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| CONFIDENTIAL | RF Module Installation Manual<br>JETCO Model JTR-01 | February 27, 2019 |
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JETCO  
Model JTR-01  
RF Module Installation Manual

**Contents**

- Overview ..... 1
  - Image: Base Station and RF Modules ..... 1
- Labeling Requirements, Warnings, and Notices ..... 2
- Required Materials ..... 3
- Base Station Setup ..... 3
  - Image: Typical Base Station Installation (with enclosure) ..... 4
- RF Module Setup ..... 5
- Serial Protocol..... 6
  - Image: Typical Base Station/RF Module network with two character RF Module addressing ..... 6
- Serial RF Module Configuration ..... 7
- Company Contact..... 8
- Document Version..... 8

## Overview

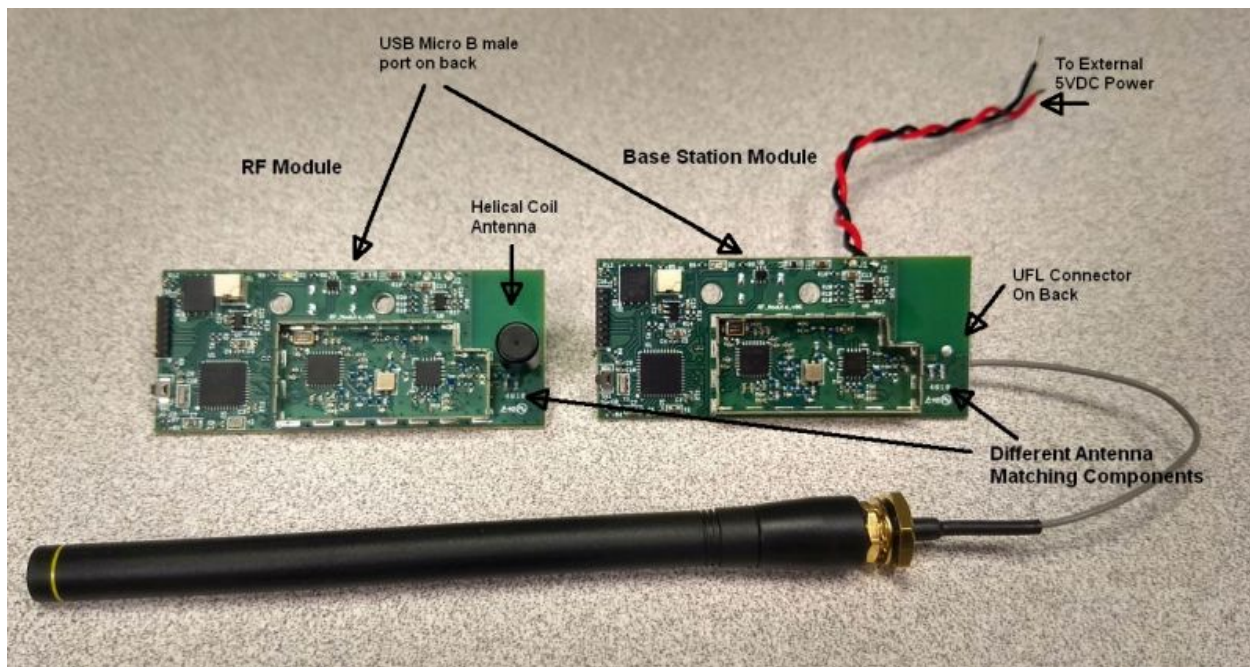
This document contains installation instructions for JETCO JTR-01 RF modules.

JETCO JTR-01 RF modules can be used to form a simple wireless connection for devices that typically connect directly to a computer through a USB port configured as virtual serial COM port. The modules support a ASCII based serial protocol with carriage return terminated messages.

There are two types of JETCO JTR-01 RF modules:

**Base Station:** This module, JTR-01-B, is typically attached to a computer through a standard USB 2.0 port. It comes with an external 5V power supply and external dipole antenna. The antenna maximum gain is 1.2dBi.

