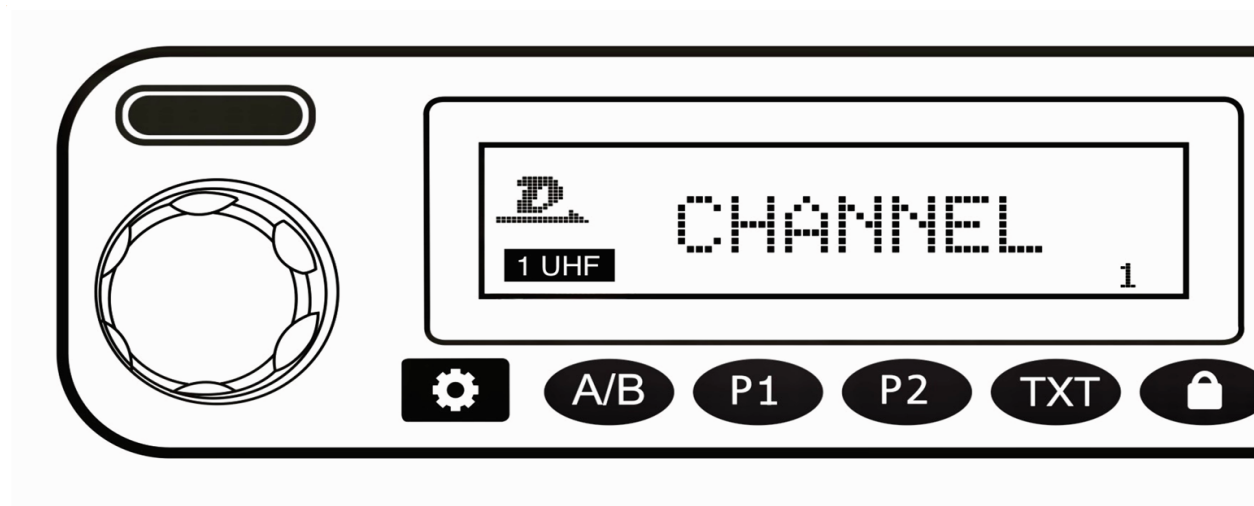




M2-U

User Manual

Safety

FCC Notice

This radio generates Radiofrequency RF electromagnetic energy during transmit mode. This radio is designed for and classified as “Occupational Use Only,” meaning it must be used only during the course of employment by individuals aware of the hazards, and the ways to minimize such hazards. This radio is NOT intended for use by the “General Population” in an uncontrolled environment. This radio has been tested and complies with the FCC RF exposure limits for “Occupational Use Only”. In addition, this radio complies with the following Standards and Guidelines with regard to RF energy and electromagnetic energy levels and evaluation of such levels for exposure to humans: FCC OET Bulletin 65 Edition 97-01 Supplement C, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields. American National Standards Institute (C95.1-1992), IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. American National Standards Institute (C95.3-1992), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields— RF and Microwave. The following accessories are authorized for use with this product. use of accessories other than those (listed in the instruction) specified may result in RF exposure levels exceeding the FCC requirements for wireless RF exposure.

To ensure that your exposure to RF electromagnetic energy is within the FCC allowable limits for occupational use, always adhere to the following guidelines:

- DO NOT operate the radio without a proper antenna attached, as this may damage the radio and may also cause you to exceed FCC RF exposure limits. A proper antenna is the antenna supplied with this radio by the manufacturer or antenna specifically authorized by the manufacturer for use with this radio.
- DO NOT transmit for more than 50% of total radio use time. Transmitting more than 50% of the time can cause FCC RF exposure compliance requirements to be exceeded. The radio is transmitting when the ‘TX indicator’ lights up red. You can cause the radio to transmit by pressing the PTT switch.
- This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 202 cm between the radiator & your body.

