

ERC-310

MANPACK TRANSCEIVER

OPERATION AND MAINTENANCE MANUAL

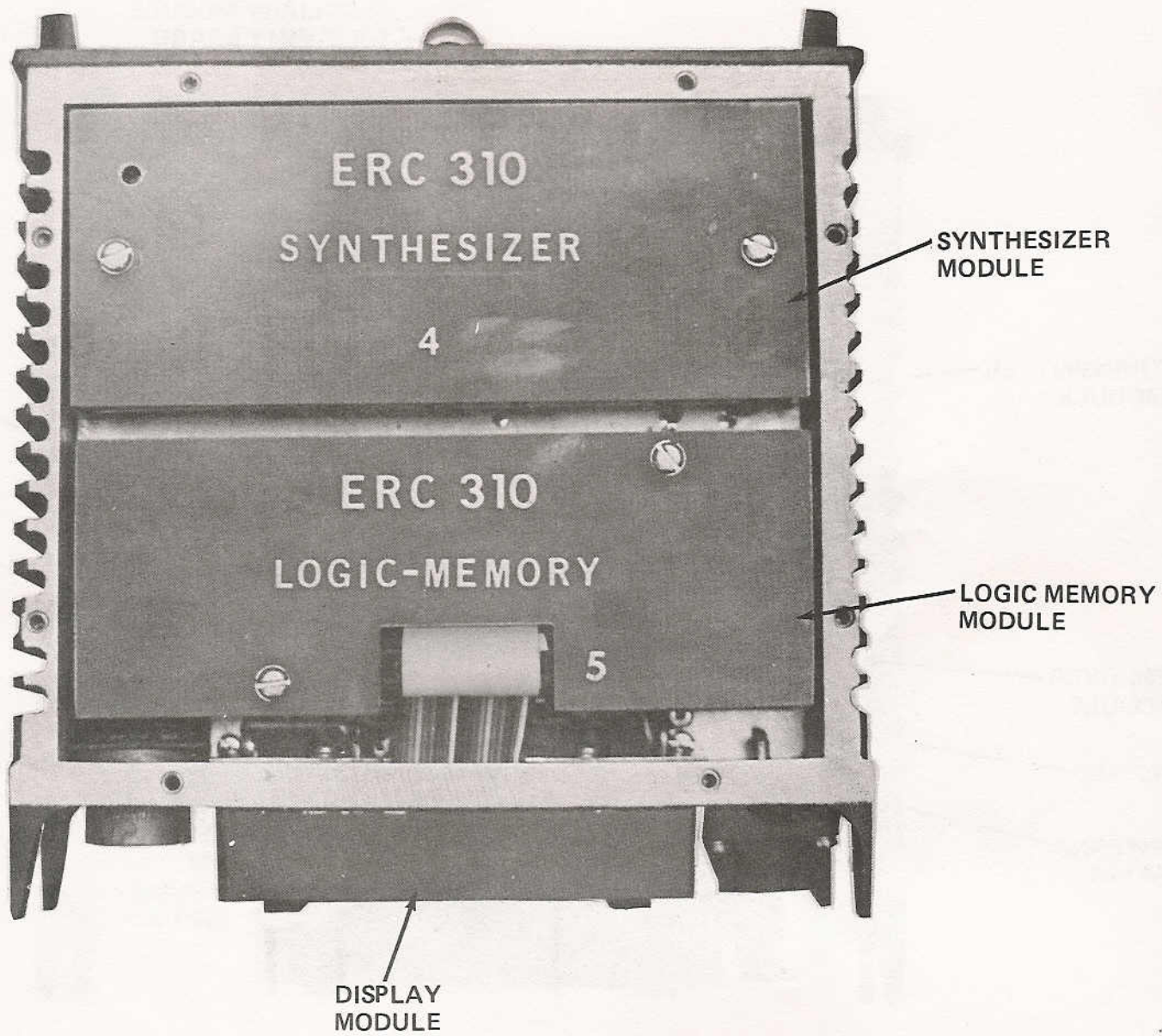


Figure 1-2. ERC-310 Manpack Transceiver, Top View

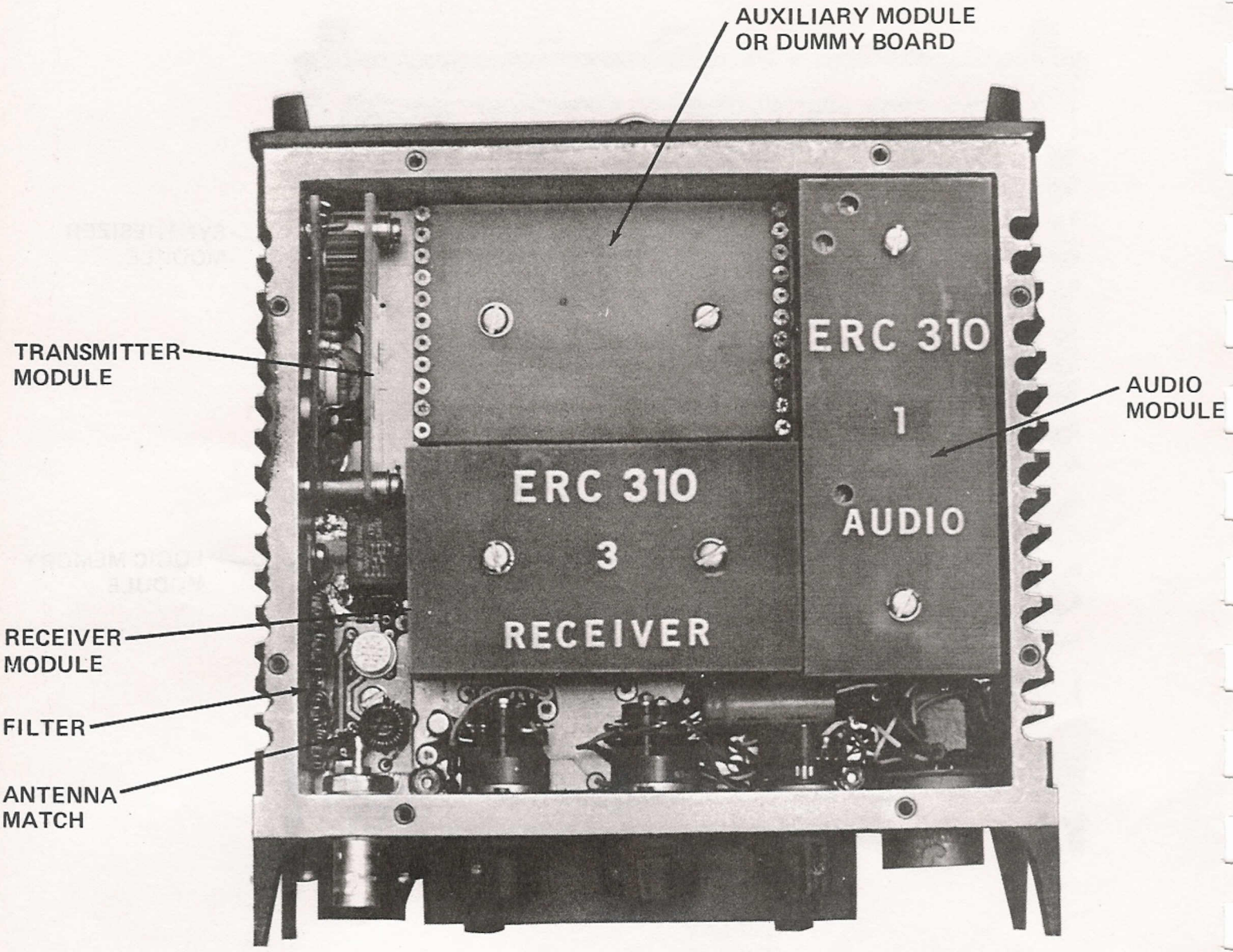


Figure 1-3. ERC-310 Manpack Transceiver Bottom View

1-5. ACCESSORIES

The following accessories are available to provide alternative methods of deploying the ERC-310:

- Carrying Case (webbing and harness)
- External Power Cable (2 meters)
- Headset and Boom Microphone
- Semi-base (Discone) Antenna with Cable (10 meters)
- Rebroadcast Cable (1 meter)
- Field Battery Charger (11-30 volts DC)
- AC Adapter for Field Charger (110-220 volts AC)
- Solar Battery Charger
- Base Station Power Supply Unit (110-220 volts AC)

