OPERATOR MANUAL

FOR

MICOM-Z
HF-SSB TRANSCEIVERS

Revision A

March 2014

WARNINGS, CAUTIONS AND NOTES

The following notations are used to place special emphasis on procedures, or to call attention to precautionary measures.

WARNING

An operating procedure, practice and so forth, which if not followed correctly, could result in personal injury, or loss of life.

CAUTION

An operating procedure, practice and so forth, which if not followed correctly, could result in damage to, or destruction of equipment.

NOTE

An operating procedure, condition and so forth, to which special attention should be paid.

GENERAL SAFETY PRECAUTIONS

⚡✋⚡ **WARNING - HIGH VOLTAGE**

During transmission, high RF voltages may appear at the RF connectors of the transceiver, antenna tuner (ATU), the antenna cable, and on the antenna itself.

Avoid touching the antenna and the RF connectors of a radio set while it operates.

Make sure the antenna is not located near high-voltage lines.

Operating and maintenance personnel must be familiar with the applicable safety requirements and regulations before attempting to install or operate the radio set.

SAFETY SUMMARY

The following are general safety precautions that are not related to any specific procedures and therefore do not appear elsewhere in this publication. These are recommended precautions that personnel must understand and apply during various phases of operation and maintenance.

KEEP AWAY FROM LIVE CIRCUITS. Operating personnel must at all times observe all safety regulations. Do not replace components or make adjustments inside the equipment with the high voltage supply turned on. Under certain conditions, dangerous potentials may exist even when the power control is in the OFF position, due to charges retained by capacitors. To avoid casualties, always remove power and discharge and ground a circuit before touching it.

DO NOT SERVICE OR ADJUST ALONE. Under no circumstances should any person reach into the equipment enclosure for the purpose of servicing or adjusting the equipment except in the presence of someone who is capable of rendering aid.

RESUSCITATION. Personnel working with or near high voltages should be familiar with modern methods of resuscitation.

USE SAFETY APPROVED EQUIPMENT. When cleaners and primers are being applied, approved explosion-proof lights, blowers, and other equipment shall be used. Insure that firefighting equipment is readily available and in working order.

GIVE CLEANERS SPECIAL CARE. Keep cleaners in special polyethylene bottles or in safety cans and in minimum quantities. Discard soiled cleaning cloths into safety cans.

BURN INJURY. When touching transceiver body while operating the radio in ambient temperature above 55 degrees Celsius, heat preventive gloves shall be used.

FIRE HAZARD for Finland, Norway, Sweden:

In Finland, Norway and Sweden unit shall be installed in restricted access location only.

Equipment connected to the protective earthing of the building installation through the mains connection or through other equipment with a connection to protective earthing – and to a cable distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a cable distribution system has therefore to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11).

Norwegian:

Utstyr som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet

utstyr – og er tilkoplet et kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av utstyret til kabel-TV nettet installeres en galvanisk isolator mellom utstyret og kabel- TV nettet.

Swedish:

Utrustning som är kopplad till skyddsjord via jordat vägguttag och/eller via annan

utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medf ra risk f r

brand. F r att undvika detta skall vid anslutning av utrustningen till kabel-TV nät

galvanisk isolator finnas mellan utrustningen och kabel-TV nätet.

TABLE OF CONTENTS

Page

TABLE OF CONTENTS (Cont'd)

TABLE OF CONTENTS (Cont'd)

LIST OF ILLUSTRATIONS

Page

LIST OF TABLES

Intentionally Left Blank

CHAPTER 1

GENERAL DESCRIPTION

1-1. SCOPE

This manual provides instructions regarding the installation and operator maintenance of the Micom-Z family of adaptive high-frequency (HF) single sideband (SSB) radio sets. The manual is organized as follows:

Chapter 1	**General Description:** provides a general description of the Micom-Z and its main components, and presents the main technical characteristics.
Chapter 2	**Operating Procedures:** provides the information needed to familiarize with the Micom-Z panels, general procedures for using the Micom-Z keypad and display to perform any desired task, and detailed operating procedures for each main radio operating mode.
Chapter 3	**Installation:** provides installation instructions for Micom-Z in fixed and mobile applications.
Chapter 4	**Using the Programming Mode:** provides detailed instructions for programming the Micom-Z parameters needed in the various operating modes.
Appendix A	**ALE Capabilities and Features:** provides a concise description of the ALE capabilities and features supported by Micom-Z.
Appendix B	**Connector Data:** provides information on pin assignment and pin functions in the Micom-Z connectors, and its accessories.
Appendix C	**Over-the-Air Remote Disable Function:** describes the over-the-air remote disable capability of Micom-Z.

1-2. OVERVIEW OF MICOM-Z CAPABILITIES

Micom-Z is a state-of-art family of adaptive HF/SSB radio sets designed to meet the demanding requirements of the operational environment. Using advanced digital signal processing (DSP) techniques, Micom-Z offers reliable long-range communication for voice, data, and telegraphy (CW) using upper sideband (USB), lower sideband (LSB), amplitude modulation equivalent (AME), and pilot modes of operation.

Micom-Z radio sets provide a complete solution to traditional HF communication problems while allowing user-friendly, easy operation even for unskilled users. Micom-Z radio sets have been specifically designed to satisfy all the needs of short, medium and long range communication in the crowded HF band.

The main characteristics of the Micom-Z family are described below:

- Micom-Z transceivers are offered in two flexible configurations: dash-mount and trunk-mount, designed to fit both fixed and mobile installations. To simplify installation, the transceivers can also provide power through the RF cable to a compatible ATU.

- User-Friendly Operation. Designed to render its cutting-edge features usable by unskilled users, the Micom-Z has an intelligent, state-of-the-art, menu-driven man-machine interface (MMI) that is easy to master, and intuitive to use. The MMI is based on a large digital front-panel display with four soft keys, and a standard 16-key keypad; the only additional front-panel control is the radio ON/OFF switch.

The MMI enables the operator to perform any desired action easily and efficiently, for example, select the desired operating mode, define or modify the parameters to be used on each preset channel, etc. Many improvements based on user feedback have been incorporated in the MMI, as a part of an ongoing evaluation program.

In addition, Micom-Z radio sets enable PC control and programming, via an RS-232 interface.

- Robust, Reliable Link Establishment. Micom-Z radio sets support Automatic Link Establishment (ALE) per MIL-STD-188-141B (the required software is supplied embedded as a standard), ALE operation is very simple, and can be easily used even by unskilled operators.

  In addition, Micom-Z also supports CCIR 493 SelCal (selective calling) with 4-digit and 6-digit addressing per UN-WGET Interoperability Agreement, and beacon calls.

  Both ALE and CCIR 493 SelCal are interoperable with all the major suppliers supporting the standards. When operating in the ALE or CCIR modes, Micom-Z provide an over-the-air remote disable function: an authorized radio set can transmit a command to a radio which has been lost or stolen to disable all the radio programmable parameters.

- Internal GPS Receiver. The Micom-Z can be ordered with an optional integral Global Positioning System (GPS) receiver. In addition to presenting the GPS information on the display, the ALE AMD or the CCIR 493 Recall GPS call messaging platforms can be used to enable any station to generate a request for GPS location from any other station in the network.

  The GPS receiver uses a compact, light-weight patch antenna with magnetic mount.

- High Reliability and Cost-Effective Logistics. The modular, 3-board design of the Micom-Z family, with its high MTBF and low MTTR, offers outstanding reliability in field conditions and cost-effective logistic support.

  A comprehensive multilevel built-in test (BIT) subsystem helps the user to identify faulty modules in the field, and ensures complete functional testing after module replacement. The BIT also provides valuable information to higher echelon maintenance personnel, without requiring module-level test equipment.

The Micom-Z family is based on a common transceiver, available in two mounting versions:

- Dash-mount version – a transceiver with built-in front panel, for fixed and mobile applications.

- Trunk-mount version – a transceiver with a separate control box that is similar to the dash-mount front panel but requires an external speaker, saves valuable cabin space in mobile use.

NOTE

The audio accessories are for illustration purposes only, and may vary in accordance with preferences.

1-3.   EQUIPMENT DESCRIPTION

This section describes the main equipment units of the Micom-Z radio set, and lists the options and accessories available for ordering.

1-3.1   Options and Accessories

The following tables list the options and accessories that can be ordered for Micom-Z. Contact the manufacturer or your local representative if you need an option or accessory not listed below.

Table 1-1. Available Options

Option	Mfg. Cat. No.	Description
G434	2072-09870-30	PC-based control and programming software package
S809	2072-09048-00	Interface cable kit for CW key and headphones
G431	2072-09197-10	Internal GPS receiver with polling application
FRN8525	2072-09460-00	Vocoder with digital audio quality enhancer (subject to export license), includes interface cable and operator manual
FVN5228	2072-09780-00	Digital Advanced Encryption Standard option for FRN8525 (subject to export license)
FRN8526	2072-09720-00	4800bps single-tone high speed data modem (MDM4800) with Micom-Net E-mail Gateway software package
FVN5229	2072-09790-00	Digital Advanced Encryption Standard option for FRN8526 (subject to export license)
FRN8527	2072-09820-00	4800bps single-tone high speed data modem (MDM4800) with Micom-Net E-mail Gateway software package integrated with vocoder and digital voice quality enhancer
FVN5230	2072-09800-00	Digital Advanced Encryption Standard option for FRN8527 (subject to export license)

Table 1-2. Accessories

Option	Mfg. Cat. No.	Description
Mobile Station Accessories		
FAD1410	2072-09010-20	Automatic tuning whip antenna
F2265	2072-09030-10	Automatic antenna tuner
FAD1400	2072-92270-10	12 ft whip antenna (not required for FAD1410)
FLN3660	2072-90174-00	Cooling tray
FLN2818	2072-09676-00	1.6 – 30MHz, 125W PEP/average heavy duty automatic antenna tuner for fixed and mobile installations, for use in data system applications. Includes 30m RF coaxial cable and operator manual (requires long wire or whip antenna)
HSN1600	2072-90410-00	External speaker
Fixed Station Accessories		
FMN5542	2072-09803-00	Desk microphone
–	2072-09031-10	Kit for continuous duty data transmission, includes junction box
FPN5600	2072-09736-00	110/220VAC AC power supply

1-3.2 Micom-Z Transceiver

The Micom-Z transceiver is a complete HF/SSB receiver-transmitter capable of receiving and transmitting voice, data, and continuous-wave (CW) telegraphy using upper-sideband (USB), lower-sideband (LSB), AME and pilot carrier modulation. High selectivity and a wide dynamic range ensure clear, undisturbed signal reception.

The transmit power can be selected by the operator for optimum transmission performance (125 W PEP for maximum range; 100 W, 60 W or 25 W to reduce interference to nearby stations, and decrease power dissipation).

The transmitter includes thermal protection. If, for any reason, the transmitter internal temperature exceeds the maximum permitted temperature, the output power is automatically reduced to avoid any fault due to excessive heat. Antenna mismatch protection is also included: if the antenna VSWR is too high, the transmit power will also be automatically reduced to avoid damage.

The transceiver nominal output impedance is 50 Ω, and therefore it can be directly connected to broadband antennas (dipoles, traveling wave antennas, delta and semi-delta antennas). For mobile service using whip antennas, an external antenna tuning unit (ATU) is necessary. Suitable ATUs are available on order.

Micom-Z utilizes digital signal processing for implementing most of the receiver functions, e.g., demodulation, narrow band filtering, automatic gain control, tunable notch filter, squelch, etc. The digital syllabic (speech identifier) squelch is activated whenever speech is identified, thus opening the audio path. However, if speech is not received, the audio path is muted, thus preventing background noise from disturbing the operator.

In addition, Micom-Z uses ClearCom, a voice communication denoising algorithm that uses advanced digital signal processing to remove background noise and dramatically enhance the received voice clarity and intelligibility. This means that you can receive clear voice even with weak signals. Since all the processing takes place within the receiving Micom-Z, ClearCom enhances any voice transmission irrespective of the type of far radio set.

Moreover, ClearCom operates only on voice traffic, therefore it can be used even when using ALE or CCIR automatic link establishment protocols, and does not interfere in any way with data or vocoder transmissions. Therefore, you should enable ClearCom whenever the reception is weak: when communication conditions are good, ClearCom is not needed and will not make any difference.

NOTE

The ClearCom feature replaces the noise blanking feature, which is effective only for reducing engine noises.

Micom-Z internal GPS receiver (optional) is a standard L1-band C/A SPS receiver that can provide navigation and time-of-day data. The minimum number of satellites that must be received is four, but the receiver can simultaneously receive and process a larger number of satellites, thereby improving the positioning accuracy. When using the ALE or CCIR mode, the positioning data can be sent, upon request, to other radio sets.

The optional GPS receiver is supplied with an omnidirectional GPS antenna with magnetic mount, which can be located at up to 5 meters (15 feet) from Micom-Z.

Two dedicated connectors located on the rear panel provide a connection point for connecting data equipment, and other user's equipment.

The transceiver is powered from 13.8 VDC (nominal) (negative pole grounded). The transceiver can also provide DC power to a compatible ATU, through the RF cable.

1-3.3 Installation Accessories

Two mounting trays, which can be used for both trunk-mount and dash-mount Micom-Z versions are offered:

- Basic mounting tray, provides mechanical support for installing a Micom-Z. Supplied as standard with the trunk-mount version.

- Mounting tray with a cooling fan (*cooling tray*), recommended when Micom-Z is used for data transmission, and other applications that require continuous transmission during prolonged periods. The fan is powered by Micom-Z through a short cable connected to its rear ACCESSORY connector.

  The tray includes a 25-pin ACCESSORY connector, which provides access to all the signal and control lines in the rear 44-pin ACCESSORY connector of Micom-Z.

  In addition, the cooling tray provides front jacks for connecting a headphone set and a Morse key.
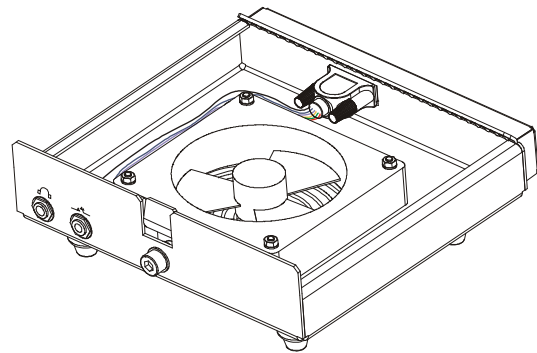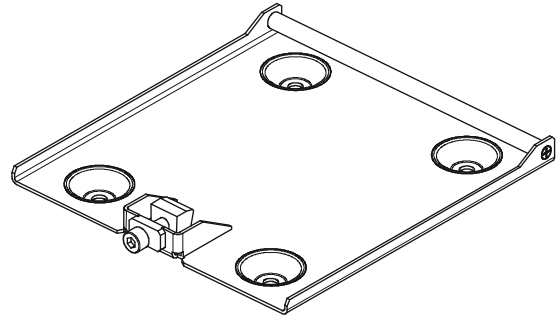
1-4. TYPICAL SYSTEM CONFIGURATIONS

Figure 1-1 shows a typical trunk-mount Micom-Z installation, and Figure 1-2 shows a typical dash-mount installation. Both figures illustrate installations with the ATU installed inside the vehicle.
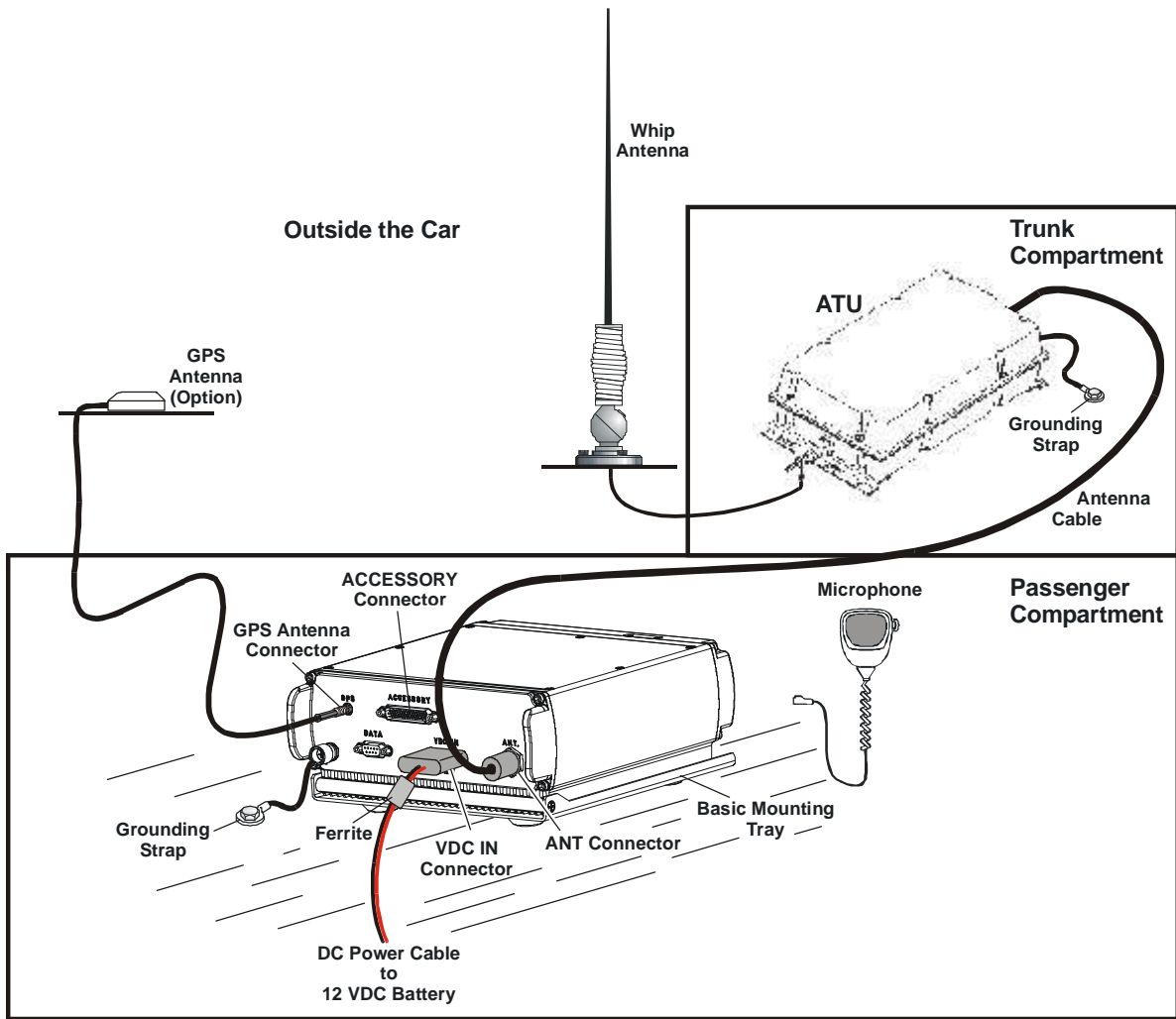
Figure 1-1. Typical Trunk-Mount Micom-Z Installation

Whip Antenna

Outside the Car

GPS Antenna (Option)

ATU

Grounding Strap

Antenna Cable

Trunk Compartment

ACCESSORY Connector

GPS Antenna Connector

Passenger Compartment

Ferrite

Control Head Cable

Microphone

Grounding Strap

Ferrite

VDC IN Connector

ANT Connector

Basic Mounting Tray

Control Head

Speaker Jack

Speaker Plug

DC Power Cable to 12 VDC Battery

Speaker
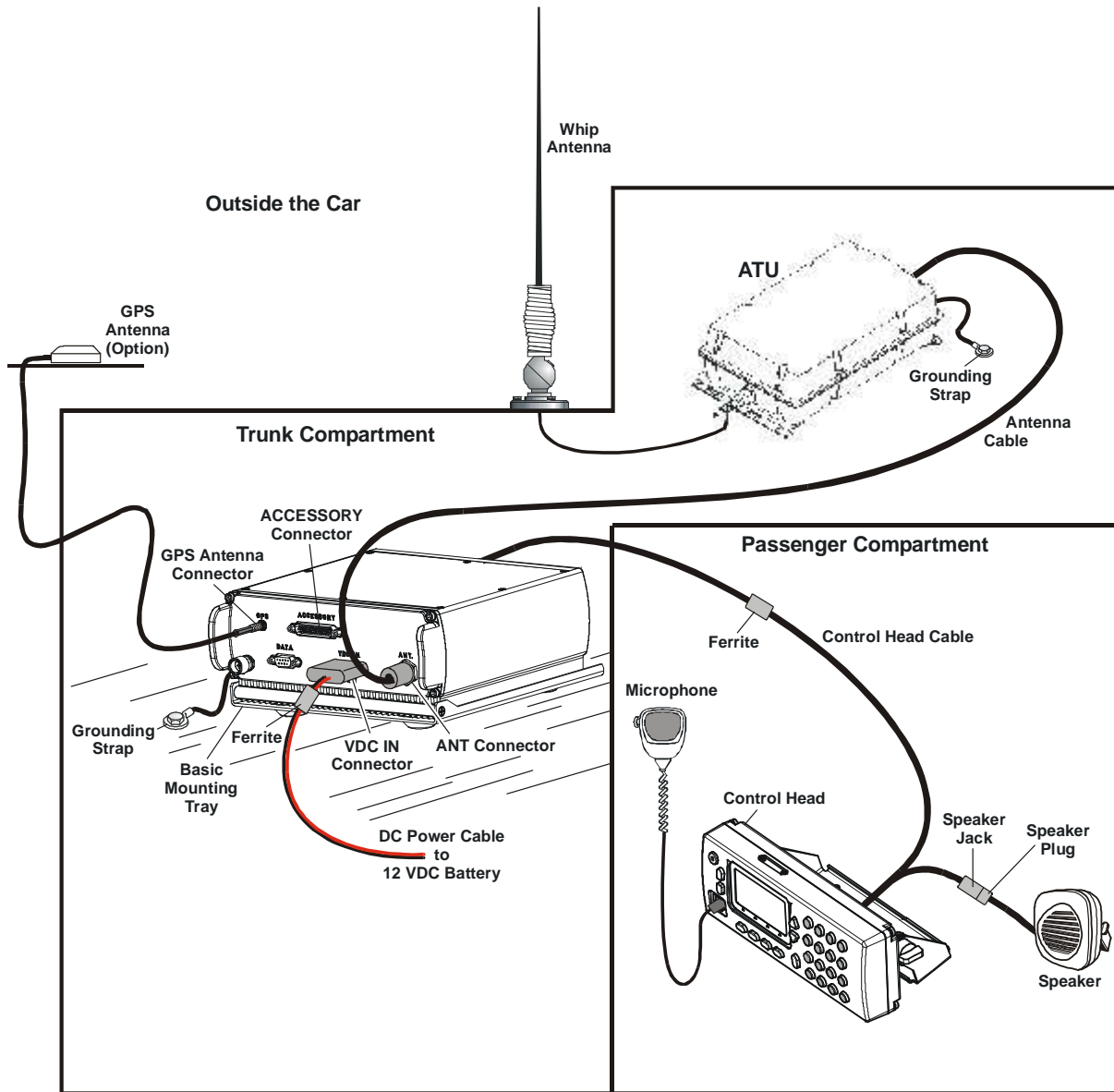
Figure 1-2. Typical Dash-Mount Micom-Z Installation

Figure 1-3 shows a typical dash-mount installation using the Wideband Mobile Automatic Antenna System, FAD1410, offered for Micom-Z radio sets (refer to the FAD1410 Owner's Guide for details).
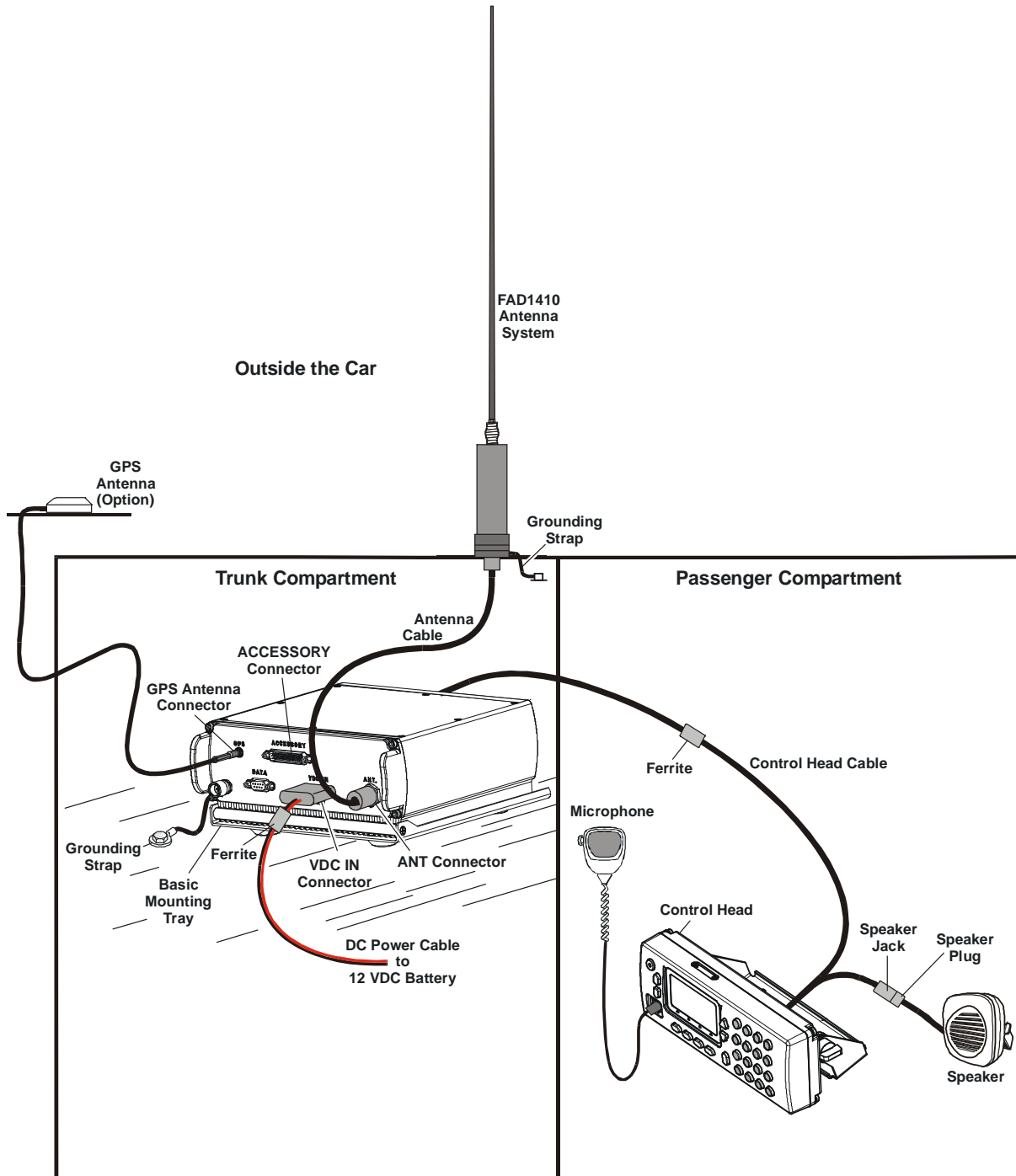
Figure 1-3. Typical Dash-Mount Micom-Z Installation Using FAD1410

1-5.   TECHNICAL CHARACTERISTICS

General	Transmit Frequency Range	1.6 to 30 MHz
	Receive Frequency Range	0.1 to 30 MHz (0.1 to 1.6 MHz reduced performance)
	RF Input Impedance	50 Ω
	Number of Channels	• 200 simplex or half duplex, user programmable. • Up to 1000 nets/channel with QuickNet ALE
	Scanning	• 5 groups with up to 100 channels per group, including 1 guard channel. • Programmable scan rate: 1 to 5 sec. per channel, in 1 sec. steps
	Frequency Stability vs. Temperature	0.6 ppm (0.3 ppm optional)
	Frequency Drift (Aging)	1 ppm/year
	Synthesizer Lock Time	10 msec. max.
	Frequency Resolution	10 Hz
	Modes of Operation	• SSB – J3E • PILOT – R3E • AME – H3E • CW – J2A
	ALE	MIL-STD-188-141B with Adaptive Multiple Networks (QuickNet)
	SelCal per CCIR Rec. 493, 4-digit and 6-digit addressing	UN-WGET Interoperability Agreement, supports beacon calls and GPS calls
	Data Interface	RS-232C
	Remote Control Interface	RS-232C (optional)
	GPS Receiver	Standard L1-band C/A SPS receiver
	Supply Voltage	13.8 VDC ±20%, negative ground
Transmitter	Output Power	125W PEP
	Reduced Output Power Levels	4 user programmable levels
	Half-power Microphone Sensitivity	25 to 125 mV (RMS)/600 Ω
	Audio Bandwidth	
	Voice	350 to 2700 Hz at -6 dB
	HS (high sensitivity) Voice	450 to 1500 Hz
	CW	650 to 1150 Hz
	Data	350 to 3300 Hz
	Audio Bandwidth Ripple	3 dB
	Intermodulation	-31 dB/P.E.P
	Harmonic Emissions	-45 dB/P.E.P
	Spurious Emissions	-64 dB/P.E.P

Transmitter (Cont'd)	Carrier Suppression	-50 dB/P.E.P
	Undesired Sideband Suppression	-55 dB/P.E.P
	Hum and Ripple	-50 dB
	Inband Noise	-60 dB (30 Hz BW)
	TX/RX Switching Time	10 msec
Receiver	Sensitivity (SINAD) SSB	0.25 µV for 10 dB SINAD
	Voice IF Filter Bandwidth	User-selectable (high sensitivity or 2.7 kHz)
	Selectivity (2.7 kHz Filter)	• -6 dB @ 350 to 2700 Hz • -60 dB @ -1 kHz; +4 kHz
	Image Rejection	-80 dB
	IF Rejection	-85 dB
	Undesired Sideband Rejection	-55 dB @ 1 kHz frequency difference
	Spurious	-80 dB
	Intermodulation	-80 dB
	Crossmodulation	-100 dB @ ±100 kHz
	Desensitization	-100 dB @ ±100 kHz
	Reciprocal Mixing	-100 dB @ ±100 kHz
	Audio Power at Speaker	5 W @ 2.5% distortion
	Squelch	Syllabic
	Clarifier Range	±200 Hz, in 10-Hz steps
Environment	Operating Temperature Range	-30° to 60°C
	Storage Temperature Range	-40° to 85°C
	Humidity	Max. 95% at 50°C

CHAPTER 2

OPERATING PROCEDURES

2-1. SCOPE

In this Chapter, you can find …

- information needed to familiarize with the equipment panels – para. 2-2

- procedures for using the Micom-Z keypad and display to perform any desired task – para. 2-3, 2-4, and para. 2-10, 2-11

- how to start using a radio ready for operation (i.e., a radio installed in accordance with Chapter 3 and programmed in accordance with Chapter 4) – para. 2-5

- specific operating procedures for each main operating mode of the radio:

    # Channel mode – para. 2-6

    # Frequency mode – para. 2-7

    # Scan mode – para. 2-8

    # ALE mode – para. 2-12

    # CCIR mode – para. 2-13.

- procedures for using the GPS receiver – para. 2-9.

2-2. FAMILIARIZATION WITH EQUIPMENT PANELS

2-2.1 Dash-Mount Model, Front Panel
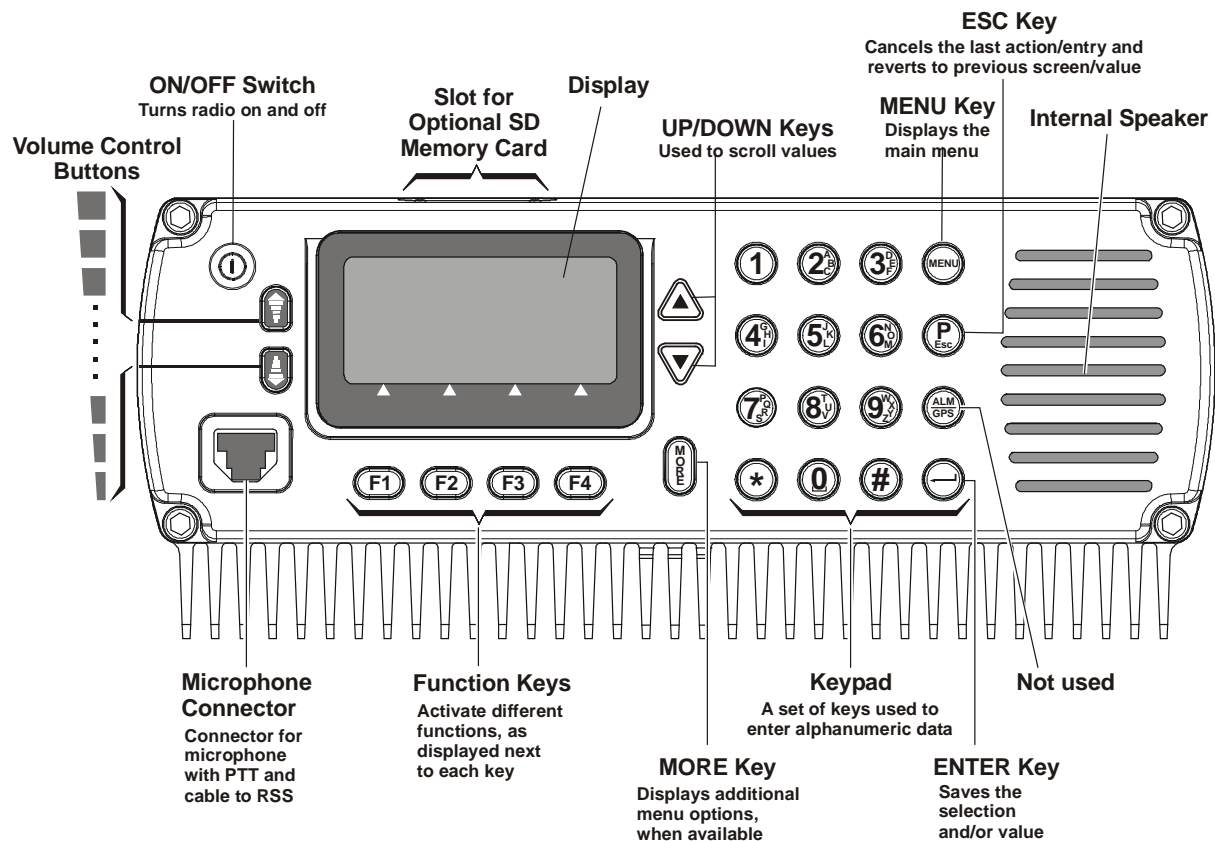
2-2.2   Trunk-Mount Model

Control Head Front Panel

ESC Key
Cancels the last action/entry and
reverts to previous screen/value

ON/OFF Switch
Turns radio on and off

**Slot for
Optional SD
Memory Card**

Display

UP/DOWN Keys
Used to scroll values

MENU Key
Displays the
main menu

**Volume Control
Buttons**

**Microphone
Connector**
Connector for
microphone
with PTT and
cable to RSS

Function Keys
Activate different
functions, as
displayed next
to each key

MORE Key
Displays additional
menu options,
when available

Keypad
A set of keys
used to enter
alphanumeric
data

ENTER Key
Saves the
selection
and/or value

Not used

Transceiver Front Panel

**Connection to Control Head
and Speaker**

2-2.3   Rear Panel (All Models)
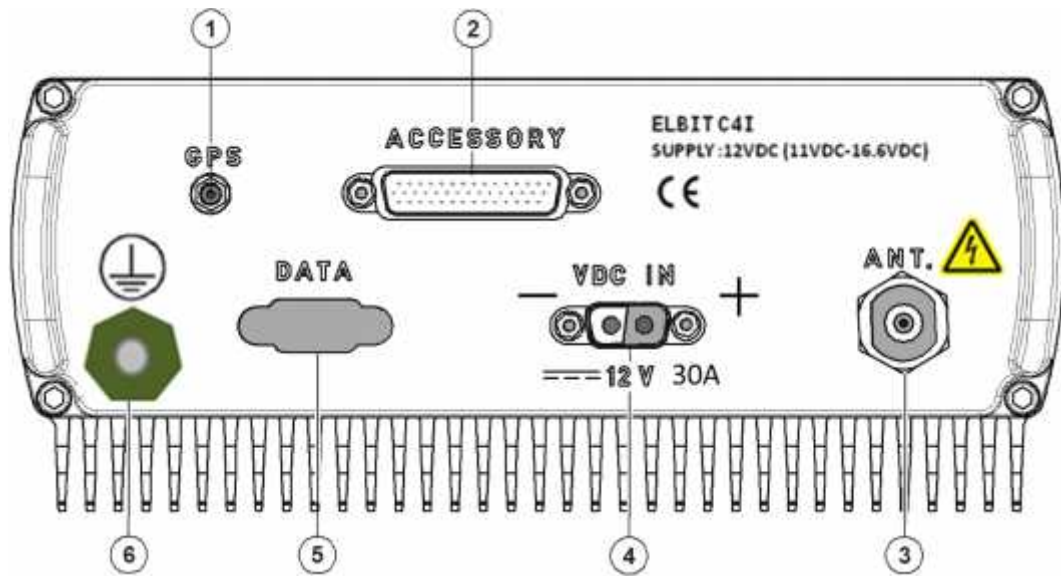
No.	Item	Function
1	GPS Antenna Connector	Connection to optional GPS antenna
2	ACCESSORY Connector	44-pin male D-type connector, used to connect the radio to external accessories such as personal computers, MRC, etc.
3	ANT Connector	N-type female connector for connection to antenna or optional antenna tuner
4	VDC IN Connector	2-pin D-type male connector for connection of DC power source. Nominal voltage (12V) is marked under the connector
5	DATA Connector	Not used
6	Grounding Screw	Connection of ground to the radio case

2-3. FAMILIARIZATION WITH MICOM-Z OPERATING PROCEDURES

This section provides general procedures that will help you start using your radio and get the most of its advanced features. Most of the activities that can be performed by you (selection of operating mode, programming, testing, etc.) are done using the keypad together with the navigation and function keys, and the front panel display.

