

TW-PRC1077-TM1

TRANS WORLD COMMUNICATIONS TECHNICAL MANUAL

Operator's and Organizational Maintenance Manual
Including Repair Parts List

RADIO SET PRC1077



TRANS WORLD COMMUNICATIONS, INC.

A  ATRON COMPANY

304 Enterprise Street, Escondido, California, 92029 U.S.A.

TELEX 695-433 PHONE (619) 747-1079 FAX (619) 741-1658

**TECHNICAL MANUAL
RADIO SET PRC1077
TW-PRC1077-TM1**



WARRANTY

Trans World Communications, Inc. (TWC) warrants that new TWC equipment has been manufactured free of defects in design, material and workmanship. If the equipment does not give satisfactory service due to defects covered by this warranty, TWC will, at its option, replace or repair the equipment free of charge.

The warranty is for a period of 90 days from the date of installation. In the event that the equipment is not installed within 90 days of factory shipment, satisfactory evidence of the installation date must be submitted.

LIMITATIONS:

This warranty does not cover physical damage caused by impact, liquids or gases. Defects caused by lightning, static discharge, voltage transients, or application of incorrect supply voltages are specifically excluded from this warranty.

RETURN OF EQUIPMENT - USA:

The equipment shall be returned freight prepaid to the Service Department, Trans World Communications, Inc., 304 Enterprise Street, Escondido, California 92029. The equipment should be packed securely, as TWC will not be responsible for damage incurred in transit. Please include a letter containing the following information:

1. Model, serial number, and date of installation.
2. Name of dealer or supplier of equipment.
3. Detailed explanation of problem.
4. Return shipping instructions.

TWC will return the equipment prepaid by United Parcel Service, Parcel Post or truck. If alternate shipping is specified, freight charges will be made collect.

RETURN OF EQUIPMENT - FOREIGN:

Write for specific instructions. Do not return equipment without authorization. It is usually not possible to clear equipment through U.S. Customs without the correct documentation. If equipment is returned without authorization, the sender is responsible for all taxes, customs duties and clearance charges.

LIMITED PARTS WARRANTY:

This warranty shall cover all parts in the equipment for a period of 12 months from the date of installation, subject to the previous conditions and limitations. The parts will be replaced free of cost. The labor charges will be made at the current TWC hourly service rate.

PARTS REPLACEMENT:

If it is not practical, or the purchaser does not want to return the equipment to the factory, this warranty is limited to the supply of replacement parts for a period of 12 months from the date of equipment installation. The following instructions for the supply of replacement parts should be followed:

1. Return defective parts prepaid to: Parts Replacement, Trans World Communications, Inc., 304 Enterprise Street, Escondido, California 92029.
2. Include a letter with the following information:
 - a) Part number(s).
 - b) Serial number and model of equipment.
 - c) Date of installation.

Parts returned without this information will not be replaced. In the event of a dispute over the age of the replacement part, components date coded over 24 months prior will be considered out of warranty.

DESTRUCTION NOTICE

- WHY** To prevent the enemy from using or salvaging this equipment for his benefit.
- WHEN** When ordered by your commander.
- HOW**
1. Smash - Use sledges, axes, handaxes, pickaxes, hammers, crowbars, heavy tools.
 2. Cut - Use axes, handaxes, machetes.
 3. Burn - Use gasoline, kerosene, oil, flame throwers, incendiary grenades.
 4. Explosives - Use firearms, grenades, TNT.
 5. Disposal - Bury in slit trenches, fox holes, other holes. Throw in streams. Scatter.

USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT

- WHAT**
1. Smash - Printed circuit board, all internal components, switches, and connectors.
 2. Cut - All chassis wiring and connecting cables.
 3. Burn - All remaining equipment, smashed parts, technical manuals and diagrams.
 4. Bury or Scatter - All of the above pieces after destroying their usefulness.

DESTROY EVERYTHING

PRC1077 MEMORY DUMP FEATURE

For silent removal of operational frequencies from PRC1077 memory, follow the steps below.

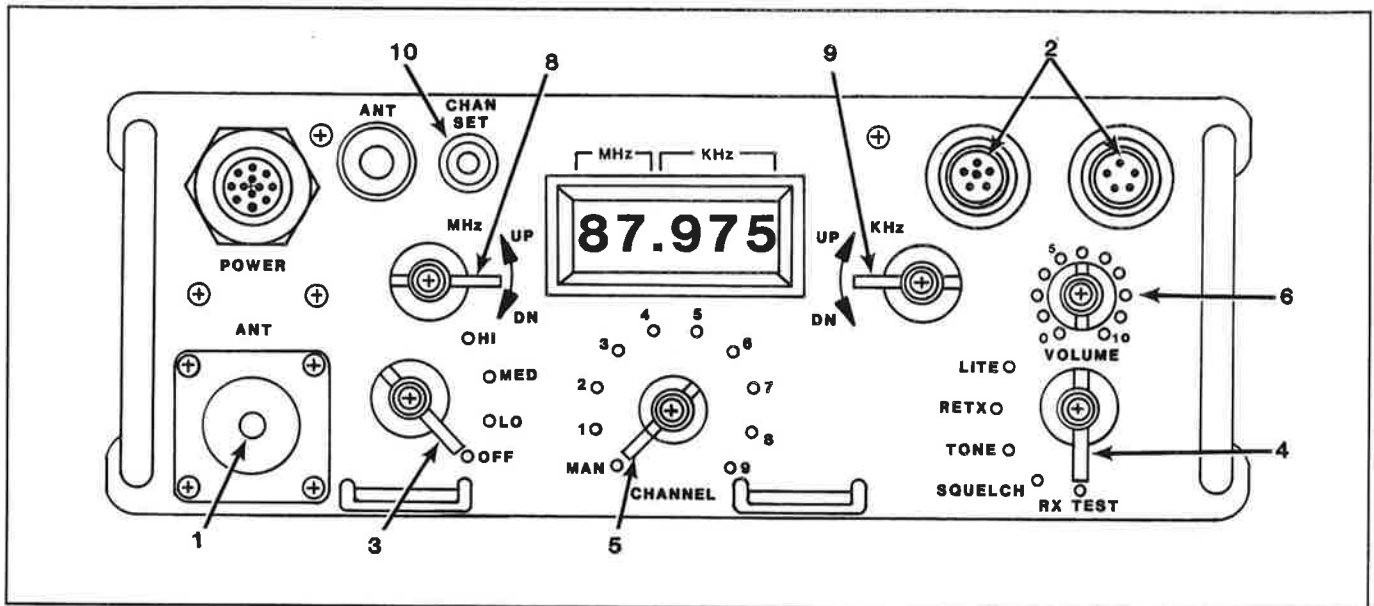
1. Turn PRC1077 off.
2. Push down and hold the channel-set button.
3. Hold MHz paddle up.
4. Turn PRC1077 on. Memories will be erased.

WARNING Radio will be left in an operational state. Full operation can be restored by reprogramming channel memories. To permanently disable the radio, follow the steps outlined above.

SPECIAL NOTES FOR USERS OF RADIO SET PRC77

1. The Radio Set PRC1077 is designed to be used in systems using the Radio Set PRC77. The PRC1077 is fully compatible with all PRC accessories and uses the same battery packs, antennas, handsets, vehicular mounts, retransmission cables, etc.
2. Although the case and battery pack for the PRC1077 are interchangeable with the PRC77, it should be noted that the internal design of the radio sets are entirely different and the internal spare parts and service procedures are not the same.
3. The PRC1077 is a modern design and has features that are not available in the PRC77. Take note that the following features cannot be used when operating with the PRC77:
 - A. Frequencies in the range 76-88 MHz.
 - B. The channel frequencies between the PRC77 channels. The frequencies will end with "25" and "75."
 - C. The noise-operated squelch. Use only the tone squelch.
 - D. Semi-duplex operation. This means that the transmitter and receiver are operating on different frequencies.
4. Remember that in comparison to the PRC1077, the PRC77 does not have the following:
 - A. 10 memory channels.
 - B. High, medium, and low power.

CONDENSED OPERATING INSTRUCTIONS FOR RADIO SET PRC1077



The numbers on the diagram refer to the steps below.

A. TO OPERATE SET

- (1) Install the antenna required for the type of operation in the antenna mount.
- (2) Attach the handset to either audio connector.
- (3) Turn the power switch to the power level for the type of operation. (HI gives maximum range.)
- (4) Turn the function switch to RX TEST.
- (5) Select the desired channel number.
- (6) Turn the VOLUME control to 5.
- (7) Press the handset push-to-talk switch and talk into the handset. Release the switch to listen.
- (6) Adjust VOLUME control (6) for desired sound level.
- (4) To stop the rushing noise when no signal is being received, turn the FUNCTION switch (4) to either SQUELCH or TONE according to the type of operation. TONE should always be selected for operation with PRC77's or other tone-operated radio receivers.

B. TO CHANGE CHANNEL FREQUENCIES

- (5) Set the control (5) to MAN.
- (8) Turn the MHz switch (8) UP or DOWN to select the Megahertz. (First two digits of the frequency.)
- (9) Turn the kHz switch (9) UP or DOWN to select the KiloHertz. (Last three digits of the frequency.)
- (10) To change the frequencies of channels 1-9, set the control (5) to the desired channel number. Repeat the previous two steps while depressing the CHAN SET button (10).

C. TO TURN SET OFF

- (3) Turn the power switch (3) to off.

D. MEMORY DUMP FEATURE

1. Turn the radio off.
2. Hold the CHAN SET (10) button in, hold the MHz (8) switch up, switch the radio on.
3. This will erase all memory channel frequencies.

NOTE - MAGNESIUM BATTERIES

1. The magnesium battery BA-4386/U does not deliver full power immediately. If the receiver does not operate immediately, wait for 30-60 seconds for the battery to produce sufficient output voltage. In the transmit mode, the battery output may fall below the operating level when the push-to-talk switch is depressed. Wait at least 10 seconds before speaking to ensure the battery has recovered. Full output power may not be reached for 30-60 seconds.
2. Remove the battery from battery box CY-2562 when the PRC1077 is not in use.

OPERATOR'S & ORGANIZATIONAL MAINTENANCE MANUAL

RADIO SET PRC1077

	<u>Paragraph</u>	<u>Page</u>
CHAPTER 1. INTRODUCTION		
Section I. General	1-1	1-1
II. Description and Data	1-2 - 1-6	1-1 - 1-4
CHAPTER 2. INSTALLATION	2-1 - 2-6	2-1 - 2-5
3. OPERATING INSTRUCTIONS	3-1 - 3-11	3-1 - 3-4
4. OPERATOR'S MAINTENANCE INSTRUCTIONS	4-1 - 4-8	4-1 - 4-2
5. FIELD MAINTENANCE INSTRUCTIONS	5-1 - 5-8	5-1 - 5-4
6. MATERIAL USED IN CONJUNCTION WITH RADIO SET PRC1077	6-1 - 6-3	6-1
7. RADIO RELAY AND REPEATER OPERATION WITH THE PRC1077	7-1 - 7-6	7-1 - 7-4
APPENDIX A. ORGANIZATIONAL REPAIR PARTS	A-1 - A-3	A-1
INDEX		I-1 - I-2



FIGURE 1-1.
Radio Set PRC1077 in Man-pack Operation with 3-foot Antenna AT-892/U installed.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual describes radio set PRC1077 and covers its installation, operation, and operator's organizational maintenance.

b. Items comprising an operable equipment (Para. 1-6).

c. Information on the technical service and maintenance of the PRC1077 is contained in the technical manual TW-PRC1077-MS1.

Section II. DESCRIPTION & DATA

1-2. Purpose and Use (Figure 1-1)

a. Radio set PRC1077 is a short-range, manpack-portable, frequency-modulated (FM) transceiver used to provide two-way, radiotelephone, voice communication.

b. The radio set PRC1077 may also be used as part of radio sets VRC-64 and GRC-160.

c. The radio set PRC1077 can communicate with most military FM radios operating within the 30- to 88-MHz range.

d. The PRC1077 can be used in conjunction with the other equipment—(1) through (8) below.

(1) Antenna equipment RC-292 can be used in place of the whip antennas to extend the communication range.

(2) The PRC1077 can be used for radio relay use in conjunction with another PRC1077 by means of the Retransmission Cable Kit MK-456/GRC.

(3) The PRC1077 may be used in conjunction with a repeater, or two PRC1077's may be used as a repeater, for extended range operation. The PRC1077 is operated in the semi-duplex mode for operation through a repeater.

(4) Remote control of the PRC1077 can be provided by radio set control groups GRA-39 or GRA-6.

(5) Radio/wire integration (RWI) operation with the PRC1077 and remote telephone facilities can be provided by radio set control GSA-7 with oscillator O-574/GRA or the GRA-39 and GRA-6.

(6) The PRC1077 can be used with antenna, homing loop AT-784/PRC for detection and location of homing beacons or other FM radios.