Electromagnetic Interference/Compatibility during transmission: Your radio generates RF energy that can possibly cause interference with other devices or systems. To avoid such interference, turn off the radio in areas where signs are posted to do so.

- DO NOT operate the transmitter in areas that are sensitive to electromagnetic radiation such as hospitals, aircraft, and blasting sites.

Occupational/Controlled Use: The radio transmitter is used in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

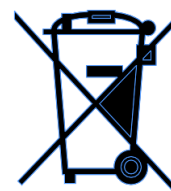
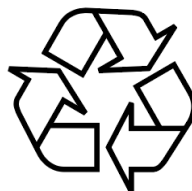
FCC Compliance Statement: This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference including received interference that may cause undesired operation. **Note 1:** The grantee is not responsible for any changes or modifications not expressly approved by the party responsible for compliance. Such modifications could void the user's authority to operate the equipment. Replacement of any transmitter component (crystal, semiconductor, etc.) not authorized by the FCC equipment authorization for this radio could violate FCC rules. **Note 2:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WARNING: MODIFICATION OF THIS DEVICE TO RECEIVE CELLULAR RADIOTELEPHONE SERVICE SIGNALS IS PROHIBITED UNDER FCC RULES AND FEDERAL LAW





To program your radio and to access advanced features, visit

rtsystemsinc.com

or contact them at 800-921-4834

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User Safety Information

- Do not attempt to configure your radio while driving.
- This radio is designed for a 12 Volts DC power supply. Do not use a 24 Volts battery to power this radio.
- Keep this radio away from devices that cause interference, such as TV's, Generators, etc.
- Do not expose the radio to long periods of direct sunlight. Do not expose the radio to heat sources.
- If an abnormal odor or smoke is detected coming from the radio, turn off the power immediately, disconnect the power source, and contact your dealer.
- Do not transmit at high power for extended periods as overheating may occur.

Package Includes

- (1) Radio Unit
- (1) Hand Mic with Magnetic Hand Mic Mount
- (1) Universal U-Bracket
- (1) DC Power cable with fuse holder
- (1) Rugged-Ready Headset / Intercom Adapter Cable
- (1) Accessory Hub
- (1) Hardware Pack
- (2) Spare Protection Fuses (15 Amp)
- (1) Warranty Card
- (1) Quick Start Guide
- (1) Sticker Sheet

Introduction

Features:

- Waterproof, IP67 sealed housing
- Superior digital audio clarity
- Ergonomic Hand Mic with Scosche® MagicMount Magnetic Mount
- Digital / Analog VHF band mobile transceiver
- Powerful Mitsubishi Transmit (TX) Amplifier
- Clear-Hear Superheterodyne receiver
- Programmable, Quick-Access controls
- RFI reflective aluminum chassis
- Large, Easy to read LED Display
- Easy access remote Accessory Hub
- Upgradeable Firmware
- 47 Watts

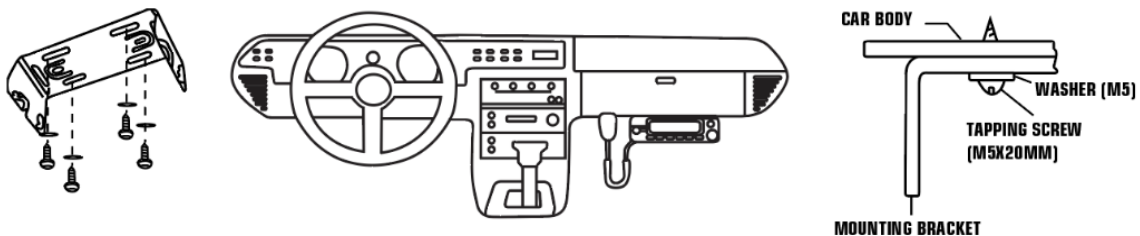
Installation

MOBILE INSTALLATION

Select a location that is safe in order to protect you and your passengers while the vehicle is in motion. Consider installing the radio in a location and position in which knees and legs will not strike it during sudden braking. Choose a well ventilated location that is shielded from direct sunlight and heat sources, but still easy to reach and access.