To simplify operation, Micom-Z function keys operate as soft keys and therefore they permit you control the radio simply and efficiently, using a menu-driven mode that guides you and helps you make the required selections. "Menu-driven" simply means that whenever you must select a parameter, an operating mode, etc., you select it from a list of allowed values displayed on the front panel display, thereby reducing the chance of error:

- To make a selection, you use navigation keys to reach the desired parameter value or action, and then confirm the selection by pressing the ENTER ⊖ key.

- To go back to previous options, or cancel the current selection or action, press the ESC ⓟ key.

2-3.1   Display Functions

2-3.1.1   Display Organization
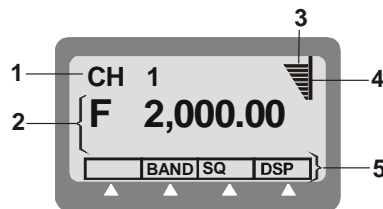
No.	Designation	Description
1	Mode Indicator	Indicates the current working mode (e.g., channel, frequency, ALE, etc.) or the action being performed (e.g., programming, testing, etc.)
2	Work Area	Displays information on the current working mode, the main operating parameters, etc. It also includes icons that identify the active options, and status
3	Level Indicator	In the transmit mode, displays the relative transmit power. In the receive mode, displays the relative received signal strength
4	Tx Bar	Appears when the radio is transmitting
5	Options Display Bar	Displays a list of options you can select, by pressing the corresponding function key, in the current working mode

2-3.1.2   RF Level Indications

Indication	Meaning
Strong received signal / Weak received signal	Received RF signal strength indication, displayed when the radio is in the receive mode. The number of bars provides a relative indication, which may fluctuate as a result of fading, etc.
Full transmit power / Relative transmit power / Low transmit power / Reflected power	Transmit bar, appears when the radio is switched to the transmit mode (for example, when the PTT is pressed). Its length indicates the maximum radio transmit power in the selected mode (MAX, HIGH, MED or LO). The number of bars indicates the instantaneous relative transmit output power, and therefore it fluctuates as a result of modulation. The relative reflected power is indicated by the base line: its length indicates the fraction of power reflected because of antenna VSWR (the length should be small relative to the total height of the transmit bar, which is proportional to the forward power)

2-3.1.3   Icons

Micom-Z displays icons in two areas: to the right of the channel number, and in the area just above the options display bar (at the left-hand side).

Icon	Description
◣	LSB mode
◢	USB mode
⟩⟩⟩	Squelch enabled
∿∿	ClearCom function enabled
∏	Notch filter enabled
∏	Indicates that a special-purpose filter (any filter except the 2.7 kHz filter) is in use
▶◀	Clarifier enabled
✳	ALE or CCIR stack stores messages
↘	AGC mode set to OFF or FAST
◢	Monitoring enabled

2-3.1.4   Message Attached Alert

When a message is attached to the received call (an option available for ALE calls even if you are using the Channel mode, and for the CCIR mode), an exclamation sign **!** appears to the left of the originating station name.

You can view the message contents after you accept the call.

```
FROM
!1002
▭ ▭ ▭ ▭
▲  ▲  ▲  ▲
```
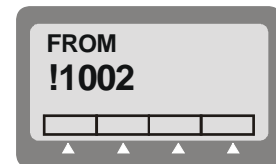
2-3.2   Using the Keypad

Each key is imprinted with a numeral and several letters.
These characters are accessed in clockwise order, as follows:

- A single key press enters the numeral or symbol

- Two consecutive key presses enter the first letter

- Three consecutive key presses enter the second letter

- Four consecutive key presses enter the third letter

- Five consecutive key presses enter the fourth letter

- To enter a blank space, press ⓪ twice.

When entering frequencies, use the ✱ key as a decimal point, if needed. In the ALE mode, the ✱ key is also used to enter a wild-card character (? or @).

To enter the ampersand @ symbol, press the # key twice.

Example: To enter a number in a field, or edit (change) the number, you type the desired digits on the keypad.

Example: To enter an alphanumeric string in a field, or edit a string, you type the desired alphanumeric character by pressing the appropriate key several times in sequence. For example, to enter "MIKE 01":

    Press 6 twice (for the letter M).

    Press 4 four times (for the letter I).

    Press 5 three times (for the letter K).

    Press 3 three times (for the letter E).

    Press 0 twice (for the blank space).

    Press 0 once (for the numeral 0).

    Press 1 once (for the numeral 1).

2-3.3 Function Keys

The function keys F1, F2, F3, and F4, appearing under the display, are soft keys used to select options or actions which depend on the current radio mode. The current function of each key is shown in the options area of the display, above the key. For example, on the BITE screen you can press F1 to start the full BIT test.

If a certain function key is not used, no label appears above the key (see for example F4), and pressing that key has no effect.
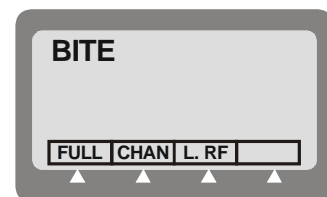
2-3.4 Options Scroll Key

When more than four options are available in the options area of the display, press the **MORE** key to display the additional options.

To return to the first option, press the **ESC** key.

2-3.5 Up/Down Scroll Keys

The up and down scroll keys are used to scroll between values that are already programmed into the radio.

Examples:

- In the Channel mode, pressing the up or down scroll key once lets you view the previous, respectively next, programmed channel. Pressing either key continuously scrolls the channels in the selected direction.

- In the Frequency mode, you can change the frequency in the corresponding direction.

- In the radio Programming mode, you can use these keys to scroll among the programmable parameters.

- When displaying GPS data, you can use these keys to toggle the display format.

2-3.6   Selection from List of Predetermined Values

When the parameter you want to change can assume only one of several predetermined values, you select the desired value by pressing function keys:

- F1 enters the lowest possible value, or OFF

- F4 enters the highest possible value

- F2 and F3 increments, respectively, decrements, the value. When you reach either end, the corresponding key disappears.

You cannot use the keypad to enter a value for such parameters.

2-3.7   Toggle Mode

When the function being set can only be toggled on or off, one function key will be marked **YES** and another **NO**.

To expedite turning on and off often-used functions (for example, turn the squelch on or off) only one key is used. In this case, just press the key assigned to the function to be toggled: the new state is shown for a few seconds, and then disappears as it takes effect immediately.

2-3.8   Alphanumeric Edit Mode

When you need to enter an alphanumeric string in a field, or edit a string, you select each desired alphanumeric character on the keypad as explained above. A blinking cursor _ indicates the location being edited.

In addition, the following edit function keys are available:

SAVE   Saves editing changes (equivalent to pressing the ENTER key).

M1>1>   Used to move the cursor backwards and forwards. When you reach either end, the
>1>10   corresponding key disappears.

CLR   Pressing this key momentarily erases the digit/letter at which the cursor is presently located, and shifts the entire field one place to the left.

Pressing this key continuously clears the entire field.

2-3.9   Numeric Edit Mode

When you need to enter a number in a field, or edit the number, you type the desired digits on the keypad. A blinking cursor _ indicates the location being edited.

In addition, the following edit function keys are available:

BACK   Erases the last digit.

CLR   Erases all newly entered digits and restores the original value.

2-3.9.1   View Mode

When the string to be displayed is longer than the number of characters that fit in one line (for instance, with long addresses or messages), the view mode enables scrolling to the rest of the string.

The view mode is indicated by the symbol M1>10 next to one of the function keys.

When you press M1>10, the key functions change:

HOME   Scrolls to display the first character of the string.

M1>1>   Scroll one character to the left or right, respectively. If you press either key
>1>101   continuously, the scrolling continues at a rate of four characters per second.

END   Scrolls to display the last character of the string.

When you reach the beginning of the string, the **HOME** and M1>1> function keys disappear, whereas when you reach the end of the string, the >1>101and **END** function keys disappear.

2-3.10 Audible Indications

The user can configure the radio to generate audible tones to indicate events related to the radio operating conditions. The tone volume, low or high, may also be set using the MRC, or by programming from the front panel.

Event	Description
Valid key pressing	Beep sounds when a key is pressed, to indicate that the key pressing has been accepted. No beep – no action.
PTT release	A beep sounds on the remote radio to indicate that the local PTT button has been released.
ALE alerts	During ALE operation, beeps alert you to events you should be aware of, e.g., link establishment/disconnection, etc.

2-4.   MENU STRUCTURE

The menu is used to select and control what you want your radio to do.

2-4.1   Displaying the Main Menu

To display the menu:

1. Press **MENU** to display the first part of the Menu screen. You can press the **MENU** key at any time during any sequence of operations: that sequence is then discontinued and the menu screen is immediately displayed.

MENU

CHAN	FREQ	CCIR	BIT
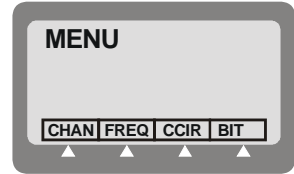
NOTE

The menu structure depends on the operating mode selected by the user. For example, when the CCIR function is not used, the third item is either ALE or SCAN.

---

2. Press **MORE** to scroll to the second part of the Menu screen.

MENU

LOCK	PROG	PSW	DIM

3. To select any item, press the function key next to it.
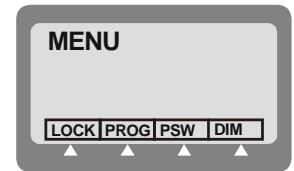
To exit the menu and return to regular radio operations (e.g., CHAN or FREQ):

1. Press the **ESC** key. The deeper you are in the menu, the more times you need to press **ESC**.

2-4.2   What you can Select on the Main Menu
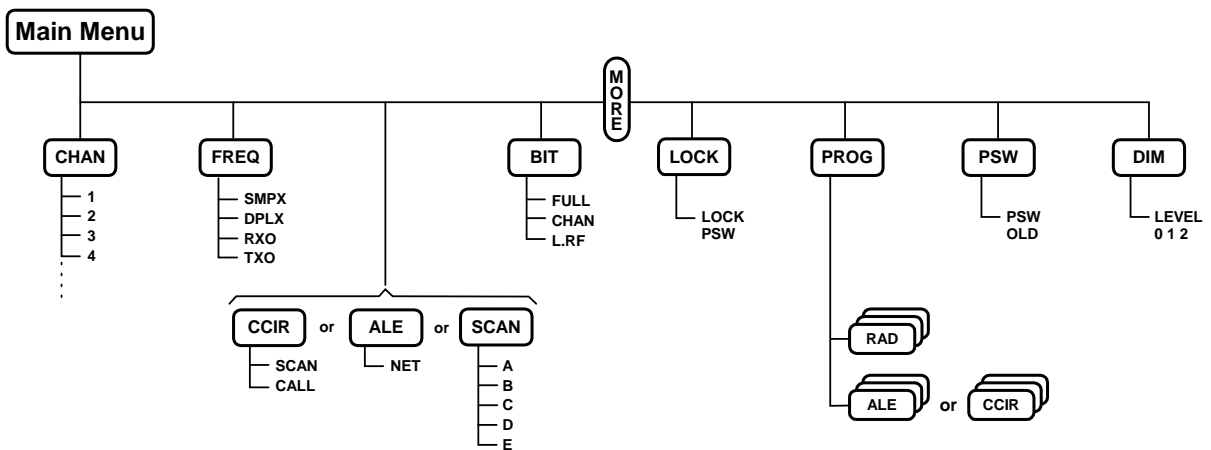
Figure 2-1. Main Menu

Use the following description with Figure 2-1, which shows the details of the main menu.

Menu item	... and its purpose
CHAN	**Channel mode:** the radio uses a set of preset parameters. Up to 200 sets of parameters can be defined and stored in the Micom-Z, where each set is assigned a *channel* number (1 to 200). You can use Figure 2-2 to find details on the selections available on the CHAN menu.
FREQ	**Frequency mode:** you can select manually the frequency (free tune mode) and the other parameters to be used. You can use Figure 2-3 to find details on the selections available on the FREQ menu.
ALE	**ALE mode:** when you want to call other radio, the radio automatically sets up a link on the best free frequency that can be found. You can also call specific radio sets, a group of radio, or broadcast to all the radio sets. The sets of parameters needed for this operation mode are stored under *net* numbers (1 to 20), the radio sets are identified by addresses stored by the radio in a directory supporting up to 100 addresses.
SCAN	**SCAN mode:** when neither the ALE, nor the CCIR mode, is used, you can define a set of channels to be scanned before starting a call. The scan parameters are always loaded by the MRC together with the other operational parameters, and cannot be changed using the Micom-Z panel.
CCIR	**CCIR mode:** mode that supports functions similar to ALE, except that it uses a different addressing scheme.
BIT	**BIT mode:** lets you check that the Micom-Z is OK.
LOCK	Lock the radio to prevent unauthorized use. To lock and unlock, you enter a password.
PROG	**Programming mode:** lets you program (select and store) the required parameters. Refer to Chapter 4 for details on the selections available on the PROG menu.
PSW	Used to change the password.
DIM	Used to adjust LCD lighting.

2-4.3 Notational Convention

In this manual, the following convention is used to simplify the description of the steps you need to carry out actions using the keys and the LCD:

When a procedure begins with a sequence of steps, that sequence is represented in an abbreviated format, with the > symbol indicating the next key to be pressed.

For instance, the following represents a sequence of steps that involves five key pressings: **MENU** > **MORE** > **PROG** > **RAD** > **CHAN**.

2-5.   GETTING STARTED

This section provides basic operating instructions: it covers issues such as turning the radio on and off, receiving and transmitting, selecting a channel or a frequency, etc.

NOTES

- The information needed to use Micom-Z in the ALE mode appears in para. 2-12.

- The information needed to use Micom-Z in the CCIR mode appears in para. 2-13.

- The information needed to use the Micom-Z GPS receiver appears in para. 2-9.

You can use these instructions to start using your Micom-Z radio. To become familiar with all the radio capabilities and features, refer to the following sections. In most cases, the radio reaches you after being configured for use in your radio net. However, if you need to make changes, refer to Chapter 4.

2-5.1   Turning the Radio On and Off

To turn the radio on:

1. Press the **ON/OFF** button.

2. The display turns on and shows SELF TEST for a few seconds.

SELF TEST

NOTE

If the display is too dim, adjust its brightness using **MENU** > **MORE** > **DIM**.

---

3. If the self-test procedure is successfully completed, the radio automatically resumes operation in the last used mode (CHAN, FREQ, ALE, CCIR, or SCAN), and volume.

CH   1
F   2,000.00
BAND SQ   DSP

4. If necessary, adjust the volume for your convenience by pressing the volume control keys.
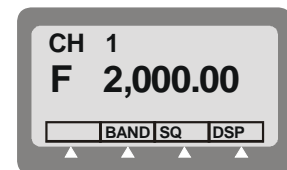
NOTE

If automatic dimming is enabled (**DIM** is **YES**), the display may turn off after a few seconds of inactivity. To cancel this feature, use **MENU** > **MORE** > **PROG** > **RAD** > **PRMT** > **DIM** to select **NO** for **DIM**.

If a problem is detected during self-test, the display shows ERR and a code number, followed by a concise description of the error (if the description does not fit in one row, its parts alternate in the display). If the detected problem does not prevent using the radio, press **EXIT** to cancel the display and continue.

To turn the radio off:

Press the ⓘ button again. The display turns blank.

2-5.2 Transmitting and Receiving

```
┌─────────────────────────────────────────────┐
│                   NOTES                        │
│                                                │
│  •  When transmitting, the RF output of the    │
│     radio must be connected to an antenna      │
│     installed as explained in the Installation │
│     chapter (for maintenance, you may also     │
│     connect to a dummy load of suitable        │
│     power rating). Do not attempt to transmit  │
│     when the antenna is not connected, or      │
│     when the antenna or any cable leading to   │
│     it is physically damaged.                   │
│                                                │
│  •  If the antenna system is equipped with an  │
│     automatic antenna tuner and the tuner is   │
│     enabled, the radio will automatically tune │
│     the antenna tuner. In the Channel mode,    │
│     pressing the ENTER key automatically       │
│     retunes the antenna.                        │
└─────────────────────────────────────────────┘
```

To transmit a voice message:

Press and hold down the Push-to-Talk (PTT) button of the microphone, and speak slowly and clearly after the channel is clear.

You should hear a sidetone, which verifies that your radio transmits normally.

The display changes to show the TX bar, together with indications of forward and reflected power.

During normal speech, these indications fluctuate in accordance with your voice.
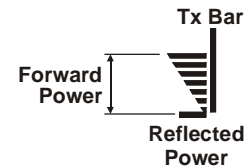
To receive calls:

When the radio identifies a call addressed to it, it sounds a beep and if it is a voice message – you start hearing it in the speaker. The display shows the name of the calling station (blinking) and the call type. The display now shows the RX indication, which is proportional to the received signal strength.
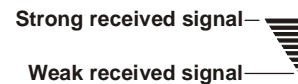
2-5.3 Radio Filter Bandwidth and Service Type

The radio filter bandwidth must be selected in accordance with the type of signal to be transmitted and received. For the transmit mode, the type of signal is identified by detecting the active PTT signal, which is one of the following:

- MIC PTT – PTT from the microphone connected to the front panel connector; transmits your voice.

- Voice PTT – PTT from an accessory connected to the radio set through its rear panel ACCESSORY connector; it causes the radio to transmit the voice signal provided by the accessory device.

- Data PTT – PTT from a data device, for example, a modem, connected to the radio set through its rear panel ACCESSORY connector; it causes the radio to switch to the data mode and transmit the modem signal.

- CW PTT – PTT from a Morse key connected to the radio set through its rear panel ACCESSORY connector; it causes the radio to switch to the CW (Morse) transmission mode.

The radio operating mode is automatically adapted for best performance with the signal expected for the detected PTT type.

A default filter bandwidth can be configured for each channel using **MENU > MORE > PROG > RAD > CHAN** (if no particular filter is set for the current channel, the radio retains the previously used filter). When a new type of call is received or sent, the bandwidth filter changes automatically, depending on the PTT source (voice, data or CW), and the programmed bandwidth for the channel being used.

Bandwidth set to:	Service type:	Filter changes after:
HS	Data	First data PTT
2.7 kHz	Voice	First microphone or voice PTT
3.0 kHz	Data	First data PTT
3.3 kHz	High speed data	First data PTT
CW	Morse	First CW PTT
LSM	Low speed data	First data PTT

NOTE

When the filter bandwidth is set to CW, the following CW filter bandwidths can be configured in the Programming mode using **MENU > MORE > PROG > RAD > PRMT**: 0.25, 0.5 or 0.8 (kHz).

2-6.   USING THE CHANNEL MODE

The Channel mode is used to operate on a channel already programmed in the Micom-Z.

The following sections describe how to use the Channel mode.

2-6.1   Selecting the Channel Mode

In general, the Micom-Z automatically enters the Channel mode when turned on, and starts using the last used channel.

If not, use the Menu screen to select the Channel mode: this is the first item on the menu you see when you press **MENU**.

To enter the Channel mode:

1. Press **MENU** to display the Menu screen.

    > **MENU**
    >
    > | CHAN | FREQ | CCIR | BIT |
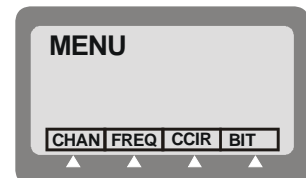
2. Press **CHAN**.

    The last active channel flashes in the display.

    > **CH 1**
    >
    > | | BAND | SQ | DSP |
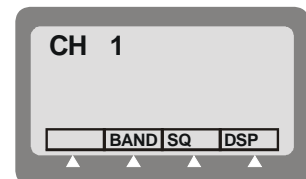
3. Press **ENTER** to confirm your choice, or select another channel as explained in the Choosing a Different Channel section (para. 2-6.3).

    > **CH 1**
    >
    > **F 2,000.00**
    >
    > | | BAND | SQ | DSP |

OM-E 2072-09584-00
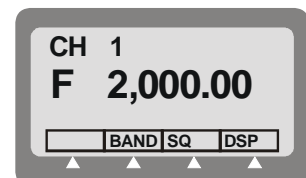
2-6.2   Channel Mode Options

In the Channel mode, you can operate a variety of functions and options which can help eliminate noise or otherwise assist reception and/or transmission.

NOTE

The changing of the channel options is temporary. When you change the currently used channel, all the current options will be lost and replaced by the values configured for the newly selected channel.

The structure of the CHAN menu is shown in Figure 2-2.
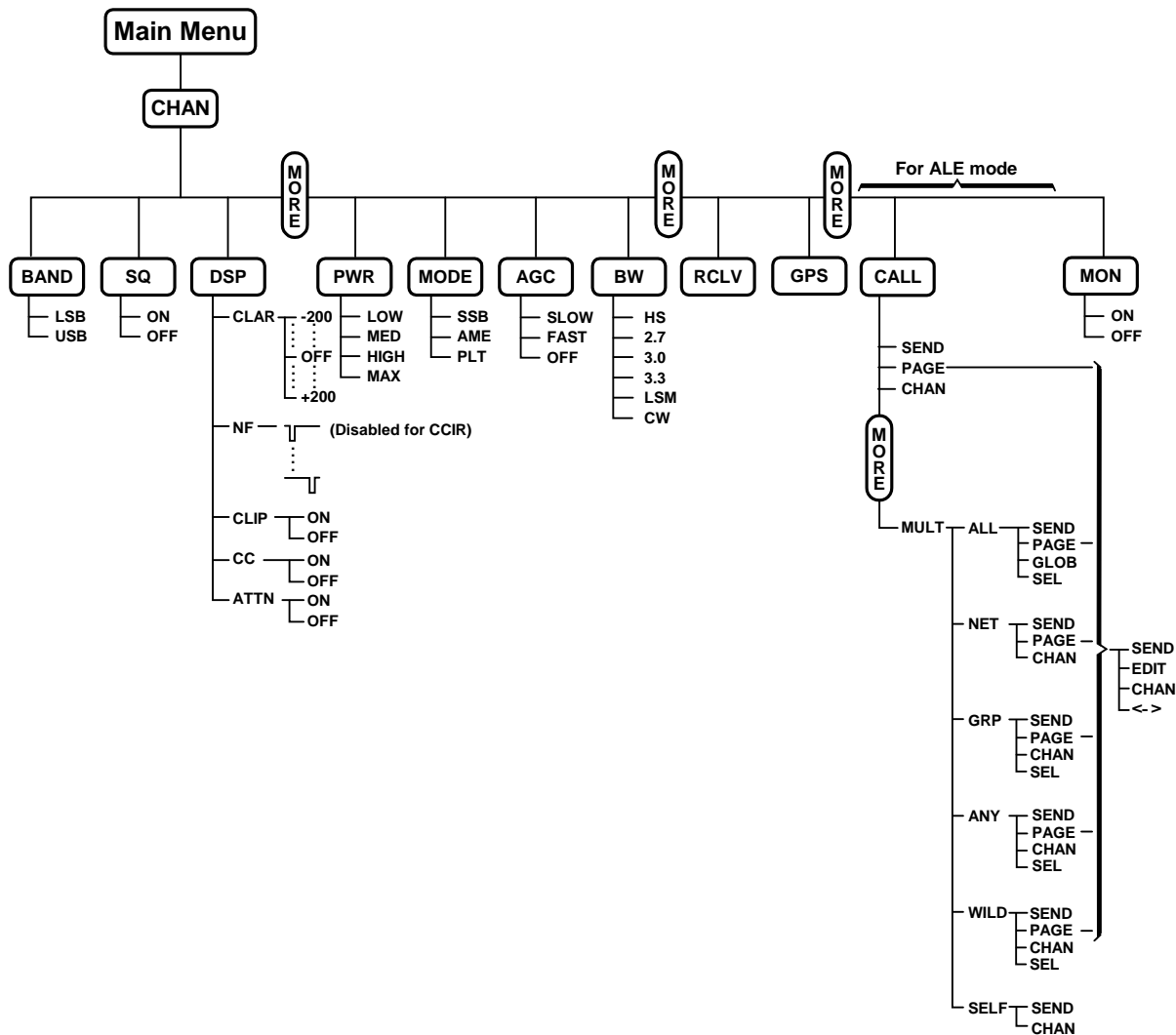
Figure 2-2. Channel (CHAN) Menu

2-14

The following table presents a concise description of the options available in the Channel mode.

Option	Description
TXM	Press to switch to the channel transmit frequency (appears only when using a duplex, or TX-only channel – see Figure 2-3). After releasing the PTT, the radio returns to the receive frequency.
BAND	Toggles between upper sideband (USB) and lower sideband (LSB).
SQ	Toggles the squelch on/off. Always select OFF for CW operation.
DSP	Accesses the Digital Signal Processing menu, which includes the following options: • **CLAR** Enables to control the clarifier (off/lower frequency/higher frequency). The function key is not available for TXO (transmit only) channels. • **NF** Enables to control the notch filter (off/lower frequency/higher frequency). The function key is not available for TXO (transmit only) channels, and in the CCIR mode. • **CLIP** Toggles the clipper on/off. • **CC** Toggles the ClearCom function on/off. • **ATTN** Toggles the attenuator on/off.
PWR	Selects the transmit power level: **LOW** – 25W; **MED** – 60W; **HIGH** – 100W; **MAX** – 125W.
MODE	Selects the operation mode: • **SSB** – single sideband • **AME** – amplitude modulation equivalent • **PLT** – single sideband with pilot signal.
AGC	Controls the automatic gain control function (fast/slow/off).
BW	Selects the filter bandwidth: • **HS** – high sensitivity filter (450 to 1500 Hz) for best voice communication under marginal conditions • **2.7** – 300 to 2700 Hz • **3.0** – 300 to 3000 Hz • **3.3** – 300 to 3300 Hz. Always select this bandwidth for data transmission • **LSM** – bandwidth optimized for use with low speed modems (1450 to 1950 Hz) • **CW** (Continuous Wave or Morse operation). The bandwidth used in this case is selected by **MENU** > **PROG** > **RAD** > **PRMT** > **CW**.
RCLV	Displays the receive level. The **RCLV** item appears only if the received signal level display is not permanently enabled using **MENU** > **PROG** > **RAD** > **PRMT** > **RCLV**.
GPS	Displays the GPS data. Refer to para. 2-9 for details.

NOTE

When ALE or CCIR is active, the following options appear:

• **CALL** – initiates an ALE or CCIR call.

• **PAGE** – displays the stacked received messages.

• **MON** – enables/disables the speaker during link establishment.

For a description of these options, refer to para. 2-12 (ALE mode) or para. 2-13 (CCIR mode).

2-6.3   Choosing a Different Channel

To choose a channel:

1. Press **MENU** to display the menu screen, and press **CHAN**.

```
MENU



CHAN FREQ CCIR BIT
▲    ▲    ▲    ▲
```
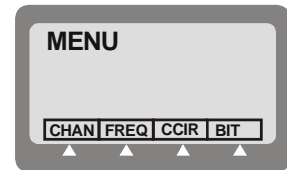
The last used channel number is displayed, blinking.

```
CH  1
F   2,000.00

      BAND SQ  DSP
      ▲    ▲   ▲
```
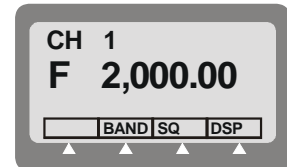
NOTE

To access the priority channel, press **ESC** momentarily.

The priority channel is available in the Scan mode, that is, when ALE and CCIR are disabled, provided it has been preprogrammed by the MRC.

---

2. Select a channel by pressing the **UP/DOWN** keys until you reach the required channel,

```
CH  12



      BAND SQ   DSP
      ▲    ▲    ▲
```

Type 12

```
① ② ③ MENU
④ ⑤ ⑥ P
⑦ ⑧ ⑨ ⑩
* ⓪ # ⊖
```

or
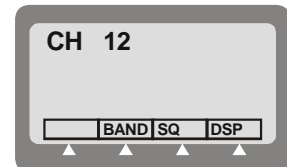
Type the desired number in the keypad.

Example: To choose channel 12:

The channel number blinks, indicating that the selection has not yet been confirmed.

3. When the desired channel is displayed, press ENTER to confirm your choice.

```
CH  12
F  15,000.00

      BAND SQ   DSP
      ▲    ▲    ▲
```
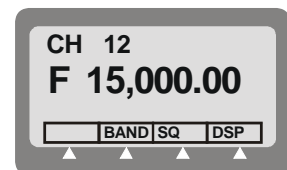
NOTE

If you enter a channel that is not yet programmed, a NOT PROG message appears. To program a new channel, refer to Chapter 4, or use the MRC software.

2-7.   USING THE FREQUENCY MODE

The Frequency mode enables you to select freely the receive and transmit frequencies. You can select the operating frequency type, change the frequency being used, and operate a variety of functions and options to assist transmission and reception. You can also store the frequency in a channel of your choice.

There are four types of operating frequencies:

- **SMPX** (Simplex Frequency): the same frequency is used for both transmission and reception.
- **DPLX** (Duplex Frequency): the radio transmits on one frequency and receives on a different frequency.
- **RXO** (Receive Only Frequency): defines a frequency for reception only. You cannot transmit on a frequency configured as RXO.
- **TXO** (Transmit Only Frequency): defines a frequency for transmission only. You will not receive on a frequency configured as TXO.

The supported frequency ranges are:

- Reception: 100 kHz to 30 MHz.
- Transmission: 1.6 to 30 MHz.

NOTE

The ALE, CCIR, and Frequency modes are mutually exclusive.

2-7.1   Frequency Mode Options

In the Frequency mode, you can operate a variety of functions and options which can eliminate noise or otherwise assist reception and/or transmission.

The structure of the FREQ menu is shown in Figure 2-3.
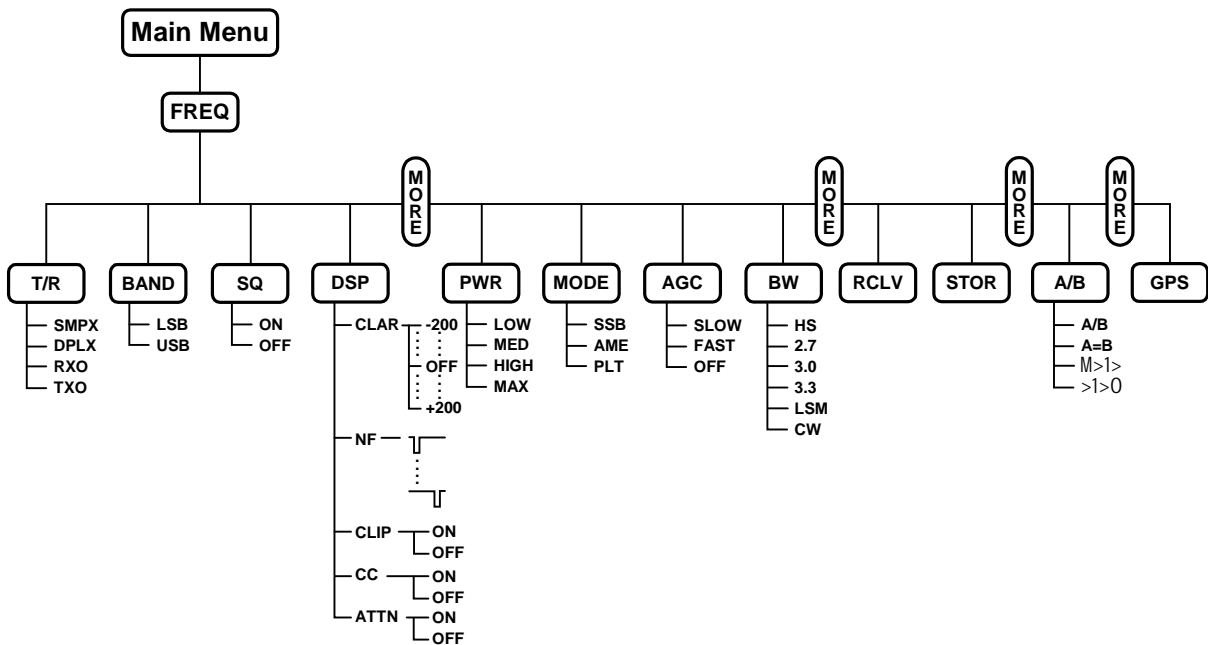
Figure 2-3. FREQ (Frequency) Menu

The following table presents a concise description of the options available in the Frequency mode.

Option	Description
T/R	Selects the transmit and receive frequencies and frequency type.
BAND	Toggles between upper sideband (USB) and lower sideband (LSB).
SQ	Toggles the squelch on/off. Always select OFF for CW operation.
DSP	Accesses the Digital Signal Processing menu, which includes the following options: • **CLAR** Enables to control the clarifier (off/lower frequency/higher frequency). The function key is not available for TXO (transmit only) channels. • **NF** Enables to control the notch filter (off/lower frequency/higher frequency). The function key is not available for TXO (transmit only) channels, and in the CCIR mode. • **CLIP** Toggles the clipper on/off. • **CC** Toggles the ClearCom function on/off. • **ATTN** Toggles the attenuator on/off.
PWR	Selects the transmit power level: **LOW** – 25W; **MED** – 60W; **HIGH** – 100W; **MAX** – 125W.
MODE	Selects the operation mode: • **SSB** – single sideband • **AME** – amplitude modulation equivalent • **PLT** – single sideband with pilot signal.
AGC	Controls the automatic gain control (fast/slow/off).
BW	Selects the filter bandwidth. • **HS** – high sensitivity filter (450 to 1500 Hz) for best voice communication under marginal conditions • **2.7** – 300 to 2700 Hz • **3.0** – 300 to 3000 Hz • **3.3** – 300 to 3300 Hz. Always select this bandwidth for data transmission • **LSM** – bandwidth optimized for use with low speed modems (1450 to 1950 Hz) • **CW** (Continuous Wave or Morse operation). The bandwidth used in this case is selected by **MENU** > **PROG** > **RAD** > **PRMT** > **CW**.
RCLV	Displays the receive level. The **RCLV** item appears only if the received signal level display is not permanently enabled using **MENU** > **PROG** > **RAD** > **PRMT** > **RCLV**.
STOR	Stores the frequency parameters in the selected channel.
M1>1> and >1>10	Move the cursor backwards and forwards. When these function keys are used in conjunction with the **UP/DOWN** scroll keys, the frequency scrolls according to the location of the cursor, enabling you to change the frequency with greater ease.
GPS	Displays the GPS data. Refer to para. 2-9 for details.

2-7.2 Selecting Operating Frequency in the FREQ Mode

> **NOTE**
>
> You cannot use the FREQ mode if the radio is locked. To unlock, refer to para. 2-10.

To enter the Frequency mode:

1. Press **MENU** to display the Menu screen.

2. Press **FREQ**. The last used frequency blinks, and the frequency type is displayed in the top line.

The letter preceding the frequency in the second line of the display indicates whether the frequency is used for Transmission (T), Reception (R), or both transmission and reception (F).

3. To use the displayed frequency and frequency type, press **ENTER**. If the Frequency type is Duplex, press **ENTER** twice to accept both the transmission and reception frequencies.

<div align="center">or</div>

Change the frequency type and the frequency as explained below.

To change the current frequency/frequencies:

1. Press **MENU** to access the Menu screen, and press **FREQ**.

```
MENU



CHAN FREQ CCIR BIT
  ▲    ▲    ▲   ▲
```
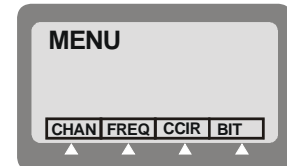
The last used frequency blinks, and the frequency type is displayed in the top line.

<div align="center">or</div>

If you are already in the Frequency mode, make sure the T/R function appears above the F1 function key, and then press **T/R**.

```
FREQ
F15,000.00


T/R  BAND SQ  DSP
 ▲    ▲   ▲   ▲
```
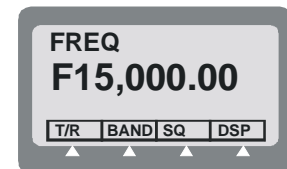
The current frequency type is displayed in the top line, followed by the frequencies in use.

2. If necessary, change the frequency type by pressing the relevant function key: **SMPX**, **DPLX**, **RXO** or **TXO**.

NOTE

Different frequency types may have default frequency settings, which will appear automatically when that frequency type is selected.

---

3. If you are using the SMPX, RXO, or TXO frequency type, and you wish to use the displayed frequency, press **ENTER**.

<div align="center">or</div>

Enter a new frequency. There are two ways to change the frequency.

Method A:
- Move the cursor to the frequency digit that you want to change. The blinking digit indicates the cursor location.
- Press **UP** or **DOWN** to scroll to the value of your choice.
- When the desired frequency is displayed, press **ENTER** to confirm your choice.

Method B:
- Type the frequency on the keypad. The frequency digits blink, indicating that the selection has not yet been confirmed.
- When the desired frequency is displayed, press **ENTER** to confirm your choice.

