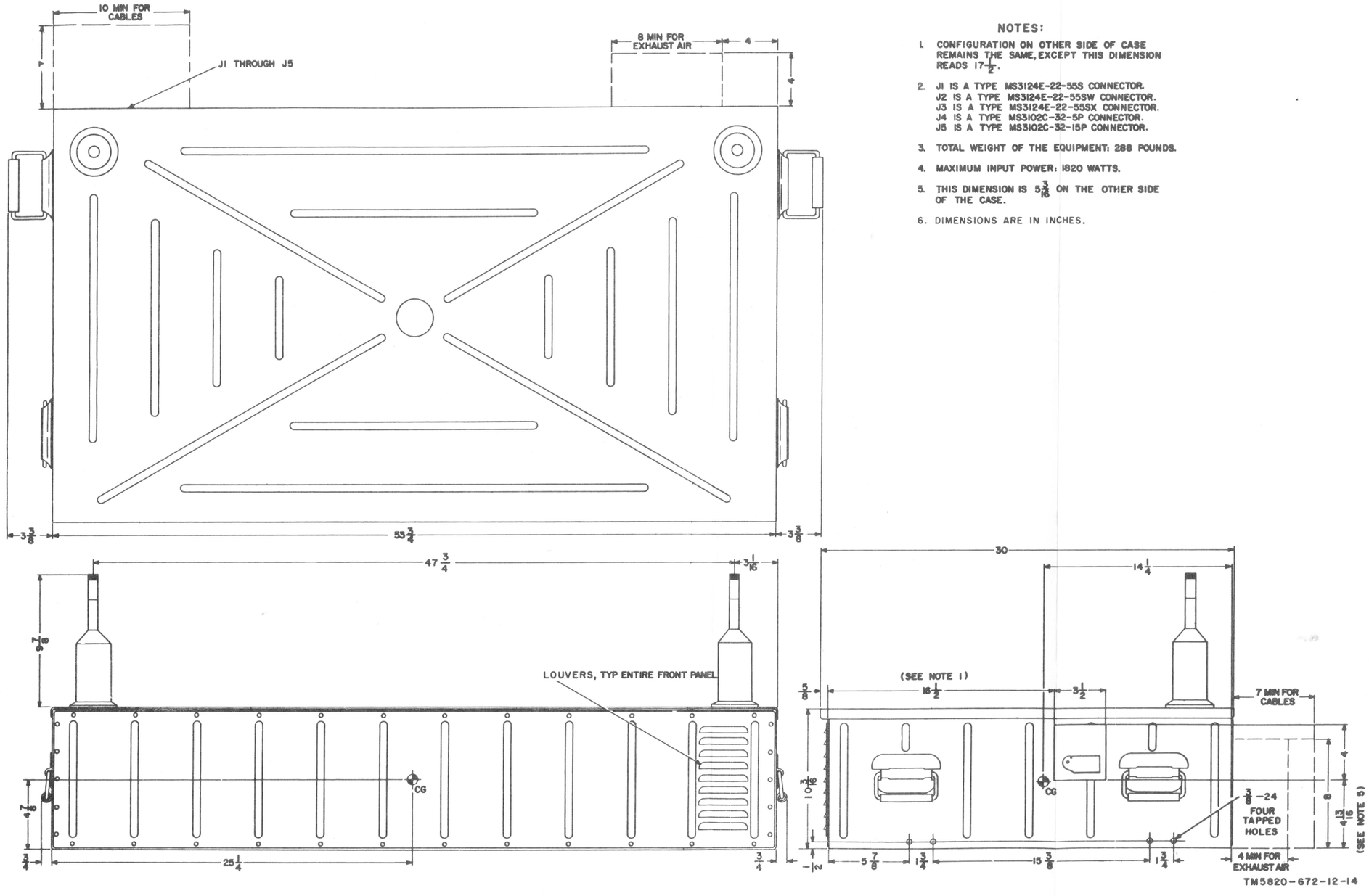
This appendix contains foldout illustrations which have been initially referenced in chapter 2. Paragraph D–2 is a list of the illustrations contained in this appendix.

D–2. List of Foldout Illustrations

Figure No.	*Caption*
D–1	Main case, outline and mounting dimensions.
D–2	Control panel, outline and mounting dimensions.
D–3	Power supply, outline and mounting dimensions.

Note. The supplemental chart given below lists the available Federal stocks numbers (FSN's) of connectors as shown in the illustrations listed. Consult DA Pam 310-4 for a complete listing of the applicable supply manuals and repair parts lists covering all maintainable items in the equipment.