(7) The PRC1077 can be used with antenna AT-984A/G, a long-wire, multiple-wavelength antenna, to extend the transmission and reception ranges.

(8) Loudspeaker, electromagnetic LS-549/PRC can be used with the PRC1077 to monitor radio reception.

(9) The PRC1077 can be used with many types of secure voice equipment.

(10) The PRC1077 can be used for digital data transmission and reception.

1-3 Technical Characteristics

Frequency Range: 30-87.975 MHz.

Number of Channels: 2,320.

Memory Channels: 10.

Channel Spacing: 25 kHz.

Types of Transmission and Reception:

Transmission - Voice (300-3,500 Hz) and 150-Hz squelch tone (selectable is optional).

Reception: - Voice - no squelch, noise squelch or 150-Hz tone squelch (selectable).

Security or Digital Data Equipment:

Wideband 200-20,000 Hz.

Transmission and Reception Power Requirements:

Transmission-10-15 Vdc

High Power 1.6 A.

Medium Power 1.1 A.

Low Power 800 mA.

Reception 10-15 Vdc 60 mA.

Type of Modulation: Frequency.

Transmitter Power Output: Selectable: 0.3 W, 2 W, 5 W.

Type of Squelch: Tone operated by 150-Hz signal or noise operated.

Distance Range: 5 miles (8 kilometers) (varies with conditions).

Types of Antennas:

Short Antenna: Antenna AT-892/U, 3-ft. long, semirigid steel tape.

Long Antenna: Antenna AT-271A/U, 10-ft. long, multisection whip.

Power Source: Battery, dry BA-4386/U or BA-398/U; or Sealed lead-acid, or NiCad.

Battery Life: High Power 60 hours (9:1 receive-transmit ratio) (BA4386/U).

For further information, refer to TW-PRC1077-MS1 Technical Manual.

1-4. Items Used with PRC1077 (Figure 1-2)

The following components are normally used with the PRC1077 in the manpack configuration. Dimensions and weights of components are provided in paragraph 2-1. A battery is required to operate the PRC1077.

<u>Trans World Part No.</u>	<u>ITEM</u>
PRC1077	Radio Set PRC1077 (includes battery box) Antenna AT-271A/U Antenna AT-892/U Bag Cotton Duck CW-503 Handset H-250/U Harness Electrical Equipment ST-138 Support, Antenna AB-591

1-5. General Description (Figure 1-2)

Radio set PRC1077 consists of the transceiver and battery box described in (a). The normal accessory components are described in (b).

a. TRANSCEIVER, RADIO PRC1077.

The PRC1077 consists of the transceiver, the transceiver case, and the battery box CY-2562.

(1) The transceiver is held in the case by four captive screws. The battery box is attached to the case by two clamps. The complete PRC1077 is watertight when assembled. All controls are on the front panel. The battery connector projects from the bottom of the case and plugs into the battery.

(2) The CY-2562 is a lightweight metal case that protects and houses the battery. The battery sits on a foam pad that is attached to the bottom of the case.

(3) A pressure relief valve is installed in the battery case to vent the hydrogen gas (a by-product of the magnesium-battery discharge action), which prevents the gas from accumulating in the transceiver case and exploding. It is important that battery cases have the pressure relief valve when using magnesium batteries.

b. ACCESSORY COMPONENTS (Figure 1-2)

(1) Antenna AT-892/U

The AT-892/U is a one section, 3-foot-long whip antenna. A spring at its base allows for the positioning of the antenna to keep it in a vertical position, regardless of the posi-

tion of the PRC1077. This antenna is used for general short-range service and, because of its steel-tape construction, can be folded into a small space.

(2) Antenna AT-271A/U

The AT-271A/U is composed of six sections; each section fits into the end of a wider section. A braided plastic cord, under spring tension, is threaded through the sections to keep them together in the operating condition. When the sections are folded, the cable keeps them together as a group and prevents the loss of individual sections. Spring tension is provided by a spiral spring in the base section. This antenna is used when the maximum range is required.

(3) Support, Antenna AB-591/U

The AB-591, which has semi-flexible tubular construction, is used as the main support for the AT-271A/U.

(4) Harness, Electrical Equipment ST-138

The ST-138 is used to secure the PRC1077 so that it can be carried on the operator's back.

(5) Bag, Cloth CW-503

The CW-503 is sectionalized into several pockets which are used to store the two antennas, the antenna support, and the handset (Figure 1-3).

(6) Handset H-250/U

The H-250/U contains a dynamic microphone and receiver for transmitting and receiving signals. A push-to-talk switch is mounted in the handle. The connecting cord is retractile and terminates in a five-pin connector.

The PRC1077 may also be used with Handset H-189/GR.

1-6. Battery (Figure 2-1)

a. Battery, dry BA-4386/U is required to operate the PRC1077. The battery is provided with a female connector to mate with the male connector on the PRC1077. The battery supplies 3 V and 15 V. The 3-V output is not used.

b. For arctic operation, battery, dry BA-398/U may be used.

c. The PRC1077 may be used with other types of batteries such as NiCad or sealed lead acid, with an output voltage of 12-15 Vdc.

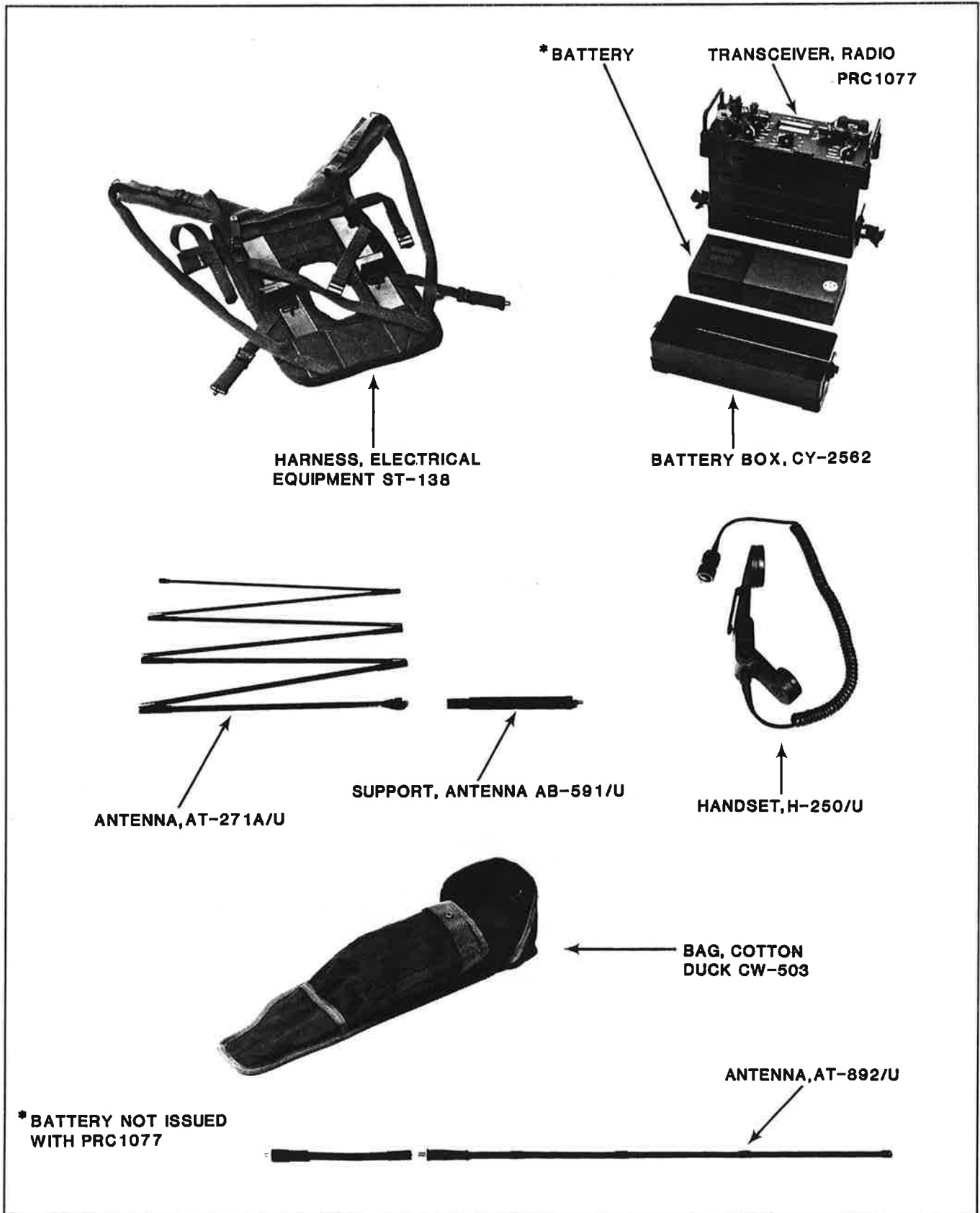


FIGURE 1-2.
Radio Set PRC1077, Components.

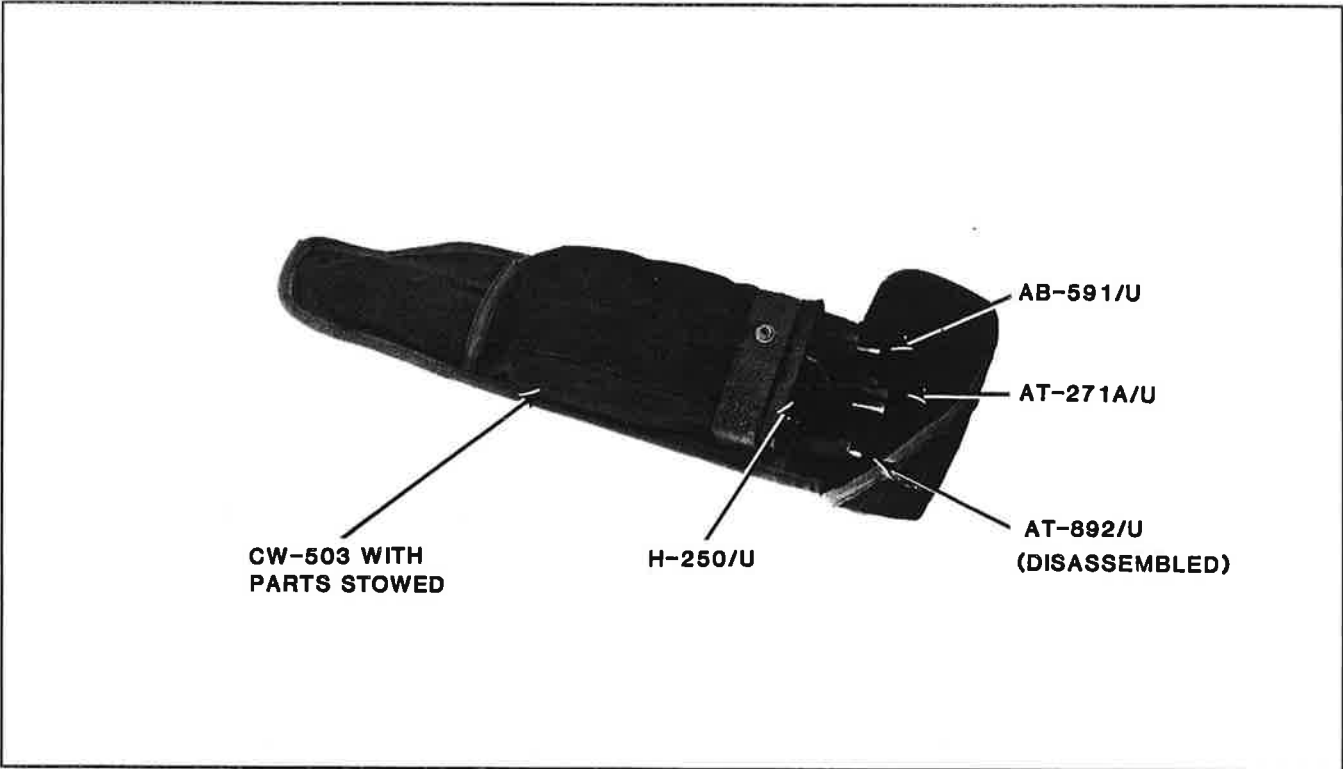


FIGURE 1-3.
Bag, Cotton Duck CW-503, with Antennas and Handset Stowed.

