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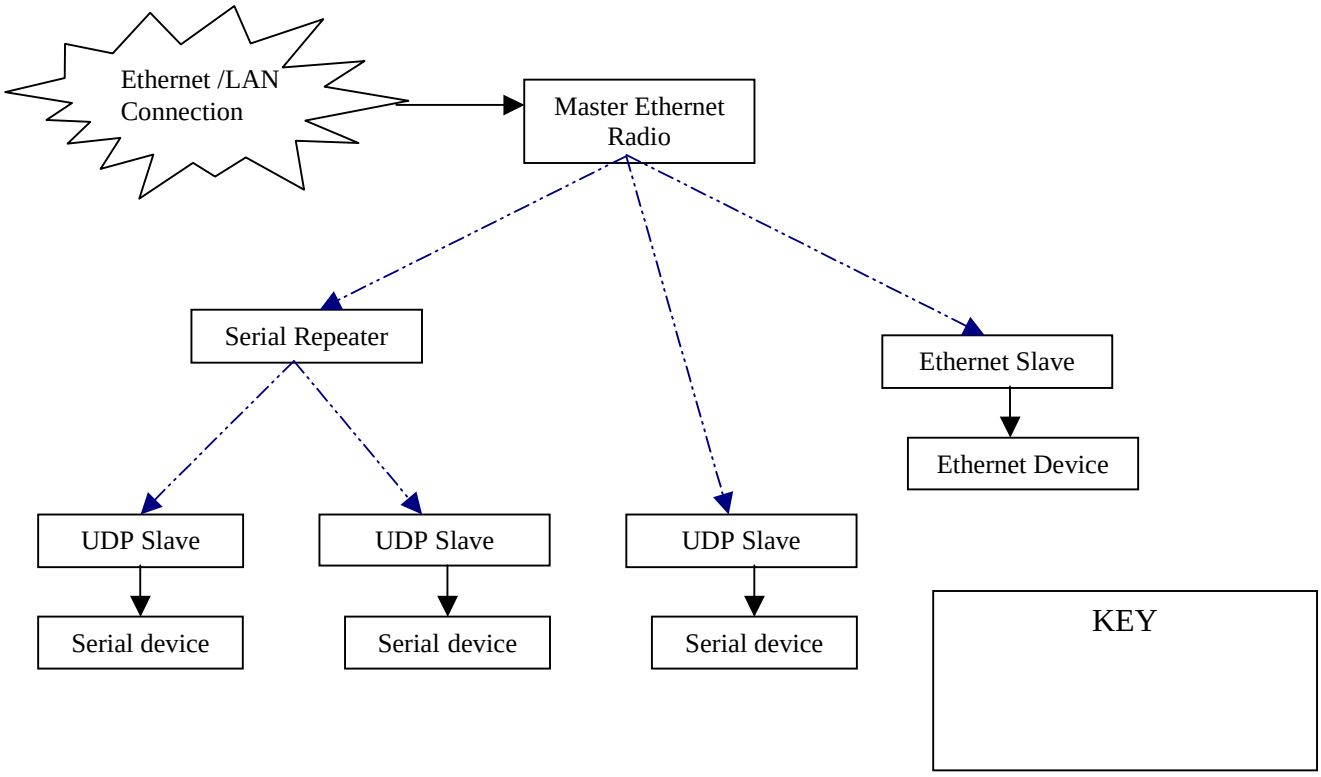
Utilizing UDP Mode to Link Serial Devices to an Ethernet Backbone

November 6, 2002

Purpose

FreeWave Technologies has added a great new UDP mode feature that allows the end user the added ability to poll a serial network through an Ethernet backbone. This allows the user to poll the serial network through your corporate Ethernet network (if the polling software supports the UDP protocol). Now with the FreeWave UDP protocol you can bring data from legacy serial devices onto the corporate network.

This application note details the settings required to successfully set up and use a UDP connection between a FreeWave Ethernet radio and a FreeWave FGR-series serial radio. Only settings unique to a UDP connection are described in this Application Note. The UDP protocol will only work in multipoint systems.



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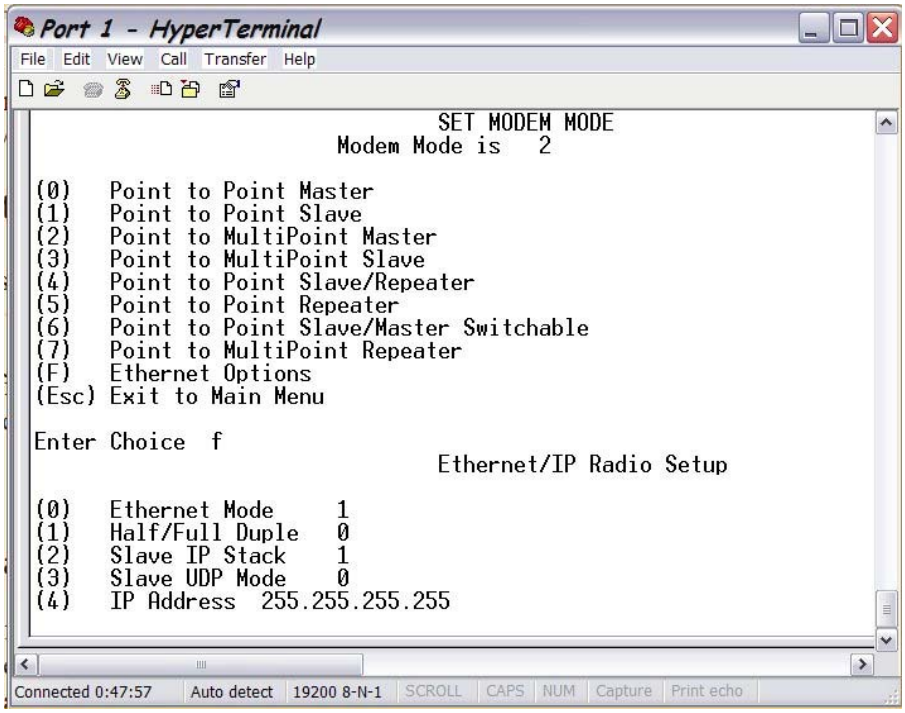
FreeWave Ethernet Radio Setup

