

PRC1099A-MSOP

**PRC1099A
RADIO SET
OPERATOR'S MANUAL**

DATRON

DATRON WORLD COMMUNICATIONS INC.

Manual Part No. PRC1099A-MSOP
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One Year Limited Warranty and Remedies

Datron World Communications Inc. (DWC) warrants that its equipment is free from defects in design, materials and workmanship for a period of 12 months from the date of installation of the equipment, but in no event later than 15 months from the date of shipment. If the equipment does not provide satisfactory service due to defects covered by this warranty, DWC will, at its option, replace or repair the equipment free of charge.

Should it be impractical to return the equipment for repair, DWC will provide replacements for defective parts contained in the equipment for a period of 12 months from the date of installation of the equipment, but in no event later than 15 months from the date of shipment.

This warranty is limited to the original purchaser and is not transferable. Repair service performed by DWC is warranted for the balance of the original warranty or 90 days, whichever is longer.

Exclusive Warranty: There are no other warranties beyond the warranty as contained herein. No agent, employee, or representative of DWC has any authority to bind DWC to any affirmation, representation, or warranty concerning the equipment or its parts that is not in conformity with the warranties contained herein. EXCEPT AS EXPRESSLY SET FORTH ABOVE, NO OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, ARE MADE WITH RESPECT TO THE EQUIPMENT OR THE PARTS CONTAINED THEREIN, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND DWC EXPRESSLY DISCLAIMS ALL WARRANTIES NOT STATED HEREIN.

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- Physical damage to the equipment or its parts that does not involve defects in design, material or workmanship, including damage by impact, liquids, temperature, or gases.
- Damage to the equipment or its parts caused by lightning, static discharge, voltage transients, or application of incorrect supply voltages.
- Defects or failures caused by unauthorized attempts to repair or modify the equipment.
- Defects or failures caused by Buyer abuse or misuse.

Return of Equipment - Domestic: To obtain performance of any obligation under this warranty, the equipment must be returned freight prepaid to the Customer Service Department. Datron World Communications Inc., 304 Enterprise Street, Escondido, California 92029. The equipment must be packed securely. DWC shall not be responsible for any damage incurred in transit. A letter containing the following information must be included with the equipment.

- 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; and
- e. Telephone or fax number where buyer may be contacted.

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

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Parts Replacement: The following instructions for the supply of replacement parts must be followed:

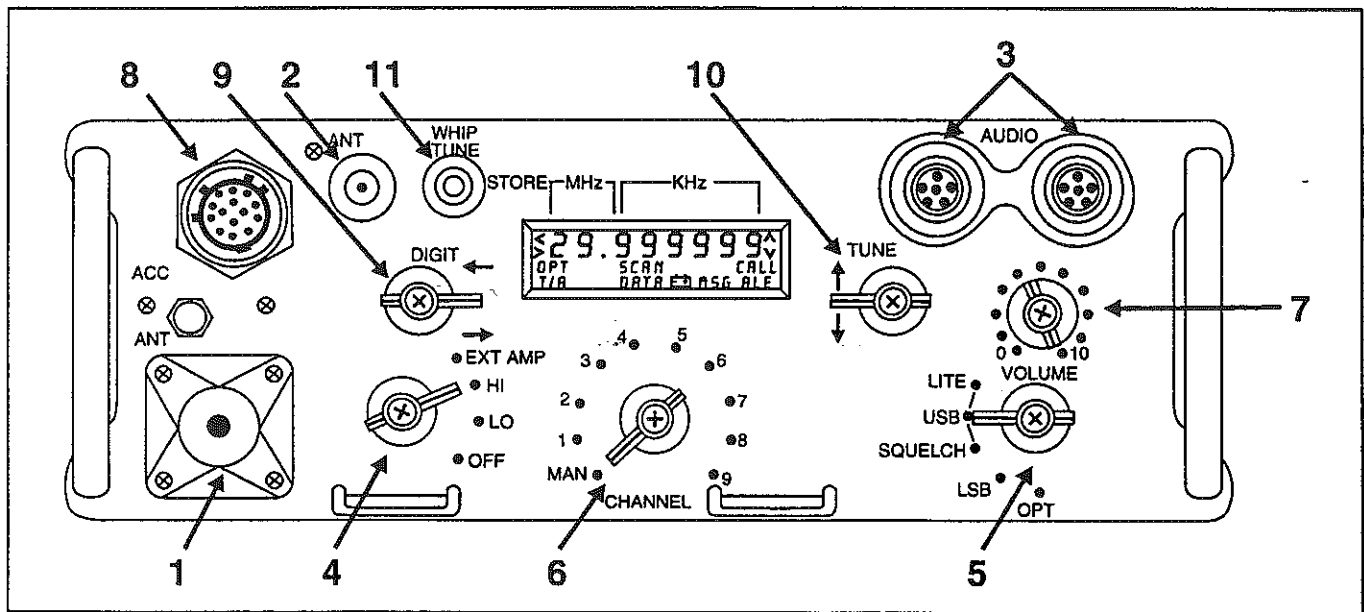
- a. Return the parts prepaid to "Parts Replacement" Datron World Communications Inc., 304 Enterprise Street, Escondido, California 92029; and
- b. Include a letter with the following information:
 1. part number;
 2. serial number and model of equipment; and
 3. date of installation.

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 previously will be considered out of warranty.

Remedies: Buyer's sole remedies and the entire liability of DWC are set forth above. In no event will DWC be liable to buyer or any other person for any damages, including any incidental or consequential damages, expenses, lost profits, lost savings, or other damages arising out of use of or inability to use the equipment. 1/96

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CONDENSED OPERATING INSTRUCTIONS FOR RADIO SET PRC1099A



1. TO OPERATE SET

- Install the whip antenna in the antenna socket (1) OR attach 50-ohm antenna feedline to BNC antenna connector (2).
- Attach the handset to either audio connector (3). NOTE: Remote handset attaches to the right audio connector only when 1099RCH option is installed.
- Turn the power switch (4) to the power level for the type of operation desired. (HI gives maximum range.)
- Turn the function switch (5) to desired sideband.
- Select the desired channel number (6). NOTE: Front-panel CHANNEL switch must be in "MAN" to use remote handset channel switch.
- Turn the VOLUME control (7) to "5."
- Press the handset push-to-talk switch and talk into handset. Release to listen.
- Adjust volume control (7) for desired sound level.

2. TO RETUNE ANTENNA

- Depress the WHIP TUNE (11) button (do not hold down). The antenna-tuning information is updated and stored in memory.

3. TO CHANGE DISPLAYED CHANNELS

- Set the CHANNEL switch (6) to the desired position.
- Select the desired channel with the TUNE switch (10). Each channel position can display any channel 00-99.

4. TO CHANGE CHANNEL FREQUENCY

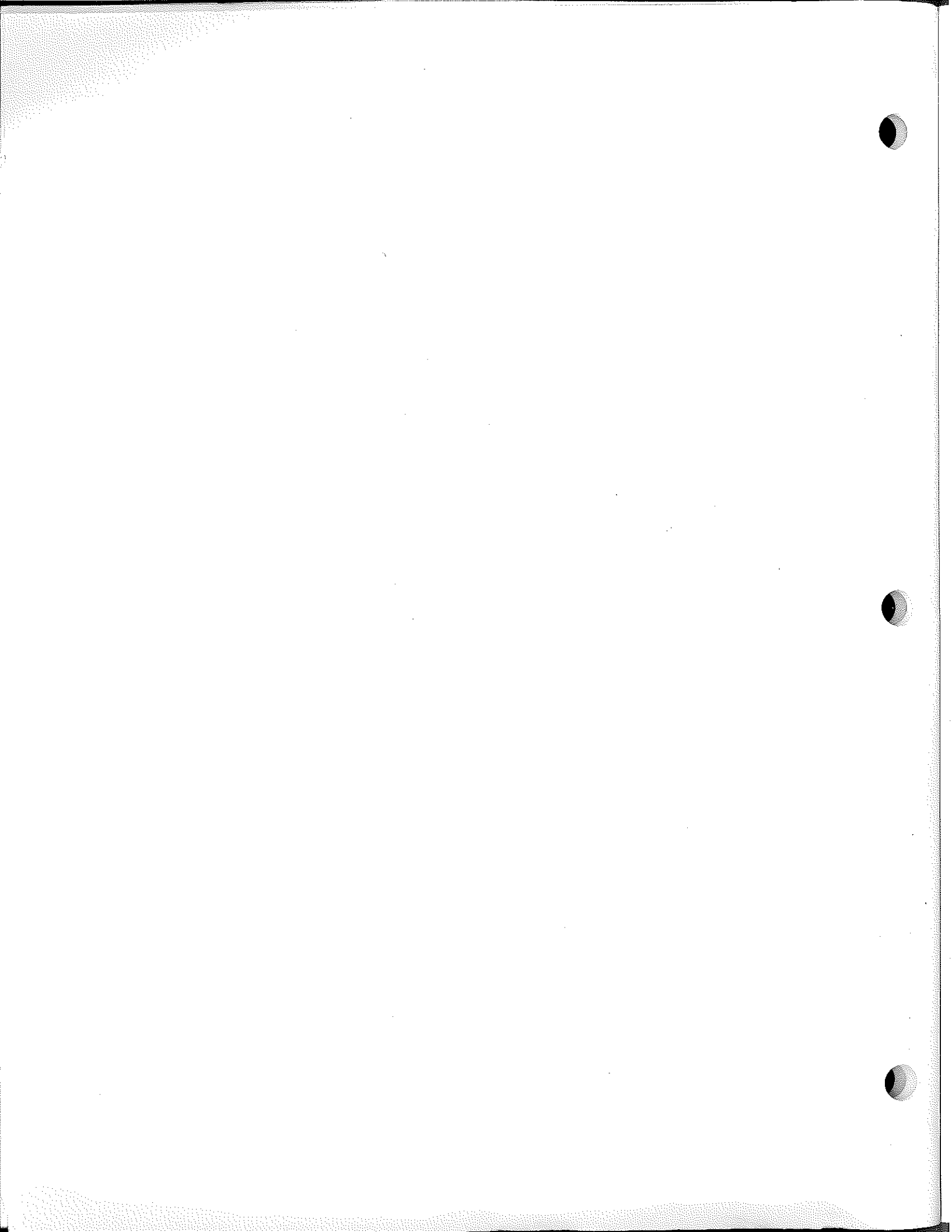
- For simplex operation, turn the DIGIT switch (9) UP once to display the channel frequency.
- Hold the WHIP TUNE button (11) down and select the digit to change with the DIGIT switch (9). Change each digit with the TUNE switch (10).
- For semi-duplex operation, enter the desired receive frequency by selecting the digit to be changed with the DIGIT switch (9) and changing the digits with the TUNE switch (10). The transmit frequency will be the original frequency.

5. SCAN CHANNEL FEATURE

- Select the SCAN icon using the DIGIT switch (9)
- Use the TUNE switch (10) to enter the sub-menu.
- Press the WHIP TUNE button (11) again to enter the SCAN SELECT sub-menu.
- Use the TUNE switch (10) to select SCAN ON, enter with WHIP TUNE (11).
- Select position 9 using CHANNEL switch (6) to initiate scanning.
- Refer to section 3-12.2 for instructions to modify scan channels.

NOTES

- LOW BATTERY - Battery icon illuminated.
- ACCESSORY CONNECTOR (8) - Cap must be connected whenever accessory connector is not in use.
- RF OUTPUT NORMAL - Transmit sidetone is heard.



OPERATOR'S & ORGANIZATIONAL MAINTENANCE MANUAL
RADIO SET PRC1099A

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FIGURE 1-1.
Radio Set PRC1099A in Manpack Operation with Antenna AT-271A and Support AB-591 installed.

CHAPTER 1 INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual describes Radio Set PRC1099A and covers its installation, operation, and operator's organizational maintenance.

b. Information on technical service and the maintenance of the PRC1099A is contained in the technical manual TW-PRC1099A-MS1.

Section II. DESCRIPTION & DATA

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

a. Radio Set PRC1099A is a high-frequency, manpack-portable, single-sideband (SSB) transceiver used to provide long-range, two-way, voice, CW, and data communication.

b. The Radio Set PRC1099A may also be used as part of the Transworld RA100, RA400/5, or RA1000/5 high power fixed, portable, and mobile stations.

c. The Radio Set PRC1099A can communicate with most HF SSB radios operating within the 1.6- to 30-MHz range.

d. The PRC1099A can be used in conjunction with the other equipment (1) through (10) below.

(1) Long-wire antennas can be used in place of the whip antennas, using the internal tuner to extend the communication range.

(2) Coaxial-fed 50-ohm antennas such as resonant dipoles, broadband antennas and directional antennas can be used in place of the whip antenna for extended range or where directional transmission/reception is desired.

(3) The antenna tuner RAT100 can be used with the PRC1099A in mobile installations and other applications where the antenna must be located away from the transceiver.

(4) The PRC1099A can be operated from the ac power supply PRC-PS in place of the internal battery.

(5) The PRC1099A can be used with high power amplifiers RA100 (100 W), RA400/5 (400 W), or RA1000/5 (1000 W) and can provide automatic control of these amplifiers.

(6) Remote control of the PRC1099A can be provided by the PRC1099A-ECU extended control unit and the PRC1099A-RCU remote control unit.

(7) Loudspeaker electromagnetic LS-549/PRC can be used with the PRC1099A to monitor radio reception.

(8) The PRC1099A can be used with the morse key KY562 for telegraphy.

(9) The PRC1099A can be used with secure voice equipment designed for HF SSB operation.

(10) The PRC1099A can be used for digital data (burst or RTTY) transmission and reception.

1-3. Technical Characteristics

Frequency Range: 1.6-30 MHz. (10-Hz resolution)

Memory Channels: 100. (Field programmable)

Types of Transmission and Reception:

Transmission -	Voice - (300-2700 Hz) SSB, USB/LSB. CW - semi break-in. Data - with external modem.
Reception -	Voice - (no squelch, noise immune squelch). CW Data - with external modem.

Security Equipment: Equipment must be designed for HF/SSB.

Transmission and Reception Power Requirements:

Transmission -	12.0 - 15 Vdc. High Power - Avg. voice 1.5 A. Low Power - Avg. voice 1.0 A.
Reception -	12.0 - 15 Vdc. Squelched 190 mA typical. Unsquelled 220 mA typical.

Type of Modulation: Single Sideband - USB/LSB.

Transmitter Power Output: Selectable - 5 W, 20 W.

Type of Squelch: Noise immune.

Types of Antennas:

Whip Antenna -	Antenna AT-271A, 10-ft long, multisection whip with AB591 Flexible Support.
Long Wire -	25-ft, 50-ft, 100-ft or random length long wire.
50- Ω Antenna -	50- Ω coaxial fed antennas with VSWR 3:1 or less.

Power Source:

Lithium battery, sealed lead-calcium battery (rechargeable), or PRC-PS ac power supply.

Battery Life:

High power 50 hours (9:1 receive-transmit ratio) with BA6598/U.

1-4. Items Used with PRC1099A (Figure 1-2)

The following components are normally used with the PRC1099A in the manpack configuration. Dimensions and weights of components are provided in paragraph 2-1. A

battery is required to operate the PRC1099A. Suitable battery types and their characteristics are shown in Table C-1 of Appendix C.

<u>Trans World Part No.</u>	<u>Item</u>
PRC1099A	Radio Set PRC1099A (includes battery box)
	Antenna AT-271A/PRC
	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 PRC1099A consists of the transceiver and battery box described in (a). The normal accessory components are described in (b).

a. TRANSCEIVER, RADIO PRC1099A.

The PRC1099A 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 PRC1099A 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 which is contained in the battery box.

(2) The CY-2562 battery box 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 which prevents battery movement.

(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), thus preventing 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-271A/PRC

The AT-271A 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 proved by a spiral spring in the base section.

(2) Support, Antenna AB-591

The AB-591, which has semi-flexible, tubular construction, is used as the main support for the AT-271A. The pin at the base of the support activates the internal antenna tuner.

(3) Harness, Electrical Equipment ST-138.

The ST-138 is used to secure the PRC1099A so that it can be carried on the operator's back.

(4) Bag, Cloth CW-503

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

(5) Handset H-250/U

The H-250/U contains a dynamic microphone and receiver for transmitting and receiving signals (Figure 1-4). A push-to-talk switch is mounted in the handle. The connecting cord is retractile and terminates in a five-pin connector.

The PRC1099A may also be used with Handset H-189/GR.

1-6. Battery (Figure 2-1)

a. Battery, Lithium BA5598/U or BA6598 may be used to operate the PRC1099A. The battery is provided with a female connector to mate with the male connector on the PRC1099A. The battery case will hold a spare BA5598/U or BA6598 battery.

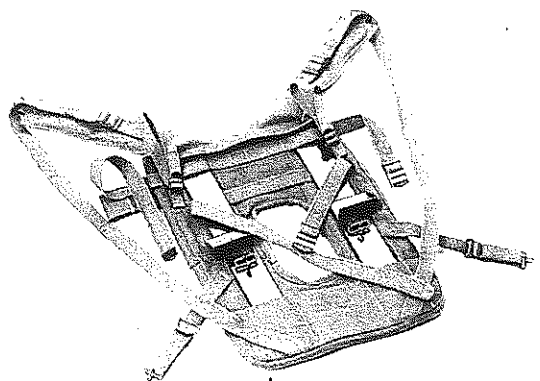
b. Battery, Sealed Lead-calcium BB-LA6 12V, 6Ah, or BB-LA3 12 V, 3 Ah may also be used with the PRC1099A. These batteries can be recharged after use.

c. Battery, Dry BA4386/U may also be used with the PRC1099A. Because of the limited current capability, restrict the power output to 5 W when using this battery.

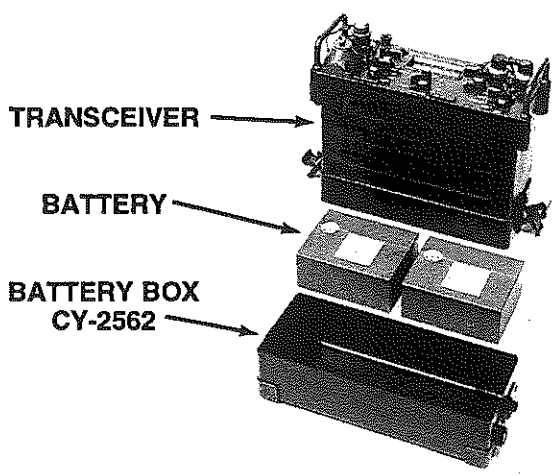
CAUTION

Never recharge the lithium or dry batteries. This could cause an explosion resulting in severe damage to the transceiver and danger to personnel.

d. The PRC1099A may be used with other types of batteries, such as NiCad, with an output voltage of 12-15 Vdc.



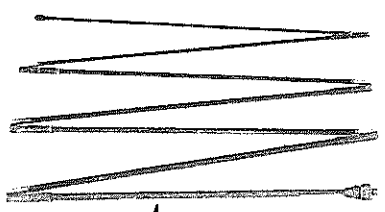
HARNESS, ELECTRICAL EQUIPMENT ST-138



TRANSCEIVER

BATTERY

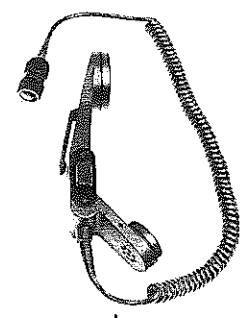
**BATTERY BOX
CY-2562**



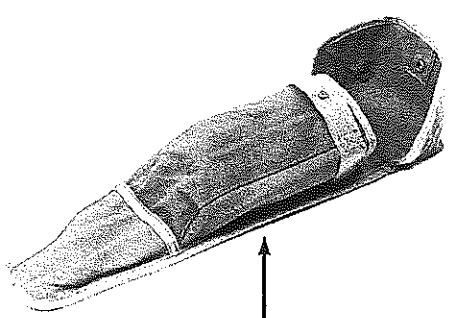
ANTENNA AT-271A



SUPPORT ANTENNA AB-591



HANDSET H-250/U



BAG, COTTON DUCK CW-503

**FIGURE 1-2.
Radio Set PRC1099A, Components.**

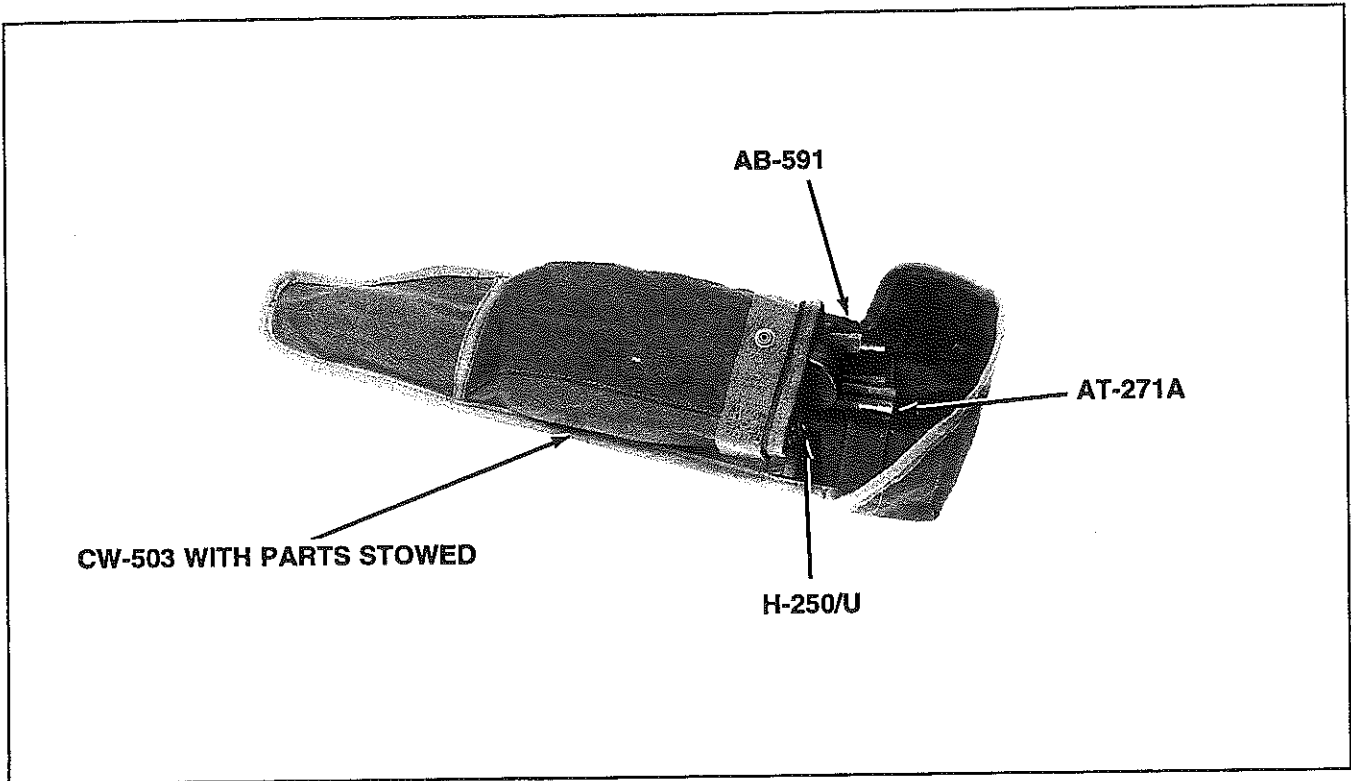


FIGURE 1-4
Bag, Cotton Duck CW-503, with Antennas and Handset Stowed.

