RV – M 2 2 *Tech Series*

M22 Miniature
Radio Modem

The RV-M22 miniature Radio Modem is a rugged, modular data radio modem available in 902-928 MHz and 868 MHz license free bands, as well as the FCC USA license free MURS bands, VHF and UHF bands. With its field-configurable I/O interface, the M22 can be configured for RS-232, RS485, USB, FIO or GPIO in the lab or in the field as needed. Ideal for SCADA, GPS tracking, RTK, and radio telemetry.

Product Overview

Reconfigurable I/O

The front interface of the **Tech Series** M22 is fully Field reconfigurable. The following front panel interfaces are available and interchangeable:

- RS-232   [S]   5A835
- USB   [U]   5A837
- RS-485   [T]   5A836-1
- RS-422   [F]   5A836-2
- GPIO   [G]   5A833
- Analog   [A]   5A838
- FIO   [D]   5A832

Embedded Wireless Modem

The M22 includes within the enclosure an M 6 , M50, or Z50 wireless modem module. Connections and I/O are the same as Raveon's M21 series, except this M22 series is smaller in size as the radio modules are smaller.

Long-Range Operation

The license free ISM band version of the M22 radio modem utilize LoRa technology, and communicates over 10 miles. Narrow-band versions also cover large distances.

High Speed and High Efficiency

The RV-M22 operates in license free bands with selectable over-the air data rates. Faster rates for higher efficiency or lower-speed for increased communication range. The 915MHz ISM version is a LoRa technology long-range license free radio.

Secure Data

The data encryption feature may be enabled on any Tech Series data radio modem. When secure data is enabled, the M22 will encrypt transmissions using AES128 encryption. When properly managed, your wireless network will be secure and hacker-proof.

GPS Option

The optional internal GPS allows the RV-M22 to be a powerful Automatic Vehicle Locating (AVL) system or Time Space Position Information (TSPI) reporting device.

Myriad of I/O Panel Options

The front panel on the M21 have many I/0 options. They are held on by 4 screws.

Even the radio module inside the M22 enclosure can be replaced, upgraded, or changed to a different band while in the field.

FIO Interface

The Flexible IO (FIO) front panel interfaces have 8 digital IO options. Each pin can be configured as desired.

A: Digital TTL Inputs,
B: Digital TTL Outputs.

GPIO Interface

The General Purpose IO (GPIO) front panel interface has many IO options on 3 pins to remotely control or monitor things. Pins 3, 4, and 5 are configurable.

A: Digital TTL Inputs,
C: Open Drain MOSFET outputs,
D: DC Power switch outputs.
E: Analog Voltage Inputs.

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General Specifications

Model Number:

RV-M22AB-CC-D

   (A = I/O option) (B = G for GPS option)
   (CC = frequency band code – see module datasheet) (D
   = A for Arduino option)

Case Size:
   3.60" X 2.75" X .90"

Weight:
   5 oz

Input Voltage:
   10-28 VDC full-spec
   7-28 VDC operational

Frequency Bands:

VM	150-155MHz (5 MURS channels USA)	
VB	150-174MHz	
UC	450-470MHz	
EC	902-928 MHz (North/South America)	
ED	863–870 MHz (Europe/export)	

Options:
   Internal GPS, TDMA firmware   -GX
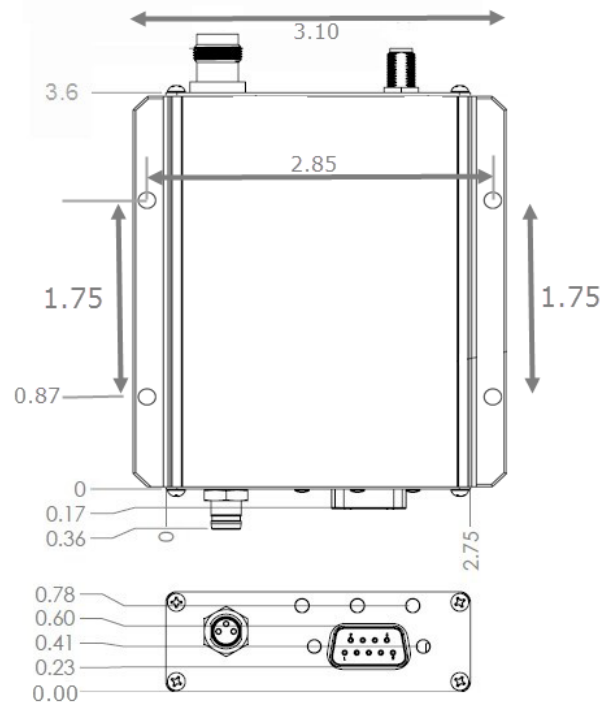
RF I/O Connector   BNC (Female)

GPS (3.3V active antenna)   SMA (Female)

RF Specifications

The RV-M22 Tech Series has various modem options, so refer to the data sheet of the internal modem module involved.

Security

   Encryption Method.................... *AES128*
   Electronic Serial Number .... Silicon ESN

Electrical Specifications

   See the appropriate Data sheet for specific details regarding the performance specifications.

