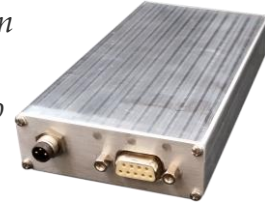


## RV-M21 Tech Series

**M21 UHF, VHF, 220MHz Band  
500mW-3W Radio Modem**

The RV-M21 Radio Modem is a rugged, modular data radio modem available in UHF, VHF, 915 ISM, and 220MHz band. With its field-configurable I/O interface, the M21 can be configured for RS-232, RS485, USB, GPIO or Audio interfaces in the lab or in the field as needed. It is over-the-air compatible with Raveon's 5-watt RV-M7 series of data radios.



## Product Overview

### Reconfigurable I/O

The front interface of the **Tech Series** M21 is fully field-reconfigurable. The following front panel interfaces are available and interchangeable:

- RS-232 [ S ] 5T835
- USB [ U ] 5T837
- RS-485 [ T ] 5T836-1
- RS-422 [ F ] 5T836-2
- GPIO [ G ] 5T833
- Analog [ A ] 5T838

### Embedded M8 Modem

The M21 embeds within the enclosure an M8 wireless modem. Any M8 series modem may be inserted into the M21 chassis, giving the M21 all the benefits and features available in the M8 series of modems. M\* series modems can communicate with Raveon's M7 series modems.

### Efficient Power Consumption

The RV-M21 can operate off DC input from 9-28V. Receiving, the M21 draws less than 1watt of power!

### Long-Range Operation

The M21 radio modem works over 10 miles point-to-point and many miles with omni-directional antennas. All RV-M21 modems support store-and-forward repeating for wide-area coverage.

### Fast Polling

The M21 transceiver has a 3mS PLL in it, making it one of the fastest telemetry radios available, especially well-suited for polled, DNP, and MODBUS applications.



### High Speed and High Efficiency

The RV-M21 operates with user-selectable over-the-air data rates of 1200 to 19200bps. Faster rates for higher efficiency or lower-speed for increased communication range. Its fast-switching radio enables it to send up to 50 transmissions per second.

### Secure Data

The data encryption feature may be enabled on any Tech Series data radio modem. When secure data is enabled, the M21 will encrypt transmissions using AES128 encryption. When properly managed, your wireless network use Tech Series radio modems will be secure and hacker-proof.

### GPS Option

The optional internal GPS allows the RV-M21 to be a powerful Automatic Vehicle Locating (AVL) system or Time Space Position Information (TSPi) reporting device.

### Arduino Option

The M21 Tech Series radios can be ordered with an optional internal Arduino processor for users to load their own custom firmware in.

### Real-time diagnostics and statistics

Channel performance, RSSI, RF power, packet counters, and radio configuration are easily accessed via the serial port or remotely over-the-air

### Flexible Addressing and Error Correction

The RV-M21 uses a 16 bit address with a 16 bit network mask, allowing for many devices to be co-located without receiving each other, as well as the creation of sophisticated network topologies.

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## General Specifications

Model Number:

**RV-M21ig-xxd-e**

( I = I/O option) ( g = G for GPS option)  
 ( x = frequency band code)  
 ( d = W 25kHz, N = 12.5kHz, Q=programmable)  
 ( e = A for Arduino option)

Size:

5.75" X 2.75" X .90"

Weight:

12 oz

Input Voltage:

12-28 VDC full-spec  
 9-28 VDC operational

Power Consumption:

Receiving data: <900mW (70mA @13V)  
 Transmitting data: <2000mW (400mA@5.0V)  
 Sleep (<100uA)

Frequency Bands:

UA 400-434 MHz (non-US/gov.)  
 UB 430-450 MHz (non-US/gov.)  
 UC 450-480 MHz  
 UD 470-512 MHz (non-US/gov.)  
 UJ 380-400 MHz (non-US/gov.)  
 VA 132-155 MHz (non-US/gov.)  
 VB 150-175 MHz  
 VC 216-220MHz

Serial Port Baud Rates (programmable)

1.2k, 2.4k, 4.8k, 9.6k, 19.2k, 38.4k, 57.6k, 115.2k

Over-the-air baud rates (programmable)

-N 1200, 2000, 2400, 4.8k, 5142, 8K,9.6k  
 -W 1200, 2000, 2400, 4.8k, 8k, 9.6k, 19.2k

Full Spec Operating Temperature range

-30°C to +60°C

TX-RX and RX-TX turn-around time

<3mS

RF I/O Connector

TNC (Female)

Addressing

Individual address: 65,536

Options:

Internal GPS, TDMA firmware -GX

## Security

Encryption Method..... AES128  
 Electronic Serial Number ..... Silicon ESN  
 Configuration Monitor ..... Serialized on update

## Transmitter Specifications

See the appropriate M8 Data Modem data sheet for specific details. Typical specifications are as follows:

RF Power Output VHF ..... 500mW – 5W (programmable)  
 Maximum Duty Cycle.....10% over 60 seconds  
 Frequency Deviation ± 2.2kHz (-N) ± 3.5kHz (-W)  
 RF Bandwidth (UHF).....20MHz no-tune  
 RF Bandwidth (VHF VA VB).....8MHz no-tune  
 Occupied bandwidth .....11 kHz (-N) 16kHz(-W)  
 TX Spurious outputs .....< -70dBc  
 Occupied Bandwidth .....Per FCC  
 Frequency Stability.....Better than ±1.5ppm

## Receiver Specifications

RX sensitivity (.1% BER)	9600bps < -108dBm
	4800bps < -114dBm
1200 & 2400baud	< -118dBm
RF No-tune bandwidth (UHF)	20MHz
RF No-tune bandwidth (VHF)	24MHz

## Interface Option Connections

### RS-232 Interface Port

Connector Type	DB-9 female
IO Voltage Levels	RS-232

### RS-485 Interface Port

Connector Type	Phoenix 6-pin
IO Voltage Levels	RS-485

### USB Interface Port

Connector Type	Mini B
----------------	--------

### Analog Interface Port

Connector Type	DB-15 female
----------------	--------------

### GPIO Interface Port

Connector Type	Phoenix 6-pin
----------------	---------------

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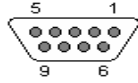
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## Mechanical Specifications

## Input/Output Connection Functions

### RS-232 Interface Port



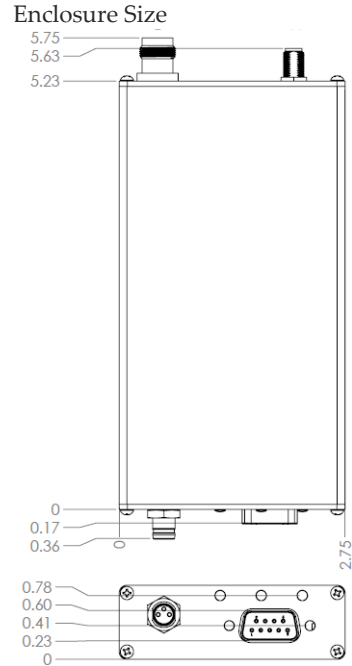
1	CD	Carrier detect
2	RxD	Receive data
3	TxD	Transmit data
4	DTR	Data terminal ready
5	GND	Ground connection
6	DSR	Data Set Ready
7	RTS	Request to send
8	CTS	Clear to send
9	Power	DC power (not Ring signal)

### Analog Interface Port

1	MIC	Analog Input
2	AUX	Analog Output
3	RSSI	Radio Signal Strength Out
4	IOC	General IO - C
5	DTR	Digital DTR out
6	VIN	DC Voltage Input
7	V3	3./3V Output
8	RXD	RX data Out, RS232
9	TXD	TX data In, RS232
10	CTS	CTS, 3V digital level
11	NC	No connect
12	PTT	Transmitter Enable Line
13	DCD	Data/Carrier Detect output
14	NC	No Connect
15	GND	Ground, chassis and power gnd.

### RS-485 Interface Port

1	RTS	RTS Input
2	RXDP	RX Data, +
3	RXDM	RX Data, -
4	TXDP	TX Data, +
5	TXDM	TX Data, -
6	GND	Ground, chassis and power gnd.



## Accessories

### DC Power Cable

Raveon part number	4C850-1
Connector Type	Sealed 3-pin 7mm "M8"
Length	2 meters

## Warranty

2 year warranty on SCADA/telemetry modems  
1 year warranty on GPS transponders

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**Tech Series Part Numbers**

Example: RV-M21SG-UCN RS232 I/O, 450-470MHz, narrow-band, with GPS transponder option.

	RV-M21	IO Code	GPS Code	-	BAND Code	Band Width	-	Other Options
	CODE							
RS232	S							
RS422	F							
RS485	T							
USB	U							
Analog	A							
GPIO	G							
No GPS								
GPS Option	G							
No Radio Board	X							
132-150MHz	VA							
150-174MHz	VB							
216-222MHz	VC							
400-434MHz	UA							
430-450MHz	UB							
450-480MHz	UC							
12.5kHz chan.	N							
25kHz chan.	W							
Arduino CPU	A							

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