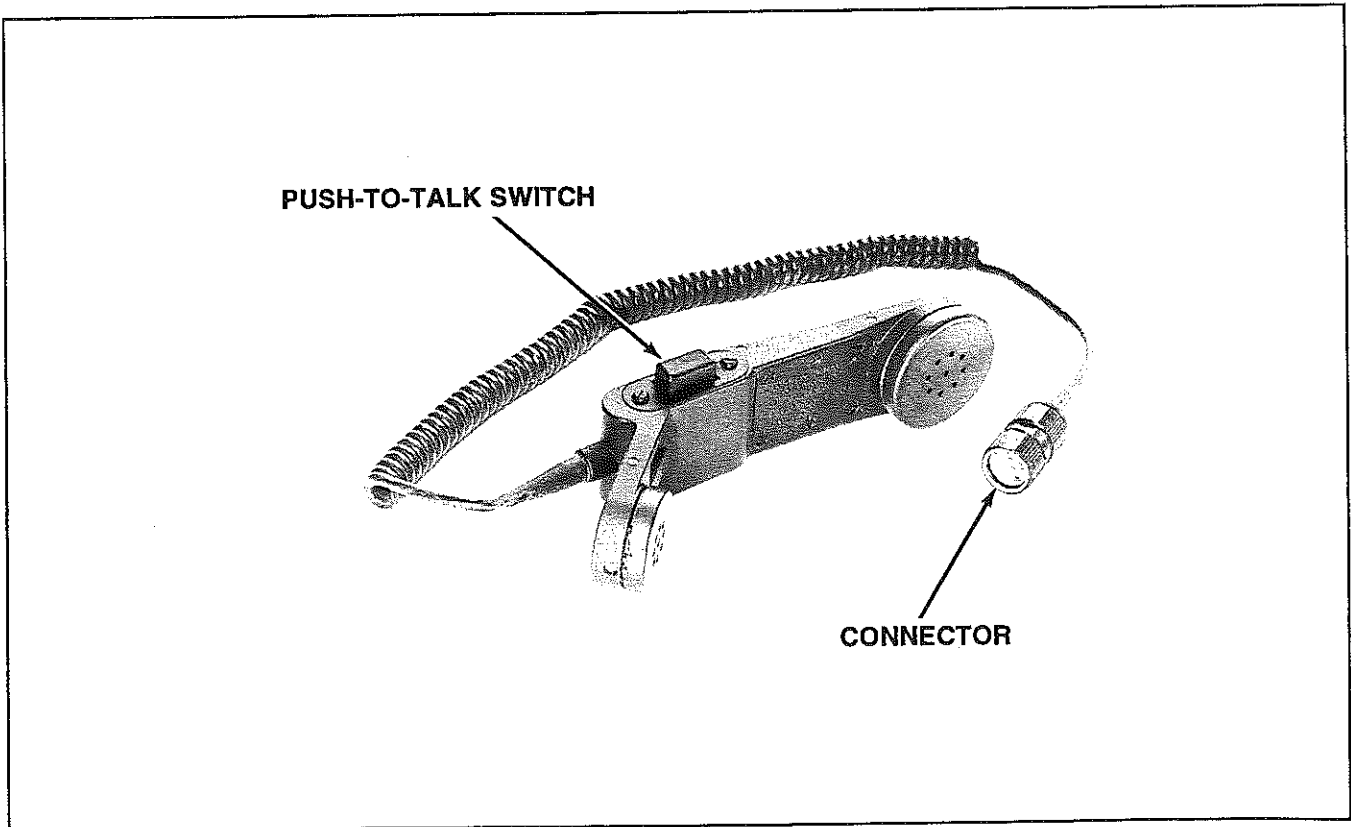


FIGURE 1-3.
Handset H-250/U.

CHAPTER 2 INSTALLATION

2-1. Unpacking

a. Packaging Data. The PRC1099A 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 (See table below).

Component	Overall Dimensions (in.)			Volume (cu in.)	Weight (lb)
	Height	Width	Depth		
Transceiver, Radio PRC1099A	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	9.00	0.75	0.75	50	0.75
Antenna AT-271A	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 which may have occurred during shipment. Check all accessories against the packing list.

2-3. Siting

The PRC1099A operates in the high-frequency spectrum where the signals are reflected by the ionosphere and line-of-sight is not required. Since the signal may be absorbed by tall buildings or vegetation, the operating site should be clear of obstacles directly in the line of communication. A good ground or counterpoise will extend the operating range, and it is preferable to site the transceiver where a ground can be connected to the ground terminal. If possible, avoid locations near sources of electrical interference, such as power or telephone lines, electric motors, or gasoline engines.

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

- a. Place the PRC1099A 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.

CAUTION

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

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.

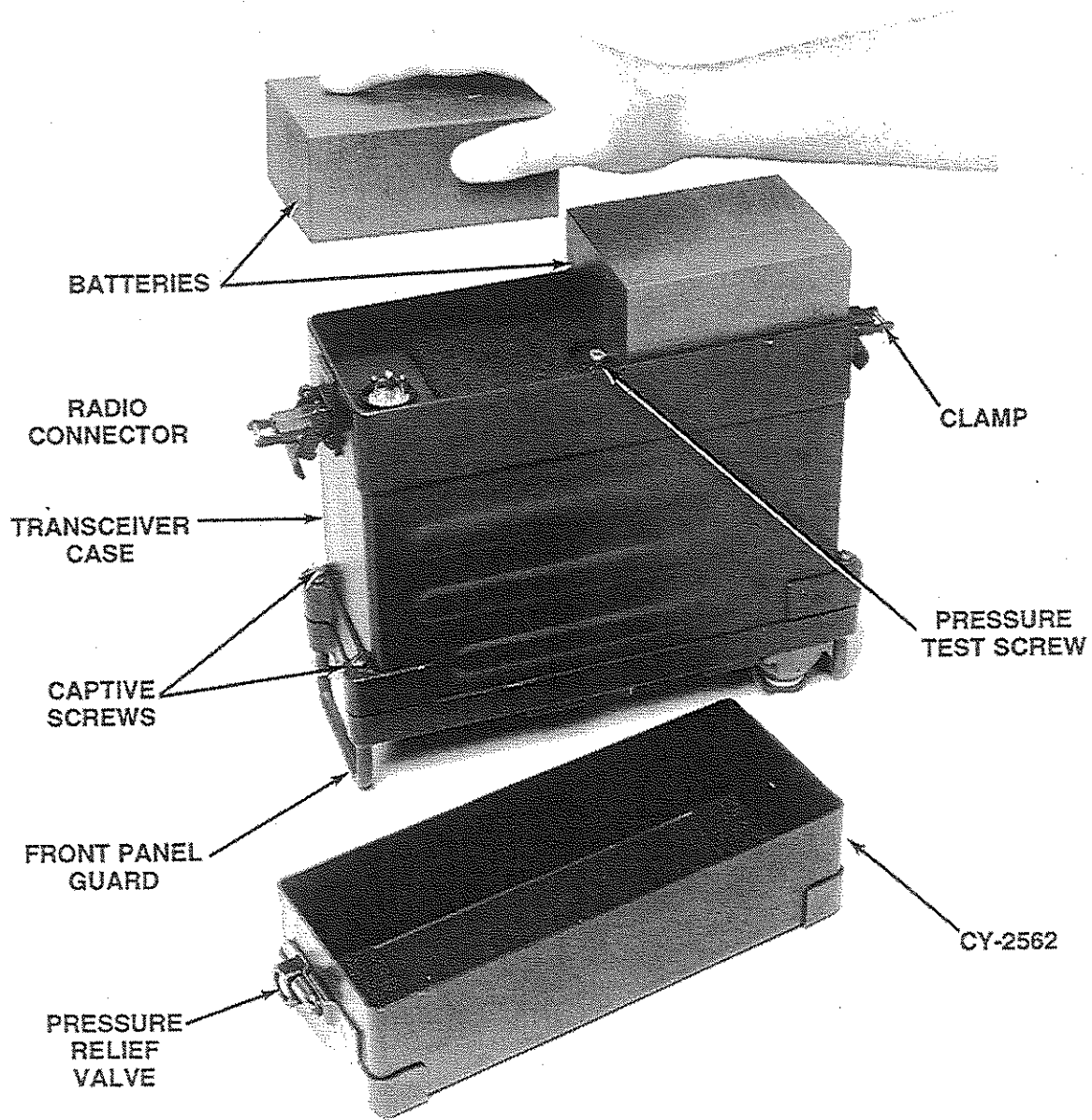


FIGURE 2-1.
Installation of Battery in Transceiver.

(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, and then down through the end slot. (Figure 2-2).

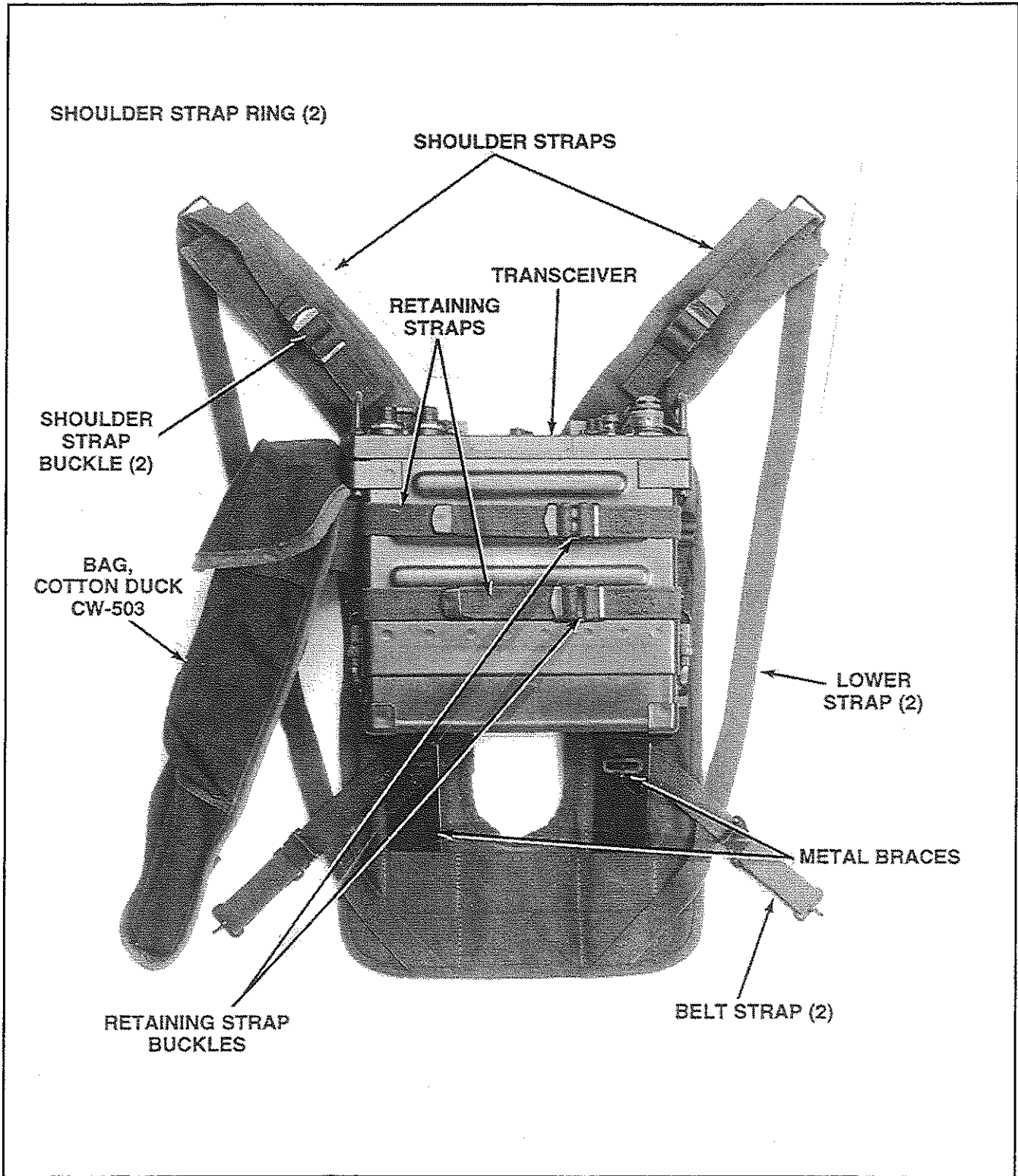


FIGURE 2-2.
Installation of Transceiver in ST-138.

(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 Antenna ANTENNA AT-271A

- a. Remove the cover from the ANT mount (Figure 3-1).
- b. Screw Support, Antenna AB-591, into the ANT mount.
- c. Extend the AT-271A by holding the base section (the heaviest section) and carefully whipping it outward. If all sections are not secure, insert the sections by hand.

d. Secure the extended AT-271A into the AB-591.

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 result in the threaded portion remaining in the mount. In addition, the end of the mount activates an internal switch which activates the automatic antenna tuner. 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.

LEFT LOWER STRAP



LEFT SHOULDER STRAP

FIGURE 2-3.
Installing PRC1099A for Manpack Operation.

CHAPTER 3 OPERATING INSTRUCTIONS

CAUTION

Battery power should be between 12.0 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 PRC1099A, 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, 5W.
	HI	Turns transceiver on - High Power, 20W.
	EXT AMP	Enables the external amplifier keyline when connected.
FUNCTION Switch	USB	Transceiver operates on the normal (upper) sideband, no squelch.
	SQUELCH	Receiver squelched — no background noise. Opens when signal received. USB operation.
	LSB	Transceiver operates on opposite (lower) sideband.
	LITE	Spring loaded position backlights frequency display. USB operation.
	OPT	Normally data mode. AME option — Transceiver operates in compatible AM (AME) mode, no squelch.
CHANNEL Switch	MAN	Selects the manual tune position. Front-panel channel switch must be in the MAN position to use optional remote handset channel switch.
	1-9	Selects pre-set channels and frequencies.
Remote CHANNEL Switch (Remote handset only)	IC	Selects the manual tune position. Remote channel switch must be in the IC position to use front-panel channel switch.
	1-9	Selects preset channel frequencies.
DIGIT Selection	←	Spring Loaded - selects digit to be tuned; right to left.
	→	Spring Loaded - selects digit to be tuned; left to right.
TUNE Control	↑	Spring Loaded - increments frequency higher in 1-digit steps.
	↓	Spring Loaded - increments frequency lower in 1-digit steps.
WHIP Tune	DEPRESS (momentarily)	Activates automatic antenna tuner to tune whip or long wire antennas.
STORE	DEPRESS (Hold)	Permits resetting frequency or channels on switch positions MAN - 9.
BITE	DEPRESS (Hold) (while turning transceiver on)	Activates BITE (Built-In-Test-Equipment) (Refer to 3-7).
Liquid Crystal Display		Displays channel frequency and information icons.
VOLUME Control		Varies receiver and sidetone volume.
Remote VOLUME Control (Remote handset only)		Varies receiver and sidetone volume to earphone. Lowest setting turns earphone off.
AUDIO Connector (2)		Provides connection for handset or audio device.
ANT Mount		Provides connection for antenna AT-271A or Long Wire Adaptor.
ANT Connector		Provides connection for fixed base or 50Ω vehicular antenna, or external power amplifier.
POWER Connector		Provides connection for external power supply when PRC1099A is used as part of vehicular radio set configurations. When the connector cover is removed, the PRC1099A is disconnected from the battery pack. Rechargeable batteries may be recharged through this connector. Provides control for external accessories such as power amplifiers.

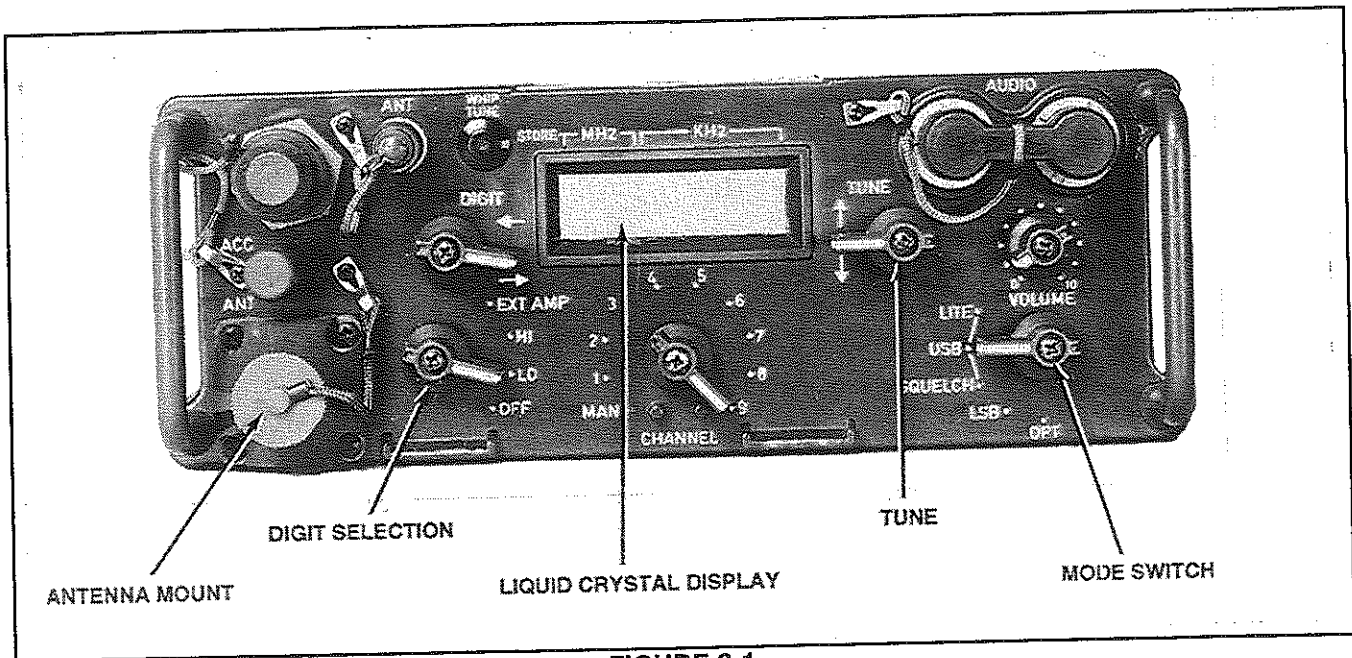


FIGURE 3-1.
Transceiver Radio PRC1099A, Controls, Indicators, and Connectors.

3-2 Presetting Channels and Frequencies

The PRC1099A will store up to 100 different frequencies in channel numbers 00 to 99. Each of the CHANNEL switch positions on the front panel is capable of displaying any one of the 100 channels stored in memory. While the front-panel display is only capable of displaying 10 channels at a time, the transceiver is capable of utilizing all 100 channels. These other channels can be used in the scanning mode or with other options.

a. PRESETTING SWITCH POSITIONS MAN - 9

(1) Turn the channel selector to the switch position where the channel is to be stored.

(2) Hold the WHIP TUNE button down, and with the TUNE control, select the channel number where the frequency is to be stored. The TUNE control will scroll through the channel numbers 00-99. It is possible to enter any frequency into any channel and to have any channel displayed at any CHANNEL selector switch position.

(3) Once the channel number has been selected, move the DIGIT control up to display the frequency stored in the selected channel. When the digit selected by the DIGIT control is in the field of 8 alpha-numeric characters, the alpha-numeric characters will indicate channel frequency. When the digit selected is NOT in the field of 8 alpha-numeric characters, the channel number will be displayed.

(4) Hold down the WHIP TUNE button while selecting digits with the DIGIT control to change the channel frequency. Use the TUNE control to select the frequency numbers.

