RV-M35

M35 Low Cost Narrow Band
100mW OEM Radio Modem

The M35 OEM Radio Modem is low-cost rugged single-board 10-100mW VHF/UHF/900MHz narrow-band OEM data radio modem with digital serial interface. Ideal for Automatic Meter Reading (AMR), SCADA and telemetry applications. It is over-the-air compatible with Raveon's 5-watt M7 and M8 series of data radios, and 2W M35 radios.

Product Overview

Medium to Long Range Operation

Operating in the narrow-band frequency bands, the RV-M35 radio modem works up to 2 miles point-to-point with Omni-directional antennas and various data rates. All RV-M35 modems support store-and-forward repeating for wide-area coverage.

GPS Option

The optional internal GPS allows the RV-M35 to be a powerful Automatic Vehicle Locating (AVL) system or Time Space Position Information (TSPI) reporting device. Raveon's TDMA protocol is built in for track thousands of things in real time.

Idea OEM radio Modem

For our products that need reliable wireless communications over 100s of meters or even up to a mile or two miles, this module can easily be embedded in your product, at low cost and easy to incorporate.

Tech Series I/O Options

The M35 may be installed in a Raveon M22 Tech Series enclosure with these I/O options. The following interface boards may be attached or changed at any time:

- RS-232 [S]
- USB [U]
- RS-485 [T]
- RS-422 [F]
- GPIO [G]
- Analog [A]

High Speed and High Efficiency

The *RV-M35* operates with user-selectable over-the air data rates of 1200 to 19200bps. Its fast-switching radio enables it to send up to 50 transmissions per second.

Automatic Meter Reading

Being small, power efficient, and fast makes the M35 ideal for automatic meter reading. With a communication range of many miles, a network of M35 radios can cover a nation reading and managing a smart grid.

Spectrally Efficient

In the USA, FCC complaint data radios must be capable of 9600baud in 12.5kHz channel or 19200baud in 25kHz channel. The M35's 4FSK modes meet all FCC spectral efficiency requirements. It can even operate on 6.25kHz narrow band.

Network Management

The CPU in the M35 has many features and command implemented in it to make setting up and managing large radio networks very easy. 16 bit IDs, ID masks, packet filtering, and repeating by ID are some powerful features.

Very Low Power Consumption

It has very low power consumption, and sleep modes allow it to be active and consume almost no power at all.

Universal 20-Pin Header

The M35 is plug-in compatible with Raveon's M6, M8, M50, and Z50 giving your design the ability to use cellular, 915MHz ISM LoRa, industrial VHF, UHF, 220MHz, or the M35. Or even 5 watt modems if needed.

General Specifications

Model:
RV-M35c-xx-oo (x=band)(oo=options)
Size:
61mm X 37mm
Weight:
3 oz
Input Voltage:
Clean Regulated 4.9 - 5.2V DC.
(Max ripple 10mV AC)
Current Draw:
Receiving data: <70mA
10mW/100mW transmitting: < 75mA/110mA
Sleep ATSM2 (<25mA) (RX disabled)
GPS Option: adds 25mA average.
Frequency Bands:

VA	135-155MHz
VM	MURS channels
VB	150-174MHz
UC	450-470MHz

Contact factory for use in other 130MHz - 990MHz
Options: (c)
Standard transceiver: S
Internal GPS G
Receive Only R

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)
-S (6.25kBW) 1200, 2400
-N (12.5kBW) 1.2k, 2k, 2400, 4.8k, 5142, 8K, 9.6k
-W (25kBW) 1.2k, 2k, 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
MMCX (Female)

LED Indications: none

Transmitter Specifications

RF Power Output	10mW to *100mW*
	(Lower power options available from factory))
Maximum Duty Cycle	*100%*
Frequency Deviation	*± 2.2kHz (-N) ± 3.5kHz (-W)*
TX Spurious outputs	< -70dBc
Occupied Bandwidth	*per FCC*
FCC Emissions Designator	*11K0F1D (-N)*
Frequency Stability	*Better than ±1.2ppm*

