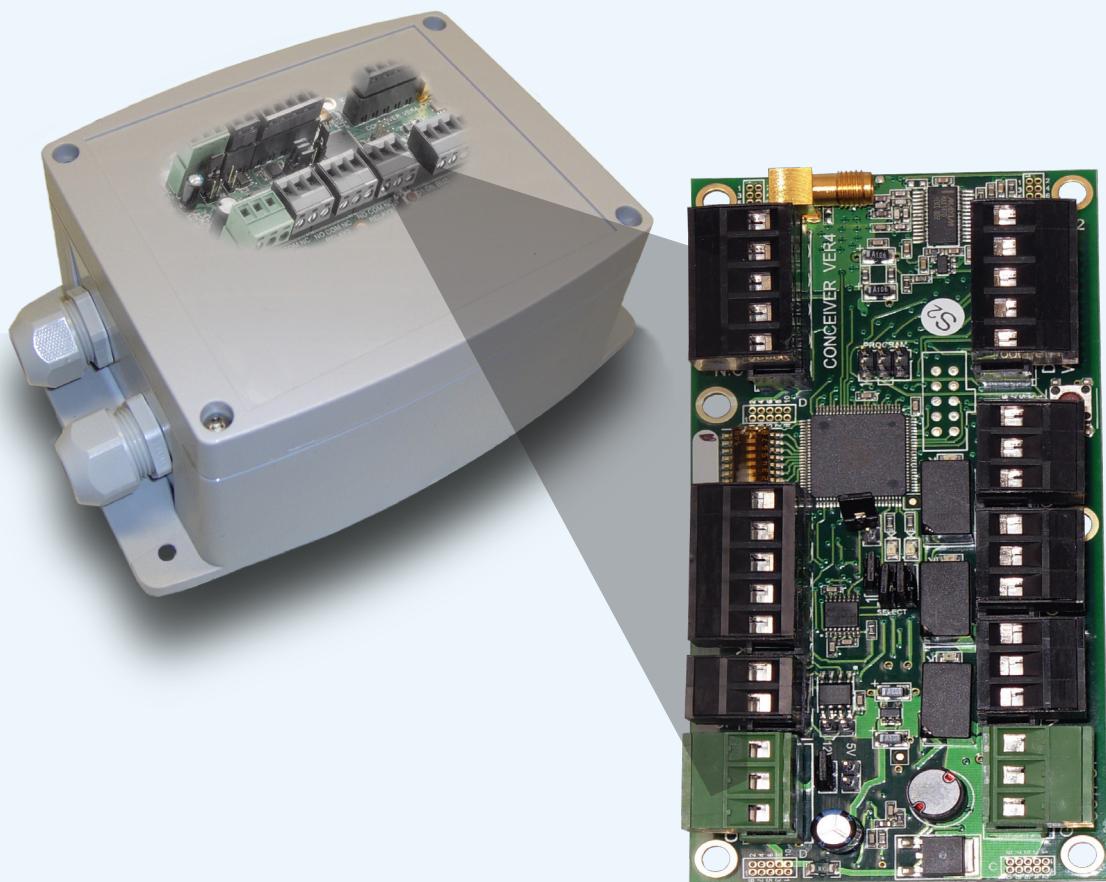


# PureRFid PRF-RDR-101 Reader User Guide

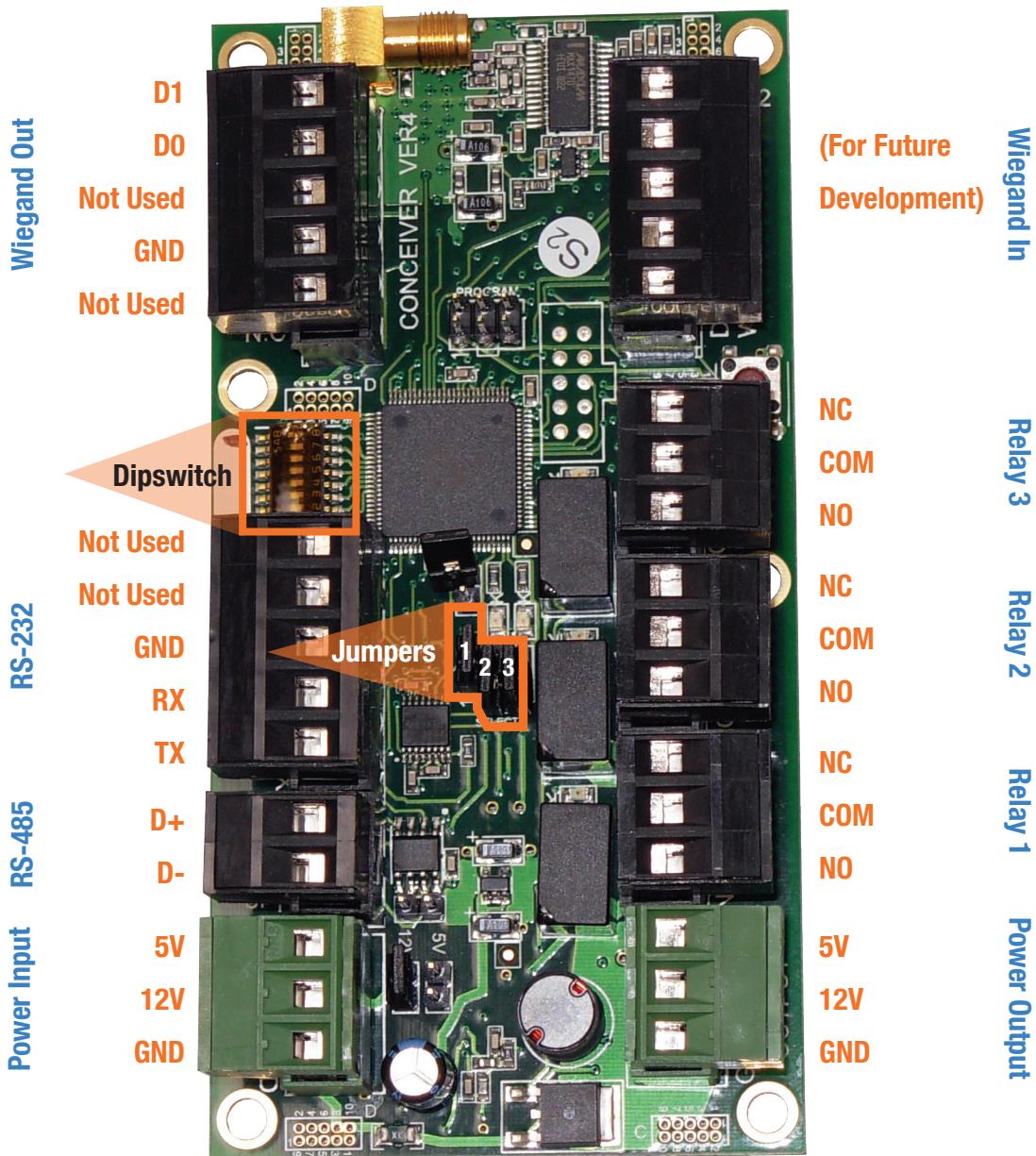


# Introduction

This User Guide contains important information for **installers and Users** of the PureRFid™ PRF-RDR-101 Reader. The PureRFid™ PRF-RDR-101 is a Reader & Converter for active RFID tags and different communication protocols. The reader will receive PureRFid™ Tags and output the data via RS232, RS485, or 26 bit Wiegand protocols. The reader will also decode RS-232 or RS-485 data from an AAID/Wavetrend Reader and convert it to 26 bit Wiegand Protocol.

