

## Programming & Installing the Premier RF Modem for a Serial Connection to your PC

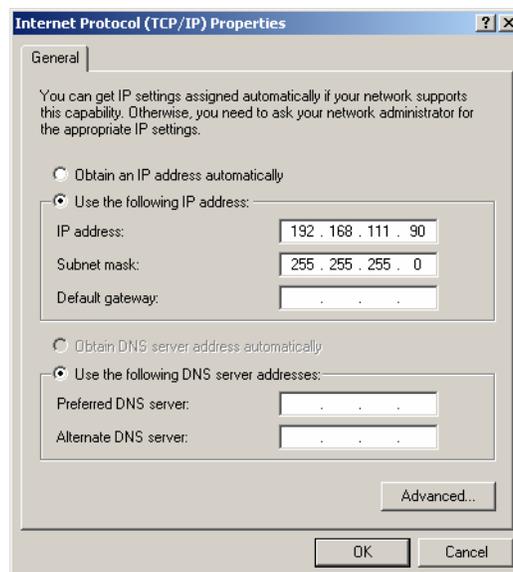
**NOTE:** JM Stewart utilizes an industrial 900 MHz RF Modem from FreeWave Technologies, model FGR 115RC.

The FreeWave Wireless RF Modems (Model *FGRplusRE*) will arrive pre-configured. It is not necessary for you to program these RF modems. Please skip to page 10 for installation instructions.

### Programming the RF Modems

**Start with the RF Modem that will be installed in your Building. (This is the Modem in the Metal Enclosure).**

1. Plug the radio into either your computer (using a crossover cable) or a switch/router using a RJ-45 cable. Connect the power adapter to the radio and a 110 volt outlet.
2. You will need to assign your computer a static IP address on the same subnet to access the radio. You can use **192.168.111.90**. See Figure #1.



**Figure #1**

- The default IP address of the RF Modem from the factory is **192.168.111.100**. Open your web browser (Internet Explorer) and type **192.168.111.100** into the address bar of your web browser. See figure #2.

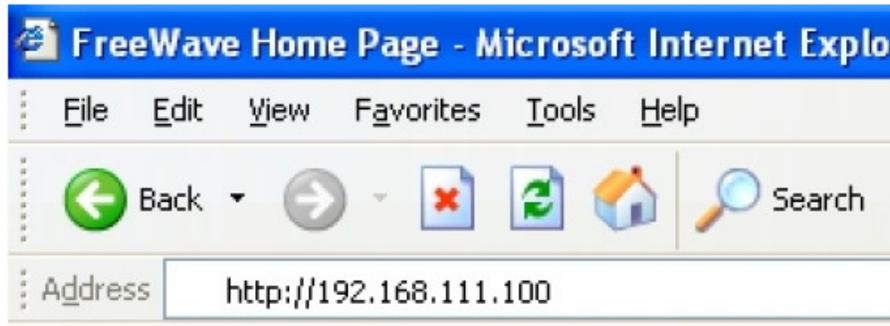


Figure #2

- You will be prompted for a user name and password. The default username for the Administrator login is '**admin**', the password is '**admin**.' See figure #3.



Figure #3

**NOTE:** The first Window that you will see is the Status Window. This Window will include all of your device information. Nothing on this screen is user adjustable. This Window will automatically refresh every 10 seconds. See figure #4



Status	Device Information
IP Setup	900MHz FGR+
Serial Gateway Setup	IP=192.168.111.100 * MAC=00:07:E7:8D:CE:0C * Serial#=9293324 Logged In as Admin
Radio Setup	Firmware Version   2/21/2007 v2.5
Security	Software Boot Version   0
Maintenance/Tools	Hardware Version   1
	Uptime   0 days 1 hours 24 minutes 41 seconds
	Ethernet Interface   100Base-TX Full Duplex
	Modem Stats
	RSSI   -125 dBm
	Noise   -122 dBm
	Voltage   0.00v
	Percent Receive Rate   0.00%
	Reflected Power (VSWR)   90
	Temperature   ~31°C ~ 88°F
	Distance   ~? meters
	Site Information
	Site Name   ""
	Site Contact   ""
	Notes   ""