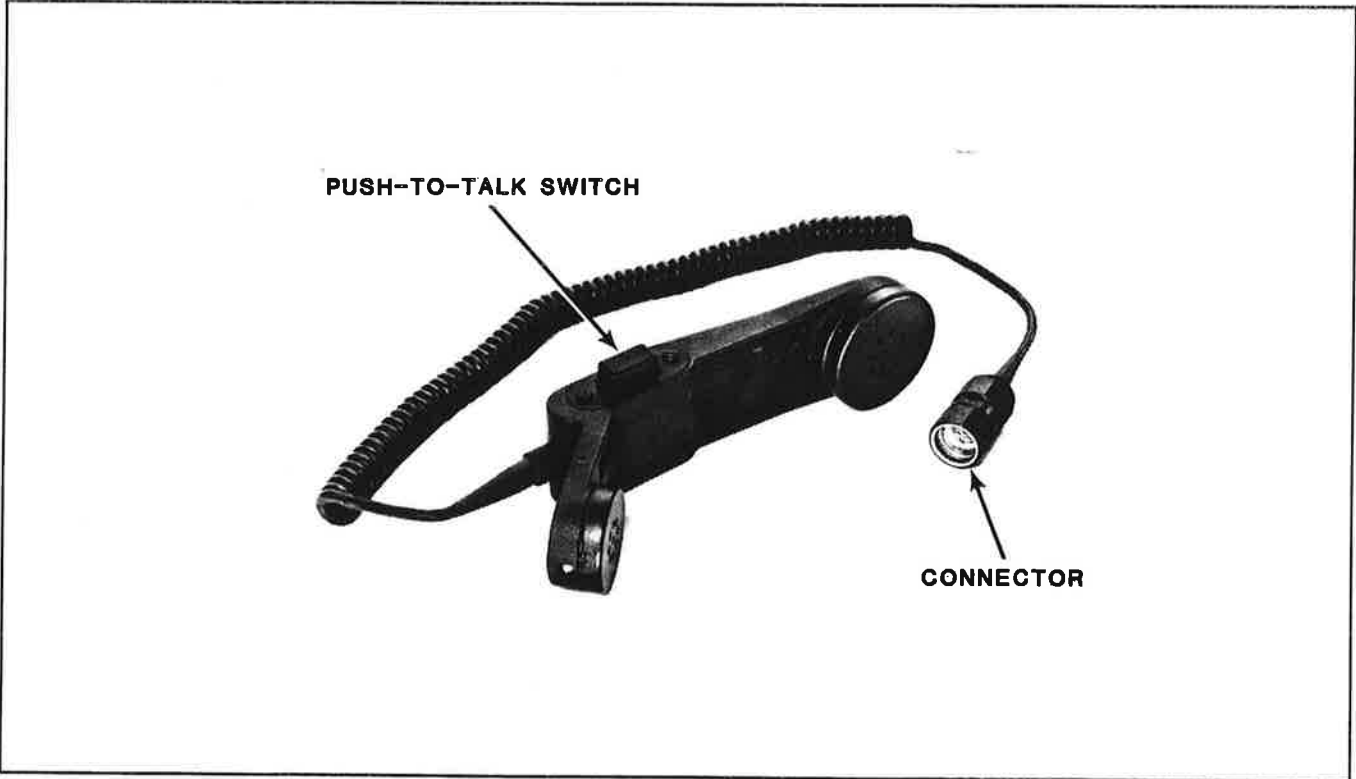


FIGURE 1-4.
Handset H-250/U.

CHAPTER 2 INSTALLATION

2-1. Unpacking

a. Packaging Data

The PRC1077 is packed in a heavy-duty, corrugated cardboard carton. The accessories are packed in a separate

carton. The cartons and packing materials should be retained in case the equipment is reshipped.

b. Component Dimensions.

Component	Overall Dimensions (in)			Volume (cu in)	Weight (lb)
	Height	Width	Depth		
Transceiver, Radio PRC1077	4.00	11.00	9.50	418	9.72
Battery Box CY-2562	4.00	11.00	3.00	132	0.82
Support, Antenna AB-591/U	9.00	0.75	0.75	50	0.75
Antenna AT-892/U	18.50	1.00	1.50	28	0.50
Antenna AT-271A/U	17.00	0.75	0.75	9	0.75
Harness, Electrical Equipment ST-138	19.00	6.00	5.00	520	3.00
Bag, Cotton Duck CW-503	19.00	4.00	5.00	456	0.75
Handset H-250/U	7.75	2.00	3.50	54	0.55

2-2. Checking Unpacked Equipment

Inspect the equipment for possible damage during shipment. Check all accessories against the packing list.

CAUTION

Remove the battery when the transceiver is not in use for more than one day.

2-3. Siting

The PRC1077 operates at low power and on high frequencies; therefore, the location of the equipment greatly affects its operating range. Normally, a line-of-sight range can be expected; that is, if the other station can be seen, satisfactory operation is probable. An intervening hill or a tall building may hamper or prevent contact with other stations. Valleys, densely wooded areas, and low places are poor sites. Location on a hilltop or a tower will increase the operating distance. If possible, avoid locations near a source of electrical interference, such as power or telephone lines, radar sets, and field hospitals.

2-4. Installation of Battery (Figure 2-1)

- a. Stand the PRC1077 on a level surface with the front panel facing down.
- b. Release the two clamps by pushing down.
- c. Remove the battery box.
- d. Check the battery connector; if it is damaged, the transceiver must be repaired. Check that the pressure test screw and relief valve are tight.
- e. Position the battery so that the connectors are aligned and then mate the connectors.
- f. Install the battery case and tighten the clamps.

2-5. Assembly and Installation for Man-Pack Operation (Figure 2-2)

- a. Attach the transceiver to the harness as instructed in (1) through (4).
 - (1) Place the harness flat on a level surface with the metal braces facing up.
 - (2) Place the transceiver on the harness with the front panel to the top and the battery case resting on the metal braces.
 - (3) Fasten the transceiver to the harness with the two retaining straps; feed the metal-tipped strap from below, through the center slot on the buckle, and then down through the end slot on the buckle.
 - (4) Clip the bag CW-503 to the harness.
- b. Mount the transceiver and harness on the operator as follows:
 - (1) Install the desired antenna (Para. 2-6).
 - (2) Connect the handset to one of the audio connectors on the front panel of the transceiver.
 - (3) Place the harness, with the transceiver attached, on the operator's back. Place the shoulder straps over the operator's shoulders.

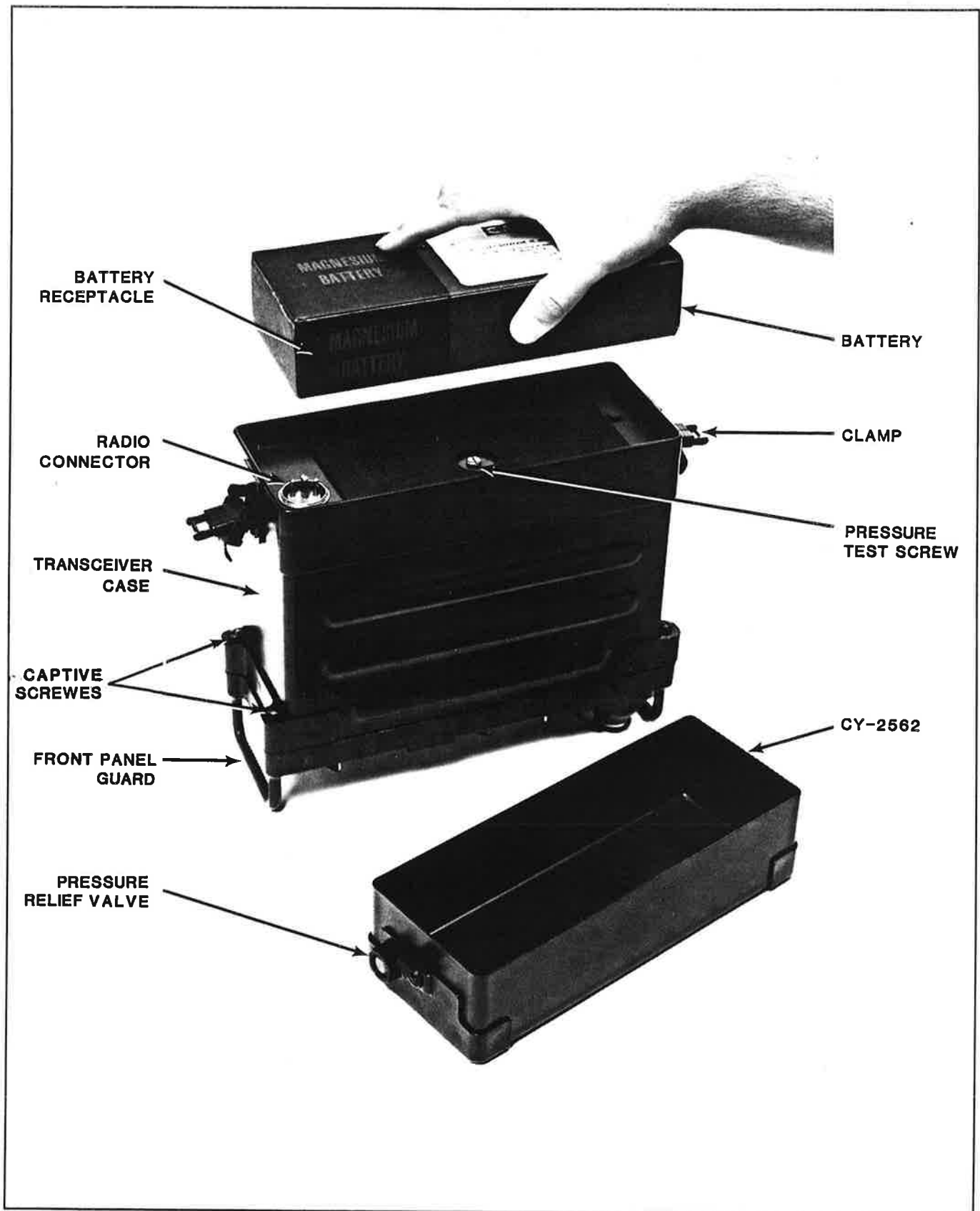


FIGURE 2-1.
Installation of Battery in Transceiver.

(4) Feed the end of the lower strap through the right shoulder strap ring. Feed the metal tip of the strap from below, through the center slot in the buckle, and then down through the end slot. (Figure 2-2).

(5) Install the left shoulder strap in a similar manner.

(6) Hook the two belt straps to the combat belt (Figure 2-3).

2-6 Installation of Antennas

Use the short antenna AT-892/U when maximum range is not required. Use the long antenna AT-271A/U when maximum range is required.

a. ANTENNA AT-892/U

(1) Remove the cover from the ANT mount (Figure 3-1).

(2) Screw the bottom of the AT-892/U into the ANT mount.

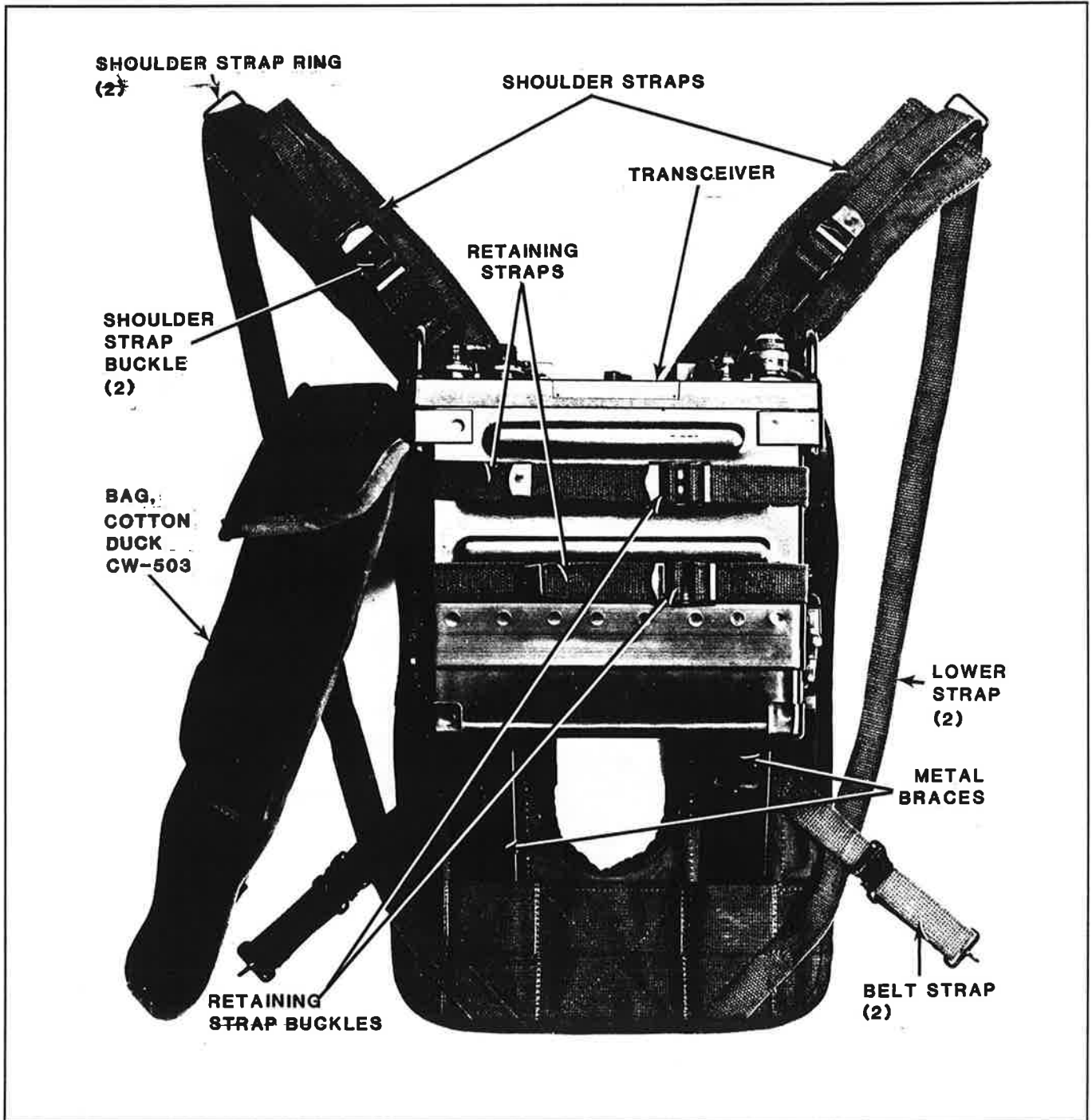


FIGURE 2-2.
Installation of Transceiver in ST-138.

