



Echo Distance Measurement Radio User's Guide



NOTE: The Echo Distance Measurement Radio (DMR) unit has been tested to comply with FCC Part 15, Subpart C for wideband pulse emitter devices. Changes or modifications to the radiating elements of Echo DMR not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: The Echo DMR is certified under the FCC Part 15.250 rule which restricts certain applications and use. Operation on board an aircraft or a satellite is prohibited. The Echo DMR may not be employed for the operation of toys. The use of Echo DMR on a fixed outdoor infrastructure is prohibited. A fixed infrastructure includes antennas mounted on outdoor structures, e.g., antennas mounted on the outside of a building or on a telephone pole.

NOTE: The Echo DMR is approved as a modular transmitter under FCC Part 15.212. Therefore any equipment that installs the module must include an external label stating that unit "Contains FCC ID: QCJECHO108".

NOTE: The Echo DMR unit 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.



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1 INTRODUCTION

The Multispectral Solutions, Inc. Echo Distance Measurement Radio (DMR) is designed to range between multiple Echo DMR units using Wideband short pulse technology. A minimum of two Echo units are required for each system.

2 HARDWARE CONNECTIONS

Each Echo radio module has the following external connections:

- Antenna Jack – Reverse polarity SMA jack
- Power Connector – Input voltage range is 3-5 Vdc.
- RS232 Connector – Baud rate of 115200 bps
- USB Connector – Baud rate of 921600 bps. Powers unit over USB in addition to communication.

Figure 1: Echo DMR Module Connections Part 1

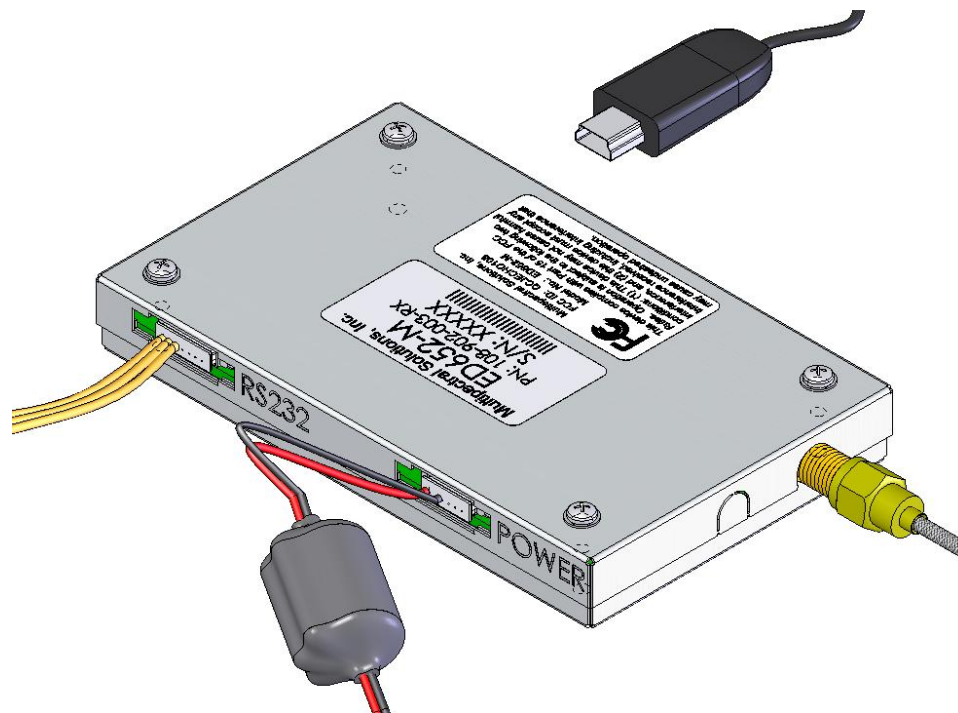
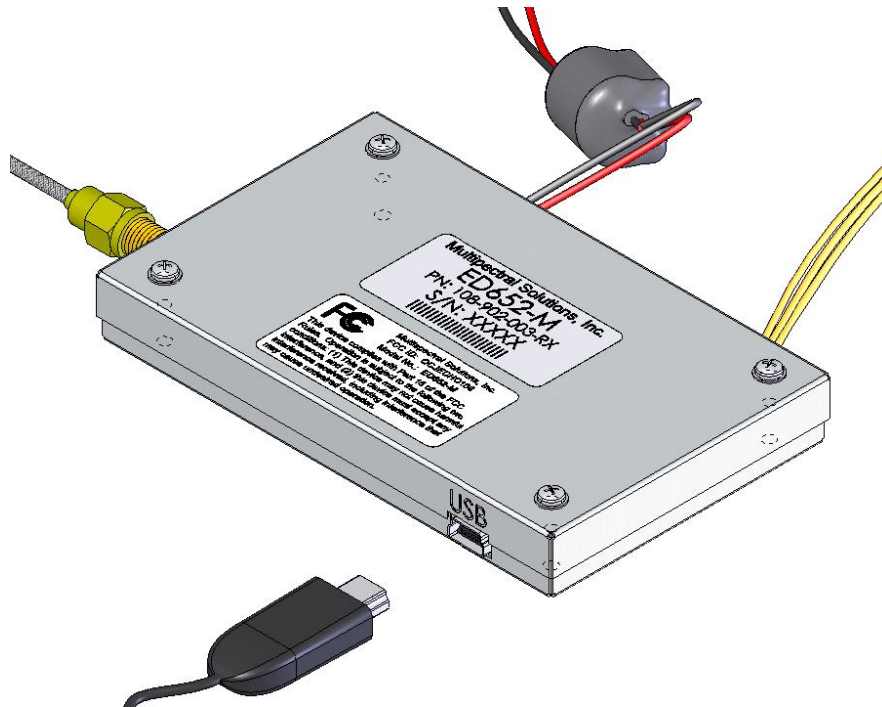


Figure 2: Echo MDR Module Connections Part 2

2.1 Antenna Jack

The antenna jack on the Echo DMR module is an SMA reverse polarity jack. The antenna jack on the antenna itself is an SMA reverse polarity jack as well.

The Echo radio module is FCC approved for only the supplied antenna and cable.

2.2 Power Connector

The mating connector housing is Molex 51021-0600 and the pins are Molex 50079-8000. The LED output listed in the table is used to indicate that power is applied to the unit. The power connector supplied with the module includes a ferrite choke so that the unit will meet unintended emission specifications of Part 15 subpart B regulations. The unit must use the provided power cable connector assembly to be FCC compliant under Part 15 subpart B if powered through this connection.



2.3 RS232 Connector

The mating connector housing is Molex 51021-0700 and the pins are Molex 50079-8000. The DB9 connections are listed for reference to connect the Echo unit to the serial port of a computer.

2.4 USB Connector

The USB jack on the Echo DMR module is a mini USB 5-pin type B jack. The Echo unit is fully powered when using the USB.



3 RS232 INTERFACE

Each Echo DMR is capable of communicating with external equipment via a serial connection. The external equipment is the master and the Echo DMR is the slave. In other words, the Echo radio unit will not send anything over the serial connection unless it is responding to a command received from the external equipment with the exception of at power-up.

3.1 Configuration

115200 bps, 8 data bits, 1 start bit, 1 stop bit, no parity, no flow control for RS232 port

921600 bps, 8 data bits, 1 start bit, 1 stop bit, no parity, no flow control for USB port