**RF Module:** This module, JTR-01-R, is typically attached to remote devices it's desired to communicate with. It requires power from the remote device, through the micro B connector on the back of the module and it comes with a permanent antenna mounted on the PCB. The antenna maximum gain is  $-8.9\text{dBi}$ .



**Image: Base Station and RF Modules**

One Base Station module is required for each system to talk to one to ten RF modules.

Note: Only one Base Station module may be used in a wireless network. Multiple Base Station modules in the same wireless area will require custom Base Station driver software to avoid transmission collisions and is not recommended or supported.

## Labeling Requirements, Warnings, and Notices

**If a JTR-01 module is placed within a separate enclosure:** the following label must be placed on the outside of the enclosure:

Contains Transmitter Module  
FCC ID: 2ASF5-JTR01

**No modifications may be made to the JTR-01 module:**

**WARNING:** This module must be used as received from the manufacturer. No modifications may be made to the power supply, module PCB, electronics, firmware, or antenna.

**Certification that the JTR-01 module complies with Part 15 of the FCC Rules:**

*This 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.*

**Radiation Exposure Statement:**

- 1. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.*
- 2. This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.*

|              |   |                   |
|--------------|---|-------------------|
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|--------------|---|-------------------|

## Required Materials

- One JETCO JTR-01 module factory configured as a Base Station (Model number JTR-01-B).

The Base Station module requires:

- One, 5V DC power supply (Globtek, WR9HA2000CCPMFR6B)
  - One, USB Male A to USB micro B female cable.
  - One, or more, JETCO JTR-01 RF modules in the normal RF Module configuration. (Model number JTR-01-R).
  - One, Windows 10 based computer with a USB 2.0, or higher version, port.
- At least one, maximum ten, JETCO JTR-01 module(s) factory configured as a RF Module (Model number JTR-01-R).

The RF Station module(s) require:

- Serial devices to connect to each RF Module. (Each serial device may require an adapter to the RF Module's micro B male USB connector. Consult with JETCO to determine the suitability and any modifications required to interface a serial device with a JTR-01-R module.)

## Base Station Setup

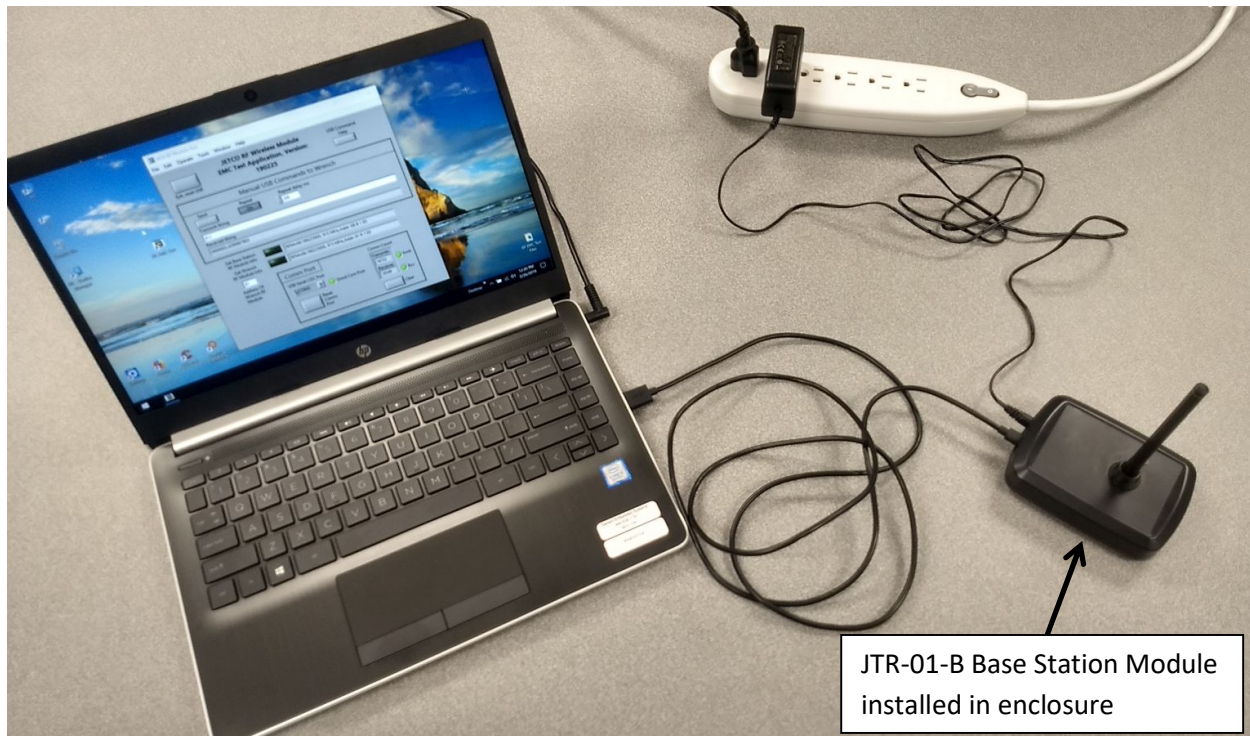
1. Connect the Base Station power supply to the connector on the Base Station module.
2. Connect the Base Station USB cable to the computer USB port.
3. Plug the power supply into AC power and ensure the AC power is on.
4. Run Device Manager on the computer, look under the 'Ports' tab and determine which port COM number the Base Station attached to the computer. Record the COM number for use when setting up your serial communications program.