4. If you are using the DPLX frequency type, the frequency displayed first is the Rx frequency. If you want to use the displayed frequency, press **ENTER**.

<div align="center">or</div>

Enter a new frequency.

The frequency digits blink, indicating that the selection has not yet been confirmed.

When the desired frequency is displayed, press **ENTER** to confirm your choice.

5. If you are using DPLX frequency type, the frequency displayed first is the Rx frequency. To display the transmission frequency, press **DPLX**.

If you want to use the displayed Tx frequency, press **ENTER**.

<div align="center">or</div>

Enter a new frequency.

The frequency digits blink, indicating that the selection has not yet been confirmed.

When the desired frequency is displayed, press ENTER to confirm your choice.

6. Press **ENTER** to confirm the frequency type and the frequencies you have set.

2-7.3 VFO Operation

VFO (Variable Frequency Offset) is a feature available in the Simplex mode, that enables you to operate the transceiver simultaneously on two different channels, designated A and B.

- Using the A/B function, you can switch to channel B and then return to channel A again.
- Using the A=B option, you can copy the frequency of the current channel to another channel.

To operate the VFO function:

1. If you are not in the Frequency mode, enter the Frequency mode and make sure that the frequency type is Simplex: **MENU** > **FREQ** > **SMPX** > **ENTER**.

2. Select the required frequency, and press **ENTER** to confirm your choice.

3. Press **MORE** until the **A/B** function appears in the options area.

4. Press **A/B** to select the A/B mode.

The **A=B** function appears in the options area.

5. Press **A/B** to alternate between the two frequencies.

6. Press **A=B** to copy the frequency of the displayed channel to the alternate channel.

7. You can adjust the frequency of either A or B at any time, using the following methods:

   - Press M1>1> and >1>10 to move the cursor backwards and forwards, depending on the digit you wish to change, and then type the desired digit on the keypad.

   - When M1>1> and >1>10 are used in conjunction with the **UP/DOWN** scroll keys, the frequency digit scrolls according to the location of the cursor. For instance, if the current frequency is 7,500.54 and the cursor is at the 100 kHz location (7,_00.54), pressing the **UP/DOWN** scroll keys will scroll the 100 kHz digit to 7,400.54; 7,600.54; 7,700.54 and so on.

To return to the regular Frequency mode:

1. Press **MORE** until the **T/R** function appears in the options area.

2. Press **T/R** to select the regular mode.

2-7.4 Storing Frequencies

You can store specific frequencies and frequency parameters in channels which you have programmed.

To store a frequency in a channel:

1. If you are not in the Frequency mode, press **MENU** to display the Menu screen.

2. Press **FREQ**.

The last used frequency blinks, and the frequency type is displayed in the top line.

3. If you wish to use the displayed frequency and frequency type, press **ENTER**. If the frequency

type is DPLX, press **ENTER** twice to accept both transmission and reception frequencies.

<div align="center">or</div>

Change the frequency type and the frequency as required (see the To change the current frequency/frequencies section).

4. If necessary, select the other parameters, using the **MORE** key and pressing the required function keys.

5. Press **MORE** twice, and then press **STOR**.

2-8.   USING THE SCAN MODE

NOTE

The Scan mode is available only when ALE and CCIR are turned off by selecting **NONE** on **MENU** > **PROG** > **RAD** > **OPTS** > **SLCL**.

In the Scan mode, Micom-Z scans preprogrammed channels. The channels used in the Scan mode are organized in groups. Up to five scan groups, identified as A to E, may be created using the MRC, each containing up to 200 channels.

When a guard channel is selected, it is monitored after every other scanned channel.

To enter the Scan mode:

1. Press **MENU** to display the Menu screen.

2. Press **SCAN**. The last used group flashes in the display.
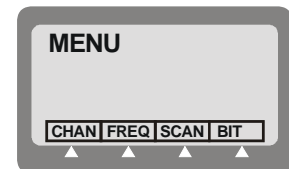
NOTE

You can use the Scan function only after at least one group has been downloaded by means of the MRC. If no scan group is stored in the radio, after selecting Scan you will see NO GROUPS, and then the display skips to the PROG menu.

---

3. If you want to use the currently displayed scan group, press **ENTER**.

<div align="center">or</div>

Press the function key corresponding to the group you want to choose, and then press **ENTER** to confirm your choice.

NOTES

- In the Scan mode, one of the five groups is always selected, and the other groups (up to four) are displayed above the function keys.

- If the selected group is not yet programmed, the message GRP X EMPTY appears in the display, where X is the selected group.

2-8.1.1   Scan Mode Options

In the Scan mode you can select various parameters and options, some used to control the scanning and others which can help eliminate noise or otherwise assist reception and/or transmission.

The following options control the scanning operation:

Option	Description
STOP	Stops the scanning. When scanning is stopped, the label changes to **SCAN**: pressing F1 again starts the scanning.
SLOW	Decreases the scanning speed.
FAST	Increases the scanning speed. **NOTE** The scan speed can be varied in the range of 150 milliseconds to 5 seconds: • From 150 to 950 milliseconds, each F2 or F3 pressing results in a 50-millisecond change. • From 1 to 5 seconds, each pressing results in a 1-second change.
GRP	Selects a scan group

The other options are identical to those available in the Channel mode (see para. 2-6.2).

NOTE

The changing of the Scan mode options is temporary. When you exit the Scan mode and then return to Scan, all the current options will be lost and replaced by the values configured for the various channels.

2-9.   USING THE GPS RECEIVER (OPTIONAL)

2-9.1   Overview of GPS Receiver Functions

The GPS receiver is an integral part of the Micom-Z transceiver, and can be used whenever the GPS antenna supplied together with the Micom-Z transceiver is properly connected and installed.

The GPS receiver provides accurate time and navigation data. The navigation data includes the geographical coordinates (position data) and the altitude. When the Micom-Z transceiver is moving, you can also see the speed and direction (heading).

The format of the navigation data can be selected in accordance with your needs:

- **LLA format**: Latitude, longitude and altitude (LLA). The latitude and longitude are displayed in degrees, with a precision of hundredths of arc minutes (1/100 min); the altitude is reported in meters, relative to the mean sea level (MSL).

  Velocity is reported as the change in the East, North, and Up coordinates, presented in meter/sec with a precision of 0.001 m/sec.

- **ECEF format**: Earth-Centered, Earth-Fixed format for position and velocity. Provides your position and velocity in a Cartesian (X, Y, Z) coordinate frame with its center at the Earth's center, the Z-axis through the North Pole, and the X-axis through 0 degrees longitude, 0 degrees latitude. The position is reported in meters.

  Velocity for each axis (that is, is the change in the X, Y and Z coordinate) is displayed in meter/sec, with a precision up to 0.001 m/sec.

The time is always presented on basis of the UTC (Universal Time Coordinated).

The information collected by the GPS receiver can be displayed on the Micom-Z display when using the CH and FREQ modes. In the ALE and CCIR modes, the position data can be reported by means of AMD messages; it can also be automatically reported in response to position queries (also sent by AMD messages).

2-9.2   How to Get the Best Results from your Micom-Z GPS Receiver

The GPS receiver extracts the information it needs by analyzing the signals received from GPS satellites. These satellite periodically transmit navigation messages, where the transmission of each complete message requires almost 15 minutes. To calculate all the data your GPS receiver is capable of providing, it must receive and decode navigation messages from at least 4 GPS satellites (the GPS receiver can use as many as 8 satellites to improve accuracy).

Therefore, after turning a GPS receiver on for the first time after a long period of inactivity, it is essential to let the GPS receiver operate continuously for at least 15 minutes, to enable it to collect updated almanac data. After this initial 15-minute interval, a GPS receiver can relatively rapidly acquire the satellites and calculate its position; thereafter, a GPS receiver must remain on only for a few minutes in order to be able to provide navigation data.

The internal GPS receiver is always powered when the transceiver is turned on. Therefore, if the GPS antenna is connected, the GPS receiver can start the acquisition process as soon as the transceiver is turned on, and can then track the satellites continuously. Turning the Micom-Z transceiver off will force the GPS receiver to reacquire the satellites.

2-9.3   Operating the GPS Receiver

2-9.3.1   GPS Menu

The GPS menu is displayed by selecting the GPS item on the FREQ or CH menu. The GPS menu structure is shown in Figure 2-4.
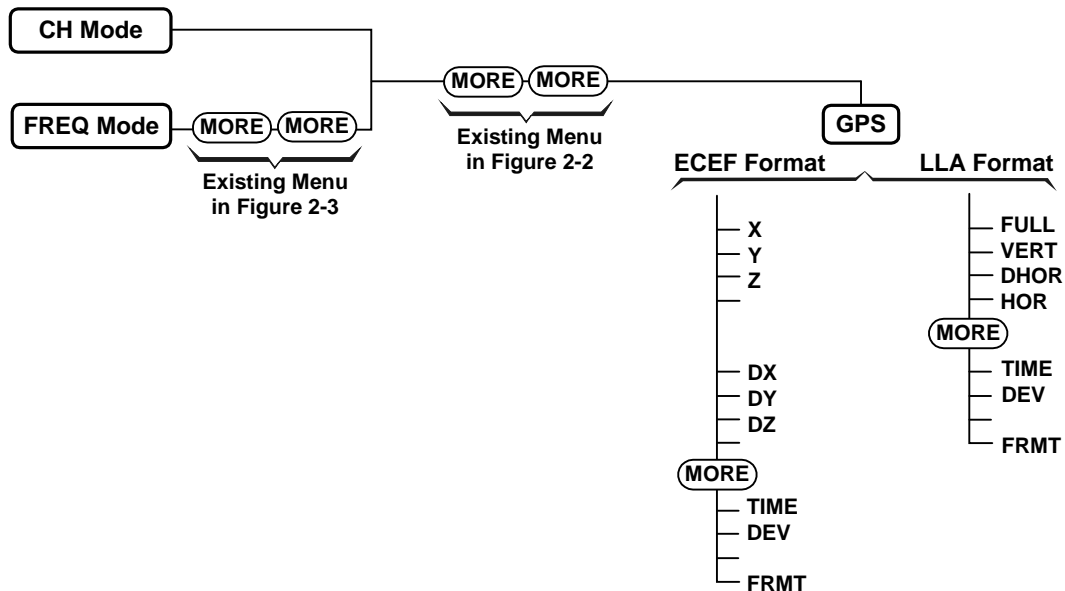
Figure 2-4. GPS Menu

The menu structure depends on the display format, **ECEF** or **LLA**, selected by the **FMT** item. You can also press the UP or DOWN panel key to toggle the display format.

    a. The items displayed on the GPS menu when using the LLA format are as follows:

FULL	Alternating display of the absolute velocity (VEL) in the horizontal plane, and its direction relative to the North (azimuth – AZIMTH).
VERT	Alternating display of altitude and up/down velocity.
DHOR	Alternating display of North/South and East/West velocities.
HOR	Alternating display of latitude and longitude.
TIME	Display the time-of-day obtained from the GPS receiver.
DEV	Used to check that the GPS receiver is operating.
FMT	Toggle the display format (to ECEF).

    b. The items displayed on the GPS menu when using the ECEF format are as follows:

X	Display the X coordinate.
Y	Display the Y coordinate.
Z	Display the Z coordinate (altitude).
DX	Display the velocity along the X axis.
DY	Display the velocity along the Y axis.
DZ	Display the velocity along the Z axis.
TIME	Display the time-of-day obtained from the GPS receiver.
FULL	Alternating display of the absolute velocity (VEL), and its direction relative to the North (azimuth – AZIMTH).
DEV	Used to check that the GPS receiver is operating.
FMT	Toggle the display format (to LLA).

2-9.3.2 First-Time Operation

The internal GPS receiver is always powered when the transceiver is turned on. Therefore, if the GPS antenna is connected and you are in a good place with a clear view of the sky, the GPS receiver can start the satellite acquisition process as soon as the transceiver is turned on, and can then track the satellites continuously.

Thus, the **GPS** item on the FREQ or CH menu only enables/disables the display of GPS data: the result is that after selecting **GPS**, the GPS data can be immediately displayed, and is updated once per second (time is updated once every 5 seconds).

Before using the GPS receiver, turn the Micom-Z transceiver on and let it operate for at least 15 minutes.

2-9.3.3 Operating Instructions

2-9.3.3.1 Switching to the GPS Display

NOTE

You cannot switch to the GPS display if you are using the ALE mode.

---

1. Select the **GPS** item by scrolling with the **MORE** key on the FREQ or CH menu, and then pressing F2. You will see a message that indicates the current display format, GPS LLA or GPS ECEF.

2. If necessary, switch to the alternate display format by pressing the UP or DOWN key.

   Alternatively, you can use the GPS menu: press **MORE** as required to see **FMT**, and then press the key next to **FMT (F4)**.

3. If the GPS receiver operates normally and is ready, you will see the information selected the last time the receiver has been used.

2-9.3.3.2 Selecting what to Display

1. Press the key next to the type of information you want to see: use Figure 2-4 to find the key to be pressed.

2. The displayed information appears on the display and is automatically updated every second. The time is updated every 5 seconds.

3. To change the display of GPS information, scroll to the desired item.

4. To cancel the display of GPS information, select any other menu except GPS.

2-9.3.4 What to do if …

1. If the GPS display mode, GPS LLA or GPS ECEF, does not appear when switching to the GPS display, scroll to the **DEV** item. You should see the GPS receiver type.

   - If you see UNKNOWN, turn the Micom-Z transceiver off and after a few minutes turn it back on. If the problem persists, the GPS receiver must be serviced.

   - If you see NONE, your Micom-Z transceiver does not include the optional GPS receiver.

2. If the requested information does not appear within 15 minutes, but the check in Step 1 above is successful, check for proper connection of the GPS antenna cable to the rear GPS antenna connector of the transceiver.

3. After checking that the antenna is properly connected, check that the GPS antenna did not shift from its intended position, and has a clear view of the sky. Try to improve your location: avoid locations near trees, high buildings or steep hills.

2-10. LOCKING/UNLOCKING THE RADIO

You can use the Lock mode to prevent unauthorized persons from accessing the programming and frequency modes.

To enter the Lock mode, you need to provide a password which consists of six digits. See para. 2-11 for instructions on configuring the desired password.

To lock the radio:

1. Press **MENU** to display the Menu screen.

```
MENU



CHAN FREQ CCIR BIT
 ▲    ▲    ▲   ▲
```

2. Press **MORE** to scroll to the second Menu screen.

```
MENU



LOCK PROG PSW  DIM
 ▲    ▲    ▲   ▲
```

3. Press **LOCK**.

```
LOCK
PSW:_


        
 ▲    ▲    ▲   ▲
```
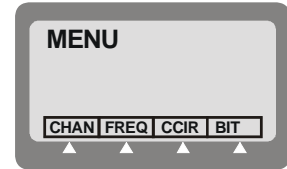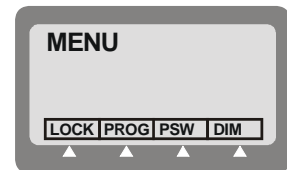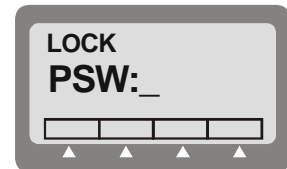
4. Enter the password to lock the radio.

```
                         NOTE
If you enter the wrong password, you will see WRONG PSW!. Enter
the password again.
```

5. Press **O.K.** or **ENTER** to confirm.

To unlock the radio:

Use the same procedure as when entering the Lock mode.

2-11. CHANGING THE PASSWORD

To be able to lock the radio, it is necessary to use a password. For security reasons, you may want to change the password often. The factory-default password is 123456.

To change the password:

1. Press **MENU** to display the Menu screen.

```
MENU


CHAN FREQ CCIR BIT
 ▲    ▲    ▲   ▲
```

2. Press **MORE** to scroll to the second Menu screen.

```
MENU


LOCK PROG PSW DIM
 ▲    ▲    ▲   ▲
```
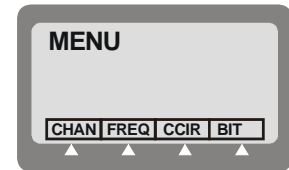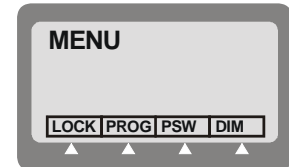
3. Press **PSW**.

4. Enter the old password, using the keypad.

   When you start to enter the password, you can use the function keys to move the cursor to the left or right, or to clear the display and enter the complete string.

```
PSW
OLD:


 ▲    ▲    ▲   ▲
```
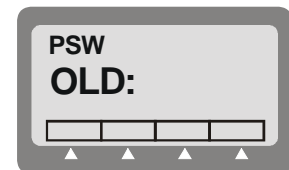
NOTE

If you have not yet set a password, use the factory-default password, 123456.

---

5. Press **O.K.** after you enter the old password.

   If you enter the wrong password, Micom-Z displays an error message, and you cannot continue.

6. After entering the correct password, you enter a new password.

7. Press **O.K.** to confirm the new password.

2-12. USING AUTOMATIC LINK ESTABLISHMENT (ALE)

The Micom-Z unit supports the Automatic Link Establishment (ALE) function, a method that enables automatically selecting the best working channel from a group of preprogrammed channels without any user intervention, thereby facilitating communication among HF radio stations and improving the communications quality and reliability. The ALE function incorporates all the advanced data transmission techniques required by MIL-STD-188-141B and FED-STD-1045. For an overview of Micom-Z ALE capabilities and services, refer to Appendix A.

The ALE function ensures the best possible link without requiring prior knowledge of radio communication conditions, and thus enables reliable HF communication even under rapidly changing propagation conditions. For this purpose, HF radio sets using the ALE function continuously monitor and evaluate the transmission quality on each frequency assigned for communication, and automatically select an optimal frequency for each transmission. After selecting the optimal frequency, a link between the communicating stations is established via an automatic handshake process, which is performed without requiring operator's intervention.

ALE combines sounding, scanning, selective calling, channel selection and LQA (Link Quality Analysis). These features, all automatic, ensure that communication takes place on the channel with the best link quality, even with an unskilled operator. The ALE also includes many types of calls you can use to rapidly and efficiently set up links with other ALE users, and features such as messages, stack and quick call.

ALE supports many features, including:

- Various type of calls
- Up to 20 nets, each with its own set of members and associated frequencies (channels)
- Up to 100 ALE addresses in the directory
- Up to 100 scan channels
- Up to 12 AMD (paging) messages.

All the ALE features you can use on your radio can be programmed: to program or modify features, you can use the front panel of the radio, as described in Chapter 4. The ALE features can also be preprogrammed using the MRC.

The following sections provide instructions for communicating in the ALE mode for a radio that has already been programmed with the necessary parameters in accordance with Chapter 4.

Note that when the ALE mode is enabled, your radio can receive and transmit ALE calls even when you are using the Channel mode. For this purpose, the **CALL** key is displayed even in the Channel mode (see Figure 2-2). The only restriction is that in the Channel mode, Micom-Z uses only the ALE parameters of net 1. Therefore, if net 1 is not programmed, no ALE functionality is available in the Channel mode, even when the ALE mode is enabled.

Note that the radio will prevent users from performing calls on Rx only (RXO) or Tx only (TXO) channels. This is true even when operating in the Channel mode: when selecting a Rx Only or Tx Only channel, the ALE option is disabled (the **CALL** key is not displayed when such a channel is selected).

2-12.1 Enabling the ALE Mode

To enter the ALE mode:

1. Press **MENU** to display the Menu screen.

<table>
<tr><td>

NOTE

If you see **CCIR** or **SCAN** next to F3, first enable the ALE mode. To enable ALE, select **ALE** on **MENU > MORE > PROG > RAD > OPTS > SLCL**.

</td><td>

MENU

| CHAN | FREQ | ALE | BIT |
| ▲ | ▲ | ▲ | ▲ |

</td></tr>
</table>
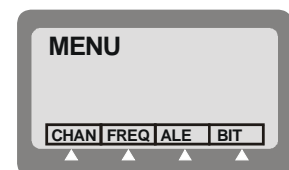
2. Press **ALE**.

   The last active net flashes in the display.

```
ALE
NET   7

CALL LQA       MON
  ▲    ▲    ▲    ▲
```
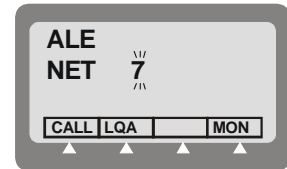
3. To use the displayed net, press **ENTER**.

   To select another net:

   • Press the **UP/DOWN** keys until you reach the required number.

                    or

   • Type the desired net number or the keypad.

   The new net number blinks, indicating that the selection has not yet been confirmed.

```
ALE
NET   1

CALL LQA       MON
  ▲    ▲    ▲    ▲
```
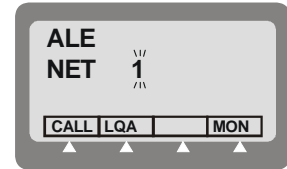
4. Press **ENTER** to confirm your choice.

   The radio then starts scanning the channels in the selected net (the changing channel number appears to the right of the net number).

```
ALE
NET   1   5

CALL LQA       MON
  ▲    ▲    ▲    ▲
```
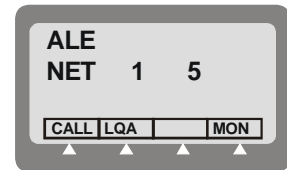
2-12.2 ALE Mode Options

Figure 2-5 shows the operator options available in the ALE mode.
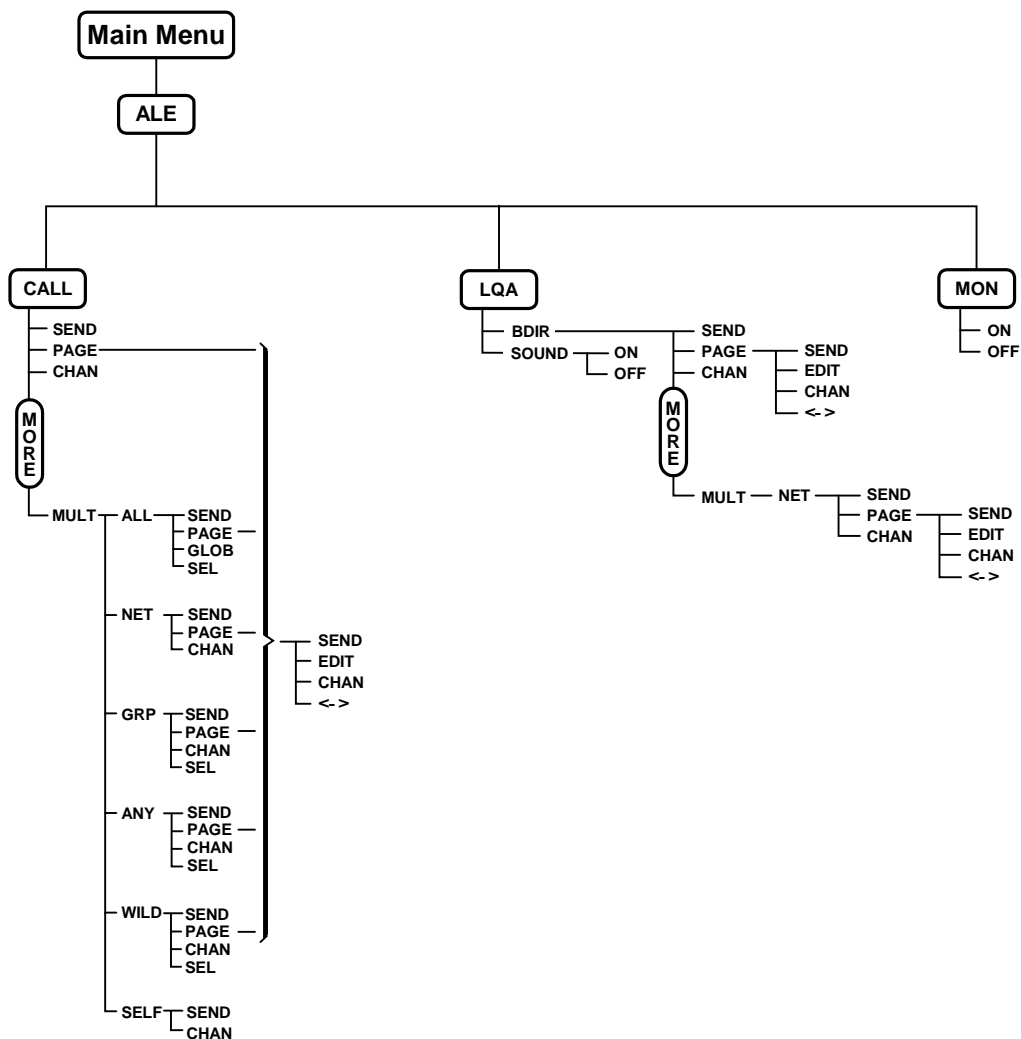
Figure 2-5. ALE Operator Menu

2-12.3 Receiving and Transmitting Calls in ALE Mode

The Micom-Z supports the following types of ALE calls:

- Individual call – call directed to a specific station.

- Net call – call directed to a net (a net is a preprogrammed group of stations).

- Group call – call directed to a group of stations.

- AllCall – call directed to all other stations simultaneously (broadcast call); can also be used as a distress call.

- AnyCall – call directed to all other stations simultaneously, usually used to detect new stations.

- Wildcard call – call simultaneously addressed to a selected group of stations within a net, with wildcards used within the address to specify the desired stations. For efficient use of wildcards, an appropriate station naming plan must be in place.

- Self call – call using the station's own address, generally used for test purposes.

- Bidirectional call – request for updating the LQA score with another station or stations.

- Sounding call – used to build a link quality database. This database stores ongoing information on the current quality of the various channels programmed for use by your radio.

All types of calls, except for sounding calls, can also carry messages.

Using the ALE message service, you can also request remote stations equipped with GPS receivers to send their position. Moreover, if the GPS receiver of your radio is operational, you can also send your position to other radio sets.

During ALE calls, a link is established between the stations participating in the call. During the link state, the radio operators have various options, many of them similar to the options available in the Channel mode. For a description of the link options, see pages 2-31 to 2-34.

2-12.3.1 Receiving Calls in ALE Mode

When your Micom-Z receives a call, it displays its type and the source address.

You are also notified when a message is attached: if a message is received, the name of the calling station is preceded by an exclamation mark.

For any type of call, if the ALERT attribute is programmed to YES, you will hear the alert tone when a message is received.

Receiving an individual call:

When an individual call (i.e., a call addressed only to your station) is received, the name of the calling station blinks in the display.
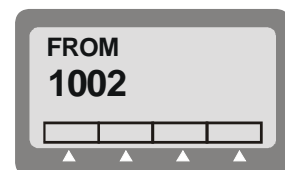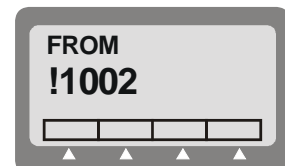
NOTE

If the calling station name is too long and does not fit in the display, M1>10 appears next to F1. Press M1>10 to enter the View mode (see page 2-7).

Receiving a net call:

When your radio receives a net call (i.e., a call addressed to all the stations in your net), the display flashes a net call alert that alternates the words **NET CALL** with the calling station name.

Receiving an AllCall:

NOTE

You can program your radio to ignore incoming AllCalls. If the radio is set to ignore incoming AllCalls, it stops scanning when an AllCall is received but it does not display, nor lets you hear the call. At the end of the AllCall, the radio automatically returns to the scanning mode.

When an AllCall is received, the display flashes an AllCall alert that alternates **ALLCALL** with the calling station name.

Receiving an AnyCall:

NOTE

You can program your radio to ignore incoming AnyCalls. If the radio is set to ignore incoming AnyCalls, it stops scanning when an AnyCall is received but it does not display, nor lets you hear the call. At the end of the AnyCall, the radio automatically returns to the scanning mode.

When an AnyCall is received, the display flashes an AllCall alert that alternates **ANYCALL** with the calling station name.

Receiving a sounding call:

When the radio is in the ALE mode and it receives a sounding call from another station, the calling station name appears in the display, preceded by the letter **S** to identify that the call is a sounding call.

Within a few seconds, the radio automatically returns to the mode used before the call was received.

Receiving a bidirectional handshake call:

When the radio receives a bidirectional handshake call from another station, your radio responds automatically, without your intervention. Within a few seconds, the radio automatically returns to the mode used before the call was received.

If the bidirectional handshake includes a message, the calling station name and the received message are stored in the stack, and the **STAK** function key appears.

To answer an incoming call:

Press any key (including PTT, but not **ESC**) to accept the call. The calling station name stops blinking, and is displayed steadily. The alert tone is no longer heard. The radio is now in the link state with the calling station.

NOTE

When an AllCall is received, no link is actually established but you can hear the calling station.

If the received call includes a message, an exclamation mark precedes the station name, and the name is followed by a colon and the message.

If the calling station name and message are too long and do not fit in the display, press M1>10 to enter the View mode, where you can scroll right and left to display the whole message.

To display LQA for the received call:

Press **LQA**. You will see the channel in use, and its LQA score.

2-12.3.2 The Link State

After the radio successfully receives or transmits a call, it is in the link state.

If the call was received from another radio, the display includes the word **FROM** in the first line, as well as the name of the station which initiated the call (if a message has been received, it is also displayed).

If the call was initiated by your radio, the display includes the word **LINK** in the first line, as well as the destination address.

While in the link state, you can operate the following functions using the function keys.

NOTE

The change of link options is temporary. When you exit the link state, all the changed parameters will be lost.

Option	Description
M1>10	Activates the View mode, where you can view the entire station address.
Page	Enables you to select a message to be sent to the station you are linked to. After a message is selected, you can edit it. The **PAGE** function is not available when receiving an AllCall.
LQA	Displays the channel on which the link was established, and the LQA score of the current link. If the name of the station you are linked to is not in your directory, this function will not be available. The LQA key is displayed only if you established the link in the ALE mode (in the Channel mode, this function is not available, because the call is received/transmitted on the current channel).
MON	Turns on and off monitoring by means of the speaker.
RPL	Replaces the currently-used channel with a channel with a better LQA score. The radio disconnects the link, replaces the channel being used, and initiates the call once again. The **RPL** function is available only for individual calls, and only for the call initiator. The **RPL** key is displayed only if you established the link in the ALE mode (in the Channel mode this function is not available, because the call is received/transmitted on the current channel).
BAND	Toggles between upper sideband (USB) and lower sideband (LSB). The sideband change takes places only after the current call is ended.
SQ	Toggles the squelch on/off. Always select OFF for CW operation.
DSP	Accesses the Digital Signal Processing menu, which includes the following options: • **CLAR** Enables to control the clarifier (off/lower frequency/higher frequency). The function key is not available for TXO (transmit only) channels. • **NF** Enables to control the notch filter (off/lower frequency/higher frequency). The function key is not available for TXO (transmit only) channels. • **CLIP** Toggles the clipper on/off. • **CC** Toggles the ClearCom function on/off. • **ATTN** Toggles the attenuator on/off.
PWR	Selects the transmit power level: **LOW** – 25W; **MED** – 60W; **HIGH** – 100W; **MAX** – 125W.
MODE	Selects the operation mode: • **SSB** – single sideband • **AME** – amplitude modulation equivalent • **PLT** – single sideband with pilot signal).
AGC	Controls the automatic gain control function (fast/slow/off).

Option	Description
BW	Selects the filter bandwidth. • **HS** – high sensitivity filter (450 to 1500 Hz) for best voice communication under marginal conditions • **2.7** – 300 to 2700 Hz • **3.0** – 300 to 3000 Hz • **3.3** – 300 to 3300 Hz. Always select this bandwidths for data transmission • **LSM** – bandwidth optimized for use with low speed modems (1450 to 1950 Hz) • **CW** (Continuous Wave or Morse operation). The bandwidth used in this case is selected by **MENU** > **PROG** > **RAD** > **PRMT** > **CW**.
RCLV	Displays the receive level. The **RCLV** item appears only if the received signal level display is not permanently enabled using **MENU** > **PROG** > **RAD** > **PRMT** > **RCLV**.
FREQ	Displays the current frequency.

2-12.3.2.1 Replacing the Current Channel While in the Link State

If during an individual call you find that the channel in use is not good enough, you can replace it with a better channel.

```
                        NOTES

    •  Channel replacement is possible only during an individual call in
       the ALE mode.

    •  Only the initiator of a call can replace the channel in use.
```

To replace the channel:

1. Press **MORE** to scroll to the second link state menu.

2. Press **RPL** to replace the channel in use.

3. The radio disconnects the link, replaces the channel being used, and initiates the call once again.

```
                        NOTE

    Even if a message was transmitted when the original link was
    initiated, the new link will be initiated without the message.
```

2-12.3.2.2 Using the Caller Stack

The caller stack stores information about unanswered calls. The stack entry contains the self-address of the calling station, and any message sent by the calling station when it sent the call set up request. The stack can contain up to 10 calls.

When the stack is not empty, you can see the stack icon in the display.

The radio records an address in the stack only once, even if the same caller made several unanswered calls. However, if the same caller sent calls with different messages, all such calls will be saved in the stack. If you see **STAK** in the options area, the stack includes at least one call you never viewed before. The stack is arranged in FIFO order, that is, the first address that enters the stack is also the first that you see on the display.

To view the calls in the stack:

1. Press **STAK**. The radio displays information on the total number of calls in the stack, and information on the first call. If the number of characters exceeds the available space, press M1>10 to activate the view mode.

2. Use the **UP/DOWN** keys to view any additional calls in the stack.

To return a call to a station registered in the stack:

1. Press **STAK**.

2. Use the **UP**/**DOWN** keys to scroll to the required call.

3. Press **CALL**.

4. Press **PAGE** if you want to attach a message when you reply to the call.

5. Press **CHAN** if you want the call to be initiated on a specific channel in the currently used net.

> **NOTE**
>
> The **CHAN** key is displayed only if the radio is in the ALE mode.

6. Press **SEND** or **ENTER** to initiate the call.

> **NOTE**
>
> After initiating a call to a station, its page in the stack is automatically deleted, together with all other calls from the same address.

To remove an address from the stack:

The radio automatically removes an address from the stack in the following cases:

- When the operator calls a station registered in the caller stack, all stack calls containing that address are erased from the stack, regardless of whether the call was returned from within the stack or during an individual call.

- The stack can contain up to ten addresses. When the stack is full and a new address comes in, the new address replaces the oldest address in the stack.

In addition, you can manually remove an address from the stack as follows:

1. Press **STAK**.

2. Use the **UP**/**DOWN** keys to scroll to the required call.

3. Press **ERAS**.

4. Press **YES** to confirm or, **NO** to cancel the deletion.

2-12.3.3   Disconnecting Calls

When you are in the link state, your radio can communicate with at least one other ALE station.

To disconnect an incoming call:

Press the **ESC** key. This disconnects the link and returns the radio to the mode used before the link was established. When you disconnect a link, you can instruct the other station(s) to return to the working mode they were in before they entered the link state. This feature is called Home Acknowledge, and can be programmed. If Home Acknowledge is enabled:

- In an individual link, each of the stations in the link can transmit the Home Acknowledgement to instruct the other stations to disconnect the link.

- In a net/AnyCall link, the Home Acknowledgement can only be transmitted by the radio which initiated the call.

2-12.3.4   Transmitting Calls in ALE Mode

To transmit an ALE call, you must specify the destination. In general, the destination consists of a net and one or more stations (members of the specified net). The destination net is always the currently selected net (its number is displayed on the LCD while the radio is scanning).

```
┌─────────────────────┐
│ ALE                 │
│ NET   1    5        │
│                     │
│ ┌────┬───┬───┬────┐ │
│ │CALL│LQA│   │MON │ │
│ └────┴───┴───┴────┘ │
│   ▲    ▲   ▲   ▲    │
└─────────────────────┘
```
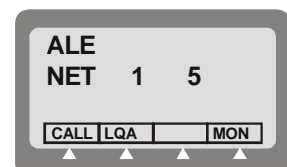
Therefore, if you do not want to select a different net, you can skip directly to the selection of the destination station(s).

To expedite the transmission of an AllCall, you can send a global AllCall by pressing the **P/ESC** key for a few seconds.

Micom-Z stores the last called address, so you can simply press the PTT twice in rapid sequence (*double pressing*) to call again that address. This also applies to AllCall, and therefore after sending AllCall for the first time, you can send it again by double pressing the PTT.

NOTE

If you want to monitor the call set up process on the speaker and be alerted by a beep when the link is set up, turn the monitor on, using the **MON** key.

2-12.3.4.1   Selecting the Desired Net

To select a net:

1. Press **MENU** and select **ALE**.

   The radio displays current active net number, flashing.
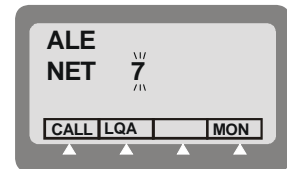
2. To change the currently used net, press the **UP/DOWN** keys, or enter the net number on the keypad, and then press **ENTER**.
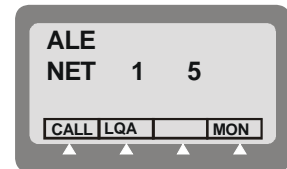
2-12.3.4.2   Calls to an Individual Station

To transmit an individual call:

1. Press **CALL**.

   The radio displays the last called address. This may be a station address, or any other type of address (for example, net, wildcard, etc.).

2. To select a different station:

   Press the **UP/DOWN** keys to scroll between stations.

   <div align="center">or</div>

   Use the keypad to enter a station name and then press **SAVE** or **ENTER** when the required station name appears.

