FREEWAVE
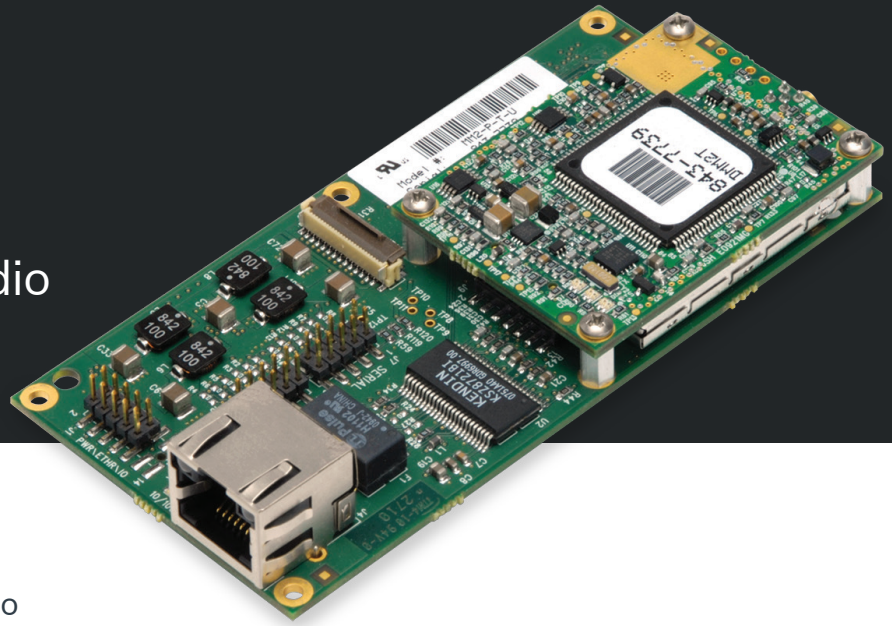
MM2 Series

900 MHz OEM Ethernet Radio

Combining the FreeWave MM2 OEM Radio with an interface module running an IP stack allows FreeWave to offer an MM2 OEM Ethernet Radio. The MM2 OEM Ethernet Radio has been designed to provide the performance, reliability, and quality that our customers have come to know and expect.

The MM2 OEM Ethernet Radio provides all of the same functionality that can be found in the FGR2 Ethernet Radio but in a smaller footprint with a wider operating temperature. The smaller footprint makes it attractive for embedded applications where space is at a premium.

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

Key Features

Versatility: Gateway, Endpoint, Repeater or simultaneous Endpoint and Repeater function in a single radio

Long Range: 97 km (60 miles) with clear line of sight with the ability to extend through Repeaters

Noise Immunity: Superior performance in noise congested environments

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

Error Free Communications: 32-bit CRC with automatic retransmissions

Industrial Grade: 100% tested for RF performance from -40°C to +85°C

Transmitter

Frequency Range	902 to 928 MHz
Output Power	Up to 1 W
Range	Up to 97 km (60 miles) with clear line of sight
Channel Spacing	230.4 kHz
RF Data Rate	115.2 or 153.6 kbps, user-selectable

Receiver

Sensitivity	-108 dBm @ 115.2 kbps for BER 10^{-4} -103 dBm @ 153.6 kbps for BER 10^{-4}
IF Selectivity	-40 dB at fc +/- 230 kHz
RF Selectivity	50 dB at 896 MHz, 935 MHz
Dynamic Range	+10 dBm 3RD order intercept point

Data Transmission

Type	Frequency Hopping Spread Spectrum
Modulation	2 level GFSK
Data Throughput	80 or 115.2 kbps, user selectable
Error Detection	32-bit CRC, retransmit on error
Data Encryption	128-bit AES encryption
Hopping Zones	16 zones, user-selectable
Hopping Bands	7, user-selectable
Hopping Channels	50 to 112, user-selectable
Hopping Patterns	15 per band, 105 total, user-selectable
Protocol	Ethernet: IEEE 802.3 CPIP, DHCP, ICMP, UDP, ARP multicast TFTP
Authentication	RADIUS

Power Requirements

Operating Voltage	+5 VDC (+/- 5%)			
Current Consumption	Voltage	Transmit	Receive	Idle
	+5 VDC	850 mA	205 mA	125 mA

Interfaces

Data Interface	1 straight 10-pin dual row header for power and Ethernet 2 serial straight 10-pin dual row headers 2 mm pin spacing RS232 or TTL Options: 1 RJ45 Ethernet connector
Diagnostics Interface	Ethernet
RF Connector	MMCX

General Information

Operating Temperature	-40°C to +85°C (-40°F to +185°F)
Humidity	0 to 95%, non-condensing
Dimensions	**MM2-P-T:** 101 L x 51 W 13 H (mm) 3.98 L x 2.00 W x 0.51 H (in) **MM2-P-T-U:** 101 L x 51 W 13 H (mm) 3.98 L x 2.00 W x 0.51 H (in) **MM2-P-T-SR001:** 101 L x 51 W x 16.8 H (mm) 3.98 L x 2.00 W x 0.66 H (in) **MM2-P-T-U-SR001:** 101 L x 51 W 13 H (mm) 3.98 L x 2.00 W x 0.51 H (in)
Weight	42 g (0.9 lbs)

Information to Order

Model Number	Description
MM2-P-T	Board level, Ethernet, RS232
MM2-P-T-SR007	Board level, Ethernet, TTL
MM2-P-T-U	Board level, Ethernet, RS232, UL Class 1 Div 2
MM2-P-T-U-SR001	Board level, Ethernet, RS232 with RJ45, UL Class I, Division 2
MM2-IP-DEVKIT	2 MM2-T radios, 2 IP Mini interface boards and accessories

FREEWAVE

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As of May-2019. Specifications are subject to change without notice.   LDS0037AA