Interface Option Connections

S RS-232 Interface Port

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

T RS-485 Interface Port

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

U USB Interface Port

Connector Type	Mini B

A Analog Interface Port

Connector Type	DB-15 female

G GPIO Interface Port

Connector Type	Phoenix 6-pin

D FIO Interface Port

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|	
Connector Type	DB-15 female

Mechanical Specifications

Enclosure Size:

Features

The RV-M22 radio modems have all the features of the modem modules incorporated into them. Common features include:

- Unique Radio ID codew.
- Simple data serial input/output. Simply works.
- GPS and TDMA transmission options.
- WMX messaging protocol compliant
- SCADA, Telemetry and MODBUS with GPIO
- Rugged water proof power connector.
- LEDs on front for status and power information
- Adjustable RF power output
- Over-the air inquiry messages to read status
- Internal voltage regulators for wide DC inputs

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Input/Output Connection Functions

S   RS-232 Interface Port
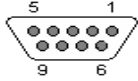
1	CD	Carrier detect
2	RxD	Receive data
3	TxD	Transmit data
4	DTR	Data terminal ready
5	GND	Ground connection
6	DSR	Data Set Ready
7	RTS	Request to send
8	CTS	Clear to send
9	Power	DC power (not Ring signal)

A   Analog Interface Port

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

T   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.

F   RS-422 Interface Port

1	MODE	Mode Input
2	Y	RX Data, +
3	Z	RX Data, -
4	A	TX Data, +
5	B	TX Data, -
6	GND	Ground, chassis and power gnd.

G   GPIO Interface Port

1	RDX	RX data out, RS232 level
2	TXD	TX data In, RS232
3	IO0	Configurable General Purpose IO
4	IO1	Configurable General Purpose IO
5	IO2	Configurable General Purpose IO
6	GND	Ground, chassis and power gnd.

IOs can be configured as: **A**:Digital TTL Input, **C**:Open Drain MOSFET output, **D**:DC Power switch output. **E**:Analog Input.

D   FIO Interface Port

1	VIN	DC Voltage Input
2	TXD	TX data In, RS232
3	OD0	Open drain output, switched
4	IO0	Configurable General Purpose IO
12	IO1	Configurable General Purpose IO
5	IO2	Configurable General Purpose IO
13	IO3	Configurable General Purpose IO
6	IO4	Configurable General Purpose IO
14	IO5	Configurable General Purpose IO
7	IO6	Configurable General Purpose IO
15	IO7	Configurable General Purpose IO
9	VDIG	Voltage out, Digital voltage as configured internal to RV-M21.
8,11	GND	Ground connection

IOs can be configured as: **A**: Digital TTL Input, **B**: Digital TTL Output.

Accessories

DC Power Cable

Raveon part number	4C850-1
Description	M8, Sealed 3-pin 7mm, 2m

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Part Number Example: RV-M22SG-UCN RS232 I/O, 450-470MHz, narrow-band, with GPS transponder option.

	RV-M22	IO Code	GPS Code	-	BAND Code	Band Width	-	Other Options
	CODE							
RS232	S							
RS422	F							
RS485	T							
USB	U							
Analog	A							
FIO	F							
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

FIO and GPIO IO Specifications

All IOs are not optically isolated on this product. The RV-N55 is.

FIO Digital Input Specifications:

Low-level input voltage:	Less than 0.5V
High-level input voltage:	Greater than 2.2V
Input resistance:	Floating, > 2K resistance.

FIO Digital Output Specifications:

Low-level Output voltage:	Less than 0.5V
High Level Output Voltage:	3.0 - 3.3V
Output resistance:	330 ohms.

GPIO Digital Input Specifications:

Low-level input voltage:	Less than 0.5V
High-level input voltage:	Greater than 2.2V
Input resistance:	5K-10K pull-down resistance.

GPIO Digital Output Specifications:

Low-level Output voltage:	Less than 0.5V
High Level Output Voltage:	3.0 - 3.3V
Output resistance:	250 ohms

GPIO Open Drain Output Specifications:

Low-level Output voltage, on:	0V to 0.5V drawing less than 2.1A.
Open drain off leakage resistance	500uA, 0-5V, < 1mA 5-20V.

High Level Output Voltage, off:	0 - 20V < VCC input volts
Output resistance, on:	<250 milliohms to ground

GPIO Switched DC power output: (IO1 and IO2) *not IO0.*

Output voltage, on:	Same as DC input, 90%-100%.
Maximum Output Current	1.0 amps
Output resistance, on:	<250 milliohms to ground
On state internal resistance	100-250mOhms.
Maximum input voltage when off	DC input + 150mV
Off output off leakage resistance	5-200uA
High Level Output Voltage, off:	Same limit as RF board within the enclosure.

GPIO Analog Input Specifications:

Low-level input voltage:	0V
High-level input voltage:	**Vin** -1.0V. Vin is the DC power voltage. 0-30V typical.
Input resistance:	220K.

If other **FIO** or **GPIO** interface requirements are needed, please contact Raveon's Customer support and give us information about your IO requirements.