The PureRFid™ PRF-RDR-101 Reader also contains three onboard relays that will activate for different functions in a stand-alone mode. Physical wiring connections are made to the reader using removable terminal blocks. The reader contains an antenna connection utilizing an SMA type connector.

## PRF-RDR-101 Layout

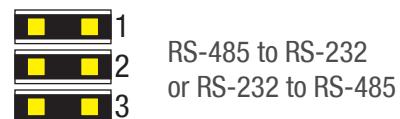
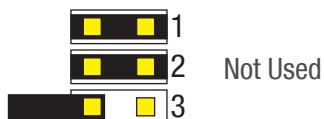
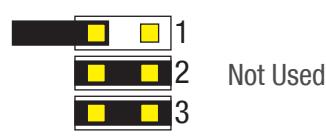
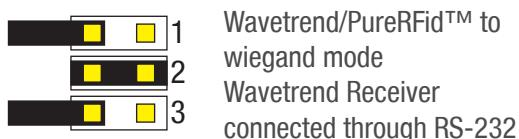
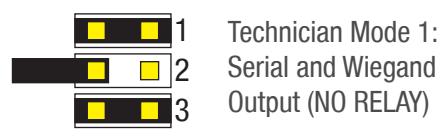
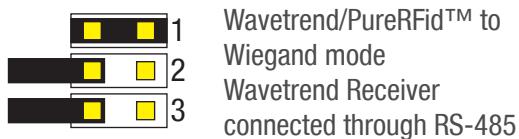
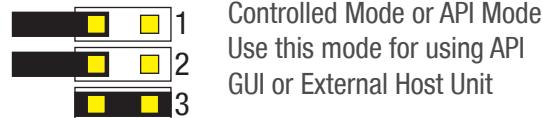
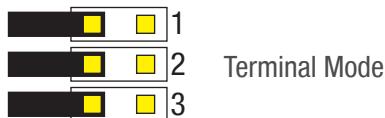


## Board Configuration

In order to configure the board there are several jumper configurations to observe. The jumpers control the board's mode and basic behavior.

### Jumpers

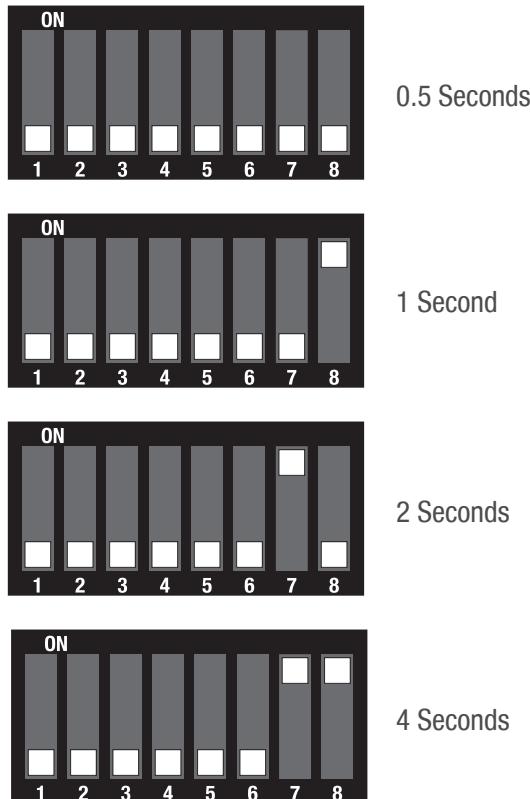
To set the desired mode of operation use the following diagram:



**NOTE: Remember to press the reset button or cycle the power after changing the jumpers for the changes to take effect.**

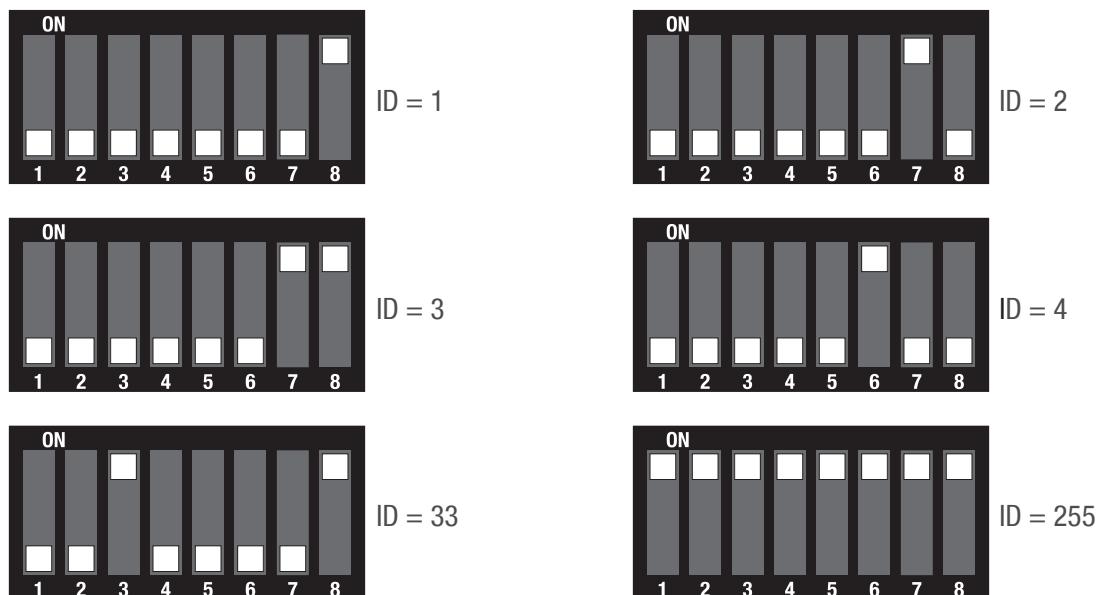
## Dipswitch

When Receiver is in either of the 2 standalone modes (Wavetrend/PureRFid to Wiegand), the dipswitch controls how long Relay 1 will be energized when a tag is received according to the diagram:



**NOTE: Remember to press the reset button or cycle the power after changing the jumpers for the changes to take effect.**

In Controlled or API mode, the dip switch will control the Receiver address according to the diagram:



## **Relay Functions**

Relay 1 : Relay 1 will energize for every PureRFid tag transmission received and every Wavetrend tag transmission converted to Wiegand data, when the receiver is in either of the stand-alone modes (Wavetrend/PureRFid to Wiegand). The energize time will depend upon the dip switch settings listed above. Relay 1 will also energize upon software command when the receiver is used in the API or Controlled mode.