The Base Station will come up as a "USB Serial Device (COMxy)" where xy is the COM number to use to talk to the Base Station.

To check if the Base Station is communicating, bring up the program you'll use to communicate and send the string "`^<CR>`" to the Base Station. If communicating, it will respond with its software version and configuration settings. Similar to:

```
"RFMv06:190225000,915MHz,Addr:EB B 1 E0"
```

5. If the Base Station responds as above, it is set up correctly. If it doesn't respond, check that the power supply is connected and has AC power and that the USB cable is correctly connected. Repeat steps 1 through 5.



### Image: Typical Base Station Installation (with enclosure)

The image shows a typical Base Station module in an enclosure, attached to AC power and a computer USB port.

|              |   |                   |
|--------------|---|-------------------|
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|--------------|---|-------------------|

## RF Module Setup

Connect the RF Module to the serial device it's meant to communicate with. The device must supply 3.3V to 5V power, at a minimum of 200 ma, to the RF module through the USB port and serially communicate through the USB port at 115,200 baud. The device must support messages that are entirely ASCII and are terminated by the ASCII carriage return character.

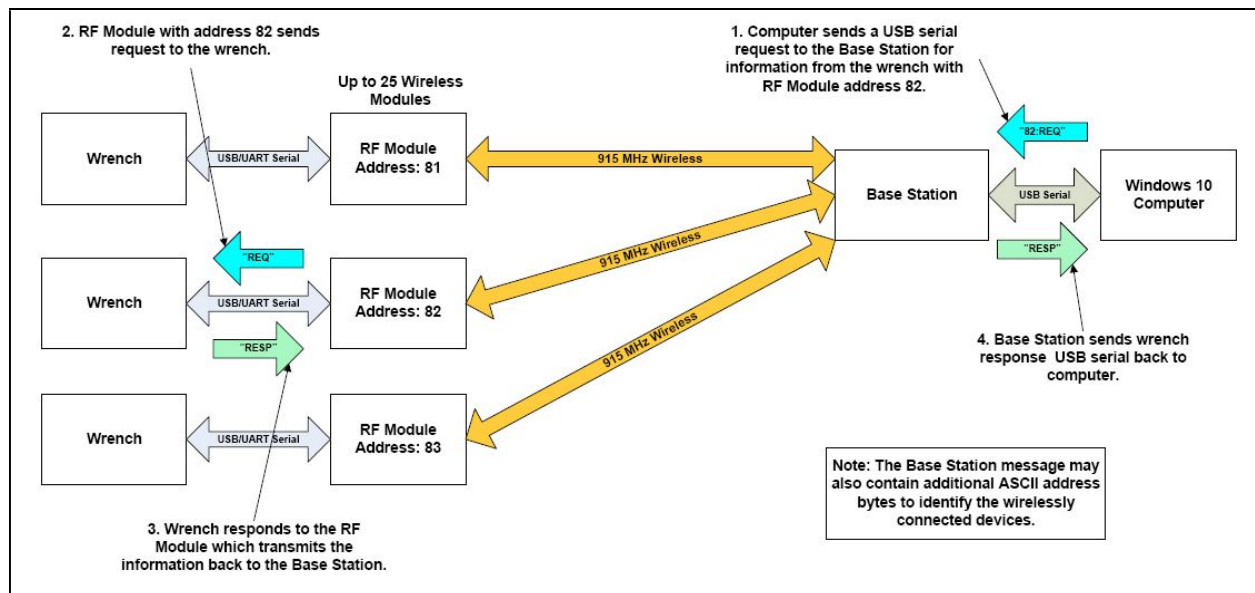
## Serial Protocol

The overall serial protocol derives from the device that is connected to an RF module. All serial protocols are permitted as long as they support the following structure:

- Baud Rate: 115,200 baud. (RF Module requirement only. May change with new versions)
- ASCII characters only.
- Each message is terminated by a carriage return. CR = 0x0d.
- The remote device must not initiate communications, it must only respond to queries or commands from the computer.

Addressing the remote devices:

For the Base Station module to address each RF Module individually, the computer must append the address of the RF Module to the ASCII string that is typically sent to the remote serial device. There is an option of a two character address; range: hexadecimal 0x80 through 0xDF which is followed by a colon, or a nine character address, consisting of any 9 ASCII digits.



