



***RV-PMTII***  
DTMF Handheld Data Modem  
Technical Manual

*Version A1*

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# **1. General Information about the RV-PMTII**

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## **1.1. Congratulations!**

Congratulations on your purchase of a *RV-PMTII* OEM radio.

Please take a few minutes to read this manual carefully. The information presented here will allow you to derive maximum performance from your radio modem. After reading it, keep the manual handy for quick reference, in case questions arise later on.

## **1.2. NOTICE**

There are no user-serviceable points inside this transceiver. All service work must be referred to your Authorized Service Center or Raveon Technologies Service Department.

### **IMPORTANT NOTICE !**

Because of the nature of wireless communication, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors), or be totally lost. Significant delays or losses of data are rare when wireless devices, such as the PMTII, are used in a normal manner with a well-constructed network.

This radio should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property.

Raveon accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the PMTII, or for the failure of the PMTII to transmit or receive such data.

## **1.3. Safety / Warning Information**

### **Service**

This equipment should be serviced by qualified technicians only.

### **Blasting Caps and Blasting Areas**

To avoid possible interference with blasting operations, turn off this radio or remove the DC power when you are near electrical blasting caps, in a blasting area, or in areas posted: **"Turn off two-way radio."** Obey all signs and instructions.

### **Potentially Explosive Atmospheres**

Turn off your radio prior to entering any area with a potentially explosive atmosphere. Do not install this product for use in areas with potentially explosive atmospheres. Do not remove, install, or charge batteries in such areas. Sparks in a potentially explosive atmosphere can cause an explosion or fire resulting in bodily injury or even death.

**Note:** The areas with potentially explosive atmospheres referred to above include fueling areas such as below decks on boats, fuel or chemical transfer or storage facilities, areas where the air contains chemicals or particles, such as grain, dust or metal powders, and any other area where you would normally be advised to turn off your vehicle engine. Areas with potentially explosive atmospheres are often but not always posted.

***FCC MPE Regulations:***

WARNING: It is the responsibility of the user to guarantee compliance with the FCC MPE regulations when operating this device in a way other than described in this manual.

***Human Body Exposure:***

This equipment is approved only for mobile and base station transmitting devices, separation distances of

- (i) 26 centimeters or more for antennas with gains of 0 dBi or less or
- (ii) 1 meters or more for antennas with gains 0 to 3 dBi should be maintained between the antenna of this device and nearby persons during operation. To ensure compliance, operation at distances closer than this is not recommended and the EUT has not been approved for operation with antennas having a gain that exceeds 3 dBi.

***1.4. Part 15 Note:***

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## 2. Overview

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The *RV-PMTII* compliant Data radio modem is capable of high-speed wide-band data communications. It contains a transmitter, and a modem, creating an easy-to-use transparent data radio link. The built-in DTMF protocol is compatible with many legacy systems. This radio modem is not compatible with Raveon's M7 series of data radio modems.

### 2.1. Features

- *Small sized and single-board construction.*
- *Highly efficient battery life (15 $\mu$ A sleep mode)*
- *Reliable and fast wakeup*
- *Seamless integration into legacy systems*
- *Immediate audible user feedback*

## 3. Specifications

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### 3.1. General

Model Number, transceiver:	RV-PMTII
IF Bandwidth	25kHz
Operating Mode	DTMF
Full Spec Operating Temperature range	-30°C to +60°C
Wake-up time	<700mS from OFF
RF I/O Connector	BNC female

### 3.2. Transmitter Specifications (RV-PMTII)

RF Power Output	1W
Frequency Range	154.6MHz
Maximum Duty Cycle (1W)	50% to 40C, 20% to 60C
Frequency Deviation	± 3 kHz
Channel spacing	25kHz
TX Spurious outputs	< -70dBc
Occupied Bandwidth	Per FCC
FCC Emissions Designator	6K00F3D
Frequency Stability	Better than ±2.5 ppm

### 3.3. Interface Specifications

#### DC Input

Internal Battery Connection	223/DL223
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#### Other

RF connector	BNC Female
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## 4. Data Transmission

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To transmit data, simply press a button on the interface. As soon as a full packet of data has been generated and collected into the internal buffer of the modem, the modem will automatically key its transmitter, and send the data over the air.

