

RM-1 User Manual

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Introduction

The RM-1 is radio transceiver module that has a transmission rang of over 100 ft. in an open environment. The RM-1 is controlled by writing and reading from it's SPI port.

Installation

The RM-1 is installed by soldering it directly to a PCB with a microcontroller that has a SPI port. Please see the specifications section for the connector pinout. The crystal output may be used as a clock source for a microcontroller.

Operation

The following C code can be used to operate the RM-1 Module. To use the code you will need to contact Ring Engineering Inc. and obtain a proper HAL (Hardware Abstraction Layer) code for your particular microcontroller.

Initialization:

```
Int RfInitialize(void);
```

Returns non-zero if successful.

To Select a Channel:

```
int RfSetCahnnel(Channel);
```

Returns non-zero if successful.

To Transmit:

```
Int RfTransmit(BYTE* pData, int DataLength);
```

pData is a pointer to a BYTE buffer that contains the data to transmit.

DataLength is an integer that specifies the length of data to transmit. DataLength can be from 1- 128.

To Receive:

```
If( RfInterrupt() == RF_RECEIVED_NEW_DATA )
```

```
{  
    BYTE ReceivedData[128];  
    int ReceivedDataLength;  
    ReceivedDataLength = RfReceive(&ReceivedData[0]);  
}
```

Call RfInterrupt() to poll for receive interrupt. If a receive interrupt was detected then call RfReceive() to get the newly received data. ReceivedDataLength will be set to the number of bytes received.

To Calibrate:

```
Int RfCalibrate(void)
```

Returns non-zero if successful.

This function should be called about every 5 minutes to maintain proper calibration.

Specifications

Overall Dimensions: 0.6 x 0.74 Inches
Supply Voltage: 2.5 – 3.0 Volts DC
Absolute Maximum Supply Voltage 3.6 Volts DC
Absolute Minimum Supply Voltage 1.8 Volts DC
Supply Current: 16mA Typical
Operating Temperature: -40 to +85C
Maximum SPI clock frequency 7.5MHz

Pin Descriptions

Pin	Signal	Direction on RF Module
1	+5 VDC	
2	Common	
3	*Reset	IN
4	Sleep	IN
5	Crystal Out	OUT
6	Serial Clock	IN
7	Serial Out	OUT
8	Serial In	IN
9	Chip Select	IN
10	Interrupt	OUT

FCC Information

Integration in OEM products:

The RM-1 module has been certified as a transmitter module by the FCC rule 15. It can be integrated into OEM products without obtaining subsequent and separate

FCC approvals according to the FCC public notice DA 00-1407.

The OEM must satisfy the following requirements to comply with the FCC regulations:

1) The OEM integrator will not use the Ring Engineering FCC ID grant code without a previous contract agreement on which the exact application and scope of the final product will be declared.

2) If the RM-1 module is integrated in another enclosure and the FCC label is not visible, then the device into which the module is installed must also display a label such as the Figure 2.

This device contains a transmitter module: RM-1
FCC ID: W4YRM-1
* The enclosed device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Figure 2: Label to be attached to the outside of the OEM product

3) The users manual should include a statement such as the one in figure 3:

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.

Figure 3: Caution statement to be included in OEM users manual

4) Any modification to this product may violate the rules of Federal Communications Commission and make the operation of the product unlawful.

5) The module has been designed and tested for battery and AC Adapter operation. However the OEM is responsible for conducted emissions compliance and has to demonstrate that it pass the conducted limits if the final product include or make provisions for the use of battery eliminators or AC adapters or if it gets power indirectly from AC lines.

6) OEM is responsible for the compliance of the FCC regulations for Unintentional radiators section 15.107 and 15.109 on their final product.