IMPORTANT NOTE: Extreme care should be taken if drilling into the dash or other areas of any vehicle to avoid damaging vehicle components.

1. Install the provided mounting bracket in the vehicle using the supplied self-tapping screws.
2. Position the radio, then insert and tighten the supplied Hex/Phillips screws already on the radio.
 - a. Determine the appropriate angle of the radio using the three screw hole positions on the side of the mounting bracket.
 - b. Double check that all screws are tightened to prevent vehicle vibration from loosening the bracket or radio.



Installation

DC Power Cable Connection

This radio is designed to operate on 12 volt systems. Never connect to a 24 volts system without reducing to 12 volts first. If the power supply is lower than 12 volts, the display may darken during transmissions, transmit power may decrease dramatically, and/or the radio may reboot. **NOTE:** Loose or poor connections may also cause similar issues.

1. Route The DC power cables supplied with the radio directly to the vehicle's battery terminals.
 - a. We suggest that you do not use the cigarette lighter socket as most do not provide enough power to transmit at high power.
 - b. The entire length of the cable must be routed so that it is isolated from heat, moisture, and the engine secondary (high voltage) ignition system, its components, or its cables.
2. Confirm the correct polarity of the connections, then attach the DC power cable to the battery terminals
 - a. Red connects to the positive (+) terminal
 - b. Black connects to the negative (-) terminal.

Warning: Connecting the power cables incorrectly will damage the radio.

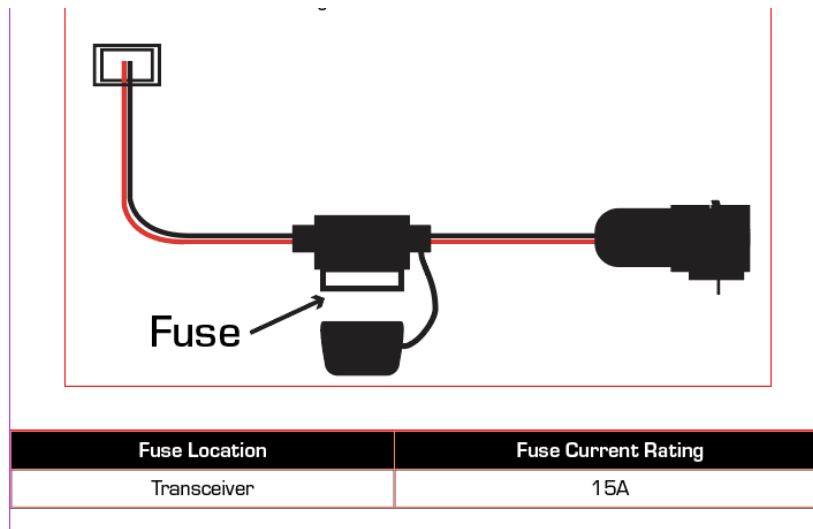
3. Connect the DC power cable to the radio's power supply plug. Press the connectors firmly together until the locking tabs click.

Attention: If you use the radio for a long period when the vehicle battery is not fully charged or when the engine is OFF, the battery may become discharged and will not have sufficient reserves to start the vehicle. Avoid using the radio in these conditions.

Installation

Replacing Fuses

If a fuse blows, determine the cause and correct the problem. After the problem is resolved, replace the fuse. If the newly installed fuse continues to blow, disconnect the power cable and contact **Rugged Radios** at **805-541-1696** and ask for the **Tech Department** for further assistance. Only use fuses of the specified type and rating that are suitable for use, otherwise the radio will be damaged.



Accessory Connections

4-PIN CONNECTOR

- Connect the Accessory Hub that comes with your radio.
- Accessory Hub is used for external speakers and easy access for plugging in and programming the radio.