## 5. Debug Related Features

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### *Bench Testing*

(Must be connected to a service monitor and/or spectrum analyzer)

All debug options below are entered by pressing **ACCESS CODE** + the following buttons:

<b>1</b>	Keys the unit to CW
<b>2</b>	Keys the unit with a square wave
<b>3</b>	Sends all DTMF characters sequentially
<b>UP</b>	Sends the DTMF character A multiple times
<b>DOWN</b>	Sets the access code for the unit
<b>7 or ON/OFF</b>	Enable/Disable Override Mode
<b>8 + 8 + 8</b>	Reset unit to factory defaults

When finished, any transmissions can be ended by pressing the **OFF** button alone.

Note: Unwanted characters may have been generated at this time. It is recommended to simply press any key after using these modes to ensure unit is working as intended.

## 6. Tune-up and Alignment

The *RV-PMTII* modem has been factory calibrated, in should not require any re-calibration when installed. The unit cannot be tuned or adjusted without the proper test board. The following section assumes access to the required test board.

**This unit is sensitive to input voltage. Improperly attempting to connect to the unit could result in permanent damage.**

### 6.1. Periodic Calibration

The only setting that may require adjustment is the center frequency. After years of operation, all crystals will age and change frequency slightly. Like all narrow-band radios, semi-annual checks and adjustment of frequency is recommended.

### 6.2. Calibration Commands

The following AT commands are used to calibrate the PMTII when connected to a test board. Do not ever change these unless you have been factory trained to do so.

AT Command	Command Description	Parameters	Factory Default
<b>R0</b>	<b>Symbol Peak Deviation</b> – Set the peak FM deviation of the transmit symbols. Note: This can be a negative number to invert the modulation.	Range: -1000 – 1000	120**
<b>R1</b>	<b>Select CD pin output signal</b> – CD pin may be RF carrier detect, or modem data detect, off, on, or RX data framing, or on-line status. Line status mode asserts CD when on-line in normal modem operation and it negates CD when in the command mode.	Range : 0 - 5 5 = RX data framing. Assert when outputting data 4 = Line stat. 3 = Always negate CD 2 = Always assert CD 1 = Data CD 0 = RF CD	0 (RF Carrier)
<b>R2</b>	<b>Over-The-Air bit rate</b> - This is the data rate the radio uses to send data over the air. <b>All RF modems in the network must use the same over-the-air baud rate.</b>	Range: 0 = 800      5 = 9600 2L 1 = 1200     6 = 19200 4L 2 = 2400     7 = 5142 2L 3 = 4800     8 = 9600 4L 4 = 8000 4L   9 = 2000 2L	3
<b>R3</b>	<b>Serial Port time out</b> – Number of mS of no activity on the serial port before transmitting the data in its buffer.	Range: 1 - 5000	20 (mS)
<b>R5</b>	<b>Preamble length</b> – The number of bytes to send over-the-air in the pre-able.	Range: 3 - 255	4** (Varies based on data rate and radio type. 7 typical)
<b>R8</b>	<b>Frequency Offset.</b> Used to set the radio on the center of the radio channel.	Range: -500 to +500	0**
<b>R9</b>	<b>Modulation Balance.</b>	Range: 0-100	20**



### **6.3. Center Frequency**

1. Key the transmitter with CW output using this command:  
**ATTD 7**
2. The modem will now put out CW on the center of the channel.
3. Read the frequency offset with the **ATR8** command.
4. Adjust the frequency to the center of the channel with the **ATR8** command. You can use the “U” key and the “D” key to change the settings up and down one value in real time.

### **6.4. TX Deviation**

1. Switch to channel 1.
2. Key the transmitter into a 50 ohm load using the **ATTD 3** command. The unit will now transmit, and send a digital 0 continuously. This should be +2.0kHz in frequency for narrow-band radios (12.5kHz spaced channels) and +3.0kHz for wide-band (25kHz channels).
3. Adjust the deviation register setting so that the frequency deviation is correct. The deviation is set with a digital adjustment. Use the **ATRO** command to read or set the deviation level.