t.b. ANTENNA AT-271A/U

- (1) Remove the cover from the ANT mount (Figure 3-1).
- (2) Screw support, antenna AB-591/U into the ANT mount.
- (3) Extend the AT-271A/U by holding the base section (the heaviest section) and carefully whipping it outward. If all sections are not secure, insert the sections by hand.
- (4) Secure the extended AT-271A/U into the AB-591/U.

c. ORIENTATION OF AT-892/U

The AT-892/U (short antenna) is provided with a spring base to permit positioning the antenna other than vertically to the top of the transceiver. For best communications the antenna should be vertical to the ground (A and B, Figure 2-4). When the operator or the transceiver is in a position other than vertical, the antenna should be adjusted so that it is vertical to the ground. If the vertical position would reveal the operator's location, the antenna can be positioned so that it is horizontal to the ground (See Figure 2-4).

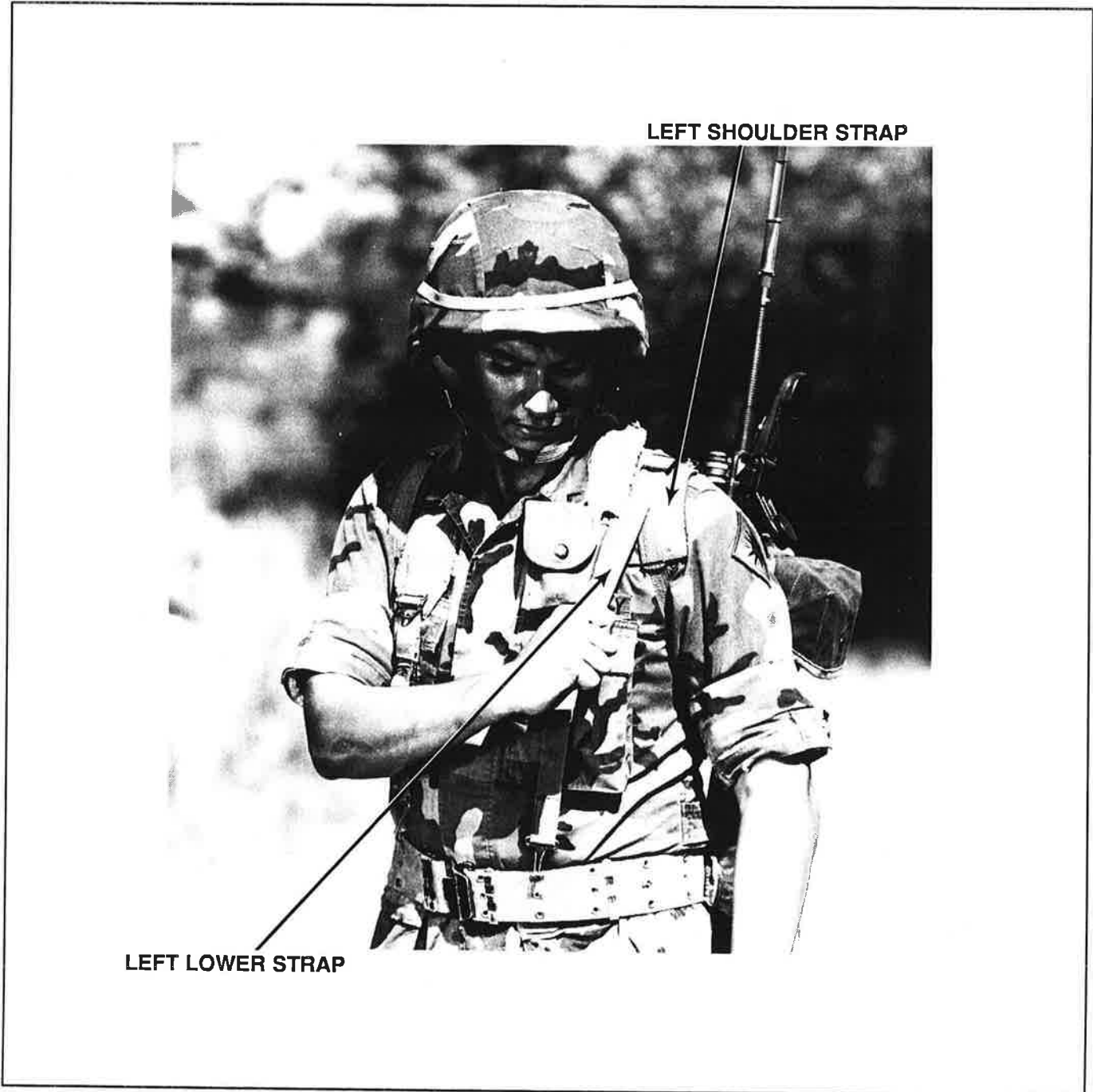


FIGURE 2-3.
Installing PRC1077 for Manpack Operation.

When the antenna is horizontal, the direction of communication is broadside to the antenna. Best results will be obtained when the two communicating transceivers have the antennas in the same position.

CAUTION

The antenna must always be tightened so that the base is

tight against the ANT mount. Even a small gap between the base and the mount may cause the antenna to break at this point, and leave the threaded portion in the mount. The plastic filling in the thread is designed to prevent the antenna from unscrewing. If the plastic wears, the antenna may unscrew under vibration. Periodically tighten the antenna in the mount.

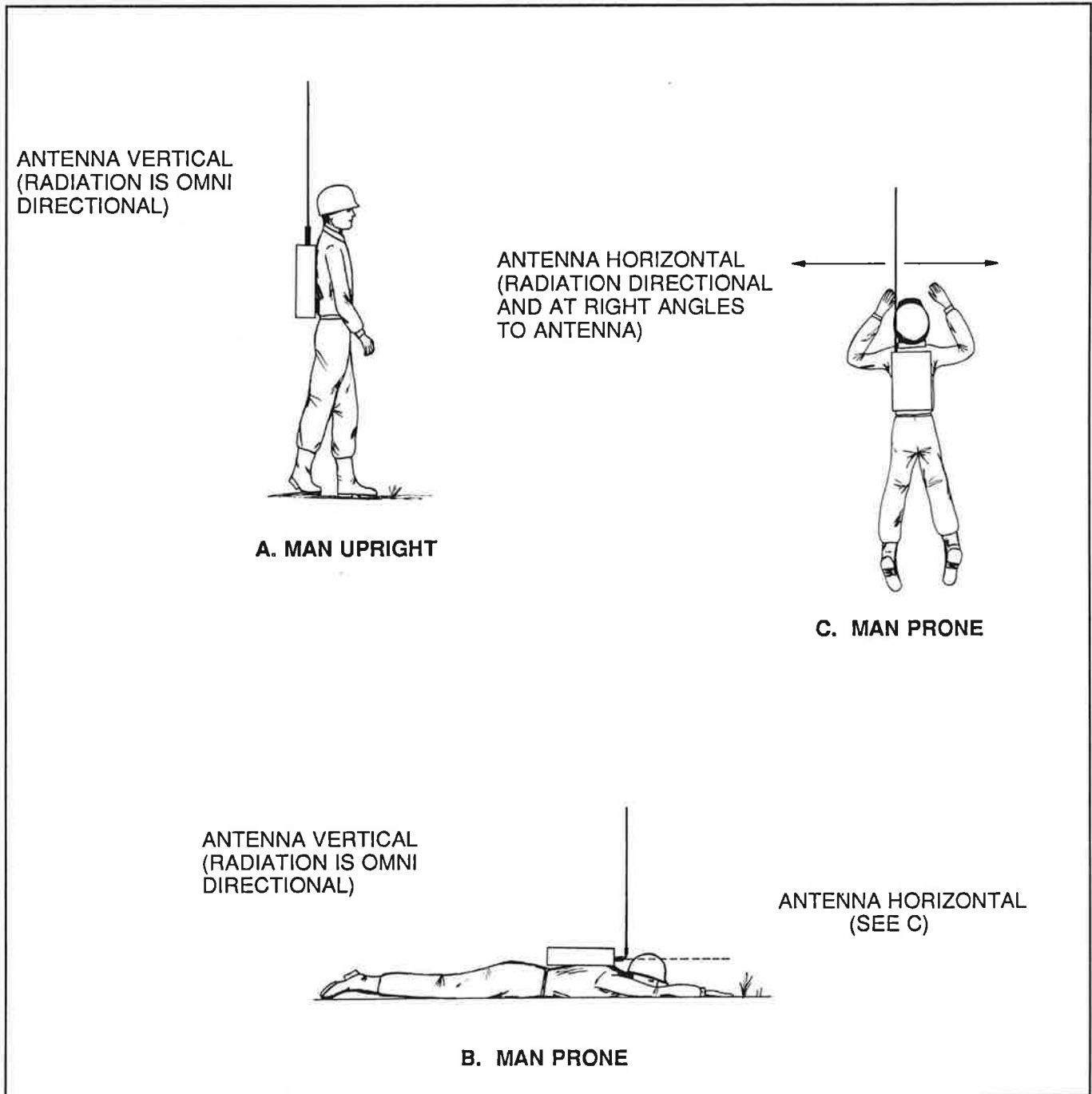


FIGURE 2-4.
Orientation of AT-892/U in Various Positions on User.

CHAPTER 3 OPERATING INSTRUCTIONS

CAUTION

Battery power should be between 12.5 V and 15 Vdc, with positive (+) applied to the B terminal on the battery connector (at the back of the transceiver) and negative (-) applied to the A terminal. Do not change the battery polarity or the transceiver will be seriously damaged.

3-1. Transceiver, Radio PRC1077, Controls, Indicators and Connectors (Figure 3-1)

Control, Indicator, or Connector	SW Position	Function/Action
Power Switch	OFF	Turns transceiver off.
	LO	Turns transceiver on - low power.
	MED	Turns transceiver on - medium power.
	HI	Turns transceiver on - high power.
Function Switch	RX TEST	No receiver squelch. Rushing noise in receiver.
	SQUELCH	Receiver squelched - no rushing noise. Opens when signal received.
	TONE	Receiver squelched - no rushing noise. Opens only on 150-Hz tone. Transmitter is modulated with 150-Hz tone.
	RETX	Permits radio relay operation.
Channel Switch	LITE	Spring loaded position back-lights frequency display.
	MAN	Selects the manual tune position.
MHz Tuning Control	1-9	Selects preset channel frequencies.
	UP	Spring loaded - increments frequency higher in 1-MHz steps.
KHz Tuning Control	DOWN	Spring loaded - increments frequency lower in 1-MHz steps.
	UP	Spring loaded - increments frequency higher in 25-kHz steps.
CHAN SET	DOWN	Spring loaded - increments frequency lower in 25-kHz steps.
	DEPRESS	Permits resetting frequency on channels 1-9.
Liquid Crystal Display		Displays channel frequency in MHz and kHz.
VOLUME Control		Varies receiver volume.
AUDIO Connector		Provides connection for handset or retransmission cable.
ANT Mount		Provides connection for antenna AT-271A/U or AT-892.
ANT Connector		Provides connection for fixed base or vehicular antenna.
POWER Connector		Provides connection for external power supply when PRC1077 is used as part of vehicular radio set configurations. When the connector cover is removed, the PRC1077 is disconnected from the battery pack. Rechargeable batteries may be recharged through this connector.