(5) Enter the transmit frequency using the procedure described in steps 3-4 to operate in HALF-DU-

PLEX. The receive frequency is entered the same way, except DO NOT press the WHIP TUNE button. When the transceiver is keyed, the radio will change to the transmit frequency, and when the transceiver is unkeyed, the radio will revert to the receive frequency.

b. MEMORY DUMP FEATURE

To erase the frequencies in all 100 channels, simply hold the DIGIT switch down, hold the TUNE switch up, and turn the radio from off to on. This will enter the Transworld test frequencies in channel 00-09 and 2 MHz in channels 10-99.

3-3. Receiver Fine Tune

The receiver may be fine tuned by incrementing the last digit using the TUNE control (do not press the WHIP TUNE button). The receiver frequency offset is deleted from memory when a new channel is selected.

3-4. Operating Procedure

The audio accessories may be plugged into the following audio jacks:

Accessory	AUD-L	AUD-R
RCH Remote Control Handset		X
H-250/U Handset	X	X
H-189/U Handset	X	X
H3M Headset Boom Microphone	X	X
KYR CW Key	X	
PRC-Selcall	X	
Data Terminal	X	

a. Set the Power Switch to HI or LO (refer to 3-4h).

b. Set the Function Switch to USB. A background noise should be heard in the handset.

c. Set the Channel Switch to the desired position (refer to Section 3-2, 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 background noise in the handset can be eliminated by turning the function switch to SQUELCH. This also reduces the receiver current drain.

h. The PRC1099A has two transmitter power output levels - High and Low. Using low power will reduce battery drain.

3-5. Antenna Tuning Procedure

a. The antenna tuning procedure is fully automatic and is activated by a momentary depression of the WHIP TUNE switch. (Do not hold switch down as this is a dual function switch.) A tone will be present in the handset during tune cycle. A pulsed tone at the end of the tune cycle indicates that the tuner has not been able to match the antenna correctly.

b. The tuning information is stored in memory and is automatically selected when the channel is changed.

c. The automatic antenna tuner will only operate when the AB-591 support or the LWA Long Wire Adapter is installed.

d. The antenna tuning varies considerably according to the positioning of the transceiver and the location. The tune information should be updated frequently. Always retune the antenna if the communications are unsatisfactory.

3-6 Stopping Procedure (Figures 1-2 and 1-3)

a. Set the Power Switch to OFF to turn off the transceiver.

b. Disable the AT-271A Whip Antenna as follows (if it was used):

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

(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 from the antenna mount.

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

3-7. 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:

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

b. Switch to several different channels. If the interference is present on all channels, it is probably caused by a local noise source. If the jammer is located at a considerable distance, the propagation conditions may mean that it is not possible to jam on all frequencies.

3-8. Anti-Jamming

When jamming is first noted, try the following procedures:

a. Operate at low power if satisfactory communications can be achieved. This makes it difficult for the jamming source to intercept the transmissions and determine the jamming frequency.

b. Change the channel frequency. The PRC1099A 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. Two typical procedures are described below:

(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, 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.

3-9. LSB - Lower Sideband Operation

When LSB is selected on the mode switch, the sidebands are inverted in the transmit and receive modes. Switching to LSB (at both transceivers) may be used to avoid interference. Always revert to USB after using LSB, as wanted calls cannot be received while operating in the LSB mode.

3-10. CW Operation

The PRC1099A will operate in the CW mode (telegraphy) when the key is installed in one of the audio connectors. The transceiver automatically switches to the CW mode and semi break-in keying is used. This means that the transmitter is held on when the key is depressed and will automatically return to receive when there is a short break in the transmission. A receiver sidetone is provided to monitor the keying.

3-11. System Application

The PRC1099A can communicate with other HF SSB stations in the 1.6 to 30-MHz frequency range. The single-sideband mode cannot be received by AM receivers.

3-12 Radio Menu Explanations

The following is an explanation for each of the standard PRC1099A display menus. The number in parentheses after each menu name refers to the corresponding menu listed on the menu flow chart shown in Figure 3-2.

3-12.1 Scan Icon

The following menus appear under the SCAN icon.

3-12.1.1 Scan Select (1)

Use Scan Select to energize the channel scanning feature of the PRC1099A. Once energized, the radio begins to scan the channels whenever the channel select switch is tuned to channel 9. Enter the channels to be scanned using the following two menus.

3-12.1.2 Scan Group Number (2)

Use Scan Group Number to select the group of channels to scan. A maximum of ten scan groups can be retained in memory.

3-12.1.3 Modify Scan Group (3)

Use Modify Scan Group to enter a scan group or modify a scan group that is already entered. All channels in the radio, 00 through 99, are displayed one at a time. Those channels that are already selected in the scan group will have an asterisk, "*", next to the channel number. Press the WHIP TUNE button to select or unselect a channel for the scan group.

3-12.1.4 Scan Rate (4)

This menu is used to select the length of time the radio will remain at each scanning channel during the scan cycle. The amount of time is selectable from 0.5 seconds to 64.9 seconds.

3-12.1.5 Scan Hold (5)

This menu is used to select the amount of time the radio remains at a particular channel, after a link, during the scan cycle.

3-12.1.6 Voice Detect Select (6)

Use Voice Detect to detect voice communication of channels that are scanned and to stop at those channels once voice communications have been detected.

3-12.1.7 Voice Detect Hold (7)

When voice detect is enabled, the radio will automatically stop scanning on channels where voice communications are detected. This menu is used to set the amount of time the radio will remain at that channel, without hearing more voice communications.

3-12.2 Data Icon

The following menus appear under the DATA icon.

3-12.2.1 Source Select (8)

Use Source Select to select the source from which the data to the accessory connector is originating. The sources are either the keyfill device or some remote peripheral.

3-12.2.2 Baud Rate (9)

Use Baud Rate to select the baud rate of the data to and from the radio accessory connector (75 to 9600 baud).

3-12.2.3 Data Bit (10)

Use Data Bit to select the number of data bits used to communicate through the accessory connector. The number of data bits are selectable at either 7 or 8 bits.

3-12.2.4 Stop Bit (11)

Use Stop Bit to select the number of stop bits which are required to communicate through the accessory connector. The number of stop bits are selectable at either 1 or 2.

3-12.2.5 Parity (12)

Use Parity to select the parity of the data. The parity can be E (even), O (odd), or N (none).

3-12.2.6 Flow Control (13)

Use Flow Control to control the character flow-control protocol of the input and output data. Flow control refers to XON and XOFF characters that are inserted into the stream of data as flow control markers to mark the beginning and end of data streams.

3-12.2.7 Radio Address (14)

This control is used to select the address number of this unit, when more than one radio are connected on the same data bus.

3-12.3 Transadapt ("TA") Icon

The following menus appear under the TA icon.

3-12.3.1 Rx Address (15)

The RX Address is the address the receiver station responds to. The receiver address is a number from 001 to 255.

3-12.3.2 Bit Error Rate Number (16)

Use Bit Error Rate Number to select the minimum bit error rate the radio will allow for a valid link.

3-12.3.3 Call Select (17)

Call Select is used to select which type of call is to be made, either Transadapt or Transcall.

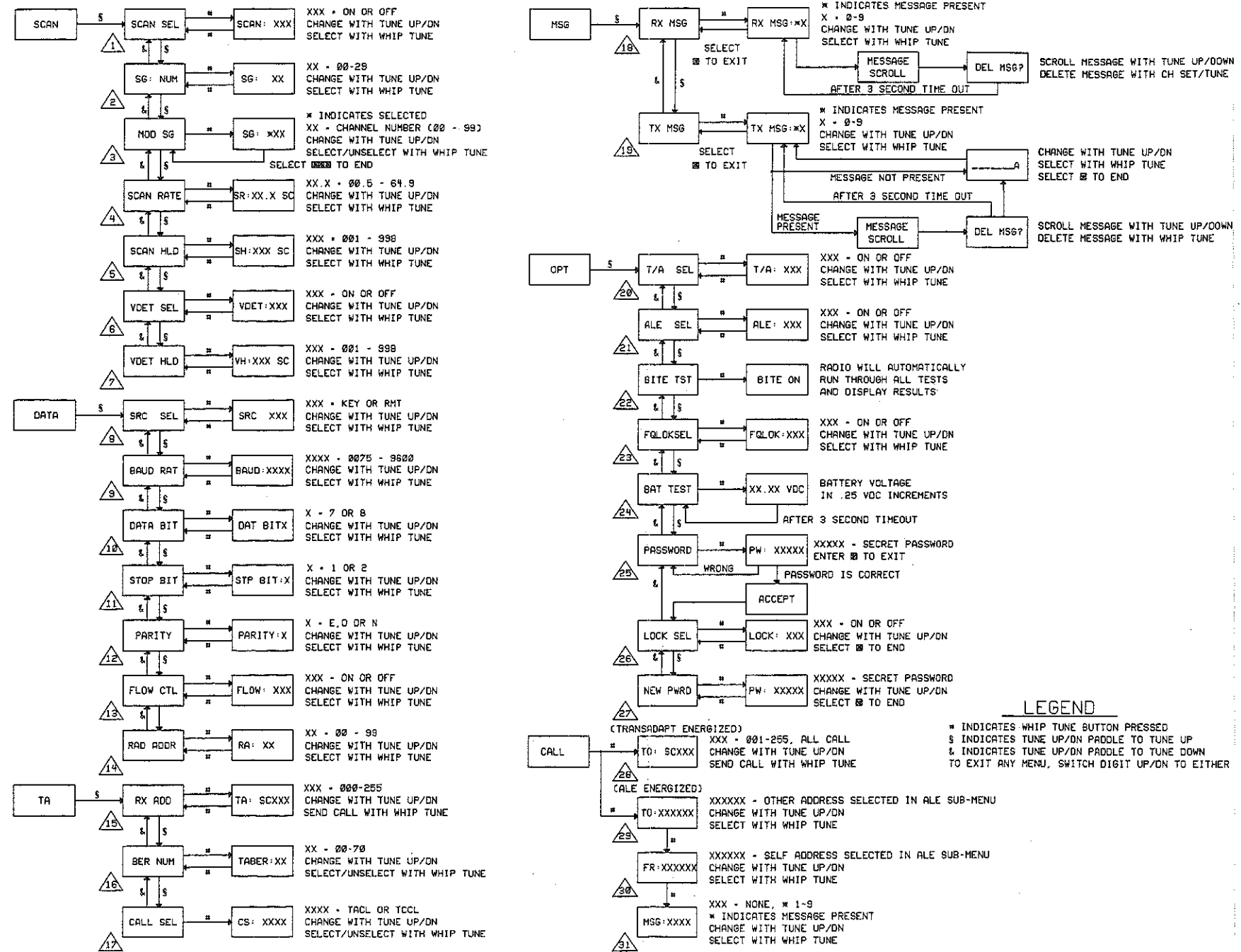
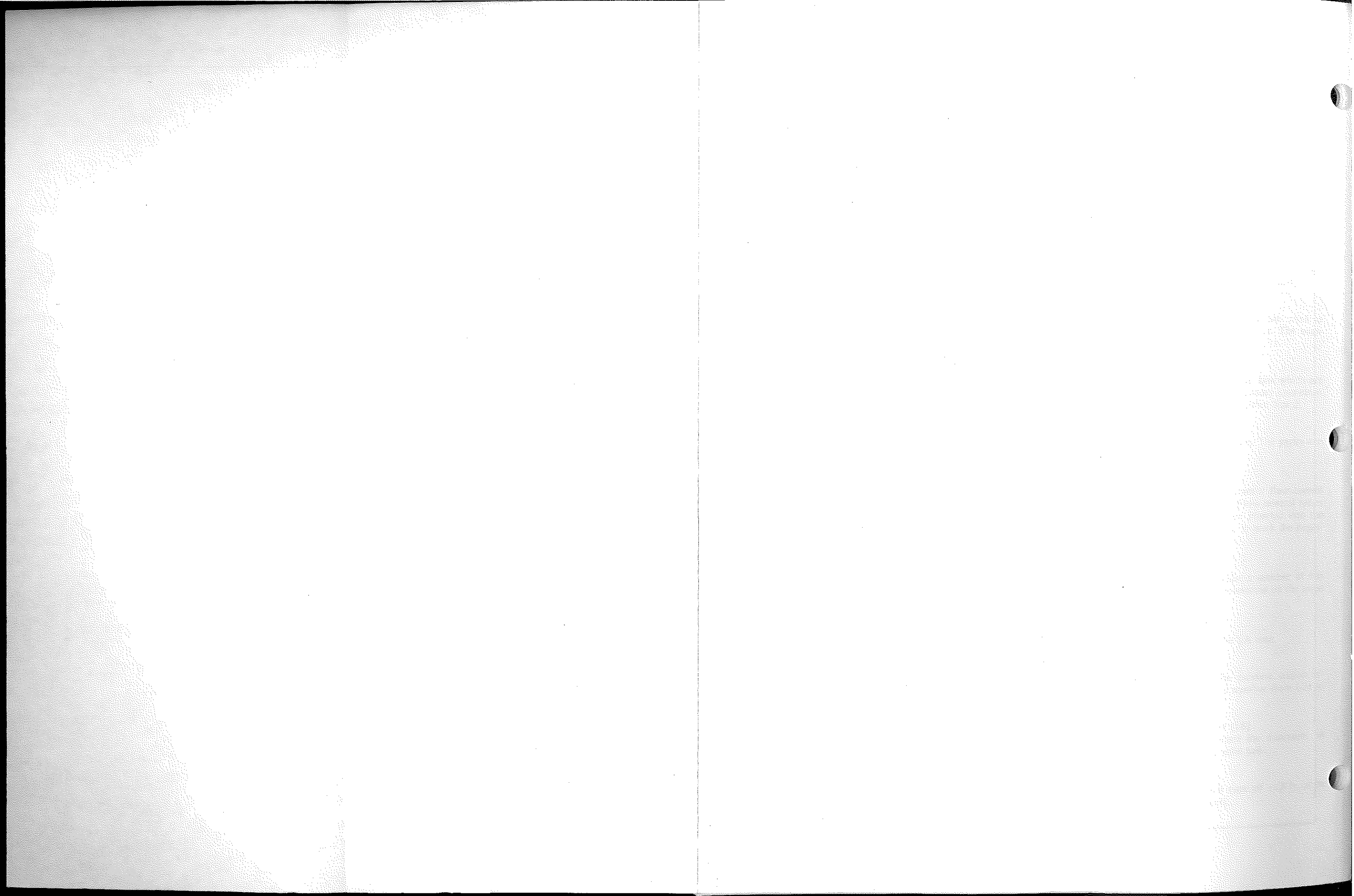


FIGURE 3-2.
PRC1099 Menu Flow Chart.



3-12.4 Message ("MSG") Icon

The following menus appear under the MSG icon.

3-12.4.1 Rx Message (18)

Use RX Message to read messages received from other stations. Select the message number to be read, then scroll through the message.

3-12.4.2 Tx Message (19)

Use TX Message to compose messages to send with the ALE message. Select the message number assigned to the message, and compose the message using the TUNE switch and the WHIP TUNE button.

3-12.5 Option ("OPT") Icon.

The following menus appear under the OPT icon.

3-12.5.1 Transadapt Select (20)

Use Transadapt Select (T/A SEL) to energize the Transadapt option, when the option is installed. If the option is not installed, this menu will not appear. If both the Transadapt option and the ALE option are installed, energizing one option will automatically de-energize the other.

3-12.5.2 Automatic Link Establishment Select (21)

Use ALE SELECT to energize the ALE option, when the option is installed. If the option is not installed, this menu will not appear. If both the Transadapt option and the ALE option are installed, energizing one option will automatically de-energize the other.

3-12.5.3 BITE Test (22)

Use BITE to activate the BITE function. Once energized, the BITE function takes control of the radio and performs all the necessary checks before returning control to the operator. After BITE is completed, the result is displayed on the front panel.

3-12.5.4 Frequency Lock (23)

Use FQLOK SEL (frequency lock) to prevent the radio channel frequencies from being changed by accident. Once energized, the radio channel frequencies cannot be changed, until de-energized.

3-12.5.5 Battery Test (24)

Use this menu to check the voltage of the battery. The battery is checked in increments of 0.25 Vdc. "Batt Bad" indicates the battery is either below 10.5 or above 15 Vdc.

3-12.5.6 Password (25)

Use this menu to enter the password to allow access to all menus. If the correct password (five letter maximum) is entered, the following menus will be accessible, if an incorrect password is entered, access will be denied. If no password has been entered using New Password menu 3-12.1.8, the following menus will be accessible and "NONE" will appear on the display.

3-12.5.7 Lock Select (26)

Use the lock select menu to lock out access to the DATA and ALE option sub-menus (if desired). With the lock ON, the user cannot access any menu under the DATA and ALE icons. This prevents unauthorized alterations of the settings in those two menus.

3-12.5.8 New Password (27)

Use this menu to enter a new password or to change an existing password. If no password exists, the menu described in section 3-12.1.6 will indicate "NONE." That menu will only allow access when the same password is entered that was entered here. Enter "⊗" only to remove password.

3-12.6 CALL Icon

The following menus appear under the CALL icon.

3-12.6.1 Transadapt Call (28)

When the Transadapt option is installed and energized, the Transadapt Call menu appears. (The menus described in sections 3-12.6.2 through 3-12.6.4 will not appear.) Use Transadapt Call to enter the address of the station to be called. The address is a number from 001 to 255 and is entered using the TUNE switch and WHIP TUNE button. If the address 000 is entered, an "all-call" transmission will result in which every station that hears the transmission will reply.

3-12.6.2 ALE Call (29)

When the ALE option is installed and energized the ALE Call Menu appears. (The menu described in section 3-12.6.1 will not appear.) Use ALE Call to enter the address of the station to be called. An alpha-numeric address up to 15 characters in length is allowed.

3-12.6.3 From Address (30)

Use From Address to include the address of the calling station, which is required in an ALE message. The "From" station address can be an alpha-numeric address up to 15 characters in length.

3-12.6.4 Message Number (31)

Use Message Number to indicate which message, if any, is to be sent with an ALE transmission. The messages to be sent are entered or modified using the menu described in section 3-12.4.2. Enter the message number, or if no message is to be sent, select "none".

3-13. Compatible AM Option Operation (1099 AME)

This mode is an option and is activated by switching the mode switch to the OPT position. This will provide a signal that is intelligible to an AM station.

3-14. Internal Battery Charger Option Operation (1099 IBC)

a. Connect the Battery Charger dc power cable (C991683) to a 12-30 Vdc power source.

b. Connect the other end of the cable to the ACC connector of the PRC1099A.

3-15 TRANSADAPT Option Operation (1099TA/TC)

3-15.1 Enabling Transadapt

To enable the PRC1099A TRANSADAPT option, select the OPTION icon using the DIGIT switch, hold the TUNE switch up momentarily and the display will change to: "T/A SEL." Press the WHIP TUNE button and "T/A XXX" will be displayed. XXX will be either ON or OFF. Select ON with the TUNE switch, this means the transadapt option is now energized. If the radio is also equipped with the 1099ALE (Automatic Link Establishment) option, only one of these options may be energized at a time. If one of the options is already energized, energizing the other option automatically de-energizes the first.

3-15.2 Receive Station

When the transadapt option is installed and energized, the radio automatically responds to any correct acquisition calls that are received. To enable SCAN, select the SCAN icon and press the WHIP TUNE button. The display will indicate "SCAN SEL." Press the WHIP TUNE button again and the display will indicate "OFF" or "SCAN XXX," where XXX is 0-9. Select the number of channels to scan using the TUNE switch and SCAN is now energized. Once scan has been energized, enable it by switching the CHANNEL selector to position 9.

With the CHANNEL selector in channel 9, the radio automatically goes into a fast channel scan, called receive scan. In receive scan, the radio jumps from channel to channel listening for an acquisition call from a transmitting station that contains that receiver's Selcall code or 000 for "Allcall". If no acquisition call containing the correct Selcall code or 000 is received after one second, the radio automatically jumps to the next channel.

The receiver Selcall code is entered through a sub-directory of the TA icon. To enter the Selcall code, select the TA icon with the DIGIT switch. Hold the TUNE switch up momentarily, causing "RX ADD" to be displayed on the front panel. Push the WHIP TUNE button and the display will change to: "RXA: XXX," where XXX indicates the Selcall code previously entered. To change this code, hold the TUNE switch up or down until the desired code is displayed. Push the WHIP TUNE button to select and return to previous sub-menu. Hold the DIGIT switch up or down momentarily to escape.

The radio has the ability to scan up to nine different groups of channels. To enter or alter these scan groups, select the TA icon with the DIGIT switch and hold the tune switch up momentarily to enter the sub menu. "RX ADD" will be displayed. Hold the TUNE switch up momentarily again and the display will change to: "SG X," where X equals the scan group selected (1-9). To change the selected scan group, press the WHIP TUNE button.

The group number can be changed with the TUNE switch. Select with the WHIP TUNE button. To modify the individual Scan groups, select the desired group. Turn the TUNE switch up and the display will indicate: "MOD TASG." Press the WHIP TUNE button and the display will indicate: "TASG#:*XX," where "#" indicates which scan group (1-9), "*" indicates that the channel number displayed has been selected to be part of that scan group, and XX indicates the channel number. Each scan group can have a maximum of nine channels in each.

3-15.3 Transmitter Station

Transmit Selcall Code Entry

To call a particular station, the transmitting station must know the Selcall code of the receiving station. This code must be entered so that it can be transmitted with the acquisition call. Therefore, the first step to initiate a call, is entering the Selcall code to be transmitted. To initiate a call and enter the Selcall code to be transmitted, select the CALL icon with the DIGIT switch and hold the TUNE switch UP momentarily. The display will now indicate: "TO: XXX," where XXX indicates the code to be transmitted. This code can be changed with the TUNE switch and is selected with the WHIP TUNE button. When the code is selected with the WHIP TUNE button, the radio automatically begins to initiate a CALL.

