

# PRC1077-MSOP



## PRC1077

### Radio Set

### Operator Manual

Datron World Communications Inc.  
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## Change Description

<b>Date of Revision</b>	<b>Revision Letter</b>	<b>Description of Changes</b>	<b>Pages Affected</b>
6/1991	A	Original release	All
6/2006	B	Overall update to text and format.	All
3/2007	C	Changed cable part number part number from C991611 to C991618.  Added protective power cap to replacement parts table.	Page 2-22 Figure 2-14  Page 4-4



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Defects or failures caused by Buyer abuse or misuse.

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- a. Model, serial number, and date of installation.
- b. Name of dealer or supplier of the equipment.
- c. Detailed explanation of problem.
- d. Return shipping instructions.
- e. Telephone or fax number where Buyer may be contacted.

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- a. Return the parts prepaid to "Parts Replacement" Datron World Communications Inc., 3030 Enterprise Court, Vista, California 92081; and
- b. Include a letter with the following information:
  1. Part number
  2. Serial number and model of equipment
  3. Date of installation

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expenses, lost profits, lost savings, or other damages arising out of use of or inability to use the equipment.  
1/95

### Safety Considerations

This product and manual must be thoroughly understood before attempting installation and operation. To do so without proper knowledge can result in equipment failure and bodily injury.

**Caution:** Before applying ac power, be sure that the equipment has been properly configured for the available line voltage. Attempted operation at the wrong voltage can result in damage and voids the warranty. See the manuals section on installation. DO NOT operate equipment with cover removed.

**Earth Ground:** All Datron products are supplied with a standard, 3-wire, grounded ac plug. DO NOT attempt to disable the ground terminal by using 2-wire adapters of any type. Any disconnection of the equipment ground causes a potential shock hazard that could result in personal injury. DO NOT operate any equipment until a suitable ground has been established. Consult the manual section on grounding.

**Servicing:** Trained personnel should only carry out servicing. To avoid electric shock, DO NOT open the case unless qualified to do so.

Various measurements and adjustments described in this manual are performed in ac power applied and the protective covers removed. Capacitors (particularly the large power supply electrolytics) can remain charged for a considerable time after the unit has been shut off. Use particular care when working around them, as a short circuit can release sufficient energy to cause damage to the equipment and possible injury.

To protect against fire hazard, always replace line fuses with ones of the same current rating and type (normal delay, slow-blow, etc.). DO NOT use higher value replacements in an attempt to prevent fuse failure. If fuses are failing repeatedly this indicates a probable defect in the equipment that needs attention.

Use only genuine Datron factory parts for full performance and safety of this product.



Made in the USA

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# CHAPTER 1

## INTRODUCTION

### The PRC1077

The PRC1077 Radio Set is a short-range, rugged, compact, VHF/FM transceiver designed as a drop-in replacement for the military VHF AN/PRC-77 radio. The PRC1077 has several improvements over the PRC-77 including higher output power, an extended frequency range with increased granularity in frequency spacing, as well as electronic tuning, with 10 preset channels. The PRC1077 radio set can also be integrated into the VRC-64 and GRC-160 vehicular radio systems.

The PRC1077 can be configured for manpack, mobile, and base applications in 5W or 50W output levels. The PRC1077 is supported with a full line of accessories such as:

- Antennas
- Retransmission cabling
- Audio accessories
- Extended control accessories and software
- Transmission encryption module
- Batteries and battery charging equipment
- Backpacks
- Mounting hardware for mobile and base applications



## Technical Specifications

**Note:** *Specifications are subject to change with notice or obligation.*

Characteristic	Specification
<b>General</b>	
Frequency range	30 to 87.975 MHz
Available channels	2,320 channels with 25kHz frequency spacing
Preset channels	10 programmable memory channels
Channel programming	Front panel
Modes	FM; simplex, semi-duplex
Input power requirements	11 Vdc to 15 Vdc
Battery pack	BB-LA6 sealed lead calcium; BA5598/U Lithium (case holds spare battery)
Battery life	30 hours at 9:1 duty cycle (5W Tx) using BB-LA6 battery pack
Antennas	3 ft. tape and 10 ft. whip; 50 ohm antenna
Antenna port	BNC for 50 ohm broadband antennas or for connection to external amplifier; whip antenna port
Display	Backlit, multi-function custom LED
<b>Mechanical</b>	
Size	11.1 in. x 4.1 in. x 9.25 in. (28.2 cm x 10.5 cm x 23.5 cm); W x H x D, including battery pack
Weight	9.7 lbs (4.4 kg), w/o battery pack; BB-LA6 pack is 2 lbs (0.9kg)
Package	OD, sealed, including battery pack
<b>Environmental</b>	
Temperature	-40 to +60° C
Shock, vibration, humidity, fungus, altitude	Per MIL-STD-810
<b>Transmitter</b>	
RF power output	0.5W, 2W, or 5W (selectable)
Duty cycle	Continuous service
Harmonics	-50 dB
<b>Receiver</b>	
Sensitivity	10 dB SINAD for 0.3 $\mu$ V input
Squelch	150 Hz tone, carrier; selectable
Audio	500 mW into 16 ohms; 50 mW at 150 ohms; 0 dBm into 600 ohms

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<b>Characteristic</b>	<b>Specification</b>
<b>Accessories</b>	
Amplifier	AM1077, 50W RF unit
Mobile mount	MT1077, +12 Vdc or +24 Vdc versions; mounts to any vehicle
Power supply	PS1077 for portable use; UPF7000A-28 or UPF7000A-12 for base station
Chargers	PRC-BC4 (4-unit charger), PRC-PS (power supply or 2-unit charger), PRC-SPU-10 (solar power unit), PRC-HC-30 (hand crank generator)
Converter	AM1077CONV, 12 Vdc to 28 Vdc



# CHAPTER 2

## INSTALLATION

### Unpacking

The PRC1077 is shipped in a heavy-duty corrugated cardboard carton with the accessories packed in a separate carton. Do not discard the cartons and packing materials in case the equipment needs to be reshipped.

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

### Location Considerations

**Manpack and Fixed Base Applications** The PRC1077 operates at high frequencies with low power so the equipment location can greatly affect its operating range. Typically, if the other station can be seen (line of sight), the PRC1077 can provide good communication. An intervening hill or a tall building may hamper or prevent contact with other stations. Valleys and densely wooded areas also impair communication quality. Positioning the transceiver on a hilltop or a tower increases the operating range. If possible, avoid locations near a source of electrical interference, such as power or telephone lines, radar sets, and hospitals.

### Manpack Installation

The PRC1077 manpack configuration includes the following equipment:

Part Number	Description
PRC1077	VHF/FM Transceiver, 30 to 87.975 MHz, 5/50W
AT-892/U	Whip antenna, 1.2m (3.9 ft.), flexible
AT-271A/U	Whip antenna, 3m (10 ft.), with AB591/U flexible base
BB-LA6	Battery, rechargeable, 6 AH
LC-2	Lightweight tubular backpack
MHS	Military Handset, H-189/U-type or H-250/U military style

### **Installing the Battery**

The PRC1077 uses the BB-LA6 sealed lead-calcium rechargeable battery. The BB-LA6 battery is rated at 6.0 AH (maximum), providing the PRC1077 with a mission life of approximately 30 hours when operating at a 9:1 (Rx:Tx) duty cycle at 5W output power.

To install the BB-LA6 battery into the PRC1077 ([refer to the figure on page 2-3](#)):

1. Stand the PRC1077 on a level surface with the front panel facing down.
2. Pull the two clamps out from the transceiver case to release and push down on the battery case.
3. Remove the battery box.
4. Check the battery connector. If it is damaged, the transceiver must be repaired. Make sure the pressure test screw and relief valve are tight.
5. Position the battery so the connectors are aligned, then mate the connectors.
6. Install the battery case, latch the clamps on the battery case hook, then push the clamps in towards the case.

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

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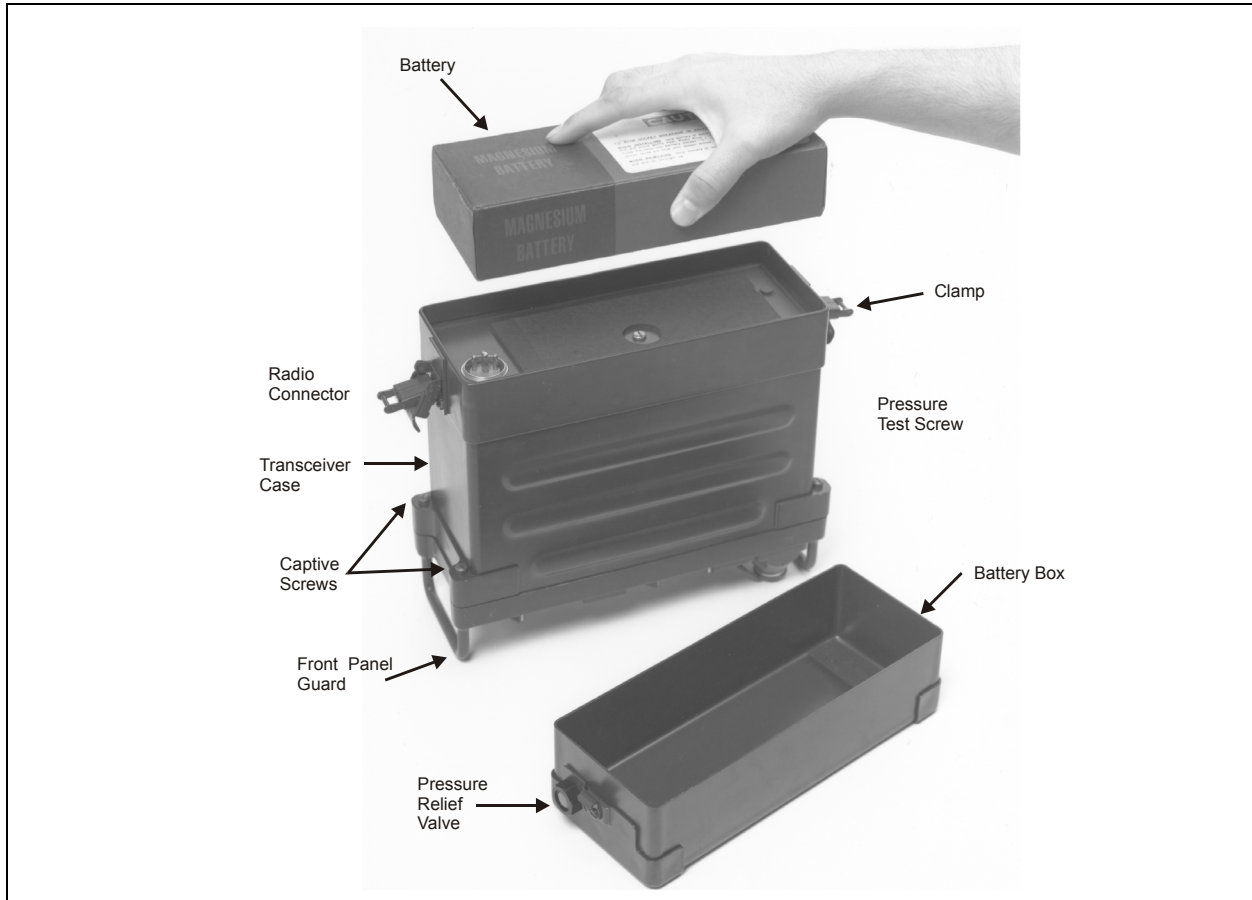


Figure 2-1. BB-LA6 Battery Installation

**CAUTION:** Battery power should be between 12.5 Vdc and 15 Vdc, with positive (+) applied to the B terminal on the battery connector (at the transceiver back) and negative (–) applied to the A terminal. To avoid serious damage to the transceiver, do not change the battery polarity.