**Image: Typical Base Station/RF Module network with two character RF Module addressing**



## Serial RF Module Configuration

Base Station modules are configured at the factory and there are no user configurations available.

RF Modules are configured at the factory to use two character or nine character addresses. If nine character addressing is configured, there are no user configurations available.

If two character addressing is configured, the RF modules can have their addresses configured by attaching them to a USB port with the following steps:

1. Attach an RF Module to a Windows 10 based computer. An adapter cable will be needed to attach the standard computer USB A female port to the RF Module USB micro B male port.
2. The Device Manager will show that a new Serial Port has been added. The port number that is shown will be used to communicate with the RF module.
3. Bring up a terminal emulator program, such as Tera Term, or any program that can send ASCII string through a serial port. Attach the emulator program to the serial port shown by Device Manager for the RF module.
4. To see the present RF Module address: Send the character '^' followed by a CR to the RF Module. The response should look somewhat like:

```
"RFMv06:190225000, 915 MHz,Addr:0000000000 81 R 1 E0"
```

Where the characters '81' is the two character address of the module.

5. To change the address, send a '%' followed by a new two character address and a carriage return. i.e. Send "%85" followed by a CR to set the new address to '85'.

The RF Module should return the ASCII string "OK"<CR>

6. If the address change was successful, sending the '^' <CR> string again will return the string:

```
"RFMv06:190225000, 915 MHz,Addr:0000000000 85 R 1 E0"
```

Contact JETCO for assistance with setting up and troubleshooting issues with the JTR-01 Base Station and RF modules.

**Company Contact**

JETCO Torque Tools LLC  
 835 Meridian St.  
 Duarte, CA 91010  
 Phone: (626) 359-2881  
 Email: TBD

**Document Version**

| Version | Changes                              | Released | Released Date |
|---------|--------------------------------------|----------|---------------|
| 1.00    | Initial                              | REM      | 2019-02-26    |
| 1.01    | Added allowable maximum antenna gain | REM      | 2019-02-27    |
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