FREEWAVE

MM2-M13 Series

MM2-M13 & MM2-M13-LV 1.3 GHz OEM Radio

FreeWave Technologies' products are designed to meet the rigorous demands of military, government, and international users worldwide. This user-configurable 1.3 GHz product is available as an OEM board level radio. It is used in applications ranging from UAVs to UGVs, and more. FreeWave MM2-M13 Series share the same features as our other radios that assure accurate data transmission, such as 32-bit CRC error detection with automatic retransmission and more.

The FreeWave MM2-M13 Series of radios is designed to provide the performance, reliability, and quality that our customers have come to know and expect in our products. The MM2-M13 combines high performance with a small size making it ideal for applications where space is at a premium.

All radios are designed, manufactured, and tested in Boulder, CO.

Key Features

Long Range: 64 km (40 miles) with clear line of sight, ability to extend through Repeaters

Error free communication: 32-bit CRC with automatic retransmission

Industrial Grade Specifications: 100% tested for RF performance from -40°C to +75°C

Wide Input Voltage Range: +8 to +30 VDC standard models and +5 VDC low voltage models

Noise Immunity: Superior performance in noise congested environments

Secure: Using Frequency Hopping Spread Spectrum (FHSS) technology; available with 128-, 192-, and 256-bit AES encryption

Versatility: Repeater and simultaneous Endpoint and Repeater function in a single radio

Designed, Manufactured, and Tested in Boulder, CO

Made in USA

Transmitter

Frequency Range	1.350 to 1.390 GHz
Output Power	Up to 1 W
Range	Up to 64 km (40 miles), clear line of sight
Channel Spacing	230 kHz
RF Data Rate	115 or 153 kbps, user-selectable

Receiver

Sensitivity	-106 dBm @ BER 10^{-4} (115.2 kbps) -104 dBm @ BER 10^{-4} (153.6 kbps)
IF Selectivity	-20 dB at fc +/- 230 kHz
System Gain	136 dB

Data Transmission

Type	Frequency Hopping Spread Spectrum Options: TDMA, Super Epoch TDMA
Modulation	2 level GFSK
Link Throughput	115.2 kbps
Error Detection	32-bit CRC, retransmit on error
Hopping Channels	1 to 112 (out of 172)
Hopping Patterns	15 per band, 105 total
Data Encryption	AES 128-, 192-, or 256-bit encryption
Protocol	RS232 / RS485 or TTL

Interfaces

Interface Connector	Dual row 14-pin header, 2 mm pin spacing
Data Interface	Serial
RF Connector	MMCX or SSMC

Power Requirements

Operating Voltage	+5 VDC (MM2-M13-LV models only) +8 to +30 VDC (MM2-M13 models only)			
Current Consumption	**Voltage**	**Transmit**	**Receive**	**Idle**
	+5 VDC	1000 mA	120 mA	30 mA
	+12 VDC	500 mA	75 mA	20 mA
	+30 VDC	200 mA	40 mA	9 mA

General Information

Operating Temperature	-40°C to +75°C (-40°F to +167°F)
Humidity	0 to 95%, non-condensing
Dimensions	50.8 L x 50.8 W x 7.6 H (mm) 2.0 L x 2.0 W x 0.3 H (in)
Weight	21 g (0.46 lbs.)

Information to Order

Model Number	Description
MM2-M13-C	Board Level, RS232, MMCX
MM2-M13-LV-C	Board Level, RS232, MMCX
MM2-M13-T	Board Level, TTL, MMCX
MM2-M13-LV-T	Board Level, TTL, MMCX
MM2-M13-C-SR	Board Level, RS232, SSMC
MM2-M13-DEVKIT	2 MM2-M13-LV-T and accessories

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