### Installing the Manpack Harness

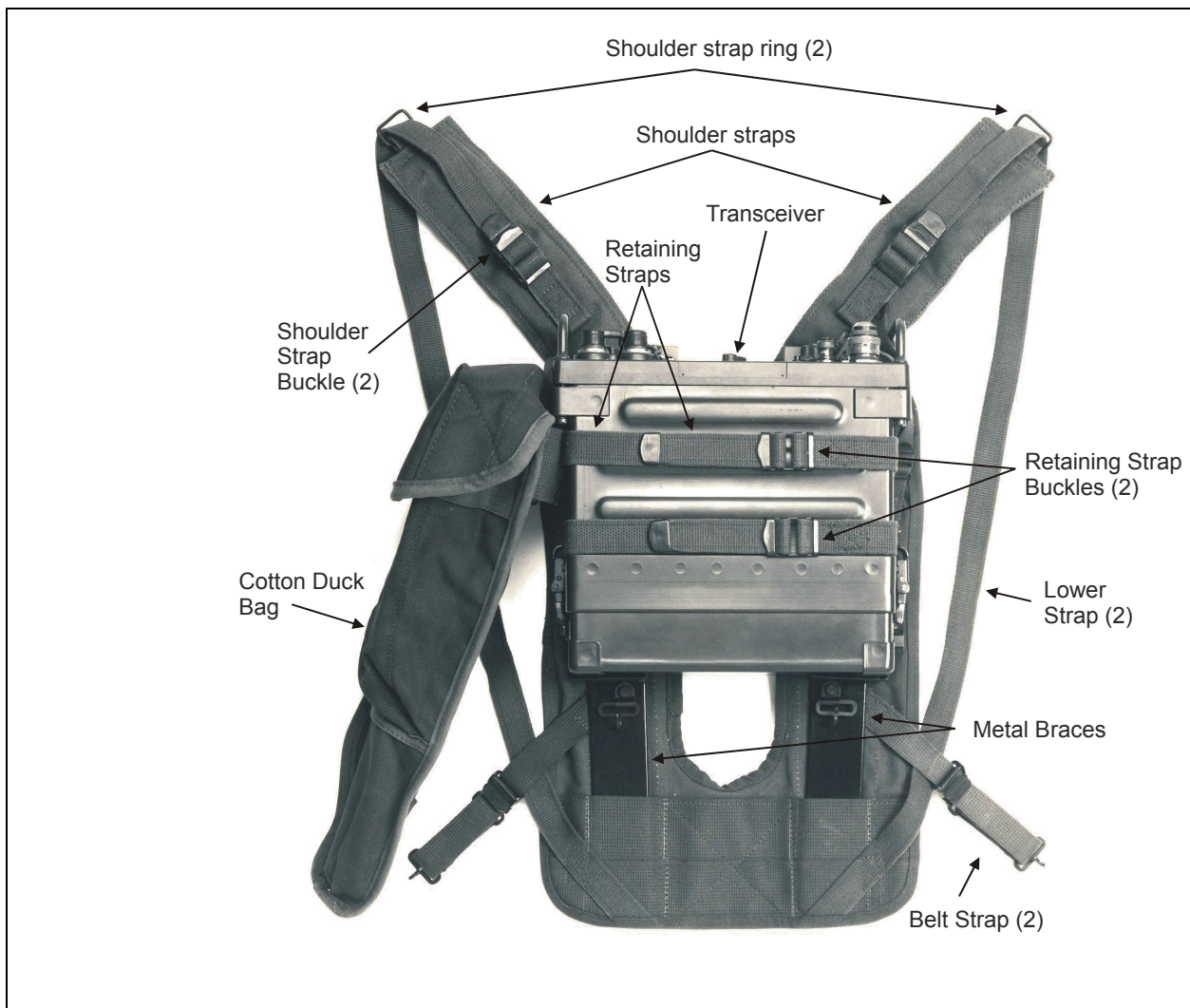
The PRC1077 manpack system includes the LC-2 or ST-138 backpack. The LC-2 backpack is a lightweight tubular carrying frame with canvas straps.

To mount the transceiver to the harness ([refer to the figure on page 2-5](#)):

1. Place the harness flat on a level surface with the metal braces facing up.
2. Place the transceiver on the harness with the panel toward 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 CW-503 canvas bag to the harness.

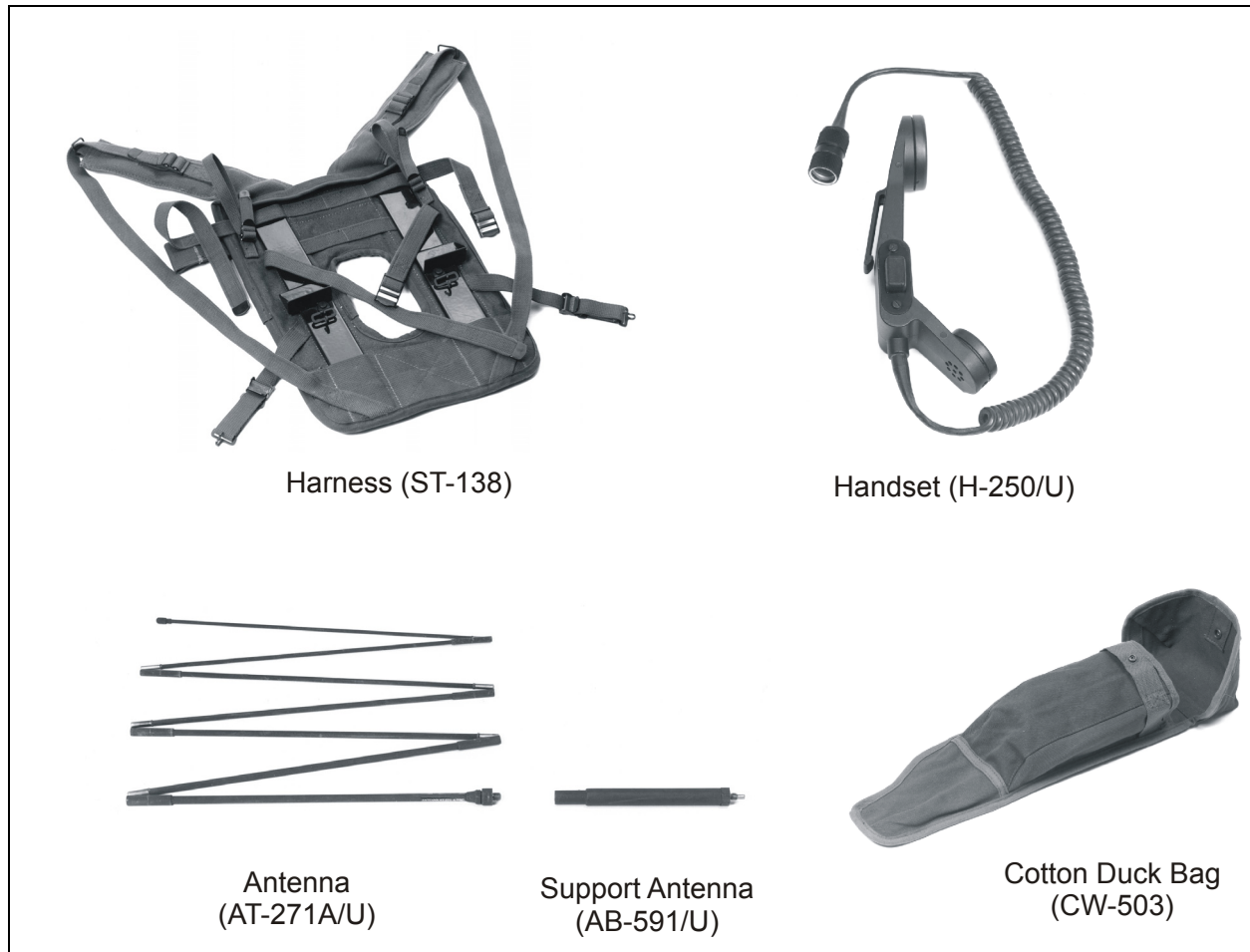
To mount the transceiver and harness on the operator:

1. Install either a AT-892/U or AT-271A/U antenna.
2. Connect the handset to one of the audio connectors on the transceiver front panel.
3. Place the harness, with the transceiver attached, on the operator's back. Place the shoulder straps over the operator's shoulders.
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, then down through the end slot.
5. Install the left should strap in a similar manner to Step 4.
6. Hook the two belt straps to the combat belt.



**Figure 2-2. Manpack Components**





**Figure 2-3. Manpack Accessories**

### Installing the Antenna

Use the AT-892/U 1.2m flexible tape whip antenna for smaller area coverage. Use the AT-271A/U 3m folding whip antenna with AB-591/U flexible antenna base.

To install the AT-892/U antenna ([refer to the figure on page 3-1](#)):

1. Remove the cover from the antenna mount.
2. Screw the bottom of the AT-892/U into the antenna mount.

To install the AT-271A/U antenna:

1. Remove the cover from the antenna mount.
2. Screw AB-591/U flexible antenna base into the mount.
3. Unfold 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. Screw the extended AT-271A/U antenna into the AB-591/U antenna base.

### **Positioning the Antenna**

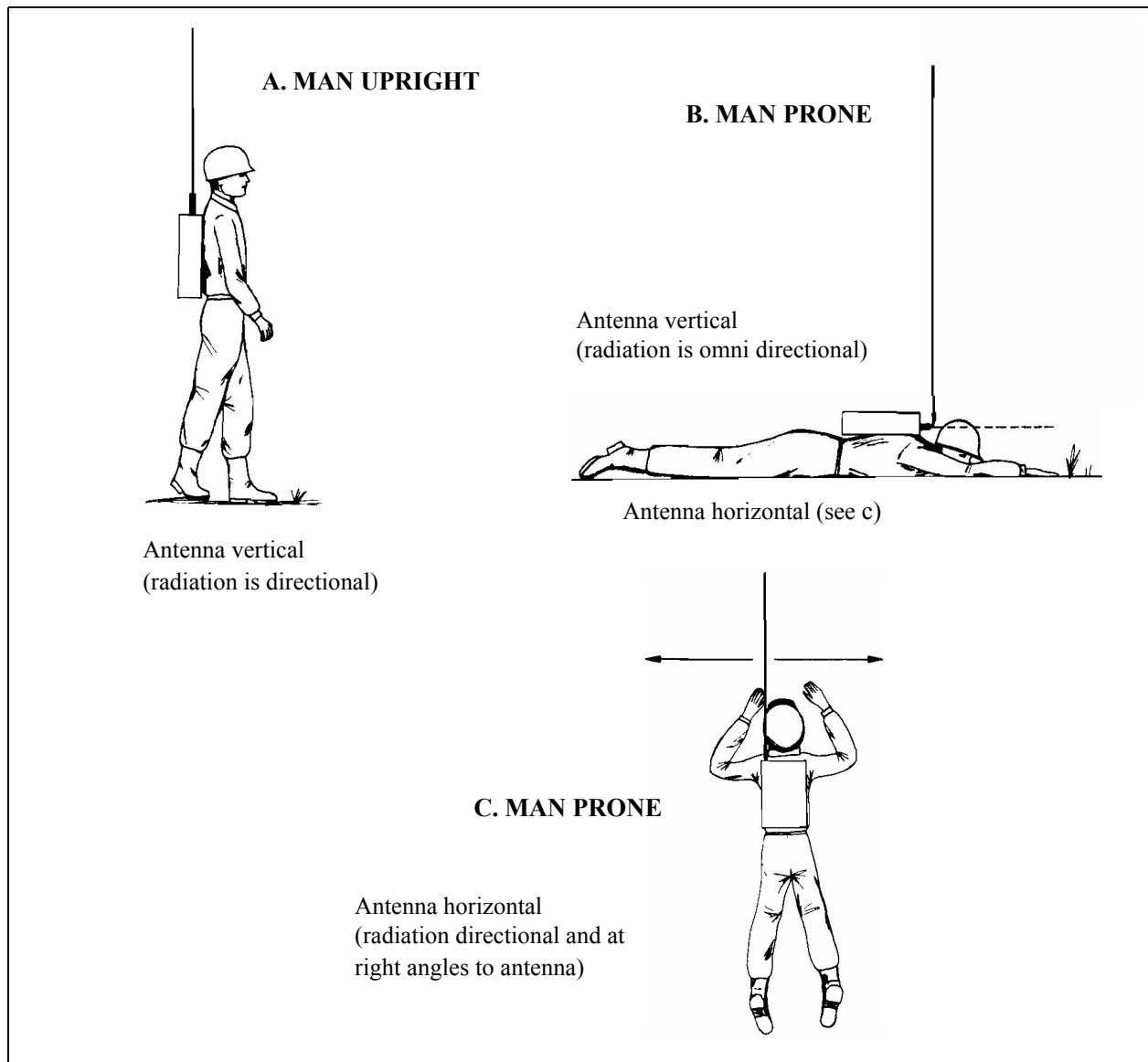
The AT-892/U 1.2m antenna is provided with a spring base to allow the antenna to be oriented in other positions than vertical to the top of the transceiver. For best communications the antenna should be vertical to the ground ([refer to the figure on page 2-7](#) examples A and B). When the operator or the transceiver is in a position other than vertical, position the antenna so that it is vertical to the ground, however, if having the antenna in the vertical position reveals the operator's location, the antenna can be positioned so that it is horizontal to the ground ([refer to the figure on page 2-7](#) example C).

When the antenna is horizontal, the direction of communications is broadside to the antenna. For best reception, position the communicating transceivers in the same position (either horizontal or vertical).

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**CAUTION: Make sure the base is tight against the mount. Even a small gap between the base and the mount can cause the antenna to break leaving the threaded portion in the mount. The plastic filling in the thread is designed to prevent the antenna from unscrewing, however, if the plastic wears, vibration can cause the antenna to become loose. Periodically tighten the antenna in the mount.**

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**Figure 2-4. AT-892/U Antenna Orientation in Various User Positions**

### **Installing the Handset**

The PRC1077 manpack configuration uses the MHS handset, which is either a H-189/U or H-250/U military handset.

To install a handset on the PRC1077 front panel ([refer to the figure on page 3-1](#)):

1. Remove the rubber cover from the dual Audio connectors on the transceiver front panel.
2. Place the handset connector onto the AUDIO connector. Turn the knurled connector until the alignment pins engage with the audio connector slots, then push in and twist clockwise. The flat side of the handset connector should face the top of the PRC1077 transceiver.