Figure No.	*Nomenclature*	*FSN*
D–1	Connector MS3102C–32–5P (J4)	5935–201–7038
D–2	Connector U–79/U (J9)	5935–503–5527
D–3	Connector MS3102R–22–22P (J2)	5935–804–5816



NOTES:

1. CONFIGURATION ON OTHER SIDE OF CASE REMAINS THE SAME, EXCEPT THIS DIMENSION READS 17-1/2.
2. J1 IS A TYPE MS3124E-22-55S CONNECTOR.
   J2 IS A TYPE MS3124E-22-55SW CONNECTOR.
   J3 IS A TYPE MS3124E-22-55SX CONNECTOR.
   J4 IS A TYPE MS3102C-32-5P CONNECTOR.
   J5 IS A TYPE MS3102C-32-15P CONNECTOR.
3. TOTAL WEIGHT OF THE EQUIPMENT: 288 POUNDS.
4. MAXIMUM INPUT POWER: 1820 WATTS.
5. THIS DIMENSION IS 5-3/16 ON THE OTHER SIDE OF THE CASE.
6. DIMENSIONS ARE IN INCHES.

Figure D-1. Main case, outline and mounting dimensions.

NOTES:

1. J1 IS A TYPE MS3124F-22-55P CONNECTOR.
   J2 IS A TYPE MS3124F-22-55PW CONNECTOR.
   J3 IS A TYPE MS3124F-22-55PX CONNECTOR.
   J9 IS A TYPE U-79/U CONNECTOR.
2. TOTAL WEIGHT OF THE EQUIPMENT: 35 POUNDS.
3. MAXIMUM INPUT POWER: 46 WATTS.
4. DIMENSIONS ARE IN INCHES.

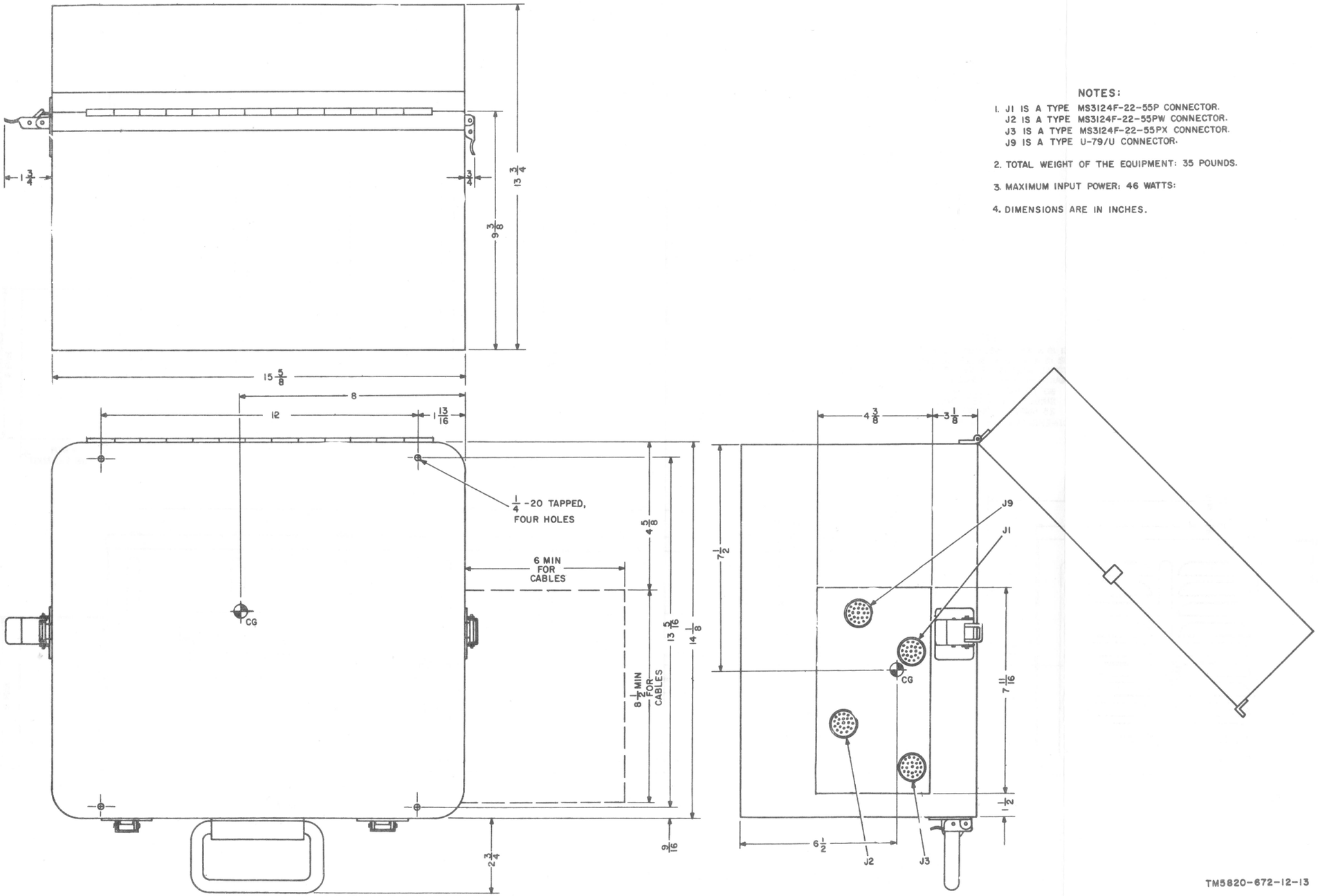


Figure D-2. Control panel, outline and mounting dimensions.