Use the External Speaker Connection on the back of the radio to connect your external speaker device.

- If you plan to use an external speaker, choose a speaker with an impedance of 8 ohms.
- The external speaker jack accepts a 3.5mm mono (2-conductor) plug.



Antenna & Cable

Radio Antenna is an additional purchase. Please visit our website www.ruggedradios.com for a list of compatible antennas.

Radio performance relies greatly on the antenna and antenna cable!

Before operating, install an efficient, well-tuned antenna and a high-quality antenna and cable. Failure to do so will reduce transmit and receive range, radio call clarity, and can damage the radio.

NOTES:

- This radio must be used with a 50Ω impedance antenna and antenna cable.
- Transmitting without an antenna may damage the radio.

Installing the Antenna

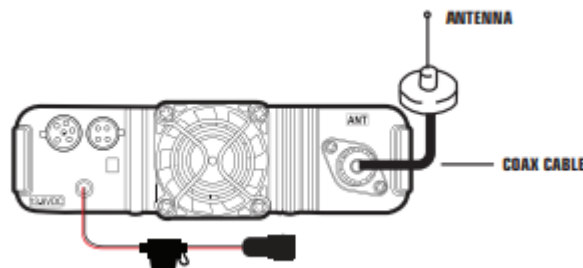
For vehicle-mounting, the best place for an antenna is the center of a metal roof.

IMPORTANT NOTE: If your specific vehicle configuration, accessories, or intended use do not allow ideal antenna mounting, the radio range and quality may decrease.

Use the following guidelines to install the antenna:

NOTE: Antenna locations will significantly affect radio's performance.

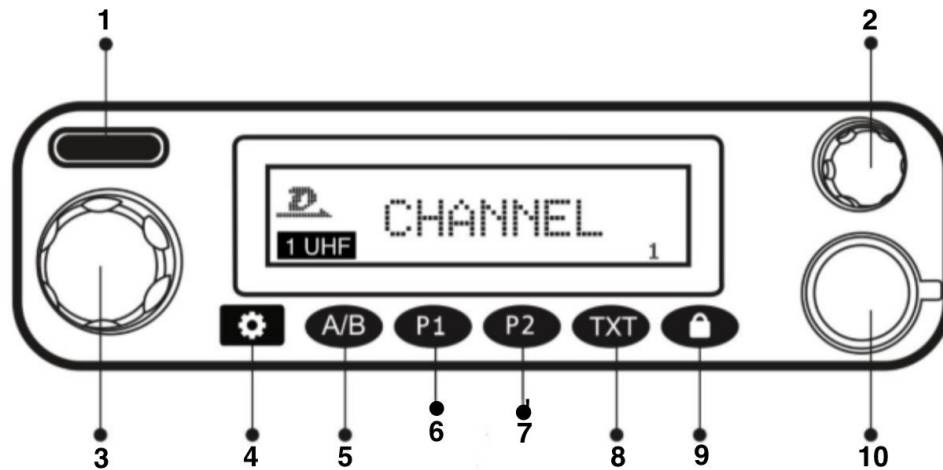
1. Mount the antenna as high on the vehicle as possible. The higher the better.
2. If possible, mount the antenna in the center of a metal roof. This is the ideal placement for an antenna.
3. Ensure the mounting location is clean and dry before installing the antenna.
4. Route the antenna cable through an accessory entry point, such as a door or trunk opening.
5. When routing the antenna cable inside the vehicle, keep the cable away from noise sources such as the ignition system, gauges, pinch points etc.
6. Exercise care to prevent cable damage. Make use of existing gaskets grommets and weather stripping to protect the cable along its route.