## Mobile Installation

The PRC1077 can be integrated into 12 Vdc or 24 Vdc mobile applications with 5W or 50W output. Each configuration is designed for emergency rapid removal.

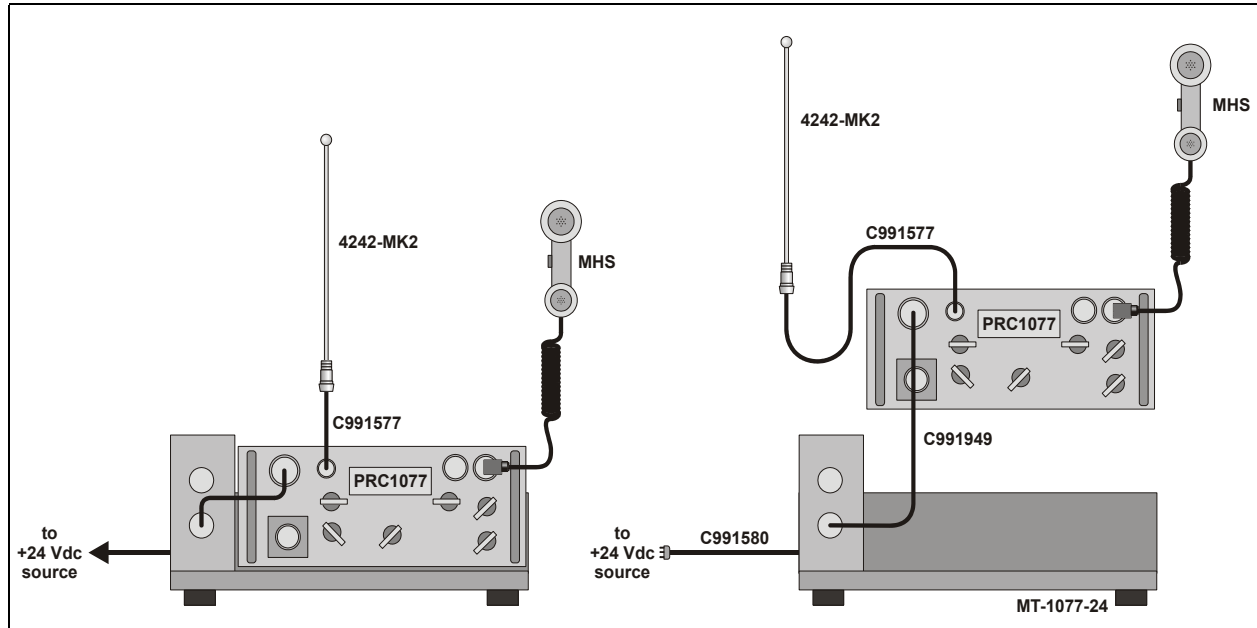


Figure 2-5. Typical 5W 24 Vdc Mobile System with MT-1077-24 Adapter

### 5W Systems

All PRC1077 5W systems are designed for 24 Vdc power sources and require the following accessories:

Accessory	Part Number	Description
Antenna	4242-MK2	Broadband vehicular center-fed whip antenna.
Adapters	MT-1077-24	24 Vdc vehicular adapter with integrated shock mount, includes antenna tuning control and loudspeaker.
	OA3633/VRC	24 Vdc vehicular adapter, includes antenna control and loudspeaker, (mounts to MT-1029/VRC standard military shock mount, includes CX-4655/GRC cable).
Handset	MHS	H-189/U military handset.
	MHS	H-250/U military handset, includes noise canceling.
Cabling	C991577	PRC1077 to 4242-MK2 RF cable.

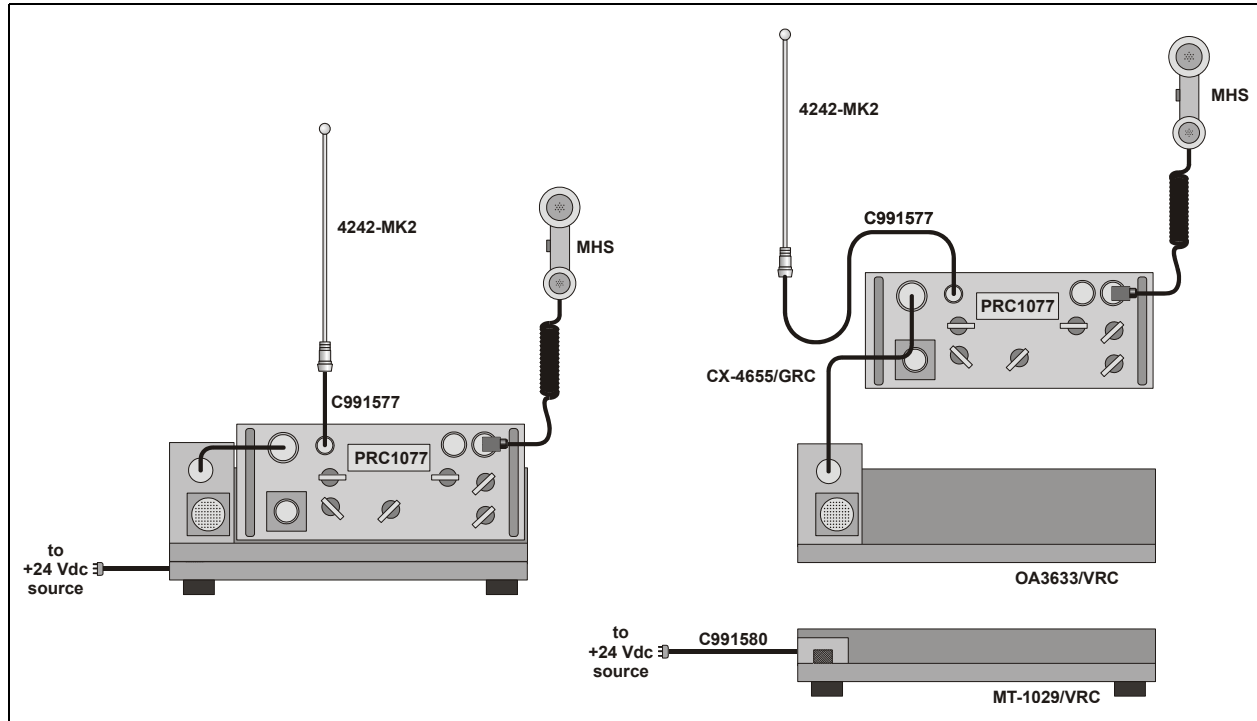
Accessory	Part Number	Description
	C991580	MT-1077-24 to dc power source cable.
	C991949	PRC1077 to MT-1077-24 control and power cable.

To install the PRC1077 into a 24 Vdc 5W mobile system ([refer to the figure on page 2-8](#)):

1. Without installing a battery, install the battery box onto the PRC1077 transceiver case ([refer to "Installing the Battery" on page 2-2](#)).
2. Slide the PRC1077 transceiver onto the MT-1077-24 adapter and clamp it in place with the two mounting clamps. The MT-1077-24 includes an integrated shock mount.
3. On the PRC1077, remove the protective cap from the POWER connector. Connect the C991949 cable to the PRC1077 POWER connector and to the MT-1077 SET PWR connector (J4).

**Note:** *Make sure the POWER connector protective cap is attached to the PRC1077 transceiver front panel by a cord so it will not become lost. The protective cap grounds the connector when the cap is installed. If the protective cap is not installed or the C991949 cable is not installed and connected to the MT-1077 adapter, the PRC1077 will not operate.*

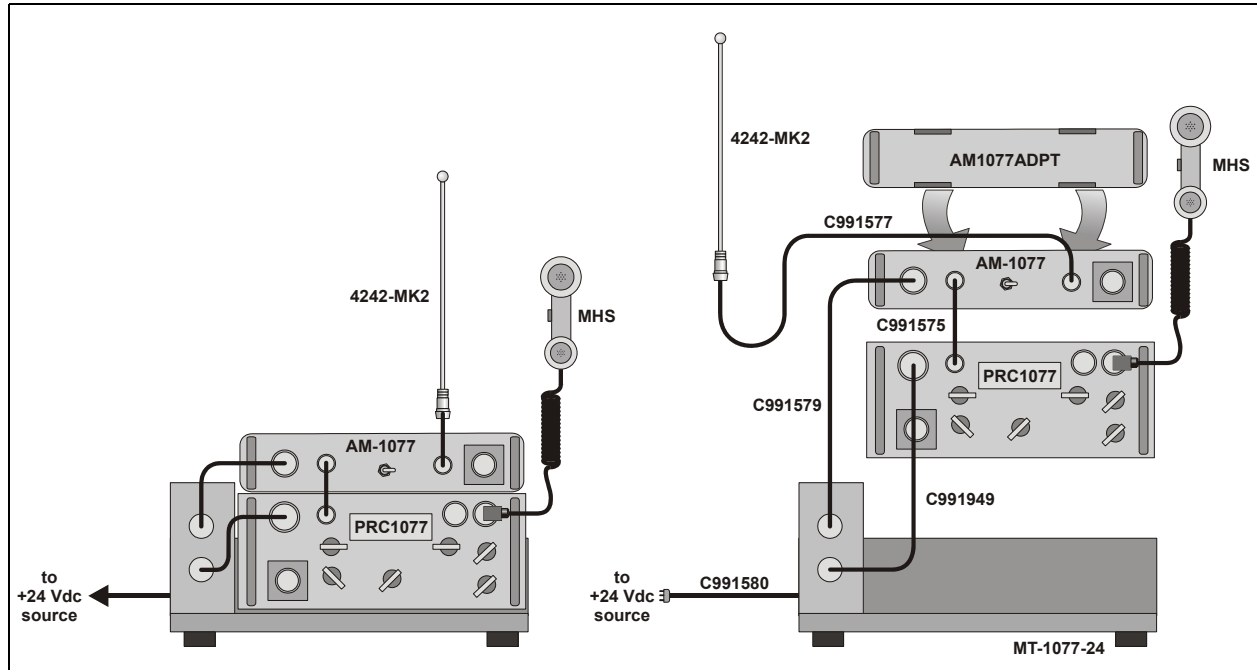
4. Connect the C991577 cable to the PRC1077 50 ohm ANT connector and to the 4242-MK2 antenna.
5. Connect the C991580 cable to the MT-1077-24 adapter J1 connector (on back), then to a 24 Vdc power source.
6. Remove the rubber protective cap from the dual AUDIO connectors and connect a military handset (MHS either H-189/U or M-250/U) to one of the connectors.



**Figure 2-6. 5W 24 Vdc Mobile System with OA3633/VRC Adapter**

To install the PRC1077 on the OA3633/VRC adapter ([refer to the figure above](#)):

1. Remove rubber protective cap from the power/control connector at the back of the mount. Slide the OA3633/VRC adapter onto the MT-1029/VRC shock mount and clamp in place with the two mounting clamps.
2. Slide the PRC1077 transceiver onto the OA3633/U adapter and clamp in place with the two mounting clamps.
3. On the PRC1077, remove the protective cap from the POWER connector. Connect the CX-4655/GRC cable, provided with the OA3633/VRC adapter, to the PRC1077 POWER connector and to the OA3633/VRC adapter SET POWER connector.
4. Continue with standard 24 Vdc 5W mobile system installation procedure (steps 4 to 6) above.



**Figure 2-7. 50W 24 Vdc Mobile System**

### 50W System

The PRC1077 50W mobile system can be used in 12 Vdc or 24 Vdc vehicular applications and requires a 50W RF power amplifier.

Accessory	Part Number	Description
Antenna	4242-MK2	Broadband vehicular center-fed whip antenna.
Adapters	MT-1077-24	24 Vdc vehicular adapter with integrated shock mount, includes antenna tuning control and loudspeaker.
	MT-1077-12	12 Vdc vehicular adapter with integrated shock mount, includes antenna tuning control and loudspeaker.
	OA3633/VRC	24 Vdc vehicular adapter, includes antenna control and loudspeaker, (mounts to MT-1029/VRC standard military shock mount, includes CX-4655/GRC cable).
Amplifier	AM-1077	50W RF Power amplifier (30 MHz to 87.975 MHz).
RF Amp. Adapter	AM1077ADPT	Empty case that attaches to the back of the AM-1077 RF amplifier.