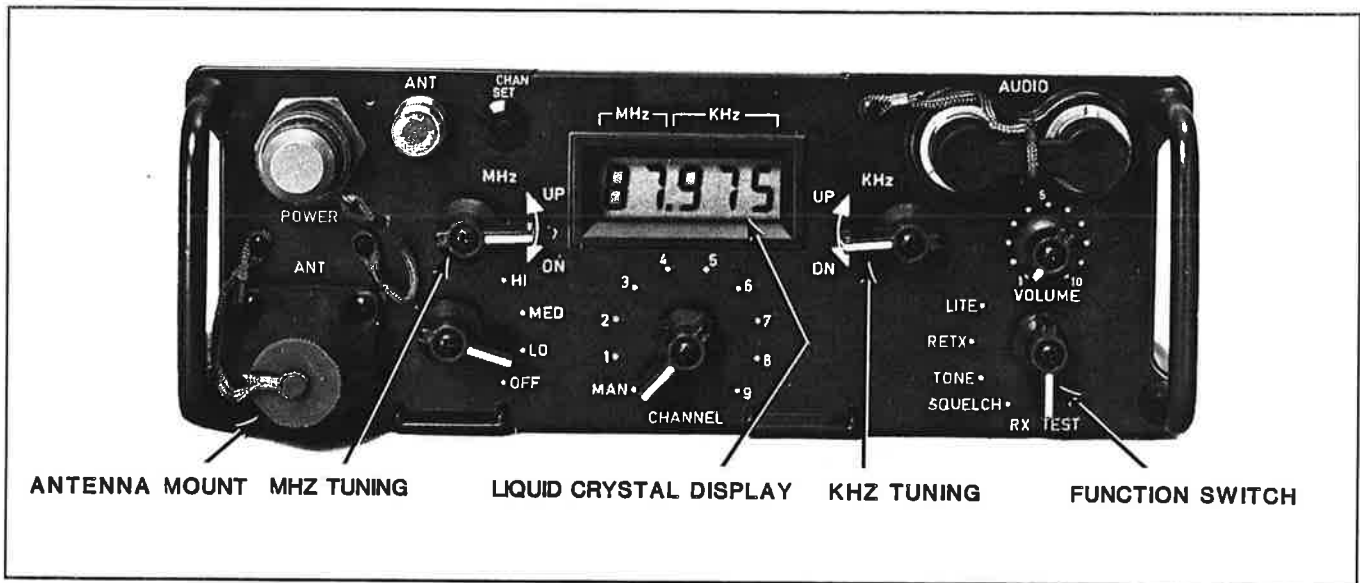


FIGURE 3-1.
Tranceiver Radio PRC1077, Controls, Indicators, and Connectors.

3-2. Presetting Channel Frequencies

The PRC1077 will store up to 10 different frequencies. These frequencies remain in memory even if the battery pack is disconnected. Channels 1-9 are usually used to store preset channels; however, the last frequency entered in the "TUNE" channel will also be retained in memory.

a. PRESETTING CHANNELS 1 TO 9

- (1) Select the desired channel number.
- (2) Depress switch CHAN SET and hold down while setting the new frequency. This switch prevents accidental change of the channel frequencies during normal operation of the transceiver.
- (3) Turn the MHz switch either "UP" or "DOWN" until the first two digits (MHz) of the display are correctly indicated.
- (4) Turn the kHz switch either "UP" or "DOWN" until the last 3 digits (kHz) of the display are correctly indicated.
- (5) Release the CHAN SET switch. The new frequency is now entered in memory.

b. PRESETTING MAN CHANNEL

Follow the preceding procedure except that it is not necessary to depress the CHAN SET switch.

c. MEMORY DUMP FEATURE

To erase the frequencies stored in memory, simply hold the CHAN SET button in, hold the MHz switch up, and turn the radio from OFF to LO. This will cause the radio to reset all programmed frequencies to 00.000 MHz.

3-3. Presetting Semi-Duplex Channels.

Semi-duplex channels are channels where the receive and

transmit frequencies are different and are usually used for extending the range by operating through a repeater.

- (1) Set the receive frequency as described in paragraph 3-2.
- (2) Continue to depress the CHAN SET switch.
- (3) Momentarily depress the handset push-to-talk switch.
- (4) Enter the transmit frequency using the standard procedure.
- (5) Check that the frequency in the display is correct in both the receive and transmit modes.

3-4. Operating Procedure

- a. Set the power switch to HI, MED, or LO (refer to 3-4h).
- b. Set the function switch to RX TEST. A rushing sound should be heard in the handset.
- c. Set the channel switch to the desired channel (refer to Section 3-3 if a new frequency, not previously entered into memory, is needed).
- d. Set the VOLUME control to the desired sound level.
- e. Transmit as follows:
 - (1) Press the push-to-talk switch on the handset.
 - (2) Speak into the handset.

NOTE

The H-250/U Handset has a noise-cancelling microphone. There will be almost no output when speaking more than 1/2 inch from the microphone element.

f. To receive, release the push-to-talk switch on the handset.

g. The rushing sound in the handset can be eliminated by turning the function switch to SQUELCH or TONE. The choice of the two squelch positions is determined as follows:

(1) The SQUELCH position is a noise-operated squelch. The receiver audio is switched off until another transmission is received. This position can be used when communicating with other PRC1077's. The squelch will not cause the PRC77, or equipment using tone squelch, to open.

(2) The TONE position is a 150-Hz tone-operated squelch. The receiver audio is switched off until another transmission, using the 150-Hz tone, is received. This position also enables the 150-Hz tone on the transmitter and must always be used when communicating with the PRC77 or other equipment using the 150-Hz tone system.

h. The PRC1077 has three transmitter power-output levels—high, medium and low. Always use the lowest power-output level that will give reliable communications. This will help prevent unwanted interception of the transmission.

3-5. Stopping Procedure (Figures 1-2 and 1-3)

a. To turn off the transceiver, set the power switch to OFF.

b. If the AT-271A/U (long antenna) was used, disable it as follows:

(1) Unscrew the AT-271A/U from the support AB-591/U.

(2) Beginning with the top section, pull out each section from the next section and fold it along the side of the next lower section.

(3) Unscrew the Support AB-591/U from the antenna mount.

c. Store the handset, both antennas, and the base in the bag CW-503 and close the flaps.

3-6. Recognition and Identification of Jamming

Jamming is the intentional transmission of signals to prevent communications. Strong unidentified transmissions may be enemy jamming. Unusual noises on the channel may also be jamming or may be interference from a local noise source. It is also possible for a faulty receiver to cause internal interference to the received signal. Make the following checks:

(1) Remove the antenna. If the noise does not disappear, there is a fault in the receiver.

(2) Switch to several different channels. If the interference is present on all channels, it is probably caused by a local noise source.

3-7. Anti-Jamming

When jamming is first noted, try the following procedures.

a. Try reducing the effects of jamming by placing the equipment so that nearby obstructions act as a screen in the probable direction of the jamming source. Try several different locations as the strength of the interfering signal may vary substantially over quite short distances.

b. Operate at the minimum power level required for satisfactory communications. This makes it difficult for the jamming source to intercept the transmissions and determine the jamming frequency.

c. Change the channel frequency. The PRC1077 has the ability to change to new frequencies as quickly as the operator can turn the channel switch. Unless the jammer is using very advanced jamming equipment, it will take some time to find the operating frequency and start jamming. Many different procedures can be used to minimize jamming. Typical procedures are described.

(1) Scheduling—Specified channel frequencies are used in specific time slots. For example, channel 1 may be used from 00 minutes to 15 minutes past the hour. Channel 2 is used from 15 to 30 minutes past the hour, and so on, in a similar sequence.

(2) Change frequency upon initiation of jamming—Set up a schedule of frequency changes. When jamming commences, the operators will change to the next frequency listed in the schedule. This procedure is particularly effective when only two stations are communicating.

(3) Split-Frequency Operation—The use of different transmit and receive frequencies. Refer to paragraphs 3-3 and 3-8.

3-8. Split-Frequency Operation

The PRC1077 has the facility to transmit and receive on separate frequencies (refer to paragraph 3-3). This enables the PRC1077 to be used through a repeater to give extended coverage (refer to paragraph 7-3). Split-frequency operation may also be used to make it difficult to monitor both sides of the conversation. The procedure is for station A to set up for split-frequency operation (refer to paragraph 3-3), station B then sets up so that the transmit and receive frequencies are reversed. For example, station A transmits on 40 MHz and receives on 50 MHz, while station B transmits on 50 MHz and receives on 40 MHz. Both A and B can communicate, but it is only possible to monitor or jam one side of the conversation.

3-9. Use of 25-kHz Channels or the 76- to 88-MHz Range

The channel frequencies ending in 25 and 75 kHz are not available in the PRC77 and should not be used when communicating with the PRC77 or other transceivers using 50-kHz channel spacing. Similarly, the frequency range 76- to 88-MHz is not available in the PRC77. The use of the 76- to 88-MHz range or the in-between 25-kHz channels can provide security and possible protection against jamming if the jammer is using PRC77-type equipment.

3-10. System Application

The PRC1077 can communicate with most other frequency-modulated (FM) radio sets operating on frequencies within the 30- to 88-MHz range. The following items should be studied in order to determine system compatibility.

(1) Frequency Range—Ensure that the PRC1077 operates within the same frequency range. For example, the PRC28 operates from 30-42 MHz, so the PRC1077 cannot be used above 42 MHz when communicating with this transceiver.

(2) Channel Spacing—The PRC1077 must operate on frequencies compatible with the channel spacing. For example, the PRC28 has 100-kHz channel spacing, so the PRC1077 should be used on the even 100-kHz frequencies.

(3) Squelch System—Select the TONE position on the PRC1077 if a 150-Hz tone squelch system is used. The PRC1077 will receive transmissions with and without 150-Hz tone in the SQUELCH position. The PRC1077 must be in the TONE position to transmit 150-Hz tone. Select the TONE position if the station does not answer a call with the function switch in the SQUELCH position.

3-11 TACSEC Voice Security Option

The TACSEC device option when fitted to the PRC1077 provides embedded tactical voice security. This voice security is achieved by the use of a security device module fitted underneath the M1 audio module.

Operation in this mode is achieved by switching the radio to the "RX Test" position. The "normal" operation of this switch position is no longer available.

NOTE

Correct switch position selection is not required in the "RX" mode as the security device will decode ALL received signals with the correct security key regardless of front-panel switch settings.

Operation in the "RETX" mode requires the "RETX" cable to be placed on the outer front-panel audio connector, identified with a black anodized ring. Failure to use

this port will result in "clear" speech being transmitted across the "RETX" link.

Programming Options

The initial programming of the security device will have been determined at the time of order. Should alterations to the basic operation of the device be required, then the use of a modem (option) and computer is required.

Key Change

Remote key changes are possible without the radio being returned to the depot, as long as the radio is within the reception range of the computer/modem.

Other options are available when using the computer/modem combination and these are described in the modem instruction manual.

3-11.1 TACSEC Radio Operating Instructions

1. Turn radio to "ON" position.
2. For normal nonsecure transmissions, select either "SQUELCH," or "TONE" mode.
3. For secure transmissions, select "RX TEST" position.
4. Connect handset to the INNER of the two front-panel audio connectors.
5. When transmitting, audio sidetone in handset will sound scrambled.

NOTE:

Begin speaking **after** the end of the TX data burst (approximately 0.5 seconds).

6. When in "receive" mode, the radio will decode a valid scrambled signal regardless of the mode switch position.

NOTE:

Mode switch **MUST** be in "RX TEST" mode for secure transmission.

"RETX" Operation

1. Set radios in "RETX" mode.
2. Connect "RETX" cable to the OUTER audio connector (identified by a black anodized ring).

NOTE:

Inner audio connector **MUST** not be used for "RETX." If used, "clear" retransmission of the signal will result.

3. Select "RETX" frequencies.
4. Operation is that of a normal "RETX" link.
5. Secure radios using the "RETX" link can be in either "SQUELCH," "TONE," or "RETX" modes. Nonsecure radios using the "RETX" link can only use "TONE" or "RETX" modes.

CHAPTER 4 OPERATOR'S MAINTENANCE INSTRUCTIONS

4-1. Scope of Maintenance

This chapter lists the operator's maintenance instructions for the PRC1077. No tools or test equipment are required.

NOTE

Replacement of the battery is covered in paragraph 2-4.

4-2. Preventive Maintenance

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

a. **Systematic Care**—The procedures given in paragraphs 4-4 and 4-5 cover systematic care essential to proper up-keep and operation of the equipment. The cleaning operations (Para. 4-6) should be performed daily when the equipment is in use and weekly when the equipment is in standby condition. The other items must be checked before the equipment is placed in operation, during operation and after shutdown.

b. **Preventive Maintenance Checks and Services**—The preventive maintenance checks and services charts (Para. 4-4 and 4-5) outline functions to be performed at specific intervals. These checks and services are designed to maintain the equipment in good condition. If a defect cannot be remedied by the operator, a higher category maintenance or repair is required.