**Figure #4 – Status Window**



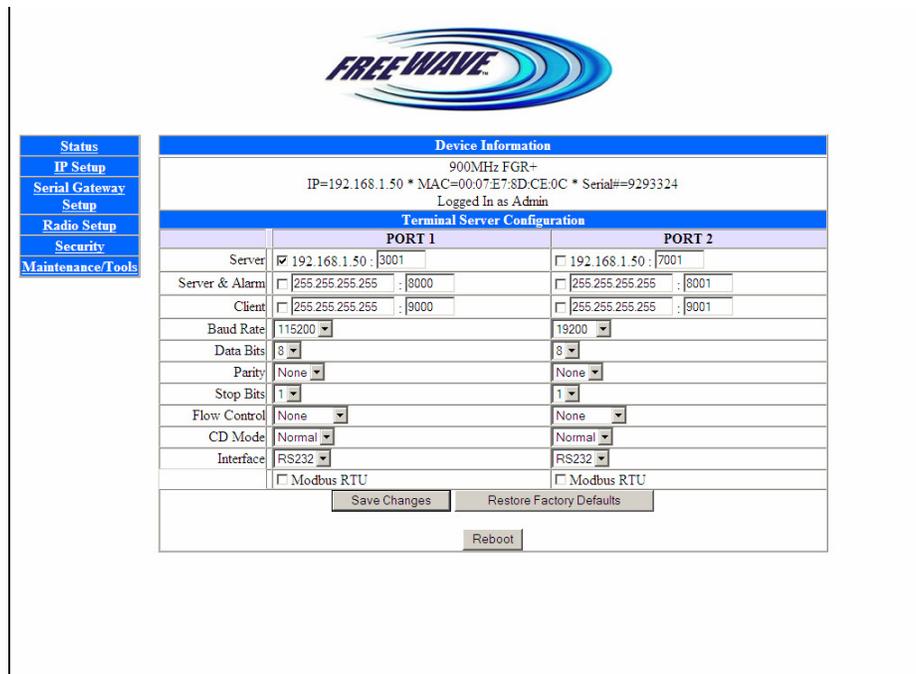
Status	Device Information
IP Setup	900MHz FGR+
Serial Gateway Setup	IP=192.168.111.100 * MAC=00:07:E7:8D:CE:0C * Serial#=9293324 Logged In as Admin
Radio Setup	Lan Network Interface Configuration
Security	IP Address   192.168.111.100
Maintenance/Tools	Subnet Mask   255.255.255.0
	Default Gateway   192.168.111.1
	Web Page Port   80
	<input type="button" value="Save Changes"/> <input type="button" value="Restore Factory Defaults"/>
	<input type="button" value="Reboot"/>

**Figure #5 - IP Setup**

**5. Configuring the Building Modem –IP Setup.**

- a. Click on “**IP Setup**”. The IP Setup Window will be displayed See figure #5.
- b. Enter in the IP Address of **192.168.1.50** for the RF Modem that will reside in your building. Enter a Subnet Mask of **255.255.255.0** and a Gateway of **192.168.1.1**. Leave the “Web Page Port” unchanged at 80.
- c. Record the IP Addresses for each RF Modem on a piece of paper and tape it to the RF Modem for future reference.
- d. Click on “**Save Changes**” to save your settings.

- e. Click on **“Reboot”** for the changes to take affect.
- f. Close your Web Browser (Internet Explorer).
- g. You will need to assign your computer a static IP address on the same subnet to access the radio at its new IP Address. Please use **192.168.1.55**.
- h. Open your Web Browser and type **192.168.1.50** into the address bar of your web browser.
- i. You will be prompted for a user name and password. The default username for the Administrator login is **‘admin’**, the password is **‘admin.’**



**Figure #6 - Serial Gateway Window**

## **6. Configuring the Building Modem – Serial Gateway.**

- a. Click on **“Serial Gateway”**. The IP Setup window will be displayed See figure #6.
- b. Under the section for **“PORT 1”**, make sure there is a check mark in the box next to **“Server”**. The IP Address you entered on the **“IP Setup”** Window should appear next to the check mark. See figure #6.
- c. Enter **“3001”** in the box to the right of the IP Address.
- d. Change the **“Baud Rate”** to **115,200**.
- e. Under the section for **“PORT 2”**, remove the check mark next to the IP Address.

- f. For all other settings on the Serial Gateway Window use the defaults as shown in figure #6.
- g. Click on “**Save Changes**” to save your settings.

1. **Configuring the Building Modem –Radio Setup.**

- a. Click on “**Radio Setup**”. See figure #7.
- b. Make sure the “Network Type” is set to “**Point-to-Point**”. Select “**Gateway**” for the Modem Mode.
- c. Click on “**Save Changes**”.
- d. Click on “**Call Book**” (on the bottom of the “Radio Setup” Window. This will open the Call Book Window.
- e. Enter the serial number of the **OTHER** RF Modem in the space provided in line 0. If there is already a number in this space you can delete it and type your number in its place. See figure #7. (The Serial Number of the RF Modem can be found on the label attached to the RF Modems).
- f. Click the “Save Changes” button to save these changes.
- g. Close the “Call Book” Browser Window to get back to the “Radio Setup Browser Window”
- h. Click on “**Reboot**” for the changes to take affect.
- i. Close all Browser Windows. This concludes the programming for the Building Modem.