Relay 2 : Relay 2 will energize for 500mS for every Wavetrend tag transmission converted to Wiegand data, if the tag transmission has a age counter value of 118,000,000, and the receiver is in either of the stand-alone modes (Wavetrend/PureRFid to Wiegand). This would indicate a low battery condition in the Wavetrend tag. Future Development: This relay will also energize for PureRFid tags that have a low battery condition but this feature is not incorporated at this time. Relay 2 will also energize upon software command when the receiver is used in the API or Controlled mode.

Relay 3 : Relay 3 will energize for 500mS for a tampered PureRFid or Wavetrend tag transmission. There are 2 conditions that this relay will energize for a tampered Wavetrend tag. If the Wavetrend tag transmission has its alarm byte on or if the magnet is not present on the reed switch, relay 3 will energize. The receiver must be in either of the stand-alone modes (Wavetrend/PureRFid to Wiegand). Relay 3 will also energize upon software command when the receiver is used in the API or Controlled mode.

**NOTE: For relays 2 and 3 to activate in the stand-alone modes, you must enable the relays in the terminal console under option 3.**

## **Terminal**

The terminal Console is used to configure different parameters in the PRF-RDR-101 Firmware. You can change the RSSI filter which controls how large the reception field will be. You can change the site code filter. You can also view tag messages.

In order to log in to the console the jumpers need to be set correctly and the RS232 cable connected to the computer. Refer to jumper settings above and look for “Terminal Mode”.

**NOTE: If you are using the supplied USB to Serial adaptor, you will first need to install the driver for this device. To install USB Driver follow instructions below:**



**Turn on computer and connect USB connector to any port on your computer**

Windows will detect new hardware and launch the hardware wizard.



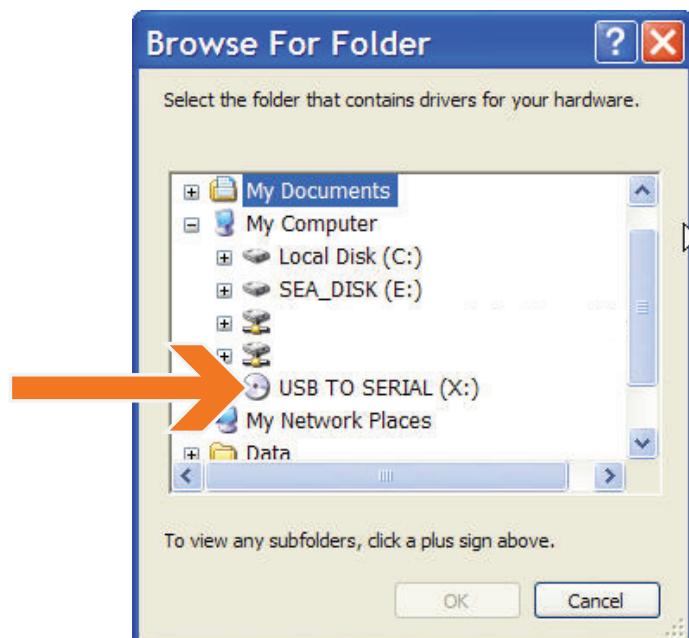
**Click on "No, not this time"**  
**Click the "Next" button.**

**Then click "Install from a list or specific location"**  
**Click the "Next" button.**

**Then click "Search for the best driver in these locations"**  
**Put a check in the box next to "Include this location in the search".**



**Now insert the CD into your computers CD ROM Drive.**



**Click on the "Browse" button on your hardware wizard and locate your CD drive.**  
**Look for USB TO SERIAL.**

**Click on Plus sign to view the contents of the CD.**

You will see 3 folders.

**Select the folder called USB Driver.**

**Click "Next".**

Your driver will install, and inform you that it is done.

**Click on "Finish".**

Please note: after you **click "Finish"** you will be asked to restart your computer. **Restart now.**

After your computer has restarted, you want to **confirm which com port number your USB device was assigned or which com port number your serial port is assigned to.**



If you have a “My Computer” icon on your desktop, **right click on it and choose properties.**

If you don’t see this icon, click on your “Start” menu, and go to the **control panel**. Depending on your control panel view, you will either double click on the “System” icon, or single click on “Performance and Maintenance”. After clicking “Performance and Maintenance” then click on the “System” icon. This will open up the “System Properties” window.

**Click on the “Hardware” tab at the top.**

Then **click the “Device Manager” button.**

This will bring up a list of devices currently installed on your machine. **Find an entry called “Port Com and LPT”. Click on plus sign to expand the ports.**

You should see “Communications Port” with a number if you have a serial port, and “Prolific USB-to-Serial-Com Port” for the USB converter.

**Make note of the “Com Port” number.** You will need it on the following steps below to set up the correct HyperTerminal Sessions.



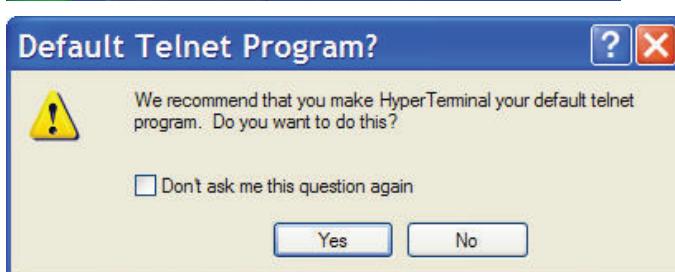
### Setting up a Session with HyperTerminal

“Hyper Terminal” can be used to log in to the terminal. Follow the steps below to access “Hyperterminal”.

**Click on Start, Programs, Accessories, Communications, HyperTerminal**

**Note:** If your computer is running Vista or Windows 7 you will need to download an alternate telnet program because Hyperterminal is not included. Paste the URL below into your web browser to download the optional program.