4-3. Preventive Maintenance - Inspection Periods

a. The daily and weekly maintenance and inspection schedules are listed in paragraphs 4-4 and 4-5. In addition to the routine schedules, the equipment should be reinspected and serviced immediately before and after use.

b. If the equipment is being maintained in a standby condition, the daily (Para. 4-4) and weekly (Para. 4-5) services and inspections should be accomplished concurrently.

4-4. Operator's Daily Preventive Maintenance Checks and Services Chart (Below)

Sequence Number	Item to Be Inspected	Procedure	Reference
1	Completeness	Check to see that the equipment is complete.	Para. 1-4
2	Exterior Surfaces	Remove dust, dirt and moisture from all surfaces and clean frequency window with a soft cloth.	Para. 4-6
3	Controls	a. Check all controls for looseness or damage. b. During the operational check (sequence 5), check the mechanical action of each control for smooth operation.	
4	Battery	Inspect for leakage, corrosion and swelling. WARNING: Remove battery when transceiver is not to be used for one or more days.	Fig. 2-1 Para. 2-4
5	Transceiver Tuning	Perform the steps in operational check list.	Para. 4-8

4-5. Operator's Weekly Preventive Maintenance Checks and Services Chart (Below)

Sequence Number	Item to Be Inspected	Procedure	Reference
1	Handset	Inspect the cable for fraying, cuts, kinks and broken insulation.	Fig. 1-4
2	Cloth Items	Inspect for fraying and tears.	Fig. 2-2
3	Antenna	Inspect for damage, loose fit, and corrosion.	Fig. 1-2
4	Gasket	Inspect the gasket on the battery box for damage.	

4-6. Cleaning

Inspect the exterior of the transceiver. The exterior surfaces should be free of dirt, grease and fungus.

- a. Remove dust and loose dirt with a clean, soft cloth.
- b. Remove grease, fungus and ground-in dirt from the case using a cloth dampened with trichlorethane.
- c. Remove dust and dirt from plugs and receptacles.
- d. Clean the panel and the control knobs using a soft, clean cloth. If the dirt is difficult to remove, dampen the cloth with mild detergent and water.

CAUTION

The fumes of TRICHLORETHANE are toxic. Provide adequate ventilation when using. Exposure to open flame converts TRICHLORETHANE to a highly toxic and dangerous gas.

4-7. Visual Inspection

- a. When the radio does not operate correctly, check the following items:

- (1) Switches and controls for correct setting.
- (2) Handset—(check by substitution).
- (3) Antenna for loose connection.
- (4) Battery flat—(check by substitution).

b. If these checks do not locate the problem, proceed to the operational check list (Para. 4-8).

4-8. Operational Checklist

a. General—The operational checklist will help the operator locate the problem quickly. Use the corrective measures to repair the equipment. If this does not work, repair is required at a higher maintenance category. Make sure that a tag reporting the nature of the problem is attached to the transceiver.

- b. Procedure—Connect the handset to either audio connector and install an antenna (Para. 2-6).
- c. Checklist—Perform the steps given in the following checklist.

Step	Action	Normal Indication	Corrective Measure
1	Set the VOLUME control to 5.		
2	Set CHANNEL switch to check channel.		
3	Set POWER switch to HIGH.	Channel frequency is displayed.	Reset frequency (Para. 3-2).
4	Set and hold FUNCTION switch at LITE.	Display lights.	a. Check cover is on power connector. b. Replace battery (Para. 2-4).
5	Set FUNCTION switch to RX TEST.	Rushing noise is heard.	Higher level maintenance required.
6	Set FUNCTION switch to TONE.	Rushing noise stops.	Higher level maintenance required.
7	Listen to test signals from a nearby set operating on the same frequency.	Signals are heard loud and clear.	Check antenna.
8	Transmit test signal to a nearby set operating on the same frequency.	Signals are heard loud and clear.	Connect handset to other audio connector.
9	Check frequencies of channels 1-9.	Correct frequencies are shown in display.	Reset frequency (Para. 2-4).

CHAPTER 5

FIELD MAINTENANCE INSTRUCTIONS

5-1. Scope of Field Maintenance

- a. This chapter covers the field maintenance of the PRC1077 and contains information for performing preventive maintenance on the equipment. A series of tests is given to ensure that the transceiver and accessories are operating correctly.
- b. This chapter does not contain information on the replacement and repair of the internal modules in the PRC1077; reference should be made to the TW-PRC1077-MS1 technical manual.

5-2. Tools and Accessories

- a. Bird Model 43 with 5-W element.
- b. Bird Model 8321 50-W dummy load.
- c. Screwdrivers—#1, #2 Phillips, and flat blade.
- d. Wrenches.
- e. Cleaning materials.
- f. Accessories—A complete set of operating accessories.

5-3. Notes on Battery BA-4386/U

Before starting performance checks, it is important to understand the operation of the BA-4386/U magnesium battery. This battery does not operate like conventional batteries and has an output voltage that can vary substantially with the time of use and load conditions. It is typical for an unloaded battery to have a terminal voltage of 12 V. When the transceiver is first switched on, this voltage may fall to 6 V and then gradually build back up to 12 V or more. This will result in the receiver operating for a few seconds, then stopping until the battery voltage recovers. During this period the frequency display may operate incorrectly.

In the transmit mode the transceiver draws considerably more current and the battery terminal voltage may again fall and then gradually rise, reaching a peak voltage of 14-16 V. If the transmitter power output is measured during this cycle, the power output may fall as low as 0.5 W and slowly rise to 8 W or more. These characteristics are most noticeable with a new battery or a battery that has not been in use for some time. Normal battery operation can be accelerated by holding the transceiver in the high-power transmit mode for 2 or 3 minutes before starting operations.

5-4. Maintenance Intervals

The maintenance interval will be determined by the conditions of usage. Equipment that is in daily use under harsh environmental conditions may require maintenance at intervals of one month or even less. In any case the maintenance schedule and performance checks described in this chapter should be performed on a quarterly basis.

5-5. Preventive Maintenance Checklist

See the following page.

5-6. Troubleshooting

a. VISUAL INSPECTION - When equipment failure occurs, inspect the equipment carefully for obvious defects. Make the following checks:

- (1) Check that the antenna is tight in the mount.
- (2) Check the audio connectors on the transceiver and the handset for dirt and correct seating.
- (3) Check the seating of the battery plug in the battery connector.

b. BATTERY

- (1) Check that the battery does not require replacement.
- (2) Make sure that the operating characteristics of the magnesium battery are not mistaken for a performance defect (Para. 5-3).

c. ACCESSORIES

- (1) Ensure the defect is not caused by an accessory.
- (2) Check the handset by substitution.

5-7. Performance Checklist

NOTE 1

Many of the performance checks are made between two transceivers. The transceivers are operated with the power switch set to LO in order to limit the range of the equipment. The distance between the transceivers should be adjusted so that they are close to maximum range in the LO power position. Two transceivers that are known to be in good operating condition should be used to determine the distance between the transceiver to be tested and the check transceiver. This is very important because a transceiver with a low-output transmitter or low-sensitivity receiver may check out satisfactorily at close range.

NOTE 2

The CHECK transceiver controls should always be set exactly the same as the TEST transceiver.

a. ACCESSORIES

- (1) Install the desired antenna in the antenna mount.
- (2) Connect the handset to either audio connector.

b. CONTROLS—Set the controls as follows:

- (1) VOLUME control—Set to 5.
- (2) POWER switch—Set to LO.
- (3) FUNCTION switch—Set to RX TEST.
- (4) CHANNEL switch—Set to MAN.
- (5) Set in test frequency (Para. 3-2).

At this point the frequency should be displayed and there should be a rushing noise in the receiver. If these indications are not correct:

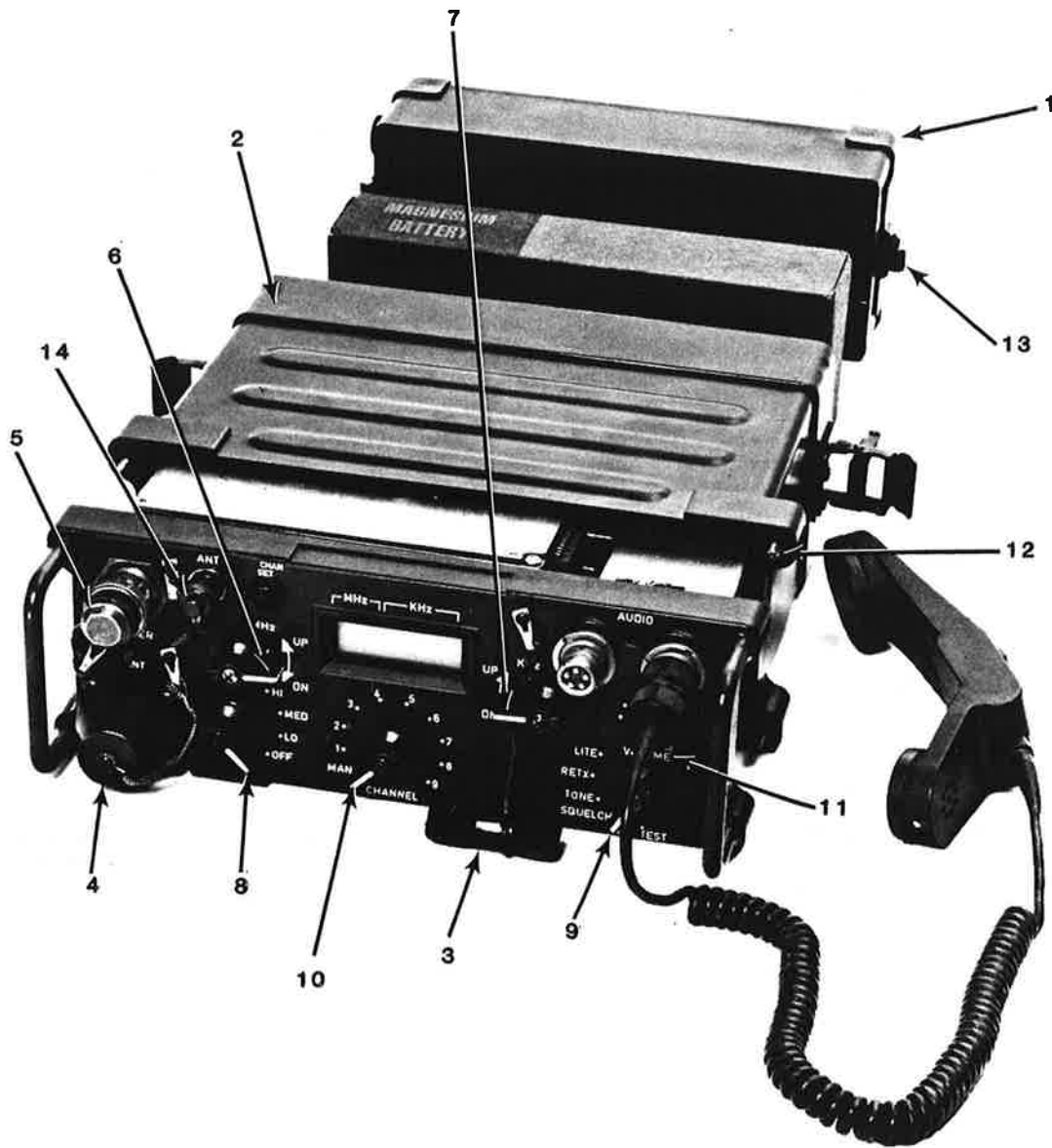
- a) Tighten power-receptacle cap.
 - b) Connect handset to other audio connector.
 - c) Check handset by substitution.
 - d) Replace battery.
- c. OPERATING CHECK
- (1) Ensure CHECK transceiver is operating on the same frequency with the same control settings as the TEST transceiver.
 - (2) Reception Test—When the CHECK transceiver makes a transmission, the signal should be heard loud and clear.
 - (3) Transmission Test—When the TEST transceiver makes a transmission, the signal should be heard loud and clear. (Change handset if signal is heard with no audio.)
- d. BAND CHECK
- The PRC1077 has four internal frequency bands selected automatically by the microprocessor. The following test ensures that the transceiver is operating on all bands.
- (1) Repeat test C on any frequency 30-39.975 MHz.
 - (2) Repeat test C on any frequency 40-51.975 MHz.
 - (3) Repeat test C on any frequency 52-67.975 MHz.
 - (4) Repeat test C on any frequency 68-87.975 MHz.

NOTE

The original test frequency will be in one of the four ranges and the test in this range need not be repeated.