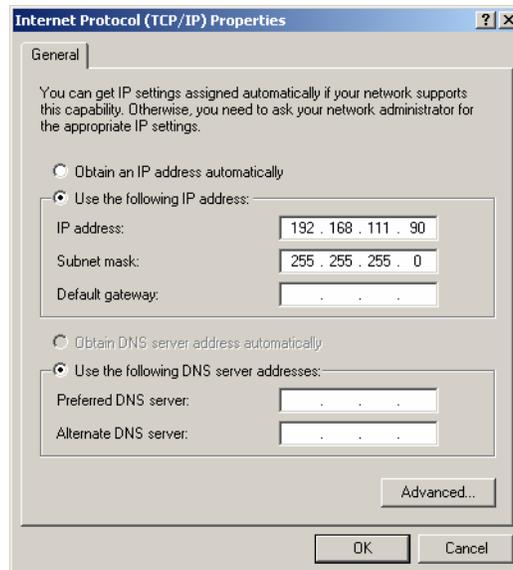


<ul style="list-style-type: none"> <li>Status</li> <li>IP Setup</li> <li>Serial Gateway Setup</li> <li><b>Radio Setup</b></li> <li>Security</li> <li>Maintenance/Tools</li> </ul>	<b>Device Information</b>	
	900MHz FGR+	
	IP=192.168.111.100 * MAC=00:07:E7:8D:CE:0C * Serial#=9293324	
	Logged In as Admin	
	<b>Operation Mode</b>	
	Network Type	Point-To-Point <span style="color: red;">← Select Point-to-Point</span>
	Modem Mode	Gateway <span style="color: red;">← Select Gateway</span>
	<b>Transmission Characteristics</b>	
	Frequency Key	5
	Frequency Zones	<input checked="" type="checkbox"/> 902.2-903.9 <input checked="" type="checkbox"/> 904.1-905.5 <input checked="" type="checkbox"/> 905.7-907.1 <input checked="" type="checkbox"/> 907.3-908.7 <input checked="" type="checkbox"/> 908.9-910.3 <input checked="" type="checkbox"/> 910.5-911.9 <input checked="" type="checkbox"/> 912.2-913.5 <input checked="" type="checkbox"/> 913.8-915.1 <input checked="" type="checkbox"/> 915.4-916.8 <input checked="" type="checkbox"/> 917.0-918.6 <input checked="" type="checkbox"/> 918.8-920.2 <input checked="" type="checkbox"/> 920.4-921.8 <input checked="" type="checkbox"/> 922.1-923.4 <input checked="" type="checkbox"/> 923.7-925.1 <input checked="" type="checkbox"/> 925.3-926.7 <input checked="" type="checkbox"/> 926.9-927.8
	Packet Size	MAX=9 MIN=1
	Transmit Power	10
Retry Timeout	255	
RF Data Rate	154 kbps	
Transmit Rate	Normal	
<b>Multipoint Parameters</b>		
Broadcast Repeat	3	
Network ID	255	
Repeaters	Disabled	
Subnet ID	Rx= F Tx= F	
Shared Access	Disabled	
<a href="#">Call Book</a> <a href="#">Click Here</a>		
<input type="button" value="Save Changes"/> <input type="button" value="Undo Changes"/> <input type="button" value="Restore Factory Defaults"/>		
<input type="button" value="Reboot"/>		

**Figure #7 - Radio Setup Window**

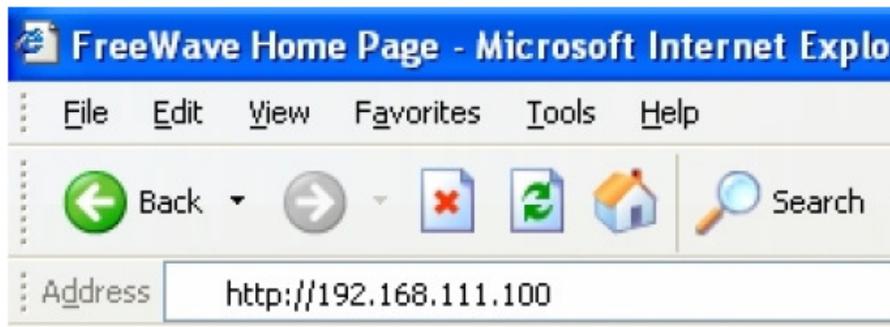
## Setting up the RF Modem that will be installed in your Sign (This is the Modem with the Exposed Circuit Boards).