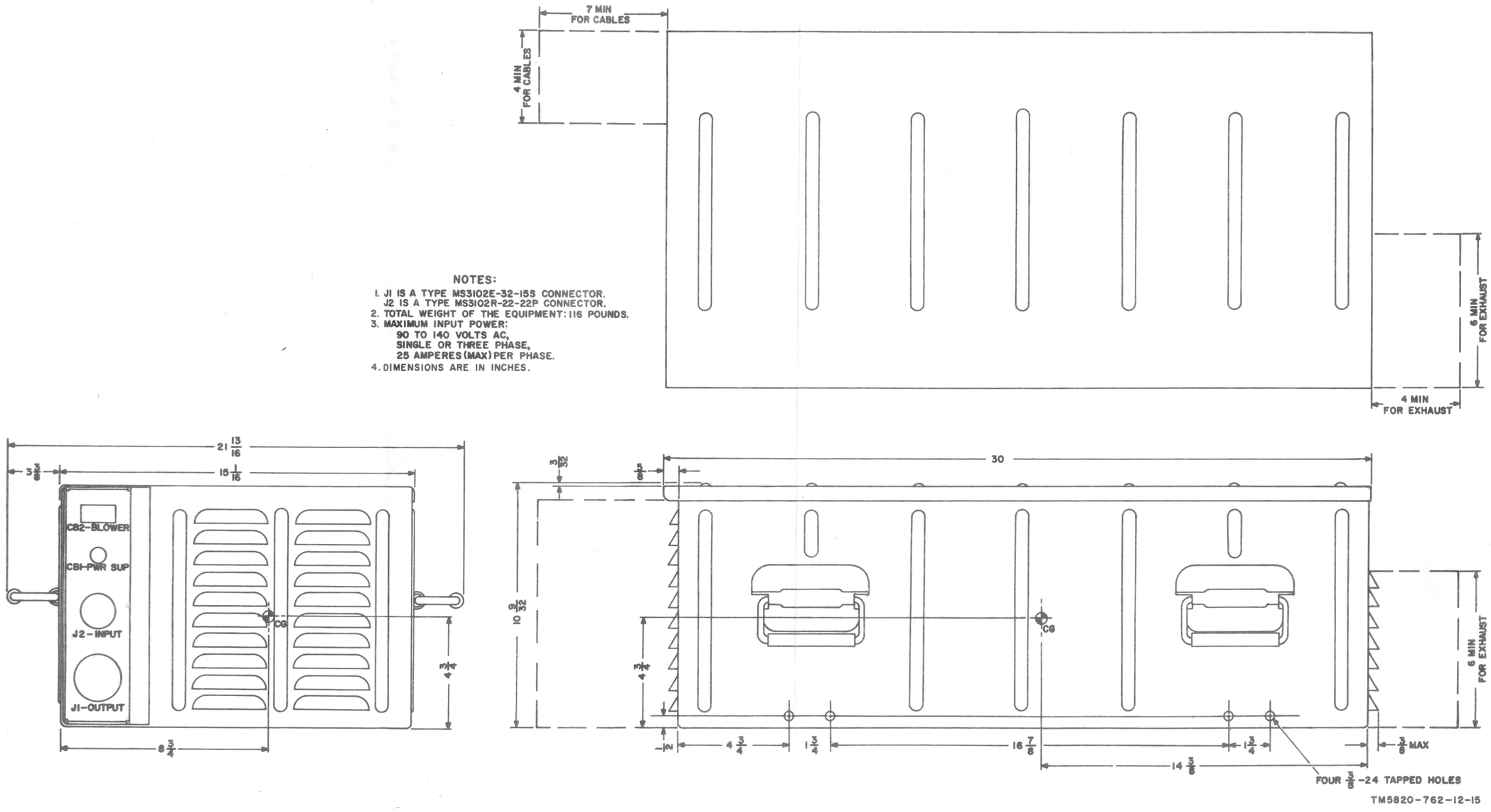


Figure D-3. Power supply, outline and mounting dimensions.

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
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USAR: None.

For explanation of abbreviations used, see AR 320–50.

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