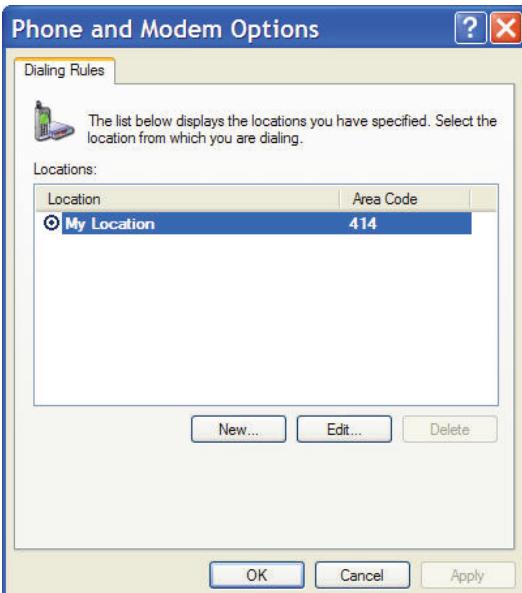
<http://www.putty.org>



If this screen comes up, **click YES**



Enter your area code  
Then Click OK



When this screen comes up, Click OK

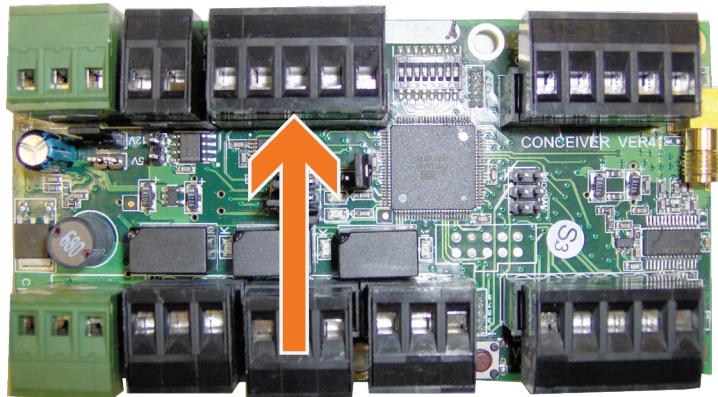


Type a name for the connection, like PRF-RDR-101  
Then Click OK

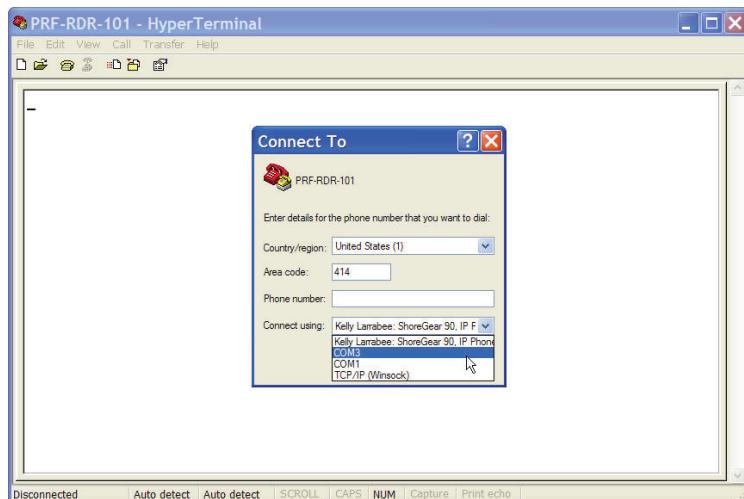
## Connecting the PRF-RR-ADJ-KIT RS232 Cable to the PRF-RDR-101 Reciever

Insert the exposed wire of the API cable into the RS232 Terminal block in following manner:

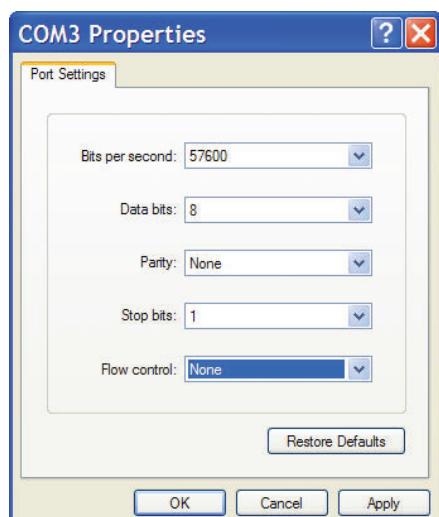
- Black wire into GND
- Red wire into Rx
- Yellow or White wire into TX



Choose the com port number you are using in the “Connect Using” drop down box



Set the port settings to what is shown in picture below then click OK



PRF-RDR-101 - HyperTerminal

File Edit View Call Transfer Help

Vuance Conceiver Service Console  
Firmware Ver. 0.35

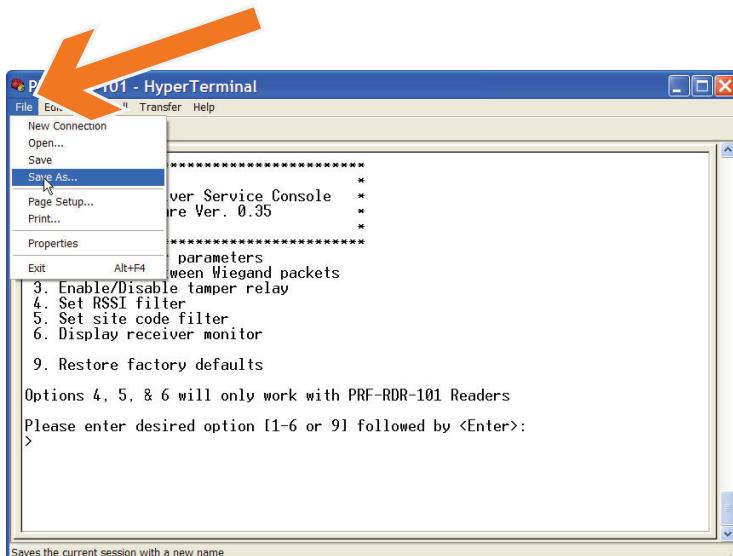
1. Set WT filter parameters  
2. Set delay between Wiegand packets  
3. Enable/Disable tamper relay  
4. Set RSSI filter  
5. Set site code filter  
6. Display receiver monitor  
9. Restore factory defaults

Options 4, 5, & 6 will only work with PRF-RDR-101 Readers

Please enter desired option [1-6 or 9] followed by <Enter>:  
> \_

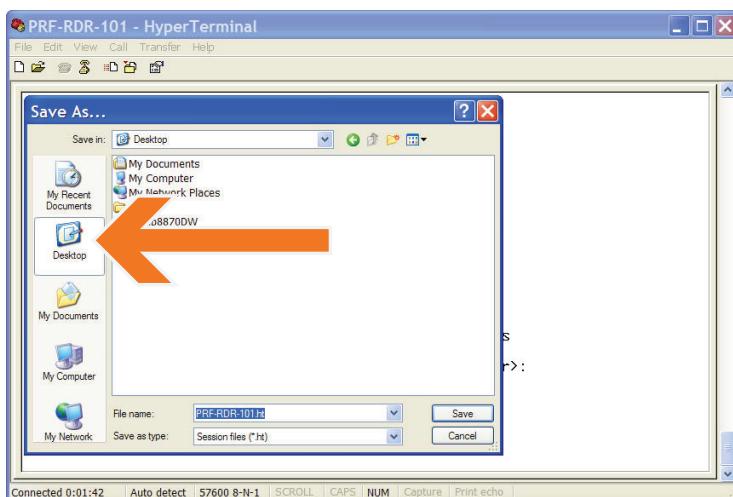
Connected 0:02:36 | Auto detect | 57600 8-N-1 | SCROLL | CAPS | NUM | Capture | Print echo |

**At the blank screen, hit the “Enter” button on your keyboard and you should see the Terminal Console pop-up**



In order to avoid this set up again you want to save this session settings to your desktop.