Accessory	Part Number	Description
RF Amp. Converter	AM1077CONV	12 Vdc to 24 Vdc power converter (for 12 Vdc systems) (6A continuous service).
Handset	MHS	H-189/U military handset
	MHS	H250/U military handset, includes noise canceling
Cabling	C991577	PRC1077 to 4242-MK2 whip antenna
	C991580	MT-1077-24 to dc power source cable
	C991949	PRC1077 to MT-1077-24 control and power cable
	C991579	AM-1077 RF amplifier to MT-1077-24 control and power cable (24 Vdc systems only)
	C991658	AM1077CONV to MT-1077-12 control and power cable (12 Vdc systems only)

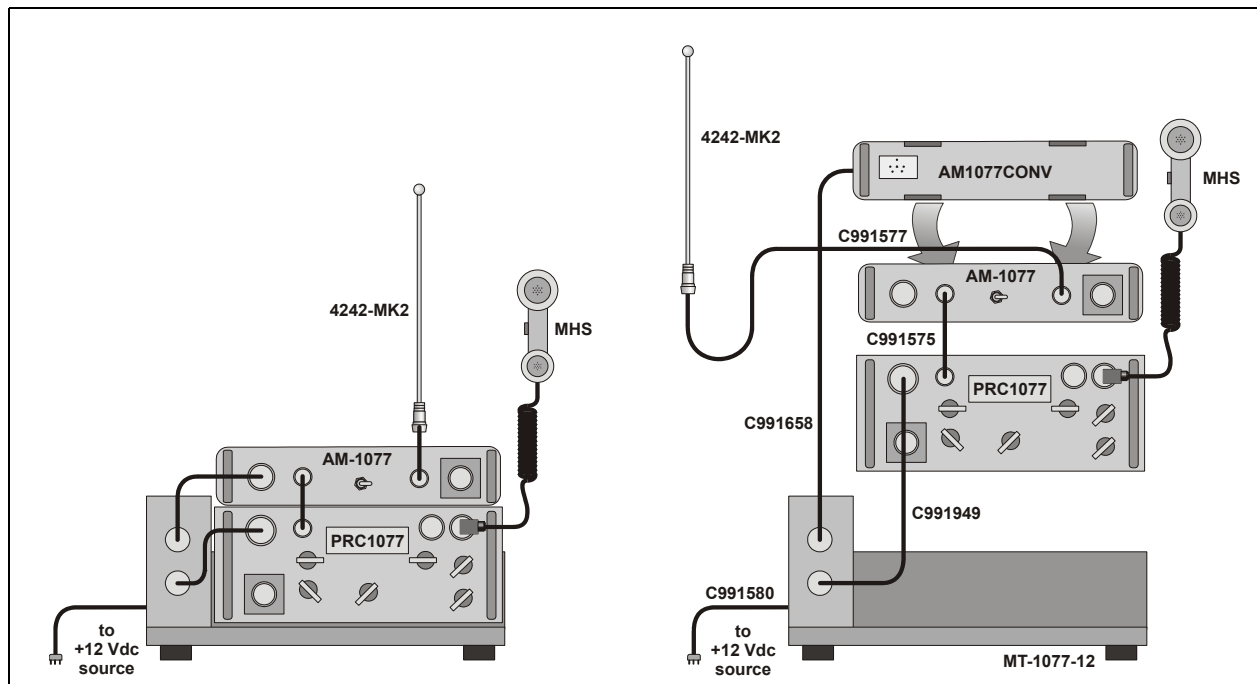
To install the PRC1077 into a 24 Vdc 50W mobile system ([refer to the figure on page 2-11](#)):

- Without installing a battery, install the battery box onto the PRC1077 transceiver case ([refer to "Installing the Battery" on page 2-2](#)).
- Slide the PRC1077 transceiver onto the MT-1077-24 adapter and clamp it in place with the two mounting clamps. The MT-1077-24 includes an integrated shock mount.
- Install the AM-1077ADPT RF amplifier adapter to the back of the AM-1077 RF amplifier case.
- Position the AM-1077 50W RF amplifier on top of the PRC1077 transceiver case and install the two handle clamps to the front-panel handles to secure the AM-1077 amplifier to the PRC1077.
- Connect the C991579 cable to the AM-1077 RF amplifier DC POWER INPUT connector and to the MT-1077-24 adapter AMP CNTL connector (J3).
- On the PRC1077, remove the protective cap from the POWER connector. Connect the C991949 cable to the PRC1077 POWER connector and to the MT-1077 SET PWR connector (J4).

**Note:** Make sure the POWER connector protective cap is attached to the PRC1077 transceiver front panel by a cord so it will not become lost. The protective cap grounds the connector when the cap is installed. If the protective cap is not installed or the C991949 cable is not installed and connected to the MT-1077 adapter, the PRC1077 will not operate.



7. Connect the C991577 cable to the AM-1077 RF amplifier 50 ohm RF OUT connector and to the 4242-MK2 antenna.
8. Connect the C991580 cable to the MT-1077-24 adapter J1 connector (on backside), then to a 24 Vdc power source.
9. Remove the rubber protective cap from the dual AUDIO connectors and connect a military handset (MHS either H-189/U or M-250/U) to one of the connectors.



**Figure 2-8. 50W 12 Vdc Mobile System**

To install the PRC1077 into a 12 Vdc 50W mobile system (refer to the figure above):

1. Without installing a battery, install the battery box onto the PRC1077 transceiver case (refer to "Installing the Battery" on page 2-2).
2. Slide the PRC1077 transceiver onto the MT-1077-12 adapter and clamp it in place with the two mounting clamps. The MT-1077-12 includes an integrated shock mount.
3. Install the AM1077CONV power converter to the back of the AM-1077 RF Amplifier case.
4. Position the AM-1077 50W RF amplifier on top of the PRC1077 transceiver case and install the two handle clamps to the front-panel handles to secure the AM-1077 amplifier to the PRC1077.

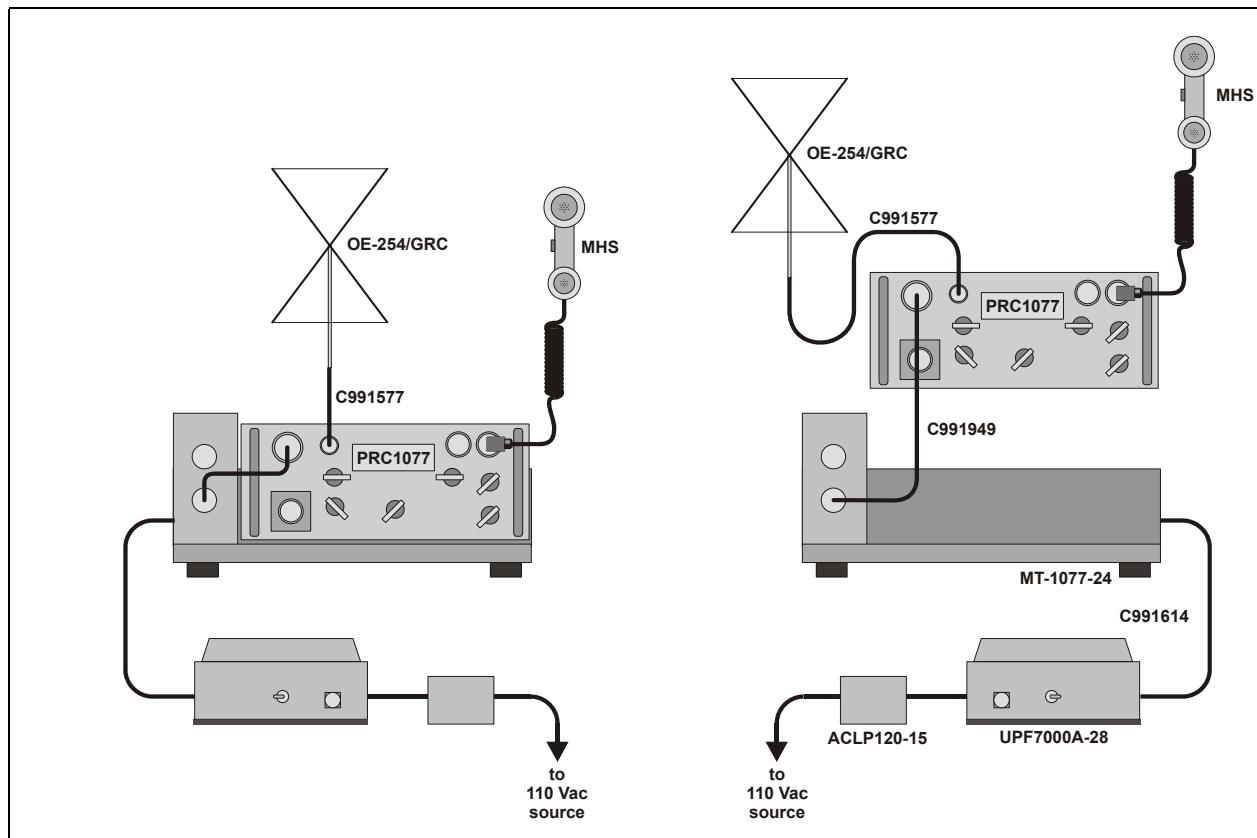
5. Connect the C991658 cable to the AM-1077 RF amplifier DC POWER INPUT connector and to the MT-1077-12 adapter AMP CNTL connector (J3).
6. On the PRC1077, remove the protective cap from the POWER connector. Connect the C991949 cable to the PRC1077 POWER connector and to the MT-1077 SET PWR connector (J4).

**Note:** *Make sure the POWER connector protective cap is attached to the PRC1077 transceiver front panel by a cord so it will not become lost. The protective cap grounds the connector when the cap is installed. If the protective cap is not installed or the C991949 cable is not installed and connected to the MT-1077 adapter, the PRC1077 will not operate.*

7. Connect the C991577 cable to the AM-1077 RF amplifier 50 ohm RF OUT connector and to the 4242-MK2 antenna.
8. Connect the C991580 cable to the MT-1077-12 adapter J1 connector (on backside), then to a 12 Vdc power source.
9. Remove the rubber protective cap from the dual AUDIO connectors and connect a military handset (MHS either H-189/U or M-250/U) to one of the connectors.

## Fixed Base Installation

The PRC1077 can be used in 5W and 50W fixed base station applications.



**Figure 2-9. 5W Fixed Base System**

### 5W Systems

The PRC1077 5W fixed base system uses the same adapters and mounts as the mobile systems, however the system includes a 28 Vdc power supply that connects to a 110 Vac source.

Accessory	Part Number	Description
Antenna	OE-254/GRC	VHF antenna kit including 30 MHz to 87.975 MHz omni-direction antenna with mast and transit bag
Adapters	MT-1077-24	24 Vdc vehicular adapter with integrated shock mount, includes antenna tuning control and loudspeaker
Power source	UPF7000A-28	28 Vdc power supply for radio with ACLP-120-15 AC Surge Suppressor (120 Vac/15A)
Handset	MHS	H-189/U military handset

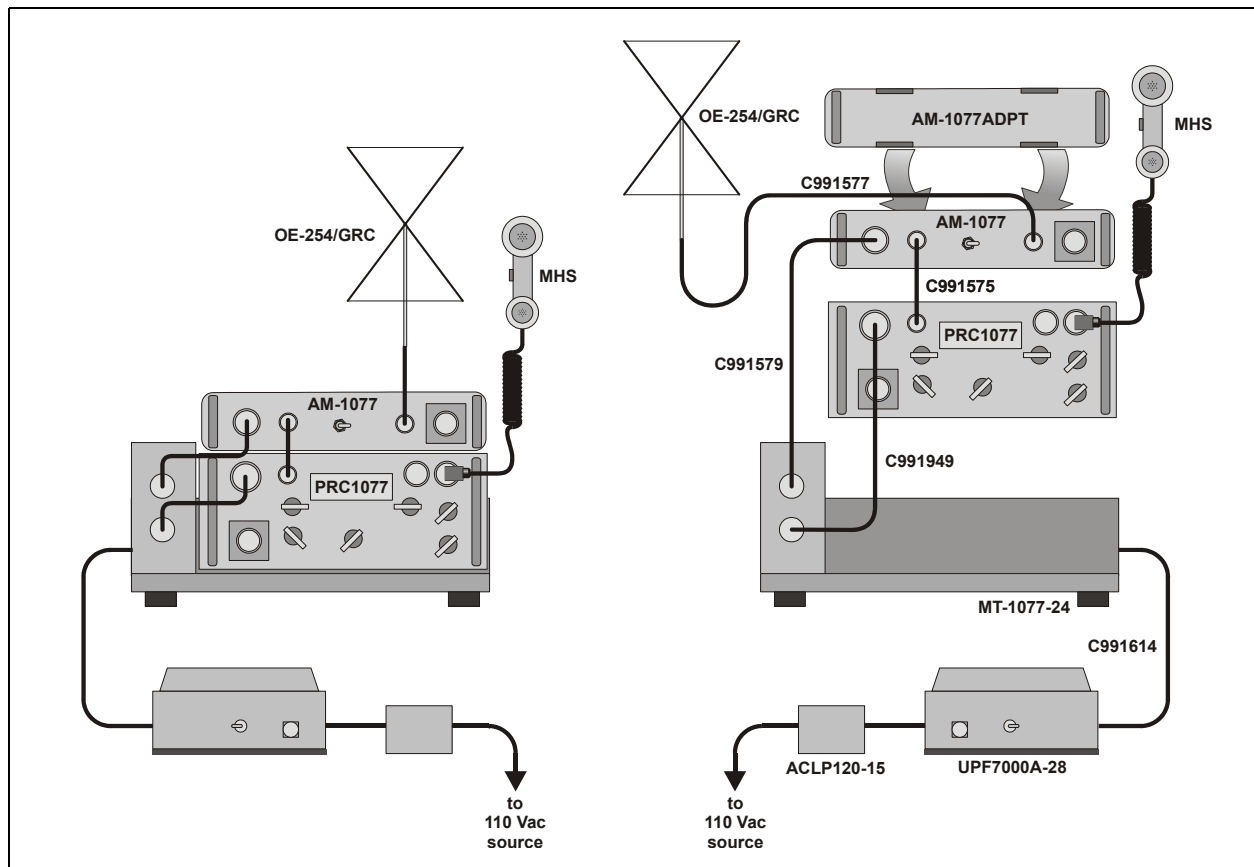
Accessory	Part Number	Description
	MHS	H-250/U military handset, includes noise canceling
Cabling	C991614	UPF7000A-28 to MT1077-24 dc power cable
	C991580	MT-1077-24 to dc power source cable
	C991949	PRC1077 to MT-1077-24 control and power cable

To install the PRC1077 into a 5W fixed base system (refer to the figure on page 2-15):

1. Without installing a battery, install the battery box onto the PRC1077 transceiver case (refer to "Installing the Battery" on page 2-2).
2. Slide the PRC1077 transceiver onto the MT-1077-24 adapter and clamp it in place with the two mounting clamps. The MT-1077-24 includes an integrated shock mount.
3. On the PRC1077, remove the protective cap from the POWER connector. Connect the C991949 cable to the PRC1077 POWER connector and to the MT-1077 SET PWR connector (J4).