2. Plug the radio into either your computer (using a crossover cable) or a switch/router using a RJ-45 cable. Connect the power adapter to the radio and a 110 volt outlet.
3. You will need to assign your computer a static IP address on the same subnet to access the radio. You can use **192.168.111.90**. See Figure #8.



**Figure #8**

4. The default IP address of the RF Modem from the factory is **192.168.111.100**. Open your web browser (Internet Explorer) and type **192.168.111.100** into the address bar of your web browser. See figure #9.



**Figure #9**

5. You will be prompted for a user name and password. The default username for the Administrator login is **'admin'**, the password is **'admin.'** See figure #10.



**Figure #10**

## **6. Configuring the Sign Modem - IP Setup.**

- a. Click on **“IP Setup”**. The IP Setup Window will be displayed. See figure #5.
- b. Enter in the IP Address **192.168.1.51** for the RF Modem that will reside in the sign. Enter a Subnet Mask of **255.255.255.0** and a Gateway of **192.168.1.1**. Leave the “Web Page Port” unchanged at 80.
- c. Record the IP Addresses for each RF Modem on a piece of paper and tape it to the RF Modem for future reference.
- d. Click on “Save Changes” to save your settings.
- e. Click on “Reboot” for the changes to take affect.
- f. Close your Web Browser (Internet Explorer).
- g. You will need to assign your computer a static IP address on the same subnet to access the radio at its new IP Address. Please use 192.168.1.55.
- h. Open your Web Browser and type **192.168.1.51** into the address bar of your web browser.
- i. You will be prompted for a user name and password. The default username for the Administrator login is ‘admin’, the password is ‘admin.’

## **7. Configuring the Sign Modem - Serial Gateway.**

- a. Click on “**Serial Gateway**”. See figure #11.
- b. Under the section for “**PORT 1**”, **remove** the check mark the box next to “**Server**” and put a check mark next to “**Client**”.
- c. Next to the “**Client**” check box type in the IP Address of the **Other** RF Modem: **192.168.1.50**.
- d. Enter “**3001**” in the box to the right of the “**Client**” IP Address.
- e. Change the “**Baud Rate**” to **115,200**.
- f. Under the section for “**PORT 2**”, remove the check mark next to the IP Address.
- g. Click on “**Save Changes**” to save your settings.



Status	Device Information	
IP Setup	900MHz FGR-	
Serial Gateway Setup	IP=192.168.111.100 * MAC=00:07:E7:8D:CE:0C * Serial#=9293324	
Radio Setup	Logged In as Admin	
Security	Terminal Server Configuration	
Maintenance/Tools	PORT 1	PORT 2
	Server <input type="checkbox"/> 192.168.111.100 : 7000	<input type="checkbox"/> 192.168.111.100 : 7001
	Server & Alarm <input type="checkbox"/> 255.255.255.255 : 8000	<input type="checkbox"/> 255.255.255.255 : 8001
	Client <input checked="" type="checkbox"/> 192.168.1.50 : 3001	<input type="checkbox"/> 255.255.255.255 : 9001
	Baud Rate 115200	19200
	Data Bits 8	8
	Parity None	None
	Stop Bits 1	1
	Flow Control None	None
	CD Mode Normal	Normal
	Interface RS232	RS232
	<input type="checkbox"/> Modbus RTU	<input type="checkbox"/> Modbus RTU
	Save Changes	Restore Factory Defaults
	Reboot	

**Figure #11 - Sign Modem / Serial Connected**

**8. Configuring the Sign Modem –Radio Setup.**

- j. Click on “**Radio Setup**”. See figure #12.
- k. This is the RF Modem that is to be installed in your Sign, make sure the “**Network Type**” is set to “**Point-to-Point**”. Select “**End Point**” for the Modem Mode.
- l. Click on “**Save Changes**”.
- m. Click on “**Call Book**” (on the bottom of the “**Radio Setup**” Window. This will open the Call Book Window.
- n. Enter the serial number of the **OTHER** RF Modem in the space provided in line 0. If there is already a number in this space you can delete it and type your number in its place. See figure #13. (The Serial Number of the RF Modem can be found on the label attached to the RF Modems).
- o. Click the “**Save Changes**” button to save these changes.

- p. Close the “Call Book” Browser Window to get back to the “Radio Setup Browser Window”
- q. Click on “**Reboot**” for the changes to take affect.
- r. Close all Browser Windows. Your RF Modems are ready to install.