- e. SQUELCH CHECK
 - (1) Set the FUNCTION switch to SQUELCH.
 - (2) The CHECK transceiver makes a transmission.
 - (3) The signal should be received loud and clear.
- f. TONE CHECK
 - (1) Set the FUNCTION switch to TONE.
 - (2) The CHECK transceiver's FUNCTION switch is set to TONE.
 - (3) The CHECK transceiver makes a transmission.
 - (4) The signal should be received loud and clear.
 - (5) The TEST transceiver makes a transmission.
 - (6) The signal should be received loud and clear.
- g. LIGHT TEST
 - (1) Turn the FUNCTION switch to LITE.
 - (2) The frequency display should light.
- h. POWER TEST
 - (1) Remove the antenna.
 - (2) Connect the wattmeter to the BNC antenna connector.
 - (3) Set the frequency to 39 MHz.
 - (4) Set the power switch to HI and press the push-to-talk switch. Measure output power.
 - (5) Repeat step 3 at MED power.
 - (6) Repeat step 3 at LO power.

Sequence Number	Item to Be Inspected	Procedure	References
1	Completeness	Check to see the transceiver is complete with all accessories.	Para. 1-6
2	Cleanliness	Check to see that the transceiver is clean.	Para. 4-6
3	Preservation	Check all surfaces for rust, corrosion and fungus. Remove and spot paint any bare spots on metal surfaces.	
4	Operational Test	Perform all tests in performance checklist.	Para. 5-7
5	Controls	Check that all controls work smoothly, do not bind, and that the knobs are tight on the shafts.	Fig. 3-1
6	Cables	Inspect the handset cable for fraying, cuts and damage.	Fig. 1-4
7	Cloth	Inspect all cloth items for tears, fraying and deterioration.	Fig. 2-2
8	Antennas	Inspect the antennas for damage, loose fit and corrosion.	Fig. 1-2
9	Display	Check the frequency display window for cleanliness.	Para. 4-6
10	Internal	Remove chassis from case and blow out to remove any possible gas accumulation from the magnesium battery.	Fig. 5-1
11	Modules	Check that the connectors are in place on all modules.	Fig. 5-1
12	Seals	Inspect the seals on the transceiver panel, battery box and battery connector.	Fig. 5-1



- | | |
|--|--|
| 1. CY-2562. | 8. Knob, long-handled (power switch). |
| 2. Case, transceiver. | 9. Knob, long-handled (function switch). |
| 3. Cover, double rubber connector protector. | 10. Knob, long-handled (channel switch). |
| 4. Cover, antenna dust. | 11. Knob (VOLUME). |
| 5. Cap, shorting. | 12. Screw, captive. |
| 6. Knob, long-handled (MHz tuning). | 13. Hook. |
| 7. Knob, long-handled (kHz tuning). | 14. Cover, BNC. |

FIGURE 5-1.
Receiver-Transmitter, Radio Set PRC1077, Organizational Repair Parts.

The nominal power output is:

High	5.0 W
Medium	2.0 W
Low	0.3 W

NOTE

The power output may differ substantially and low output power may be caused by low battery voltage. The push-to-talk switch should be held down for approximately 1 minute to ensure the magnesium battery reaches normal output voltage.

The test frequency is chosen so that there is minimum loading of the transmitter by the antenna tuner. When the antenna is removed, the antenna tuner is mismatched and may load the transmitter so that full power is not available at the BNC antenna connector. The transmitter is a broadband design and correct power output at the test frequency indicates correct operation across the frequency range even though the measured output power may vary considerably on some frequencies.

i. MEMORY CHECK

- (1) Switch the transceiver channel switch through channels 1-9.
- (2) The correct frequencies should be displayed.

NOTE

The PRC1077 uses a small internal battery to store the channel frequencies and is not dependent on the main battery. The internal battery has a life of approximately ten years. In the event of a failure of the memory battery the transceiver remains operable but will not retain memory when the main battery is removed.

5-8. Internal Inspection of the PRC1077

a. Stand the PRC1077 on its front panel (Figure 2-1). Remove the battery case and the battery (Para. 2-4 a, b and c). Loosen the captive screws and pull the case from the chassis. (Figure 5-2).

b. Blow out all parts on both sides of the chassis, using lung power. This will remove any hydrogen gas from the magnesium battery that may have accumulated in the chassis.

c. Inspect the battery connector for the following:

(1) A rubber gasket (shaped similarly to the metal ring around the battery connector hole in the PRC1077 case) must be installed on the battery connector. It must be undamaged, be seated flush with the bottom of the connector (and inside the four connector mounting screws), and flush with the body of the connector.

(2) The two O-rings on the battery connector must be installed and undamaged. That is, they must not be sheared, and each O-ring must be sealed, under tension, in its recess.

(3) The three battery connector pins must not be bent or otherwise damaged.

d. Inspect the connectors on all transceiver modules. Ensure the pin connectors are locked firmly in place. Ensure the hex nuts on the coaxial connectors are secure.

e. Inspect the seals on the front panel and the base of the transceiver. The seals should be clean and free from cuts or nicks. Inspect the top edge of the case and the battery box. These edges must be smooth and free from dents or nicks. The front panel and battery case seals must be in good order to ensure that the transceiver is waterproof.

f. The pressure test screw in the battery box must be securely sealed. The hole is used for pressure testing of the case.

g. Check that the pressure relief valve is screwed tightly in place. This valve will vent any hydrogen gas generated by the magnesium battery.

CHAPTER 6

MATERIAL USED IN CONJUNCTION WITH RADIO SET PRC1077

6-1. General

The PRC1077 is designed to be compatible with all accessories used with the PRC77. The instructions for using these accessories are fully applicable to the PRC1077.

6-2. PRC77 Accessories Used With PRC1077

Retransmission Cable Kit MK-465
Battery, Dry BA-398/U for Arctic Operation
Antenna Equipment RC-292
Antenna, Homing Loop AT-784
Antenna AT-984A/G
Loudspeaker, Electromagnetic LS-549

Radio Set Control Group AN/GRA-39

Radio Set Control AN/GSA-7 and Oscillator, Audio Frequency 0-574/GRA

Control Group AN/GRA-6

Security Equipment TSEC/KY-38

6-3. Radio Relay Procedures and Retransmission Cable Kit MK-456/GRC

The selection of frequencies information is not applicable to the PRC1077. There are fewer restrictions on the choice of frequencies when using the PRC1077. Refer to Chapter 7 for further information.

CHAPTER 7

RADIO RELAY AND REPEATER OPERATION WITH THE PRC1077

7-1. Introduction

The PRC1077 is normally limited to line-of-sight range. In flat country, the typical range is five miles (eight kilometers). If the transceivers are located at elevated sites in line of sight, distances of 20 or 30 miles are easily covered. Unfortunately, it is not often possible to have the transceivers located at elevated sites. The retransmission cable kit MK-456/GRC was developed for the PRC77 so that two transceivers could be located at an elevated site to relay signals. The PRC1077 will operate with this system and details of radio relay operation are given in this chapter. The PRC1077 is also capable of semi-duplex operation through a repeater, a system which gives the advantage of wide area coverage with great flexibility.

7-2. Radio Relay Operation

The easiest way to understand radio relay operation is to examine a manually-operated system. A transceiver and operator (Station A) are located at an elevated site in line-of-sight range of the two stations (Stations B and C) that wish to communicate. Stations B and C cannot communicate directly because of obstructions in the direct path. Station B can get a message to Station C by using Station A as a relay. Station B transmits the message to Station A, who writes down the message and then retransmits it to Station C. The process can be reversed to get the answer back to Station B.

This process can be automated by using two transceivers and the retransmission cable kit. This connects the two transceivers together, so that instead of the operator relaying the message, the audio output of the first transceiver is connected to the microphone input of the second transceiver. If the second transceiver was on the same frequency as the first transceiver, it would block out reception. The second transceiver is assigned a separate frequency, chosen so it will not interfere with reception. The cable kit is 50 feet long, so that the two transceivers can be well separated to prevent overloading.

The relay system works well in extending the communications range between two transceivers. It is not a system suitable for operating a network of stations, as different frequencies must be used by the stations at each end of the relay.

7-3. Repeater Operation

The repeater system gives extended coverage with much greater flexibility than radio relay operation. All stations in the network can communicate with each other using the same semi-duplex frequencies. The only limitation of the system is ensuring the stations are in line-of-site range of the repeater. If the repeater is located on a mountain top, the service area may cover hundreds of square miles.

The repeater is a simple system consisting of a radio receiver and transmitter operating on separate frequencies. The audio output from the receiver is connected into the microphone input of the transmitter. The repeater may be a receiver and transmitter specially designed for repeater operation. Alternatively two PRC1077's may be used.

To operate through the repeater, the transceiver is programmed so that the transmitter frequency is the same as the repeater receiver frequency. The receiver frequency must be the same as the repeater transmit frequency. Any signal received by the repeater will be rebroadcast on the transmit frequency and will be heard by any station within reception range. Two-way communication is available between all stations in the network.

This repeater system cannot be used with transceivers such as the PRC77, that operate only in the simplex mode (the same frequency for transmit and receive). The PRC1077 has provision for programming separate transmit and receive frequencies (Para. 3-3) and is suitable for semi-duplex operation through a repeater.

7-4. Radio Relay Procedures

For radio relay operation, use the retransmission cable kit MK-456 and follow the same procedures as used with the PRC77. The PRC1077 has fewer spurious frequencies and the revised procedure for the selection of frequencies should be used.

a. SELECTION OF FREQUENCIES

The two frequencies must be chosen so that they do not cause mutual interference. The two frequencies must have a separation of at least 5 MHz. Refer to the chart to avoid frequencies that may cause interference. Finally, make a trial and error check as there may be possible frequency combinations, not listed on the chart, that can cause interference.

b. COMPATIBILITY OF PRC1077 AND PRC77

Provided two PRC77's or two PRC1077's are used as the radio relay, there are no problems of compatibility with the transceivers using the relay. The relay will work equally well with both types of transceivers.

7-5. Dedicated Repeater

The dedicated repeater is a receiver/transmitter combination designed for repeater operation. The transmitter and receiver are very carefully shielded and can be operated in the same enclosure. Frequently, the repeater uses a device called a duplexer so that the same antenna is used for transmitting and receiving.

The dedicated repeater is recommended for any permanent repeater site. The specially designed transmitter has higher power output and is designed for continuous service. The receiver is very sensitive and has a high rejection of spurious responses.

The antenna will be designed for maximum efficiency on the operating frequency. These factors will ensure excellent coverage of the service area.

For further information on the dedicated repeater, refer to the technical manuals for the specific equipment.

7-6. PRC1077 Repeater

Two PRC1077's can be used as a repeater with Transworld's repeater cable kit 1077RETRAN.

- a. The 1077RETRAN consists of a 50-foot cable with the connectors required to connect the two PRC1077's as a repeater.
- b. Selection of Frequencies - The receive and transmit frequencies should be separated by at least 5 MHz. Some combinations of frequencies may cause interference in the receiver. Check first in the interference chart (Figure 7-1),

and then by trial and error to determine that the frequencies chosen are suitable for repeater operation.

- c. Program the PRC1077 designated as the transmitter with the transmit frequency (Para. 3-3), and the PRC1077 designated as the receiver with the receive frequency (Para. 3-3).
- d. Program the PRC1077's that are to use the repeater with the reciprocals of the repeater frequencies. That is, the receiver frequency is the same as the repeater transmit frequency, and the transmitter frequency is the same as the repeater receiver frequency (Para. 3-3).
- e. Program another channel in the PRC1077's with the same frequencies as the repeater. That is, the transmit and receive frequencies will be exactly the same as the repeater (Para. 3-3). This channel can be used to contact other stations directly, instead of going through the repeater.
- f. Locate the two transceivers in the repeater 50 feet apart, and at as high an elevation as possible. Use the AT-892/U Antenna if maximum range is required. Remember that the separation between the transceivers is essential to prevent receiver overload. Choose the location carefully to