NOTE

When scrolling between stations with the **UP/DOWN** keys, every key pressing displays destination addresses in the following order:

- The last called address

- The AllCall address (GL ALLCALL, or SL ALLCALL, if you used it instead of GL ALLCALL)

- The current active net number

- The addresses of the members in the current net

- Other addresses in the directory.

---

3. Press **SEND** or **ENTER** to initiate the call.

4. The radio now starts the link set up process. During this process, you will see **TO** alternating with the number of the channel on which the set up request is being sent (the channel may change, if the called station does not answer on the first channel(s)).

> **NOTE**
>
> While the radio is initializing the link, you can press **STOP** or **ESC** to abort the entire process.

5. After the link is established, you will see a LINK message. Now you may press the PTT and start talking.

> **NOTE**
>
> If the link with the selected station cannot be set up, you will see for a few seconds a flashing NO LINK message.

6. To disconnect the link, press the **ESC** key (see page 2-31).

> **NOTE**
>
> If you want to call again the same station, double-press the PTT to use the quick-call feature (see page 2-37).

To transmit on a specific channel:

1. Initiate a call as explained above (page 2-33 or 2-35) and select the desired station.

2. Press **CHAN** to select a specific channel.

   The channel with the best LQA score is displayed. The speaker is unmuted to enable you to check the channel quality by listening to it.

> **NOTE**
>
> If the name of the called station has been edited and the new station name is not in the directory, no LQA score is displayed.

3. Press **BEST** to select the channel with the best LQA score...

> **NOTE**
>
> If the name of the called station has been edited and the new station name is not in the directory, the channel displayed after pressing **BEST** is the first scanned channel of the net.

… or

Press the **UP/DOWN** keys to scroll to the channel of your choice.

> **NOTE**
>
> You can use this option to transmit a call to a station operating in the Channel mode. If the other station is in the Channel mode, your radio switches to the Channel mode for the duration of the call, and then returns to the ALE mode after the link to that station is disconnected.

4. Press **SEND** or **ENTER** to initiate the call.

5. The radio now starts the link set up process. During this process, you will see **TO** alternating with the number of the channel on which the set up request is being sent (the channel may change, if the called station does not answer on the first channel(s)).

> **NOTE**
>
> While the radio is initializing the link, you can press **STOP** or **ESC** to abort the entire process.

6. After the link is established, you will see a LINK message. Now you may press the PTT and start talking.

7. To disconnect the link, press the **ESC** key (see page 2-31).

2-12.3.4.3   Quick Call

A quick call is a call to the last station you tried to call (regardless of whether the call was successful or not). In the ALE mode, the channel used for the original call is reused for the quick call.

The Quick Call feature can be enabled or disabled as part of ALE parameters programming.

> **NOTES**
>
> • Quick Call will not transmit a message, even if the last call contained a message.
>
> • The first time the station is switched to the ALE or Channel mode, quick call is not possible as no "most recent" station data exists.

To send a quick call:

Double-press the PTT of your microphone or handset. The radio automatically tries to contact the last called station.

During this process, you will see **TO** alternating with the number of the channel on which the set up request is being sent (the channel may change, if the called station does not answer on the first channel(s)).

> **NOTE**
>
> While the radio is initializing the link, you can press **STOP** or **ESC** to abort the entire process.

2-12.3.4.4   Using Autodial

The Autodial feature lets you use a single digit to call a preprogrammed address. There are ten programmable Autodial addresses, where each can include a message.

To use Autodial to send a call:

1. Press # on the keypad.

> **NOTE**
>
> If you do not select an auto-address within a few seconds, the display automatically reverts to the previous state.

2. Press the desired preprogrammed Autodial number (0 to 9).

   The programmed address is immediately displayed; if a message is preprogrammed, an exclamation sign will appear before the station name.

   Press **PAGE** if you want to attach a message to the call or to replace/edit a preprogrammed attached message. See page 2-38.

> **NOTE**
>
> If the Autodial number you enter is not programmed, the message **NOT PROG** will be displayed.

3. Press **CHAN** if you want the call to be initiated on a specific channel. See page 2-38.

4. Press **ENTER** or **SEND** to start the call.

5. The radio now starts the link set up process. During this process, you will see **TO** alternating with the number of the channel on which the set up request is being sent (the channel may change, if the called station does not answer on the first channel(s)).

> **NOTE**
>
> While the radio is initializing the link, you can press **STOP** or **ESC** to abort the entire process.

6. After the link is established, you will see a LINK message. Now you may press the PTT and start talking.

7. To disconnect the link, press the **ESC** key (see page 2-31).

2-12.3.4.5   Sending Messages

You can send messages (*page*) together with the initial call (before the link is set up), and also whenever necessary while the link is already set up (that is, when your station is in a link with the destination station). In the link state, if you are making an individual call, both the receiving and the calling station can send messages to the other station. This is also true for net calls and group calls.

To transmit an individual call with a message:

1. Initiate a call as explained above (page 2-33 or 2-35) and select the desired station.

2. Press **PAGE** to add a message. The last sent message is displayed.

   • Press the **UP/DOWN** keys to scroll to the required message.

   <div align="center">or</div>

   • To edit the message, press **EDIT** and use the keypad to enter a new message.

3. Press **SAVE** when the message is ready.

4. Press **SEND** or **ENTER** to initiate the call.

5. Proceed with the call as explained above (page 2-33 or 2-35).

To send a message during a call (link state):

1. Press **PAGE**.

> **NOTE**
>
> If this function key is not displayed, you cannot send a message in the present mode.

2. Select or edit the desired message as explained on page 2-37.

3. Press **SEND** or **ENTER** to send the message.

4. The radio now starts the link set up process for this message (this process is similar to the process used to set up the link for this call). During this process, you will see **TO** alternating with the number of the channel being used.

NOTES

- While the radio is initializing the link, you can press **STOP** or **ESC** to abort the entire process.

- If the link needed to send the message to the selected station cannot be set up, you will see for a few seconds a flashing NO LINK message.

2-12.3.4.6   Other Types of Calls

In addition to calls to individual stations described on the pages 2-34 to 2-38, additional types of calls can be used to help you call multiple stations (see list on page 2-30).

NOTE

A properly designed address assignment plan is needed to take advantage of the special ALE calling modes.

The special call types are reached under a special submenu, designated MULT (see Figure 2-5 for its organization).

To select a special call type:

1. Press **CALL**.

   The radio displays the last called address. This may be a station address, or any other type of address (for example, AllCall, net, wildcard, etc.).

2. Press **MORE** once.

3. Press **MULT** to display the first page of special calls. If the desired call type is located on this page, press the corresponding function key to select it.

4. If necessary, press **MORE** again to display the next page.

NOTE

Pressing **MORE** again return you to the first page of special calls: do not use the **ESC** key, as it cancels the MULT option.

5. Go to the page listed below for detailed instructions.

Option	Capabilities	See Page …
ALL	AllCall – call directed to all the other stations simultaneously; usually used as a distress call.	2-40
NET	Net call – call directed to a net (a net is a preprogrammed group of stations). Up to 20 nets can be defined.	2-41
GRP	Group call – call directed to a group of individually selected stations. Groups can be preprogrammed, but you can also select the stations to be called and save the selection for reuse. Up to five groups can be defined.	2-42
ANY	AnyCall – call directed to all the other stations simultaneously, usually used to detect new stations.	2-44
WILD	Wildcard call – call simultaneously addressed to a selected group of stations within a net, with wildcards used within the address to specify the desired stations. Wildcard calls use the special ALE addressing modes. If you are not familiar with these modes, you should review Appendix A.	2-45

SELF   Self call – call using the station's own address, generally used for test   2-46
            purposes.

2-12.3.4.7   Transmitting AllCalls

An *AllCall* is a message which your radio uses to establish a connection with all the other stations simultaneously, and is typically used to broadcast a message or send a distress call. An AllCall can also include a message.

In addition to this type of AllCall (referred to as a *global (GL) AllCall*), it is also possible to use *selective (SL) AllCall*: this is a simultaneous call addressed only to all the stations whose names (addresses) end with a character you specify.

```
NOTE

If so required, you can set your radio so that it cannot send AllCalls.
```

You cannot select the channel on which an outgoing AllCall will be sent: outgoing AllCalls are sent on the AllCall channel defined for the currently selected net, or on the best scanned channel of the net.

There are two ways to send a global AllCall: using the **ESC** key or using the CALL function. A selective AllCall can be sent only using the CALL function.

To send global AllCall using the ESC key:

1. Press **ESC** continuously for a few seconds. The radio starts sending the GL AllCall.

   During this process, you will see **TO** alternating with the number of the channel on which the set up request is being sent.

```
NOTE

While the radio is initializing the link, you can press STOP or ESC to
abort the entire process.
```

2. After a delay, you will see LINK with a flashing GL ALLCALL.

3. Confirm the link set up by pressing **ENTER** or the PTT. The GL ALLCALL message stops flashing, and you can start talking.

4. Press **PAGE** if you want to send a message. See page 2-38 for details.

5. To end the call, press **ESC**.

To send global AllCall using the CALL function:

1. Press **CALL**. The radio displays the last called address.

2. Press the **UP/DOWN** keys until you reach GL ALLCALL.

3. Press **PAGE** if you want to add a message to the call. See page 2-38 for details.

4. Press **SEND** or **ENTER** to start the call.

   The call now proceeds as for call initiated by pressing the **ESC** key.

To send selective AllCall:

1. Press **CALL**. The radio displays the last called address.

2. Press **MORE** once.

3. Press **MULT** to display the first page of special calls.

4. Press **ALL**.

5. Press **SEL**.

```
NOTE
If you decide to send a Global AllCall, press GLOB.
```

6. Type the desired character (only one character is accepted).

```
NOTE
You can press ? if you decide to send a global AllCall.
```

7. Confirm your selection by pressing **ENTER**.

```
NOTE
If you decide to send a global AllCall, press GLOB.
```

8. Press **SEND** or **ENTER** to start the call. The radio starts sending the selective AllCall.

```
NOTE
While the radio is initializing the link, you can press STOP or ESC to abort the entire process.
```

9. After a delay, you will see LINK, and you can start talking.

10. Press **PAGE** if you want to send a message. See page 2-38 for details.

11. To end the call, press **ESC**.

Transmitting Net Calls

Before starting, select the net you want to use as explained on page 2-35.

```
NOTES
•  You can program nets using the front panel, or the MRC.
•  The radio must be programmed as a MASTER radio in the net (an ALE Programming option) in order to be able to transmit net calls.
```

To transmit a net call:

1. Press **CALL**.

    The radio displays the last called address.

    If you see the net you want, skip directly to Step 5 below, otherwise continue as explained below.

2. Select the NET option as explained on page 2-39.

3. Press **PAGE** if you want to attach a message to the call.

4. Press **CHAN** if you want to initiate the call on a specific channel.

5. Press **SEND** or **ENTER** to initiate the call.

    The radio now starts the link set up process. During this process, you will see **TO** alternating with the number of the channel on which the set up request is being sent.

```
NOTE
While the radio is initializing the link, you can press STOP or ESC to abort the entire process.
```

When a net call is transmitted, each member in the net responds to the call and the initiator of the call receives an indication of the response on the display.

6. After links have been established, you can start talking.

7. To end the call, press **ESC**.

2-12.3.4.8   Transmitting Group Calls

Group calls let you call several individual stations in your net (at least 2) at once. Thus, you can use a group call to communicate with a few select stations, while other stations can still communicate at will, using other channels available to your net.

You can call up to 5 stations in a group call. The only restriction is that the total length of all the addresses cannot exceed 12 ALE words (36 characters). If the maximum allowed length is exceeded, you get a **BUFF FULL** error.

NOTES

*   If you need to check beforehand the length, remember that each ALE word must include 3 characters. Therefore, when an address is not an exact multiple of 3, stuffing symbols are automatically added in the last positions.

*   ALE addresses are categorized in accordance with their leading ALE word (that is, their first three characters: if the address is short and has only one or two characters, stuffing symbols @ are added). When assembling a group you must also take into consideration that the maximum number of different address categories (as identified by their leading word) in one group is 5. If more are included, then when you try to send the call you will see **UFA WRONG**. In this case, remove addresses to make the group more homogenous.

To make a group call, first you must specify the stations to be included in the group. The addresses of the stations you include in the group can be saved as a ***group***; the radio can store up to 4 different groups. If a group including the desired stations is already programmed, you can directly initiate the call to the desired group.

NOTE

Before starting, you may want to select a different net to use: see instructions on page 2-35.

To transmit a group call:

1. Press **CALL**.

    The radio displays the last called address.

    If you see the group you want, skip directly to Step 6 below, otherwise continue as explained below.

2. Select the GRP option as explained on page 2-39.

3. The first group displayed is always group 1. If this is the group you want, skip directly to Step 6 below, otherwise press the UP or DOWN arrows until you see the desired group.

4. Press **PAGE** if you want to attach a message to the group call.

5. Press **CHAN** if you want to initiate the call on a specific channel.

6. Press **SEND** or **ENTER** to initiate the call.

NOTES

- If the selected group does not include at least 2 stations, your request is rejected and you will see for a few seconds **AT LEAST 2**.

- If the addresses in the group have more than 5 different leading words, your request is rejected and you will see for a few seconds **UFA WRONG**.

The radio now starts the link set up process. During this process, you will see **TO** alternating with the number of the channel on which the set up request is being sent.

NOTE

While the radio is initializing the link, you can press **STOP** or **ESC** to abort the entire process.

When a net call is transmitted, each member in the group responds to the call and the initiator of the call receives an indication of the response on the display.

7. After links have been established, you can start talking.

8. To end the call, press **ESC**.

To define or change a group:

1. Press **CALL** and select the GRP option, as you do to start a group call (page 2-42).

2. The first group displayed is always group 1. If this is the group you want, skip directly to Step 3 below, otherwise press the UP or DOWN arrows until you see the desired group.

3. To select the stations you want in this group, press **SEL**.

NOTE

The following example explains how to build a new group, but you can use the same procedures to change an existing group.

4. After pressing **SEL**, you will see the DIR screen. Therefore, you can select stations from the addresses already stored in the directory, or type new addresses using the keypad.

To select an address from these already in the directory:

1. Use the UP and DOWN arrows to display the desired directory entry, and then press **ADD**.

   The label above the selected entry changes to ADDED, to indicate that it is now included in the group.

   Now you can also have the option (**ERAS**) to delete the entry from the group.

NOTE

If adding the station would cause the total length of the station addresses in the group to exceed 12 ALE words, then after pressing **ADD** you will see **BUFF FULL** and the process stops.

2. Repeat the procedure described above until the group includes only the desired stations.

   As you scroll through the directory, you will see DIR for stations that can be added, and ADDED for those already added. If the station you want to add to the group is not in the directory:

   Enter the new station using the keypad. If you make a mistake, scroll to the desired position using M1>1> and/or >1>10, or clear (**CLR**) the whole entry and start again.

3. When ready, press **SAVE** to store the new station in the directory.

Now you can add it to the group by pressing **ADD**.

2-12.3.4.9 Transmitting AnyCalls

An AnyCall is a general broadcast which your radio uses to simultaneously establish links with other stations. An AnyCall can also include a message.

> **NOTE**
>
> If so required, you can set your radio so that it cannot send AnyCalls.

AnyCall is somewhat similar to AllCall, except that it requests responses from the other stations and therefore it can be used to detect new stations. Another difference is that you can also select the channel on which the AnyCall will be transmitted (alternatively, you can let the radio select automatically the channel).

You can send three types of AnyCalls (see also description of addressing modes on Appendix A):

- General: the address sent by your radio is **@@?**. This is a simultaneous call addressed to all the stations.

- Selective: you specify the last character of the address. This is a simultaneous call addressed only to the stations whose names (addresses) end with a character you specify.

- Double selective: similar to selective, except that you specify the last two characters of the address.

To make an AnyCall, first you must select the address to be used for the call.

Micom-Z will wait for responses for a certain time before entering the link state with all the stations that responded within this interval (the maximum number of stations that are accepted in an AnyCall is 16).

> **NOTE**
>
> Before starting, you may want to select a different net to use: see instructions on page 2-35.

To transmit an AnyCall:

1. Press **CALL**. The radio displays the last called address.

   If you see the address you want (that is, you want to repeat the last AnyCall), skip directly to Step 10 below, otherwise continue as explained below.

2. Press **MORE** once.

3. Press **MULT** to display the first page of special calls.

4. Press **ANY**.

5. Press **SEL**.

> **NOTE**
>
> If you try to send (**SEND**) the call without first selecting an address, your attempt is rejected and you see for a few seconds **NOT PROG**.

6. Select the AnyCall address:

   - To send a general AnyCall, press **?**.

   - To send a selective AnyCall, enter the desired character (any character except **#**, **@** or **?**).

   - To send a double-selective AnyCall, enter two characters.

7. Confirm your selection by pressing ENTER.

8. Press **PAGE** if you want to attach a message to the call.

9. Press **CHAN** if you want to initiate the call on a specific channel.

10. Press **SEND** or **ENTER** to initiate the call.

The radio now starts the AnyCall process. During this process, you will see **TO** alternating with the number of the channel on which the request is being sent.

NOTE

You can press **STOP** or **ESC** to abort the entire process.

When an AnyCall is transmitted, the initiator of the call receives an indication of each station answering the call (its address flashes in the display, until replaced by the next answering station).

11. After a programmed interval (or after 16 stations answer, whichever comes first), the link is established. Now you can start talking.

12. To end the call, press **ESC**.

2-12.3.4.10 Transmitting Wildcard Calls

Wildcard calls, that is, calls in which the destination address includes the wildcard character **?**, let you to simultaneously address multiple stations with a single address:

- Any station receiving an address with wildcards stops scanning and checks the address length: if the number of characters in the received address is different from the number of characters in its own self-address, the station ignores the call.

- If the received address matches the length, a receiving station checks the significant positions in the received address against its own. For example, the stations JOHN and JOIN will both accept a call with the address JO?N.

- Each station accepting the call answers the calling station in a pseudo-random slot.

Micom-Z will wait for responses for a certain time before entering the link state with all the stations that responded within this interval (the maximum number of stations that are accepted in a wildcard call is 16). Therefore, with the wildcard option, the link set up process takes more time, because the radio waits longer to get responses (it cannot "guess" the number of stations that will answer).

Before continuing, you may wish to review Appendix A, which presents details on ALE addressing (including the use of wildcards in addresses).

NOTE

Before starting, you may want to select a different net to use: see instructions on page 2-35.

To transmit a wildcard call:

1. Press **CALL**. The radio displays the last called address.

   If you see the address you want (that is, you want to repeat the last wildcard call), skip directly to Step 11 below, otherwise continue as explained below.

2. Press **MORE** once.

3. Press **MULT** to display the first page of special calls.

4. Press **MORE** again to display the next page.

5. Press **WILD** to start.

6. Press **SEL**.

> **NOTE**
>
> If you try to send (**SEND**) the call without first selecting an address, your attempt is rejected and you see for a few seconds **NOT PROG**.

7. Select the desired address:

   - To insert a wildcard, press **?**

   - Enter the desired characters using the keypad.

8. Confirm your selection by pressing ENTER.

9. Press **PAGE** if you want to attach a message to the call.

10. Press **CHAN** if you want to initiate the call on a specific channel.

11. Press **SEND** or **ENTER** to initiate the call.

> **NOTE**
>
> If the selected group does not include at least 2 stations, your request is rejected and you will see for a few seconds **AT LEAST 2**.

The radio now starts the process. During this process, you will see **TO** alternating with the number of the channel on which the request is being sent.

> **NOTE**
>
> You can press **STOP** or **ESC** to abort the entire process.

12. After a delay, you will see LINK with the wildcard address flashing.

13. Confirm the link set up by pressing **ENTER** or the PTT. The address stops flashing, and you can start talking.

14. To end the call, press **ESC**.

2-12.3.4.11 Transmitting a Self Call

The self-call is a test call addressed to your own address within the currently selected net. Its purpose is to check that your radio set is OK and can transmit calls (to check reception, you can simply listen to other radio sets).

When you send the self-call, the radio starts sending calls to its own address, successively, on each channel in the current net. After going through all the channels, the call process stops. No other response is expected.

> **NOTE**
>
> You can also include the self address in a group call.

To send a self-call:

1. Press **CALL**. The radio displays the last called address.

2. Press **MORE** once.

3. Press **MULT** to display the first page of special calls.

4. Press **MORE** again to display the next page.

5. Press **SELF** to start the self-call.

6. You may select now a specific channel to perform the call, by pressing **CHAN**. See details on page 2-36.

7. When ready, press **SEND** to start transmitting. The display alternates between your self-address and the channel used for the call is sent. If you did not select a specific channel, the channel number changes as the radio sends the call on each channel assigned to the selected net.

After all the channels have been used, the call automatically stops.

You can press STOP at any time to end the call sooner.

2-12.3.4.12 Bidirectional Handshake

The bidirectional handshake is used to exchange LQA scores with other stations without establishing a link.

NOTE

The Micom-Z can also be programmed to automatically initiate the call to the station after finishing the bidirectional handshake (using the BDLK parameter reached under the ALE programming options).

A bidirectional handshake can be carried out with a single station or with all stations in the net. It can be carried out either on a single channel, or on all the net channels. When required, a message can also be added to the procedure.

After a bidirectional handshake with a single station, the LQA matrices of both radios are updated. The operator can then initiate a call to that station and obtain the best channel automatically.

When the bidirectional handshake procedure is performed with a net, all the stations in the net update their LQA tables.

Micom-Z will wait for responses for a certain time before entering the link state with all the stations that responded within this interval (the maximum number of stations that are accepted in a bidirectional handshake is 16).

NOTE

Before starting, you may want to select a different net to use: see instructions on page 2-35.

To execute a bidirectional handshake with an individual station:

1. Press **LQA** to enter the LQA menu.

2. Press **BIDR.** The last called address is displayed. If this is the address you want, skip directly to Step 6 below.

3. To select a different address, use the **UP/DOWN** keys to scroll to the required address in the directory, and then press **ENTER** to confirm your selection.

<div align="center">or</div>

If the station you want to add to the group is not in the directory:

- Enter the new station using the keypad. If you make a mistake, scroll to the desired position using M1>1> and/or >1>10, or clear (**CLR**) the whole entry and start again.

- When ready, press **SAVE** to store the new station in the directory.

4. Press **PAGE** if you wish to attach a message to the bidirectional handshake process. After confirming the message, exclamation mark precedes the name of the called station, indicating that a message has been attached.

5. Press **CHAN** if you wish to execute a bidirectional handshake process on a specific channel.

6. Press **SEND** or **ENTER** in order to initiate the bidirectional handshake process. During this process, you will see **TO** alternating with the number of the channel on which the set up request is being sent.

> **NOTE**
>
> During the bidirectional handshake process, you can press **STOP** or **ESC** to abort the entire process.

To execute a bidirectional handshake with a net:

1. Press **LQA** to enter the LQA menu.

2. Press **BIDR.**

   The last called address is displayed. If this is the net you want, skip directly to Step 8 below.

3. Press **MORE**.

4. Press **MULT**.

5. Press **NET**.

> **NOTE**
>
> You cannot change the net number at this stage – the bidirectional handshake is always performed on the currently selected net. To change the net, see page 2-35.

6. Press **PAGE** if you want to attach a message to the handshake.

7. Press **CHAN** if you want to initiate the handshake on a specific channel.

8. Press **SEND** or **ENTER** to initiate the handshake. During this process, you will see **TO** alternating with the number of the channel on which the handshake is being sent.

> **NOTE**
>
> While the radio is initializing the handshake, you can press **STOP** or **ESC** to abort the entire process.

2-12.3.4.13 Sounding

Sounding is used to test the quality of the channels and propagation paths of all channels in the net.

The sounding signal is normally repeated automatically, at regular intervals. A complete round of sounding messages, or "sounding cycle" can be programmed to 30, 60, 90, or 120 minutes, or can be set to OFF.

Sounding can also be initiated manually whenever necessary, even if automatic sounding is enabled.

To manually initiate sounding:

1. Press **LQA** to enter the LQA menu.

2. Press **SOND**.

3. Press **ON** to start manual sounding, or **OFF** to stop an ongoing sounding process.

> **NOTES**
>
> - The radio automatically returns to ALE mode when sounding is stopped.
> - When the radio transmits a sounding signal, the Tx bar is visible.

2-12.3.5 Using the Inlink Function

When the inlink function is enabled, the stations participating in a call are automatically notified by a DISC message whenever another participant leaves (disconnects from) the call.

The link is then automatically disconnected when only one station is left (that is, after all the other participants disconnected).

The inlink function is available in any type of call that involves the setting up of a link using bidirectional handshaking. Therefore, you can use it in individual calls, group calls, net calls, etc., but not in AllCalls and self calls.

NOTE

For the inlink function to operate correctly, it must be enabled on all the stations.

Do not enable the inlink function when communicating with a radio that does not support the full ALE capabilities in accordance with MIL-STD-188-141B.

To avoid disconnecting the link too soon as a result of inactivity (that is, after the programmed PTT time-out interval (PTOT)), each participant can request other stations to wait beyond the PTOT interval (up to 10 minutes more) before automatic disconnection occurs.

This option (TOT – time-out interval) is displayed over the F4 key after the link is set up: to send a request for the other stations to wait more time, press the TOT key.

2-12.3.6 Transmitting ALE Calls in the Channel Mode

The ALE option is available in both the ALE and Channel modes and therefore, the radio can also answer ALE calls.

The transmission process is similar for both operating modes, with the following differences:

- In the Channel mode, every call is initiated on the currently selected channel.
- The LQA function is not available in the Channel mode: sounding and bidirectional calls can only be initiated in the ALE mode.
- When the radio is in the Channel mode, it uses the parameters programmed for net 1.

NOTE

If net 1 is not programmed, there is no ALE functionality in the Channel mode, even if the ALE option is turned on.

2-12.4 Using ALE Mode to Send and Request GPS Position Data

You can use the ALE AMD service to:

1. Send your position to any another destination (including one-to-many).

2. Request the position of another Micom-Z transceiver equipped with a GPS receiver. You can make this type of request only when you call an individual station.

Note that the operations described above automatically set up a link between the two stations and therefore it is necessary to disconnect the link when it is no longer needed. For this purpose, it is recommended to enable Home Acknowledge, and/or enable the PTT time-out function.

> **NOTE**
>
> AMD messages with the GPS position do not enter the stack (the information such message carries is good only at the time you got it): if you do not read the message in time, you can no longer retrieve the message at a later time.
>
> Thus, you must allow sufficient time for the destination station to read the position message before when link is disconnected. This is particularly important when Home Acknowledge is enabled: the message will disappear as soon as you disconnect the link.

2-12.4.1   Request GPS Position

To automatically get the position of another Micom station, use the following procedure:

1. Select the **CALL** mode (either from the ALE mode or the CHAN mode).

2. Select the destination address (you can make only an individual call).

3. Select the **PAGE** selection mode.

4. Scroll until you see the **RMT POS** message, and then send the message.

5. Your station starts the link set up to the selected station; after the link is set up, you will see the response AMD of the called station, which includes its latitude and longitude. POSITION INVALID means that the remote station cannot provide its location.

6. You may now continue with voice communication, or disconnect the link to the called station.

> **NOTE**
>
> Radio sets of various vendors can also accept GPS position requests. The position request is made by sending the string FIXPOSIT as an AMD message.

2-12.4.2   Sending Own GPS Position

You can use the PAGE service to send the AMD message that appears in position 14 in the default list of AMD messages to transmit your own position to a remote station.

2-13. USING THE CCIR MODE

The automatic link establishment protocol standardized by CCIR (Consultative Committee on International Radio, currently part of the International Telecommunications Union) is a protocol that provides services similar to the ALE protocol (see para. 2-12), except that it uses a different addressing scheme, based on six-digit station addresses with support for four-digit addresses for backwards compatibility.

The main services available with the CCIR protocol are as follows:

- Receive calls from individual transceivers, as well as groups and subgroups of transceivers

- Call individual transceivers, as well as groups and sub-groups of transceivers

- Transmit text messages, beacon calls, and emergency calls.

2-13.1 Enabling the CCIR Mode

To enter the CCIR mode:

1. Press **MENU** to display the Menu screen.

> **NOTE**
> If you see **ALE** or **SCAN** next to F3, first enable the CCIR mode. To enable CCIR, select **CCIR** on **MENU > MORE > PROG > RAD > OPTS > SLCL**.
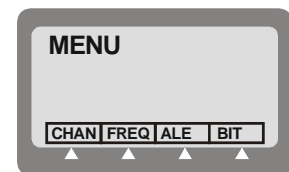
2. Press **CCIR** to start using the CCIR mode.

3. Select the desired operating mode:

   - SCAN – selects a channel automatically out of a specified group of channels programmed into the radio set

   - CHAN – enables the operator to select the desired operating channel.
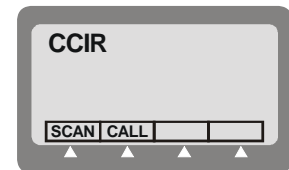
2-13.2 CCIR Mode Options

Figure 2-6 shows the operator options available in the CCIR mode.
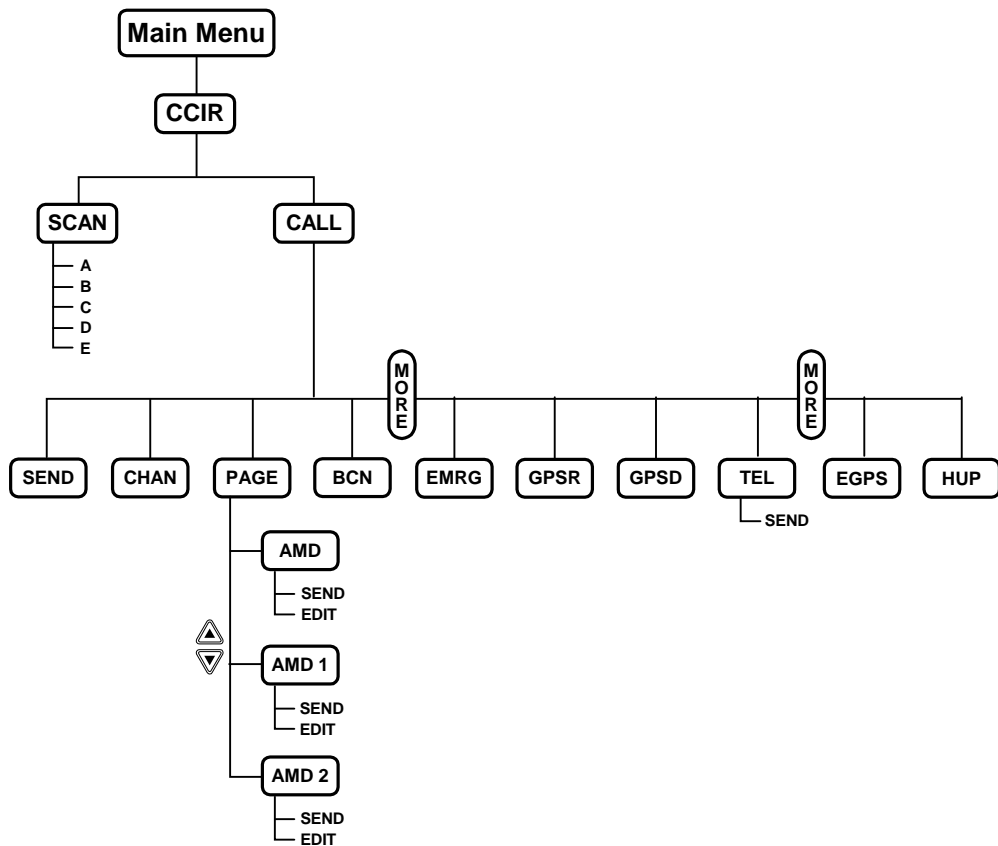
Figure 2-6. CCIR Operator Menu

Option	Description
SEND	Send a call
CHAN	Used to select a specific operating channel
PAGE	Enables you to select a message to be sent to the station you are linked to. After a message is selected, you can edit it
BCN	Send a beacon call
EMRG	Send an emergency call

2-13.3 Receiving CCIR Calls

This section describes how to receive calls in the CCIR mode. Before receiving calls, you must select either the CCIR scanning mode or the CCIR channel mode

---
NOTE

After you finish a call, you can mute the speaker: press **MORE** > **MORE** > **MORE** > **MON**.

2-13.3.1   Receiving Calls in CCIR Scanning Mode

To activate the CCIR scanning mode:

1. Access the CCIR menu: **MENU** > **CCIR**.
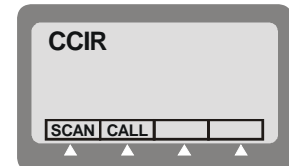
2. Press **SCAN** to access the Scan menu.

NOTE

When no scanning groups have been programmed, EMPTY appears in the display. Groups are programmed using the MRC

---

3. Select a scan group, and then press **ENTER** to confirm.
    The transceiver begins scanning the channels in the selected group (the changing channel number appears to the right of the group identification).

4. If you receive a scanning call, press PTT or ENTER.
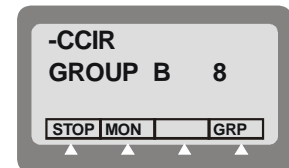
NOTE

If you do not press **PTT** or **ENTER** within 60 seconds, the caller's address is stored in the stack memory. For more details, see the Working with Stack Memory section.

---

5. To stop scanning, press **PTT** or **STOP**.

NOTE

Scanning automatically resumes 60 seconds after you release **PTT**.

---

6. To change the scanning group, press **GRP** to access the Group menu.

7. Select a scan group and press **ENTER** to confirm. The transceiver begins scanning.
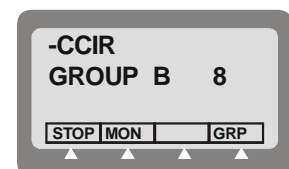
8. To mute the speaker, press **MON**.

2-13.3.2   Receiving Calls in the CCIR Channel Mode

This section describes how to receive calls in the CCIR Channel mode.

2-13.3.2.1   Receiving Individual, Sub-Group, Group, and All Calls

When your transceiver receives a call, the caller's address appears in the display.

To receive individual, sub-group, group, and all calls:

1. Press any button (including PTT) to accept the call.

```
CH  12
F 15,000.00
  BAND SQ   DSP
```

2. If you do not press any buttons (including PTT) for 60 seconds, the call automatically ends.

3. After the call ends, press **MORE** > **MORE** > **MORE** > **MON** to mute the speaker.
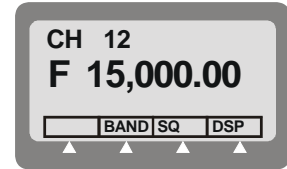
2-13.3.2.2   Receiving AMD Messages

When your transceiver receives an AMD message, the caller's address and message appear in the display.

To receive AMD messages:

1. Press M1>10 to view the message.

2. Press any button (including PTT) to end the call.

2-13.3.2.3   Receiving Emergency Calls

When your transceiver receives an emergency call, the caller's address appears in the display.

To receive emergency calls:

1. Press any button (including **PTT**) to accept the call.
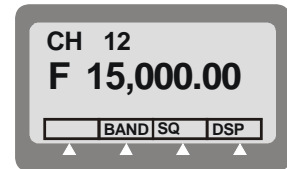
```
CH  12
F 15,000.00
  BAND SQ   DSP
```

NOTE

If you do not press any buttons (including **PTT**) for 60 seconds, the caller's address is stored in the stack memory. For more details, see the Working with Stack Memory section.

---

2. After the call ends, press **MORE** > **MORE** > **MORE** > **MON** to mute the speaker.

2-13.4   Transmitting CCIR Calls

This section describes how to transmit calls.

NOTE

Before you transmit calls, you must configure at least one directory. For more details, see the Configuring CCIR Directory Entries section in Chapter 4.

2-13.4.1 Selecting a Specific Channel

To select a specific channel:

1. Access the CCIR menu: **MENU** > **CCIR**.

```
CCIR


SCAN CALL
```

2. Press **CALL** to access the Call menu.

3. Press **CHAN** to access the Channel menu.

4. Press **UP/DOWN** keys to select a specific channel.
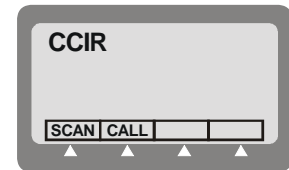
> **NOTE**
>
> The transceiver uses the selected channel until you select a different channel.

5. Press **ENTER** to confirm.

```
CALL
DIR 621565


SEND CHAN PAGE BCN
```
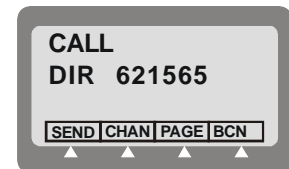
2-13.4.2 Transmitting Individual, Sub-Group, Group, and All Calls

> **NOTE**
>
> After you finish a call, press **MORE** > **MORE** > **MORE** > **MON** to mute the speaker.