1-6 REFERENCE DATA

General

Frequency Range	30 to 80 MHz (any 20 MHz segment)
Channel Spacing	25 kHz
Number of Channels	800
Number of Pre-set Channels	3
Mode of Operation	F3, simplex
Frequency Stability	Better than 2.5 kHz
Operating Voltage	10 to 30 VDC
Battery Pack	NiCad; 13.2 VDC – 2 AH
Battery Life	15 hours on a 10:90 Duty Cycle
Configuration	Manpack Vehicular Base Station
Rebroadcast	Via Multicore Cable

Transmitter

RF Power Output	1.5 W min. into 50-ohms @ 10 V increasing to 5.0 W @ 24 V
Spurious Attenuation	>70 dB
Harmonic Attenuation	>60 dB
Modulation Deviation	5 kHz (Voice) 1.5 kHz (Tone)
Modulation Distortion	< 8% @ 1 kHz
Modulation Frequency	300 to 2700 Hz within 3 dB
Response	5.4 kHz – 20 dB
Modulation Limiting	Speech Processor with Whisper facility (automatic)
Transmit Current Drain (12V)	800 mA

1-6 REFERENCE DATA (Continued)

Receiver

Sensitivity	0.4 μ V for 10 dB SINAD
Adjacent Channel Rejection	>75 dB
Image Rejection	>75 dB
IF Rejection	>75 dB
Audio Output	4mW into 600 ohms
Distortion	<8% @ 1 kHz
Receive Current Drain (12V)	80 mA

Mechanical and Environmental

Weight (including battery)	<5-1/2 lbs. (2-1/2 kg)
Temperature Range	-40°C to +65°C (operating) -55°C to +75°C (storage)
Humidity	95% R.H. @ 55°C
Altitude	4500 meters (operating) 9000 meters (transport)
Immersion	2 hours @ 1 meter
Vibration	MIL-STD-810
Bumping	DEF-133

CHAPTER 2

SERVICE UPON RECEIPT AND INSTALLATION

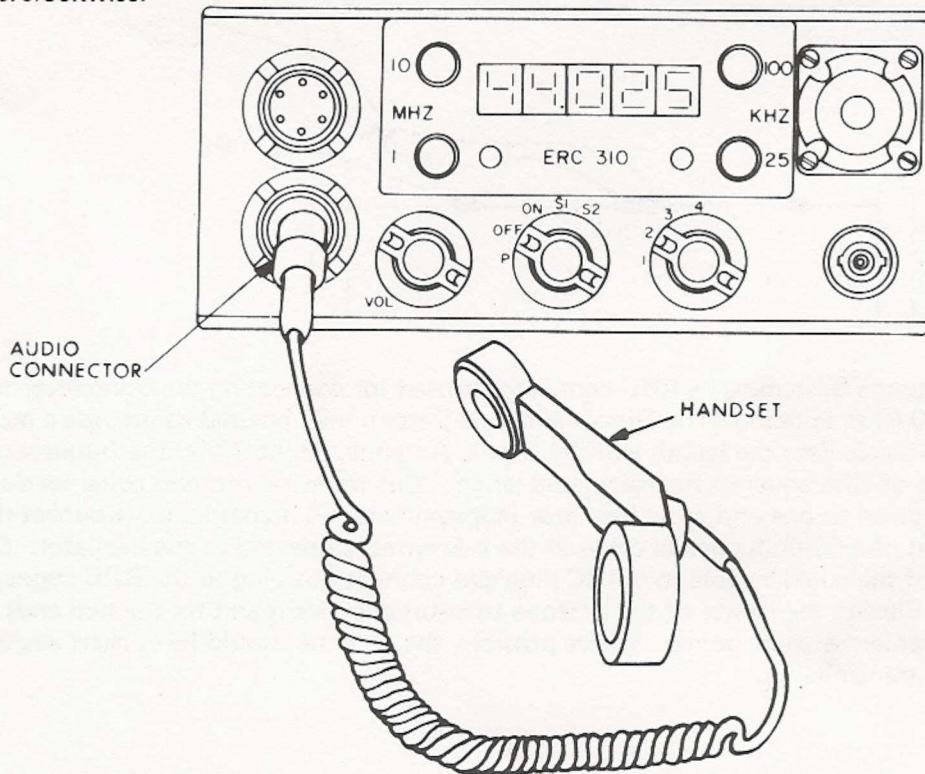
2-1. UNPACKING AND INSPECTION

Immediately upon receipt of the ERC-310, inspect the packing box and the unit for signs of possible shipping damage. Ascertain if the transceiver is performing satisfactorily as outlined in the Operating Instructions, Chapter 3. If the transceiver is damaged or fails to operate properly, file immediate claim with the carrier who is responsible to deliver your shipment undamaged. Failure to check for and report damage immediately may result in monetary loss to you.