Status	Device Information
IP Setup	900MHz FGR+
Serial Gateway Setup	IP=192.168.111.100 * MAC=00:07:E7:8D:CE:0C * Serial#=9293324
Radio Setup	Logged In as Admin
Security	Operation Mode
Maintenance/Tools	Network Type: Point-To-Point <span style="color: red;">← Select Point-To-Point</span>
	Modem Mode: EndPoint <span style="color: red;">← Select EndPoint</span>
	Transmission Characteristics
	Frequency Key: 5
	Frequency Zones: <ul style="list-style-type: none"> <li><input type="checkbox"/> 902.2-903.9 914.1-905.5 905.7-907.1 907.3-908.7</li> <li><input type="checkbox"/> 908.9-910.3 911.5-911.9 912.2-913.5 913.8-915.2</li> <li><input type="checkbox"/> 915.4-916.8 917.0-918.6 918.8-920.2 920.4-921.8</li> <li><input type="checkbox"/> 922.1-923.4 923.7-925.1 925.3-926.7 926.9-928.3</li> </ul>
	Packet Size: MAX=9 = 1
	Transmit Power: 10
	Retry Timeout: 255
	RF Data Rate: 154kbps
	Transmit Rate: Normal
	Multipoint Parameters
	Broadcast Repeat: 3
	Network ID: 255
	Repeaters: Disabled
	Subnet ID: Rx= F F
	Shared Access: Disabled
	<a href="#">Call Book</a> <a href="#">Click Here</a>
	<input type="button" value="Save Changes"/> <input type="button" value="Undo Changes"/> <input type="button" value="Restore Factory Defaults"/>
	<input type="button" value="Reboot"/>

**Figure #12 - Radio Setup Window**

Device Information			
900MHz FGR+			
IP=192.168.111.100 * MAC=00:07:E7:8D:CE:1A * Serial#=9293338			
Logged In as Admin			
Call Book			
<i>Gateway --&gt; Repeater 1 --&gt; Repeater 2 --&gt; Remote</i>			
Entry To Call	EndPoint Serial Number	1st Repeater Serial Number	2nd Repeater Serial Number
<input checked="" type="radio"/> All	9293324		
<input type="radio"/> 0			
<input type="radio"/> 1			
<input type="radio"/> 2			
<input type="radio"/> 3			
<input type="radio"/> 4			
<input type="radio"/> 5			
<input type="radio"/> 6			
<input type="radio"/> 7			
<input type="radio"/> 8			
<input type="radio"/> 9			
<i>(Use EndPoint Value of 9999999 For Repeater Links Of 3 or More)</i>			
<input type="button" value="Save Changes"/>			
<input type="button" value="Clear"/>			

**Figure #13 - Call Book Window**

## Installing the RF Modems

1. Included in the RF Modem box is the following:
  - a. One RF Modem installed in a Metal Enclosure (to be used in the building).
  - b. One RF Modem with Exposed Circuit Boards (to be used in the sign).
  - c. Antenna adapters
  - d. 2 ea. Antennas
  - e. 2 ea. power adapters
  - f. 1 ea. Gray cable with DB-9 (RS232) connector on one end and a 6 pin Panduit on the other end.
  - g. 1 ea. 6 Ft. length Ethernet cable
  - h. 1 ea. 6 ft. serial cable
  - i. 1 ea. instructions “Installing the Premier (FreeWave) Wireless Modem”.
  - j. 1 ea. CD User’s Manual.