To transmit individual, sub-group, group, and all calls:

1. Access the CCIR menu: **MENU** > **CCIR**.

```
CCIR


SCAN CALL
```

2. Press **CALL** to access the Call menu.

3. Press **UP/DOWN** keys or use the keypad to select the address you want to call.

```
CALL
DIR 621565


SEND CHAN PAGE BCN
```

4. Press **SEND** to transmit the call. An audible reply confirms your connection.

5. Press PTT to speak and release PTT to listen.

```
CALL
DIR 621565


SEND CHAN PAGE BCN
```

6. If you do not press any buttons (including PTT) for 60 seconds, the call automatically ends.

7. After the call ends, press **MORE** > **MORE** > **MORE** > **MON** to mute the speaker.
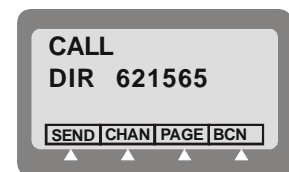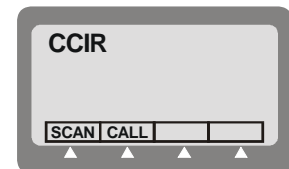
2-13.4.3   Transmitting Calls in Scanning Mode

While the radio is in the scanning mode, you can send an individual call by entering the destination address, and selecting the desired channel.

To transmit an individual call during scanning:

1. While the radio is scanning ...

```
-CCIR
GRP A      4

STOP  MON        GRP
```

... type the destination address. If you make a mistake, use the backspace arrow to clear it, or clear the entire address by pressing **CLR**.

```
-CCIR
236985

SAVE  <--       CLR
```

2. After checking the address, press **ENTER**. You will be prompted to select the channel to be used.

    Press **UP/DOWN** keys to select a specific channel, and then press **ENTER** to confirm.

```
CALL
CH   8
```

3. Press **SEND** to transmit the call. An audible reply confirms your connection.

```
CALL
236985

SEND CHAN PAGE BCN
```

4. After the call ends, press **MORE** > **MORE** > **MORE** > **MON** to mute the speaker.
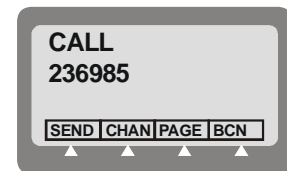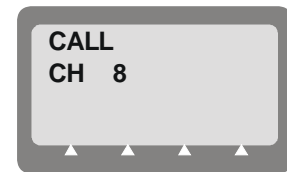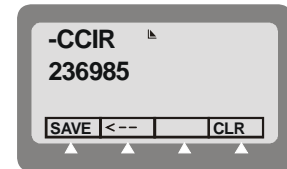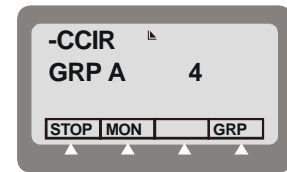
2-13.4.4   Editing and Transmitting AMD Messages

> **NOTE**
>
> You can transmit AMD messages only as individual calls. For more details, see the Configuring AMD Messages in CCIR Mode section in Chapter 4.

To edit and transmit AMD messages:

1. Access the CCIR menu: **MENU** > **CCIR**.
2. Press **CALL** to access the Call menu.
3. Press **UP/DOWN** keys or use the keypad to select the individual address you want to call.
4. Press **PAGE** to access the Page menu.
5. Press **UP/DOWN** keys to select the message you want to transmit. You have 3 selections:
    *   AMD 1 – AMD message 1
    *   AMD 2 – AMD message 2
    *   AMD (without a number) – free text message.
6. If necessary, you can change (edit) the selected message. Press **EDIT** and then use the keypad to edit your message: when ready, press **SAVE**.
7. Press **SEND** to transmit the message.

2-13.4.5   Transmitting Beacon Calls

To transmit beacon calls:

1. Access the CCIR menu: **MENU** > **CCIR**.

```
CCIR



 SCAN  CALL          
  ▲     ▲     ▲     ▲
```

2. Press **CALL** to access the Call menu.

3. Press **UP/DOWN** keys or use the keypad to select the address of the remote radio you want to call.

```
CALL
DIR  621565


 SEND CHAN PAGE  BCN
  ▲     ▲     ▲    ▲
```

4. Press **BCN** to transmit the beacon call.

5. After receiving the beacon call, the remote radio returns four tones, which are reproduced by your transceiver. Listen carefully to the four tones, to judge the quality of the connection (noisy or clear). If your receive level monitor is enabled, also pay attention to the received signal strength while the tones are heard.
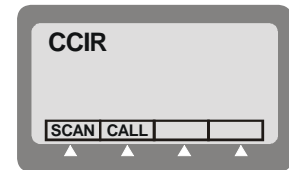
2-13.4.6   Transmitting Emergency Calls

To transmit an emergency call:

1. Access the CCIR menu: **MENU** > **CCIR**.

```
CCIR



 SCAN  CALL          
  ▲     ▲     ▲     ▲
```

2. Press **CALL** to access the Call menu.

3. Press **UP/DOWN** keys or use the keypad to select the address you want to call.

```
CALL
DIR  621565


 SEND CHAN PAGE  BCN
  ▲     ▲     ▲    ▲
```

4. Press **MORE** to scroll to the next menu screen.

5. Press **EMRG** to transmit the emergency call. An audible reply confirms your connection.

6. Press **PTT** to speak and release **PTT** to listen.

7. If you do not press any buttons (including **PTT**) for 60 seconds, the call automatically ends.

8. After the call ends, press **MORE** > **MORE** > **MORE** > **MON** to mute the speaker.
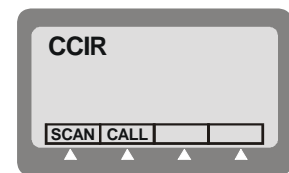
2-13.5 Working with Stack Memory

If you receive a call, but do not answer within 60 seconds, the caller's address is stored in the stack memory. Note the following:

- You can only access stack memory if there is at least one stack memory entry. In other words, if you did not miss at least one call, you need not (and cannot) access the stack memory.

- Only the caller's address is stored in the stack memory, but not any message attached to the call.

- The stack memory can contain up to 10 entries and works on a first-in, first-out (FIFO) basis.

2-13.5.1   Viewing Stack Memory Entries

To view stack memory entries:

1. Access the Channel menu: **MENU** > **CHAN**.

2. Press **UP/DOWN** keys to select a specific channel.

3. Select a channel and press **ENTER** to confirm.

4. Press **MORE** > **MORE** > **MORE**.

5. Press **STAK** to access the stack memory.

6. Press **UP/DOWN** keys to view all stack memory entries.

2-13.5.2   Transmitting Calls from Stack Memory

To transmit calls from stack memory:

1. Access the Channel menu: **MENU** > **CHAN**.

2. Press the **UP/DOWN** keys to select a specific channel.

3. Select a channel and press **ENTER** to confirm.

4. Press **MORE** > **MORE** > **MORE**.

5. Press **STAK** to access the stack memory.

6. Press **UP/DOWN** keys to select a stack memory entry.

7. Press **CALL** to transmit a call to this address. Your transceiver automatically deletes this entry from the stack memory.

2-13.5.3   Deleting Stack Memory Entries

To delete stack memory entries:

1. Access the Channel menu: **MENU** > **CHAN**.

2. Press **UP/DOWN** keys to select a specific channel.

3. Select a channel and press **ENTER** to confirm.

4. Press **MORE** > **MORE** > **MORE**.

5. Press **STAK** to access the stack memory.

6. Press **UP/DOWN** keys to view all stack memory entries.

7. Press **ERAS** to delete a stack memory entry.

2-13.6 Using CCIR Mode to Send and Receive GPS Position Data

2-13.6.1   Receiving GPS Request Calls

1. When your transceiver receives a GPS data (GPSD) request call, the caller's address appears in the display.

2. In response, your transceiver automatically sends your GPS data to the other transceiver.
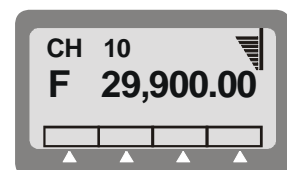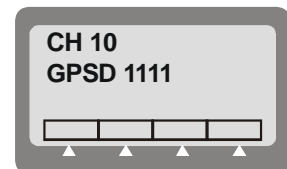
2-13.6.2 Receiving GPS Data from Other Stations

When your transceiver receives a GPS data call, the caller's address and GPS data appear in the display.

```
-CCIR
!1133:PV LT

<->
```
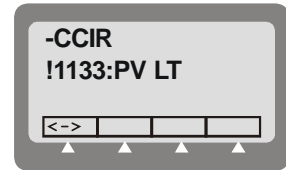
To receive GPS data calls:

1. Press   to view the caller's GPS data.

   POSITION INVALID means that the remote station cannot provide its location.

   PV indicates that the following data is valid.

```
-CCIR
!1111:PV

<->
```
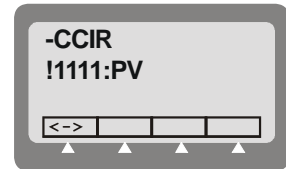
> **NOTE**
>
> The caller's GPS data disappears and your transceiver returns to its previous mode if you do not select   within 60 seconds, or press any button other than   .
>
> In both cases, the caller's address is stored in your stack memory, but from the stack memory you cannot view the caller's GPS data.

2. Press   to see the entire message.

```
CH 10
LT 03877.33

HOME <-- --> END
```
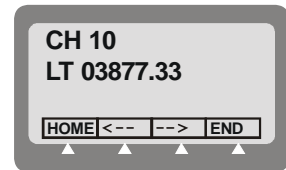
3. Press any button (including **PTT**) to end the call. The caller's GPS data disappears.

```
CH  10
F  29,900.00

CALL          MON
```
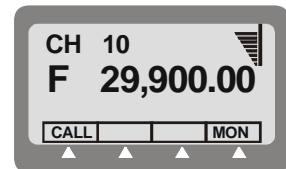
2-13.6.3 Transmitting Emergency GPS Calls

To transmit an emergency GPS (EGPS) call:

1. Access the CCIR menu.
2. Select **CALL** to access the Call menu.

```
CALL
LAST 1234

SEND CHAN PAGE BCN
```

3. Press **UP**/**DOWN** keys, or use the keypad to select the address you want to call.

```
CALL
DIR 1119

SEND CHAN PAGE BCN
```

4. Press **MORE** *twice* to scroll to the correct menu screen.

```
CALL
DIR 1119

EGPS HUP
```
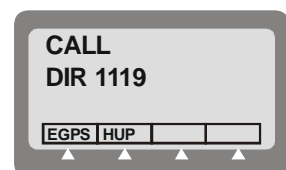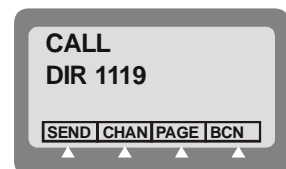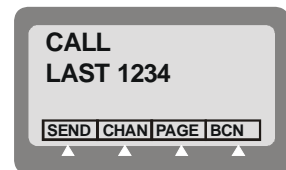
5. Press **EGPS** to transmit the emergency GPS call.

```
CH 10
EGPS 1119
```
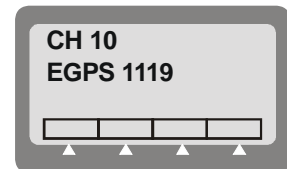
2-13.6.4   Transmitting GPS Request Calls

This section describes how to request GPS data from another transceiver.

To transmit a GPS request (GPSR) call:

1. Access the CCIR menu.

2. Press **CALL** to access the Call menu.

```
CALL
LAST 1234
SEND CHAN PAGE BCN
```

3. Press **UP/DOWN** keys, or use the keypad to select the address you want to call.

```
CALL
DIR 1119
SEND CHAN PAGE BCN
```

4. Press **MORE** to scroll to the next menu screen.

```
CALL
DIR 1119
EMRG GPSR GPSD TEL
```

5. Press **GPSR** to request GPS data from the other transceiver.

```
CH 10
GPS 1119
```
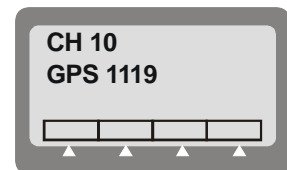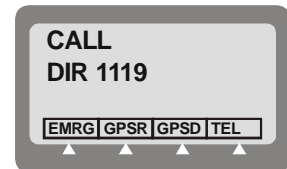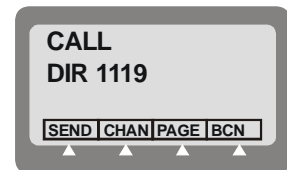
6. After a short delay, the other transceiver automatically sends you its GPS data.

```
CH 10
LT 03877.33
HOME <-- --> END
```
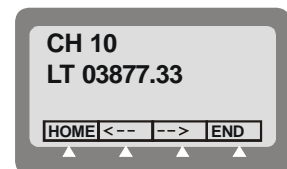
2-13.6.5   Transmitting GPS Data Calls

This section describes how to transmit your GPS data to another transceiver.

> **NOTE**
> You can transmit GPS data only to individual transceivers.

To transmit a GPS data (GPSD) call:

1. Access the CCIR menu.
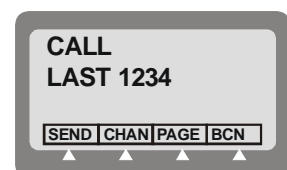
2. Press **CALL** to access the Call menu.

```
CALL
LAST 1234
SEND CHAN PAGE BCN
```

3. Press **UP/DOWN** keys, or use the keypad to select the address you want to call.

```
CALL
DIR 1119

SEND  CHAN PAGE BCN
 ▲     ▲    ▲    ▲
```

4. Press **MORE** to scroll to the next menu screen.

```
CALL
DIR 1119

EMRG GPSR GPSD TEL
 ▲    ▲    ▲    ▲
```
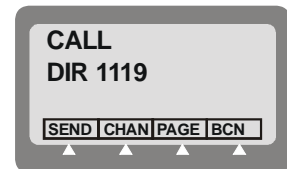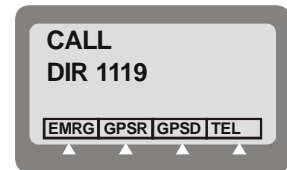
5. Press **GPSD** to transmit your GPS data to the other transceiver.

```
CH 10
GPSD 1119

 ▲    ▲    ▲    ▲
```
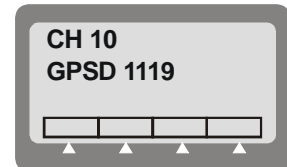
Intentionally Left Blank

CHAPTER 3

INSTALLATION

3-1. SCOPE

This Chapter provides installation instructions for Micom-Z.

The information presented in this Chapter includes:

- Unpacking – para. 3-2.

- Installation planning guidelines – para. 3-3.

- Installation procedures for Micom-Z – para. 3-4, 3-5 and 3-6.

- Post-installation checks – para. 3-7.

⚡✋ WARNING - HIGH VOLTAGE

Do not touch the antenna and the RF connectors when the Micom-Z is turned on.

Make sure that the antenna is not located near high-voltage lines.

During transmission, high RF voltages appear at the RF connectors, the antenna cables, and on the antenna itself. These voltages may cause severe injury or death on contact.

Antenna can assume hazardous voltage ijn transmission mode. Antenna accessible parts shall be suitably guarded / insulated from touch! Antenna connection (shield) shall be permanently connected to protective earth in building installation by a service person in accordance with the national code and regulations

Operating and maintenance personnel must be familiar with the applicable safety requirements and regulations before attempting to install or operate Micom-Z radio sets. Severe injury or death could result from failure to comply with the safety practices.

3-2. UNPACKING

a. A preliminary inspection of the equipment containers should be made prior to unpacking. Evidence of damage should be noted and reported immediately to the proper authorities.

Unpack the equipment as follows:

(1) Place each container on a clean flat surface, cut all straps, and open or remove the top.

(2) Take out each item carefully and place it securely on a clean surface.

(3) Remove the packing material while looking for small items.

(4) Fold and store the containers and packing materials in accordance with standard procedures.

b. Checking Unpacked Equipment.

(1) Inspect all items for damage. Immediately report any damage found.

(2) Check all items against the items listed in the accompanying packing slip and/or the appropriate list of items given in the equipment manuals.

(3) Report any missing items or discrepancies. Shortage of a minor part which does not affect the proper functioning of the equipment should not prevent use of the equipment.

3-3.   INSTALLATION PLANNING GUIDELINES

This section provides the information necessary for planning the installation of Micom-Z equipment. The information presented in this section is applicable to both fixed station and mobile installations.

3-3.1   Location

Select the radio location for convenience of access to electrical connections and for maintenance. The selected location should be clean, dry and well ventilated. Do not mount the equipment in close proximity to strong electrical fields produced by brush motors and generators, welders, etc.

In general, the antenna, antenna tuner (when used), and associated cable kits are provided separately. These should be installed before the radio is installed with each item (refer to the corresponding manuals for installation data).

The radio may be placed on any sturdy, flat surface. A mounting tray allows the radio to be mounted in any location. Before installing the radio, read the entire installation procedure detailed in this section. Follow the instructions carefully.

3-3.2   Power Requirements

The Micom-Z requires DC power at a nominal voltage of 12 VDC (negative pole grounded). For fixed (base) stations, when AC power is available, you can use a DC power supply to provide the required DC voltage, for example, FPN5600, to provide the required DC voltage.

It is recommended to connect a 12 V backup battery with a capacity of 80 Ah to the battery terminals of the power supply. Therefore, when AC power failure occurs, the battery functions as the main power source. When AC power is again available, the power supply charges the battery.

Make sure to select a DC power supply that can also serve as a charger for the backup battery. Contact manufacturer for recommended DC power supply/charger types.

```
┌──────────────────────────────────────────────────┐
│                     CAUTION                        │
│                                                    │
│  Use a 30A protection fuse in series with the     │
│  positive battery terminal.                        │
│                                                    │
│  Risk of explosion if incompatible battery is     │
│  used, or battery is incorrectly connected!        │
└──────────────────────────────────────────────────┘
```
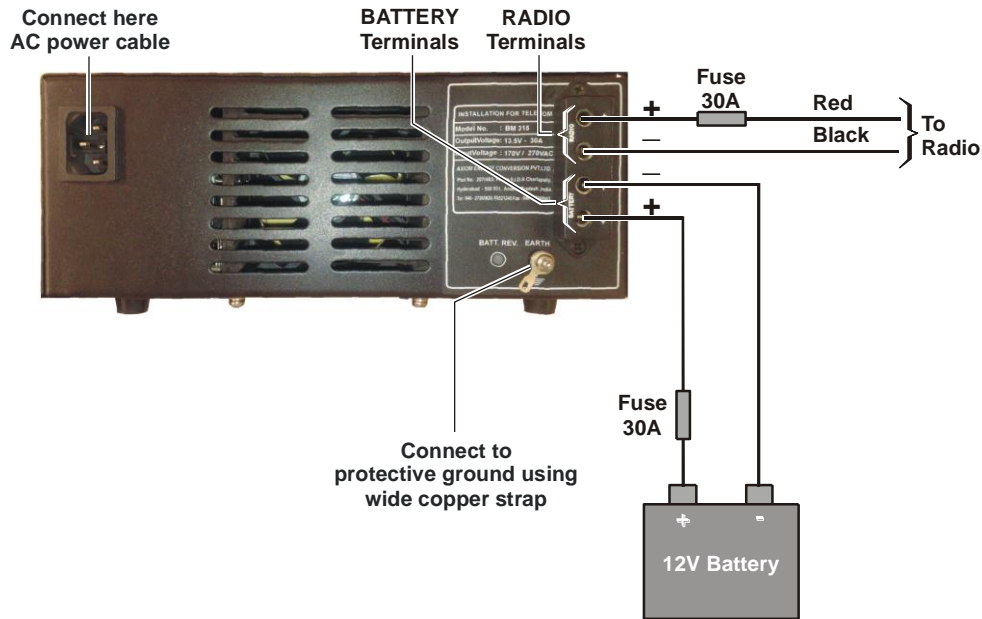
Figure 3-1. FPN5600 Power Supply Connections

3-3.3   Grounding

The resistance measured between the Micom-Z body and the system ground should be as small as feasible. Failure to provide proper grounding will degrade system operation and cause RF voltage to be present on the equipment chassis.

Wide copper straps, as short as possible, should be used for grounding. These straps should be clamped or bonded to the vehicle body.

For vehicular installations, the vehicle body must be properly grounded during fixed station use. This can be achieved by means of ground rods. Where the soil is dry and sandy, ground radials should be used.

CAUTION

The earthing stud shall be permanently connected to protective earth in building installation by authorized personnel. Protecvtive grounding shall be the first to connected and the last to be disconnected.

3-3.4   Vehicular Noise Reduction

Most vehicles contain several noise sources which can greatly disturb radio reception (for example, the high voltage ignition sparks that are produced at the vehicle's plugs, and the alternator activity). If necessary, install a noise reduction kit.

3-3.5   Antenna and Antenna Tuner Unit (ATU)

For fixed stations, dipole and broadband antennas, which provide a nominal impedance of 50 Ω, can be used. In such applications, the antenna can be directly connected to the Micom-Z ANT connector.

For other applications, and in particular when using whip antennas, long wire antennas, and any antenna which does not present a 50 Ω impedance over the full operating frequency range, an antenna tuner unit (ATU) is necessary. Suitable ATUs, for example, F2265 and FLN2818, are available from the manufacturer; these ATUs can be used in both mobile and base station applications. An externally mounted mobile automatic antenna system, FAD1410, is also available.

The recommended vehicular whip antenna is FAD1400, also available from the manufacturer. To achieve maximum operating range, the antenna should be mounted as high on the vehicle body as possible without striking overhead obstructions in the normal service area of the vehicle. Select a mounting location on a flat portion of the vehicle body, compatible with the maximum allowable length of the ATU lead-in cable.

For short range communications (ground waves), a vertical (non-bent) antenna is preferred. For long range communications (sky waves), a bent antenna is preferred. The antenna may be bent and tied down to the vehicle's body with a nylon cord.

The best antenna location is the vehicle rooftop, where the antenna is not obstructed by metal objects. Roof center installation provides good symmetrical omnidirectional radiation patterns. If roof top installation is impossible, a side wall installation, with the antenna as far away from the side wall and as high as possible, will suffice. If the antenna's height above ground is limited, it is preferred to install the antenna as high as possible and to bend and strap it down to the required height (as opposed to installing the antenna close to the ground, such as in a bumper mounted installation).

Suggested mobile installations are illustrated in Figure 3-2. Figure 3-3 shows options for installations using FAD1410.
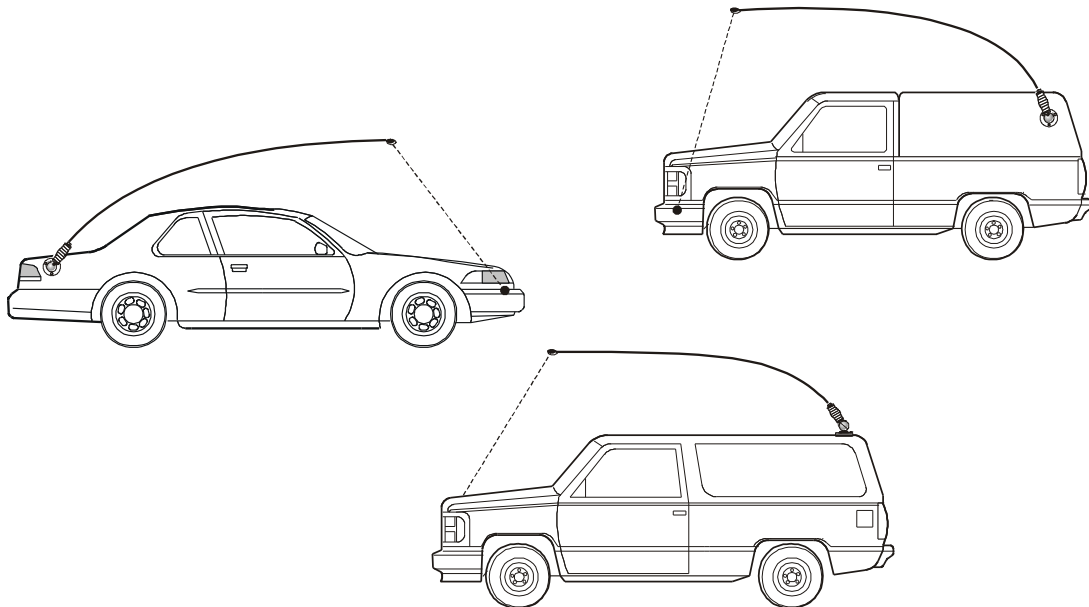
Figure 3-2. Suggested Mobile Installations Using ATU
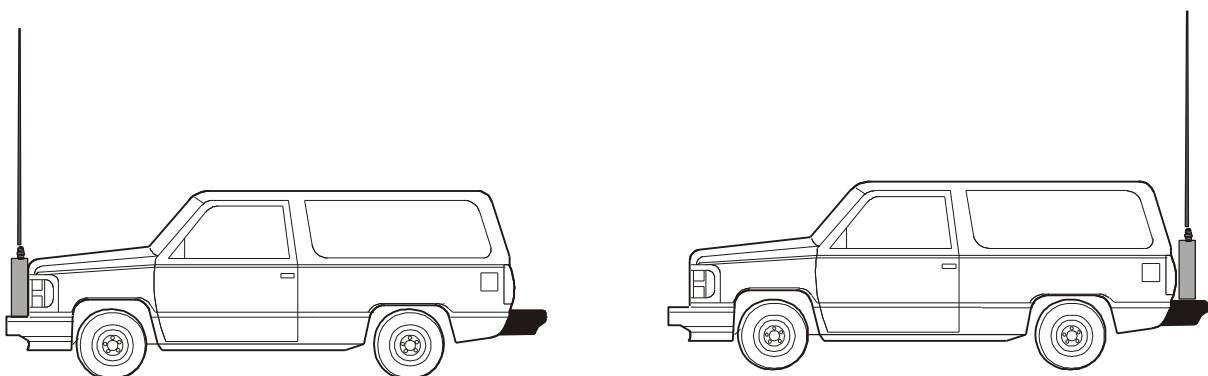
Figure 3-3. Suggested Mobile Installations Using FAD1410

3-3.6   GPS Antenna

If you will use the integral GPS receiver of your radio set, then it is necessary to select a suitable location for the GPS antenna.

3-3.6.1 GPS Antenna Description

The GPS antenna is a compact active omnidirectional antenna with magnetic mounting, which attaches easily and firmly to vehicle's steel body parts, even when painted. The antenna will not attach to non-magnetic alloys (e.g., aluminum alloys), nor to parts made of composite materials (e.g., fiberglass).

The antenna connects to the GPS connector of the Micom-Z transceiver through a 5-meter (15 feet) long coaxial cable, which is part of the antenna. This cable carries both DC power for the antenna, and the received GPS signals.

The antenna is 42 mm wide by 50.5 mm long by 13.8 mm high (1.65"×1.99"×0.55"), and it requires a minimal ground plane of 60 by 60 mm (2.36"×2.36") to provide the specified performance.

3-3.6.2   Selecting a Proper Location for the GPS Antenna

GPS satellites transmit their special signals in the 1575 MHz range: such signals do not penetrate conductive surfaces. When selecting the location of the GPS antenna, you should also be aware that strong local interference as well as reflections from nearby objects may disrupt normal reception and degrade the signal quality.

Thus, the GPS antenna should be installed on horizontal surfaces, in a place that provides a clear view of the sky, which, in as far as possible, is not obstructed by large objects. For example, the roof of the passenger's cabin is a good place for the GPS antenna.

Moreover, you should not park the vehicle under dense foliage or other cover, for example, in a garage, if you want to get a position fix from your GPS receiver.

> **NOTE**
>
> When the GPS antenna is installed on a metal surface for prolonged periods, care must be taken to insulate the antenna, to prevent galvanic corrosion.

After installing the antenna, route its cable to the GPS connector on the rear of the Micom-Z, and make sure to avoid running it parallel to the other transceiver cables.

3-3.7   Cooling

Micom-Z units are cooled by free air convection. Therefore, make sure that sufficient free space is available around the equipment to enable free air flow.

When it is necessary to use Micom-Z in applications that require continuous transmission for prolonged intervals, it is recommended to install Micom-Z on the optional cooling tray.

3-3.8   Installation Data

All the dimensions are in mm.

3-3.8.1   Dash-Mount Micom-Z Model

Figure 3-4 shows the dimensions of the dash-mount Micom-Z transceiver model.
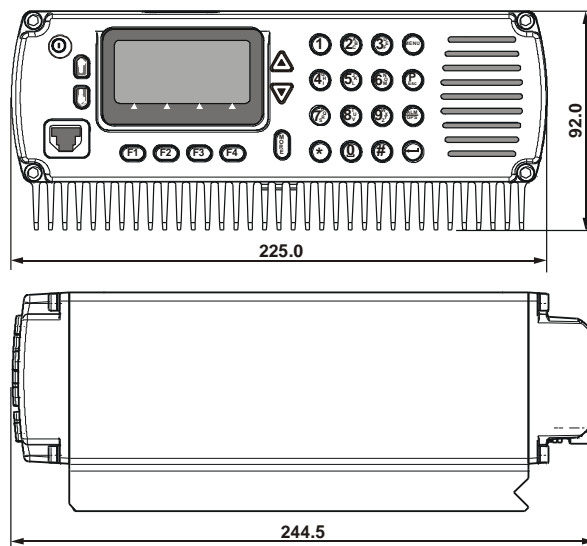
Figure 3-4. Dash-Mount Micom-Z Dimensions

3-3.8.2   Trunk-Mount Control Head

Figure 3-5 provides installation data for the control head of the trunk-mount Micom-Z model.

Figure 3-5. Installation Data for Trunk-Mount Control Head
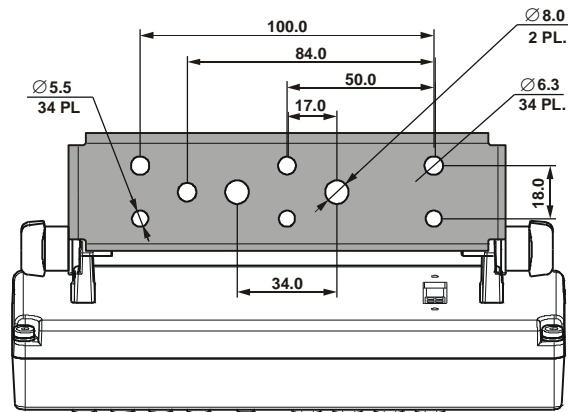
3-3.9   Mounting Trays

3-3.9.1   Basic Mounting Tray

Figure 3-6 shows the basic mounting tray hole pattern.

Figure 3-6. Hole Pattern for Basic Mounting Tray
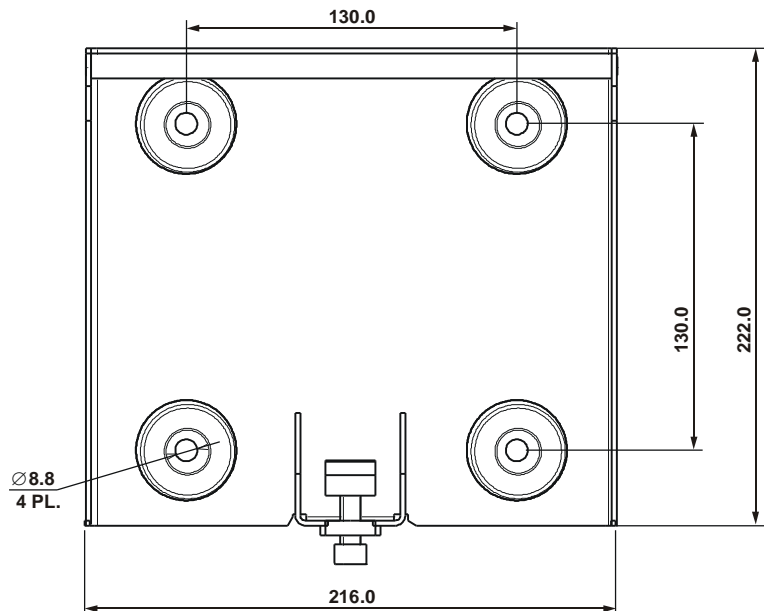
3-3.9.1.1   Mounting Tray with Cooling Fan

Figure 3-7 shows the front and rear views of the cooling tray, and Figure 3-8 shows the cooling tray hole pattern.

The cooling tray is supplied with four feet, for installation on desktop and shelves in static stations. When used in mobile stations, these feet can be removed, to enable fastening the tray to the mounting area.

A. Front View

Headset Jack   **Morse Key Jack**   **Transceiver Fastener**   **Feet**

B. Rear View

TO RADIO   **ACCESSORY**

NOTE
For fastening tray to mounting surface, remove the four rubber feet

Connection to MICOM-Z ACCESSORY Connector   **Connection to External Equipment**

Figure 3-7. Cooling Tray

232.1

140.0

154.0

210.0

TO RADIO   **ACCESSORY**

69.0

76.5
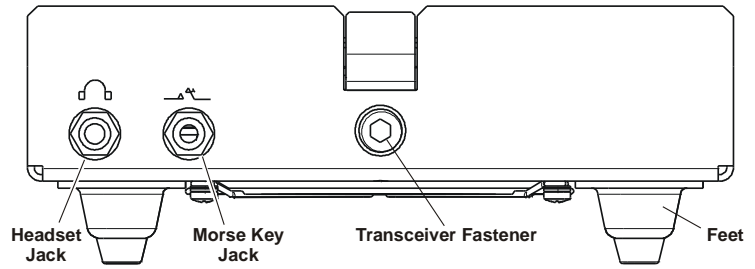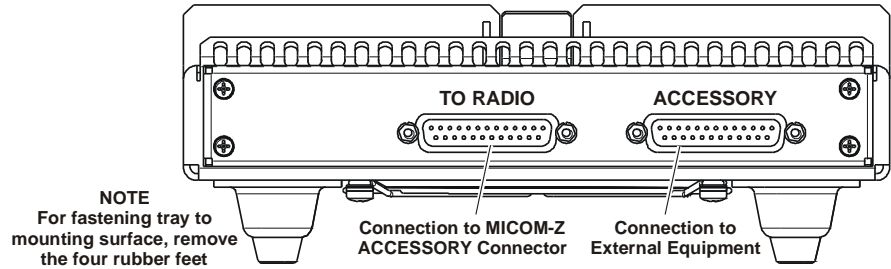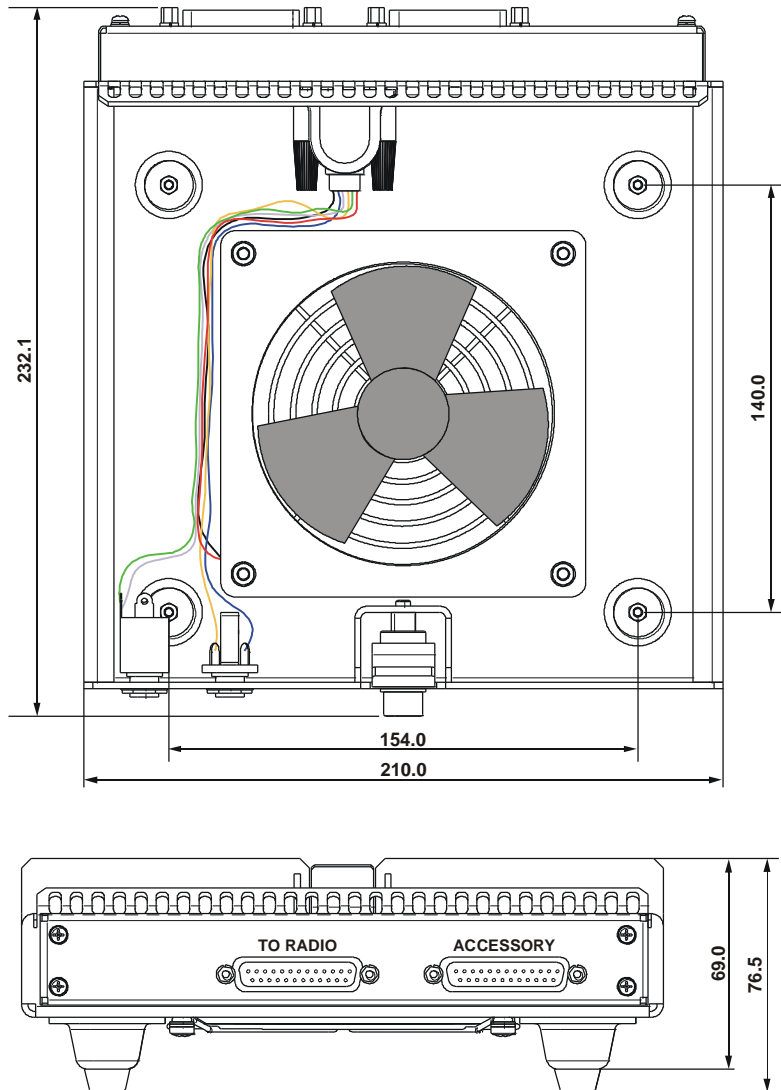
Figure 3-8. Cooling Tray Dimensions and Mounting Hole Pattern

3-4. INSTALLATION OF DASH-MOUNT MICOM-Z MODEL ON BASIC TRAY

Figure 3-9 shows a typical installation diagram for a dash-mount Micom-Z radio in vehicles.

> **NOTES**
> 1. See para. 3-6 for details regarding installation on the cooling tray.
> 2. When using the FAD1410, refer to its Owner's Guide for installation instructions.

Figure 3-9. Typical Dash-Mount Micom-Z Installation Diagram (Basic Tray)

Figure 3-10 shows typical locations for the components installed within the vehicle.

The radio is installed on the dashboard of the vehicle inside the passenger compartment. The other components connect to the power source, the battery, and to the antenna, which enables the radio to transmit and receive.

When you intend to use the GPS receiver, you must also install the GPS antenna at a suitable location, as explained in para. 3-3.6.