It is recommended you keep the shipping carton. In the event storage or reshipment becomes necessary it will come in handy.

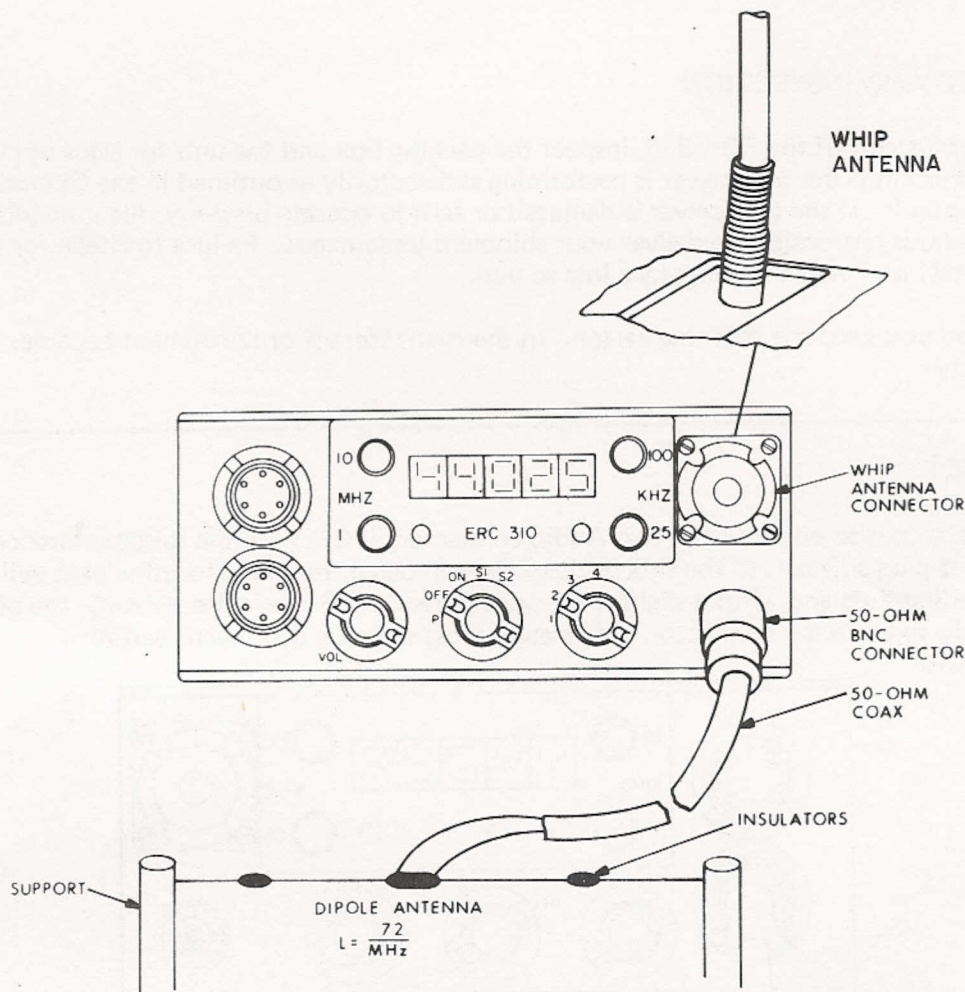
2-2. HANDSET

Connect the Handset to either of the two Audio connectors (10). With the raised reference mark on the Handset plug adjacent to the short side of the top panel, the three locating pegs will fit into the corresponding slots and, with a slight downward pressure and clockwise twisting, the plug will be securely fixed to the connector. To release, press the plug downward and turn counterclockwise.



2-3. ANTENNA INSTALLATION

2-3.1 Whip Antenna. In normal use, a Whip Antenna is inserted into the Whip Antenna connector.
Note: At no time should an antenna be connected to both connectors simultaneously.