Mode 1

In mode 1 of TRANSADAPT (Selcall compatible), the transmitting station is stationary on any channel (other than 9, if scan is enabled), while the receive station is either stationary on the same channel as the transmit station, or in receive scan (channel 9, scan enabled). When a call is initiated from the transmitting station, the transmit call is timed to allow enough time for the receiver to scan through all nine channels to ensure that the receiver and transmitter are on the same channel. If no reply is received, a slow error alarm will be heard in the handset, and the radio will automatically return to normal operation. If a reply from the transmitting station is received, a fast call alarm will be heard in the handset, and BOTH transceivers will display "CALL" on the front panel.

Mode 2

In mode 2 of TRANSADAPT (Transcall Compatible), the transmitting station is in receive scan (Channel 9, scan enabled). When a call is initiated, the radio enters into an acquisition scan. In acquisition scan, the radio scans each channel selected in the scan group in order. The scan on each channel is timed to give time for the receiver to scan all nine channels while the transmitter is calling on one. If there has been no acknowledgement after one complete acquisition scan cycle, a slow error alarm is heard in the handset and the radio automatically returns to receive scan. When the receive station responds, a fast call alarm is heard in the handset and both radios discontinue scanning and display "CALL" on the front panel. Both radios will resume scanning two minutes after the last transmission has been sent.

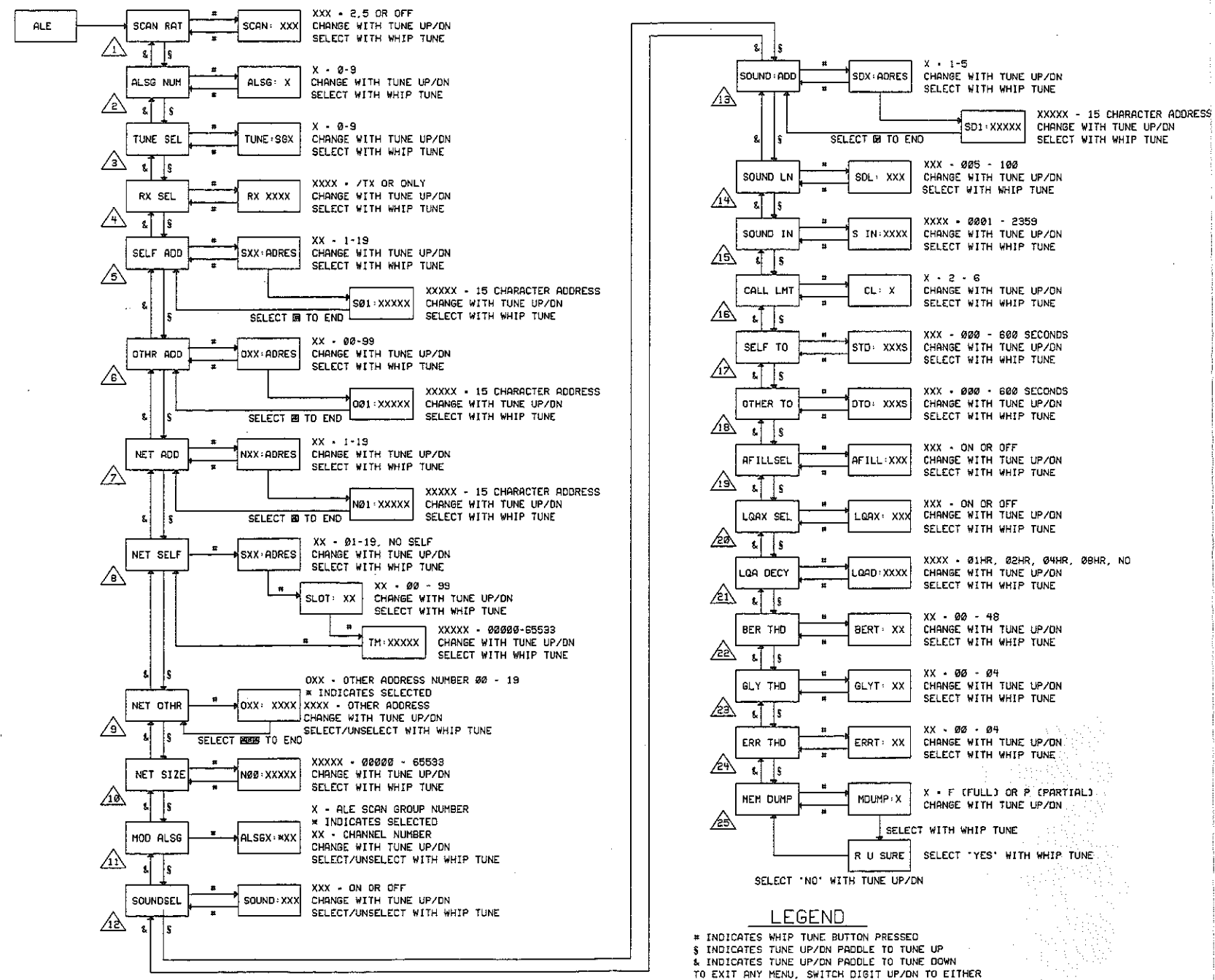
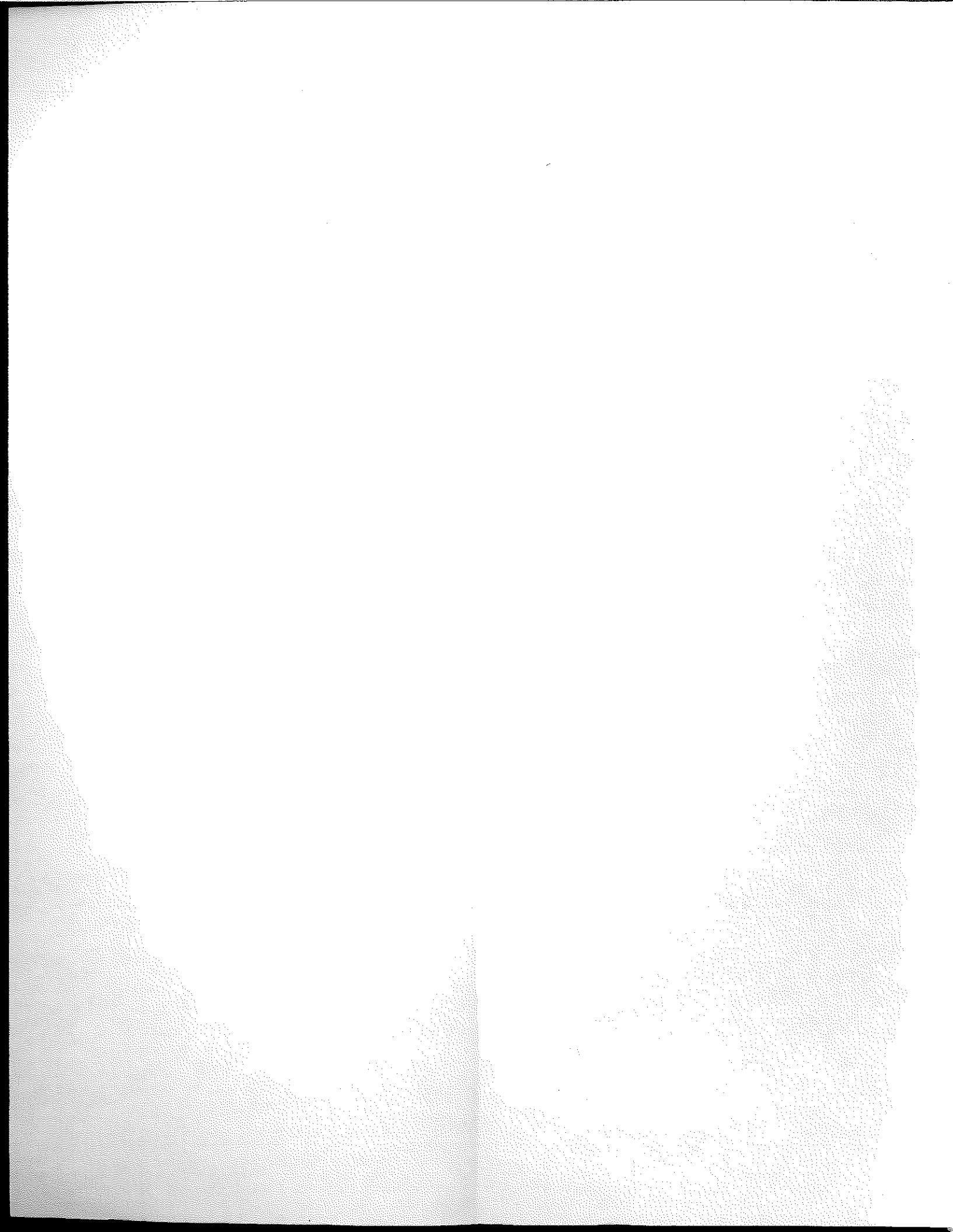


FIGURE 3-3.
PRC1099 ALE Menu Flow Chart.



3-16 ALE Option Operation (1099ALE)

3-16.1 General Description

The ALE option is used for Automatic Link Establishment and is fully interoperable with the FED-STD-1045 protocols for automatic channel selection, selective calling, and link-up. The 1099ALE option provides all the radio control and modem functions required to operate the radio in accordance with the FED-STD 1045 protocol. This unit provides Link Quality Analysis (LQA), scanning, selective calling, automatic sounding, and modem hand-off.

3-16.2 Operation

The ALE functions are all operator accessible through the front panel menu system. This system is accessed by sequencing the DIGIT UP/DOWN paddle until the ALE icon blinks and then using the TUNE UP/DOWN to sequence through the menus. To see what selections are available under a menu, push the WHIP TUNE button once. For example, to see the scan rates available under the "SCAN RAT" menu, just press the WHIP TUNE button once. The selection "SCAN 2" is on the display. Scroll through the available selections until the desired one is displayed. Press the WHIP TUNE button once and the "SAVED" message appears briefly. This indicates the selection was saved and the "SCAN RAT" menu appears. All menus used for the 1099ALE option are described below. Refer to Figure 3-3 for a menu flow chart. The numbers in parentheses after each section correspond to the numbers in the triangles on the menu flow chart.

3-16.2.1 ALE Scan Rate (1)

This control sets the rate at which the radio will scan the selected channels. This can be set at two channels per second, five channels per second, and OFF, where the radio does not scan at all. This scan control is independent of the normal radio scan control located under the SCAN icon.

3-16.2.2 ALE Scan Group Number (2)

The ALE scan group number refers to a number given to a group of channels to be scanned. The radio has a capability of scanning up to ten different groups of channels. Use this control to select the desired scan group. Refer to section 3-16.2.9 to enter or modify the separate scan groups.

3-16.2.3 ALE Tune Select (3)

To properly receive or transmit on a channel, the radio must be matched to the antenna at that channel. Use this control to instruct the radio to automatically tune to every channel in a scan group. Do this prior to using each channel to ensure maximum performance. To activate the automatic tune, select the scan group to be used and press the WHIP TUNE button. The radio automatically does the rest.

3-16.2.4 Receive Select (4)

Use the Receive Select control to disable the automatic transmission of a reply to a properly received ALE signal.

This is useful for times when transmissions are not allowed. Select "RX ONLY" to prevent replies from being transmitted.

3-16.2.5 Self Address (5)

The ALE self address for each radio can be up to 15 characters in length. Each radio can have a maximum of 20 different self addresses. Use this control to enter and modify all 20 different self addresses for the radio.

3-16.2.6 Other Address (6)

When a station initiates a call, the identity of the station to be called must be included within the ALE message that is sent. Use this control to enter all the addresses of other radios that messages will be sent to using up to 15 characters per address. The radio has a maximum capacity of 100 other addresses that can be retained in memory. Enter the other address that is called most often first to minimize time searching through all 100 memory locations.

3-16.2.7 Net Address (7)

When a station initiates a call to a net, the identity of the net to be called must be included in the ALE message. The radio has a capacity of 20 net addresses that can be retained in memory, using a maximum of 15 characters in length per address.

3-16.2.8 Net Self (8)

Use this control to enter the self address of this radio to be used in a net.

3-16.2.9 Net Other (9)

The Net Other control is used to enter the addresses of other stations to be used in the net.

3-16.2.10 Net Size (10)

Use this control to select the size of the net to be formed. The maximum size of a net is 65.534 seconds and refers to the length of time stations will remain at a channel to wait for replies.

3-16.2.11 Modify ALE Scan Group (11)

Use this control to modify or create scan groups. Select the scan group to be modified or created using the "ALSG NUM" control explained in section 3-16.2.2. After the scan group has been selected, use this control to select/unselect the channels to be included in the scan group. The maximum number of channels for each scan group is 100.

3-16.2.12 Sounding Selection (12)

Use this control to activate the ALE Sounding function. Sounding is used to periodically communicate over the air with another station and update the Link Quality Analysis information to ensure the stations are communicating on the best possible channel. Use this control to enable and disable sounding.

3-16.2.13 Sounding Address (13)

Use this control to enter the address of the station to periodically communicate with to maintain Link Quality An-

alysis information. This address is only valid for the channel selected; each channel must be individually configured.

3-16.2.14 Sound Length (14)

When the sounding function is activated, the radio automatically transmits sounding bursts to be evaluated by the receiving station. Once evaluated, the receiving station responds with its own sounding burst. Use this control to set the length of the sounding burst to be transmitted.

3-16.2.15 Sound Interval (15)

Use this control to select the time interval between sounding transmissions. The interval is selectable in one minute increments between 1 minute and 24 hours. This interval is only valid for the channel selected; each channel must be individually configured.

3-16.2.16 Call Retry Limit (16)

Use this control to enter the number of attempts to establish communications on each channel. The number of attempts is selectable for 1 to 5.

3-16.2.17 Self Timeout (17)

When one station makes a call to another station, and the other station replies, both stations will remain linked for a predetermined length of time. Use this control to set the length of time this station will remain linked after INITIATING the call. Each increment is equal to 15 seconds of time.

3-16.2.18 Other Timeout (18)

When another radio calls and is answered, both radios remain in a linked state for a predetermined length of time. Use this control to set the length of time the radios remain linked after they RECEIVE a call. Each increment is equal to 15 seconds.

3-16.2.19 Autofill (19)

Use the autofill function to allow the radio to automatically enter and retain addresses of other radios it hears

over the air but with which it has never made contact. This autofill function occurs automatically unless de-energized using this command.

3-16.2.20 LQA Exchange (20)

LQA refers to Link Quality Analysis, a numerical evaluation grade given to each channel after it has been used. Use this control to exchange LQA information with other stations.

3-16.2.21 LQA Decay Rate (21)

Radio frequency propagation through the atmosphere is changing constantly, therefore the Link Quality Analysis evaluation score for each channel changes. Use this control to select the time that each LQA score remains valid, unless it is updated. The time is selectable at either 1, 2, 4, or 8 hours. Selecting "NO" means the score remains valid indefinitely.

3-16.2.22 Bit Error Rate Threshold (22)

The Bit Error Rate Threshold is the amount of bit error that is allowed before a 8-bit word is rejected. Use this control to select the threshold (between 00 and 48).

3-16.2.23 Golay Threshold (23)

The Golay Threshold is the amount of word encoding error that is allowed before a word is rejected. Use this control to select the threshold (between 0 and 4, with the default at 3).

3-16.2.24 Error Threshold (24)

Use this control to select the number of errors that are allowed before a word is rejected (between 0 and 4, with the default at 3).

3-16.2.25 ALE Memory Dump (25)

Use the ALE Memory Dump function of the radio to erase the memory of the ALE data. A partial memory dump is used to erase the LQA data and a full memory dump is used to erase all ALE data in the radio.

CHAPTER 4

OPERATOR'S MAINTENANCE INSTRUCTIONS

4-1. Scope of Maintenance

This chapter lists the operator's maintenance instructions for the PRC1099A. 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 upkeep 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 of 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 operational check (sequence 5), check the mechanical action of each control for smooth operation.	
4	Battery	Inspect for leakage, corrosion and swelling. <i>WARNING: Remove battery when transceiver is not to be used for one or more days.</i>	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 dead - (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 is attached to the transceiver reporting the nature of the problem.

- 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 LO or HI.	Channel number is displayed.	Reset channel or frequency (Para. 3-2). a. Ensure shorting plug is completely connected to accessory connector. b. Replace battery (Para. 2-4).
4	Set and hold FUNCTION switch at LITE.	Display lights.	
5	Set FUNCTION switch to USB	Background noise is heard.	Higher level maintenance required.
6	Set FUNCTION switch to SQUELCH	Background 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		

CHAPTER 5

FIELD MAINTENANCE INSTRUCTIONS

5-1. Scope of Field Maintenance

a. This chapter covers the field maintenance of the PRC1099A 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 PRC1099A; reference should be made to the PRC1099A-MS1 Technical Manual.

5-2. Tools and Accessories

- a. Bird Model 43 with 50 W element.
- b. Bird Model 8321 50 W dummy load.
- c. Screwdrivers - #1, #2 Phillips, and Flat Blade.
- d. Cleaning Materials.
- e. Accessories - A complete set of operating accessories.

5-3. Notes on Battery

The battery voltage (under transmit load) must be at least 12 V for correct performance to specifications. The PRC1099A is designed to remain operational with battery

voltages as low as 10.5 V. Low battery voltage is indicated by the low battery icon. Do not continue to operate the transceiver with the lead-calcium battery when the icon is illuminated or the battery operational life is reduced.

The PRC1099A has much lower battery drain on voice operation than in the CW mode. Do not hold the transmitter key down for more than brief periods.

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 chart below.

5-6. Troubleshooting

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

Sequence Number	Item to Be Inspected	Procedure	Reference
1	Completeness	Check to see that 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 front-panel display window for cleanliness.	Para. 4-6
10	Modules	Check that the connectors are in place on all modules.	Fig. 5-1
11	Seals	Inspect the seals on the transceiver panel, battery box and battery connector.	Fig. 5-1

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

Check that the battery does not require replacement.

c. ACCESSORIES

- (1) Ensure that 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. Separate the transceivers so that they will not cause overload.

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 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) MODE switch - Set to USB.
- (4) Set in test frequency (Para. 3-2).

At this point there should be background noise in the receiver. If these indications are not correct:

- a) Ensure shorting plug is completely installed on accessory connector.
- 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 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 PRC1099A has six 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 1.6-3.099999 MHz
- (2) Repeat test C on any frequency 3.1-5.099999 MHz
- (3) Repeat test C on any frequency 5.1-7.999999 MHz
- (4) Repeat test C on any frequency 8-12.999999 MHz
- (5) Repeat test C on any frequency 13-19.999999 MHz
- (6) Repeat test C on any frequency 20-29.999999 MHz

NOTE

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

e. SQUELCH CHECK

- (1) Set the MODE switch to SQUELCH.
- (2) The CHECK transceiver makes a transmission.
- (3) The signal should be received loud and clear.

f. LSB

- (1) Set the MODE switch to LSB.
- (2) Repeat Operating Check (c) steps 1-3.

g. LIGHT TEST

- (1) Turn the FUNCTION switch to LITE.
- (2) The front-panel display should light.

h. POWER TEST

- (1) Remove the antenna and mount.
- (2) Connect the wattmeter and dummy load to the BNC antenna connector.
- (3) Select any frequency.
- (4) Set the power switch to HI.
- (5) Connect CW key. Press key and measure power output.
- (6) Repeat step 5 at LO power.

The nominal power output is:

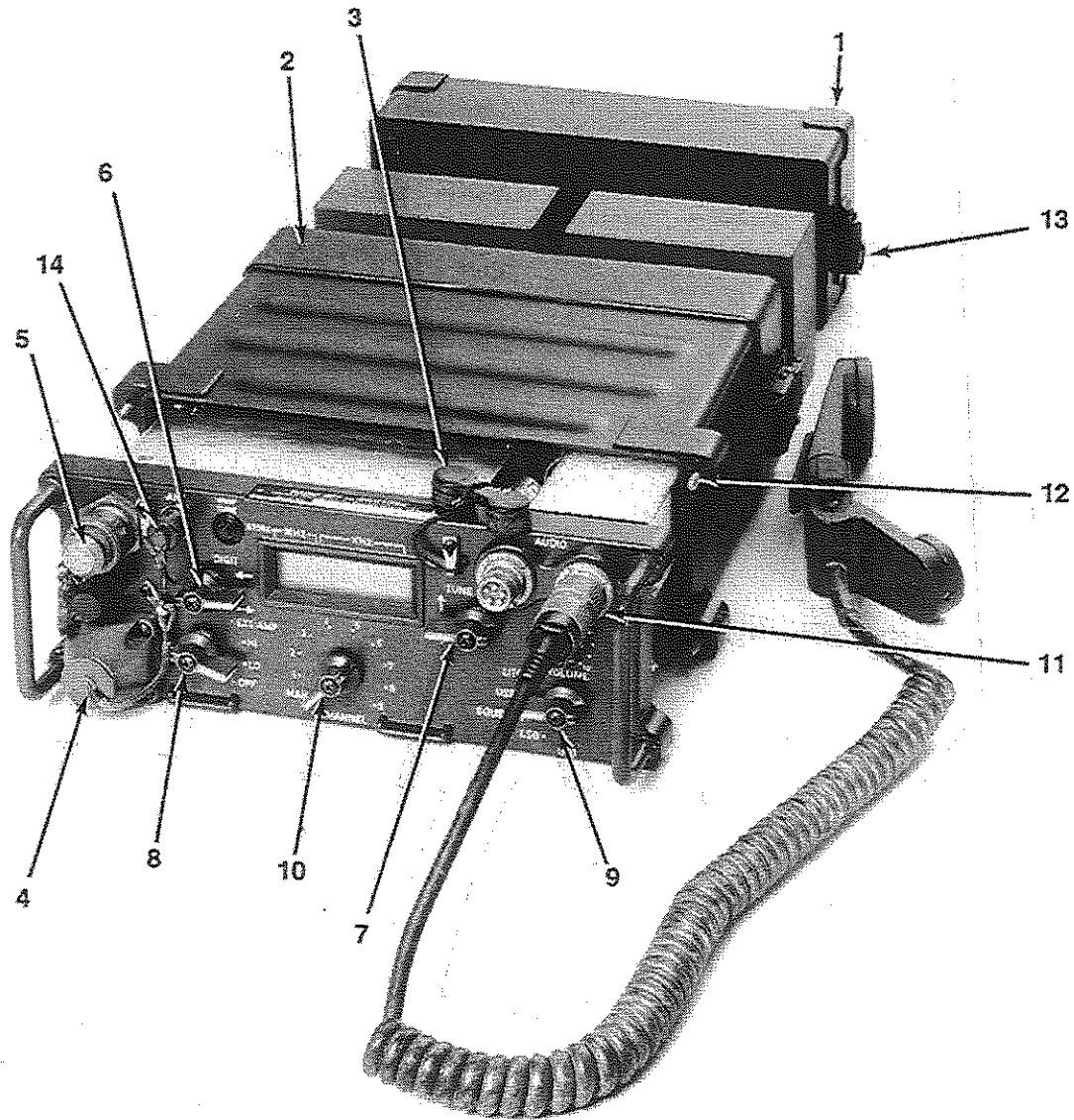
High: 20 W
Low: 5 W

NOTE

The power output is 20 W PEP (peak envelope power) on voice operation and requires the use of a peak measuring device such as an oscilloscope. It is normal for the power meter reading to read 20-40% of normal during voice operation. The meter should indicate correct power output on CW.

i. MEMORY CHECK

- (1) Set the transceiver to any channel and frequency (Para. 3-2) and remember both. Turn transceiver off.
- (2) Turn transceiver to LO. The channel and frequency should still be displayed.