**Click on “File” at the top left and choose “Save As”**



**Click on the “Save In” drop down box and choose your desktop**

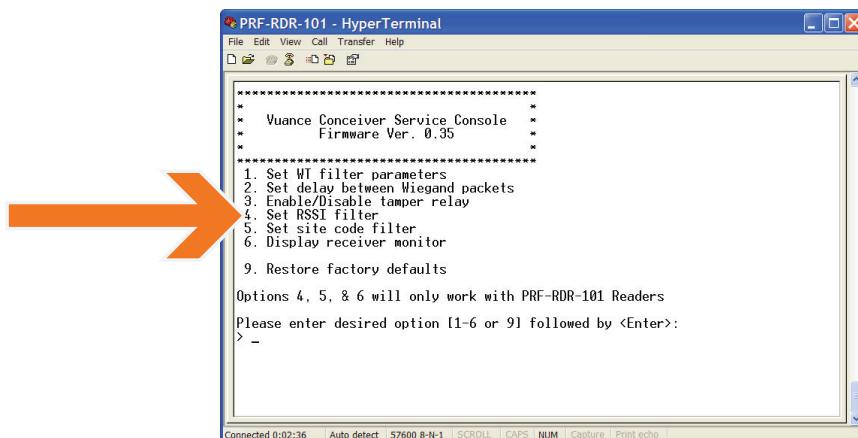
Now, at any point in the future after you have already closed this session, just double click the file on your desktop and the blank window will open up.

## Adjusting the PRF-RDR-101 Receiver's Range

The PRF-RDR-101 Receiver reception range is adjusted by changing a filter parameter in the Receiver called the RSSI. RSSI stands for Received Signal Strength Indicator. When a tag message is received by the receiver, it contains an RSSI value. The higher the RSSI value of each tag message, means the closer to the receiver that it is. Therefore, this means that the higher the receiver's RSSI filter setting then the smaller the reception field. Conversely, the lower the receiver's RSSI filter setting, then the larger the reception field. The RSSI filter setting can be set between 0-1023. However, the threshold for tag messages appears in the roughly 580-880 RSSI settings. This means that the lowest possible tag RSSI will be in the 580 range, and the highest possible tag RSSI will be in the 880 range.

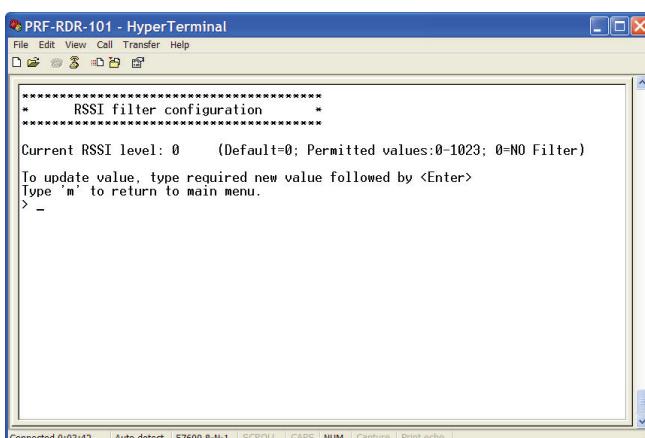
If you have a Receiver set between 0-580, this is the most possible range you can achieve out of the tag and receiver. If you have the receiver RSSI set between 800-880, this is the smallest possible range you can achieve.

**Note: If you set the RSSI filter to roughly 880 or higher your receiver may stop receiving tags completely!**

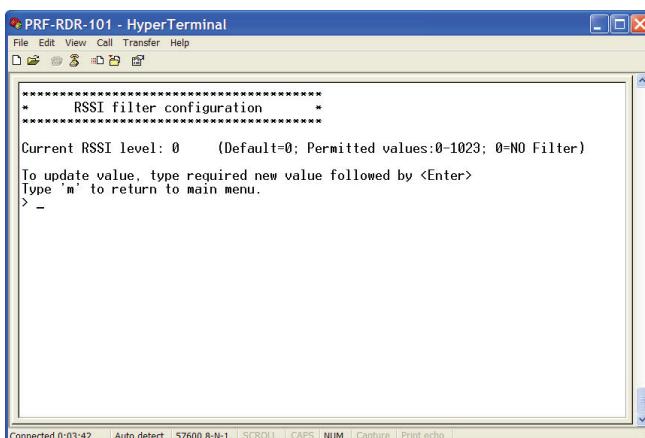


To change the Receiver RSSI setting see instructions below:

**From Main page in the Terminal Console type in the number 4 for "Set RSSI Filter" and press enter**



You will see the RSSI page



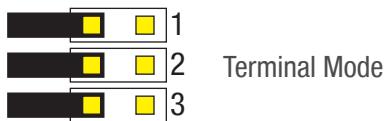
HIGHER RSSI SETTING  
=  
LOWER RECEIVER RANGE

To change the RSSI filter, type in the value you would like to set it to and press enter

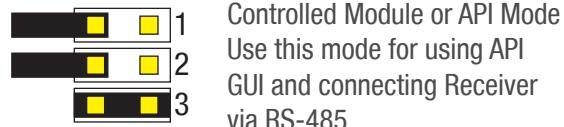
To return back to the main page, simply type a lowercase "m" and press enter

## Using Receiver with a Wiegand Access Controller

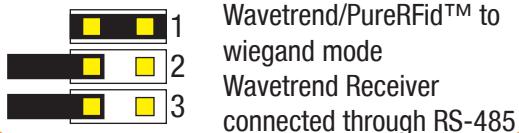
The receiver will output a 26 bit Wiegand protocol format for both PureRFid™ tags received by the receiver's antenna and tags received from a Wavetrend Reader then decoded via RS-485 or RS-232 by the PureRFid™ Receiver. The Wiegand data is output on the connector labeled Wiegand Out. In order for the Receiver to perform this functionality, it must be in either 1 of 2 modes. The receiver jumpers must be configured either 1 of 2 ways listed previously in this document. See Below:



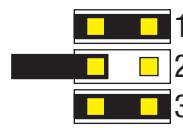
Terminal Mode



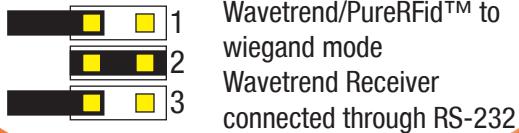
Controlled Module or API Mode  
Use this mode for using API  
GUI and connecting Receiver  
via RS-485



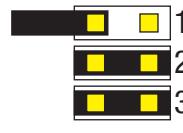
Wavetrend/PureRFid™ to  
wiegand mode  
Wavetrend Receiver  
connected through RS-485



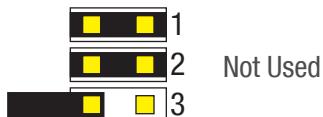
Technician Mode 1:  
Serial and Wiegand  
Output (NO RELAY)