Receiver Specifications

RX sensitivity (.1% BER)	9600bps < -108dBm
	4800bps < -114dBm
1200 & 2400baud	< -118dBm
RF No-tune bandwidth	20MHz
Adjacent Channel Selectivity 12.5kHz.....	-50dB
Adjacent Channel Selectivity 25kHz.....	-60dB
Alternate Channel Selectivity	-65dB
Blocking and spurious rejection 10mHz .	-85dB
RX intermodulation rejection.....	-70dB

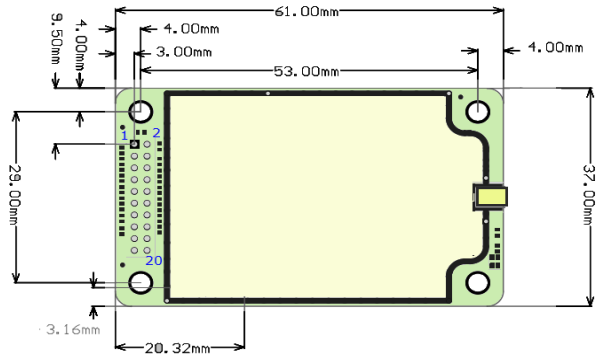
Input / Output Connection Functions

20-Pin Interface Port

1	GND	Ground
2	VCC	DC Input
3	CD	Carrier Detect Out.
4	TX On	Pin is High when module is transmitting. Low when off, receiving, or sleeping.
5	Data In (TXD)	Transmit serial data input.
6	Data Out (RXD)	Receive serial data output.
7	Enable	Low to shut-down the module. High to enable it.
8	DTR	CPU Sleep input. Put in low-power fast-startup mode.
9	CTS	Clear to send output. Indicates state of internal buffers.
10	RTS	RTS input for serial flow control.
11		
12	VDIG	3.3V output
13	IOA	IO port A, Analog Input Capability.
14	IOB	IO port B,
15	IOC	IO port C
16	STAT1	Status IO 1
17		Do not connect.
18	STAT2	Status LED out
19	GND	Ground
20		Do not Connect

*See AN224 for details

Mechanical Specifications



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Idea OEM Radio Module

Utilize this long-range RF modem in any product you have.

The M35 OEM radio modem module is a commercial off-the-shelf low cost narrow band radio. Raveon mad it and many other radios for other companies who utilize RF data communications in their products. The M35 has hundreds of features and is very easy to incorporate into a product as the product's communication platform. It can wirelessly communicate to other modems, or base stations, or network gateways. The perfect device to connect remote devices to IoT platforms, SCAD servers, telemetry controllers, and most any other kind of app.

MIMIC Mode

The MIMIC mode in the M35 radio module enables two M35's to monitor or remotely control external devices without any additional software or devices. MIMIC mode operation takes the digital inputs from one M35 and automatically transmits them over the air to another M35 that will automatically output them.

Receiving MIMIC messages over the air and outputting them to the I/O pins is done by setting the AT I/O command to 1. If the radio modem used is incorporated into a Tech Series enclosure (M21 or M21), then keep the I/O mode set to 8 (ATIO 8). The MIMIC mode will be enabled automatically when the GPIO front panel of the Tech Series Enclosure is installed on the unit.

If the radio modem is receiving inbound data over the air when it comes time to transmit the MIMIC data, it will wait until the reception is over, and then send the MIMIC data.

GPS Tracking Option

The M35 radio module has a GPS option (G) that incorporates a UBLOX GPS module into the module.

The M35 uses Raveon's TDMA protocol to transmit and receive GPS location and status information over the air. Data may also be transmitted in TDMA slots. Using the TDMA protocol, thousands of devices can be tracked with no interference and fast and reliable update times. AES128 encryption is used to secure the location transmissions.

It is the fastest real-time GPS tracking transponder available. It uses commercial radio channels without service fees or monthly charges, and it works virtually anywhere.

Parks and Golf: *Easily locate all other vehicles in the park or golf-course. The location display may be in any vehicle, at the ranger-station, or even with a hand-held GPS.*

Construction: *Know where all your equipment is, and how it is being used. Quickly locate anyone, as soon as you drive onto the site.*

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