- | | |
|---|---|
| 1. CY-2562 | 8. Knob, long-handled (power switch) |
| 2. Case, transceiver | 9. Knob, long-handled (mode switch) |
| 3. Cover, double rubber connector protector | 10. Knob, long-handled (channel switch) |
| 4. Cover, antenna dust | 11. Knob (VOLUME) |
| 5. Cover, BNC | 12. Screw, captive |
| 6. Knob, long-handled (DIGIT Select) | 13. Hook |
| 7. Knob, long-handled (TUNE) | 14. Dummy connector, plug |

FIGURE 5-1.
Receiver-Transmitter, Radio Set PRC1099A, Organizational Repair Parts.

NOTE

The PRC1099A uses a small internal battery to store the channels and 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 power is turned off.

j. AME option.

- (1) Set MODE switch to OPT.
- (2) Repeat Operating Check steps 1-3.

5-8. Internal Inspection of the PRC1099A

a. Stand the PRC1099A 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. Inspect the battery connector for the following:

(1) A rubber gasket (shaped similarly to the metal ring around the battery connector hole in the PRC1099A case) must be installed on the battery connector. Check to make sure that it is not damaged. It must be seated flush with the bottom of the connector (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 not damaged. That is, they must not be sheared; and each O-ring must be sealed, under tension, in its recess.

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

c. Inspect the connectors on all transceiver modules. Ensure that the pin connectors are locked firmly in place.

d. Inspect the seals on the front panel and the base of the transceiver. The seals should be clean and free from cuts, dirt, 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.

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

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

5-9. Frequency Calibration

The PRC1099A operates in the single sideband mode, and precise frequency calibration is required for correct operation. If the speech sounds garbled and off tune, increment the TUNE switch up and down to fine tune the receiver. If the speech clarity improves when the receive frequency is offset, then either one of the test transceivers requires frequency calibration. This is an internal adjustment and requires the use of an accurate frequency counter.

CHAPTER 6

HF COMMUNICATIONS & SINGLE SIDEBAND

6-1. Introduction

This section of the manual contains information on the single sideband mode and high frequency communications. This information will help the operator use the PRC1099A to provide more effective communications.

6-2. Single Sideband

The PRC1099A provides voice communications in the single sideband mode (SSB). This mode provides more efficient operation for high frequency communications than the FM (frequency modulation) mode used for tactical communications in the 30-88 MHz range. SSB has now almost completely replaced the earlier AM (amplitude modulated) mode and provides a major advantage for HF communications. The SSB transmitter uses special circuitry to suppress the carrier and one of the two sidebands of an AM signal. This gives a sixfold increase in efficiency, as the carrier uses 2/3 of the power and carries no useful information; the two sidebands contain identical information. This means that the SSB transmitter puts all of the power into one information carrying sideband. This makes the PRC1099A as effective as a 120 W AM transmitter.

Apart from the improved efficiency, the SSB signal occupies less than half the frequency space of the AM signal and permits much better utilization of the crowded HF spectrum. The SSB signal is more intelligible at poor signal levels and is far less affected by selective fading and interference. To receive SSB, it is necessary to use a special receiver that locally reinserts the suppressed carrier so that the transmission may be demodulated. The SSB signal sounds quite unintelligible when received with a standard AM receiver.

6-3. HF Communications

The high frequency (HF) communications spectrum is primarily used for long distance communications, while VHF is favored for local communications. If the correct frequencies and antenna systems are used, the HF spectrum will provide effective communications over almost any distance including inter-continental ranges. There are two main modes of propagation of HF signals - ground wave and sky wave. The ground wave follows the surface of the earth and provides reliable signals over short ranges. The signals are attenuated very rapidly as they pass over the surface of the earth, so that high powers and good antennas are essential for good ground wave coverage. The ground wave attenuation increases as a function of frequency, and the lower frequencies below 3 MHz are favored for ground wave operation. This mode may be the only effective method for local coverage in areas too mountainous for VHF and UHF operation.

Most HF communication is by sky wave where the signals are refracted by the reflecting layers of the ionosphere. Long distances can be covered with little signal attenuation provided the correct frequency is chosen. The ionosphere does not stay constant; it varies with the time of day, time of year, the sun spot cycle and the activity of the sun. Solar flares can cause complete radio blackouts with little warning. HF communications are affected by static caused by lightning; sometimes from storms many hundreds or thousands of kilometers away. A clear channel can never be assured, as long distance propagation may cause strong interfering signals on the frequency from great distances. It must always be understood that although long distance communications are possible with low powers and simple antennas, high reliability and freedom from interference is not possible. In spite of the problems, a surprisingly good standard of communications can be achieved provided that care is taken to select the correct frequency and to use good equipment with an efficient antenna system.

The correct choice of frequency is beyond the scope of this manual and may be limited by the available frequency allocations. The following information may give a starting point in choosing the best frequency. Remember that the final guide should be an actual test, as often only a small change in frequency may make a big difference in signal strength.

The low frequencies, below 3 MHz, will normally be restricted to short ranges during the day. At night, longer ranges (3-400 kilometers) are possible, but interference and static may be major problems. Good antennas and high power are essential for anything but the shortest distances.

The medium frequencies from 3-5 MHz may be a good choice for moderate distances (3-400 kilometers) during the day. At night, considerable distances are possible, although static will be a frequent problem during summer months. The physical length of a good antenna is still quite long, and it is difficult to achieve good efficiencies with whip antennas in this range.

The medium frequencies from 5-11 MHz are the most popular for communications up to 1000 kilometers. Good ranges are possible during the day with the higher frequencies being favored for the longer distances. Communications may become more difficult at night with interfering signals from all over the world.

The higher end of the spectrum, above 12 MHz, is favored for long distance communications. The propagation will be

severely affected by the ionosphere and expert advice is essential in choosing the correct frequencies for long distance operation. For example, frequencies as high as 30 MHz may be used for worldwide communications during the peak of the sunspot cycle. However, during

periods of low sunspot activity, this frequency range will be completely dead. It is important to remember that at the higher frequencies there can be skip zones; and a strong signal may be received from 2000 kilometers away, while closer stations cannot be heard.

CHAPTER 7

ANTENNA SYSTEMS

7-1. Introduction

In the manpack configuration the PRC1099A is generally used with a short whip antenna. This antenna is very short compared with a resonant antenna on most frequencies in the HF range and must be artificially matched by the antenna tuner. The whip antenna operates against ground, and in the manpack configuration the ground is provided by the capacitance of the operator's body. The combination of the short antenna, lossy ground, and inefficiencies in the matching system severely restrict the range of the equipment in the manpack configuration. A major improvement in performance is possible by using longer whip or wire antennas and a better ground system. For maximum ranges, the resonant antennas provide superior performance.

7-2. Internal Antenna Tuner

The internal antenna tuner will match the 10 ft whip antenna from 2-30 MHz. The following antennas may also be matched over the 1.6-30 MHz frequency range with the addition of a special long wire adapter.

Long whips

- 16 ft. - need LWA above 15 MHz
- 24 ft. - need LWA above 9 MHz
- 32 ft. - need LWA above 6 MHz

Long wires

- 25 ft, 50 ft and 100 ft - need LWA

The whip or long wire antennas must be connected to the special adapter, LWA. The antenna tuner will not tune properly unless the adapter is used. The antenna tuner will also match random length long wire antennas (exceeding 50 ft) on most operating frequencies. In an emergency, the long wire may be attached to the top of the AT-271A support and will tune on most frequencies..

7-3. Ground Systems

The end fed whip or long wire antennas will only operate at maximum efficiency when used with a perfect ground system. In the manpack configuration the ground is capacitively coupled through the operator's body and almost all of the output power is absorbed by the lossy ground system. This is the major reason for the poor performance of HF manpacks. Even placing the transceiver directly on the ground will give some improvement in efficiency. If possible, a separate ground system should always be used. The transceiver ground terminal should be connected directly to the ground by using the shortest possible wire. The ground can be a ground stake in moist soil or a water pipe going into the ground. A counterpoise system using as many radial wires as possible will improve performance even if there is no direct connection to ground. A direct

connection to a vehicle body provides another effective counterpoise system. Even a single wire laid on the ground or a connection to any mass of metal such as a wire fence will improve transceiver performance.

7-4. End-Fed Antennas

The end fed antenna is usually erected as a vertical whip or a long wire. The whip should be connected directly to the antenna terminal using a short connecting lead. One end of the long wire antenna is connected to the antenna terminal. The long wire can be erected part vertical and part horizontal, or in a sloping configuration. Almost any support such as trees or buildings will work. Even compromise installations where the antenna is draped over hedges or let out of a window can work and usually outperform the manpack configuration. The antenna does not even have to be in a straight line. The important consideration is to try and keep the radiating part of the antenna as high and in the clear as possible.

a. 50-OHM ANTENNAS

When the adapters are removed from the antenna post, the antenna tuner is disconnected and the output is switched to the BNC antenna connector. Any 50 ohm coaxial fed antenna with a VSWR of less than 3:1 (preferably 2:1) can be used with the PRC1099A.

(1) Resonant Dipole. The resonant half wave dipole is a simple, efficient antenna providing good long range coverage, even with the limited power of the packset. The length of the antenna must be adjusted for the frequency of use. See Figure 7-3.

(2) Broadband Antennas. The ABB100A and ABB-100B antennas offer good performance, without adjustment over the 2-30 MHz frequency range. See Figure 7-4.

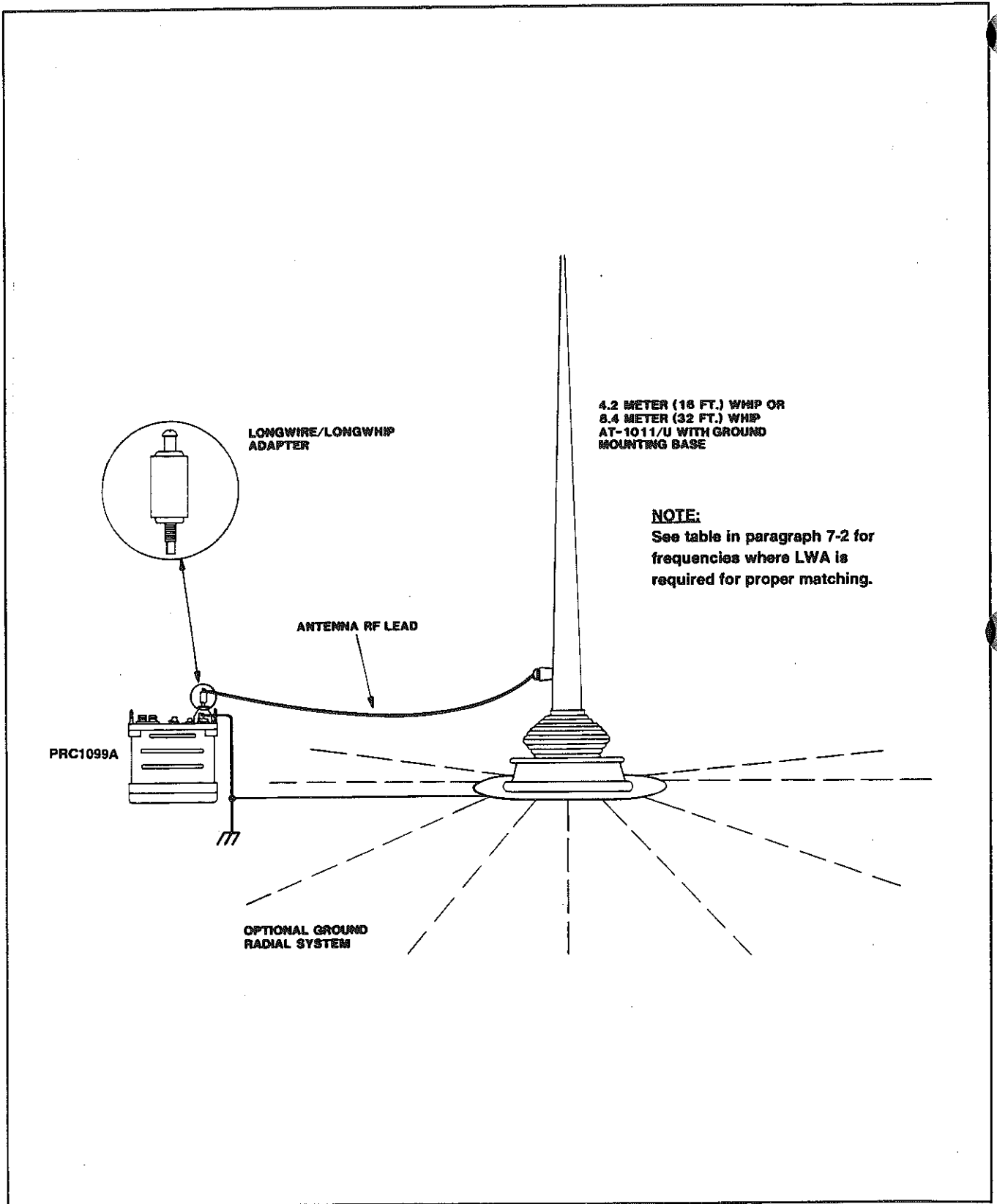
(3) Directional Antennas. Directional Antennas are used for long range communications. Rotatable arrays provide coverage in all directions while fixed antennas are used for operation in specific directions. Some directional antennas are restricted to single frequency operation; while other arrays, such as the log periodic, can be used over a wide frequency range.

b. REMOTELY-TUNED ANTENNAS

The PRC1099A has provision for the operation of the RAT100 Automatic Antenna through a multiwire control cable and 50 ohm coaxial RF cable. The tuner may be located at the antenna and is particularly convenient for mobile installation. The tuner is rated at 125 W and can be used with the RA100, 100 W amplifier.

NOTE

The RAT100 should be used with a separate 12 V supply source.



4.2 METER (16 FT.) WHIP OR
8.4 METER (32 FT.) WHIP
AT-1011/U WITH GROUND
MOUNTING BASE

NOTE:
See table in paragraph 7-2 for
frequencies where LWA is
required for proper matching.

FIGURE 7-1.
Whip Antenna Configuration.

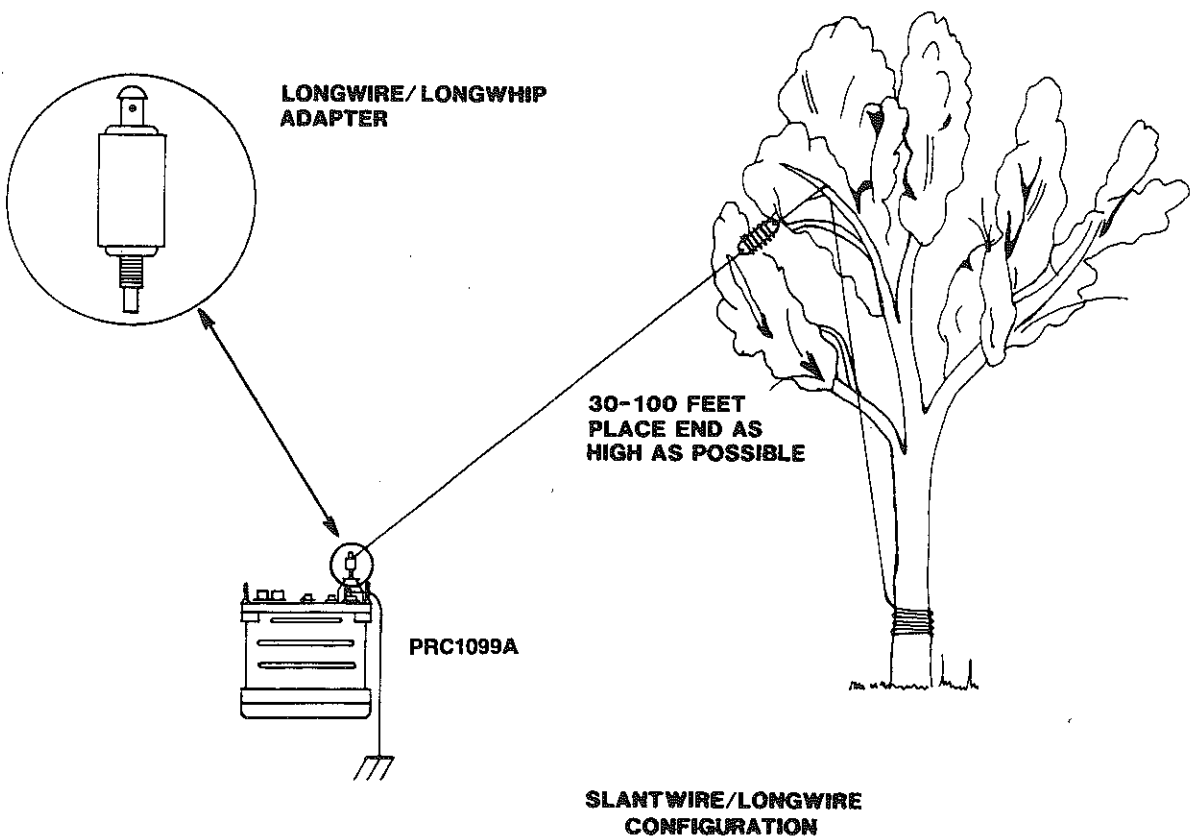


FIGURE 7-2.
Slant Wire/Long Wire Antenna Configuration.

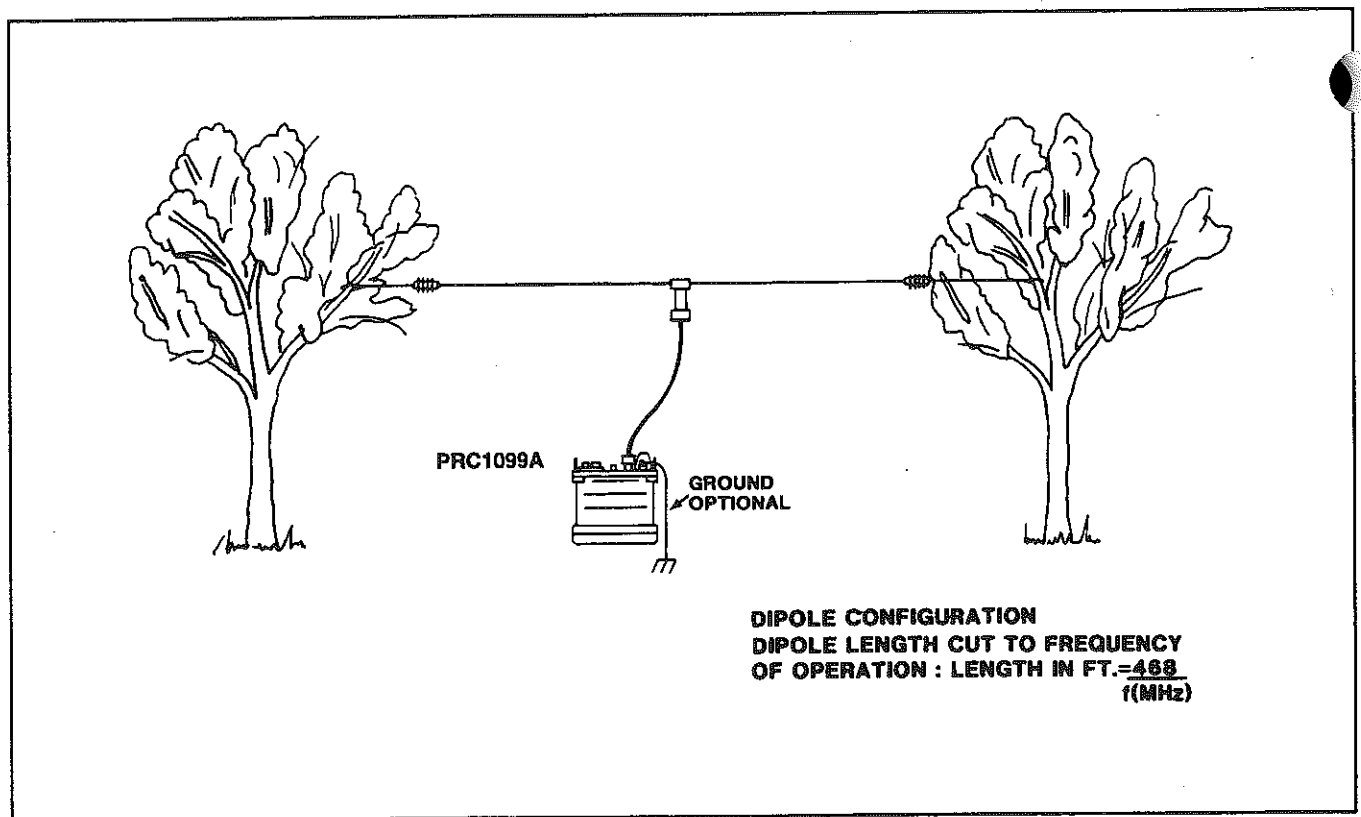


FIGURE 7-3.
Resonant Dipole Antenna Configuration.