If the battery is located in the rear section of the vehicle, the power cable extends to the battery location in the rear.
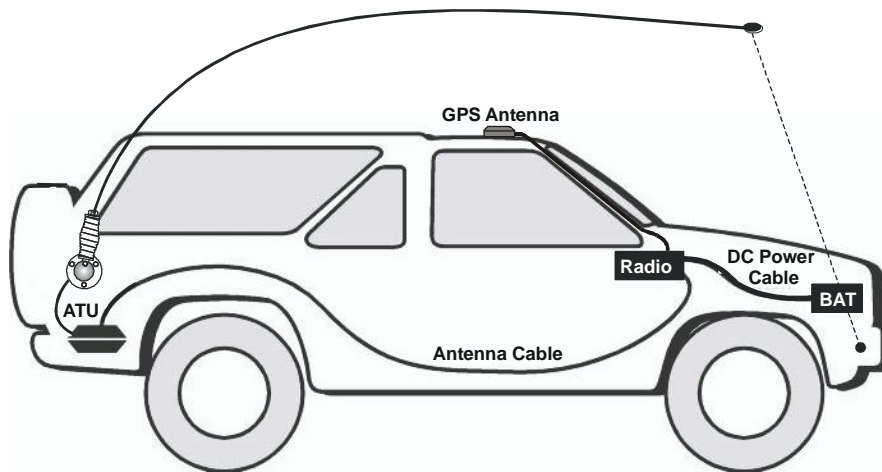
Figure 3-10. Typical Dash-Mount Micom-Z Installation within Vehicle

---

NOTE

To achieve maximum operating range, the antenna should be mounted as high on the vehicle body as possible without striking overhead obstructions in the normal service area of the vehicle. Select a mounting location on a flat portion of the vehicle body, compatible with the maximum allowable high voltage lead-in cable length to the ATU.


After determining the locations of the various components within the vehicle, install as follows:

1. Install the whip antenna, or the FAD1410 antenna system, in accordance with the manufacturer's installation manual.

2. Install the ATU (when used) in accordance with the manufacturer's installation manual, and connect its high-voltage lead to the whip antenna. Make sure to provide a good grounding connection.

3. Install the Micom-Z mounting tray in the prescribed location.

   • Check the mounting surface and the holes used to attach the mounting tray. Thoroughly clean the mounting surface and remove all paint, grease and dirt from the holes in order to provide a better grounding connection.

   • Place the tray in the prescribed location, and align its holes with the holes on the mounting surface.

   • Insert a bolt with springwasher through each tray hole, and screw it into the corresponding hole of the mounting surface. Tighten securely each bolt.
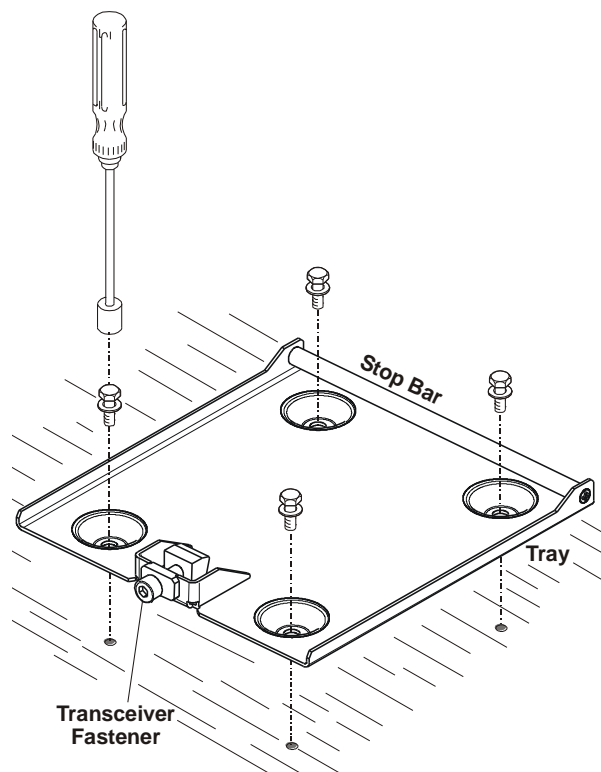
NOTE

If the holes in the mounting surface do not include threaded inserts, use nuts with toothwashers.

---

4. Release the transceiver fastener.

5. Insert the transceiver as shown in the figure, until its rear engages the stop bar of the tray. Make sure that the transceiver heatsink fins fit around the fastener sides. Check that the transceiver sits well within the tray, and that its heatsink is horizontal and touches the tray along its whole length.

6. Tighten the fastener with an Allen wrench, to secure the transceiver safely within the tray.

Fastener
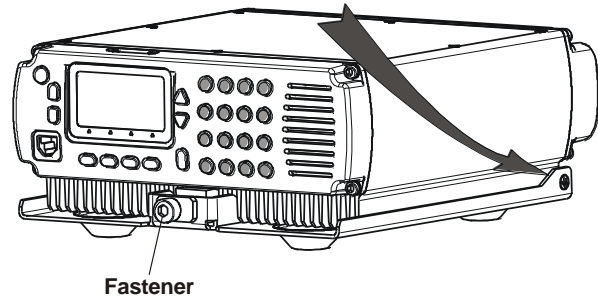
7. Connect the grounding strap to the vehicle body, as shown in Figure 3-9.

8. Route the antenna cable along the prescribed route, passing it through access holes as needed.

9. Connect the antenna cable to the N-type connector of the ATU. Connect the other end of the cable to the Micom-Z ANT connector.

10. When using the GPS receiver, route the GPS antenna cable along the prescribed route, and connect its connector to the GPS connector on the Micom-Z rear panel.

11. Check the fuse installed in the red extension lead.

12. Connect the lugs of the two DC power extension leads to the battery. Pay attention to polarity (red lead to the positive battery terminal). Make sure the negative pole of the battery is connected to the vehicle chassis, as close as possible to the transceiver.

13. Install the ferrite supplied in the installation kit on the DC power cable, as close as feasible to the connector.

14. Connect the DC power cable to the transceiver VDC IN connector, and route the cable to the battery location, along the prescribed route.

15. Connect the plug of the DC power negative (black) lead to the jack of the black extension lead.

16. When ready to apply DC power, connect the plug of the DC power positive (red) lead to the jack of the red extension lead.

17. Connect a microphone to the transceiver front panel.

3-5. INSTALLATION OF TRUNK-MOUNT MICOM-Z MODEL ON BASIC TRAY

For trunk-mounted Micom-Z radio sets, only the control head, the speaker, and the microphone are installed in the passenger compartment of the vehicle. The radio transceiver is usually installed in the trunk of the vehicle, together with the antenna tuner.

Figure 3-11 shows a typical installation diagram for the trunk-mount Micom-Z model.

NOTES

1. See para. 3-6 for details regarding installation on the cooling tray.

2. When using the FAD1410, refer to its Owner's Guide for installation instructions.
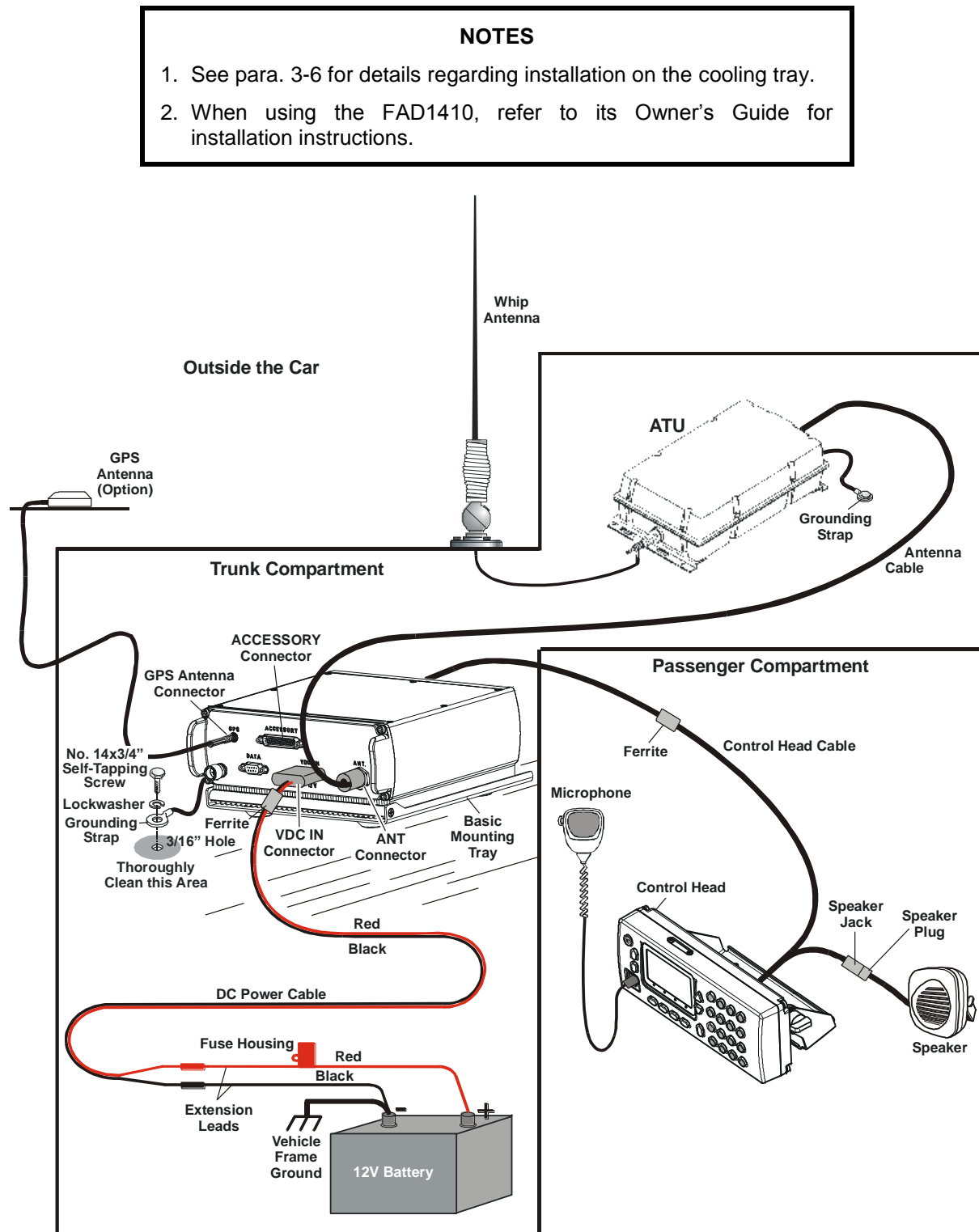
Figure 3-11. Typical Trunk-Mount Micom-Z Installation Diagram

Figure 3-12 shows typical locations of the components installed within the vehicle.

The trunk-mount model requires the connection of two cables across the length of the vehicle because the radio transceiver is located in the trunk.

If the battery is located in the rear section of the vehicle, the power cable extends to the battery location.

- The upper installation (location 1 in Figure 3-12), is recommended over the front installation (location 2 in Figure 3-12) because of the covering that protects the control head from direct sunlight.

- To achieve maximum operating range, the antenna should be mounted as high on the vehicle body as possible without striking overhead obstructions in the normal service area of the vehicle. Select a mounting location on a flat portion of the vehicle body, compatible with the maximum allowable high voltage lead-in cable length.
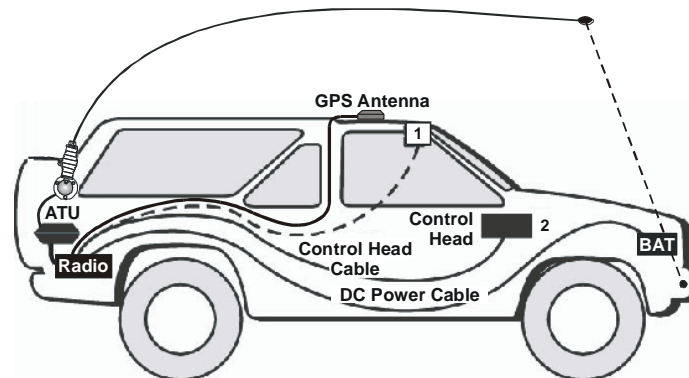
Figure 3-12. Typical Trunk-Mount Micom-Z Installation within Vehicle (Basic Tray)

After determining the locations of the various components within the vehicle, install as follows:

1. Install the whip antenna, or the FAD1410 antenna system, in accordance with the manufacturer's installation manual.

2. Install the ATU (when used) in accordance with the manufacturer's installation manual, and connect its high-voltage lead to the whip antenna. Make sure to provide a good grounding connection.

3. Install the Micom-Z mounting tray in the prescribed location, using the procedure described above for the dash-mount model.

4. Prepare installation holes for the Micom-Z control head. If necessary, use the bracket as template to mark the position of the holes on the mounting surface.

5. Secure the control head mounting bracket to the surface with the supplied hardware.

6. Adjust the control head position for operator's convenience, and secure it with the two wing screws.

7. Install the external speaker in the prescribed position, by securing its bracket to the surface with the supplied hardware.

8. Connect the grounding strap from the transceiver to the vehicle body (same as described above for the dash-mount model).

9. Connect the antenna cable to the N-type connector of the ATU. Connect the other end of the cable to the Micom-Z ANT connector.

10. When using the GPS receiver, route the GPS antenna cable along the prescribed route, and connect its connector to the GPS connector on the Micom-Z rear panel.

11. Check the fuse installed in the red extension lead.

12. Install the ferrite supplied in the installation kit on the DC power cable, as close as feasible to the connector.
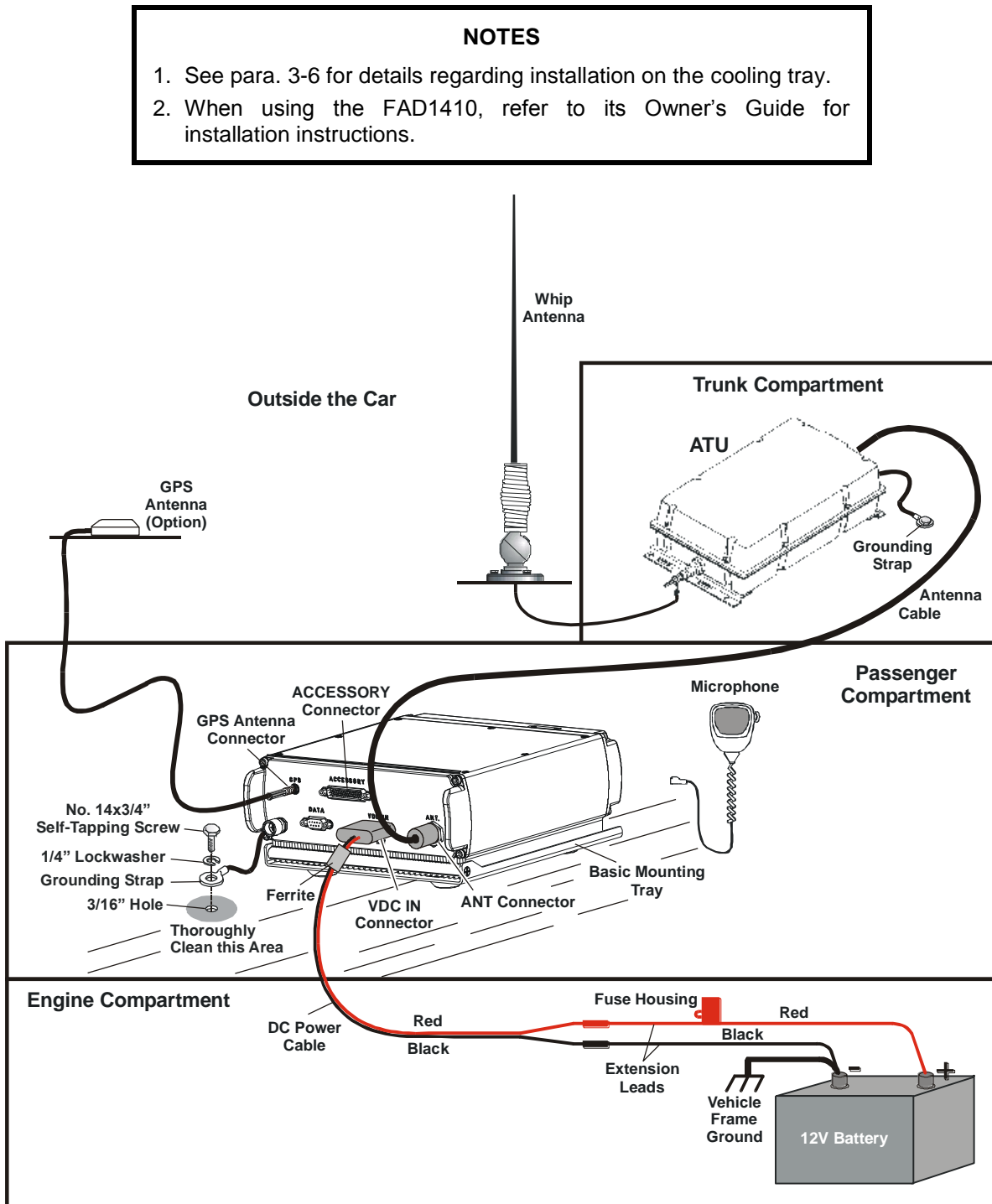
13. Connect the lugs of the two DC power extension leads to the battery. Pay attention to polarity (red lead to the positive battery terminal). Make sure that the negative pole of the battery is connected to the vehicle chassis, as close as possible to the transceiver.

14. Connect the DC power cable to the transceiver VDC IN connector, and route the cable to the battery location, along the prescribed route.

15. Connect the plug of the DC power negative (black) lead to the jack of the black extension lead.

16. Install the additional ferrite supplied in the installation kit on the control head cable, near its middle or at the entry point to the passenger compartment.

17. Connect the control head cable to the 16-pin connector on the transceiver front panel, and route the split cable end to the control head. Connect the free 16-pin connector to the control head, and plug the speaker cable into the cable jack.

18. Connect a microphone to the transceiver front panel.

19. When ready to apply DC power, connect the plug of the DC power positive (red) lead to the jack of the red extension lead.

3-6.   INSTALLATION OF MICOM-Z ON COOLING TRAY

When installing the Micom-Z radio set on the cooling tray, you can follow the same procedures described above in para. 3-4 or 3-5 except for the details related to the cooling tray. The specific steps needed to install a Micom-Z transceiver on the cooling tray are described below.

3-6.1.1   Preparing the Cooling Tray for Installation

In static stations, there are no preparations – simply place the cooling tray in the prescribed position. For mobile stations, it is necessary to fasten the tray to the mounting area as explained in para. 3-6.1.2. For this purpose, you must remove the feet attached to the tray, to free the installation holes (the feet are fastened by screws). The installation hardware supplied with the cooling tray includes two sets of four screws (one set for attaching the tray to a wooden surface, and the other set – for metallic surfaces).

3-6.1.2   Installing the Cooling Tray

To install the Micom-Z cooling tray in the prescribed location, proceed as follows:

1. Check the mounting surface and the holes used to attach the cooling tray. Thoroughly clean the mounting surface and remove all paint, grease and dirt from the holes in order to provide a better grounding connection.

2. Place the tray in the prescribed location, and align its holes with the holes on the mounting surface.

3. Insert a bolt with springwasher through each tray hole, and screw it into the corresponding hole of the mounting surface. Tighten securely each bolt, using the Allen wrench supplied in the installation kit.

NOTE

If the holes in the mounting surface do not include threaded inserts, use nuts with toothwashers.

CAUTION

Before installing the transceiver, carefully inspect the cooling tray, and clean the area from dirt. Remove dust, and any foreign object that may prevent free rotation of the fan.
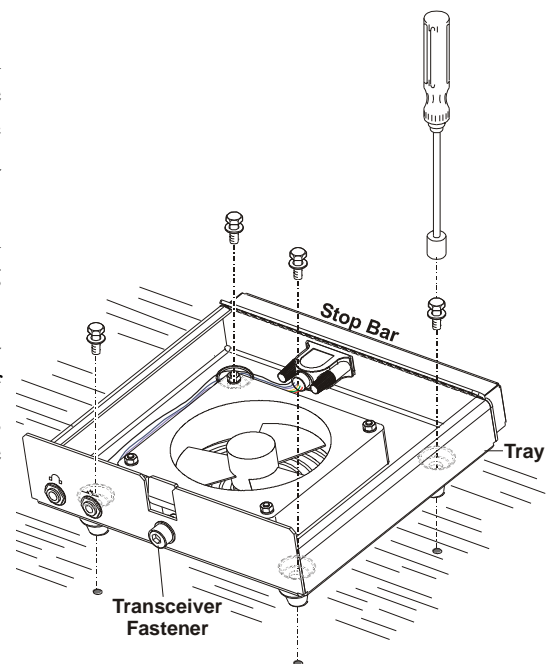
4. Release the transceiver fastener, and insert the transceiver until its rear engages the stop bar of the tray. Make sure that the transceiver heatsink fins fit around the fastener sides. Check that the transceiver sits well within the tray, and that its heatsink is horizontal and touches the tray along its whole length.

5. Tighten the fastener with an Allen wrench, to secure the transceiver safely within the tray.

6. Connect the grounding strap to the vehicle body, as shown in Figure 3-9 or Figure 3-11.

7. Connect the 44-pin/25-pin adapter cable between the ACCESSORY connector of the transceiver and the TO RADIO connector on the cooling tray.

3-6.1.3   Connecting to the Cooling Tray

At this stage, you may start connecting cables to the transceiver as explained in para. 3-4 or 3-5, respectively. The only differences are as follows:

1. Connect the equipment to the ACCESSORY connector on the cooling tray, instead of the connector located on the transceiver.

2. You can connect a headphone set and a telegraphy (Morse) key to the corresponding front jacks of the cooling tray.

3-7.   CHECKING INSTALLED EQUIPMENT

The purpose of the checks is to verify that the equipment has been properly installed and is ready for communication.

If a problem is detected during the checks, use para. 3-7.2 to identify the source and return the equipment as soon as possible to operational condition, by replacing cables, accessories, or equipment units suspected of being defective.

3-7.1   Operational Checks

When installation is complete, perform a visual inspection, to ensure that the radio equipment and the antenna system have been properly installed, and then carefully check all the operational functions of the radio set. Whenever possible, perform a communication check with one of the other radio stations in your net.

When using the cooling tray, make sure that the fan rotates freely, without any unusual noises (upon power-up, the fan is automatically activated for 10 seconds).

3-7.2   What to Do If ...

3-7.2.1   Preliminary Checks

In case a problem is detected, or the radio set fails to operate, perform the following steps:

1. Visually inspect the radio set, and make sure that the radio set is assembled properly and ready for operation. Also check that all the accessories are properly connected.

2. In static installations, replace or recharge the battery. The first time a new battery is used, it should be charged for at least 16 hours.

3. Check the antenna system and its connections. In particular, for whip antennas check that the whip is screwed on properly, with its base flush against the top of the antenna base or matching unit.

4. Pay attention to any fault messages that may appear on the Micom-Z display, either upon power-up or during operation, and refer to para. 3-7.2.2 for instructions.

If the problem persists, identify the closest description appearing in Table 3-1 and then perform the listed corrective actions until the problem disappears. If problem persists, refer to para. 3-7.2.3.

Table 3-1. Preliminary Troubleshooting Chart

Problem	Corrective Actions
Blank display	Check that the DC power cable is properly connected to the radio set and to the battery. Check the 30A fuse installed in the fuse holder located on the red wire of the DC power cable
Display present, but weak or no receive signal or noise	Check for proper connection of antenna to its antenna tuner, and from the antenna tuner to radio (loose or broken connections, damage to cables, etc.). Change the operating channel, and then return to the original channel. This will cause the antenna tuner to retune. Check for correct programming of operating channel (frequency, mode of operation, etc.). You may also try to establish communication with a nearby station, to check whether you can receive it properly. Set the squelch to OFF
Engine noise picked up by the antenna	Determine by observing difference in the reception by turning the engine ON/OFF. After confirming that the engine noise is the source, make sure that the ground leads are properly connected, and all power wires and ground leads are as short as possible. Install a noise reduction kit
No transmission, or low transmit power	Check that grounding leads are properly connected from the radio and from the antenna tuner to the vehicle chassis, and they are as short as possible.. While speaking, check the transmit power indicator for activity: • If the transmit power indication is low, this may be caused by a faulty microphone, faulty transmitter, overheating, or a defective antenna system. • If there is a problem with the antenna system, often you may note that the reflected power indication is very large. Even if the reflected power indication seems normal, try to change the operating channel, and then return to the original channel (this will cause the antenna tuner to retune). Also check the antenna system, the connections of the antenna to the antenna tuner, and the connections from the antenna tuner to radio (loose or broken connections, damage to cables, etc.)

3-7.2.2   Handling Fault Messages

In case a failure occurs during operation, the radio displays a fault message. Refer to Table 3-2 and perform the corrective actions listed for the corresponding message, until the problem is corrected.

Table 3-2. Fault Messages

Message	Corrective Actions
NO CLOCK	Service the Micom-Z unit (defective LORD board)
SYN FAIL	Perform the built-in test using the MRC, to obtain more information
PW_LATCH	Perform the built-in test using the MRC, to obtain more information. Check the condition of the antenna and its connections, because this error is displayed when the VSWR exceeds 3.5:1. To check whether the problem is caused by high VSWR, transmit into a dummy load with suitable power rating. If the problem persists, service the Micom-Z unit (defective HIGH POWER board)

Table 3-2. Fault Messages (Cont'd)

Message	Corrective Actions
OVER TMP	Check that there is no obstruction to free air flow around the radio.
	When using the cooling tray, check that the fan is working and there are no obstructions to fan rotation.
	Perform the built-in test using the MRC, to obtain more information. If no further information is displayed, service the Micom-Z unit (defective HIGH POWER board)
CU-LIMIT	Check that the radio is programmed to TUNER OFF when it is not equipped with an ATU, or does not use the FAD1410 antenna system.
	Check for short-circuit or other damage to the antenna feed coax.
	Check that the ATU is in good working condition
NOT PROG (Error 14)	This message indicates that the radio is not programmed (the message may also appear if the radio DC power failed during programming). In this case, the default baud rate of the MRC interface is 1200 bps.
	Program the radio parameters (using the MRC). This forces the radio to accept the downloaded parameters
BATTERY FAIL (Error 11)	Micom-Z has an internal battery, that enables the memory to store the last channel information that was used before the radio was turned off. If this battery becomes weak, it will display this warning. When the battery is dead, all the channel information will be retained, but the radio will always use channel 1 when you turn the radio on. (Example: if you are scanning in the ALE mode and you turn the radio off; when you turn the radio back on, it will be on channel 1).
	You may continue using the radio, but request service as soon as possible
DATABASE FAIL (Error 15)	This message will appear if the ALE scanned channels do not match the programmed channels in the MRC (for example, ALE is programmed to scan channels 1, 2 and 3, but the MRC program does not have a frequency programmed into channel 3).
	Check and correct the programmed parameters

3-7.2.3   Interpreting BIT Results and Error Codes

Micom-Z performs self-test whenever it is turned on, and also upon operator's command, as explained below.

If a problem is detected, you will see a two-digit error code. Most of the codes indicate a hardware problem, and therefore, in general, you should request service for Micom-Z unit (contact your service representative and report the malfunction or error code).

1. Turn the radio set off, and then turn it back on, and monitor the display: every time the radio is turned on, a self-test procedure is performed. If an internal malfunction is found, an error message will be displayed. Refer to Table 3-3 for a description of the error codes, and the recommended actions.

2. Activate the BIT function, using **MENU > BIT**. You have three options:

   - **FULL** (F1) – runs a full test of the Micom-Z.

   - **CHAN** (F2) – tests Micom-Z operation on the current channel.

   - **L.RF** (F3) – tests the Micom-Z receive path only.

> **NOTE**
>
> To obtain reliable results, it is necessary to perform the test under controlled conditions. This is achieved by disconnecting the external antenna, and connecting a 50Ω dummy load or 30 dB attenuator with a suitable power rating (150W or more) to the ANT connector (make sure to select TUNE on **PROG** > **RAD** > **OPTS** > **ACC** when using a dummy load). In addition, you must perform the test in the SSB mode, and the DPWR parameter must be MAX (DPWR changes only after the Micom-Z is turned off and then back on).

Select the test best suited to the detected problem, and wait a few seconds for the test to complete. Refer to Table 3-3 for a description of the test result codes, and the recommended actions.

Table 3-3. Error Codes

Error Code	Meaning	Probable Cause
00	O.K. – no errors	
01	DSP boot checksum fail (during download)	LORD board problem
02	DSP PLL unlocked	LORD board problem
03	DSP external RAM memory	LORD board problem
05	DSP internal RAM memory	LORD board problem
08	HC16 flash memory checksum	LORD board problem
09	HC16 RAM memory	LORD board problem
10	No 16.8 MHz clock	LORD board problem
11	Battery low	Weak internal battery: replace battery to correct problem
12	Control head wake-up	Control head problems
13	Control head is not responding	Control head problems
14	Radio not programmed	Problem experienced during programming. Program radio (connect the MRC at 1200 bps)
15	Database fail	ALE scanned channels do not match the programmed channels by means of the MRC
16	VCO 1 first injection	LORD board problem
17	VCO 2 first injection	LORD board problem
18	VCO 3 first injection	LORD board problem
19	VCO second injection	LORD board problem
20	Synthesizer unlock	LORD board problem
21	Receiver failure	LORD board problem
22	Preselector range 1	LORD board problem
23	Preselector range 2	LORD board problem
24	Preselector range 3	LORD board problem
25	Preselector range 4	LORD board problem
26	Preselector range 5	LORD board problem
27	Preselector range 6	LORD board problem

Table 3-3. Error Codes (Cont'd)

Error Code	Meaning	Probable Cause
28	Preselector range 7	LORD board problem
29	Preselector range 8	LORD board problem
30	Exciter test	HIGH POWER board problem
31	Antenna mismatch	Problem with antenna: check antenna and its connections. If problem persists, it is a HIGH POWER board problem
32	Harmonic filter range 1	HIGH POWER board problem
33	Harmonic filter range 2	HIGH POWER board problem
34	Harmonic filter range 3	HIGH POWER board problem
35	Harmonic filter range 4	HIGH POWER board problem
36	Harmonic filter range 5	HIGH POWER board problem
37	Harmonic filter range 6	HIGH POWER board problem
38	Harmonic filter range 7	HIGH POWER board problem
39	Power amplifier failure	HIGH POWER board problem

CHAPTER 4

USING THE PROGRAMMING MODE

4-1.   SCOPE

This Chapter provides concise instructions for using the PROG mode.

The Programming mode, accessed by opening the PROG menu is used to program manually the parameters needed by your radio set. There are three main group of parameters:

- Radio parameters – the parameters for communication in your environment and in the radio nets you use most of the time. Refer to para. 4-3 for details.

- ALE parameters – the parameters needed to use the ALE function. Refer to para. 4-4 for details.

- CCIR parameters – the parameters needed to use the CCIR function. Refer to para. 4-5 for details.

The manufacturer offers a dedicated Radio Service Software (MRC), which is an efficient tool for preparing sets of operational parameters for Micom-Z radio. MRC supports all the functions that can be performed by means of the PROG menu. MRC is recommended when it is necessary to configure many radio sets.

Micom-Z lets you change the most of parameters in use on-line, to adjust to any particular situation. However, when you select another channel or net, the changes are discarded and the programmed values are used again.

4-2. THE PROG MENU

NOTE

The PROG menu is accessible only if the radio is not locked. If you cannot display the PROG menu, refer to the Locking/Unlocking the Radio section in Chapter 2 for instructions on unlocking your radio set.

To enter the PROG menu:

1. Press **MENU** to display the Menu screen.

MENU

| CHAN | FREQ | ALE | BIT |
| ▲ | ▲ | ▲ | ▲ |

2. Press **MORE** to scroll to the second Menu screen.

MENU

| LOCK | PROG | PSW | DIM |
| ▲ | ▲ | ▲ | ▲ |

3. Press **PROG** to enter the Programming mode.

PROG

| RAD | ALE | | |
| ▲ | ▲ | ▲ | ▲ |
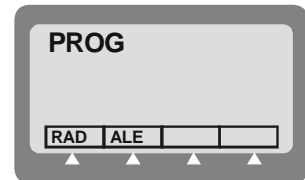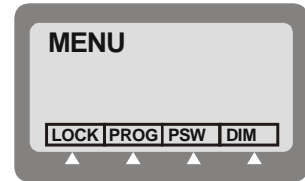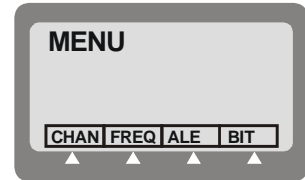
The structure of the PROG menu is shown in the following figures:

*   Programming the Radio Parameters (Figure 4-1).
*   Programming the ALE Parameters (Figure 4-2).
*   Programming the CCIR Parameters (Figure 4-3).

4-3.   PROGRAMMING THE RADIO PARAMETERS

The Radio (RAD) Programming menu is used to program the following types of parameters:

- Channel parameters – para. 4-3.1
- General radio parameters – para. 4-3.2.
- Radio options – para. 4-3.3.

Refer to Figure 4-1 for the detailed structure and options of the RAD menu.
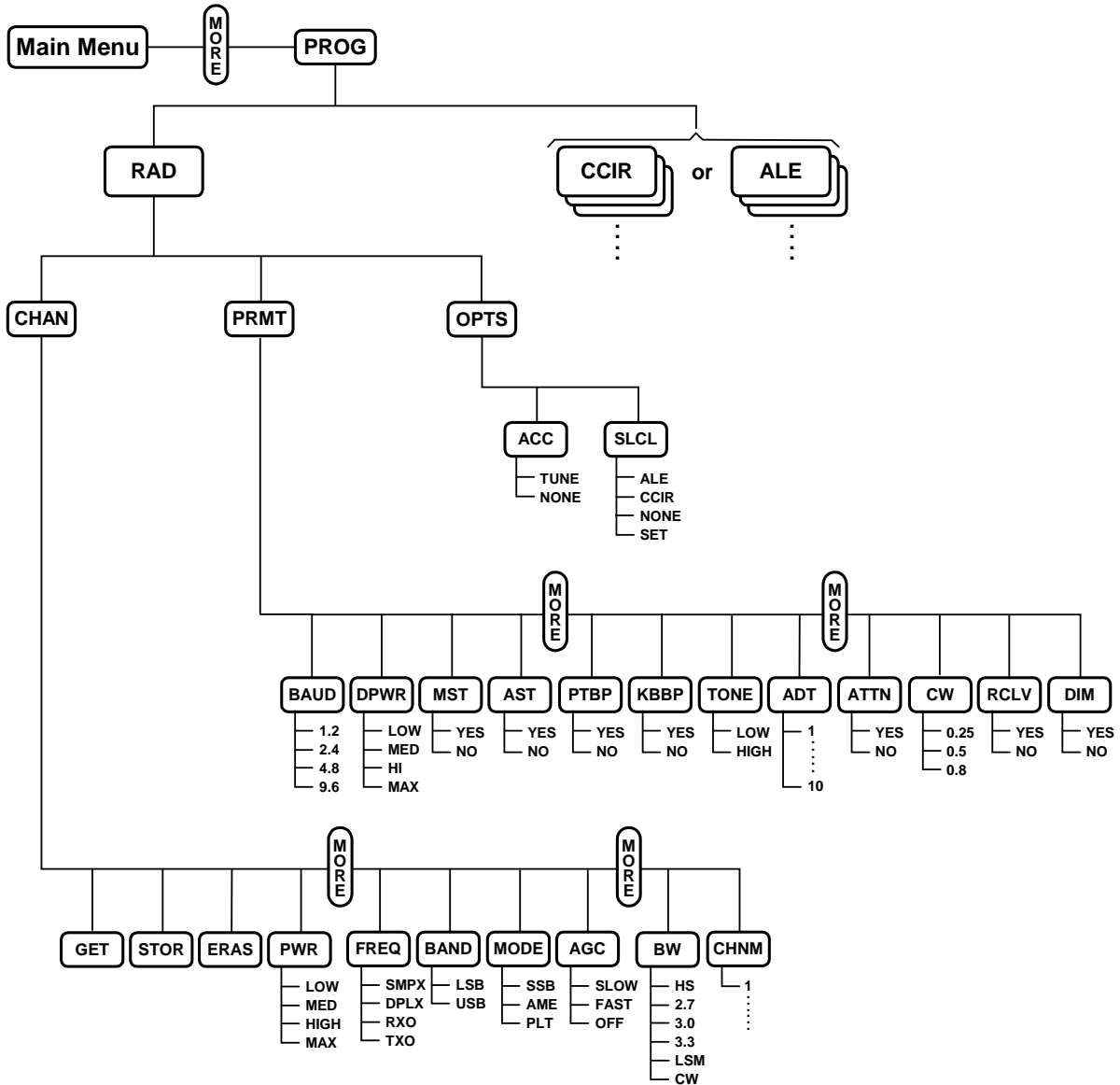
Figure 4-1. PROG Menu – Radio Parameters Programming

The following sections explain the programming procedures.