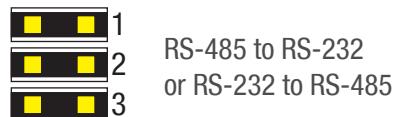
Wavetrend/PureRFid™ to  
wiegand mode  
Wavetrend Receiver  
connected through RS-232



Not Used



Not Used



RS-485 to RS-232  
or RS-232 to RS-485

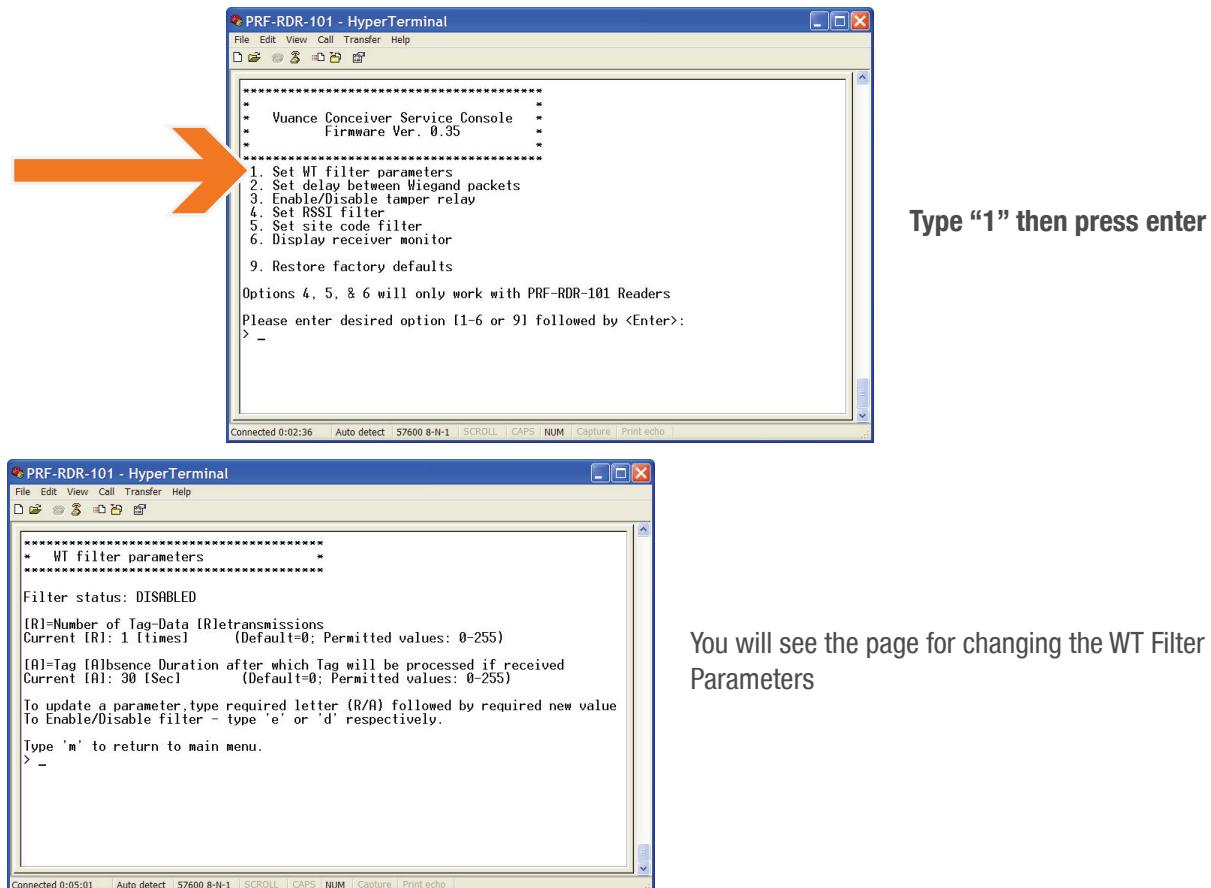
**NOTE: Remember to press the reset button or cycle the power after changing the jumpers for the changes to take effect.**

## Configuring Wiegand Parameter Options

There are configurable firmware features related to the Wiegand output of the receiver that are accessed and changed using the receiver's terminal console. Follow steps listed previously to access the terminal console. The following steps explain the functionality and how to adjust the parameters.

### WT Filter Parameters:

After logging onto the Terminal Console and accessing the main page you will see the very first option listed as WT Filter Parameters.



The filter parameters are used when you want to restrict the amount of Wiegand transmissions sent to the access controller for Tags moving through a Receiver field. Since the tags are active and are always transmitting at a pre-set interval, you will generally receive several tag transmissions at the receiver when a tag is traveling through the receiver field at a gated area or door. To limit the amount of Wiegand transmissions sent out by the receiver, you can adjust 2 settings with the WT Filter Parameters.

The first setting is called the "[R] Number of Tag Data [R]etransmissions". This is the amount of Wiegand transmissions that are sent once a tag is received by the receiver. By default this setting is 1. This means, as a tag moves through the field, after the first time it is received, the receiver will output the tag's wiegand ID information **1 Time** and then not again. If [R] were set to 2, then the receiver would output the tag's wiegand ID information **2 Times** and then not again. [R] can be set between 1-255 times. As long as the tag never leaves the receiver field then the Wiegand transmission will only be sent for [R] amount of times. The only way for the tag, to be sent again is for the tag to leave the field for [A] amount of seconds.

**NOTE: The WT Filter Parameters will not work for tag messages from a Wavetrend receiver connected to the PRF-RDR-101 using RS232.**

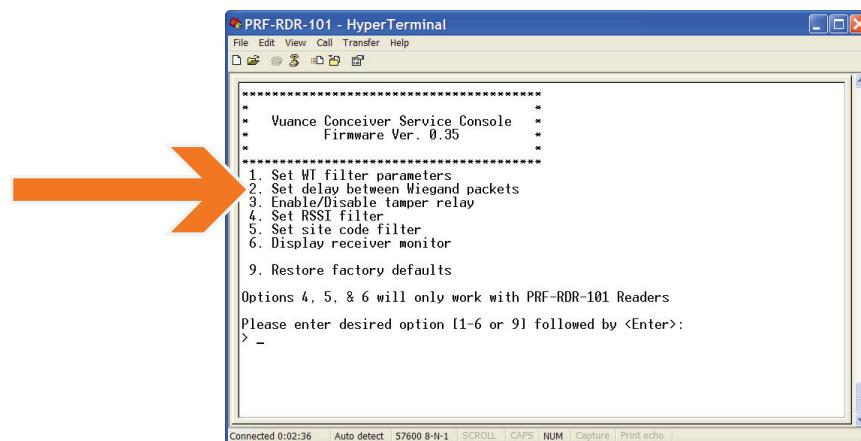
The second setting is called the “[A]bsence Duration after which Tag will be Processed if Received”. This means that a tag must be absent from the field of the receiver for [A] amount seconds, then be received again before [R] amount of Wiegand transmissions will sent out. By default this value is set to 30. This means after a tag is received and [R] amount of Wiegand transmissions are sent, the tag must leave the field of the receiver for 30 seconds, then come back into the field, before it will be sent for [R] amount of times again. The parameter [A] can be set from 1-255 seconds. The receiver will hold up to 50 tags inside its buffer to maintain these filter parameters.