**Note:** Make sure the POWER connector protective cap is attached to the PRC1077 transceiver front panel by a cord so it will not become lost. The protective cap grounds the connector when the cap is installed. If the protective cap is not installed or the C991949 cable is not installed and connected to the MT-1077 adapter, the PRC1077 will not operate.

4. Connect the C991577 cable to the PRC1077 50 ohm ANT connector and to the OE-254/GRC antenna.
5. Connect the C991614 cable to the MT-1077-24 adapter J1 connector (on back), and to the UPF7000A-28, 28 Vdc power source and ACLP-120-15, 120 Vac Surge Suppressor. Connect the ACLP-120-15 surge suppressor to 115 Vac power source.
6. Remove the rubber protective cap from the dual AUDIO connectors and connect a military handset (MHS either H-189/U or M-250/U) to one of the connectors.



**Figure 2-10. 50W Fixed Base System**

### 50W Systems

The PRC1077 50W fixed base system uses the same adapters and mounts as the mobile systems, however the system includes a 28 Vdc power supply that connects to 110 Vac source. The fixed base system also uses the same RF amplifier and converter as the mobile system.

Accessory	Part Number	Description
Antenna	OE-254/GRC	VHF antenna kit including 30 MHz to 87.975 MHz omni-direction antenna with mast and transit bag
Adapters	MT-1077-24	24 Vdc vehicular adapter with integrated shock mount, includes antenna tuning control and loudspeaker
Amplifier	AM-1077	50W RF power amplifier (30 MHz to 87.975 MHz (24 Vdc power source only)

Accessory	Part Number	Description
Power source	UPF7000A-28	28 Vdc power supply for radio with ACLP-120-15 AC Surge Suppressor (120 Vac/15A)
Handset	MHS	H-189/U military handset
	MHS	H-250/U military handset, includes noise canceling
Cabling	C991614	UPF7000A-28 to MT1077-24 dc power cable
	C991580	MT-1077-24 to dc power source cable
	C991949	PRC1077 to MT-1077-24 control and power cable

To install the PRC1077 into a 24 Vdc 50W mobile system ([refer to the figure on page 2-17](#)):

- Without installing a battery, install the battery box onto the PRC1077 transceiver case ([refer to "Installing the Battery" on page 2-2](#)).
- Slide the PRC1077 transceiver onto the MT-1077-24 adapter and clamp it in place with the two mounting clamps. The MT-1077-24 includes an integrated shock mount.
- Install the AM-1077ADPT RF amplifier adapter to the back of the AM-1077 RF amplifier case.
- Position the AM-1077 50W RF amplifier on top of the PRC1077 transceiver case and install the two handle clamps to the front-panel handles to secure the AM-1077 amplifier to the PRC1077.
- Connect the C991579 cable to the AM-1077 RF amplifier DC POWER INPUT connector and to the MT-1077-24 adapter AMP CNTL connector (J3).
- On the PRC1077, remove the protective cap from the POWER connector. Connect the C991949 cable to the PRC1077 POWER connector and to the MT-1077 SET PWR connector (J4).

**Note:** Make sure the POWER connector protective cap is attached to the PRC1077 transceiver front panel by a cord so it will not become lost. The protective cap grounds the connector when the cap is installed. If the protective cap is not installed or the C991949 cable is not installed and connected to the MT-1077 adapter, the PRC1077 will not operate.

- Connect the C991577 cable to the AM-1077 RF amplifier 50 ohm RF OUT connector and to the 4242-MK2 antenna.

8. Connect the C991614 cable to the MT-1077-24 adapter J1 connector (on back), and to the UPF7000A-28, 28 Vdc power source and ACLP-120-15, 120 Vac Surge Suppressor. Connect the ACLP-120-15 surge suppressor to 115 Vac power source.
9. Remove the rubber protective cap from the dual AUDIO connectors and connect a military handset (MHS either H-189/U or M-250/U) to one of the connectors.

## Battery Charger Installation

The PRC1077 typically uses a BB-LA6 sealed lead-calcium rechargeable battery pack that fits into the battery case. The battery case is attached to the back of the transceiver case. The BB-LA6 battery can be recharged using the following battery recharge configurations:

- PRC-PS Power supply/battery charger
- PRC-BC4 Multiple battery charger
- PRC-HC-30 Hand crank charger
- PRC-SPU-10 Solar power generator

### PRC-PS Power Supply/Battery Charger

The PRC-PS can operate both as an external power supply and as a battery charger, powering a PRC1077 and recharging a BB-LA6 battery at the same time. The PRC-PS does not provide power but derives power from either a 24 Vdc power source or a 115/230 Vac (internally strappable) power source.

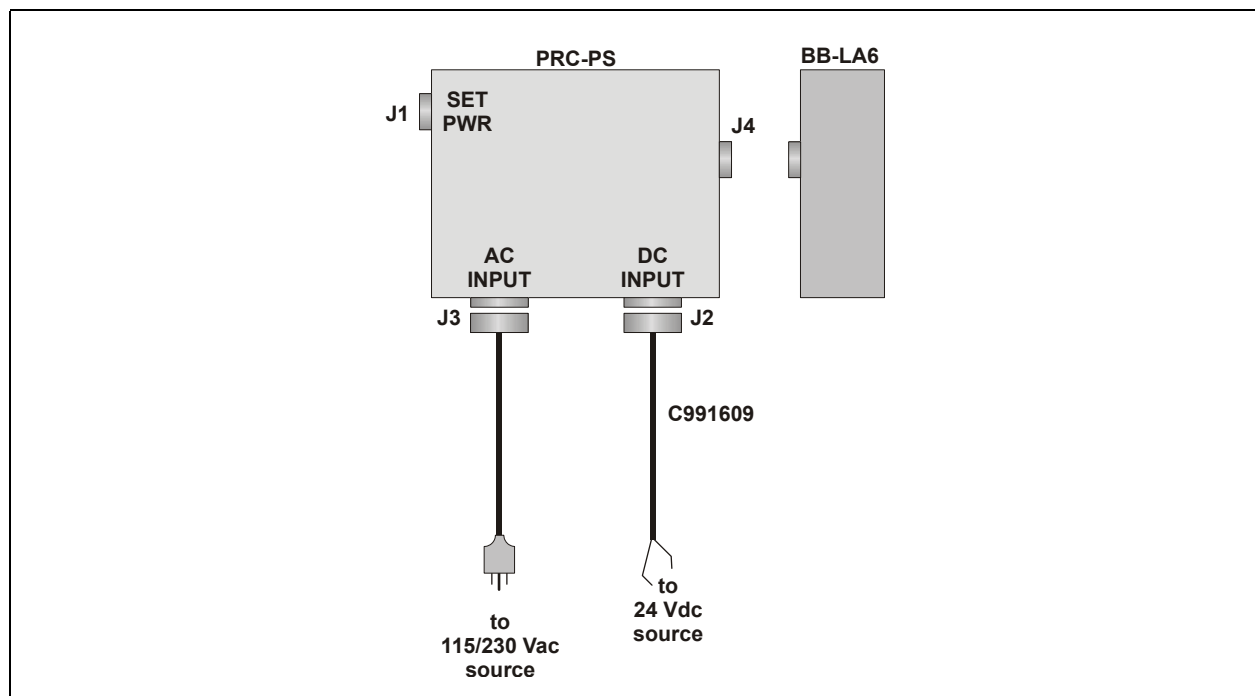


Figure 2-11. PRC-PS Power Supply/Battery Charger

To recharge a BB-LA6 battery and power a PRC1077 at the same time (refer to the figure on page 2-19):

1. Connect the C991608 cable to the PRC-PS POWER SET connector (J1) and to the PRC1077 POWER connector.
2. When using a 24 Vdc source, connect the C991609 cable to the PRC-PS J2 connector and to a 24 Vdc power source; when using a 115/230 Vac power source, connect a 110 Vac power cable to the PRC-PS J3 connector and a 115/230 Vac power source.
3. Power on the PRC-PS and observe the indicator lights:
  - Fault indicator light, illuminates if the battery is not connected properly or is shorted.
  - Charging indicator light, illuminates during normal charge cycle
  - Ready indicator light, illuminates when the battery is fully charged.
4. Leave the PRC1077 powered off unless it needs to be operated while being recharged.
5. Connect a BB-LA6 battery directly to the PRC-PS J4 connector.
6. Allow about 6 hours to recharge a battery discharged to 20% of capacity.

#### PRC-BC4 Multiple Battery Charger

The PRC-BC4 battery charger can charge up to four BB-LA6 sealed lead-calcium batteries simultaneously.

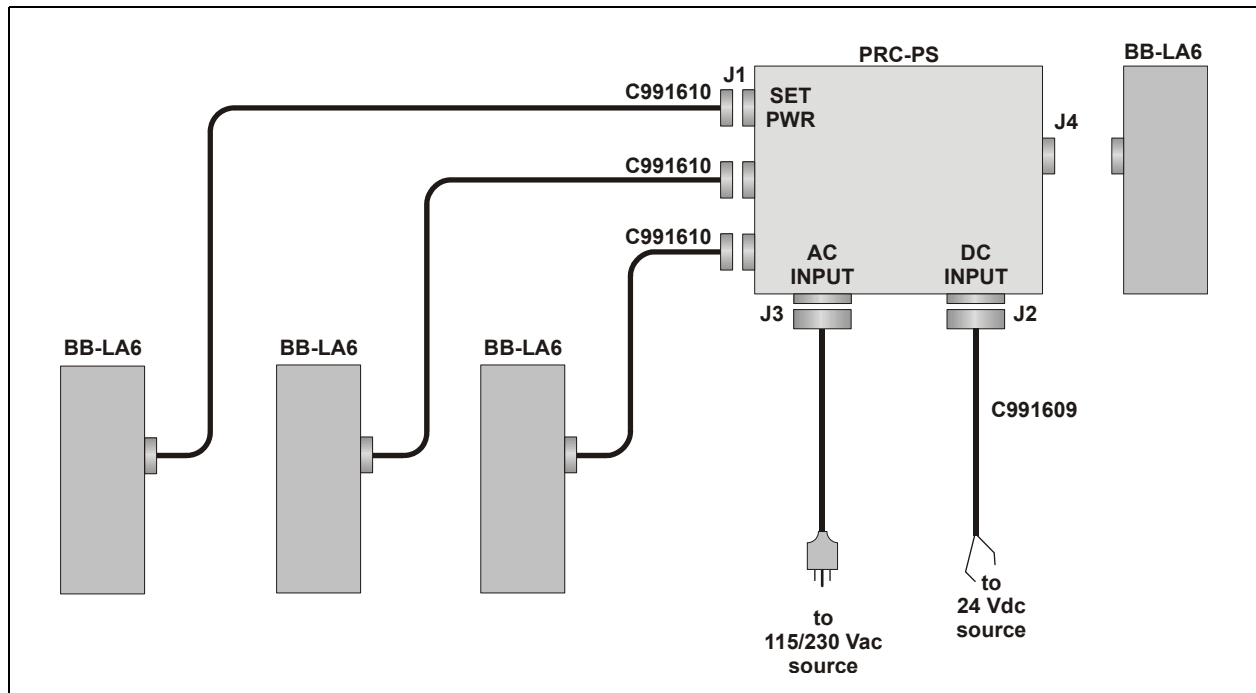


Figure 2-12. PRC-BC4 Multiple Battery Charger

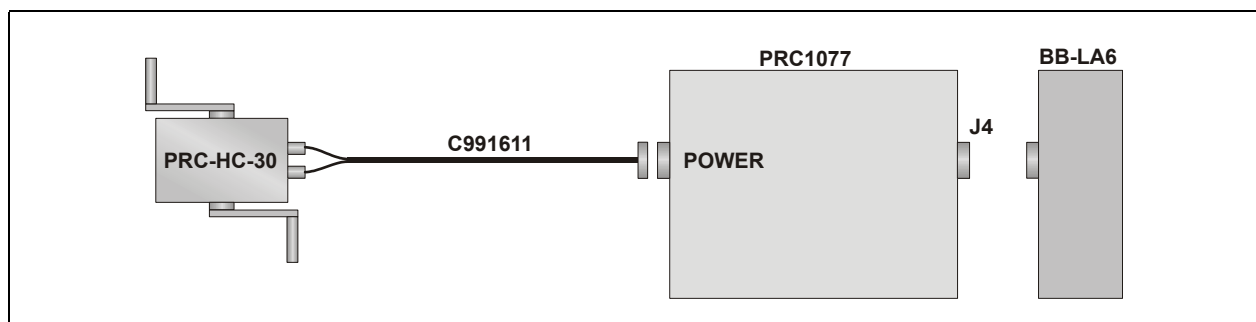


To recharge up to four BB-LA6 batteries ([refer to the figure on page 2-20](#)):

1. Connect a C991610 cable to each battery pack to be charged (not installed in PRC1077 transceivers).
2. Connect the PRC-BC4 to either a 24 Vdc or 115/230 Vac power source.
3. Power on the PRC-BC4 and observe the indicator lights:
  - Fault indicator light, illuminates if the battery is not connected properly or is shorted.
  - Charging indicator light, illuminates during normal charge cycle.
  - Ready indicator light, illuminates when the battery is fully charged.
4. Allow about 6 hours to recharge a battery discharged to 20% of capacity.