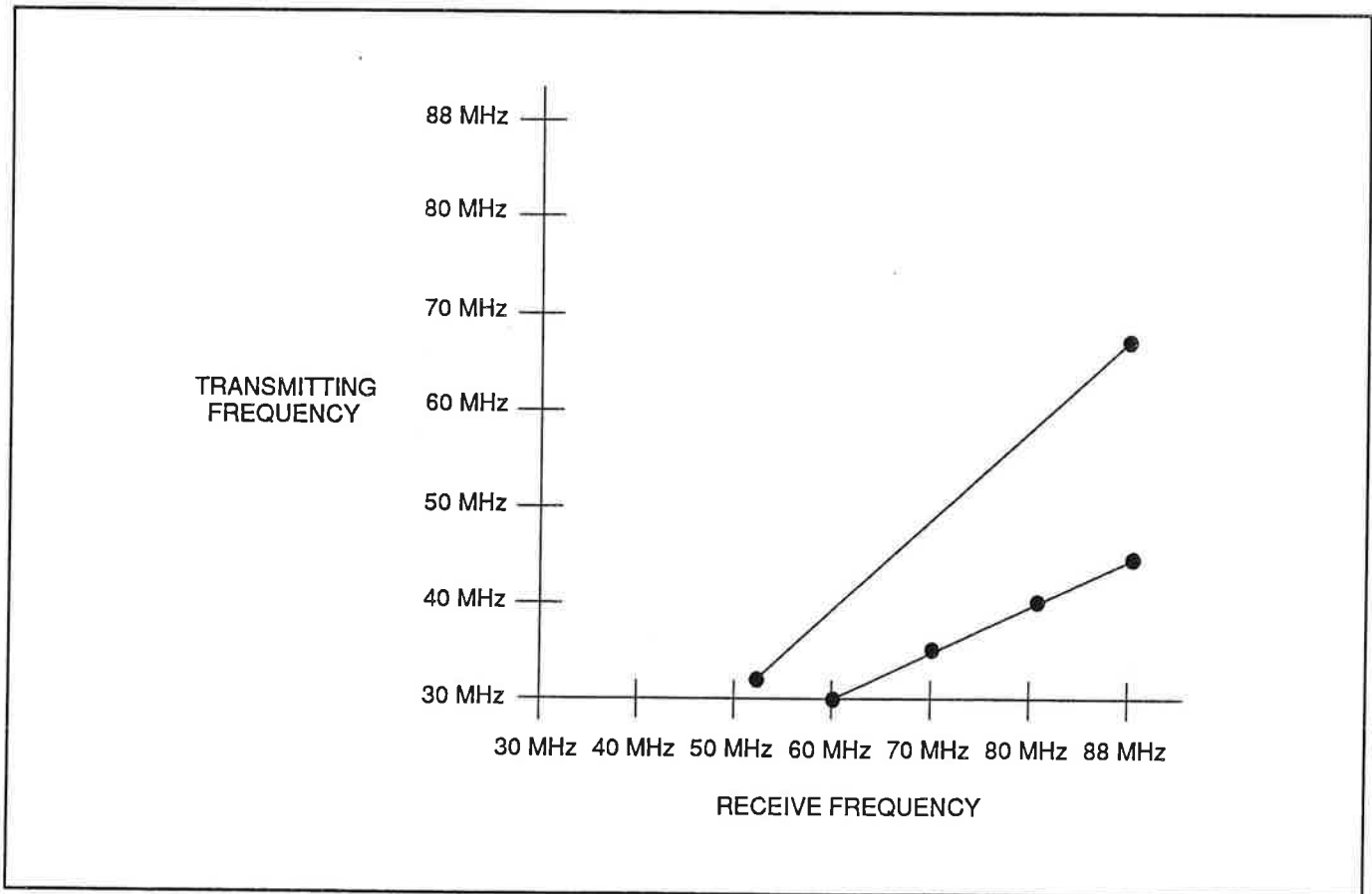


FIGURE 7-1.
Interference Chart.

give the best possible coverage and remember that there is no point in locating either the transmitter or receiver at a better location, as this will simply result in either the transmitter outperforming the receiver, or the reverse.

g. Connect the transceivers with the 1077RETRAN repeater cable kit. Switch both transceivers to the RETRANSMIT mode. Figure 7-2 shows the transceiver connections.

h. If the repeater is to be used for extended service, the transmitter should be powered from a heavy-duty battery. This is necessary because the transmitter in the repeater operates continuously while stations are communicating. An external battery cable is supplied with the 1077RETRAN repeater cable kit. A 12-V automobile battery makes an excellent power source for repeater operation. A 60-Ah battery will power the repeater for approximately 60 hours of continuous operation. Under actual operating conditions, this means several days of service.

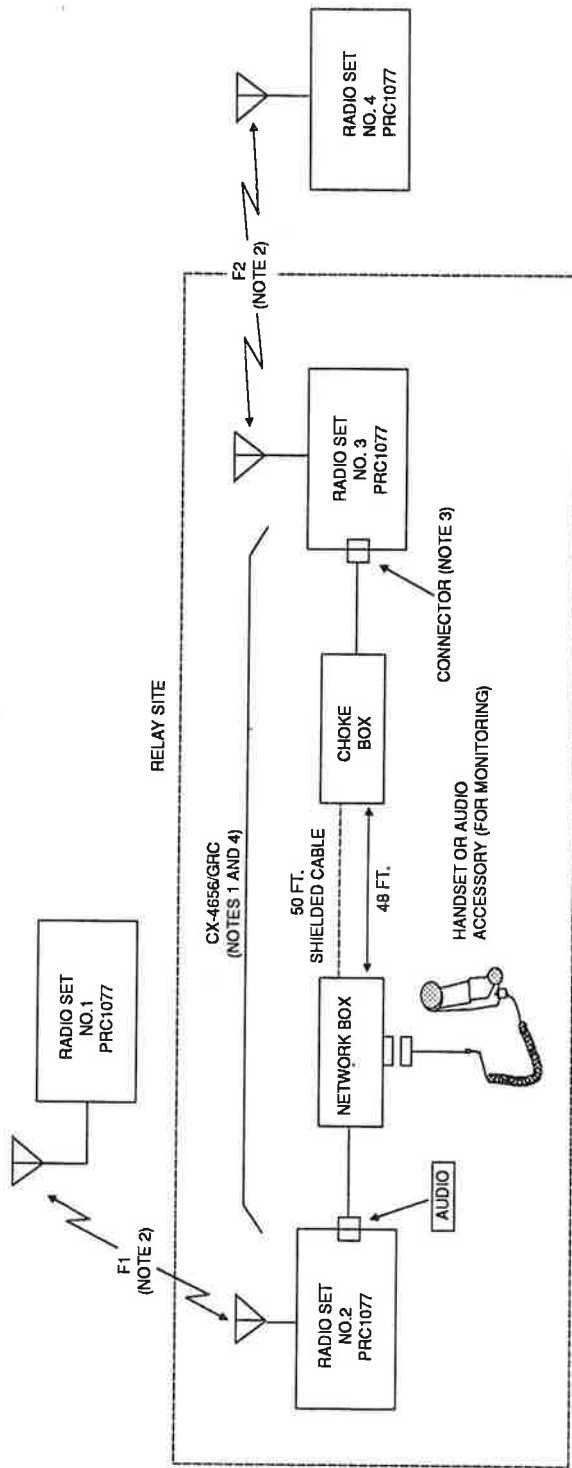


FIGURE 7-2.
Traneiver Connections.

1. Part of MK-456/GRC.
2. Frequencies for F1 and F2 are selected for non-interference.
3. Connect cable to **AUDIO** connector.
4. Radio sets NO. 2 and NO. 3 at relay site separated by full length (50 ft.) of CX-4656/GRC.
5. Indicates equipment marking.
6. Switch positions required for radios in the radio relay net.
Radio set #1, #4: tone position or RETX.
Radio set #2, #3: RETX position.

APPENDIX A ORGANIZATIONAL REPAIR PARTS

A-1. General

This appendix contains a list of repair parts required for the performance of organizational maintenance for radio set PRC1077.

NOTE

No special tools, test or support equipment are required.

A-2. Explanation of Columns

An explanation of columns in Table A-1 is given below.

a. Stock Number, Column 1, Table A-1.

The company stock number for the item is indicated in this column.

b. Description, Column 2, Table A-1.

The item name and military part number (if used) are included in this column.

c. Unit of Issue, Column 3, Table A-1.

The unit used as a basis of issue (e.g. ea, pr, ft, yd, etc.) is indicated in this column.

d. Quantity incorporated in Unit, Column 4, Table A-1.

The quantity of repair parts in an assembly is given in this column.

e. Illustrations, Column 5, Table A-1.

1. Figure Number, Column 5.

The number of the illustration in which the item is shown in this manual is indicated in the column.

A-3. Location of Repair Parts

a. When the stock number is unknown, follow the procedures given in (1) through (3) below.

1. Use the table of contents to locate the appendix of the repair parts list.

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

3. Locate the applicable illustration in this manual and note the figure number. Use the repair parts listing and locate the figure number as noted on the illustration.

b. When the stock number is known, use the repair parts listing to find the repair part and figure number.

**TABLE A-1.
Repair Parts for Organizational Maintenance.**

(1)	(2)	(3)	(4)	(5)
STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	QTY INC IN UNIT	ILLUSTRATIONS - FIGURE NUMBER
PRC1077	Radio Set			1-2
894102	Battery Box, CY-2562	ea	1	1-2
894104	Case, transceiver	ea	1	2-1
610080-A	Cover, double rubber connector protector	ea	1	5-1
610088	Cap, shorting	ea	1	5-1
610087-A	Cover, antenna dust	ea	1	5-1
610085	Cover, BNC	ea	1	5-1
891027	Knob - long handled (MHz & kHz tuning)	ea	2	5-1
891027	Knob - long handled (power switch)	ea	1	5-1
891027	Knob - long handled (function switch)	ea	1	5-1
891027	Knob - long handled (channel switch)	ea	1	5-1
891028	Knob (volume)	ea	1	5-1
CFH	Harness, Electrical Equipment ST-138	ea	1	1-2
ACB	Bag, Cotton Duck CW-503	ea	1	1-3
AT-271A/U	Antenna, 10ft. Folding Whip (AT-271A/U)	ea	1	1-2
AT-892/U	Antenna, 3ft. Whip (AT-892/U)	ea	1	1-2
AB-591/U	Support Antenna for AT-271A/U	ea	1	1-2
MHS	Handset, H-250/U	ea	1	1-4

INDEX

	Paragraph	Page
Accessories:		
General	6-1	6-1
PRC77 Accessories used with PRC1077	6-2	6-1
Accessory Components	1-5b	1-2
Antenna:		
Installation:		
AT-271A/U	2-6b	2-4
AT-892/U	2-6a	2-3
Antijamming	3-7	3-3
Arctic:		
Operation using Battery, Dry BA-398/U	1-6b	1-2
Assembly and installation for manpack operation	2-5	2-1
Battery, Dry BA-4386/U:		
Field maintenance	5-3	5-1
General description	1-6a	1-2
Installation	2-4	2-1
Battery, Other	1-6c	1-2
Channel Frequencies, Presetting	3-2	3-2
Channels, use of 25-kHz or the 76- to 88-MHz Range	3-3	3-2
Checking unpacked equipment	2-2	2-1
Cleaning	4-6	4-2
Components:		
Accessory	1-5b	1-2
Dimensions	2-1b	2-1
Used with PRC1077	1-4	1-2
Controls, indicators, and connectors, Transceiver Radio PRC1077	3-1	3-1
Daily preventive maintenance checks and services chart	4-4	4-1
Dedicated repeater	7-5	7-1
Description, general	1-5	1-2
Dimensions, component	2-1b	2-1
Field maintenance:		
Maintenance intervals	5-4	5-1
Performance checklist	5-7	5-1
Preventive maintenance checklist	5-5	5-1
Scope	5-1	5-1
General description:		
Accessory components	1-5b	1-2
Battery	1-6a	1-2
Transceiver, Radio PRC1077	1-5a	1-2
Installation:		
Antenna	2-6	2-3
AT-271A/U	2-6b	2-4
AT-892/U	2-6a	2-3
Battery, Dry BA-4386/U	2-4	2-1
Manpack operation	2-5	2-1
Internal inspection of the PRC1077	5-8	5-4
Items used with PRC1077	1-4	1-2
Jamming, recognition and identification	3-6	3-3
Maintenance service and inspection periods (operator)	4-3	4-1
Maintenance, intervals (field)	5-4	5-1
Operating procedure	3-4	3-2

INDEX (Continued)

	Paragraph	Page
Operational checklist	4-8	4-2
Operator's maintenance:		
Scope	4-1	4-1
Service and inspection periods	4-3	4-1
Performance checklist	5-7	5-1
Presetting channel frequencies	3-2	3-2
Presetting semi-duplex channels	3-3	3-2
Preventive maintenance:		
Checks and services chart:		
Daily	4-4	4-1
Weekly	4-5	4-2
Field	5-5	5-1
Operator's	4-2	4-1
Purpose and use	1-2	1-1
Radio relay operation	7-2	7-1
Radio relay procedures	7-4	7-1
Radio Relay Procedures & Retransmission Cable Kit MK-456/GRC	6-3	6-1
Recognition and identification, jamming	3-6	3-3
Repeater, dedicated	7-5	7-1
Repeater operation	7-3	7-1
Repeater, PRC1077	7-6	7-2
Scope:		
Manual	1-1	1-1
Operator's maintenance	4-1	4-1
Field maintenance	5-1	5-1
Semi-duplex channels, presetting	3-3	3-2
Siting	2-3	2-1
Split-frequency operation	3-8	3-3
Stopping procedure	3-5	3-3
System application	3-10	3-4
Technical characteristics	1-3	1-1
Tools, and accessories	5-2	5-1
Transceiver, Radio PRC1077:		
Controls, indicators and connectors	3-1	3-1
Description	1-5a	1-2
Troubleshooting	5-6	5-1
Unpacking	2-1	2-1
Use of 25-kHz channels or the 76- to 88-MHz range	3-9	3-3
Visual inspection	4-7	4-2
Weekly preventive maintenance checks and services chart	4-5	4-2



