

Point-to-Point EtherNet I/P Setup with FGRPlus Ethernet Radio Modems

Applies To

Allen Bradley:

- MicroLogix 1100, 1400
- SLC 5/05

FreeWave Technologies:

- HTP-900RE (firmware version 2.18)

Summary

This application note describes how to configure FreeWave HTP-900RE Ethernet Radio Modems and Allen Bradley EtherNet I/P devices to create a wireless EtherNet I/P network. A Micrologix 1100 is used as an example in this document. The PLC configuration is similar, if not identical, to the configuration that would be used in a MicroLogix 1400 and SLC5/05.

Gateway FGRplusRE Settings

The following steps provide an overview of the configuration procedure for the Gateway FGRplusRE.

1. If you know the radio's IP address, skip to step 10. If you do not know the radio's IP address proceed to step 2.
 - a. The factory default IP address is 192.168.111.100.
2. With the radio disconnected from power, connect COM 1 of the radio to an available COM port on your computer, using a straight through serial cable.
3. Open HyperTerminal, or a similar terminal window program. Select a connection to the COM port to which the radio is connected. Set the port settings to the following values:
 - a. Bits per second: 19,200
 - b. Data bits: 8
 - c. Parity: None
 - d. Stop bits: 1
 - e. Flow control: None
4. Once the connection is open, power the radio with a power supply between 6V and 30V. After a few seconds, the following prompt will appear in the HyperTerminal window: Do you want to Enter Setup? (y) or (Y)
5. Enter a 'y' or a 'Y' within 2 seconds to go into the IP setup menu of the radio.
 - a. Any other key will prompt the radio to exit the setup screen.
6. Enter the Administrative password at the 'Enter Password' prompt.
 - a. The factory default password is 'admin'.
7. Select option 2, IP Setup, from the FreeWave Setup Menu that appears.
8. In the IP Setup Menu, option 1 displays the IP address of the radio and option 4 displays the web port. Make a note of both of these numbers.
9. Press Esc twice to exit the setup menu and then disconnect the HyperTerminal session. You may also disconnect the serial cable from the radio.
10. Plug the radio into a computer using an RJ-45 cable.
11. Assign a unique static IP address to the computer.
 - a. The computer's IP address should be on the same subnet as the radio's IP address.
 - b. If the radio's subnet mask is left at its default value of 255.255.255.0, then the first 3 number sets (octets) of the computer's and the radio's IP addresses must match, while the fourth octet should be different.

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- c. (same).(same).(same).(different)
- 12. Open a web browser and type the IP address of the radio into the address bar.
 - a. If the web port is at the default (standard) value of 80, type only the IP address after http://
 - i. For example, for a radio with an IP address of 192.168.111.90 and a web port of 80, type 'http://192.168.111.90'.
 - b. If the web port is a value other than 80, type 'http://<IP address>:<Port>'
 - i. For example, for a radio with an IP address of 192.168.111.90 and a web port of 5150, type 'http://192.168.111.90:5150'.
- 13. In the popup window that appears, select the admin user name and enter the Administrative password.
 - a. The factory default password is 'admin'.
- 14. In the webpage, configure the radio by changing the settings under each of the following menus. After making changes in each menu, click the 'Save/Apply' button at the bottom of the page before moving on to the next menu. In the case of the IP Setup Menu, you must click both the 'Save Changes' button and the 'Reboot' button.
 - a. IP Setup:
 - i. LAN Network Interface Configuration:
 - 1. IP Address: Set to a unique address
 - 2. Subnet Mask: 255.255.255.0 (default)
 - 3. Default Gateway: 255.255.255.0
 - a. Set to the above unless otherwise required by the application
 - 4. Web Page port: 80 (default)
 - 5. Force SSL Enable: Unchecked
 - 6. Spanning Tree Enabled: Unchecked
 - ii. VLAN Configuration
 - 1. Management VLAN ID: 0
 - 2. Data VLAN ID: 0
 - 3. Local Interface: Un-Tagged
 - b. Serial Setup:
 - i. All settings in this configuration page can be left at defaults
 - c. Radio Setup
 - i. Operation Mode:
 - 1. Network Type: Point to Point
 - 2. Modem Type: Gateway
 - ii. Transmission Characteristics:
 - 1. Frequency Key: Any entry from 0 through E.
 - a. Avoid using the default value of 5.
 - 2. Frequency Zones: Leave all zones checked
 - 3. Packet Size: Max=9, Min=1
 - 4. Transmit Power: Application dependent
 - a. Select the lowest transmit power setting that provides a reliable wireless link. If unsure, use 10. For a bench test, setting transmit power to 0 should be sufficient. Increasing the transmit power increases the distance across which the radios remain linked, at the expense of increased power consumption.
 - 5. Retry Timeout: 255
 - 6. RF Data Rate: Application dependent
 - a. A setting of 154 kbps should be used when the transceivers are close together and data throughput needs to be optimized. A setting of 115 kbps should be used when the transceivers are