IMPORTANT: Do not coil excess cabling. This will drastically reduce radio performance

Getting Acquainted

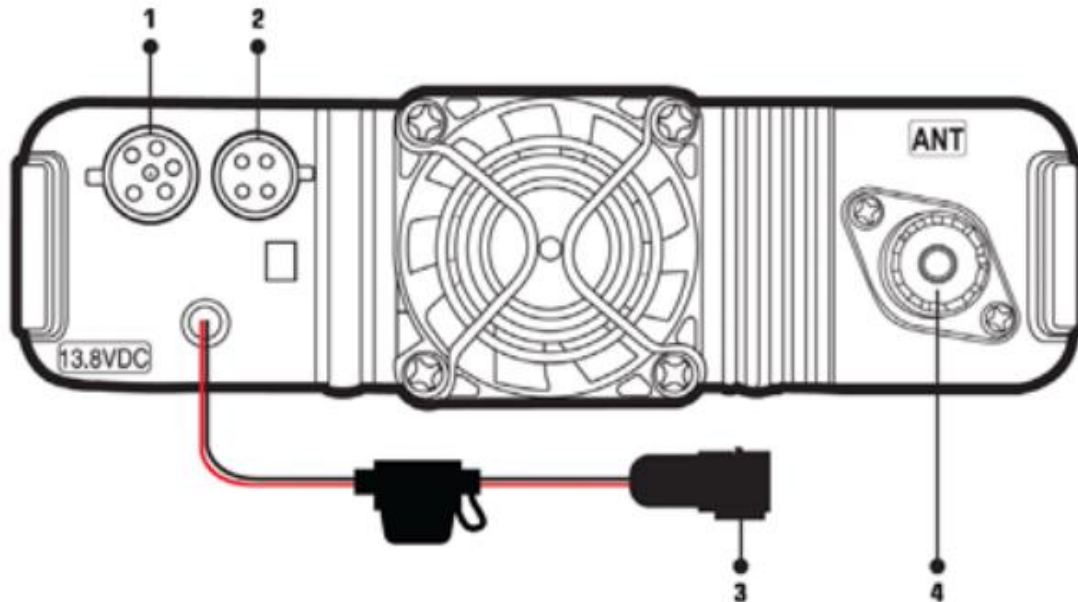
Front Panel Operation



No.	Key	Function	Quick-Press	Long-Press
1.	Indicator Light	Illuminates red while transmitting	N/A	N/A
2.	Volume Knob	Powers the radio on/off, adjusts volume	N/A	N/A
3.	Channel Knob	Changes channels/Scrolls through menu	N/A	N/A
4.	Menu (⚙️ Gear Icon)	Enters the menu / Confirms the current selection	Menu/Confirm	N/A
5.	A/B	Switches between monitored channels in "Dual Monitor Mode"	A/B	Programmable
6.	P1	Quick access to P1 channel preset	Preset UHF 1	Programmable
7.	P2	Quick access to P2 channel preset	Preset UHF 2	Programmable
8.	TXT	While on digital channel will open text mailbox	Text Mailbox	Programmable
9.	LOCK Icon [🔒]	Locks the radio controls/ Exit or back in menu	Back in Menu/Exit	Lock/Unlock
10.	Microphone Port	6-Pin connection port for hand mic	N/A	N/A