By default this feature is disabled as shown at the top of the screen. This means that no filtering will take place, and a Wiegand transmission will be sent for every tag received by the receiver. Follow the on screen instructions to adjust the parameters and enable or disable the WT Filter Parameter feature.

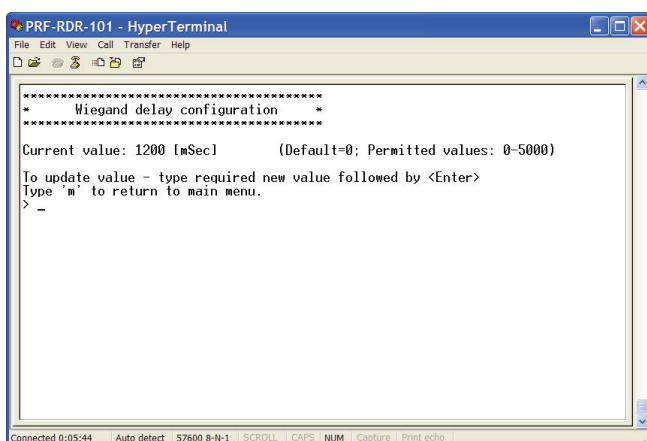
**Note: The letters typed are case sensitive.**

### Set Delay between Wiegand Packets:

After logging onto the Terminal Console and accessing the main page you will see the second option listed as Set Delay between Wiegand packets



Type “2” then press enter



You will see the page for changing the Wiegand delay configuration

The Wiegand Delay Configuration controls how often the receiver is sending out Weigand packets or transmissions, out of the Wiegand Out port to an Access Controller. This parameter is used to adjust the interval speed of the Wiegand packets sent in case an Access Controller will not accept card reads very quickly back to back. The default setting is 1200. This value is in milliseconds meaning that for every tag transmission received, the Wiegand ID data for that tag will be sent out once every 1200 miliseconds or 1.2 seconds. This is a standard acceptable speed for most access controllers. In some cases this speed may be too slow, or too fast. **If you need to adjust it, simply type in the value you would like to use and press enter.**

PRF-RDR-101 - HyperTerminal

File Edit View Call Transfer Help

Wiegand delay configuration

Current value: 1200 [mSec] (Default=0; Permitted values: 0-5000)

To update value - type required new value followed by <Enter>

Type 'm' to return to main menu.

> -

Connected 0:05:44 Auto detect 57600 8-N-1 SCROLL CAPS NUM Capture Print echo

The Wiegand delay can be set from 0-5000 milliseconds meaning 0-5 seconds, in increments of 1 millisecond. It is important to remember that if a tag is being received faster than the receiver is sending out its corresponding Wiegand packets, then the receiver will hold up to 50 tag transmissions inside its buffer. This means that even after the tag is no longer being received by the receiver, you may still get Wiegand transmissions for those tag(s) depending on the tag transmission interval speed and this Wiegand delay interval configuration setting.

## ENABLING RELAY 2 & 3

To enable Relay 2 & 3 to energize for tamper and low battery messages **type 3** (Enable/Disable Tamper Relay) and **press enter on the main menu of the terminal console**.

PRF-RDR-101 - HyperTerminal

File Edit View Call Transfer Help

Vuance Conceiver Service Console Firmware Ver. 0.35

1. Set HT filter parameters  
2. Set delay between Wiegand packets  
3. Enable/Disable tamper relay  
4. Set RSSI filter  
5. Set site code filter  
6. Display receiver monitor  
9. Restore factory defaults

Options 4, 5, & 6 will only work with PRF-RDR-101 Readers

Please enter desired option [1-6 or 9] followed by <Enter>:

> -

Connected 0:02:36 Auto detect 57600 8-N-1 SCROLL CAPS NUM Capture Print echo

PRF-RDR-101 - HyperTerminal

File Edit View Call Transfer Help

Vuance Conceiver Service Console Firmware Ver. 0.35

1. Set HT filter parameters  
2. Set delay between Wiegand packets  
3. Enable/Disable tamper relay  
4. Set RSSI filter  
5. Set site code filter  
6. Display receiver monitor  
9. Restore factory defaults

Options 4, 5, & 6 will only work with PRF-RDR-101 Readers

Please enter desired option [1-6 or 9] followed by <Enter>:

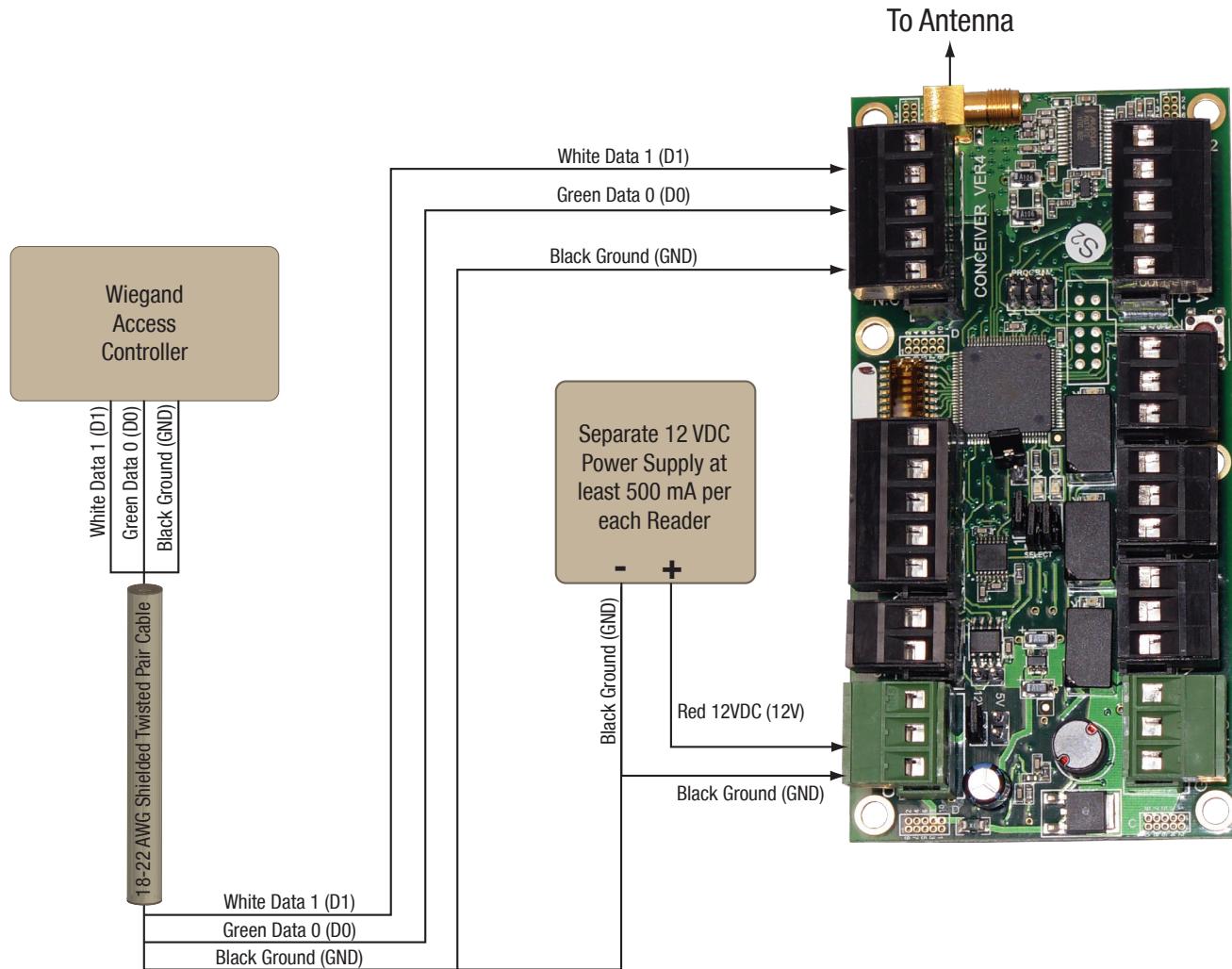
> -

Connected 0:02:36 Auto detect 57600 8-N-1 SCROLL CAPS NUM Capture Print echo

Type in lower case “e” to enable the relay and press enter.

To disable the relays type in lower case “d” and press enter.

## Wiring Diagram for Receiver when using 26 Bit Wiegand Access Controller and a Separate 12VDC Power Supply



### Connecting the Wavetrend Reader to the PureRFid Receiver

The PureRFid Receiver will decode the serial data (RS232 or RS485) from the Wavetrend reader (AA-R500-SP, L-RX201). All the same Wiegand functions as mentioned previously in this document will also be applied to the Wavetrend reader data as well. The following tables illustrate both RS232 and RS485 connections:

RS-232		
Wavetrend Reader	PureRFid Reader	CAT5 Color
RJ45 Pin 1	Not Used	Not Used
RJ45 Pin 2	RS-232 TX	Orange
RJ45 Pin 3	Output 12V	Green / White
RJ45 Pin 4	Output GND	Blue

RS-485			
Wavetrend Reader	PureRFid Reader	CAT5 Color V#1	CAT5 Color V#2
RJ45 Pin 3	Output 12V	Green / White	Blue / White
RJ45 Pin 4	Output GND	Blue	Blue
RJ45 Pin 5	RS-485 D+	Blue / White	Orange / White
RJ45 Pin 6	RS-485 D-	Green	Orange

**Note:** PureRFid has supplied two different CAT5 color designations in the past relating to the RS485 Connections. Refer to the RS485 table above and make note of how the CAT5 wires are terminated on the RJ45 connector.

## Specifications

### Rx Frequency

433.92 MHz

### Power In

11.5VDC - 13.5VDC, 50mA

### Power Out

Voltage: dependent upon input  
Amperage Max = 500mA

### Operational Temperature

-40 °F to +176 °F  
(-40 °C to +80 °C)

### Storage Temperature

-40 °F to +176 °F  
(-40 °C to +80 °C)

### Humidity

5% to 90% (non-condensing)

### PRF-RDR-101 (With Enclosure)

Size 7.7" x 5.3" x 2.8"

Weight 4 oz

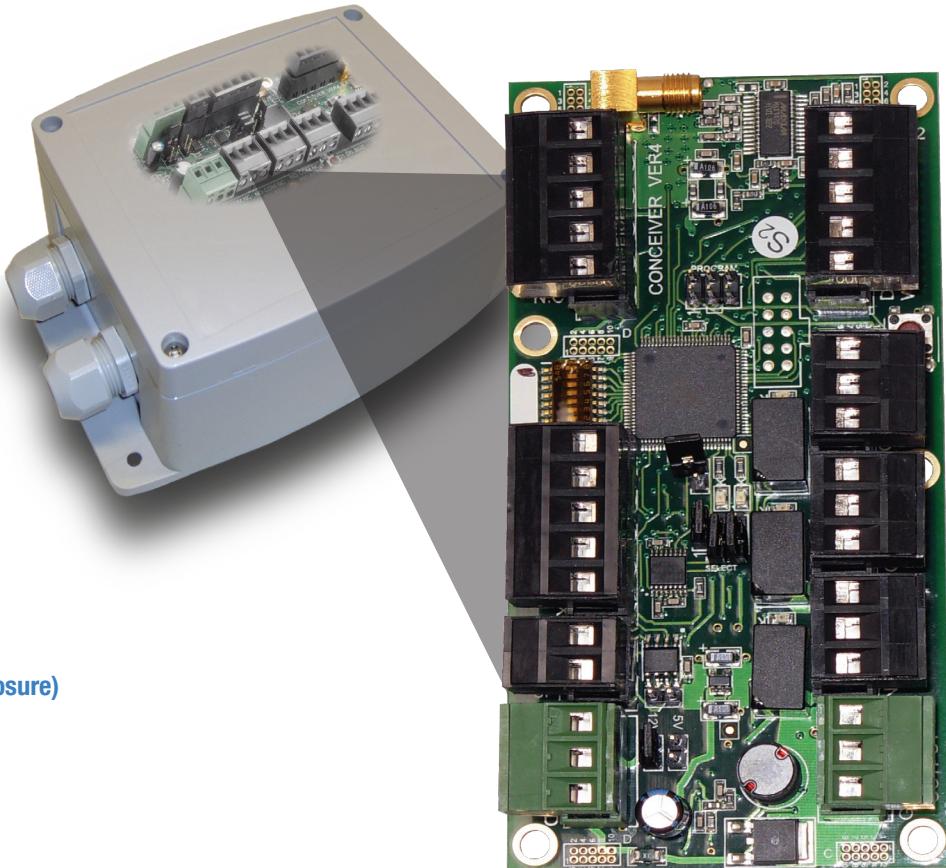
### PRF-RDR-101-PCB (Without Enclosure)

Size 2.32" x 4.3" x 0.8"

Weight 7 oz

### Certification

FCC



## Antenna Options



**PRF-ANT-BLADE**

Small Omni Directional Antenna for non-directional low range applications  
(can be located inside Reader enclosure)



**PRF-ANT-RAEK**  
Small Omni Directional Remote Antenna  
for non-directional medium range  
applications  
(Can be located away from Reader)



**PRF-ANT-RADK-PAT**

**PRF-ANT-RADK-CP**

Large Directional Remote Antenna for  
directional long range  
applications  
(Can be located away from Reader)