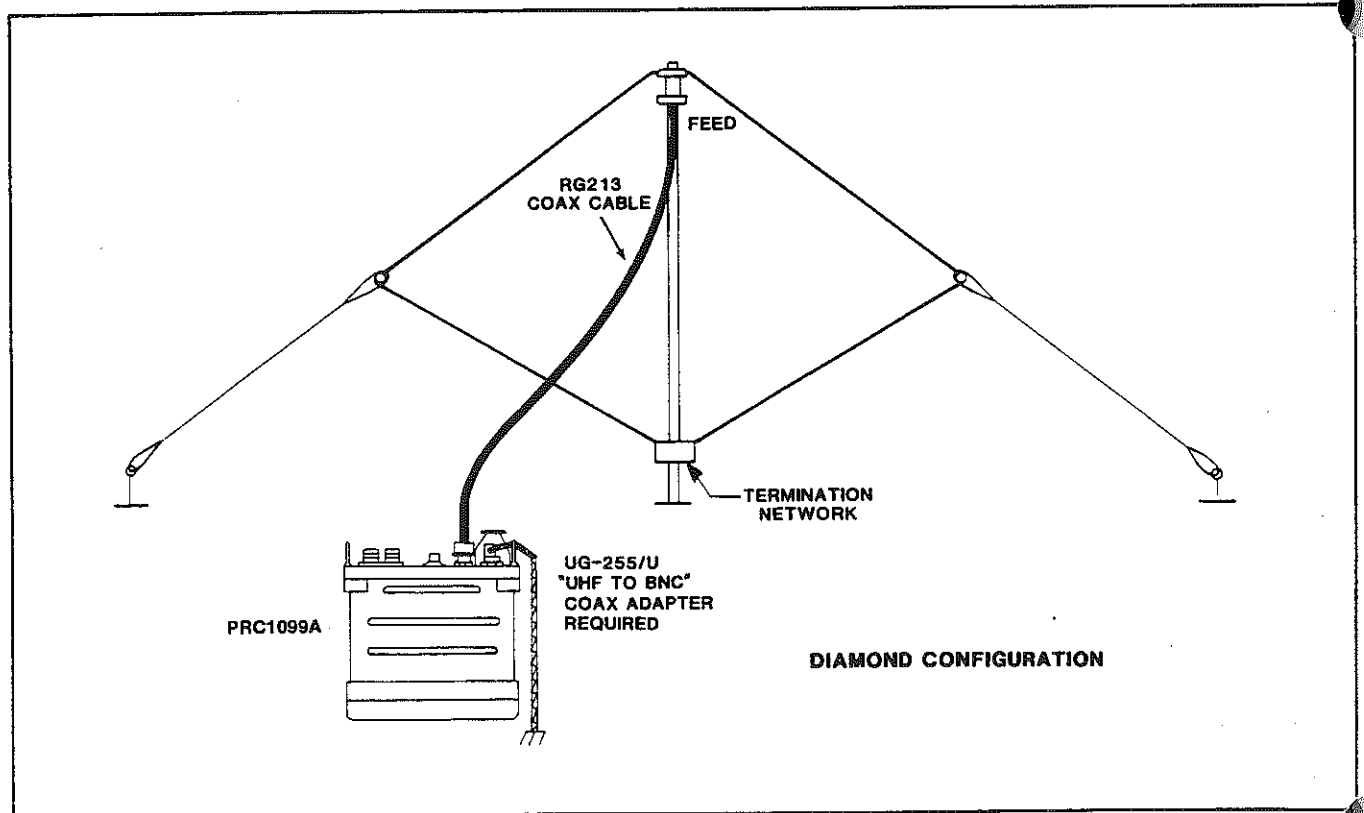


FIGURE 7-4.
Broadband Antenna Configuration.

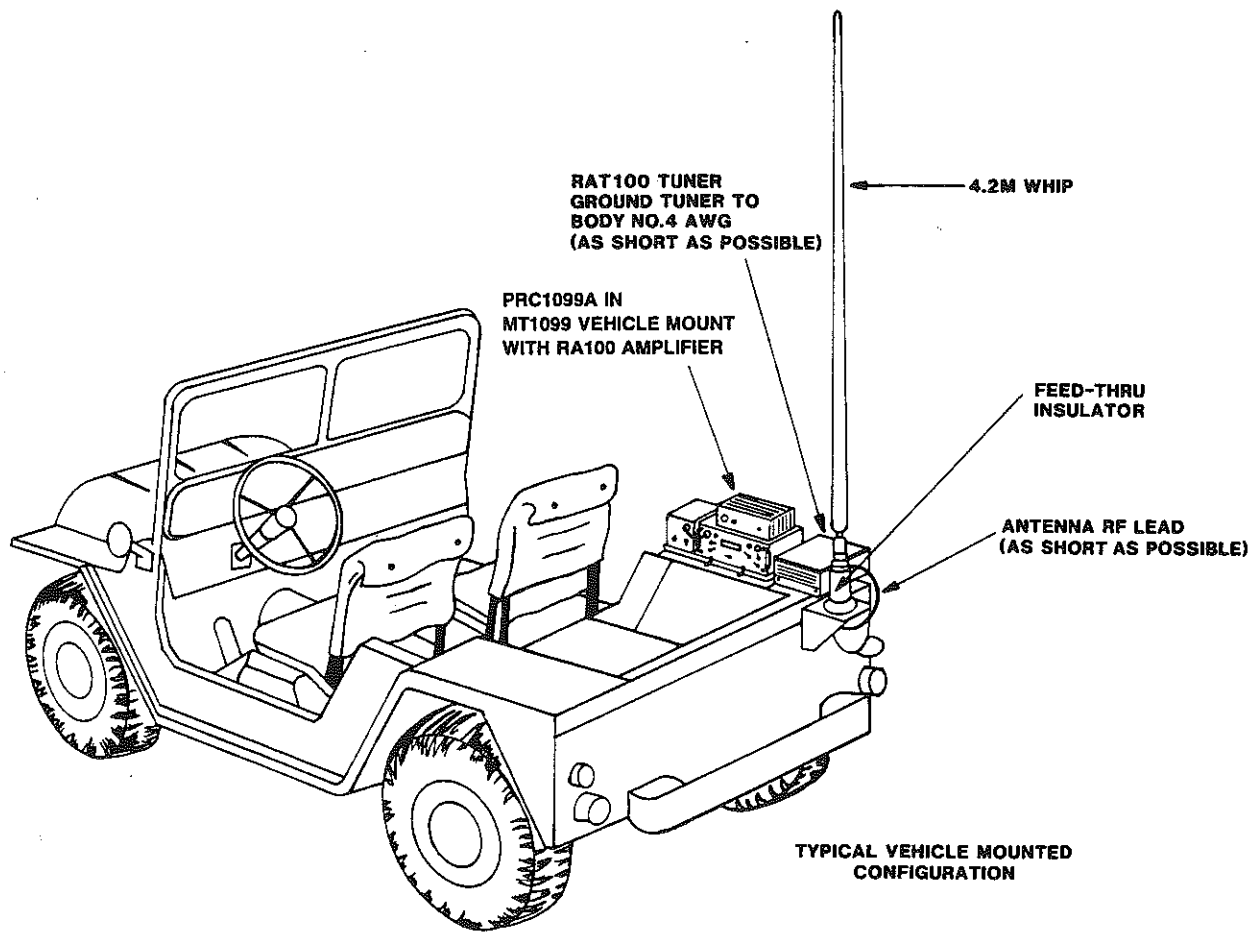


FIGURE 7-5.
Mobile Configuration with Remote Antenna Tuner.

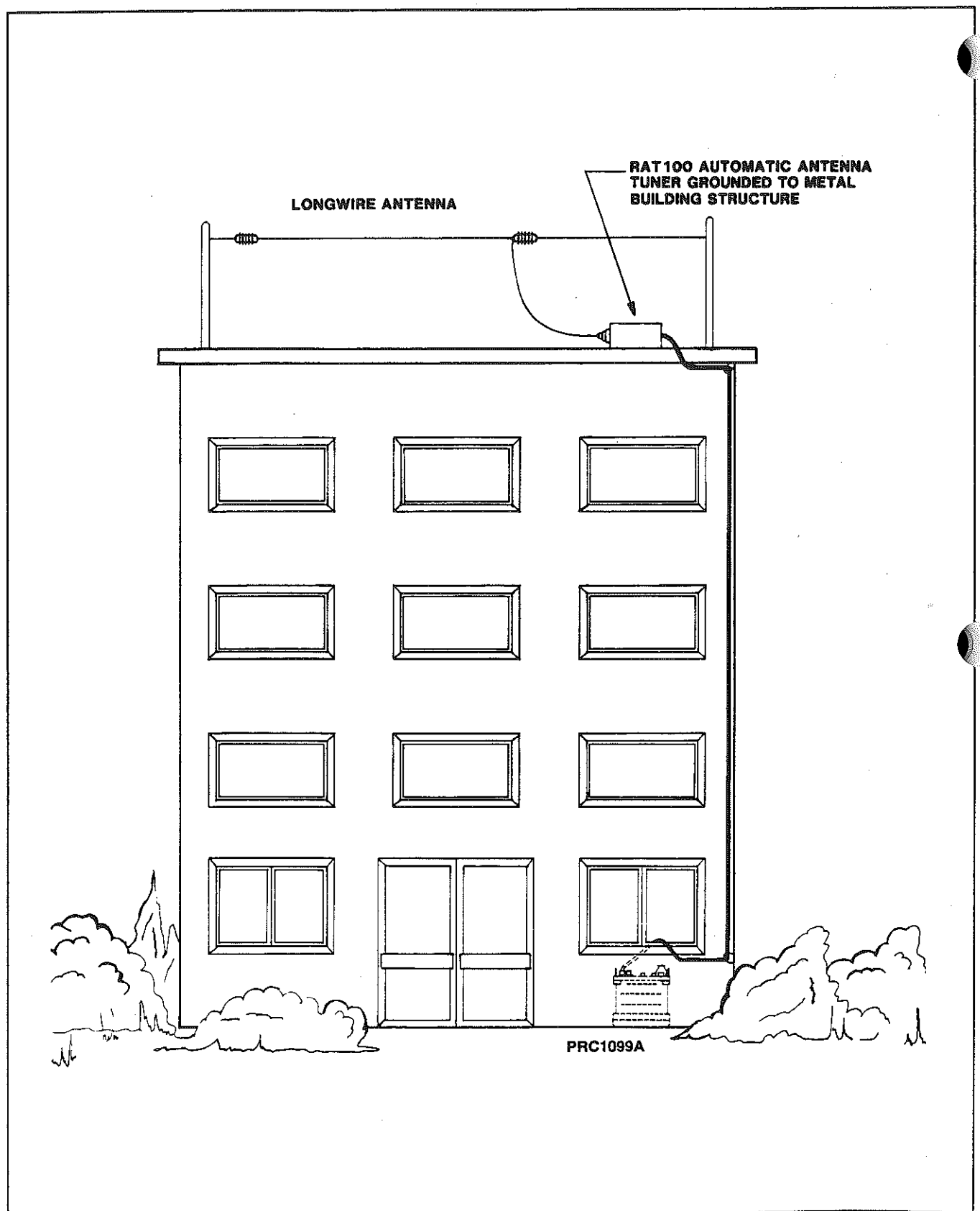


FIGURE 7-6.
Remote Tuned Antenna Configuration.

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 PRC1099A.

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.

The manufacturer's stock number for the item is indicated in this column.

b. Description, Column 2.

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

c. Unit of Issue, Column 3.

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.

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

e. Illustrations/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.

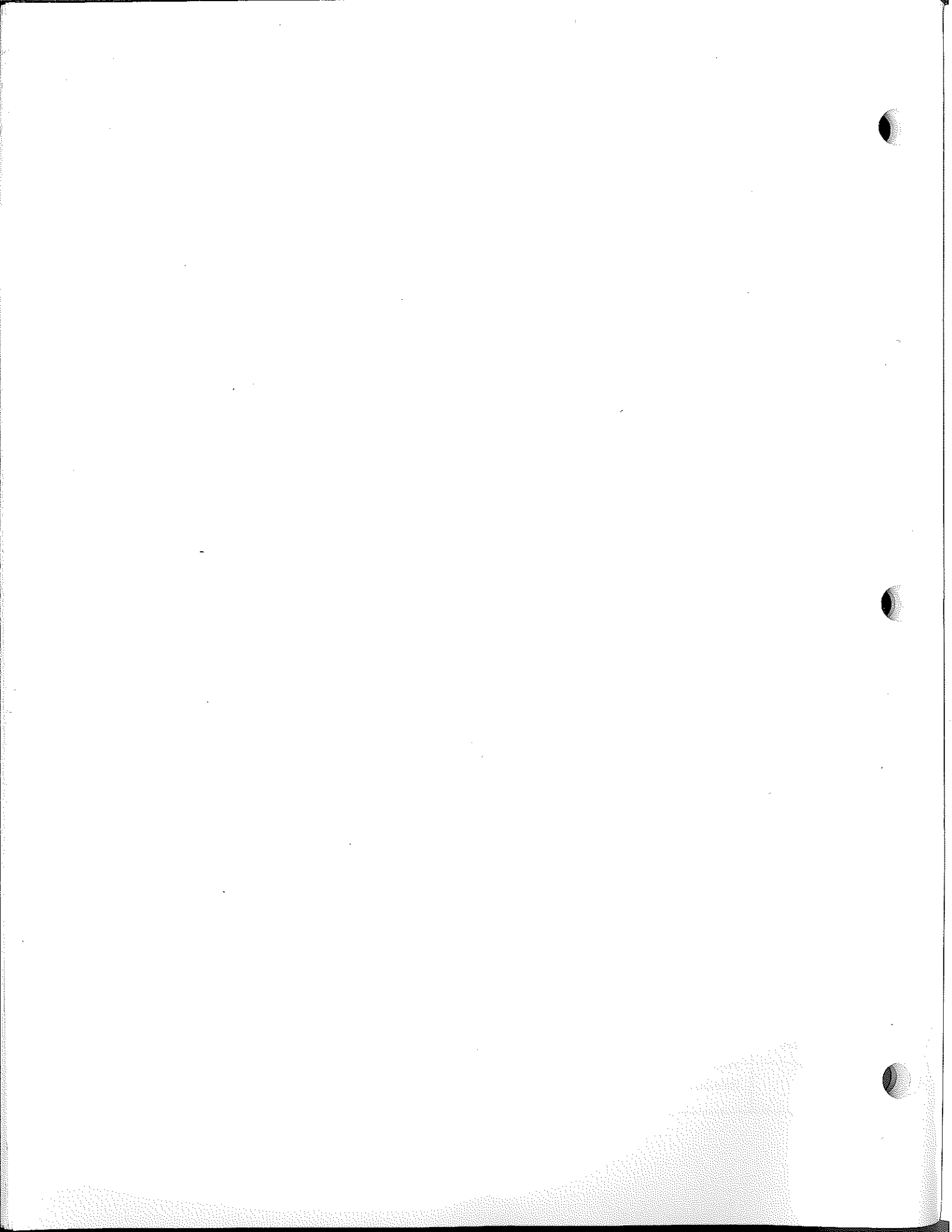
2. If the item and figure number is not known, check the description column (column 2) in the repair parts list to locate the part.

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)
TWC STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	QTY INC. IN UNIT	ILLUSTRATIONS- Figure Number
PRC1099A	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
610085	Dummy Connector, plug	ea	1	5-1
610087-A	Cover, antenna dust	ea	1	5-1
610088	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	Antenna, 10 ft. Folding Whip (AT-271A)	ea	1	1-2
AB-591	Support Antenna for AT-271A	ea	1	1-2
MHS	Handset, H-250/U	ea	1	1-4



APPENDIX B OPTIONAL ACCESSORY EQUIPMENT

B-1 General

This Appendix contains a list of optional accessory items for radio set PRC1099A in Table B-1. It also includes instructions for using the major accessory items with the PRC1099A.

b. Description, column 2.

The item name and military part number (if used) are included in this column. Accessories are grouped in categories to assist in locating items of interest.

B-2 Explanation of Columns

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

c. Unit of issue, column 3.

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

a. Stock number, column 1.

The manufacturer's stock number for the item is indicated in this column.

d. Quantity used in (or with) unit, column 4.

The quantity of items used per radio/system is indicated in this column.

**TABLE B-1.
Optional Accessory Equipment.**

(1)	(2)	(3)	(4)
TWC STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	QTY USED PER UNIT
	<u>BATTERIES</u>		
BB-LA6:	Sealed lead-calcium rechargeable battery (6 Ah).	ea	1
BA6598/U:	BA6598/U high-capacity lithium battery (14 Ah).	ea	1
BB-NC4:	"D"-cell battery cassette for dry batteries or "D" nicad cells. NOTE: Only usable at 5-W power level with "D" dry batteries. Cassette only does not include batteries.	ea	1
	<u>BATTERY CHARGERS/POWER SUPPLIES</u>		
PRC-PS:	Power supply//battery charger for sealed lead-calcium battery pack. Will operate radio while charging internal battery. Automatic rapid/taper charge characteristic; 115/230-Vac input. Separate charger circuit charges spare battery.	ea	1
PRC-BC4:	Multiple battery charger. 115/230-Vac, 24-Vdc input power. Charges up to 4 BB-LA6 lead-calcium battery packs simultaneously. Automatic rapid/taper charge characteristic. Individual charge status indicators.	ea	1
PRC-SPU-10:	Solar power generator for charging sealed lead-calcium battery pack. Portable, rugged unit can supply 10-W output.	ea	1
PRC-HC-30:	Portable hand-crank generator used for charging nicad or lead-calcium batteries. Rugged, compact unit that can supply 30-W output.	ea	1
PRC-HC-8:	Portable hand-crank generator used for charging nicad or lead-calcium batteries. Rugged, compact unit that can supply 8-W output.	ea	1

**TABLE B-1.
Optional Accessory Equipment, Continued.**

(1)	(2)	(3)	(4)
TWC STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	QTY USED PER UNIT
	<u>POWER CABLES</u>		
PRC-CA12V:	12-V power cable allows operation of radio from 12-V source. Allows charging of lead-calcium BB-LA6 battery pack on radio direct from 12-V vehicle charging system. 12-V systems only—no lithium or dry battery charging.	ea	1
	<u>CARRYING ACCESSORIES</u>		
ST-138:	Standard military carrying harness with shoulder straps, frame, and securing straps for PRC1099A.	ea	1
CW-503:	Accessory carrying bag. For PRC1099A antennas and handset. Attaches to ST-138 carrying harness.	ea	1
	<u>AUDIO ACCESSORIES</u>		
	All PRC1099A audio accessories are terminated with twist-lock mil-spec connectors. Audio accessories which have color coding may only be connected to the front-panel 6-pin audio connector with the matching color code. If one of the front-panel audio connectors is not color coded, that connector accepts noncolor-coded audio accessories. The appropriate audio connector (left (L) or right (R)) is shown here next to "Qty Used Per Unit."		
RCH	RCH remote-control handset. Allows remote PTT, Earphone Volume and Channel Select Control Non-noise cancelling.	ea	1 (R)
H-250/U:	H-250/U military handset. Noise-cancelling.	ea	1 (L,R)
H-189/U:	H-189/U military handset. Nonnoise-cancelling.	ea	1 (L,R)
H-80/U:	M-80/U ruggedized hand microphone.	ea	1 (L,R)
H3M:	Headset-boom microphone. Single earphone low profile—will fit under GI Kevlar helmet with clip-on push-to-talk switch.	ea	1 (L,R)
H-140/U:	H-140/U ruggedized headphones with 5-pin mil-spec connector.	ea	1 (L,R)
KYR:	Morse key with 36-in cord and 5-pin mil-spec connector.	ea	1 (L)
LS-R:	Loudspeaker, allows loudspeaker monitoring of PRC1099A radio.	ea	1 (L,R)

TABLE B-1.
Optional Accessory Equipment, Continued.