### PRC-HC-30 Hand Crank Generator

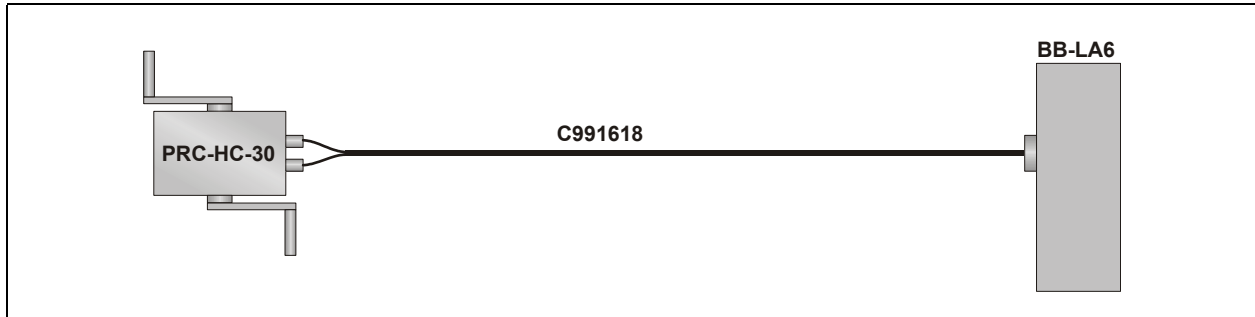
The PRC-HC-30 Hand Crank Generator can recharge a BB-LA6 battery directly or while installed in a PRC1077. As the name indicates, the PRC-HC-30 is a mechanical hand-crank recharging device.



**Figure 2-13. PRC-HC-30 Hand Crank Generator with Battery Installed**

To recharge a BB-LA6 battery:

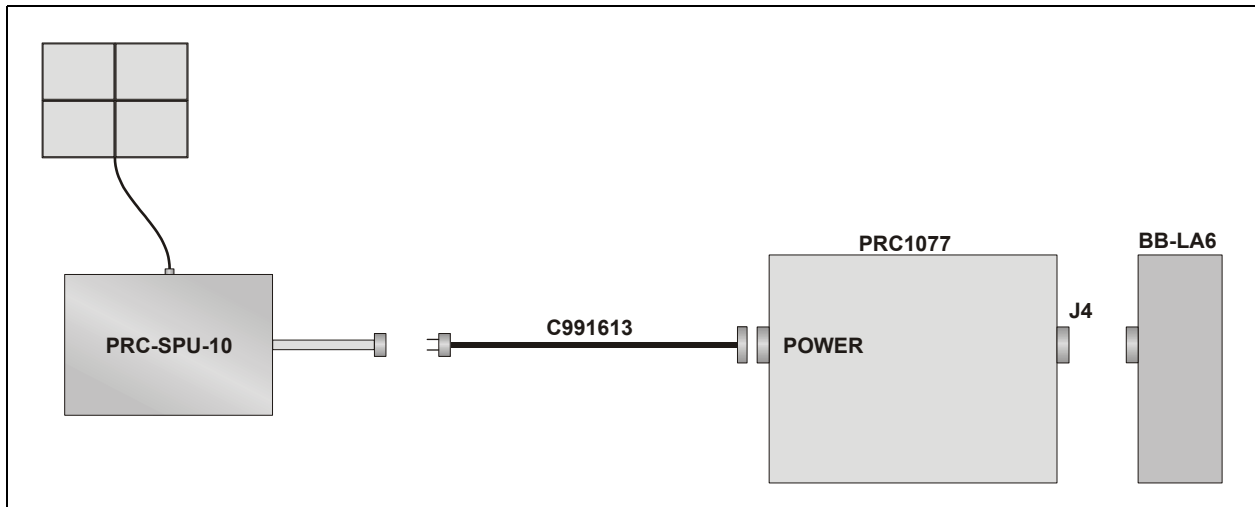
1. Connect the C991618 cable to the PRC-HC-30 hand crank generator and to the BB-LA6 battery ([refer to the figure on page 2-22](#)) or connect a C991611 cable to the PRC-HC-30 and to a PRC1077 with a BB-LA6 battery installed ([refer to the figure above](#)).
2. Mount the PRC-HC-30 to a secure surface that facilitates convenient cranking.
3. Rotate the handles to generate energy to the battery.



**Figure 2-14. PRC-HC-30 Hand Crank Generator with Battery Connected Directly**

**PRC-SPU-10  
Solar Power  
Generator**

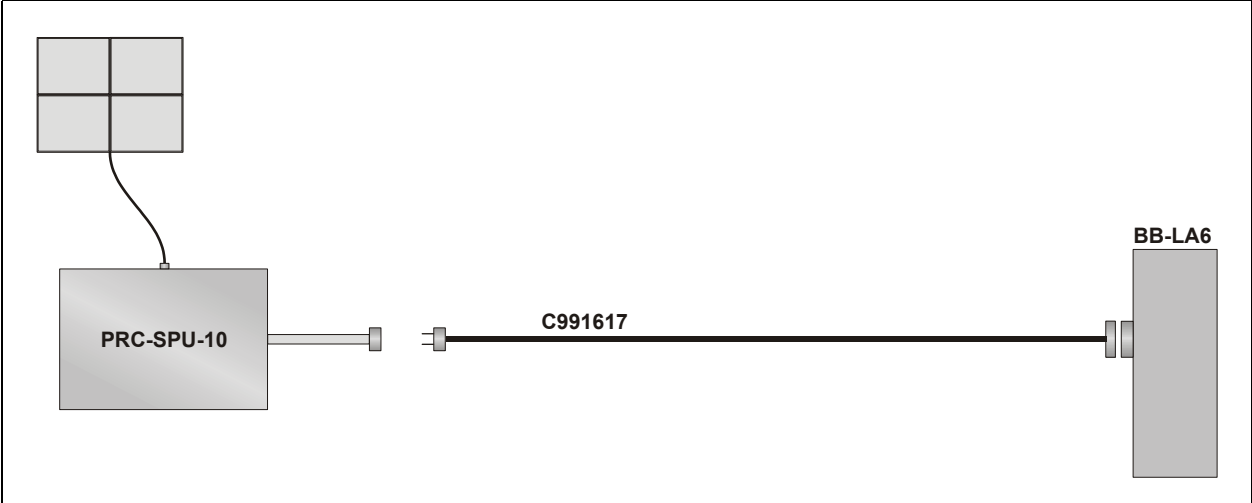
The PRC-SPU-10 Solar Power Generator can recharge a BB-LA6 battery directly or while installed in a PRC1077.



**Figure 2-15. PRC-SPU-10 Solar Power Generator with Battery Installed**

To recharge a BB-LA6 battery:

1. Unfold the PRC-SPU-10 Solar power generator and position it for maximum exposure to the sun.
2. Connect the C991613 cable to the PRC-SPU-10 and to the PRC1077 with a BB-LA6 battery installed ([refer to the figure above](#)) or connect a C991617 to the PRC-SPU-10 and directly to a BB-LA6 battery ([refer to the figure on page 2-23](#)).
3. Allow several hours for charging a fully depleted battery.



**Figure 2-16. PRC-SPU-10 Solar Power Generator with Battery Connected Directly**



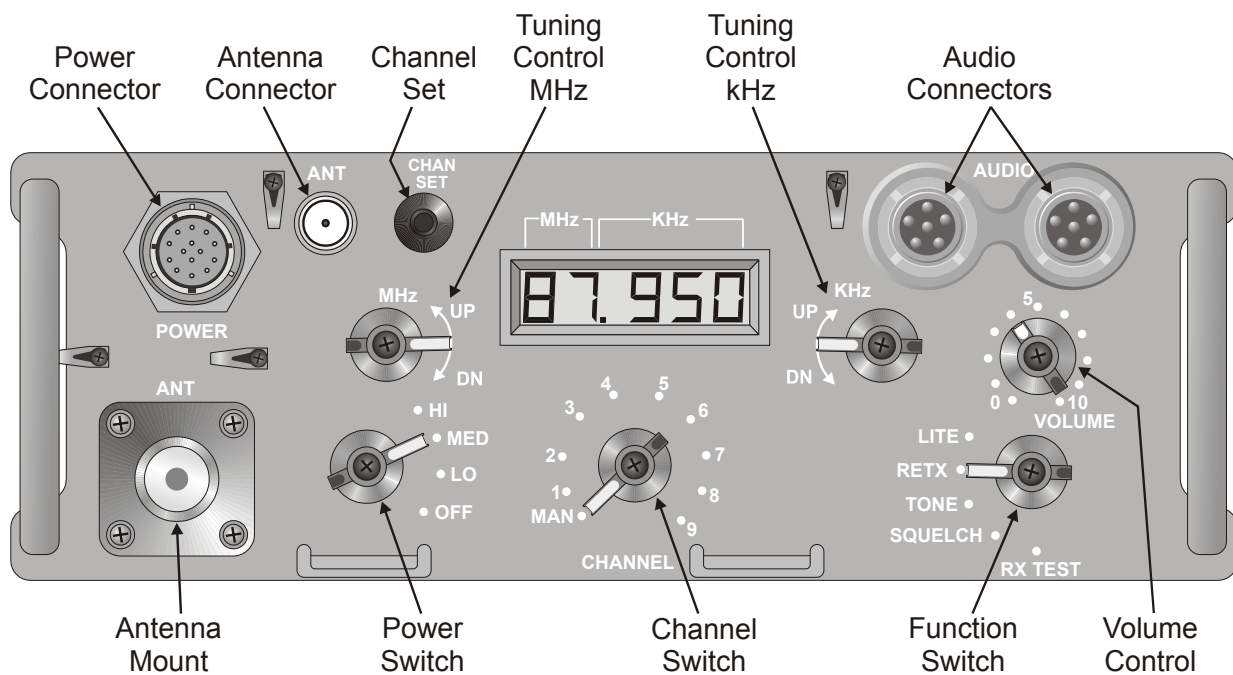
# CHAPTER 3

## OPERATION

### Quick Start

For basic operation, the PRC1077 needs a battery, an antenna, and a handset. To operate the PRC1077:

1. Install a fully charged battery.
2. Install an antenna.
3. Install a handset.



**Figure 3-1. Front Panel Controls**

4. Turn the Power switch to the desired power level:
  - LO (0.5W)
  - MED (2.0W)
  - HIGH (5.0W)

5. Turn the Function switch to the desired function:
  - RX TEST
  - SQUELCH
  - TONE
  - RETX
  - LITE
  
6. Turn the Channel switch to the desired channel:
  - MAN
  - Preset Channels (1 to 9)
  
7. Set the VOLUME control knob to the desired level (0 to 10).

## Settings, Indications and Connections

**Power Knob** The Power switch sets the transmitted output power.

Position	Description
OFF	Turns transceiver off.
LO	Turns transceiver on; sets output power to 0.5W.
MED	Turns transceiver on; sets output power to 2.0W.
HI	Turns transceiver on; sets output power to 5.0W.

**Function knob** The Function knob sets the various radio functionality.

Position	Description
RX TEST	No receiver noise - background noise in receiver.
SQUELCH	Receiver squelched - no background noise, audio only when signal is received.
TONE	Receiver squelched - no background noise, audio only on 150-MHz tone. Transmitter is modulated with 150 MHz tone.
RETX	Permits radio retransmission operation.
LITE	Momentarily back-lights frequency display. This lever position is spring loaded.

**Channel Knob** The Channel knob sets the transmit and receive frequency.

Position	Description
MAN	Manual tune channel
1 to 9	Preset channels

**Tuning Knobs** The two Tuning knobs adjust the preset channel frequencies (1 to 9) or the manual (MAN) channel.

Position	Description
UP	Increments frequency higher in 1 MHz steps. Lever is spring-loaded.
DOWN	Increments frequency lower in 1 MHz steps. Lever is spring-loaded.
UP	Increments frequency higher in 25 kHz steps. Lever is spring-loaded.
DOWN	Increments frequency lower in 25 kHz steps. Lever is spring-loaded.