There are a few settings that are unique to FreeWave Ethernet radios. These settings have to be set properly in order to successfully pass data through the radio link.

To properly configure a Master Ethernet radio confirm that the settings in the Ethernet/IP Radio Setup menu match those that are illustrated in Fig 1.

Figure 1: Master Ethernet Radio Settings



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Notice that the modem mode is set to 2 which is Point to Multipoint Master and the IP address is left at its default (255.255.255.255, a null value). In a FreeWave Ethernet network, Master radios are not capable of using an IP address. Also, notice that the Ethernet Mode option is set to 1 as well as the Slave IP Stack option.

Verify that the parameters listed below are set appropriately:

Set Baud Rate menu

(a) The Baud rate is 230,400

(b) Flow control is set to 1.

Radio Parameters menu

(a) MCU speed is set to 1

(b) RF Data Rate is set to 3. Note: RF Data Rate setting of 3 is not standard for the usual Ethernet mode of operation, but is required for successful UDP functionality.

All other settings on the Master radio (Ethernet radio) should be set according to recommendations of the User Manual.

The previously mentioned settings are the only ones that directly impact the Ethernet or UDP communications protocol.

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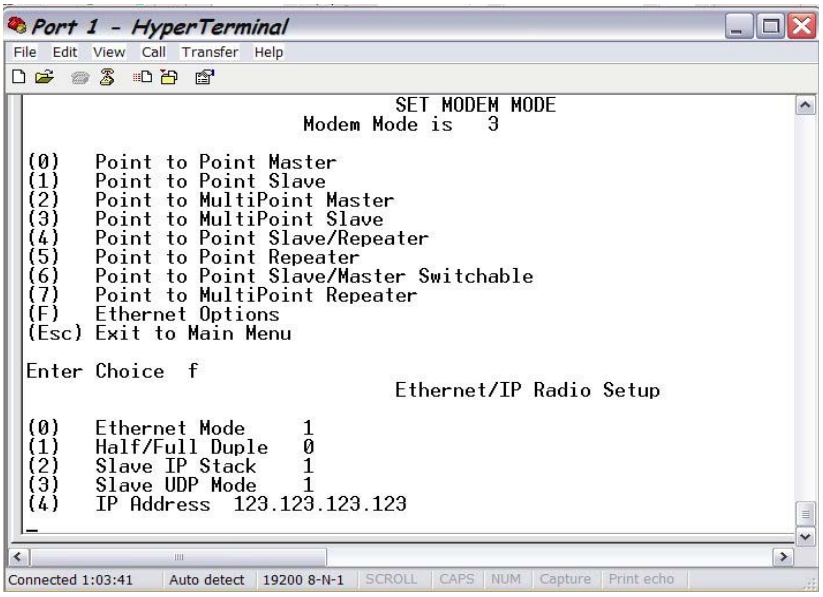
FreeWave Serial UDP Radio Setup

Refer to Fig 2 for an illustration of the settings required for an FGR-series radio to operate in UDP mode.

Figure 2: Slave Ethernet Radio Settings



Note that the modem mode on the slave radio is 3 making it a Point to Multipoint Slave radio. Also, the Slave UDP Mode setting has been turned on (set to 1). This allows the Slave radio to decode the incoming packets from the Ethernet Master into a serial data stream, as well as to encode outgoing serial packets into UDP format. UDP will NOT work unless this option is turned on.

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The IP Address that you choose here is entered three digits at a time and verified by an <ENTER> keystroke. One should be able to ping this particular Slave radio at the selected IP address. Likewise, this will be the address that can be used to communicate with any devices attached to this Slave radio.

The following are the specific unique parameters that must set on the Slave UDP radio:

Radio Parameters menu

(a) MCU speed is set to 1

(b) RF Data Rate is set to 3. Note RF Data Rate Setting of 3 is not standard for the usual Ethernet mode of operation, but is required for successful UDP functionality.

Hardware Installation

The location of the radios in a UDP network will vary. However, ensure that the Master radio is connected to the same LAN as the polling computer that will be used.

Once connected, the UDP links may be tested by pinging the IP address assigned to each of the slave radios.

Software Configuration

In order for any polling or communications software to be used the IP address of the radio will have to be entered along with its port number. The port number for ALL FreeWave UDP radios is pre-defined as port 4131. This is hard coded and is not changeable. This port number will usually need to be defined in the polling software in order to successfully communicate with an end device. Any data coming back from any given Slave in the network will be labeled as if it would be coming from the port number 1023 (decimal). This value is also not user selectable.

Another software requirement is that the protocol must be UDP. If the software being used is using TCP the end UDP radio will disregard any packets sent to it through the master radio. It is extremely important that the protocol being is UDP.