Getting Acquainted

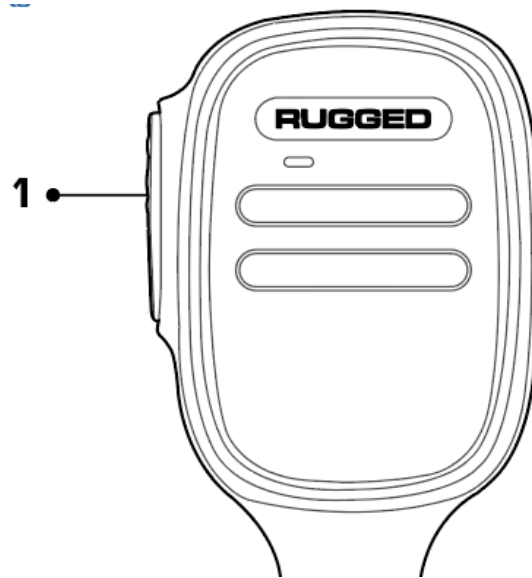
Rear Panel Operation



No.	Port	Function
1.	Intercom	Rugged Ready connector used for headsets, intercoms, etc. Requires adapter cable PN CJ-M1 (included).
2.	External Speaker/ Programming	Port to attach cable PN ACCS-HUB for external speaker and programming cable.
3.	Power Plug	Connects to the radio power cable. Ensure a direct connection to the battery
4.	Antenna	Port to attach coax cable from antenna

Getting Acquainted

Hand Mic Operation



No.	Key	Function
1.	PTT Button	To transmit, hold the microphone approximately 2 inches from mouth, press the PTT key [1], and speak into the microphone. Release PTT key [1] when transmit is complete.

Getting Acquainted

Menu

Menu Item	Operation
Scan	Scans for signals on every channel in the scan list.
Zone Selection	Select your active zone
Messages (Only shown when selected Zone is Digital)	Send, Receive and manage text messaging
Call Log (Only shown when selected Zone is Digital)	Access and manage the call record
Utilities	Access Radio Settings and Radio Info

Getting Acquainted

Messages Expanded

Menu Item	Function	Operation
Inbox	All received text messages will be stored here.	When in the Messages menu, use the Channel Knob to scroll to Inbox and press [□] to accept.
Quick Text	Choose from preprogrammed text messages to send or send your own programmed quick texts.	When in the Messages menu: • Use the Channel Knob to scroll to Quick Text and press [□] to accept. • Use the Channel Knob to scroll to the desired preprogrammed text messages and press [□] to accept. • Review the selected text message then press [□] to accept. • Use the Channel Knob to select Send, Save or Clear then press [□] to accept.
Sent Items	All sent text messages will be stored here	When in the Messages menu, use the Channel Knob to scroll to Sent Items and press [□] to accept.
Drafts	All text messages saved as Draft will be stored here	When in the Messages menu, use the Channel Knob to scroll to Drafts and press [□] to accept.

Getting Acquainted

Call Log Expanded

Menu Item	Function	Operation
Call Log Record	When receiving or transmitting in a Digital Zone this feature will keep a record of all transmissions from the radio and transmissions received by the radio.	From the Call Log menu: • Press [] to open the Directory. All radio transmissions will be stored here organized by day. • Use the Channel Knob to scroll to the desired day and press [] to enter • When in the Record use the Channel Knob to scroll to Play, Destination ID, Source ID, Date, Time, Tx/Rx or Record Time and press [] to enter.

Getting Acquainted

Settings Expanded

Menu Item	Operation
Tone/Alerts consist of: All Tones Talk Permit Keypad Tones	 Enable or disable all radio tones and prompts Enable or disable the "Talk Permit" tone. The transmitting, radio emits a tone indicating it is transmitting to alert when to begin speaking. Enable or disable tones while using the number keypads.
Squelch	Increases or decreases the sensitivity of the receiver. Higher Squelch settings will block more interference but also limit range. NOTE: Rugged Radios suggests using the factory-set Squelch level.
Backlight	Dims the display after 5, 10, 20, or 30 seconds of inactivity.
Dimmer Level	Increases or decreases the display brightness.
Monitor	Will temporarily change the squelch to open allowing you to hear very weak signals.

Dual Monitor	Allows you to switch between monitoring 1 or 2 Channels.
Menu Timeout	Sets the length of time before the menu times out and returns to default display.
Autolock	Enables automatic keypad locking feature after the selected duration. Keypad can be unlocked by long pressing the ☐ button.