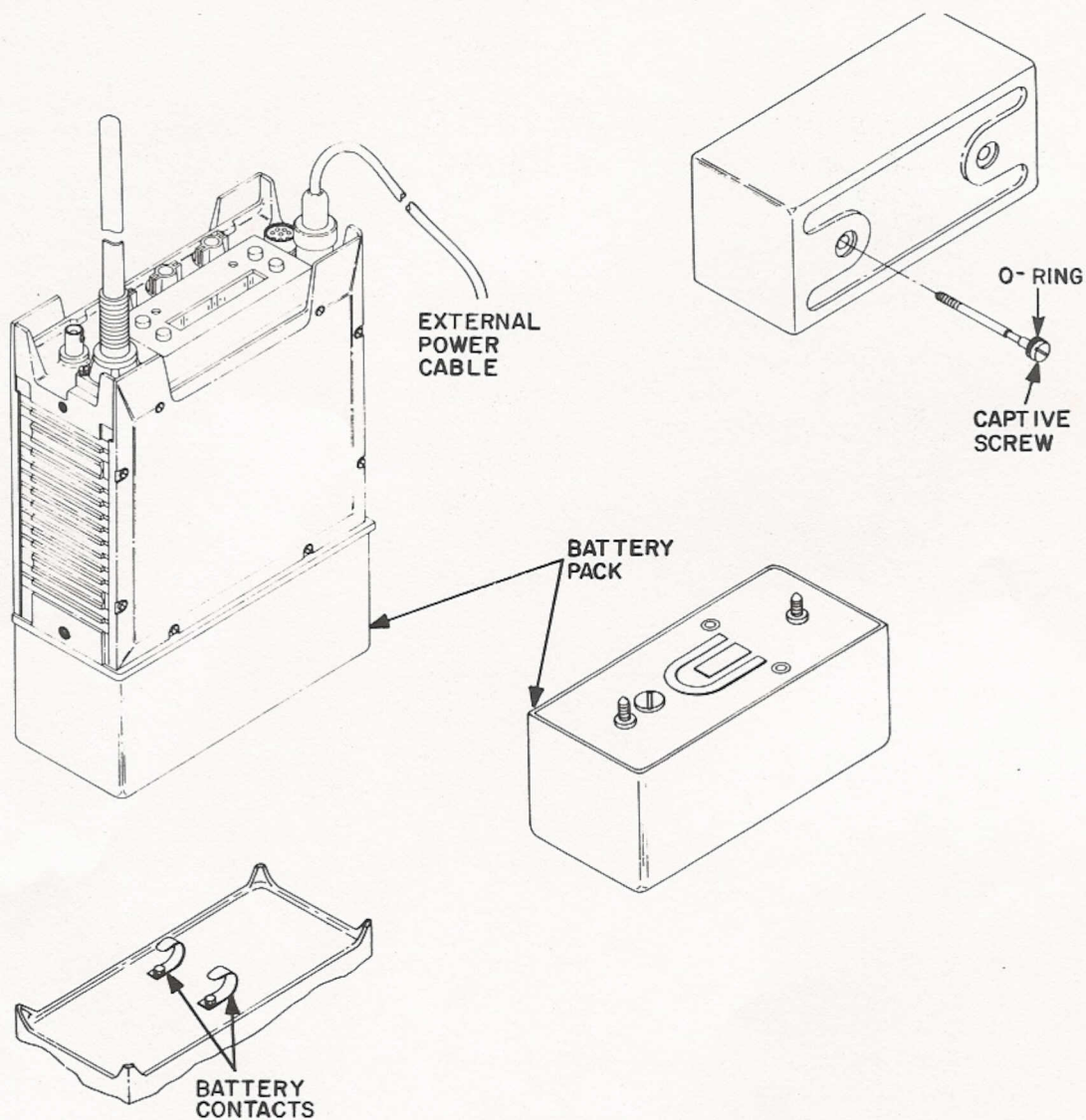


2-3.2 Alternate Antenna System. The BNC connector is used for connecting the transceiver to any other type of 50-Ohm antenna. The Dipole Antenna System may be used to provide a more efficient antenna. To calculate the length and the Dipole Antenna, divide 72 by the frequency in MHz and cut a piece of wire equal to the calculated length. Cut the wire into two equal sections and connect each section to one end of an insulator (approximately 6 inches long). Connect the conductor and shield of a 50-ohm coaxial cable to the two wires connected to the insulator. Connect the other end of the coaxial cable to a BNC plug and connect this plug to the BNC connector on the transceiver. Elevate the center of the antenna to a suitable height and fix the two ends of the antenna to convenient anchor points. Where possible, the antenna should be at right angles to the direction of the transmission.