(1)	(2)	(3)	(4)
TWC STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	QTY USED PER UNIT
PRC-SELCALL	<p align="center"><u>ENCRYPTION AND CODED SIGNALLING ACCESSORIES</u></p> <p>Note the possibility of color-coded connectors, as described under "Audio Accessories."</p> <p>PRC-SELCALL. high-speed selective-calling unit with internal modem.</p>	ea	1 (L)
	<p align="center"><u>MANPACK AND LONG-RANGE ANTENNAS</u></p>		
AT-271A/U-AB-591/U:	AT-271A/U 3-m folding whip antenna with AB-591/U flexible antenna base.	ea	1
ATD:	Adjustable stainless steel tape halfwave dipole with 45 ft RG-58/CU feedline.	ea	1
ALD:	Lightweight tactical dipole kit with 30 ft RG-58/CU feedline and erection lines.	ea	1
ALW:	Ruggedized longwire antenna kit. Includes 100 ft antenna wire on bobbin insulator, hang-up cord and counterpoise/ground stake. Longwire adapter for whip antenna socket also provided.	ea	1
AGK:	Grounding kit—2 wire braided 50 ft each, counterpoise/ground stake to enhance efficiency with short antennas.	ea	1
AAW:	Whip adapter and feedwire used for direct connection of PRC1099A to either RA-MAS and RA-PAS. Not required when external automatic antenna tuner is used.	ea	1
RA-MAS:	Mobile antenna system, comprised of 120-16 4.8-m, 4-section fiberglass military whip, 120-43 mobile base, and RMB mobile mounting bracket. Requires antenna tuner.	ea	1
RA-MSS:	Mobile antenna system. As above except includes 4245 locking rigidized spring base for heavy duty use.	ea	1
RA-PAS:	9.6 m (32 ft) fiberglass ruggedized-type whip with flange base, side feed.	ea	1
ABB100A:	Broadband folded loop dipole 2-30 MHz, 45.7 m long. Optimized for 2-10 MHz performance. Supplied with 15 m RG-213/U coaxial cable feedline. For semi-permanent applications (mast required).	ea	1

TABLE B-1.
Optional Accessory Equipment, Continued.

(1)	(2)	(3)	(4)
TWC STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	QTY USED PER UNIT
	<u>MANPACK AND LONG-RANGE ANTENNAS (Continued)</u>		
ABB100B:	Broadband folded loop dipole 2-30 MHz. Short model 27.4 m long. Supplied with 15 m RG213/U coaxial cable feedline. For semi-permanent applications (mast required).	ea	1
AMX:	Portable antenna mast kit for ABB100 and ABB1000 series antennas. Includes 48 ft of mast sections, guy rings, dacron rope guys, guy stakes, mast base, raising halyard rope and pulley supplied in canvas carrying bag with guy hammer.	ea	1
	<u>AMPLIFIERS AND POWER SUPPLIES</u>		
RA100-12:	100-W RF power amplifier 1.6-30 MHz. Ruggedized package compatible with MT-1099 vehicle adapter mount and PRC1099A manpack transceiver. Transceiver operates from nominal 12-Vdc power source. Order C991575 RF cable and C991585 control cable separately.	ea	1
RA100-24:	100-W RF power amplifier 1.6-30 MHz. Same as RA100-12, except operates from nominal 24-Vdc power source. Order C991575 RF cable and C991585 control cable separately (Figure B-9).	ea	1
RA400-99:	400-W RF power amplifier. 1.6-30 MHz medium power tactical amplifier for PRC1099A manpack transceiver. Designed for continuous duty applications. Fully immersible. Order C991510 RF cable and C991509 control cable separately (Figure B-10).	ea	1
RA1000-99:	1000-W RF power amplifier 1.6-30 MHz base station or mobile high-power amplifier for PRC1099A manpack. Requires 100-W RA100 amplifier as a driver unit. Designed for continuous duty applications in a rugged tactical environment. Order RF and control cables separately (Figure B-11).	ea	1
UPS100-12:	115/230-Vac power supply for RA100-12. Also supplies power for PRC1099A driver unit.	ea	1
UPS100-28:	115/230-Vac power supply for RA100-28. Also supplies power for PRC1099A driver unit.	ea	1
UPS500:	115/230-V power supply for RA400-99. Also supplies power for PRC1099A driver unit.	ea	1
UPS1000:	115/230-V power supply for RA1000-99. Also supplies power for PRC1099A driver unit.	ea	1

TABLE B-1.
Optional Accessory Equipment, Continued.

(1)	(2)	(3)	(4)
TWC STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	QTY USED PER UNIT
	<u>ANTENNA TUNERS</u> (Supplied less interface cables. Order cables as indicated).		
RAT20	25-W automatic digital antenna tuner—used with PRC1099 to locate the radiating antenna away from the radio operator. May be used with dipoles, longwires, NVIS, and other antennas.	ea	1
RAT100-99:	125-W automatic digital antenna tuner—used with RA100 amplifiers for mobile, marine, fixed and portable installation using whip and long-wire antennas. Order cables separately. (Fig. B-9).	ea	1
RAT400-99:	Automatic digital antenna tuner 400 W used with RA400-99 amplifier. For mobile (3-30 MHz) and marine, fixed or portable (2-30 MHz) installations. Provides automatic high-speed (digital) tuning on receipt of actuation signal from PRC1099A transceiver. Operates with whip and longwire antennas. Order cables separately (Figure B-10).	ea	1
RAT1000-99:	1000-W automatic digital antenna tuner. Same as RAT400-99 with additional cooling fan. Order cables separately (Figure B-11).	ea	1
	<u>SHOCK MOUNTS</u>		
RA100-SM:	Shock mount for RA100 amplifier.	ea	1
RA400-SM:	Shock mount for RA400 amplifier.	ea	1
RA1000-SM:	Shock mount for RA1000 amplifier.	ea	1
RAT100-SM:	Shock mount for RAT100 tuner.	ea	1
RAT400-SM	Shock mount for RAT400 tuner.	ea	1
RAT1000-SM	Shock mount for RAT1000 tuner.	ea	1
	<u>VEHICLE MOUNTS</u>		
MT-1099-24	Vehicle adapter with integral shock mount for installation of PRC1099A into 24-V vehicles. Unit provides power conditioning and surge/reverse polarity protection plus loudspeaker audio and interface to accessory RA100 power amplifier. Mounting dimensions identical with U.S. standard MT-1029/VRC vehicle mount. Order C991580 power cable separately.	ea	1
MT-1099-12	Vehicle adapter same as MT-1099-24 except for 12-V vehicles.	ea	1

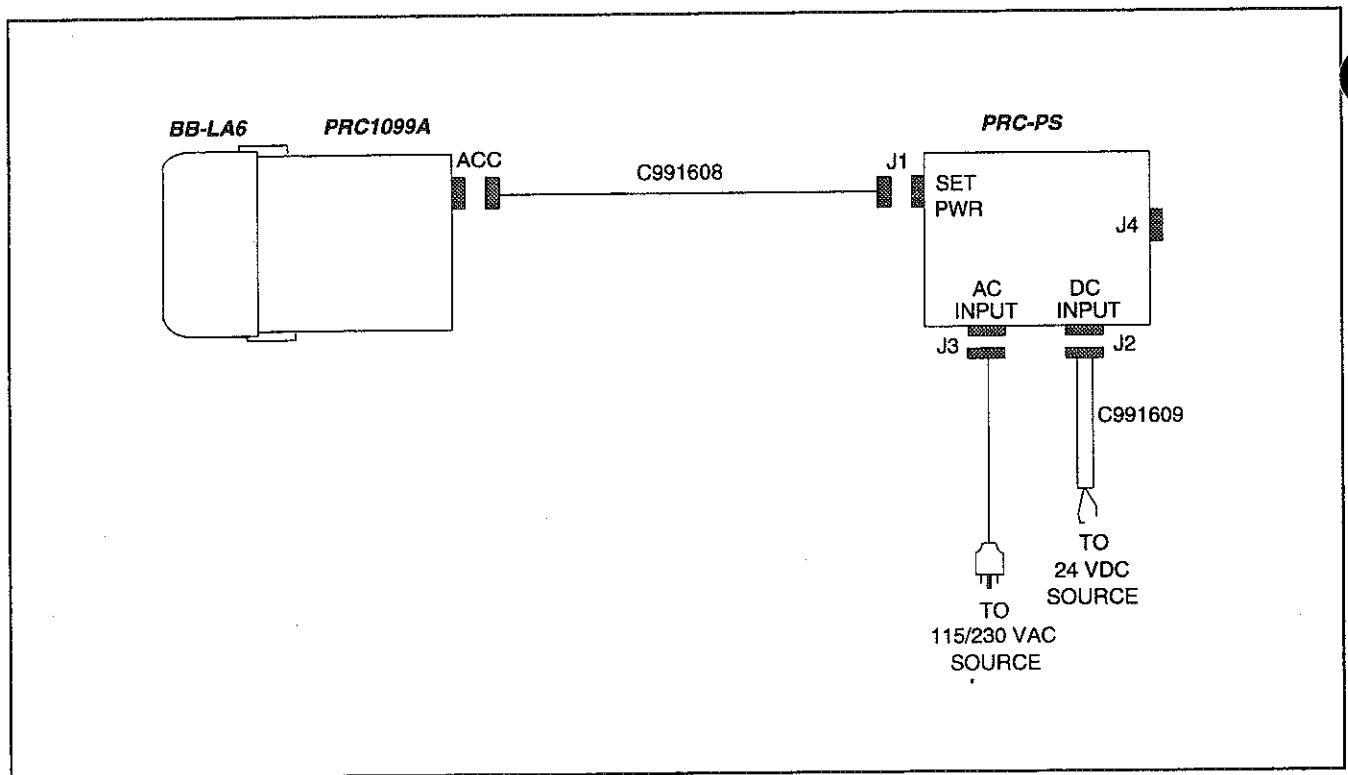


FIGURE B-1.
Operation of PRC-PS into PRC1099A.

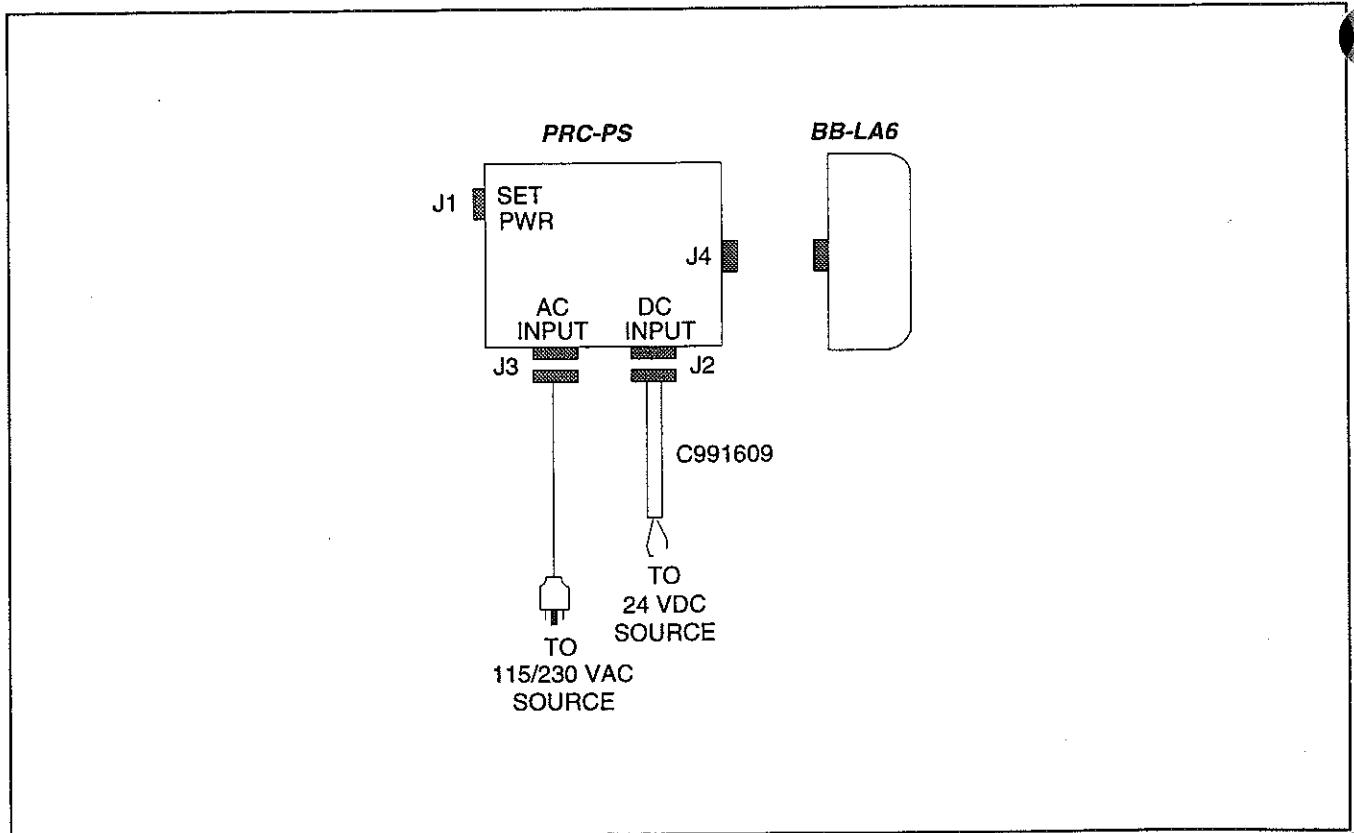


FIGURE B-2.
Operation of PRC-PS into Separate Battery.

B-3 Installation and Use of Optional Accessory Items

This section covers the installation and use of the PRC1099A with the following accessories:

1. PRC-PS
2. PRC-BC4
3. PRC-HC-30
4. PRC-SPU-10
5. RA100
6. RA400
7. RA1000
8. MT-1099

B-4 Battery Charging Using the PRC-PS Power Supply/Charger

a. The PRC-PS can charge a battery while it is attached to the radio set, and it can also operate the radio set while charging its battery. Operation is as follows:

1. Attach the transceiver with its battery to the PRC-PS as shown in Figure B-1.
2. Attach the PRC-PS to an appropriate power source, either:
 - i) 115/230 Vac, or
 - ii) 24 Vdc
3. Turn the transceiver on if both battery charging and radio operation is desired; leave the transceiver off if only battery charging is needed.
4. Turn the PRC-PS on and note the LED indicators:
 - i) If the battery is not connected, not connected properly or is shorted, the "fault" LED will come on.
 - ii) The "charging" LED will come on during a normal charge cycle.
 - iii) The "ready" LED will come on when the battery is fully charged.

b. The PRC-PS can also charge another battery connected to it through a battery connector in the rear of the unit.

1. Attach a BB-LA6 to the PRC-PS as shown in Figure B-2.
2. Attach the PRC-PS to an appropriate power source.
3. Turn the PRC-PS on and note the LED indicators:
 - i) If the battery is not connected, not connected properly or is shorted, the "fault" LED will come on.
 - ii) The "charging" LED will come on during a normal charge cycle.
 - iii) The "ready" LED will come on when the battery is fully charged.

B-5 Battery Charging using the PRC-BC4

a. Charging up to four BB-LA6 sealed lead-calcium battery packs at the same time is done as follows:

1. Attach the PRC-BC4 to an appropriate power source, either:

- i) 115/230 Vac, or
- ii) 24 Vdc

2. Attach the PRC-BC4 to the battery packs to be charged (Figure B-3).

3. Turn the PRC-BC4 on and note the LED indicators:

- i) The "fault" LED will come on if the battery is not connected, not connected properly, or is shorted.
- ii) The "charging" LED will come on during a normal charge cycle.
- iii) The "ready" LED will come on when the battery is fully charged.

B-6 Battery Charging Using the PRC-HC-30 Hand Crank Generator

a) The standard method of battery charging using the PRC-HC-30 is shown in Figure B-4.

1. Attach the BB-LA6 battery needing charging to the PRC1099A.
2. Attach the PRC-HC-30 to the PRC1099 transceiver.
3. Mount the PRC-HC-30 for convenient cranking.
4. Begin operating the PRC-HC-30 by rotating its handles.

b. If it is necessary to charge a battery directly from the PRC-HC-30 (Figure B-5):

1. Attach the BB-LA6 to the PRC-HC-30 as shown.
2. Mount the PRC-HC-30 for convenient cranking.
3. Begin operating the PRC-HC-30 by rotating its handles.

B-7 Battery Charging Using the PRC-SPU-10 Solar Power Generator

a. The standard method of battery charging using the PRC-SPU-10 is shown in Figure B-6.

1. Unfold the PRC-SPU-10 and orient it for maximum exposure to the sun.
2. Attach the battery needing charging to the PRC1099A.
3. Attach the PRC-SPU-10 to the PRC1099A transceiver.

b. If it is necessary to charge a battery directly from the PRC-SPU-10 (Figure B-7):

1. Unfold the PRC-SPU-10 and orient it for maximum exposure to the sun.

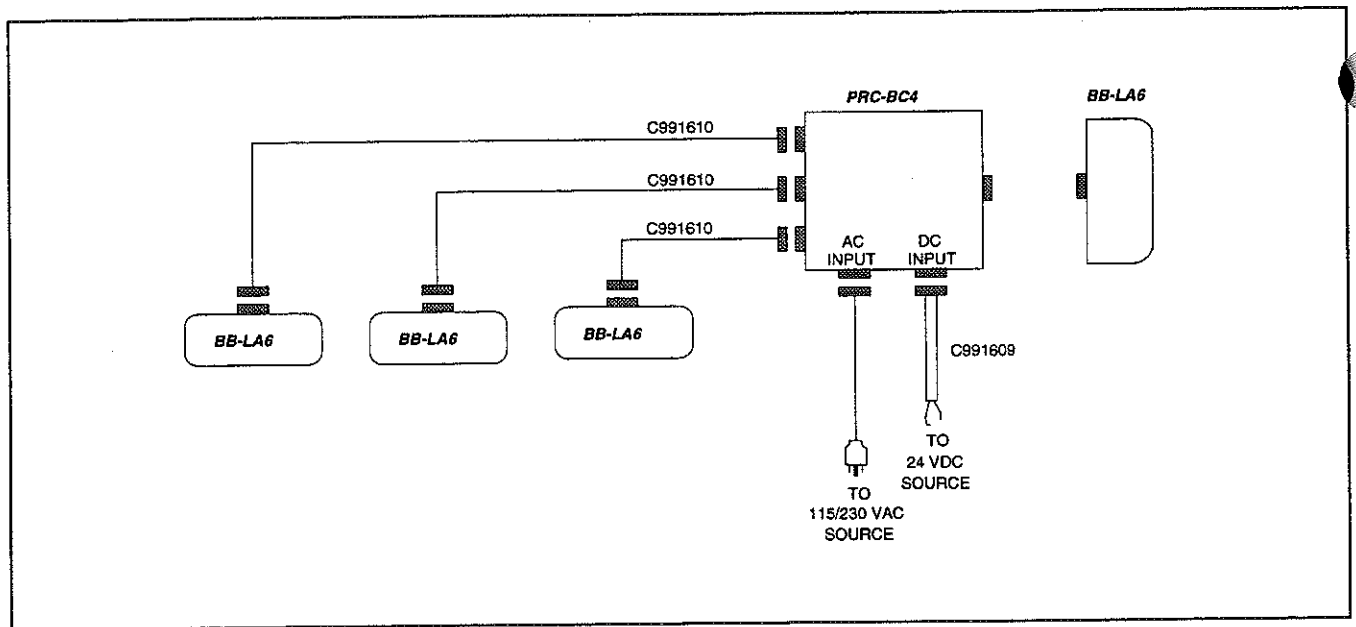


FIGURE B-3.
Operation of PRC-BC4 with Batteries.

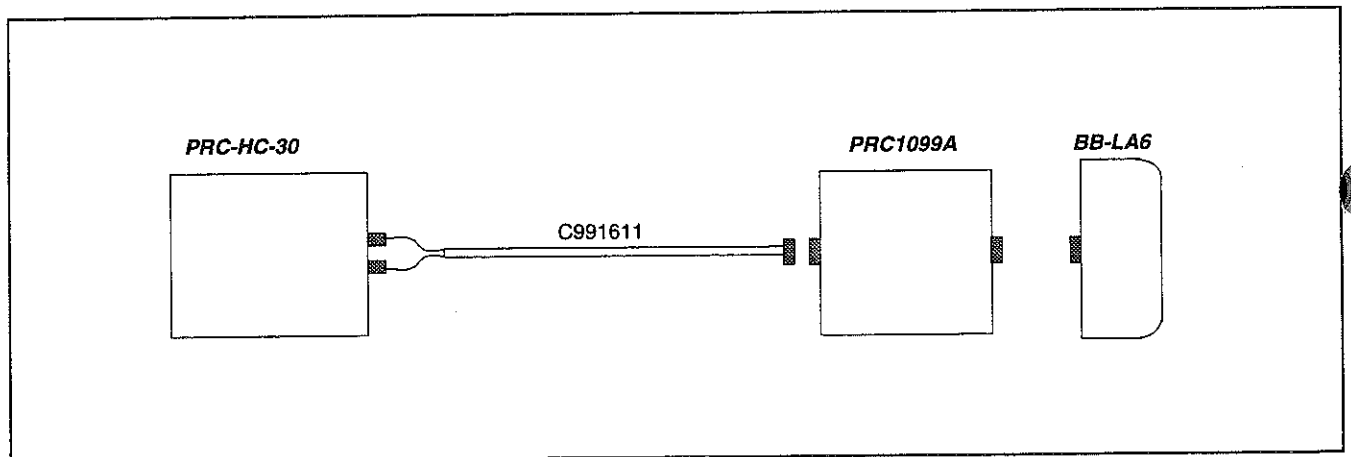


FIGURE B-4.
Battery Charging Using the PRC-HC-30 and PRC1099A.