### Connecting your RF Modem to the CPU Board in the Sign

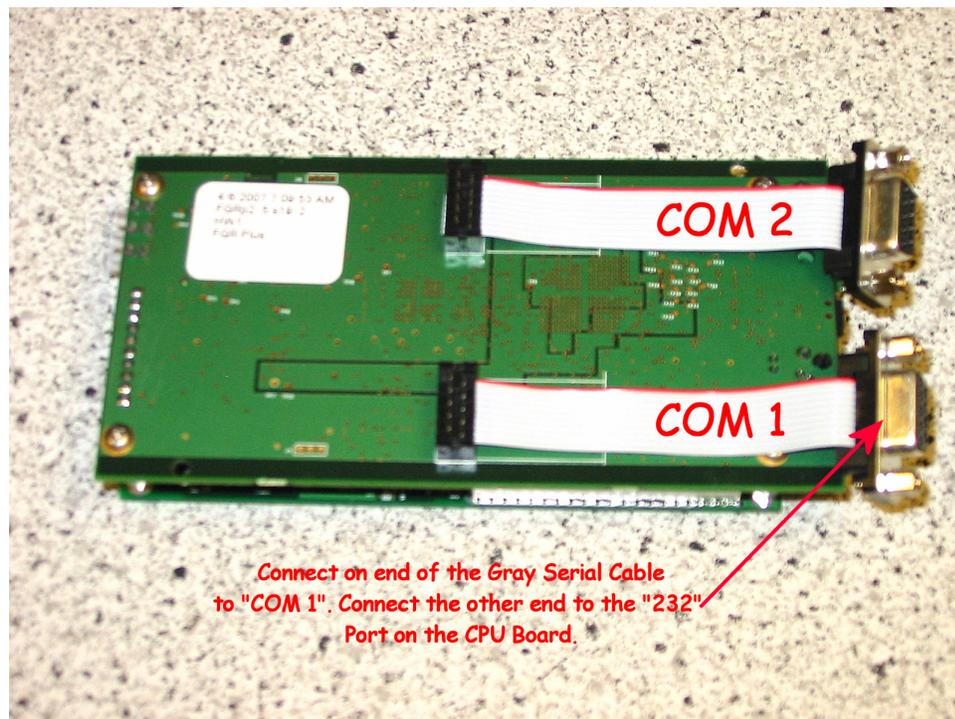
2. The Wireless RF Modem that is not installed a metal case is the one you will be installing inside ID cabinet #1 of the sign. ID cabinet #1 is identified by the temperature probe mounted at the lower left corner of the LED cabinet. Figure #14



**Figure #14 - The Temp Probe is Located at the Bottom Left of ID# 1**

***NOTE: To Avoid electrical shock be sure and Install the RF Modem in the Sign BEFORE you plug in the Power Adapter.***

3. Find the Wireless RF Modem that is **NOT** installed in a Metal Case. Find the gray serial cable. This cable has a DB-9 (9 pin) connector on one end and a 6 pin Panduit connector on the other end.
4. Connect the gray serial cable to the Serial Port on the RF Modem identified as **COM 1**. This port is located just above the female RJ46 connector on the Wireless RF Modem. Secure the serial cable to the RF Modem by tightening the two captive screws on the Adapter. See figure # 15.

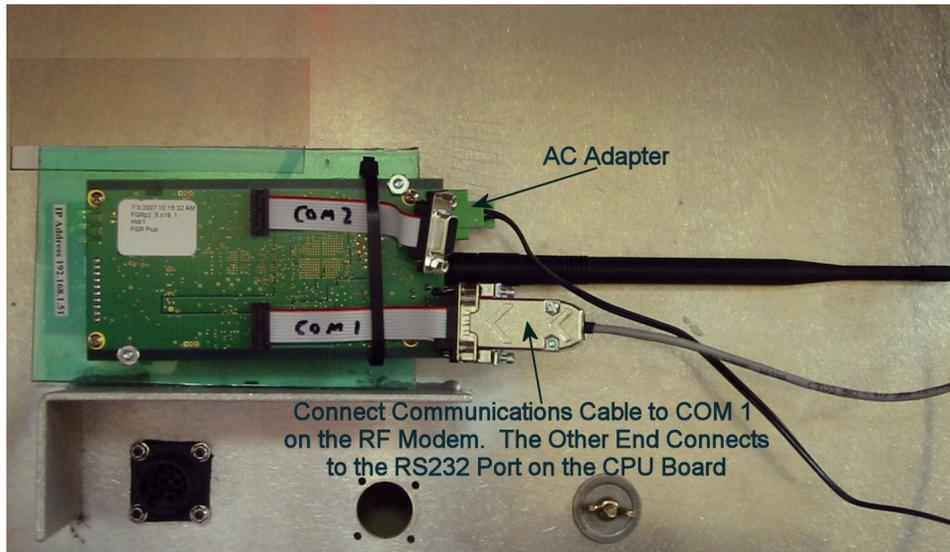


**Figure #15 - Connect the DB9 to Panduit Cable to COM 1**

5. Attach the included antenna to the Antenna Port on the Wireless RF Modem.
6. On ID cabinet #1, open the Lid on the LED portion of the sign by removing the Phillips screws surrounding the Lens.
7. Unscrew the Wing Nuts at the bottom of the LED panel and remove the bolts. Raise the LED panel. Use the aluminum pole located inside the sign to prop the LED panel up. This will expose the electronics mounted to the inside rear of the LED cabinet.