2-4. POWER REQUIREMENTS

2-4.1 External Power Source. The transceiver can be connected directly to a vehicular or base station 11-30 - volt DC source without a power supply adapter using the external power cable. Connect one end of the cable to either of the two front panel audio connectors as shown below and the other end to the power source.

NOTE: On above 18 VDC cannot be used continuously on transmit.



2-4.2 NiCad Battery Pack. The NiCad Battery pack provides DC voltage for manpack operation of the transceiver. Mate the contacts on the battery pack with battery contacts on rear of transceiver. Secure the captive screw on rear of battery pack.

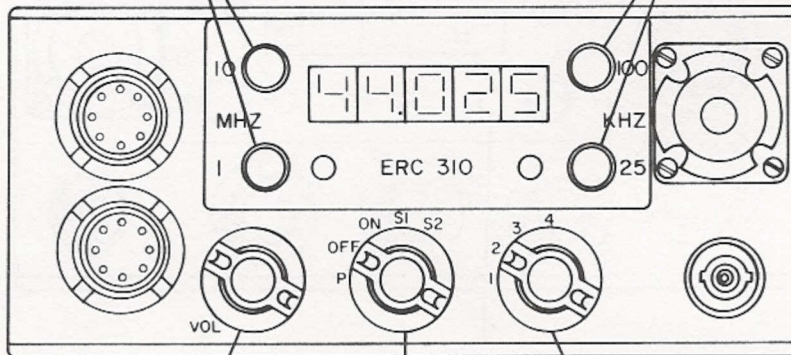
CHAPTER 3

OPERATING INSTRUCTIONS

3-1. OPERATOR CONTROLS, INDICATORS, AND CONNECTORS

3-1.1 Controls.

Frequency Selection Pushbuttons – Preset transceiver frequency of operation in 10 MHz, 1 MHz, 100 kHz, or 25 kHz steps. Depressing any of the pushbuttons illuminates the display for approximately 5 seconds.



Volume Control – Adjusts receiver audio level.

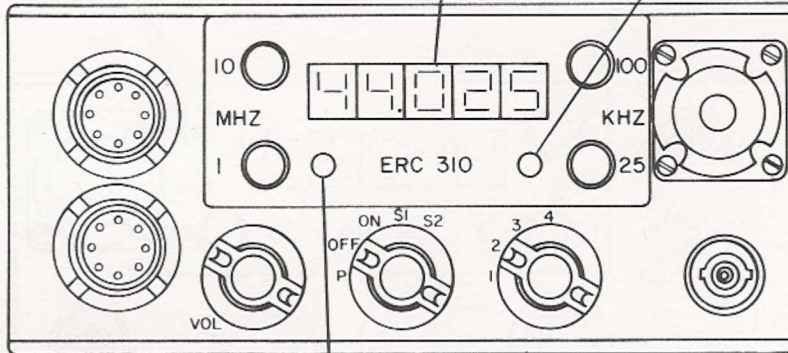
Memory Switch – Selects up to four preset frequencies.

Function Switch – (Program Mode) allows programming up to four specific frequencies into the radio's memory prior to a mission. OFF disconnects radio from the supply voltage. ON allows radio to operate with no squelch. S1 selects tone squelch – audio will be heard if the receiver receives a signal modulated by a 150 Hz tone; otherwise radio remains mute. S2 selects noise squelch – audio will be heard when the RF signal has 6 to 15 dB SINAD (internally presettable); otherwise radio remains mute.

3-1.2 Indicators and Sensor.

Battery Condition Indicator — Operates when Display is on to indicate battery condition. Lights to indicate battery state of charge is adequate to assure usable communications. When not illuminated, it indicates that battery is either in a state of discharge or near discharge.

Display — Displays frequency present by Frequency Selection pushbuttons.