**CHAN SET Button** The CHAN SET button works in conjunction with the Tuning knobs to change the preset channel frequencies.

Position	Description
Pressed	Allows the preset channel frequencies to be changed with the Tuning knobs.
Released	Prevents the preset channel frequencies from being accidentally changed.

**LCD Display** The LCD displays the selected channel frequency in MHz and kHz.

**Volume** The VOLUME knob sets the audio level for received signals (0 to 10).

**Connectors** Connectors provide connections for handsets and antennas.

Connector	Function/Action
AUDIO	Provides connection for handset or retransmission cable to transceiver.
ANT	Provides connection for AT-271A/U or AT-892/U antenna.
ANT (BNC)	Provides connection for a fixed base or vehicular antenna.

Connector	Function/Action
POWER	Provides connection for external power supply when the PRC1077 is used in a vehicular radio set configuration. When the connector cover is removed, the PRC1077 is disconnected from the battery pack so the radio will not operate. Rechargeable batteries can be recharged through this connector.

## Presetting Channel Frequencies

The PRC1077 stores up to 10 different frequencies. These frequencies remain in memory even if the battery pack is disconnected. Channels 1 to 9 are preset channels; however, the last frequency entered in the MAN channel is also retained in memory.

### Presetting Channels 1 to 9

To preset memory channels 1 to 9 ([refer to the figure on page 3-1](#)):

1. Turn the Power switch to the LOW, MED, or HIGH position.
2. Turn the CHANNEL switch to the desired channel number (1 to 9).
3. Press the CHAN SET button and hold it down while setting the new frequency (next step). This button prevents accidental preset channel frequency changes during normal transceiver operation.
4. Turn the Tuning control (MHz) switch to either UP or DN until the two right digits (MHz) in the LCD indicate the desired frequency.
5. Turn the Tuning control kHz switch to either UP or DN until the three left digits (kHz) in the LCD indicate the desired frequency.
6. Release the CHAN SET button. The new preset frequency is now entered into memory.

### Presetting the MAN Channel

To set the MAN channel:

1. Turn the POWER switch to the LOW, MED, or HIGH position.
2. Turn the CHANNEL switch to MAN.
3. Turn the MHz switch to either UP or DN until the first two digits in the LCD (MHz) indicate the desired frequency.
4. Turn the kHz switch to either UP or DN until the last three digits in the LCD (MHz) indicate the desired frequency.
5. The new frequency is now entered into memory.



**Erasing Frequencies**

To erase all the frequencies stored in memory (the Power switch is in the OFF position):

1. Press and hold the CHAN SET button; turn and hold the Tuning control MHz switch up
2. Turn the Power switch from the OFF position to the LOW position. This causes the radio to reset all programmed frequencies to 00.000 MHz.
3. Release the Tuning control MHz and the CHAN SET button.

**Setting Different Transmit and Receive Frequencies**

Semi-duplex operation is when the PRC1077 transmits and receives on different frequencies. This type of setup is typically used for operating through a repeater system ([refer to "Repeater Operation" on page A-2](#)).

To set the PRC1077 to semi-duplex operation:

1. Turn the Power switch to the LOW, MED, or HIGH position.
2. With the Channel switch, select one of the preset channels and set it to the desired receive frequency ([refer to "Presetting Channels 1 to 9" on page 3-4](#)).
3. Press and hold the CHAN SET button.
4. Press and hold the handset PTT button.
5. With the CHAN SET button and handset PTT button still pressed, adjust either Tuning control knob (MHz or kHz) up or down to set the transmit frequency. The transmit frequency is displayed in the LCD.
6. Release PTT and CHAN SET button (sequence is not important).

Once the transmit frequency is set, and PTT is pressed, the transmit frequency is displayed in the LCD. When PTT is released, the receive frequency is displayed.

## Jamming Recognition and Identification

Jamming refers to the transmission of radio signals that disrupt or interfere with communications within a radio system. The source of the jamming signals can be from an enemy radio, or it can be unusual channel noise or interference from a local noise source. It is also possible that a faulty receiver can cause internal interference to the received signal.

To determine the source of the interference, perform the following checks:

Action	Indication
Remove the antenna.	If the noise continues, the receiver is the probable noise source.

Action	Indication
Switch to several different channels.	If the interference is present on all channels, interference is from a local noise source.

**Anti-Jamming** When jamming is first detected, try the following checks to reduce the effects:

Action
Position the PRC1077 to make use of nearby obstructions to act as a screen against the jamming source. Experiment with different locations as the interference signal strength may vary substantially over very short distances.
Operate at the minimum power level that still provides adequate communications. This makes it difficult for the jamming source to intercept transmissions and determine the jamming frequency.
Change the channel frequency. With multiple preset channels, the PRC1077 is capable of changing frequencies quickly, so unless the jammer is using very advanced jamming equipment, it will take some time to find the operating frequency and resume jamming.
Set up predetermined time slots for communications using specified channels at specified times, for example, channel 1 used from 00 minutes to 15 minutes past the hour; channel 2 used from 15 minutes to 30 minutes past the hour; etc.
Set up frequency change schedule. When jamming is detected, operators switch to the next frequency in the schedule. This arrangement is particularly effective when only two stations are communicating.
Use split-frequency operation. This configuration uses different transmit and receive frequencies.

## Radio Set Compatibility

The PRC1077 can communicate with most frequency-modulated (FM) radio sets. The PRC1077 is compatible with the AN/PRC77 and PRC28 radio sets, however, incompatibilities do exist that impose limitations, for example, the PRC1077 has a higher frequency range and smaller frequency spacing than the PRC77 and PRC28 radio sets.

### Frequency Range

The PRC1077 has a operational frequency range from 30 MHz to 87.975 MHz whereas the PRC77 transceiver has a frequency range from 30 MHz to 75 MHz, leaving a range of frequencies from 76 MHz to 87.975 MHz that the PRC1077 cannot use when communicating with a PRC77.

The PRC28 operates from 30 MHz to 42 MHz, leaving the PRC1077 with an unusable frequency range from 43 MHz to 87.975 MHz when communicating with the PRC28 transmitter.

These unusable frequencies can provide security and protection from jamming if an enemy is using a PRC77 or PRC28 transmitter.

**Frequency Spacing**

The PRC1077 provides frequency spacing of 25 MHz whereas the PRC77 has 50 MHz frequency spacing so the PRC1077 cannot use frequencies ending in 25 kHz and 75 kHz when communicating with a PRC77 transceiver. The PRC28 has 100 kHz frequency spacing, limiting the usable frequencies to even 100 kHz frequencies. Again, these unused frequencies can provide both security and protection.

**Squelch System**

Some transceivers do not include 150 Hz tone in the squelch mode. The PRC1077 can receive transmissions with or without 150 Hz tone in squelch mode. If a station does not respond to transmission with the Function switch set to SQUELCH, set the Function switch to TONE to transmit 150 Hz tone signal.

**Voice Security**

The PRC1077 can be fitted with an optional TACSEC-II device to provide embedded tactical voice security. The TACSEC-II voice security module is mounted underneath the Audio board.



# CHAPTER 4

## MAINTENANCE

### Preventative Maintenance

Preventative maintenance is the systematic care, inspection, and servicing of equipment to prevent problems and reduce down time. This ensures the equipment remains serviceable.

#### **Scheduled Maintenance**

The following is a recommended procedure for daily preventative maintenance to keep the PRC1077 and accessories in good working condition.

- Make sure the PRC1077 transceiver is complete with all accessories.
- Remove all dust, dirt, and moisture from all exterior surfaces and clean the display with a soft cloth. Check all surfaces for rust, corrosion, and fungus. Remove and spot paint any exposed metal surfaces.
- Check all control knobs for looseness or damage. During the operational check, note the mechanical action of each control.
- Inspect the battery for leakage, corrosion and swelling.

**Note:** *Remove the battery if the transceiver is not used for one or more days.*

- Perform the Operational Checklist.

The following is a recommended procedure for weekly preventative maintenance to keep the PRC1077 and accessories in good working condition.

- Inspect the handset cable for fraying, cuts, kinks and broken insulation.
- Inspect all cloth items for fraying and tears.
- Inspect the antenna for damage, loose fit and corrosion.
- Inspect the battery box gasket for damage.

#### **Cleaning**

Radio equipment needs to be cleaned daily when in use or weekly when in standby condition. Use the following procedure for cleaning the PRC1077 transceiver and accessories.

- Inspect the transceiver exterior. Make sure the exterior surfaces are free from dirt, grease, and fungus.

- Remove dust and loose dirt with a clean, soft cloth.
- Remove grease, fungus, and ground-in dirt from the case using a cloth dampened with trichlorethane.

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**CAUTION: TRICLORETHANE fumes are toxic. Make sure the area of use has adequate ventilation. Exposure to open flame converts TRICLORETHANE to a highly toxic and dangerous gas.**

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- Remove dust and dirt from plugs and receptacles.
- Clean the front panel and control knobs using a soft clean cloth. If the dirt is difficult to remove, dampen the cloth with mild detergent and water.

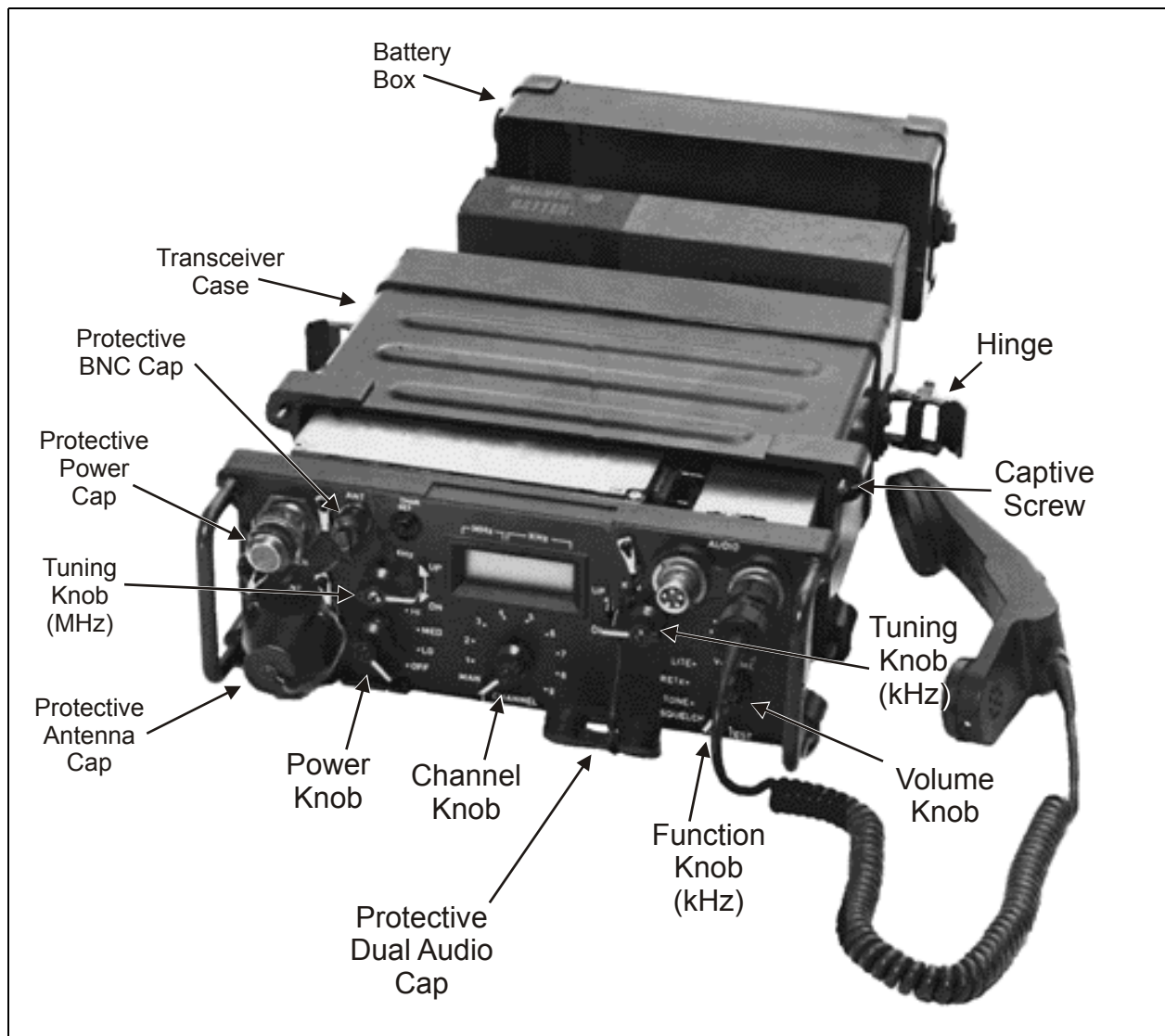
### **Operational Checklist**

Make the following operational checks before and after using the PRC1077. If the PRC1077 or any accessory fails to function correctly report the failure to technical personnel.