To start radio programming:

1. Press **MENU** to display the Menu screen.
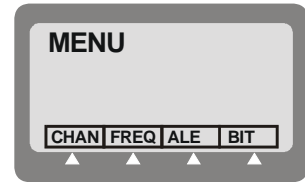
```
MENU



 CHAN  FREQ  ALE    BIT
  ▲     ▲     ▲      ▲
```

2. Press **MORE** to scroll to the second Menu screen.

```
MENU



 LOCK PROG  PSW   DIM
  ▲    ▲     ▲     ▲
```
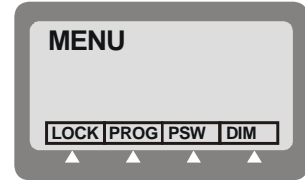
3. Press **PROG** to enter the Programming mode.

```
PROG



 RAD   ALE
  ▲     ▲     ▲     ▲
```
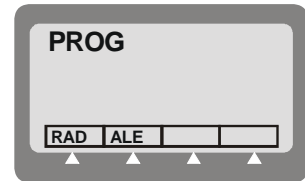
4. Press **RAD** to enter the Radio Programming mode.

```
RADIO
PROGRAMMING


 CHAN PRMT  OPTS
  ▲    ▲     ▲     ▲
```
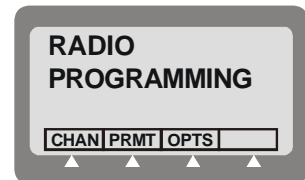
4-3.1 Programming Channels

The Channel programming menu includes two groups of options:

- GET and STOR are used to copy the channel parameters from one selected channel to another, and ERAS is used to delete the user-configured parameters of a selected channel.

- The other options are used to configure the operational parameters to be used on the channel being configured.

To enter the Channel Programming mode:

1. Enter the Radio Programming menu.
2. Press **CHAN**.

The CHAN menu provides the following options (see also Figure 4-1):

Option	Description
GET	GET retrieves all the parameters defined for a channel already programmed in Micom-Z (the default is the current channel, but you can select any other channel). You can store these parameters in a new channel using the STOR function, and then edit the parameters as required.
STOR	Store the set of parameters in a selected channel.
ERAS	ERAS is used to delete (erase) a channel. Actually, this action only replaces the user-modified parameters of the channel with the factory-default parameters, but marks the channel as **not programmed**. The factory-default parameter values are as follows: • Rx Frequency 15.000.00 MHz • Tx Frequency 15.000.00 MHz • SSB Mode USB • Bandwidth 2.7 • Tx Power MAX • AGC SLOW.
PWR	Select the channel transmit power level. Four transmit power levels can be selected: • **LOW** – 25 W nominal • **MED** – 60 W nominal • **HIGH** – 100 W nominal • **MAX** – 125 W nominal.
FREQ	Select the channel frequency. Micom-Z offers four frequency options: • **SMPX** Simplex Frequency – the same frequency is used for both transmission and reception. • **DPLX** Duplex Frequency – transmits on one frequency and receives on a different frequency. • **RXO** Receiving Only Frequency – defines a frequency for reception only. Transmission on that frequency is disabled. The available frequency range is 100 kHz to 30 MHz. • **TXO** Transmitting Only Frequency – defines a frequency for transmission only. You cannot receive on that frequency. The available frequency range is 1.6 to 30 MHz.
BAND	Select the channel operating sideband: • **USB** – upper sideband mode • **LSB –** lower sideband mode.

Option	Description
MODE	Select the channel radio operating mode: • **SSB** – single sideband • **AME** – amplitude modulation equivalent • **PLT** – single sideband with pilot signal.
AGC	Select the channel Automatic Gain Control mode. Micom-Z offers two AGC response speeds: **SLOW** and **FAST**. You can also turn the AGC **OFF** completely.
BW	Selects the filter bandwidth. • **HS** – high sensitivity filter (450 to 1500 Hz) for best voice communication under marginal conditions • **2.7** – 300 to 2700 Hz • **3.0** – 300 to 3000 Hz • **3.3** – 300 to 3300 Hz. Always select this bandwidth for data transmission • **LSM** – bandwidth optimized for use with low speed modems (1450 to 1950 Hz) • **CW** (Continuous Wave or Morse operation). The bandwidth used in this case is selected by **MENU** > **PROG** > **RAD** > **PRMT** > **CW**.

4-3.2   Configuring Radio Parameters

The radio parameters are global parameters, which are used for all the channels.

To start the radio parameters programming:

1. Enter the Radio Programming menu.

2. Press **PRMT**.

The PRMT option in the Radio Programming menu provides the following options (see Figure 4-1):

Option	Description
BAUD	Selects the data transmission rate of the internal modem: • **1.2** – 1200 bps • **2.4** – 2400 bps • **4.8** – 4800 bps • **9.6** – 9600 bps.
DPWR	Selects the maximum transmit power for data transmission, that is, for a transmission initiated by the data PTT. The available selections are: • **LOW** – 25 W nominal • **MED** – 60 W nominal • **HIGH** – 100 W nominal • **MAX** – 125 W nominal. The transmit power used in the other modes is independently selected for each channel. If the selected data transmit power exceeds the transmit power configured on the operating channel, the radio will use the lower channel transmit power. When operating the radio without the optional cooling tray, it is recommended to use the lower power settings (LOW or MED).
MST	Enables/disables the sidetone heard in the speaker when you transmit using the microphone.
AST	Enables/disables the heard in the speaker sidetone when you transmit using an accessory connected through the rear panel.

Option	Description
PTBP	Enables/disables the transmission of a beep when the local push-to-talk (PTT) button is released. This beep is used to notify the other stations that the local (your) radio set has stopped transmitting and returned to the receive mode: therefore, another radio can start transmitting.
KBBP	Enables/disables the keypad beep. When enabled, a beep is heard whenever a valid key is pressed.
TONE	Select the keypad beep level: high or low. The selection is relevant only when the keypad beep is enabled.
ADT	Selects the alternate display time-out, that is, the time after which a keypad sequence is automatically aborted in case no action is taken. In this case, the display returns to the previous screen. The time-out interval can be selected in the range of 1 to 10 seconds.
ATTN	Enables/disables the use of an internal RF attenuator. The attenuator is used to reduce interference when your radio is located near strong transmitters.
CW	Select the channel filter bandwidth used in the CW mode: • **0.25** – 250 Hz • **0.5** – 500 Hz • **0.8** – 800 Hz A lower value improves the reception but requires better frequency accuracy.
RCLV	Enables/disables the receive signal level display. If the receive signal indication is not enabled, you can temporarily enable it using one of the function keys.
DIM	Enables/disables automatic dimming of the display. Usually, the display operates continuously. However, you can program the display to be normally off, and be automatically turned on when the transceiver detects any type of activity (keypad, PTT, incoming call, etc.). The ADT option selects the time before the display is again turned off when inactive.

4-3.3   Setting Radio Options

To start programming the radio options:

1. Enter the Radio Programming menu.

2. Press **OPTS**.

The OPTS option in the Radio Programming menu provides two sets of options (see Figure 4-1):

Ñ **ACC**   Used to configure the radio for operation with an antenna tuner:

> **NONE**   Operation without an antenna tuner, which is possible only when using a broadband antenna.
>
> **TUNE**   Operation with an external antenna tuner. An antenna tuner is always necessary when using a whip. If you are using an external antenna tuner, you must select this option.

Ñ **SLCL**   Used to select the radio link setup mode:

> **ALE**   Use of ALE protocol.
>
> **CCIR**   Use of CCIR protocol.
>
> **NONE**   No link set up protocol. In this case, you can set up groups of channels to be scanned.

> After selecting the desired mode, select **SET** to set the new mode.

4-4. ALE PROGRAMMING

The ALE Programming menu is used to configure the parameters needed by the ALE function. The structure of the ALE programming menu is shown in Figure 4-2.

NOTE

You can access the ALE Programming menu only after you select **ALE** for **MENU** > **MORE** > **PROG** > **RAD** > **OPTS** > **SLCL**.
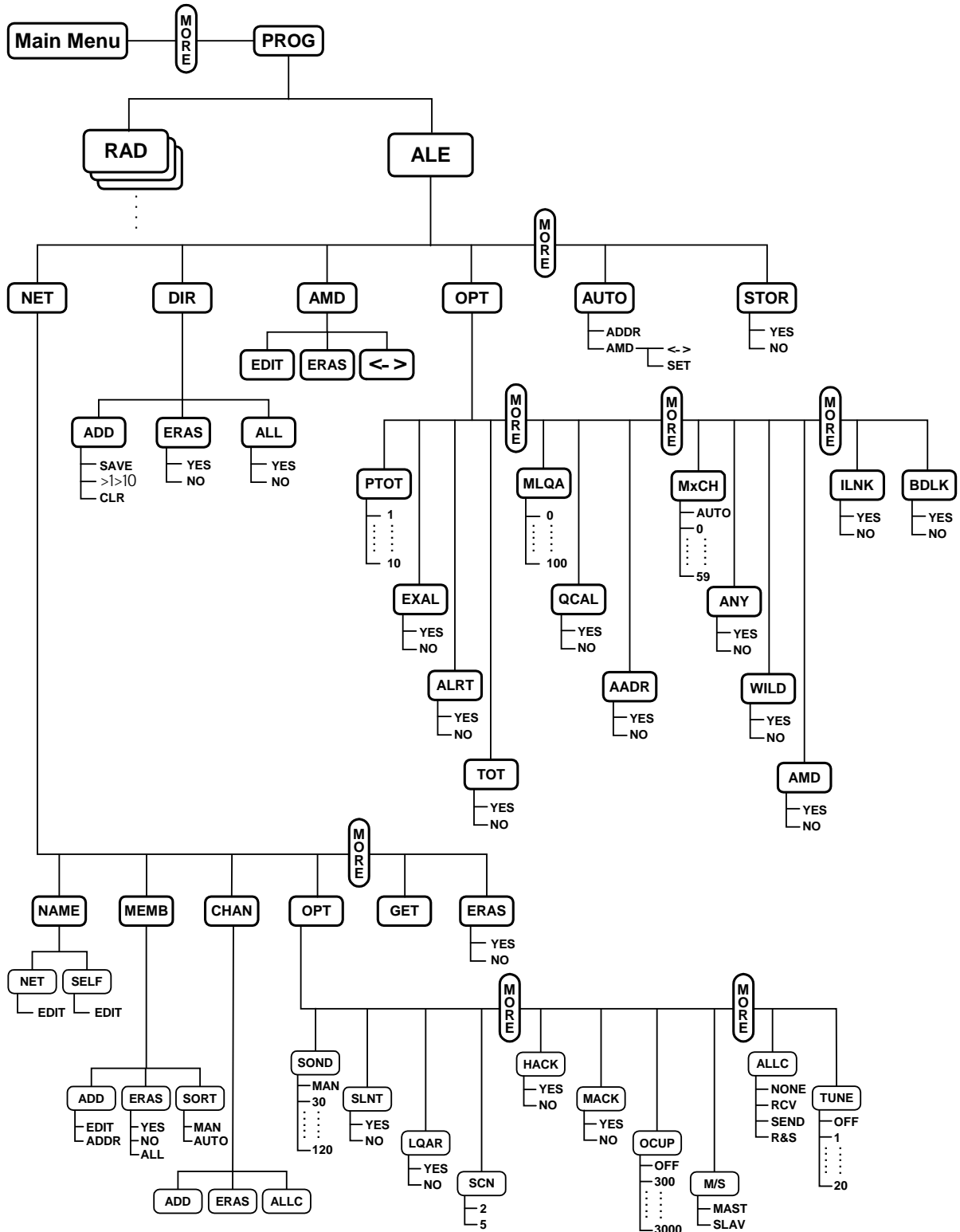
Figure 4-2. PROG Menu – ALE Parameters Programming

To start ALE programming:

1. Press **MENU** to display the Menu screen.

```
MENU



CHAN FREQ ALE  BIT
  ▲    ▲    ▲    ▲
```

2. Press **MORE** to scroll to the second Menu screen.

```
MENU



LOCK PROG PSW  DIM
  ▲    ▲    ▲    ▲
```

3. Press **PROG**.

```
PROG



RAD  ALE
  ▲    ▲    ▲    ▲
```

4. Press **ALE** to enter the ALE Programming menu.
5. Press **MORE** as required to access additional ALE programming parameters.

```
ALE
PROGRAMMING

NET  DIR  AMD  OPT
  ▲    ▲    ▲    ▲
```

In the ALE Programming mode, you can program the following features:

Option	Description	See Page …
NET	Net parameters: station names, options, members and scanned channels.	4-10
REC	Edit the list of stations not appearing in the directory from which calls have been received. This item is displayed only after such calls have been received, and therefore will not appear when the Micom-Z is just turned on.	4-12
DIR	Directory: configuration of the ALE address list.	4-12
AMD	Messages: preparation of AMD messages ready to be sent with ALE calls.	4-12

> **NOTE**
> During ALE operation, you can also edit, or prepare, a message, on-line, using the PAGE EDIT option.

OPT	Options: configuration of the various ALE options, such as PTT timeout, external alarm, and so on.	4-13
AUTO	Autodial parameters: shortcuts for ALE calls to frequently called stations.	4-14
STOR	Store the changes made in the ALE programming session.	4-15

The following sections explain the programming of these features.

```
┌─────────────────────────────────────────────────────┐
│                      NOTES                           │
│                                                      │
│   •  The ESC key is used to cancel a change you have │
│      made, if not yet confirmed. If you have already │
│      saved changes, the ESC key will only return to  │
│      a previous screen of the ALE Programming menu.  │
│                                                      │
│   •  When you end ALE programming, you must store    │
│      the parameters you defined.                     │
│                                                      │
│   •  If you press the MENU key to exit the           │
│      programming mode without first saving your      │
│      changes, you will be prompted to store the ALE  │
│      configuration changes. Press YES to store the   │
│      configuration. If you press NO, the             │
│      configuration will revert to the previous       │
│      configuration, and any changes made in the      │
│      current ALE programming session will be ignored.│
│                                                      │
└─────────────────────────────────────────────────────┘
```

4-4.1   Programming Nets

When programming a net, you can set the net names, define the net members, add channels, configure various options, copy parameters from a defined net or erase an entire net.

4-4.1.1   Overview of Net Programming

The net programming mode enables you to view and edit the configuration of each net. The configuration includes the following menus:

Ñ **NAME**   Edit the net name and the self-address:

> • **NET**: Define or edit the net names.
>
> It is not allowed to use a name already used as a self-address, nor an address already appearing in the address directory.
>
> • **SELF**: Define or edit your self address (the identification of your station, to be used by other stations within the same net).
>
> It is not allowed to use a name already used as a net address, nor an address already appearing in the address directory.

A net name or self address can contain up to 15 characters. Valid characters are the letters A to Z and the numerals 0 to 9.

Ñ **MEMB**   Add or erase members (station addresses) from the list of net members. This list defines which stations can participate in a net call (a net can have up to 16 addresses).

The MEMB menu also enables you to sort the list of members: this determines the order in which members respond to a net call. You can arrange the order of the list of members manually, or instruct the radio to arrange them in alphanumeric order.

A member name can contain up to 15 characters. Valid characters are the letters A to Z and the numerals 0 to 9. It is not allowed to define a name already used as a net address, nor an address already appearing in the address directory. New member names will automatically be added to the directory list (unless the directory is full).

Ñ **CHAN**   Add or remove channels to the list of scanned channels in a net, and to define the channel on which AllCalls are to be transmitted (the *AllCall channel* (ALLC)).

┌───┐
│ **NOTES** │
│ │
│ • Each net can contain up to 100 scanned channels. │
│ │
│ • All nets combined can contain up to 100 scanned channels. If you │
│   exceed this number, the message **OVER 100 CH** is displayed for │
│   one second, and then the display returns to the previous menu. │
│ │
│ • If you enter a channel which is not programmed, a **NOT PROG** │
│   message is displayed for a second, and the display returns to the │
│   previous menu. │
└───┘

Ñ **OPT**   Configure net options, including: sounding, silent net, LQA request, scan rate, home acknowledgment, monitor acknowledgment, occupancy detection, master/slave definitions, AllCall options and tune time.

Ñ **GET**   Copy all parameters from one net to another. This function is useful if you are defining a new net and wish to base most of its parameters on an existing net, for instance if you need to use different frequencies/channels for day and night communication, but all other net information (such as stations and names) is identical.

Ñ **ERAS**   Erase an entire net from the ALE data base.

After preparing a set of parameters, your entries are checked and any errors are reported. If you do not correct the detected errors, Micom-Z will offer to discard the new set of parameters.

4-4.1.2   Default Values

Unless you define different values, each net uses the following factory-defaults:

* Net Name   No default defined
* Self Address   No default defined
* AllCall   Send and receive enabled
* AllCall Channel   No default defined
* Tune Time   No tune time
* Silent   No
* Home Acknowledgment   Yes
* Monitor Acknowledgment   No
* Master/Slave   Master
* LQA Request   Yes
* Sounding   Manual
* Occupancy Check   No
* Scanned Channels   No default defined.

When programming a new net or other ALE parameters, you do not need to define all parameters: change only those for which the default values are not suitable.

4-4.2 Setting the Net Options

Use this menu to configure net options:

Ñ **SOND**   Sounding Parameters: define the interval (in minutes) at which automatic sounding is performed (30, 60, 90 or 120 minutes), or define sounding as a manual function. See Appendix A for a detailed explanation on the sounding process.

Ñ **SLNT**   Silent Mode: select whether the net is in the silent mode, which means that members in the net can initiate calls but not allowed to respond to an ALE transmission.

Ñ **LQAR**   LQA Reports: select whether your radio will ask the called station for a report on the quality of the communication every time a call is initiated.

Ñ **SCN**   Scan Rate: select the number of channels scanned each second when the radio is in ALE mode: can be set to 2 or 5 channels per second.

Ñ **HACK**   Home Acknowledgment: enable/disable home acknowledgment. When enabled, the radio transmits an end-of-call indication to the remote station.

Ñ **MACK**   Monitor Acknowledgment: enable/disable monitor acknowledgment. When enabled, the radio transmits an *accept call* indication to the station that initiated the call.

Ñ **OCUP**   Occupancy Check: enable/disable the occupancy check. The occupancy check defines whether the radio uses the speech detect mechanism to determine whether a channel on which a call is about to be made is occupied. If this option is ON, a call cannot be initiated on a channel determined to be occupied. This option can be operated in addition to the ALE signal detection mechanism.

   You can select the interval at which occupancy checks are made (300 to 3000 msec, in 300-msec increments).

Ñ **M/S**   Master/Slave: select whether your radio serves as a master or slave in the current ALE network. Only a master station can initiate a Net Call.

Ñ **ALLC**   AllCall Settings: this option determines whether the ALE is able to receive and/or send AllCalls.

   An AllCall is an ALE broadcast transmission. All stations receiving an AllCall are linked to the sender, even if they do not recognize the sender's address. If no AllCall channel is defined, the call will be made on the best channel in the net.

Ñ **TUNE**   Tune Time: select the tuning time. Tuning time is the maximum time the current ALE waits for the called station to tune (this is the tune-in time of the slowest tuner in the net). The tune time is added to the calculated response time. Tune time can be 1 to 20 seconds, or OFF (zero).

4-4.3 Directory Parameters

This DIR option on the ALE Programming menu enables preparing the ALE address list. This list contains the names of stations to which the radio can address a private call using the ALE. You can add a new address, and edit an existing address.

A name can contain up to 15 characters. Valid characters are the letters A to Z and the numerals 0 to 9. You cannot add an address which is identical to the name of a programmed net, nor an address already used as a self address in a programmed net. The list can contain up to 100 addresses, and is automatically sorted in ascending alphanumeric order.

4-4.4 AMD Message Configuration

The AMD option of the ALE Programming menu is used to view, edit, add or erase messages intended for transmission. The characters you can enter in messages using the radio keypad are: A to Z, 0 to 9, space, * and #. See message preparation details in Chapter 2.

Messages programmed using a remote PC with a standard keyboard can contain all the ASCII characters the range of 20 (hexa) to 5F (hexa).

The message list can contain up to 12 messages, numbered AMD 0 to AMD 11. Each message can contain up to 90 characters.

NOTE

If no messages are stored, **EMPTY** will appear in the second display line.

4-4.5   ALE Options Configuration

This menu enables you to configure the following ALE options:

Option	Description
PTOT	PTT Timeout: the time (in minutes) which elapses between the moment you release the PTT button, until the ALE disconnects the link. The allowed range is 1 to 10 minutes.
EXAL	External Alarm: activate/deactivate the radio external alarm when a call is received.
ALRT	Alert tone: enable/disable the generation of an alert tone whenever a link is established.
TOT	Accept Link Time-out Time: the radio can be configured to disconnect the link automatically if neither the PTT, nor any other key is pressed within 30 seconds from the reception of a call. If Accept Link TOT is set to NO, the received call is accepted immediately and automatically.
MLQA	Minimum LQA Score: determines the minimum acceptable LQA (Link Quality Analysis) score allowed when trying to establish a link on a specific channel. If the minimum score is not achieved when the radio attempts to establish a link in the ALE mode, the radio will try to establish a link on the scanned channel with the next best LQA score. At the end of this process, a link will be established on the scan channel with the best LQA score. If the call is made on a specific channel, the radio ignores the minimum LQA score check. The allowed range of LQA scores is 0 to 100%. When selecting the minimum LQA score, remember that in accordance with the ALE standards, the maximum LQA score (assigned for receiving an optimum sounding is 70%), and the minimum score is 30%. The score given to a station that did not send any sounding or a station whose sounding has not been received is also 30%.
QCAL	Quick Call: enable/disable initiating a call to the last called address by pressing the MIC PTT button twice in rapid sequence (**double pressing**).
AADR	Automatic address: enable/disable automatically adding the source addresses of incoming calls to the ALE directory. **NOTE** If the directory is full, new addresses will not be added.
MxCH	Maximum Scan Channels: this parameter is used to adapt the duration of the calling signal to the total number of scanned NET, to ensure that communications are not disrupted. You can select between automatic selection, or select a value in the range of 0 to 59 seconds.
ANY	AnyCall: enable/disable the sending AnyCalls.
WILD	Wildcard: enable/disable the sending wildcard calls.
AMD	Automatic Message Display: enable/disable the sending AMD messages.

Option	Description
ILNK	Inlink: enable/disable the inlink facility, which enables notifying other call participants when each participant disconnects from the link. All participants must be programmed to use the same selection (either YES or NO). Do not enable the inlink function when communicating with a radio that does not support the full ALE capabilities in accordance with MIL-STD-188-141B.
BDLK	Bidirectional link: enable/disable automatically setting up a link on the best channel after a bidirectional handshake with an individual station.

The ALE options have the following factory-default values:

- PTT Timeout   No timeout
- Alert   Yes
- External Alarm   Yes
- Auto Address   No
- Quick Call   Yes
- Minimum LQA score   0
- Accept Link Timeout Yes
- MxCH   Auto
- ANY   Yes
- WILD   Yes
- AMD   Yes
- ILNK   No
- BDLK   No

When configuring ALE options, you do not need to define all parameters: change only those for which the factory-default values are not suitable.

4-4.6   Auto Dial Parameters

Auto Dial enables you to set shortcuts for calls to frequently called stations, with or without automatically attaching messages when a station is called:

- **AUTO**   Used to configure up to 10 autodial codes, numbered AUTO 0 to AUTO 9.
- **AMD**   Used to prepare AMD messages for sending when an autodial code is used. See message preparation details in Chapter 2.

NOTE

If a message is attached to the address, an exclamation mark precedes the address.

4-4.7 Storing ALE parameters

Before exiting the ALE programming menu, you must store the parameters you have programmed.

NOTE

If you press the MENU or ESC key to exit programming mode without first saving your changes, you will be prompted to store the ALE configuration changes. Press YES to store the configuration.

If you press NO, the configuration will revert to the previous configuration, and any changes made in the ALE programming session will be ignored.

4-4.8 Using the New Station Address Filter

To help you add new station addresses to the ALE directory of your radio set in a controlled manner, Micom-Z has a special ALE address filter. To enable this filter, enable the Auto Address function on the **PROG** > **ALE** > **OPT** > **AADR** menu (this function can also be enabled by means of the MRC).

When enabled, the address filter compares the source address of each call received by your radio set with the addresses stored in the ALE directory. When the first new unlisted address is found, it is stored in a special memory stack, and you are notified that at least one unlisted address has been detected by adding the option RCV under **PROG** > **ALE**, after the **NET** option. When you want to check the addresses stored in the stack, you select **RCV** and then decide whether to erase an address or add it to the ALE directory of your radio set.

Up to 20 new addresses can be stored in this stack, which is organized as a FIFO stack: this means that when a new address, different from all the previously detected addresses, is received while 20 addresses are already stored, it will replace the oldest address.

The information on the received addresses is automatically erased when the radio is turned off; only addresses added to the directory remain in the directory.

To edit the received addresses and add addresses to the ALE directory:

1. Press **MENU** and select **ALE.**

2. When addresses are stored in the new received addresses stack, you will see the **RCV** option. Press **RCV** to display the RCV screen.

3. The RCV screen displays the last detected unlisted address. Use the **UP/DOWN** arrows to display the desired address (the display is cyclical).

4. When the desired address is displayed, press the key corresponding to the action to be performed:

    *   To delete the address from the stack, press **ERAS**.

    *   To add the address to the directory, press **ADD**. The address is removed from the stack.

5. To confirm, press **SAVE**.

6. Repeat the actions until all the desired addresses are processed. When done, press **ESC** to end.

If the stack is now empty, the **RCV** option is no longer displayed on the ALE menu.

4-5. CCIR PROGRAMMING

The CCIR Programming menu is used to configure the parameters needed by the CCIR function. The structure of the CCIR programming menu is shown in Figure 4-3.

NOTE

You can access the CCIR Programming menu only after you select **CCIR** for **MENU** > **MORE** > **PROG** > **RAD** > **OPTS** > **SLCL**.

Main Menu — MORE — PROG

PROG
- RAD ⋮
- CCIR
  - SELF
    - SELF4
    - SELF6
  - DIR
    - ADD
      - SAVE
      - >1>10
      - CLR
    - ERAS
      - YES
      - NO
      - ALL
  - AMD
    - AMD 1
      - EDIT
        - SAVE
        - >1>10
        - CLR
      - ERAS
    - AMD 2
      - EDIT
        - SAVE
        - >1>10
        - CLR
      - ERAS
  - MORE
    - OPT
      - ALRM
        - ON
        - OFF
      - BCON
        - ON
        - OFF
      - CALL
        - MIN
        - M1>1>
        - >1>10
        - 10
    - STOR
      - YES
      - NO
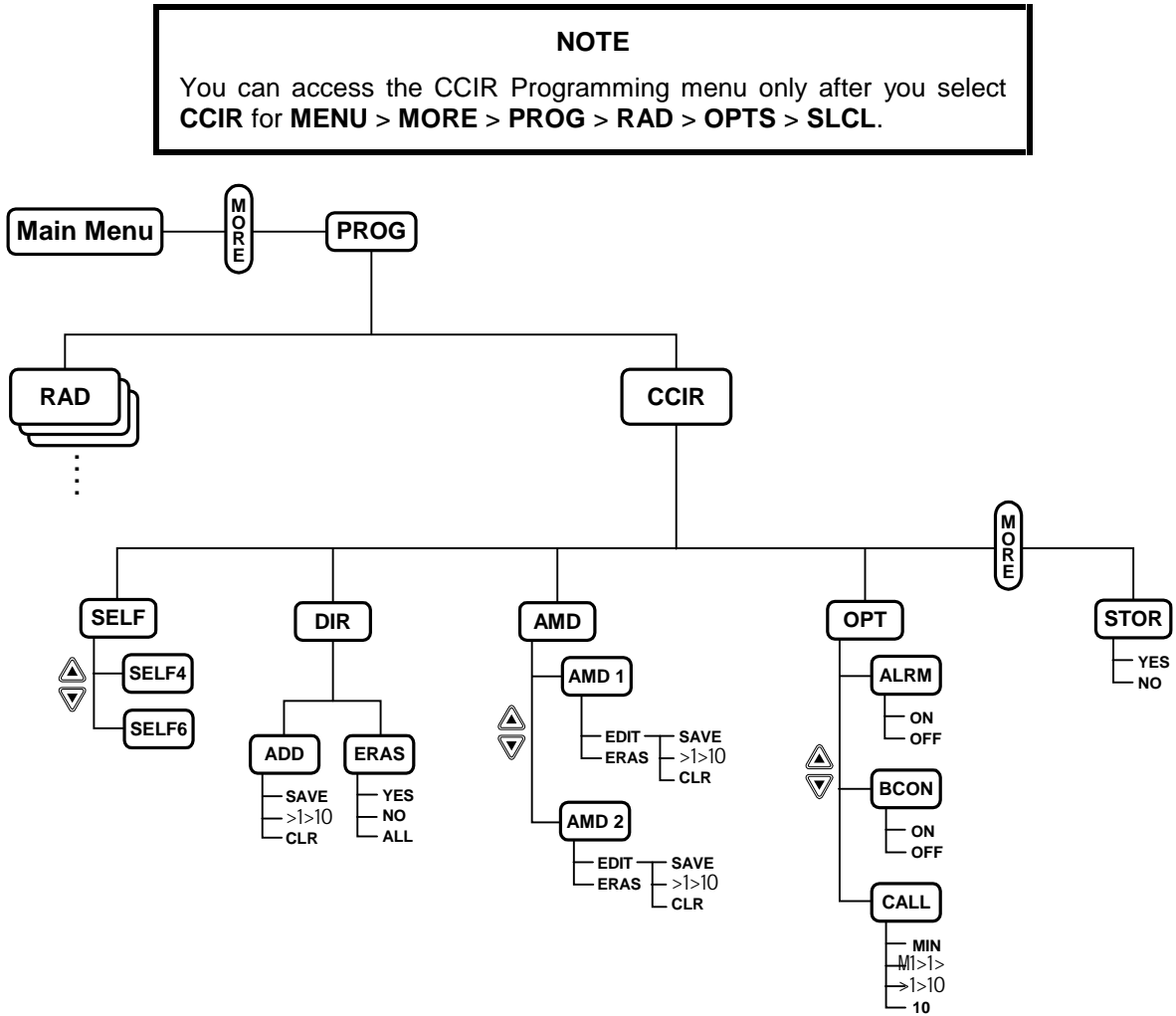
Figure 4-3. PROG Menu – CCIR Parameters Programming

NOTE

Before configuring the CCIR mode, you must prepare an ALE default file to initialize your transceiver. To initialize your transceiver, use the MRC, or the transceiver panel.

To start CCIR programming:

1. Press **MENU** to display the Menu screen.

```
MENU




CHAN  FREQ  CCIR  BIT
 ▲     ▲     ▲    ▲
```

2. Press **MORE** to scroll to the second Menu screen.

```
MENU




LOCK PROG  PSW  DIM
 ▲    ▲     ▲    ▲
```

3. Press **PROG**.

```
PROG




RAD   CCIR
 ▲     ▲     ▲    ▲
```

4. Press **CCIR** to enter the CCIR Programming menu.

5. Press **MORE** as required to access additional CCIR programming parameters.

```
CCIR
PROGRAMMING


SELF  DIR  AMD  OPT
 ▲     ▲    ▲    ▲
```

In the CCIR Programming mode, you can program the following features:

Option	Description	See Page …
Ñ **SELF**	Configuration of the local (self) station address.	4-20
Ñ **DIR**	Directory: configuration of the CCIR address list.	4-21
Ñ **AMD**	Messages: preparation of AMD messages ready to be sent with CCIR calls.	4-22

> **NOTE**
> During CCIR operation, you can also edit, or prepare, a message, on-line, using the PAGE EDIT option.

Ñ **OPT**	Options: configuration of the various CCIR options.	4-22
Ñ **STOR**	Store the changes made in the CCIR programming session.	4-23

The following sections explain the programming of these features.

4-6. CONFIGURING CCIR SELF-ADDRESSES

4-6.1 CCIR Addressing Plan

CCIR uses selective calling: any station operating on the same channel, or scanning channels in the same (or partially overlapping) group of channels, will accept a call only if it is directed to it, or to the set of stations matching the destination specified by the transmitting station.

The current CCIR addressing plan supports six-digit addresses, that is, 000000 to 999999. Previous CCIR standards specified only four-digit addresses, that is, 0000 to 9999, and therefore, for backward compatibility, Micom-Z supports both addressing plans. This means that you can program two independent self-addresses for your radio set, a four-digit self-address and a six-digit self-address, and the radio will respond to calls using either address.

In addition to individual station addressses, the CCIR addressing plan specifies the following types of destination addresses (see Table 4-1 and Table 4-2):

- **Sub-Group Addresses** – addresses ending with a single 0 are directed to a set of stations called *sub-group*. When using four-digit addresses, the first three digits of the address determine the sub-group address, whereas when using six-digit addresses, the first five digits of the address determine the sub-group address.

  For example, a transceiver with self-address 1234 is included in sub-group 1230, and it will accept all calls with address 1230.

- **Group Addresses** – addresses ending in two consecutive 0 are directed to a set of stations called *group*. When using four-digit addresses, the first two digits of the address determine the group address, whereas when using six-digit addresses, the first four digits of the address determine the group address.

  For example, a transceiver with self-address 1234 is included in group 1200, and it will accept all calls with address 1200.

- **All Addresses** – addresses ending with in three consecutive 0 are called the *all* address. When using four-digit addresses, all the stations with the same first digit will accept the *all* call; when using six-digit addresses, all the stations with the same three digits will accept the *all* call.

- Ñ **Beacon Address** – a beacon call is identified by its last two digits, which are 99.

Figure 4-4 and Figure 4-5 illustrate the concept of groups and sub-groups for the two CCIR addressing plans. As a result, when assigning self-addresses to an individual station, never select addresses ending in one or more 0, nor addresses ending in 99. Such addresses are allowed only as destination addresses.

Table 4-1. Four-Digit CCIR Addressing Plan

Address Type	Description
Sub-Group	A call transmitted to XXX0 is received by up to 9 transceivers with individual addresses in the range of XXX1 to XXX9.
Group	A call transmitted to XX00 is received by up to 89 transceivers with individual addresses in the range of XX01 to XX99.
All	A call transmitted to X000 is received by up to 890 transceivers with individual addresses in the range of X001 to X999.
Beacon	A call transmitted to XX99 is interpreted as a beacon call

Table 4-2. Six-Digit CCIR Addressing Plan

Address Type	Description
Sub-Group	A call transmitted to XXXXX0 is received by up to 9 transceivers with individual addresses in the range of XXXXX1 to XXXXX9.
Group	A call transmitted to XXXX00 is received by up to 89 transceivers with individual addresses in the range of XXXX01 to XXXX99.
All	A call transmitted to XXX000 is received by up to 890 transceivers with individual addresses in the range of XXX001 to XXX999.
Beacon	A call transmitted to XXXX99 is interpreted as a beacon call

All 1000

Group 1200	Group 1400	Group 1600	Group 1800
Sub-Group 1230	**Sub-Group 1430**	**Sub-Group 1630**	**Sub-Group 1830**
1234	1434	1634	1834
1236	1436	1636	1836
Sub-Group 1250	**Sub-Group 1450**	**Sub-Group 1650**	**Sub-Group 1850**
1254	1454	1654	1854
1256	1456	1656	1856
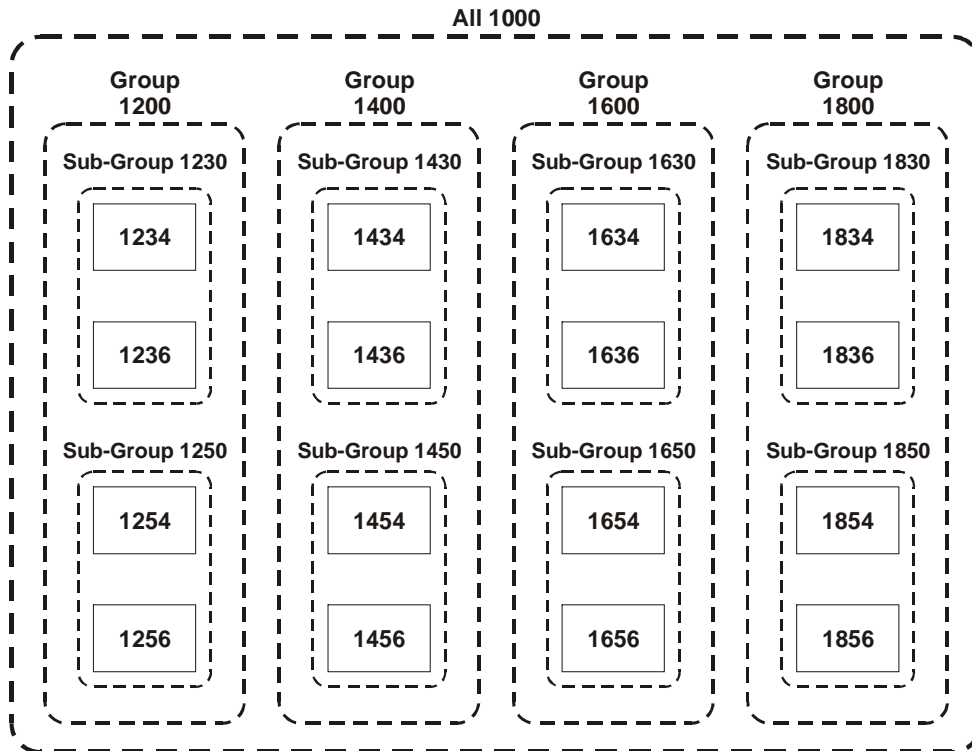
Figure 4-4. Groups and Sub-Groups in Four-Digit CCIR Addressing Plan

All 111000

Group 111200	Group 111400	Group 111600	Group 111800
Sub-Group 111230	**Sub-Group 111430**	**Sub-Group 111630**	**Sub-Group 111830**
111234	111434	111634	111834
111236	111436	111636	111836
Sub-Group 111250	**Sub-Group 111450**	**Sub-Group 111650**	**Sub-Group 111850**
111254	111454	111654	111854
111256	111456	111656	111856
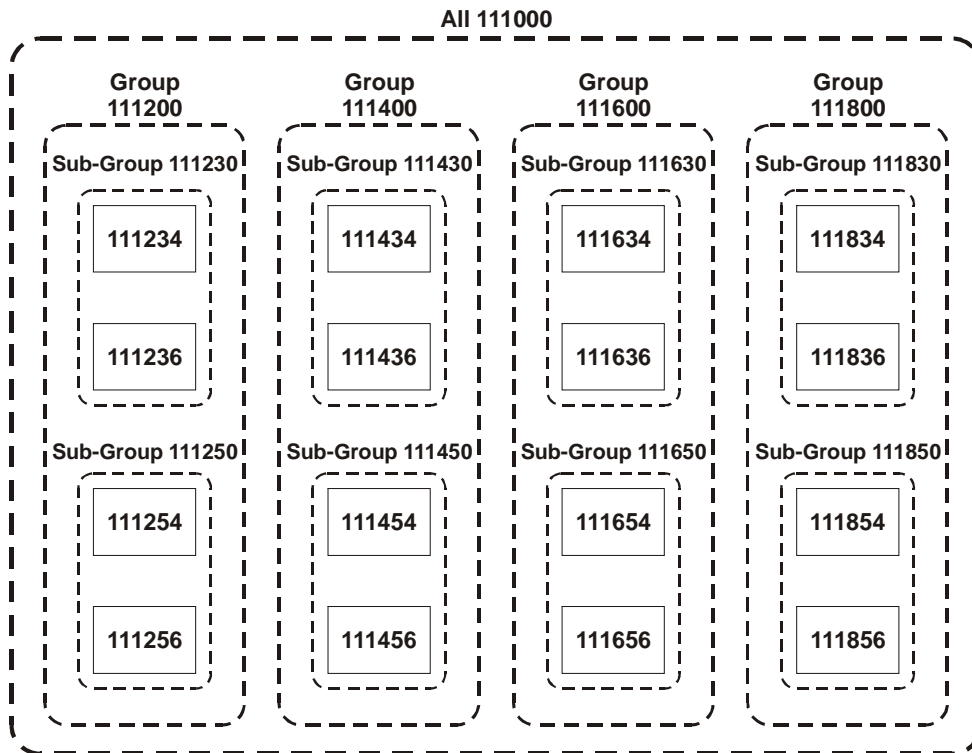
Figure 4-5. Groups and Sub-Groups in Six-Digit CCIR Addressing Plan

4-6.2   Configuring the Self-Address

NOTE

A call transmitted to XXX0, XX00, or X000 is received by multiple transceivers. Therefore, do not configure a self-address with "0", "00", or "000" as the last digits.