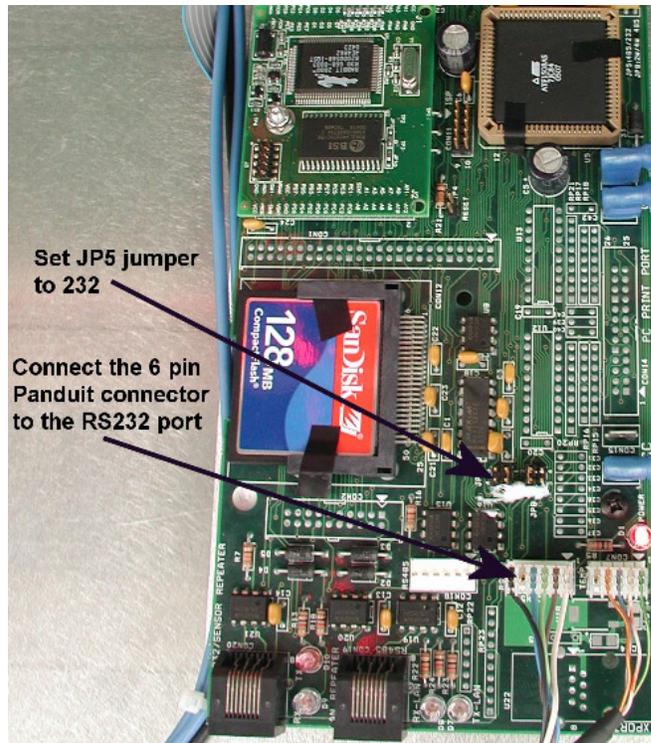
8. Peel the protective covering from the Velcro located on the bottom of the Wireless RF Modem. Secure the Wireless RF Modem to the shelf inside rear panel of the sign, just below the electronic circuit boards. See figure #16.

**CAUTION: Do not place any electrical devices on the inside bottom of the LED cabinet. Water can collect in this location before draining out of the weep holes.**



**Figure #16**

1. Connect the AC adapter provided to the AC receptacle inside the sign. It is highly recommended to secure the AC adapter to the receptacle with a nylon zip tie. Connect the other end to the power jack on the Wireless RF Modem.
9. Locate the gray serial cable you attached to the Wireless RF Modem in step 3. Attach the 6 pin Panduit connector to the RS232 port on the CPU board inside ID cabinet #1. This port is labeled **RS232** on the CPU board. See figure #17.
10. Make sure the RS232 / RS485 jumper is set correctly. Locate jumper pin set marked **JP5**, (This jumper is located 1 inch above and to the right of the CON5 connector you plugged the cable into in step 8). The jumper should be on the set of pins marked 232. See figure #17.



**Figure #17 - CPU Board Inside of the Sign**

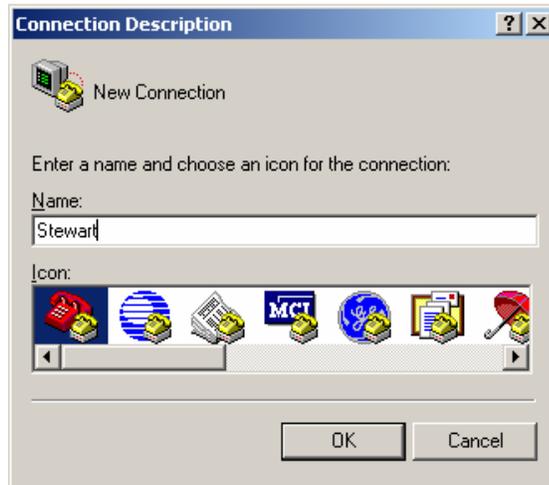
## Connecting your RF Modem to the PC in your Building

1. The Wireless RF Modem that is installed in the metal case is to be installed at the PC in your building that you will use to communicate to the sign.
2. Locate the DB9 to DB9 serial cable included with Wireless RF Modem. Attach one end of this cable to the Serial Port on the Wireless RF Modem marked “**COM 1**”.
3. Attach the other end of the DB9 serial cable to the Serial Port on the PC that you will use to communicate to the sign.
4. Connect the AC adapter provided to an AC receptacle. Connect the other end to the “**DC Input**” receptacle on the Wireless RF Modem.
5. Using the included antenna adapters attach the antenna to the Antenna Port on the Wireless RF Modem.
6. After both Wireless RF Modems are connected, you should be able to successfully connect to the sign using Complay Software.

## Troubleshooting

### Testing the RF Modems by Performing a Loopback Test

1. Remove the serial cable and the BLACK null modem adapter from the modem inside the sign. Connect pin 2 to pin 3 on the DB9 connector **on the RF Modem**. Or you can purchase a DB9 Serial loopback connector from an electronics supply store and install it instead.
2. Go back to the PC that the other RF Modem is connected to. Make sure the power adapter is connected to the modem. Make sure the modem is connected to the COM 1 serial port on your PC.
3. Click on the Microsoft Start button. A menu will appear. Select the following: “Programs”, “Accessories”, “Communications” and then “HyperTerminal”. The Hyper Terminal window will appear. See figure #18.