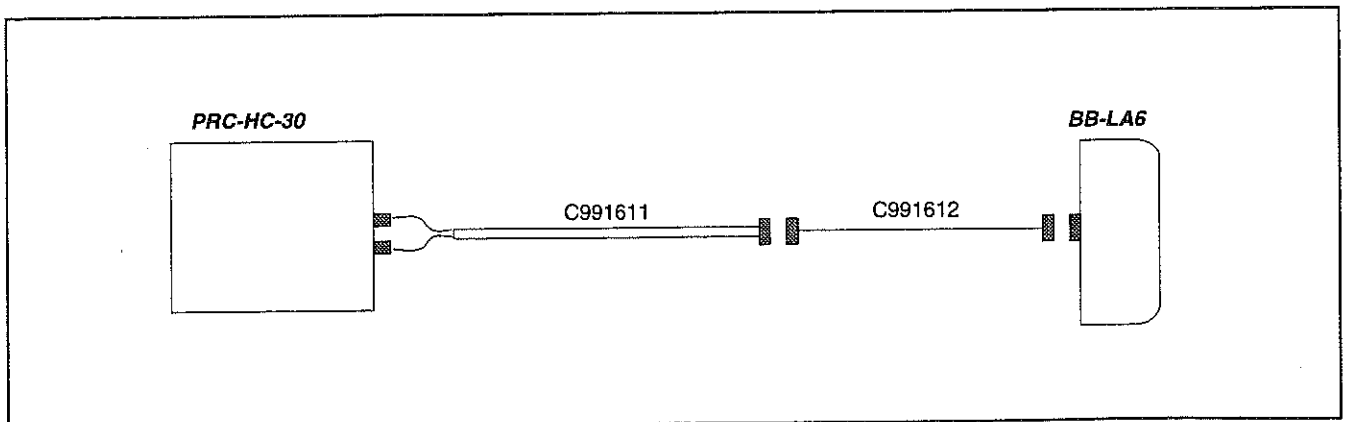


FIGURE B-5.
Battery Charging Using the PRC-HC-30 Directly.

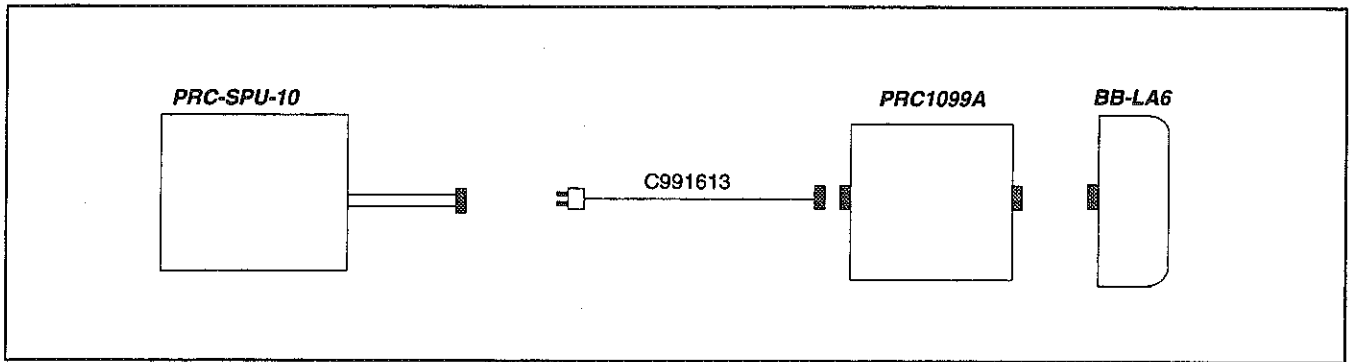


FIGURE B-6.
Battery Charging Using the PRC-SPU-10 and PRC1099A.

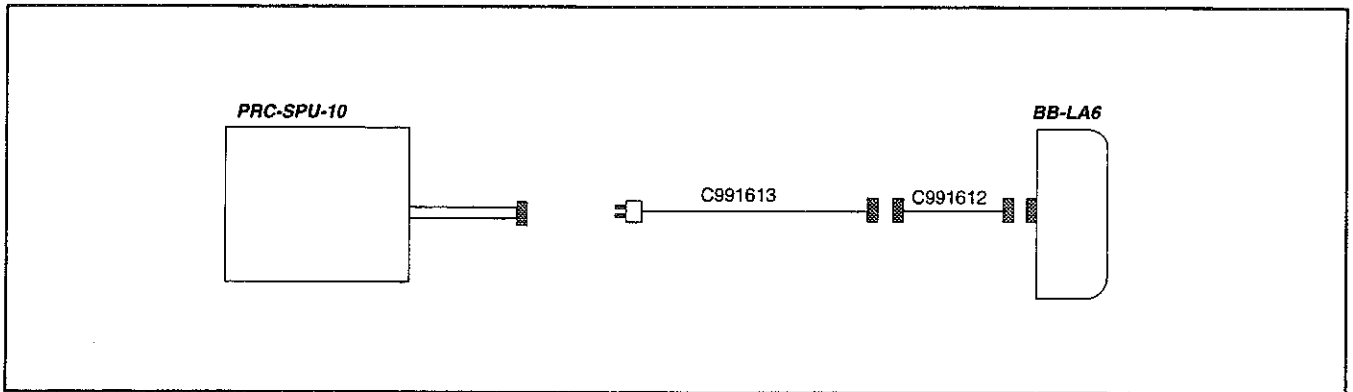


FIGURE B-7.
Battery Charging Using the PRC-SPU-10 Directly.

2. Attach the BB-LA6 to be charged to the PRC-SPU-10.

B-8 Mobile 20-W System Operation

- a. The PRC1099A can be used in a mobile configuration as shown in Figure B-8.

NOTE

This system can be used with either 12- or 24-V vehicles; the only difference is that 12-V vehicle installations must use the MT-1099-12 mount while 24-V vehicle installations must use the MT-1099-24 mount. Everything else, including cabling, is the same.

1. The radio set must have its battery box attached.
2. Slide the PRC1099A into the MT-1099 mount and clamp it in place.
3. Attach the correct cables as indicated in Figure B-8.

B-9 Mobile 100-W System Operation

- a. The PRC1099A can be used in a mobile configuration with the RA100 power amplifier as shown in Figure B-9.

NOTE

As in the 20-W mobile system, 12- or 24-V operation is possible in this configuration also. It is necessary to make sure the RA100 as well as the MT-1099 is the proper 12- or 24-V model.

1. Attach the battery box to the PRC1099A.
2. Slide the PRC1099A into the MT-1099 mount and clamp in place.
3. Attach the RA100 amplifier to the MT-1099 mount.
4. Attach the RAT100 automatic antenna tuner to its shock mount, then mount to the vehicle immediately next to the vehicular antenna.
5. Hook up the correct cables as shown in Figure B-9.

B-10 Mobile 400-W System Operation

- a. The PRC1099A can be used in a mobile configuration with the RA400 power amplifier as shown in Figure B-10.

NOTE

This system can only be used in a 24-V vehicle.

1. Attach the battery box to the PRC1099A.
2. Slide the PRC1099A into the MT-1099-24 mount and clamp in place.
3. Attach the RA400 amplifier to its shock mount, and mount to the vehicle.
4. Attach the RAT400 ATU to its shock mount, and then mount to the vehicle immediately next to the antenna.
5. Hook up the correct cables as shown in Figure B-10.

B-11 Mobile 1000-W System Operation

- a. The PRC1099A can be used in a mobile configuration with the RA1000 power amplifier as shown in Figure B-11.

NOTE

This system can only be used in a 24-V vehicle.

1. Attach the battery box to the PRC1099A.
2. Slide the PRC1099A into the MT-1099-24 mount and clamp in place.
3. Attach the RA100-24 amplifier to its shock mount, and mount to the vehicle.

NOTE: For 12-V vehicles, use the MT1099-12;
For 24-V vehicles, use the MT1099-24.

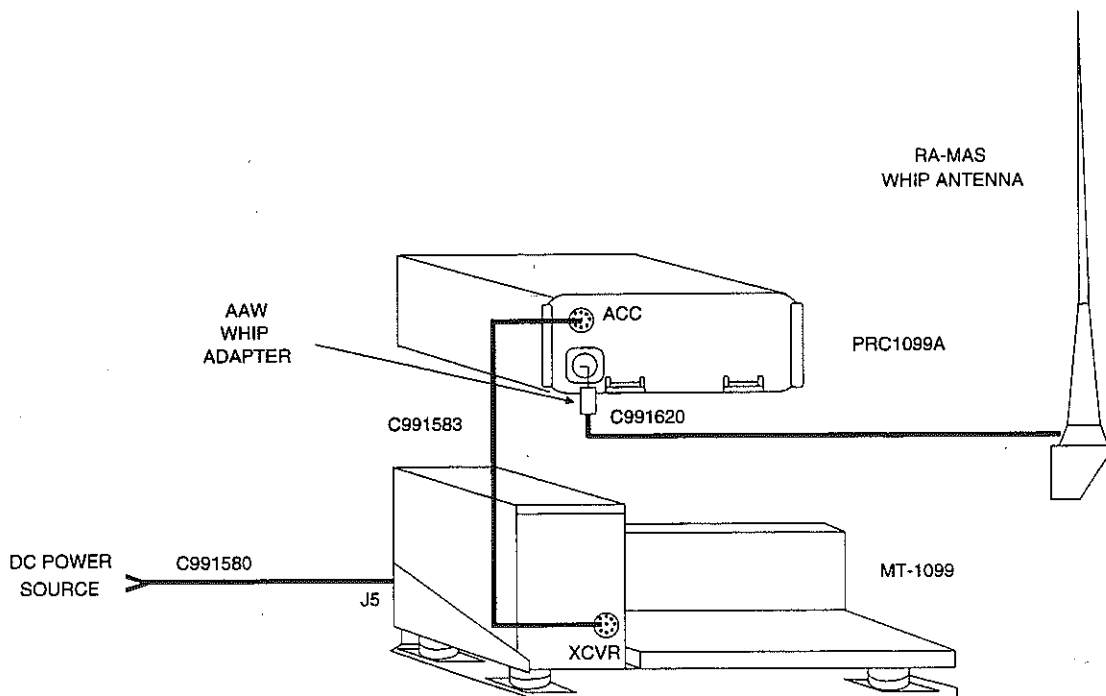


FIGURE B-8.
Mobile 20-W System.

NOTE: For 12-V systems, use the MT1099-12 and RA100-12;
For 24-V systems, use the MT1099-24 and RA100-24.

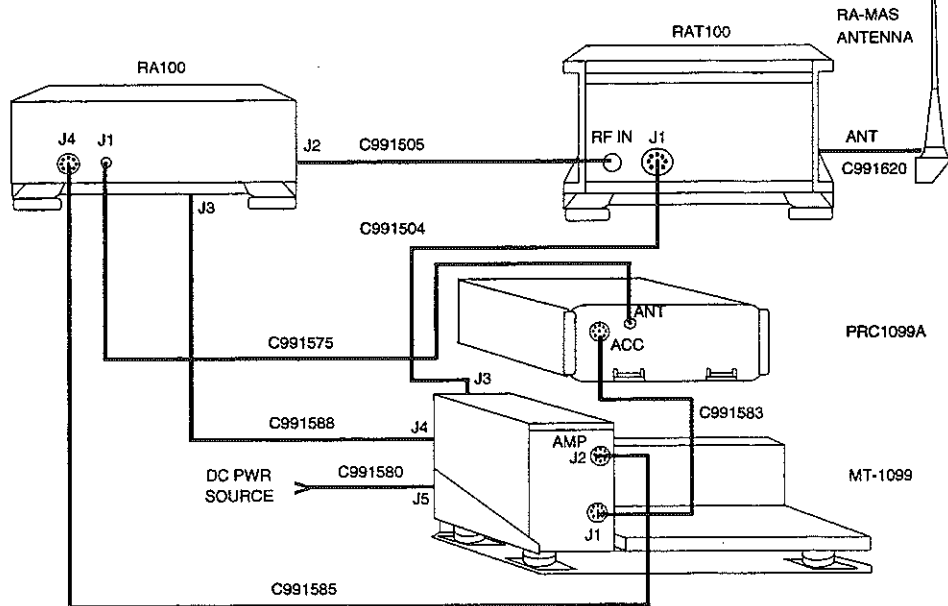


FIGURE B-9.
Mobile 100-W System.

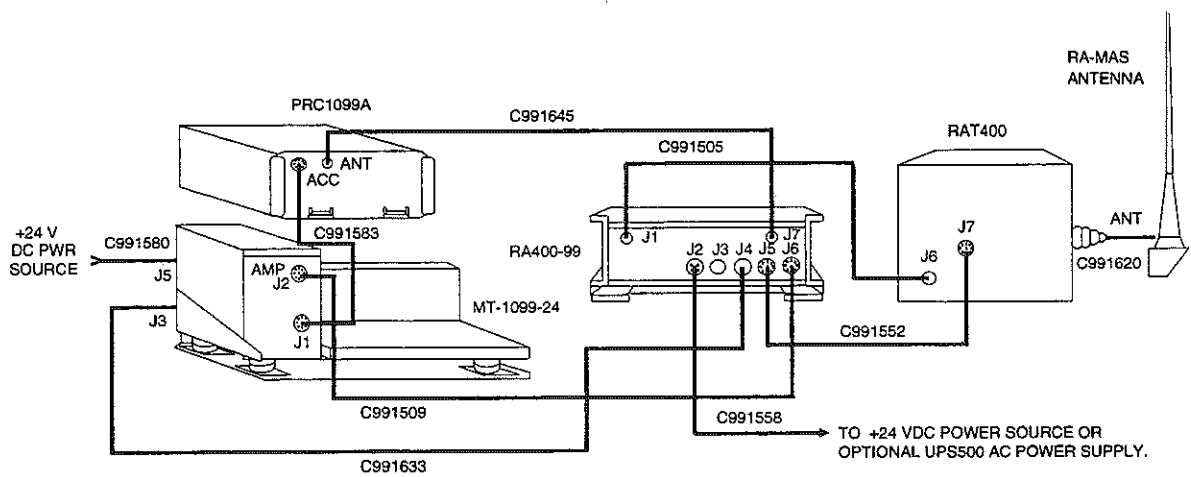


FIGURE B-10.
Mobile 400-W System.

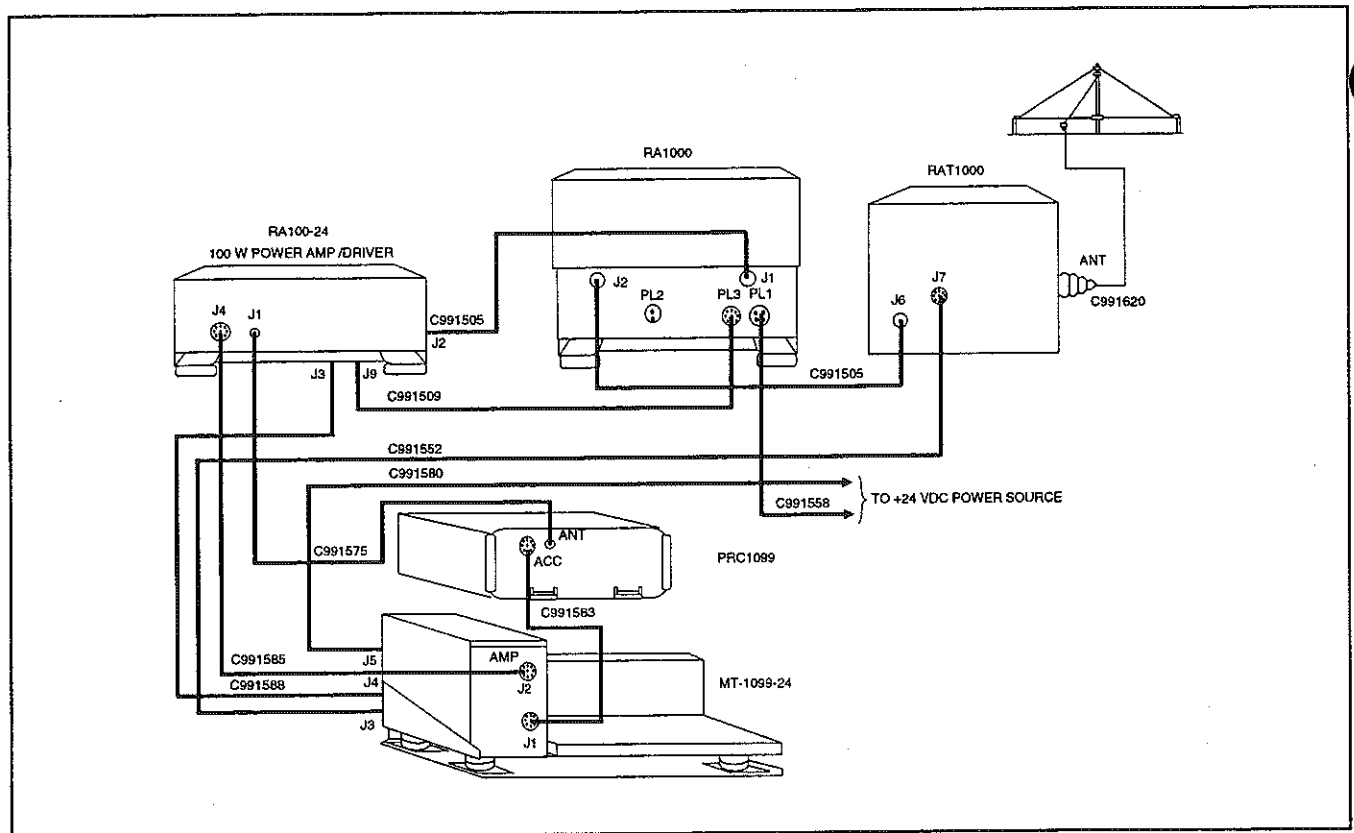


FIGURE B-11.
Mobile 1000-W System.

4. Attach the RA1000 amplifier to its shock mount, and mount to the vehicle.
5. Attach the RAT1000 ATU to its shock mount, and the mount to the vehicle immediately next to the antenna.
6. Hook up the correct cables as shown in Figure B-11.

B-12 Fixed/Portable Station Systems

a. All of the systems previously described can also be used in fixed or portable stations. In these cases the external power must be obtained from ac power sources instead of vehicular supplies.

1. 100-W systems can use the UPS100-12 (for 12-V operation) or UPS100-24 (for 24-V operation) as the primary power source.

Referring to Figure B-9, cable C991580 going between the vehicular power source and the MT-1099 must be replaced with cable C991614. This cable connects the MT-1099 to the UPS100.

2. 400-W systems can use the UPS100 and cable C991614 to power the MT-1099, and also use the UPS500 power supply as the primary power source for the RA400.

Referring to Figure B-10, cable C991580 going between the vehicular power source and the MT-1099 must be replaced with cable C991614; this cable connects the MT-1099 to the UPS100.

Also in Figure B-10, cable C991558 going between the vehicle power source and the RA400 must be replaced with cable C991508; this cable connects the RA400 to the UPS500.

3. 1000-W systems can use the UPS100 and cable C991614 to power the MT-1099, and also use the UPS1000 power supply as the primary power source for the RA1000.

Referring to Figure B-11, cable C991580 going between the vehicular power source and the MT-1099 must be replaced with cable C991614; this cable connects the MT-1099 to the UPS100.

Also in Figure B-11, cable C991558 going between the vehicular power source and the RA1000 must be replaced with cable C991508; this cable connects the RA1000 to the UPS1000.

APPENDIX C

BATTERY TYPES AND ACCESSORY CABLES

TABLE C-1.
Battery Types.

NON-RECHARGEABLE:			NOMINAL OPERATIONAL LIFE 9:1 Receive/ Transmit Ratio
PART NO.	TYPE	CHARACTERISTICS	
BA-6598/U	Lithium/Thionyl-Chloride	14.4V 14 AMP HRS	50 HRS
BA5598/U	Lithium/Sulfur Dioxide	14.4V 7 AMP HRS	25 HRS
BA4386/U†	Magnesium	14.4V 4 AMP HRS	14 HRS
RECHARGEABLE:			NOMINAL OPERATIONAL LIFE 9:1 Receive/ Transmit Ratio
PART NO.	TYPE	CHARACTERISTICS	
BB-LA6	Sealed Lead-Calcium	12V 6 AMP HR	20 HRS
BB-NC4	Nickel Cadmium "D" Cell Pack	12V 3.6 AMP HR	12 HRS
NOTES:			
† Limited peak current capacity - PRC1099A operates on 5W low power position only when using BA4386/U.			

TABLE C-2.
Accessory Cables.

CABLE P/N	CABLE DESCRIPTION	LENGTH
C991608	PRC-PS to PRC1099A—power	3 ft
C991609	External 24 Vdc source to PRC-PS/PRC-BC4—power	10 ft
C991610	PRC-BC4 to BB-LA6—power	3 ft
C991611	PRC-HC-30 to PRC1099A—power	6 ft
C991613	PRC-SPU-10 to PRC1099A—power	3 ft
C991617	PRC-SPU-10 to BBLA6—power	3 ft
C991618	PRC-HC-30 to BBLA6—power	3 ft
C991580	External Battery to MT-1099—power	10 ft
C991672	PRC1099A to RAT20 - control	66 ft
C991673	PRC1099A to RAT20 - RF	66 ft
C991583	MT-1099 to PRC1099A—control	1 ft
C991586	AAW adaptor to whip—RF	18 in

TABLE C-2.
Accessory Cables. Continued.

CABLE P/N	CABLE DESCRIPTION	LENGTH
C991588	MT-1099 to RA100—power	18 in
C991585	MT-1099 to RA100—control	18 in
C991504	MT-1099 to RAT100—control	16 ft
C991505	RA100 to RAT100—RF	16 ft
C991620	RAT100 to whip—RF	18 in
C991575	PRC1099A to RA100—RF	8 in
C991558	External 24 Vdc to RA400—power	10 ft
C991509	MT-1099 to RA400—control	16 ft
C991552	RA400 to RAT400—control	16 ft
C991510	PRC1099A to RA400—RF	3 ft
C991511	RA1000 to RA100—power	16 ft
C991614	UPS100 to MT-1099—power	3 ft
C991508	UPS500 to RA400—power	3 ft

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