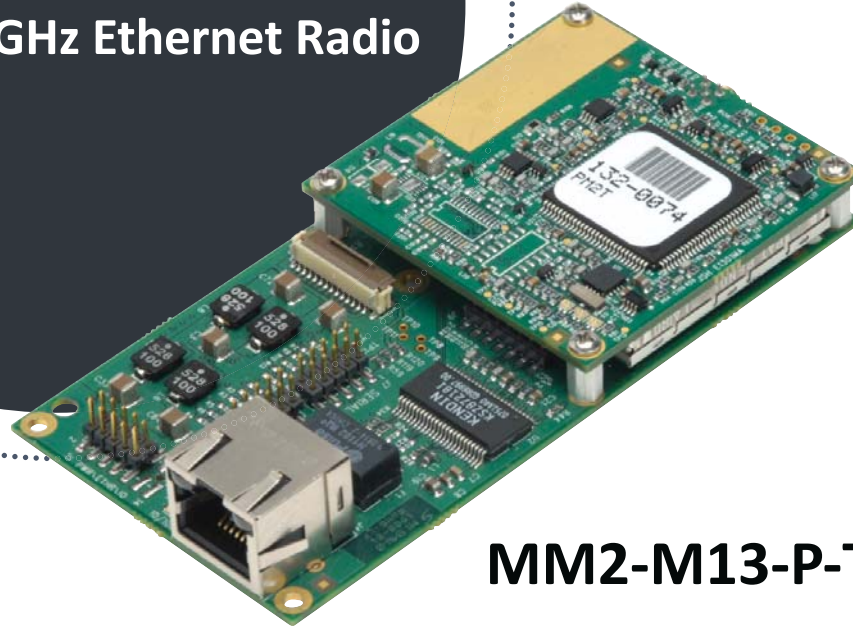


# M13 Series

## MM2-M13 1.3 GHz Ethernet Radio



### MM2-M13-P-T-SR001

#### KEY FEATURES

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

**Long Range:** 40 miles with clear line of sight with the ability to extend through Repeaters.

**Noise Immunity:** Superior performance in noise congested environments.

**Secure:** Frequency Hopping Spread Spectrum technology prevents detection and unauthorized access. 128 and 256-bit AES encryption standard.

**Error Free Communications:** 32-bit CRC with automatic retransmissions.

**Low Power Consumption:** Ideal for solar, battery, and DC applications.

**Industrial Grade:** Operating Temperature from -40°C to +75°C.

#### OVERVIEW

FreeWave Technologies' restricted products are designed to meet the rigorous demands of military and government 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 restricted products share the same features as our commercial radios that assure reliable data transmission, such as 32 bit CRC error detection with automatic retransmission and more.

The FreeWave MM2 Series of radios have been designed to provide the performance, reliability, and quality that our customers have come to know and expect in our products. The 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.

#### SOLUTIONS



DRONES & ROBOTICS



EARTH MONITORING



GOV & DEFENSE



IRRIGATION & PRECISION AGRICULTURE



ASSET TRACKING



OIL & GAS



WATER & WASTEWATER



SMART CITIES



UTILITIES

# TECHNICAL SPECIFICATIONS

## TRANSMITTER

|                        |   |
|------------------------|---|
| <b>Frequency Range</b> | 1.350 to 1.390 GHz                        |
| <b>Output Power</b>    | Up to 1 W                                 |
| <b>Range</b>           | Up to 64 km (40 mi.), clear line of sight |
| <b>Channel Spacing</b> | 230 kHz                                   |
| <b>RF Data Rate</b>    | 115.2 or 153.6 kbps, user-selectable      |

## RECEIVER

|                       |                                 |
|-----------------------|---------------------------------|
| <b>Sensitivity</b>    | -106 dBm @ BER 10 <sup>-4</sup> |
| <b>IF Selectivity</b> | -20 dB at fc +/- 230 kHz        |
| <b>System Gain</b>    | 136 dB                          |

## DATA TRANSMISSION

|                             |   |
|-----------------------------|---|
| <b>Type</b>                 | Frequency Hopping Spread Spectrum                               |
| <b>Modulation</b>           | 2 level GFSK  |
| <b>Data Throughput</b>      | 92 kbps   |
| <b>Error Detection</b>      | 32-bit CRC, retransmit on error                                 |
| <b>Data Encryption</b>      | AES 128- and 256-bit encryption user-selectable                 |
| <b>Hopping Zones</b>        | 16 zones, user-selectable                                       |
| <b>Hopping Bands</b>        | 7, user-selectable  |
| <b>Hopping Channels</b>     | 1 to 112 (out of 172), user-selectable                          |
| <b>Hopping Patterns</b>     | 15 per band, 105 total, user-selectable                         |
| <b>Protocol</b>             | Ethernet: IEEE 802.3  |
| <b>User Interface Rates</b> | Ethernet Rate    10/100 Mbps<br>Serial Rate        Up to 1 Mbps |

## POWER REQUIREMENTS

|                            |                 |                |             |
|----------------------------|-----------------|----------------|-------------|
| <b>Operating Voltage</b>   | +5 VDC (+/- 5%) |                |             |
| <b>Current Consumption</b> |                 |                |             |
| <b>Voltage</b>             | <b>Transmit</b> | <b>Receive</b> | <b>Idle</b> |
| +5 VDC                     | 1025 mA         | 250 mA         | 150 mA      |

## INTERFACES

|                       |  |
|-----------------------|--|
| <b>Data Interface</b> | 10-pin and Ethernet header, 2 10-pin serial RS232 headers for power, data, and diagnostics 2mm pin spacing<br>Options: 1 RJ45 Ethernet connector |
| <b>RF Connector</b>   | MMCX or SSMC   |

## GENERAL INFORMATION

|                              |   |
|------------------------------|---|
| <b>Operating Temperature</b> | -40°C to +75°C (-40°F to +167°F)                              |
| <b>Humidity</b>              | 0 to 95%, non-condensing                                      |
| <b>Dimensions</b>            | 102 L x 50.8 W x 7.6 H (mm)<br>4.00 L x 2.00 W x 0.30 H (in.) |
| <b>Weight</b>                | 44g (0.10 lbs.)   |

## INFORMATION TO ORDER

| <b>Model Number</b>      | <b>Description</b>                                   |
|--------------------------|--|
| <b>MM2-M13-P-SR</b>      | Board level, SSMC, Ethernet, RS232                   |
| <b>MM2-M13-P-SR-CCNB</b> | Board level, SSMC, Ethernet, RS232 Conformal Coated  |
| <b>MM2-M13-P-T</b>       | Board level, MMCX, Ethernet, TTL                     |
| <b>MM2-M13-P-T-SR001</b> | Board level with RJ45 connector, MMCX, Ethernet, TTL |
| <b>MM2-M13-P-DEVKIT</b>  | 2 MM2-M13-P-T radios with accessories                |

## CONTACT US

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