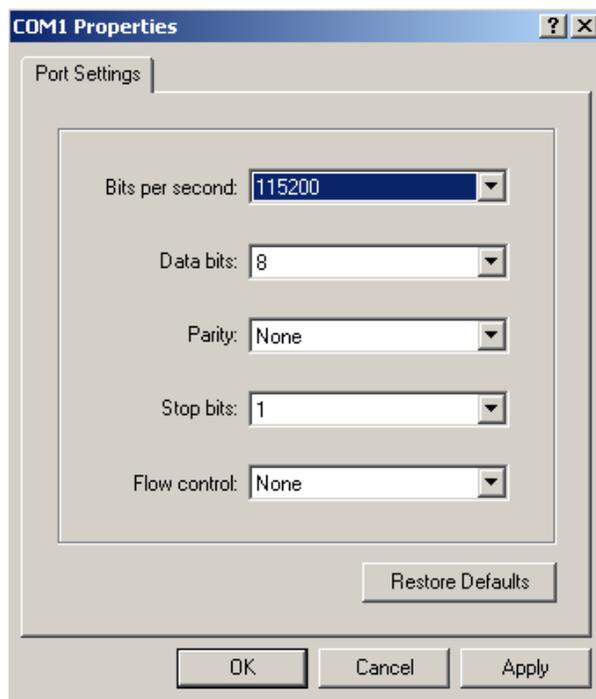
**Figure #18**

4. In the “Connection Description” text box, type in any name. Click on the **OK** button. The “Connect To” dialog box appears. See figure #19.



**Figure #19**

5. Select the connection type to be used. From the **“Connect using”** drop-down menu select either **COM1** or **COM2** depending which PC Serial Port you plugged the serial cable into.
6. Click on the **OK** button. The **“COM1 (or COM2) Properties”** dialog box appears for the selected connection type. See figure #20.



**Figure #20**

7. The following are the port settings which must be set for a proper connection:

Port Setting	Menu Option to Select
Bits per second	19200
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

8. After selecting the appropriate menu items for each setting, click the “Apply” button and then the “OK” button. A Hyper Terminal window will appear. See figure #21

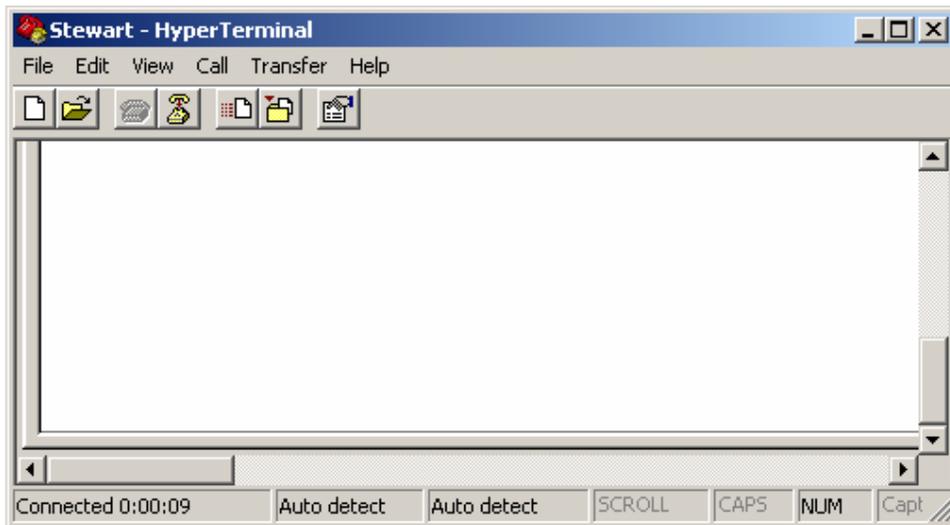


Figure #21

9. You should be able to type characters on the Hyper Terminal window. These characters should echo back to the window. If you type characters and nothing appears in the Hyper Terminal window perform the following:

- Place a Loopback connector (or connect pin 2 to pin3) on the serial port of your PC. If the Loopback test fails, there is a problem with the serial port on your PC.
- Place the Loopback connector (or connect pin 2 to pin3) on the end of the serial cable coming from your PC and repeat the Loopback test. If the Loopback test fails replace the serial cable. If the Loopback test passes check the position and programming of the RF Modems. Bring the modem from the sign into your room and try the test again with the two modems in visual range on each other. If the Loopback test passed with the modems within visual range and fails with one modem in the sign you probably have too many obstructions between the Modems or the Modems are not within communication range of each other.