Advanced Menu

Menu Item	Operation
B Chan Alert	When monitoring two channels (dual monitor), B Channel Alert emits a tone when radio calls are received on "B" or "Sub" Channel.
TX Mic Level	Adjusts the transmit volume of the microphone.
VOX	Turns Vox On or Off. Allows users to transmit their voice automatically without needing to press the push to talk (PTT) button.
VOX Sensitivity	Increases or decreases the volume threshold in which your voice automatically activates a radio transmission *Adjusting this level will make it easier or harder to trigger a VOX transmission.
Record	When is on, each digital call will be recorded and stored on the radio
Clock	Set the date and time
Radio Info	Display firmware version and the date it was updated.

Bluetooth	
BT On/Off	Turns BT On/Off
BT Pairing	Connect headsets or BT speakers
Paired Devices	Shows BT devices that are connected
BT PTT Pair	Connect a BT PTT button
BT Hold Time	BT power saving mode. Increase/decrease how long the hold time is.
BT Mic Gain	Increase/decrease the TX volume of the microphone
BT Spk Gain	Increase/decrease how loud the incoming audio is.

Radio Speaker	Turn On/Off radio built in speaker
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Specifications

General

Frequency Range	UHF: 400-480 MHz
Channel Capacity	1000
PLL Channel Spacing	6.25/12.5kHz
Voltage Rating	13.8V DC
Operating Temperature	-30°C ~ +60°C
Storage Temperature	-30°C ~ +85°C
Dimensions	143x50x175mm
Compatible with American Military Standard	(MIL-STD-810C/D/E)

Specifications

Receiver

Frequency stability (-20C +60C, +25°C)	+/-1.0ppm
Digital Sensibility	0.3uV/-117.4dBm(BER 5%) 0.7uV/-110dBm(BER 1%)
Analogue Sensibility	0.35uV/-116dBm(20dB SINAD) 0.22uV/-120dBm(20dB SINAD)
Rated Audio	5W
Adjacent Channel Selectivity	TIA603C:60 dB@ 12.5kHz ETSI: 60 dB@ 12.5kHz
Intermodulation	TIA603C:65 dB ETSI: 65 dB
CO-channel Rejection	12 dB@ 12.5kHz
Spurious Rejection	TIA603C:70 dB ETSI: 70 dB
Audio distortion @ rated audio	≤ 3%

FM Hum and Noise	-40dB @12.5kHz
Audio response	+1dB--3dB
Spurious emission	-57dBm@< 1 GHz -47dBm@>1GHz
Block	84dB

Specifications

Transmitter

FM Hum and Noise	-40dB @12.5kHz
Modulation limited	+/-2.5kHz @ 12.5kHz
Conducted/radiated emission	-36 dBm < 1 GHz -30 dBm >1Ghz < 4GHz
Adjacent channel power	-60 dB @12.5kHz
Audio Response	+1dB--3dB
Audio Distortion	3%
FM modulation	12.5kHz: 11KOF3E
4FSK digital modulation	12.5kHz only data:7K60FXD 12.5kHz data and audio:7K60FXE
Digital Protocol	ETSI TS 102361-1, -2, -3
Digital vocoder type	AMBE++
Digital agreement	DMR

Troubleshooting

Problem	Possible Cause and Potential Solutions
(a) Power is on, nothing appears on Display.	+ and - polarities of power connection are reversed. Connect red lead to + positive terminal and black lead to - negative terminal of DC power supply.
(b) Fuse is blown.	Check and solve the problem resulting in a blown fuse. Replace the blown fuse with a new fuse.
(c) No sound comes from speaker	• Squelch is muted. Decrease squelch level. • Tone or CTCSS/DCS squelch is active. • Turn CTCSS or DCS squelch off. • Increase volume on radio
(d) Key and Dial do not function.	Key-lock function is activated. Cancel Key-lock function. Long press lock (icon) button to unlock

For additional help call our Tech Department at (888) 541-7223. We are here to help!

HOURS OF OPERATION: Monday - Friday: 8:00 AM - 5:00 PM PST

Notes

[illegible]