In addition, a call transmitted to XX99 acts as a beacon call. Therefore, do not configure a self-address with "99" as the last digits.

To configure four-digit self-addresses:

1. Access the CCIR Programming menu: **MENU** > **MORE** > **PROG** > **CCIR**.

2. Press **SELF** to access your self-address.

3. Press **UP/DOWN** keys to scroll to **SELF4**.

4. Enter the prescribed four-digit self-address. If you enter a self-address with less than four digits, the transceiver automatically converts it to a four-digit self-address. For example, if you enter "1", then the transceiver automatically converts it to "0001".

5. Press **SAVE** to confirm.

6. Press **MENU** to exit.

7. Press **YES** to store.

To configure six-digit self-addresses:

1. Access the CCIR Programming menu: **MENU** > **MORE** > **PROG** > **CCIR**.

2. Press **SELF** to access your self-address.

3. Press **UP/DOWN** keys to scroll to **SELF6**. If you enter a self-address with less than six digits, the transceiver automatically converts it to a six-digit self-address. For example, if you enter "1", then the transceiver automatically converts it to "000001".

4. Enter your six-digit self-address.

5. Press **SAVE** to confirm.

6. Press **MENU** to exit.

7. Press **YES** to store.

4-6.3 Configuring Directory Entries

This section describes how to configure directory entries. In the CCIR mode, the directory can store up to 100 directory entries.

> **NOTE**
>
> A call transmitted to XX99 acts as a beacon call. Therefore, do not configure a directory entry with "99" as the last digits.

To add directory entries:

1. Access the **CCIR** Programming menu: **MENU** > **MORE** > **PROG** > **CCIR**.

2. Press **DIR** to access the Directory menu.

3. Press **ADD** to add a new directory entry.

> **NOTE**
>
> If you store exactly 100 directory entries, the **ADD** button disappears.
>
> If you delete one directory entry, the **ADD** button reappears.

4. Enter the four-digit or six-digit numeric directory entry address.

5. Press **SAVE** to confirm.

6. If you want to add more directory entries, repeat Step 3 through Step 5.

7. Press **MENU** to exit.

8. Press **YES** to store.

To delete directory entries:

1. Access the **CCIR** Programming menu: **MENU** > **MORE** > **PROG** > **CCIR**.

2. Press **DIR** to access the Directory menu.

3. Press UP/DOWN keys to scroll to the directory entry you want to delete.

4. Press **ERAS** to delete the directory entry.

5. Do one of the following: Press **YES** to delete the directory entry. Press **NO** to cancel. Press **ALL** to delete all directory entries.

6. Press **MENU** to exit.

7. Press **YES** to store.

4-6.4 Configuring Channels

CCIR mode enables you to configure up to 200 channels, which can be renamed as channels 201 to 500. The MRC lets users rename channels as 1 to 500.

To configure channels:

1. Access the Radio Programming menu: **MENU** > **MORE** > **PROG** > **RAD**.

2. Press **CHAN** to access the Channel menu.

3. Press **GET** to get channels.

4. Press the **UP/DOWN** keys to scroll to a channel.

5. Press **ENTER** to select the channel.

6. Press **MORE** twice to scroll to the correct menu screen.

7. Press **CHNM** to access the channel number.

8. Press **ENTER** to select the channel.

9. Use the keypad to rename the channel number. Enter a number between 1 and 500.

10. Press **ENTER** to confirm.

4-6.5   Configuring AMD Messages

This section describes how to configure AMD text messages for the CCIR mode.

The CCIR mode lets you prepare and store in the transceiver memory two messages, identified as AMD 1 and AMD 2. in addition, you can also edit on-line an AMD message, which is not stored. Each message can contain the following. Each message can contain up to 32 characters; the allowed characters are A to Z, 0 to 9, and *space*.

NOTE

Although each message can contain up to 32 characters, the screen can only display 11 characters. Press M1>1> and >1>10 to scroll back and forth to view different parts of the message.

To edit an AMD message:

1. Access the CCIR Programming menu: **MENU** > **MORE** > **PROG** > **CCIR**.

2. Press **AMD**.

3. Press **UP/DOWN** keys to scroll to the message you want to edit, AMD 1 or AMD 2.

NOTE

When there is no defined message, EMPTY appears in the second display line.

---

4. Press **EDIT** to edit the message.

5. Use the keypad to enter the message.

6. Press **SAVE** to confirm.

7. Press **MENU** to exit.

8. Press **YES** to store.

To delete an AMD message:

1. Access the CCIR Programming menu: **MENU** > **MORE** > **PROG** > **CCIR**.

2. Press **AMD** to access the Automatic Message Dialing feature.

3. Press the **UP/DOWN** keys to scroll to the message you want to edit.

4. Press **ERAS** to delete the message.

5. Press **YES** to confirm. Press **NO** to cancel.

6. Press **MENU** to exit.

7. Press **YES** to store.

4-6.6   Configuring the External Alarm Feature

You can set activate/deactivate the radio external alarm to indicate when a call is received.

To configure the external alarm feature:

1. Access the CCIR Programming menu: **MENU** > **MORE** > **PROG** > **CCIR**.

2. Press **OPT** to access the options.

3. Press the **UP/DOWN** keys to scroll to **ALRM**.

4. Do one of the following:

   - Press **ON** to activate the external alarm function.

   - Press **OFF** to disable the external alarm function.

5. Press **MENU** to exit.

6. Press **YES** to store.

4-6.7   Configuring the Beacon Feature

The beacon feature enables you to enable or disable the response to beacon calls from other transceivers.

To configure the beacon feature:

1. Access the CCIR Programming menu: **MENU** > **MORE** > **PROG** > **CCIR**.

2. Press **OPT** to access the options.

3. Press the **UP/DOWN** keys to scroll to **BCON**.

4. Do one of the following:

   - Press **ON** to enable beacon calls.

   - Press **OFF** to disable beacon calls.

5. Press MENU to exit.

6. Press YES to store.

4-6.7.1   Configuring the Call Feature

The call feature enables you to configure the duration of your transmitted calls. Use this feature to synchronize your call duration with the Scanning mode options of other transceivers.

To configure the call feature:

1. Access the CCIR Programming menu: **MENU** > **MORE** > **PROG** > **CCIR**.

2. Press **OPT** to access the options.

3. Press UP/DOWN keys to scroll to **CALL**.

4. Select a call length between Level 1 and Level 10.

5. Press **MENU** to exit.

6. Press **YES** to store.

4-6.7.2   Storing CCIR Parameters

Before exiting the CCIR Programming menu, you must store your CCIR parameters.

To store the CCIR parameters:

1. Access the CCIR Programming menu: **MENU** > **MORE** > **PROG** > **CCIR**.

2. Press **MORE** to scroll to the next menu screen.

3. Press **STOR** to store the programmed CCIR parameters.

4. Press **YES** to store.

Intentionally Left Blank

APPENDIX A

ALE CAPABILITIES AND FEATURES

A-1. SCOPE

This Appendix provides a concise description of the ALE capabilities and features.

A-2. SCANNING

The method used to select the best channel is based on scanning: as long as it is idle, a radio operating in the ALE mode switches frequency at a relatively rapid rate (programmable at 2 or 5 channels per second) within the group of channels that can be used (the ALE frequency table, with up to 100 frequencies). During this process, it collects information regarding the state of each channel (busy/free and its background noise) that can be used together with the quality information collected by sounding when the user initiates a call.

- When a station initiates a call, it selects the best free channel on the basis of the most recent information, switches to that channel and then transmits a call request for a time sufficient for any station to finish scanning all the preprogrammed channels and reach the selected channel.

- Any station that should receive this call will then stop on the channel used by the initiating station, and will use the channel for communication. The exact response to the call request depends on the type of call (call types are described below): as a result, it is possible to program any desired station to ignore some types of calls (in fact, any call not specifically addressed to it).

A-3. SOUNDING

Automatic sounding is the method used by ALE for testing the quality of channels and propagation paths under field conditions. The sounding signal is a unilateral identifying broadcast, repeated at periodic intervals on unoccupied channels. Identification of a sounding signal sent from a station indicates a high probability of bidirectional communication.

The length of the sounding cycles can be set to short or long cycles, depending on propagation conditions. When propagation changes are slow, long intervals of about 1 or 2 hours may be sufficient. If, however, the propagation changes are erratic and rapidly changing, or if it is critical to have updated connectivity information, then shorter intervals are recommended. Each station can also measure BER and S/N, and update the LQA table accordingly.

The maximum score for receiving an optimum sounding is 70%; the minimum score is 30%. The score given to a station that did not send any sounding or a station whose sounding has not been received is also 30%.

A-3.1 Sounding Cycle Time

The sounding signal is repeated at regular intervals on all the channels in the network. A complete round of sounding messages, or **sounding cycle,** can be programmed to 30, 60, 90, or 120 minutes when the automatic sounding is on. You can also manually initiate sounding when there is a specific need for it, even if the system is set to operate in the automatic mode.

A short sounding cycle ensures a more updated LQA memory. However, frequent sounding increases network occupancy, leaving less channel-free time for the users. Figure A-1 illustrates network occupancy in relation to sounding cycles of 30, 60, 90 and 120 minutes. (Note that both axes have logarithmic scales.) The chart also shows 80% and 95% occupancy in a 120-minute sounding cycle at a very rapid scanning rate (applicable only to multiple-channel networks).
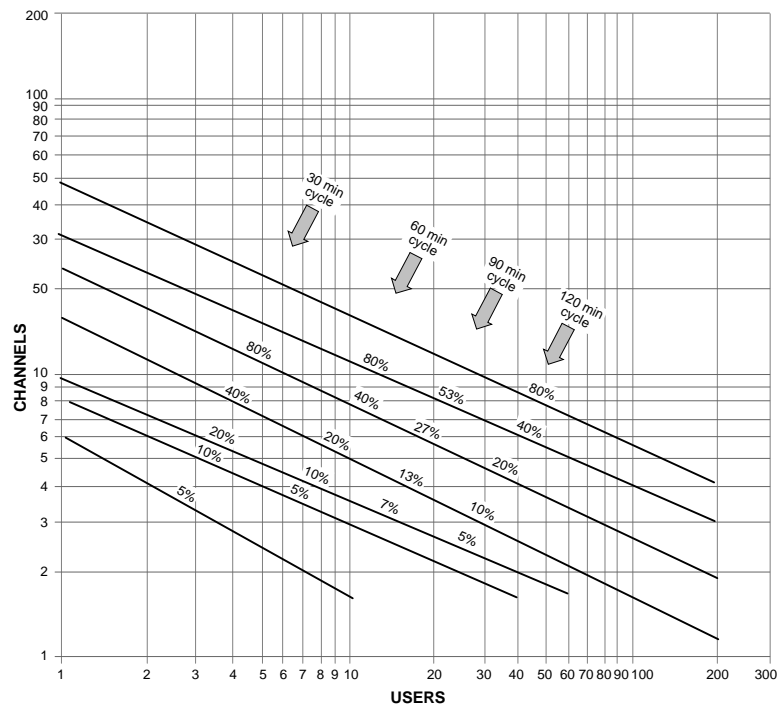
Figure A-1. Network Occupancy

Use the chart to determine the best sounding cycle for your particular network, bearing in mind network occupancy, propagation conditions and other considerations.

The following examples demonstrate how to read the chart.

- In a network of nine channels used by eight members, a 30-minute sounding cycle would result in 80% occupancy; a 60-minute cycle would result in 40% occupancy; a 90-minute cycle would result in 27% occupancy and a 120-minute cycle would result in 20% occupancy.

- If there are only two or three channels in the network, a sounding cycle of 30 minutes allows enough channel-free time, even for as many as ten users.

Under field conditions, occupancy will usually be less than the value obtained from the chart because not every station receives all the soundings that are being broadcast on all channels.

To increase channel-free time for the users by reducing network occupancy, you can try one of these four methods (in this order):

1. Increase the sounding cycle time (to 90 or 120 minutes).

2. Reduce the number of channels in the network (for example, by using different nets for different times of day).

3. Reduce the number of stations in the network by re-arranging the hierarchical subgrouping of stations.

4. Request all stations to set the fast scan rate option.

A-3.2   Manual Sounding

When it is necessary to perform a rapid sounding cycle on all channels instead of, or in addition to the automatic sounding cycle, manual sounding can be used.

A-4. LQA MEMORY

The ALE builds a database of connectivity information based on calls and the ALE sounding messages transmitted by other stations in the network. This information is stored in a special LQA memory and is used to determine the link quality of all channels in the networks. The data in the LQA memory is **time-weighted**, that is, recent information is given more value than old, thus compensating for changing propagation conditions.

A-5. BIDIRECTIONAL HANDSHAKE

The bidirectional handshake is an operator-initiated procedure used to exchange LQA scores with other stations without establishing a link.

NOTE

The Micom-Z can also be programmed to automatically initiate the call to the station after finishing the bidirectional handshake (using the BDLK parameter reached under the ALE programming options).

This procedure is useful in the following cases:

- The radio has only recently been switched on and the automatic sounding cycle has not yet been completed.
- The operator wishes to update the LQA scores before initiating a call to another station, for example, for example, because of abrupt atmospheric charges, or other propagation changes.
- A new or passive station has joined the system.

A bidirectional handshake can be carried out with a single station or with all stations in the net. It can be carried out either on a single channel, or on all the net channels. When required, a message can also be added to the procedure.

After a bidirectional handshake with a single station, the LQA matrices of both radios are updated. The operator can then initiate a call to that station and obtain the best channel automatically.

When the bidirectional handshake procedure is performed with a net, all the stations in the net update their LQA tables.

A-6. SELECTIVE CALLING

Micom-Z uses an approach standardized in MIL-STD-181-141B and FED-1075 to selective calling, and therefore has the capability and flexibility to link with one or many prearranged or as-needed single or multiple stations.

This selective calling capability is based on the use of a special addressing method.

A-6.1 ALE Addressing Method

ALE uses digital addresses to identify stations. The fundamental address element in the ALE system is the single word: one ALE address word must always contain three characters (one triplet).

A single ALE word is needed for the basic individual station address (this is called a **basic address**). To increase the available range of addresses, basic addresses can be expanded up to a maximum of 5 words (15 characters): such addresses are called *extended addresses*.

The characters that can used in addresses are a subset of the standard Basic 38 ASCII character set. This subset includes:

- All the capital (upper case) letters (**A** to **Z**)
- All the digits (**0** to **9**)
- Two utility characters:

  # The stuffing symbol @. It can be used to add characters at the end of an address, so that the resulting length is a whole number of words (triplets). A receiving station then interprets only the non-stuffing characters. For example, if the address has 8 characters, add one @ at the end of the address, whereas for an address with 7 characters, two @ symbols must be added. In special addressing modes, this symbol is interpreted as an *ignore* instruction: see additional utilization guidelines in Table A-1.

  # The wildcard symbol **?**. It is used to indicate that any character (except @) is acceptable (this is the equivalent of a **don't mind** instruction). See Table A-2 for utilization guidelines in the special addressing modes.

> **NOTE**
>
> In the following sections, "A," "B," "C" or "D" indicates any alphanumeric character other than "@" or "?".

Micom-Z has the capacity to store and use 100 addresses of up to 15 characters each. Micom-Z will reject addresses longer than 15 characters, and will notify you with an UFA WRONG message.

A-6.2 Address and Call Types

ALE stations, including the Micom-Z, have the capability and flexibility to link with one or many prearranged or as-needed single or multiple stations. There are three general addressing methods:

- Individual station addressing
- Multiple stations addressing, for example, net and group
- Special addressing modes, for example, AllCall, AnyCall, etc.

The following sections explain the addressing modes and how they can be used for various purposes.

A-6.2.1   Individual Station Address

The individual station address may contain 1, 2, 3, 4, or 5 words. To enable using addresses that are not an integer multiple of 3 characters (for example, an address consisting of 1, 2, 7, 8, 10, …, etc. characters), stuffing can be used: with stuffing, the last address word includes one or two stuffing symbols in the last position(s) (see the "stuff-1" and "stuff-2" patterns in Table A-1).

The wildcard symbol cannot be included in an individual station address, nor in a call request to an individual station.

Table A-1. Use of "@" Stuffing Symbol

Pattern	Interpretation
A B C	"Standard" 3-character address word, shown here for reference. Only the station with this address stops scanning and responds
A B @	"Stuff-1" reduced address field, used to add characters "A, B" at the end of the address
A @ @	"Stuff-2" reduced address field, used to add character "A" at the end of the address
@ ? @	"AllCall" global address (see also Table A-2): all the stations stop and listen (unless this function is inhibited)
@ A @	"Selective AllCall" global address: each station with the same last character "A" stop scanning and listen (unless this function is inhibited
@ @ ?	"AnyCall" global address (see also Table A-2): all the stations stop scanning and respond in randomly selected timeslots (unless this function is inhibited)
@ @ A @ B @ (option)	"Selective AnyCall" address: each station with same last character(s) "A" (or "B") stops scanning and responds in a randomly selected timeslot (unless this function is inhibited), using its own address
@ A B @ C D (option)	"Double selective AnyCall" address: each station with same last characters "AB" (or "CD") stops scanning and responds in a randomly selected timeslot (unless this function is inhibited), using its own address
@ @ @	"Null" address; all the stations ignore this address. The null address intended for use in test and maintenance, or to create an extra "buffer" timeslot

A-6.2.2   Net Addresses

The purpose of a net call is to rapidly and efficiently establish contact with multiple prearranged (net) stations. This is achieved by the use of a single net address.

The net address is actually an additional address assigned in common to all the stations that are members of a specific net. Its address structure is identical to that used for individual station addresses (basic or extended, with or without stuffing, as necessary).

When defining a net, each member station is automatically assigned a timeslot: by having each station answer a call request in a different timeslot, collisions are avoided.

A-6.2.3   Group Addresses

The purpose of a group call is to rapidly and efficiently establish contact with multiple non-prearranged (group) stations.

To make a group call, a calling ALE station uses a sequence of the actual individual station addresses of the called stations.

A-6.2.4   Special Addressing Modes – Use of Wildcards

A "wildcard" is a special character, "?", that a calling station can use to address multiple stations with a single call address. The following rules apply:

- The total length of a calling address that includes wildcard(s) must be equal to that of the called station addresses.

- A receiving station will accept a wildcard character as a substitute for the alphanumeric character in its own address that occupies the same position. This means that the wildcard character is a substitute for any of 36 characters and digits (A to Z, 0 to 9) in the Basic 38 character subset.

- Multiple wildcard characters can be used in different positions of the same address (basic or extended).

See Table A-2 for examples of patterns using the "**?**" wildcard symbol.

Table A-2. Use of "?" Wildcard Symbol

Pattern	Interpretation
A B C	"Standard" 3-character address, shown here for reference. All the characters in this word must be evaluated
A B ? **A ? C** **? B C**	"Standard" "wild-1" address word. Indicates that only the positions occupied by other characters ("A" and "B") need be evaluated: the position occupied by the "**?**" symbol can be ignored (**ignored** in this context means that any valid character is accepted)
A ? ? **? B ?** **? ? C**	"Standard" "wild-2" address word. Indicates that only the position occupied by an character ("A", "B" or "C") need be evaluated: the positions occupied by the "**?**" symbols can be ignored
? ? ?	"Standard" "wild-3" address word. Indicates that all of the three positions in this word can be ignored
A B @	"Stuff-1" reduced address field, shown here for reference. Only the first two characters in this word must be evaluated
A ? @ **? B @**	"Wild-1" "stuff-1" address. Only the character "A" or "B" in this word must be evaluated
? ? @	"Wild-2" "stuff-2" address. Only the character "A" or "B" in this word must be evaluated
A @ @	"Stuff-2" reduced address field, shown here for reference. Only the first character in this word must be evaluated
? @ @	"Wild-1" "stuff-2" address. Only the first character in this word must be evaluated, and is ignored
@ A B	"Double selective AnyCall" address word, shown here for reference: only the last two characters in this word must be evaluated
@ A ?	"Double selective AnyCall" "wild-1" address word: only the middle character "A" in this word must be evaluated
@ ? B	Not permitted. Use "selective AnyCall"
@ ? ?	Not permitted. Use "global AnyCall"
@ @ A	"Selective AnyCall": see Table A-1
@ @ ?	"Global AnyCall": see Table A-1
@ A ?	"Selective AllCall": see Table A-1
@ ? @	"Global AllCall": see Table A-1
? @ ?	"Inlink address": see page A-7

A-6.2.5   AllCall Addresses

An AllCall is a general broadcast that does not request responses and does not designate any specific addressee: a call with this address is accepted by any station, which then stops scanning and listens to the call. The most common use of AllCalls is in cases of distress: when in distress, it is more likely to want to make any available connection in the minimum period of time than to issue a call to an individual or to a select group.

The global AllCall address is **@?@**. As a variation, the calling station can also use selective AllCall. Basically, the selective AllCall address is identical in function to the global AllCall, except that it specifies the last single character of the addresses of the desired subgroup of receiving stations (that is, it replaces the **?** with an alphanumeric – see more details in Table A-1). Any station whose address matches the pattern stops scanning and listens.

The operator can always initiate an outgoing (transmit) AllCall, but the Micom-Z can be programmed to accept or ignore incoming (receive) AllCalls.

When a radio issues an AllCall, all the stations that are capable of receiving calls receive the AllCall.

In the scan mode, if the Micom-Z station is set to receive AllCalls, it stops scanning when an AllCall is received. If an AllCall channel has been defined, then outgoing AllCalls are performed on that channel. If no AllCall channel has been defined, the call is performed on the first scanned channel of the net. In the Channel mode, outgoing AllCalls are performed on the currently active channel.

> **NOTE**
>
> You can transmit an AllCall by pressing the ESC button for a few seconds.

A-6.2.6   AnyCalls

An AnyCall is a general broadcast similar to AllCall with the difference that it requests responses, without designating any specific addressee(s). Therefore, an ALE station may use the AnyCall to generate responses from essentially unspecified stations, and thus it can identify new stations and connectivities.

The global AnyCall address is **@@?**. As a variation, the calling station can also use selective AnyCall, which is identical in function to the global AnyCall, except that it specifies the last single character of the addresses of the desired subset of receiving stations (that is, it replaces the **?** with an alphanumeric – see more details in Table A-1). If even narrower acceptance and response criteria are required, double selective AnyCall may be used: this is identical to selective AnyCall, except that its special address (**@AB**) specifies the last two characters that the desired subset of receiving stations.

The operator can always initiate an outgoing (transmit) AnyCall, but the Micom-Z can be programmed to accept or ignore incoming (receive) AnyCalls.

Any station accepting an AnyCall stops scanning, and then initiates a response in a randomly selected timeslot.

A-6.2.7   Self Addresses

Stations can also use their own self addresses when making calls. This may be useful for self-test and maintenance purposes, etc.

The self address may be used only in specifically-addressed calls including a group call, but not in an AllCall or AnyCall.

A-6.2.8   Null Address

The null address is a special type of address that is not directed to, accepted by, or responded to by any station.

This address is intended for test and maintenance purposes, and to provide buffer time: for example, if a null address appears in a group call, no station will respond in the associated timeslot.

A-6.2.9   Inlink Address

The inlink address, **?@?**, is used to instruct all the stations participating in an already established link to accept and act upon the information sent with the inlink address. For example, any station can use the inlink address to send an AMD message that all the linked stations would present to their user.

The inlink address is recognized only after a link is established between two or more stations.

A-7.   MESSAGES

The ALE enables you to create, send or receive alphanumeric messages ("paging" messages) in accordance with the AMD (Automatic Display Message) definition in Federal Standard FS-1045.

The messages are displayed on the receiving station LCD display, and can be up to 90 characters long. Messages can be added to any type of call, whether individual, group, net, AllCall, AnyCall, bidirectional handshake, etc. You can create up to 12 messages, and can edit or erase any of the messages at any time.

A-8.   USING THE CALLER STACK

The *caller stack* is an internal memory that stores a list of unanswered calls. Each stack entry contains the self address of the calling station and a message (AMD) if any was sent. You can view the list, return a call and view any message sent with any call.

The stack can contain up to 10 calls. The radio records an address in the stack only once even if the same caller makes repeated unanswered calls. However, if the same caller sent calls with different messages, all such calls will be saved in the stack. Each stack entry is referred to as a Page.

The appearance of the word STAK next to one of the function buttons of the LCD display indicates that there is at least one call in the stack. The STAK indicator is automatically turned off when all pages in the stack have been erased.

The stack is arranged in FIFO order, that is, the first address that enters the stack is also the first that you see on the display. If the stack is full and a new call is received, the oldest call in the stack is automatically erased.

For convenience, addresses appearing in the stack can be easily added to the ALE address directory.

A-9.   QUICK CALL

During a call, the radio saves the latest destination information as the **quick call** information. When the user presses the PTT of the microphone or handset twice in rapid sequence, the radio automatically directs the call to that address.

In the ALE mode, channel information is also retained and used for quick calls.

APPENDIX B

CONNECTOR DATA

B-1.   MICOM-Z TRANSCEIVER CONNECTORS

B-1.1   Microphone Connector

The microphone connector is located on the radio front panel. Table B-1 lists the functions of the microphone connector pins.

Table B-1. Microphone Connector, Pin Functions

Pin	Designation	Description
1	SWA+	Power output to the microphone
2	RXD	Serial communication line (input)
3	TXD	Serial communication line (output)
4	GND	Ground line
5	MIC AUDIO	Input audio signals generated by the microphone (600 Ω impedance; 300 mV tone is required for full output power).
6	PTT MIC	Activates transmission by short to ground.
7	MONITOR	Mutes the speaker before transmission is enabled (short momentary to ground to open speaker).
8	AUDIO OUT	Receive audio output to earphone (600 Ω, 300 mVRMS)

B-1.2   Antenna Connector

The N type antenna connector is located on the rear panel of the transceiver. In the transmit mode, it is used to feed the antenna with the transmit signal; in the receive mode, it is used to connect the received signal from the antenna to the radio.

B-1.3   ACCESSORY Connector

The ACCESSORY connector is a 44-pin D-type male connector located on the radio rear panel. It is intended for use with external accessories such as modems, PCs, etc., or for connection to the cooling tray (para. B-2.4). Table B-2 lists the pin functions of the ACCESSORY connector.

Table B-2. ACCESSORY Connector, Pin Functions

Pin	Designation	Description
1	SPKR-	Differential output to external 8Ω, 5W speaker
2	STOP SCAN	Digital control input for stop scan function (optional function)
3	SPKR+	Differential output to external 8Ω, 5W speaker
4	EXT RX AUDIO+	Differential received audio output (0 dBm/600Ω; not controlled by volume)
5	EXT RX AUDIO-	
6	EXT TX AUDIO+	Differential transmit audio input (600Ω input impedance, 0 dBm is required for full power)
7	EXT TX AUDIO-	
8	PTT IN VOICE	Transmission command (short to ground) for voice signals

Table B-2. ACCESSORY Connector, Pin Functions (Cont'd)

Pin	Designation	Description
9	PTT IN DATA	Transmission command (short to ground) for data signals
10	PTT IN CW	Transmission command (short to ground) for CW (Morse) signals
11	SW A+	Primary DC voltage current limited output (max 1A)
12	DSI/KW CC	BDM – Data serial in/optional external amplifier channel change
13	KW ON/OFF	Optional external amplifier power on/off output
14	REV CLOSE LOOP	Close the radio ALC loop (input from optional external amplifier)
15	RXA	Receive input (point-to-point protocol to host/HLC)
16	TXA	Transmit output (point-to-point protocol to host/HLC)
17	EX RESET	External RESET input (for BDM)
18	GND	Ground
19	KW PTT	PTT output to optional external amplifier (active low)
20	EXT ALARM	External alarm output (open collector, pulled to ground when external alarm is activated)
21	VPP	Flash programming voltage, input to BDM
22	DSC/KW_ALC	BDM – Data serial clock/optional external amplifier ALC
23	SQ GATE	Squelch open/closed indication output
24	DSO/FAN_ON_OFF	BDM – Data serial out/Fan control
25	FREEZE/KW TUNE	BDM – Freeze/optional external RF power amplifier tune
26	GND	Ground
27	FWD CLOSE LOOP	ALC radio loop closure input (from optional external amplifier)
28	RXC	Receive input (point-to-point protocol to host/HLC)
29	TXB	RS-232 transmit output to "smart" external accessories
30	AMP REV	Maintain constant power at transceiver output (optional function)
31	RXD	Receive input (point-to-point protocol to host/HLC)
32	TX AUDIO OUT	Input to LORD baseband TX path from external device (for example, modem)
33	RXB	RS-232 protocol receive input to "smart" external accessories
34	RX AUDIO OUT	Input to LORD baseband RX path from external device (for example, modem)
35	RX AUDIO IN	Output from LORD baseband RX path to external device (for example, modem)
36	AMP FWD	Maintain constant power at transceiver output (from optional external amplifier)
37	VP PTT	PTT output (active low) (optional function)
38	TXD	Transmit output (point-to-point protocol to host/HLC)
39	TXC	Transmit output (point-to-point protocol to host/HLC)

Table B-2. ACCESSORY Connector, Pin Functions (Cont'd)

Pin	Designation	Description
40	TX AUDIO IN	Output from LORD baseband TX path to external device (for example, modem)
41	EXT RX AUDIO(2)+	Audio output from the optional ISB processor (secondary sideband)
42	EXT TX AUDIO(2)-	
43	EXT RX DATA-	Baseband output (0 dBm, 600 Ω), unsquelched
44	EXT RX DATA+	

B-1.4 VDC IN Power Connector

The VDC IN power connector located on the rear panel of the radio is used to provide power to the radio. Table B-3 lists the functions of the VDC IN connector pins.

Table B-3. VDC IN Power Connector, Pin Functions

Pin	Designation	Description
1	Power	Positive input line
2	Ground	Return (negative) line

B-2. COOLING TRAY CONNECTORS

B-2.1 44-Pin/25-Pin Adapter Cable

The 44-pin/25-pin adapter cable is used to connect the 25-pin TO RADIO connector of the cooling tray to the 44-pin ACCESSORY connector of Micom-Z. Table B-4 lists the cable wiring diagram.

Table B-4. 44-Pin/25-Pin Adapter Cable Wiring Diagram

44-Pin Connector	25-Pin Connector	44-Pin Connector	25-Pin Connector
1	1	43	14
44	2	15	15
3	3	16	16
4	4	17	17
5	5	18	18
6	6	19	19
7	7	20	20
8	8	21	21
9	9	22	22
10	10	23	23
11	11	24	24
12	12	25	25
13	13		

B-2.2 ACCESSORY Connector

The ACCESSORY connector is a 25-pin D-type male connector. Table B-5 lists the pin functions of the ACCESSORY connector.

Table B-5. 25-Pin ACCESSORY Connector, Pin Functions

Pin	Designation	Description
1	SPKR-	Differential output to the external 8Ω, 5W speaker
2	EXT RX DATA+	Baseband output (0 dBm, 600Ω) to external device, unsquelched
3	SPKR+	Differential output to the external 8Ω, 5W speaker
4	EXT RX AUDIO+	Differential receive audio output (0 dBm, 600Ω; not affected by the volume control, but controlled by the squelch)
5	EXT RX AUDIO-	
6	EXT TX AUDIO+	Differential transmit input (600Ω input impedance; 0 dBm is required for full power)
7	EXT TX AUDIO-	
8	PTT IN VOICE	Transmission command (short to ground) for voice signals
9	PTT IN DATA	Transmission command (short to ground) for data signals
10	PTT IN CW	Transmission command (short to ground) for CW (Morse) signals
11	SW A+	Primary DC voltage current limited output (max. 1A)
12	DSI/KW CC	BDM − Data serial in/optional RF power amplifier channel change
13	KW ON/OFF	Optional RF power amplifier power on/off output
14	EXT RX DATA-	Baseband output (0 dBm, 600Ω) to external device, unsquelched
15	RXA	Receive input (point-to-point protocol to host/HLC)
16	TXA	Transmit output (point-to-point protocol to host/HLC)
17	EX RESET	External RESET input (for BDM)
18	GND	Ground
19	KW PTT OUT	PTT output to optional RF power amplifier (active low)
20	EXT ALARM	External alarm output (open collector, pulled to ground when external alarm is activated
21	VPP	Flash programming voltage, input to BDM
22	DSC/KW_ALC	BDM – Data serial clock/optional RF power amplifier ALC
23	SQ GATE	Squelch open/closed indication output
24	DSO/FAN ON/OFF	BDM – Data serial out/fan control
25	FREEZE/KW TUNE	BDM – Freeze/kW amplifier tune

B-2.3 Headphone Jack

The headphone jack is a standard 1/4" audio jack.

B-2.4 Telegraphy (Morse) Jack

The telegraphy (Morse) jack is a standard 5.3 mm audio jack.

APPENDIX C

OVER-THE-AIR REMOTE DISABLE FUNCTION

C-1. SCOPE

This Appendix covers the over-the-air remote disable capability of Micom-Z HF-SSB transceivers operating in the ALE or CCIR modes.

C-2. OVERVIEW

When a radio set is lost or stolen, it is necessary to prevent unauthorized use. Among other undesirable possibilities, unauthorized use may reveal sensitive information, for example, frequencies and call signs.

Micom-Z is designed to prevent unauthorized use: an authorized operator can transmit a command to another radio set to effectively disable it, by erasing its operational parameters. This returns the radio set to the unprogrammed state (after receiving the command, the radio continuously displays NOT PROG). Therefore, to return the radio to a usable state, it must be programmed by means of the Micom Radio Control Application (MRC).

The over-the-air remote disable command is transmitted as an AMD message directed to the target radio, using the paging function. Therefore, for this remote disable capability to be available, the target radio must operate in the ALE or CCIR mode.

The command string can be individually programmed on each radio set. The factory-default string is KILL BILL, and it can be changed using the MRC (version 2.21 or higher). Make sure to change this default with a reasonably secure string (the maximum string length is 30 characters).

C-3. OPERATING INSTRUCTIONS

To send an over-the-air remote disable command:

1. Obtain the parameters needed to establish ALE or CCIR communication with the target radio set (for example, address and ALE net parameters, or CCIR frequency table).

2. Prepare the AMD message with the prescribed command string (for example, KILL BILL), to be sent.

3. Call the target radio, attaching the AMD message using the PAGE function.

> **NOTE**
>
> When the target radio receives the call request, it automatically restarts and starts displaying NOT PROG. Therefore, do not expect a confirmation for the disable command.

C-4. RESTORING THE RADIO TO NORMAL OPERATION

To return a radio set to normal operation, it is necessary to connect it to a PC running the MRC and program it with the appropriate parameters.

For detailed instructions, refer to the Micom Radio Control Application User's Guide, Publication OM-E 2072-09602-10.

Intentionally Left Blank