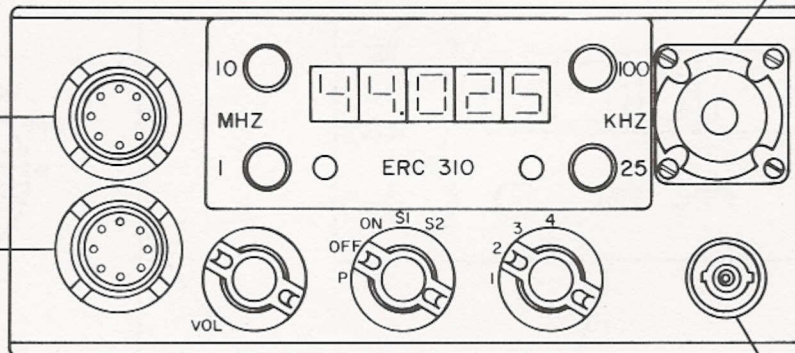


Display Intensity Sensor — Determines display brightness. In strong sunlight, display intensity is increased; in darkness, display intensity is decreased.

3-1.3 Connectors

Audio Connectors – Provides connection to Handset, External Power Cable and Rebroadcast Cable, and other accessories.

Whip Antenna Connector – Provides connection of Whip Antenna.



50-Ohm BNC Connector – Provides connection of Discone, Dipole, or other 50-Ohm Antenna.

3-2 MODES OF OPERATION

The transceiver is capable of operating in the following modes of operation.

- a. Normal preset frequency mode of operation
- b. Guard channel operation (option)
- c. Frequency hopping operation (option).

CHAPTER 4

PRINCIPLES OF OPERATION

Section I. TRANSCEIVER OVERALL FUNCTIONING

4-1. INTRODUCTION.

The ERC-310 is a fully synthesized manpack transceiver providing 800 channels, at 25 KHz spacing, of voice communication in any 20 MHz band of the 30 to 80 MHz frequency range. The 20 MHz operating band of the transceiver is factory installed to any desired 20 MHz band between 30 and 80 MHz (i.e., 30-50 MHz, 35-55 MHz, 40-60 MHz, 50-70 MHz, 60-80 MHz, etc.). The transceiver can be supplied with up to three modes of operation: normal preset channel operation is standard; guard channel operation and semi-duplex operation are optional. A factory installed option is available to provide 400 channels at 50 KHz spacing in lieu of the standard 800 channels at 25 KHz spacing.

4-2. TRANSCEIVER OVERALL BLOCK DIAGRAM FUNCTIONING. (See figure 8-1.)

The ERC-310 can be operated from a battery pack or can be connected directly to a vehicular or base station 24-volt DC power source without a power supply adapter. The applicable power source is connected to the audio module which contains the main power supply for the radio and to a voltage regulator on the logic memory module which provides the operating voltage for the logic memory module circuitry and for the display module. External power is applied to the transceiver via one of the front panel Audio connectors. A front panel Battery Condition Indicator lights to indicate that battery charge is adequate to assure usable communications. When not illuminated, it indicates that battery is either in a state of discharge or near discharge.

Prior to using the radio in the normal preset frequency mode of operation, the operator programs up to four specific frequencies into the radio's memory prior to a mission. This is accomplished by placing the Memory Select switch in the program (P) position and using the Frequency Select pushbuttons to enter a specific frequency for each position of the Memory Select switch. When communications on a predetermined channel is desired, the operator then merely selects the preset number on the Memory Select switch and the radio is immediately on the frequency programmed to that position earlier. A factory installed option can provide up to 10 Memory Channels. Actuation of the Frequency Select pushbuttons when the Function Select switch is on any position other than P will not affect the programmed frequencies.

The receiver module contains the entire receiver with the exception of the audio amplifiers. It is broad-band, operating between 30 and 80 MHz and limits the operating band to a 20 MHz segment selected by the user. Although operating in the 30 to 80 MHz band, the receiver has been tested to operate virtually flat to 500 MHz.

The audio module is used for both receiver and transmitter functions. On receive the audio module delivers approximately 4 milliwatts into a 600 ohm headset. The audio module also includes tone and noise squelch generators, selectable by the Function switch. The ON position of the function switch allows the radio to operate with no squelch. Position S1 of the Function switch selects tone squelch,