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- farther away and a solid data link is preferred over data throughput.
- iii. Point-To-Point Parameters:
 - 1. Transmit Rate: Normal
 - 2. Call Book: Enter the serial number of the unit that will be used as the Endpoint into the Call Book 'EndPoint Serial Number' column, in row 0. Select 'Entry to Call' row 0.
 - iv. Multipoint Parameters:
 - 1. All settings in this configuration page can be left at defaults.
15. Reboot the radio by cycling power.

Endpoint FGRplusRE Settings

The following steps provide an overview of the configuration procedure for the Endpoint FGRplusRE.

1. If you do not know the radio's IP address, follow steps 2-9 outlined in the Gateway FGRplusRE Settings section to find this information.
2. Plug the radio into a computer using an RJ-45 cable.
3. Verify that a unique static IP address is assigned to the computer, and is on the same subnet as the radio's IP address.
4. Open a web browser and type the IP address of the radio into the address bar.
5. In the popup window that appears select the admin user name and enter the Administrative password.
6. Perform step 14 of the Gateway radio configuration with the following exceptions:
 - a. IP Address: Set to a unique address with the first three octets matching the Gateway FGRplusRE
 - i. (same).(same).(same).(different)
 - b. Radio Setup
 - i. Operation Mode
 - 1. Modem Type: Endpoint
 - c. Call Book: Enter the serial number of the unit that will be used as the Gateway into the Call Book 'EndPoint Serial Number' column, in row 0. Select 'Entry to Call' row 0.
7. Reboot the radio by cycling power.
8. Power both the Gateway and Endpoint radios.
 - a. Upon establishing a wireless link both the Gateway and Endpoint radios will display a solid green Carrier-Detect (CD) LED and blinking red Transmit (TX) and Clear-To-Send (CTS) LEDs.

PLC Settings

For the purposes of this document, the EtherNet I/P device described will be a MicroLogix 1100. However, the following EtherNet I/P devices will have similar (if not identical) settings

- MicroLogix 1400
- SLC5/05

The following steps provide an overview of the configuration procedure for the MicroLogix 1100.

1. Power up the MicroLogix 1100 and establish a connection to a PC running RSLinx and RSLogix 500.
2. Configure the channel 1 port as follows:
 - a. IP Address: Set to a unique address with the first three octets matching the other PLC
 - i. (same).(same).(same).(different)
 - b. Subnet Mask: 255.255.255.0

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- c. Gateway Address: 255.255.255.0
- d. Default Domain Name, Primary Name Server and Secondary Name Server:
 - i. No settings needed
- e. Network Link ID: 0
- f. Protocol Control:
 - i. BOOTP Enable: Unchecked
 - ii. SNMP Server Enable: Unchecked (if not grayed out)
 - iii. HTTP Server Enabled: Checked (not required for this application)
 - iv. Auto Negotiate: Checked
 - v. Port Setting: (should be grayed out)
 - vi. DHCP Enable: Unchecked
 - vii. SMTP Client Enabled: Checked or Unchecked
 - viii. Msg connection Timeout: 15000ms
 - ix. Msg Reply Timeout: 300ms
 - x. Inactivity Timeout: 30Min
- 3. Select 'OK' or 'Apply'.
- 4. For the other MicroLogix 1100, follow steps 2 through 3, making sure that each device has an IP address that has the same first three octets and a unique forth octet.
 - a. (same).(same).(same).(different)

With the above settings you will be able to send messages from the PLC attached to the Gateway radio to the PLC attached to the Endpoint radio, and vice versa. Best practice is to do all messaging from the Gateway PLC to help reduce network traffic. It is also recommended that whenever an FGRPlus Ethernet radio is used in a PLC network in which it is connected via a switch to a larger network, the switch should be a managed type so that all traffic not destined to go across the wireless network is blocked from reaching the FGRPlus.