1. Connect the handset.
2. Install the antenna.
3. Set the Volume knob to 5.
4. Set the Channel switch to any channel.
5. Set the Power knob to LO, MED or HIGH. The frequency displayed in the LCD should match the frequency of the channel to which the Channel switch is set. If the displayed frequency does not match the frequency of the channel, reset the channel frequency. If the displayed frequency is still not correct, replace the battery.
6. Set the Function switch to LITE. The LCD should be backlit. If the LCD does become backlit, notify technical personnel
7. Set the Function switch to SQUELCH. The background noise should stop. If the background noise does not stop, notify technical personnel
8. Listen to test signals transmitted from a nearby radio set operating at the frequency (simplex operation) displayed on the LCD. If the transmissions are not heard clearly, check the antenna connection for looseness. If the audio is still not clear, notify technical personnel.
9. Transmit a test signal to a nearby radio set. If you do not hear a side tone or get a response from the test radio:
  - Check the antenna connection for looseness
  - Replace the battery
  - Notify technical personnel
10. With the Function knob set to TONE, repeat steps 8 and 9.

11. The PRC1077 is designed with four internal test bands selected automatically by the microprocessor. Perform steps 8 and 9 in each of the four frequency band ranges listed below:

- 30 MHz to 39 MHz
- 40 MHz to 51.975 MHz
- 52 MHz to 67.975 MHz
- 68 MHz to 87.975 MHz



**Figure 4-1. PRC1077 Replacement Parts**

## Replacement Parts

If a PRC1077 part is damaged, the following table provides a list of parts and part numbers for ordering replacement parts.

<b>Part Number</b>	<b>Description</b>
610080-A	Protective dual audio connector cap
610085	Protective BNC cap
610087-A	Protective antenna cap
610088	Protective power cap
819909	Captive screw
891027	Tuning knob (MHz) (kHz) Power knob Function knob
891028	Volume knob
894102	Battery box (CY-2562)
894104	Transceiver case
919107	Hinge



# APPENDIX A

## RADIO RELAY AND REPEATERS

### Introduction

The PRC1077 Radio Set is typically limited by line-of-sight range. In flat country, the typical range is five miles (eight kilometers), however, if the transceivers are located on elevated sites with line-of-sight, ranges of 20 or 30 miles are easily achievable. Unfortunately, locating transceivers on elevated sites is not always possible. A relay system uses two PRC1077 positioned on elevated sites to relay signals. The two transceivers are connected using the MK-456/GRC Retransmission Cable Kit.

The PRC1077 can also operate in semi-duplex mode through a repeater, which offers the advantage of a wider area of coverage with greater flexibility over the relay system.

### Radio Relay Operation

An easy way to demonstrate 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 (station B and station C) that want to communicate. Stations B and C cannot communicate directly because of obstructions in the line-of-sight path between each other. As an alternative, station B can get a message to station C, using station A as a relay. Station B transmits a message to station A, who writes down the message, then transmits the message to station C. This process can be reversed to get a response back to station B.

This process can be automated using two transceivers connected together with the retransmission cable kit so that the audio output of the first transceiver is directly connected to the microphone input of the second transceiver. The second transceiver is assigned a different frequency from the first transceiver so it will not interfere with reception. The retransmission cable is 50 feet long providing adequate distance between the two transceivers to prevent overloading.

This relay system is effective in extending the communications range between two transceivers. It is not a suitable system for operating a network of stations because different frequencies must be used by stations at each end of the relay.

## Repeater Operation

The repeater system extends the range of radio coverage with greater flexibility than the relay system. In the repeater system, all stations in the network can communicate with each other using the same semi-duplex frequencies. The repeater system is limited in that each stations must be in line-of-sight of the repeater, however, if the repeater transceiver is located on a mountain top, the range of coverage could be hundreds of square miles.

The repeater system consists of a radio receiver and transmitter operating on separate frequencies. The audio output from the receiver is connected to the microphone input of the transmitter. The repeater system can be a receiver and transmitter specially designed for repeater operation. Two PRC1077s can be used to create a simple repeater system.

To communicate through a repeater, the transceiver is programmed so the transmitter frequency is the same as the repeater receiver frequency. The receiver frequency must be the same as the transmitter frequency. The repeater will rebroadcast any signal it receives on the transmit frequency to any station within reception range enabling two-way communications between any two stations on the network.

The PRC1077 can be programmed with separate transmit and receive frequencies making it capable of semi-duplex operation through a repeater.

## Radio Relay Procedures

For radio relay operation, use the MK-456 Retransmission Cable Kit to connect to the relay transceiver and follow the same procedures as used with the PRC77 transceiver. Since the PRC1077 has fewer spurious frequencies than the PRC77, use the revised procedure to select frequencies.

The two frequencies used in a radio relay system must be separated by at least 5 MHz to eliminate the possibility of mutual interference. It is prudent to experiment with frequency combinations to make sure the two frequencies do not cause interference ([refer to the Frequency Interference Chart on page A-4](#)).

The PRC1077 transmitter is compatible with the PRC77, so both types of transmitters can be used to create a radio relay system.

## Dedicated Receiver

A dedicated repeater is a receiver/transmitter combination specifically designed to be used in a repeater system. The transmitter and receiver are carefully shielded and can be operated in the same enclosure. Frequently the repeater uses a duplexer that enables the transmitter and receiver to share the same antenna.

The dedicated repeater is preferred for permanent repeater applications because it is specifically designed for continuous service with higher power output. The receiver has a high sensitivity and high rejection of spurious responses and the antenna is designed for maximum efficiency on the operating frequency. These factors help ensure the best service area coverage.

## PRC1077 Repeater Installation

When using the PRC1077 in a repeater system, use the 1077 Retransmission Repeater Cable Kit to connect the two radio sets. The 1077RETRAN includes a 50-foot cable with connectors to connect two PRC1077 transceivers together.

1. Select transmit and receive frequencies that are separated by at least 5 MHz. Some combinations of frequencies may cause interference, so it is prudent to experiment with various frequency combinations to determine which are compatible with the repeater system ([refer to Frequency Interference Chart figure on page A-4](#)).
2. Program the PRC1077s to be used in the repeater system with reciprocal frequencies 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.
3. Program a different channel with the same frequencies as the repeater, that is, the transmit and receive frequencies are exactly the same as the repeater. This channel can be used to contact other stations directly, instead of going through the repeater.
4. Position the two repeater transceivers 50 feet apart, at as high an elevation as possible. Use the AT-892/U Antenna for maximum range. Remember that the separation between the transceivers is essential to prevent receiver overload. Choose the locations carefully to provide optimum service coverage. Remember that there is no advantage to locating the transmitter or receiver in a better location as this results in either the transmitter outperforming the receiver or the receiver outperforming the transmitter.
5. Connect the PRC1077 transceivers together with the 1077 Retransmission Repeater Cable Kit ([refer to Transceiver Connections - Relay System figure on page A-4](#)). Switch both transceivers to RETX.
6. If the repeater is used for extended service, use a heavy-duty battery to power the transmitter, as the repeater transmitter operates continuously while stations are communicating. The 1077 Retransmission Repeater Cable Kit includes an external battery cable. A 12 V automobile battery makes an excellent power source for sustaining a repeater system.

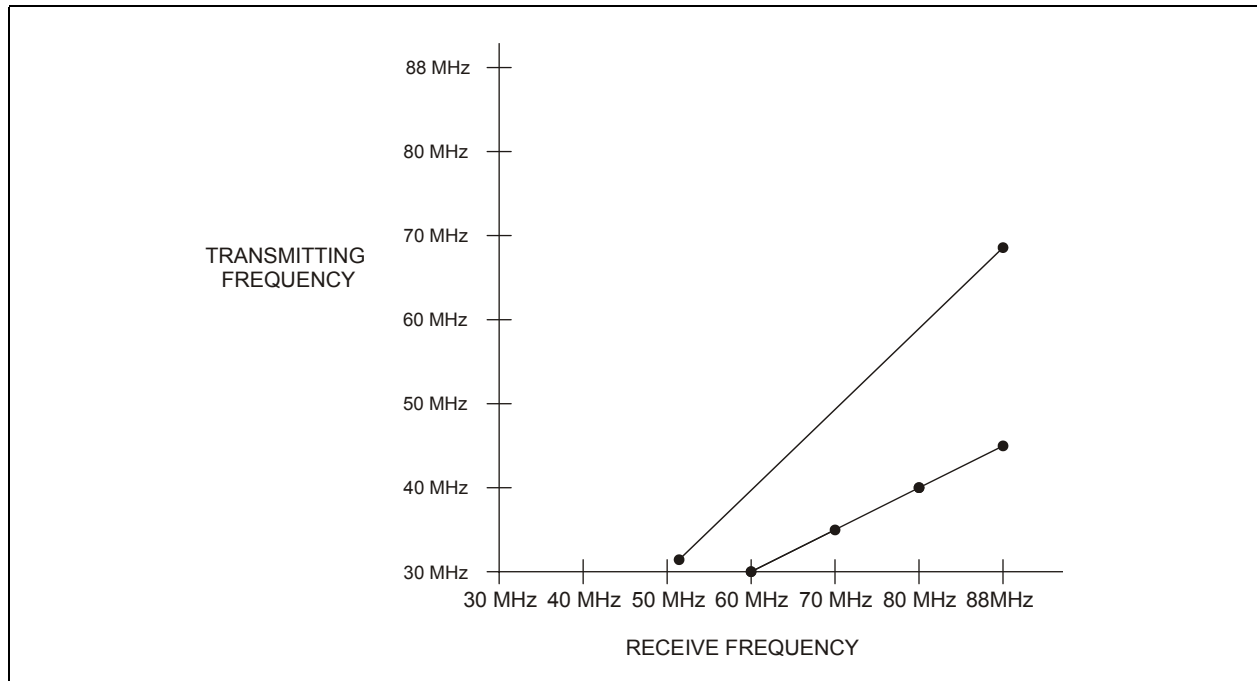


Figure A-1. Frequency Interference Chart

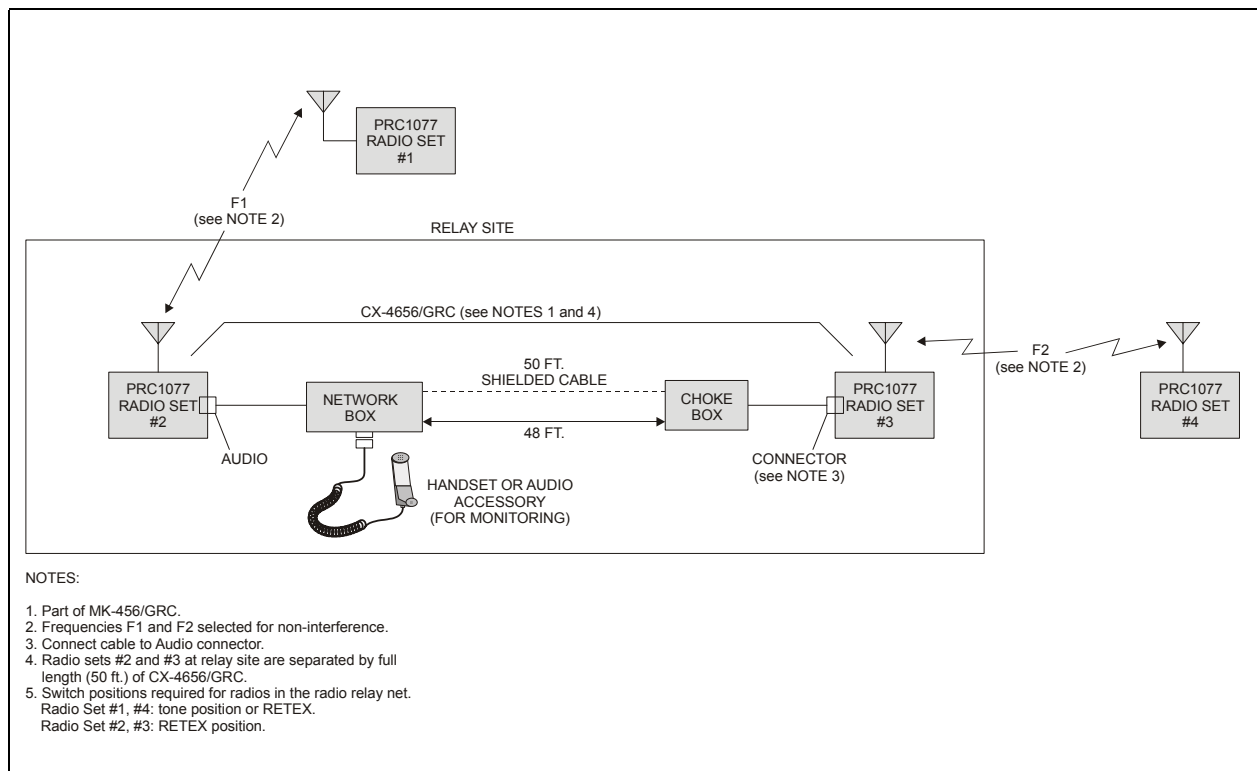


Figure A-2. Transceiver Connections - Relay System