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Operations Manual for RFExtender Setup

INTRODUCTION

The RFExtender allows most Omega OM-CP data loggers to be remotely accessed from up to one mile away from a host computer. The system is transparent to the Omega OM-CP line of data loggers, therefore the data loggers can be controlled as if they were physically connected to the computer.

This document describes the setup of a basic RFExtender system. If the RFExtender is to be used with Omega's OM-CP-RF data logger line, consult the RF Manual for more advanced setup.

SYSTEM COMPONENTS

The following components are required to successfully set up and use an RF Extender system:

- A personal computer running the Windows operating system (Windows 95 or higher)
- Omega Data Recorder software
- One RFExtender-Base transceiver module (includes DB9 extension cable and one DC power adapter)
- One or more RFExtender-Remote transceiver modules (includes RFExt-IFC interface cable and one DC power adapter)
- One or more RFExtender-compatible data loggers

Note: For each data logger to be used in the system there must be one RFExtender-Remote transceiver module.

TRANSCIVER MODULE SETUP

In order to achieve a complete working system, at least two transceiver modules must be used. One transceiver module is connected directly to the host computer using the DB9 serial cable that is included as part of the RFExt-Base kit. This module is also known as the 'Base' module. All other transceiver modules are connected to individual data loggers via the RFEXT-IFC. These modules are also known as the 'Remote' modules. For a basic RFExtender system, there are three main parameters that must be set in the transceiver modules, the Network Address, Module Address and Baud Rate.

The transceiver modules operate in Frequency Hopping Spread Spectrum (FHSS). The Network Address specifies the pseudo-random hopping sequence that is used to navigate through the different channels. This value can range from 0 (default) to 6, allowing for 7 different hopping sequences. In most cases, this value will not need to be modified, but allows the user to minimize the amount of interference if multiple module pairs are used in the same vicinity.

The Module Address specifies the identity of the transceiver on a specific network address. The Module Address can range from 0 (default) to 0xFFFF (65535). This allows for 65536 different transceiver modules to be placed on the same network. All modules having the same Module Address and network address can communicate among each other. If there are multiple remote transceivers to be used in the same vicinity, each one should

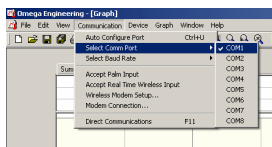


be configured with a different Module Address to avoid 'cross talk' between the remote modules.

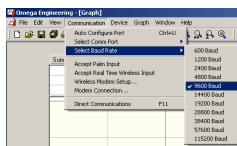
The third parameter that must be configured is the Baud Rate. The baud rate of the remote transceiver must match the baud rate of the data logger that is going to be used. The default Baud Rate of the transceiver devices is 9,600 baud.

To configure the above parameters, use the Omega software and follow the instructions below:

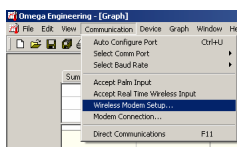
- Using the Omega software, select the proper communications port from the 'Communication>Select COMM Port>' menu. (In most cases, the COM port will be COM1)



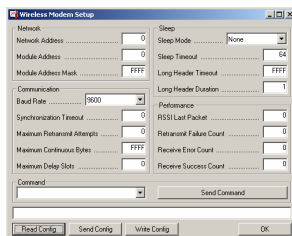
- Select the proper baud rate in the software from the 'Communication>Select Baud Rate>' menu. (By default, the transceiver baud rate is set to 9,600 baud)



- Open the 'Wireless Modem Setup' window by selecting 'Communication>Wireless Modem Setup...'

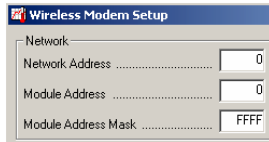


- Click on the 'Read Config' button in the bottom left corner of the window to read the current configuration of the transceiver module.

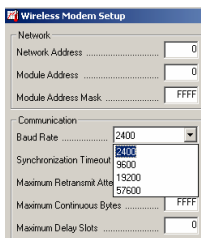




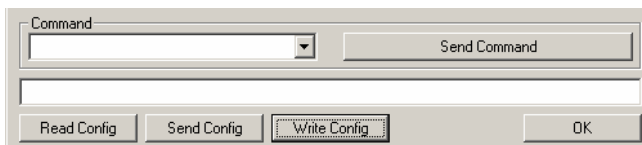
- Type in the desired Network Address and Module Address into the associated text boxes.



- Select the proper baud rate from the drop down menu in the 'Wireless Modem Setup'.



- Click the 'Write Config' button on the bottom of the 'Wireless Modem Setup' window to store the new configuration parameters into the transceiver.



- Click on the 'OK' button to close the 'Wireless Modem Setup' window when finished.

SINGLE LOGGER SYSTEM SETUP

A single logger RFExtender system consists of one base module, one remote module and one data logger. The purpose of this system is to enable wireless communications on a single Omega data logger.

In order to complete the setup of the single logger RFExtender system, the transceiver modules must be configured properly to communicate with the data logger and each other. In order to do this, one must know the baud rate of the data logger that is being used in the system. For example, an RHTemp101 communicates at 2,400 baud, therefore, the transceiver modules must be configured to communicate at 2,400 baud. The base module and the remote module must be set to the same Network Address and the Module Address in order for the pair to communicate properly.

Before installing the remote module into the application, connect the remote module to the PC using the DB9 serial cable. Using the procedure described in 'Transceiver Module Setup', configure the remote module. Make sure to remember what Network Address and Module Address is set in the remote module. When finished, connect the base module to the PC using the DB9 serial cable and configure the base module with the same parameters as the remote module.



When all modules are properly configured, the end-user may then install the RFExtender modules into the application. A single logger system will be similar to the one shown in figure 1.

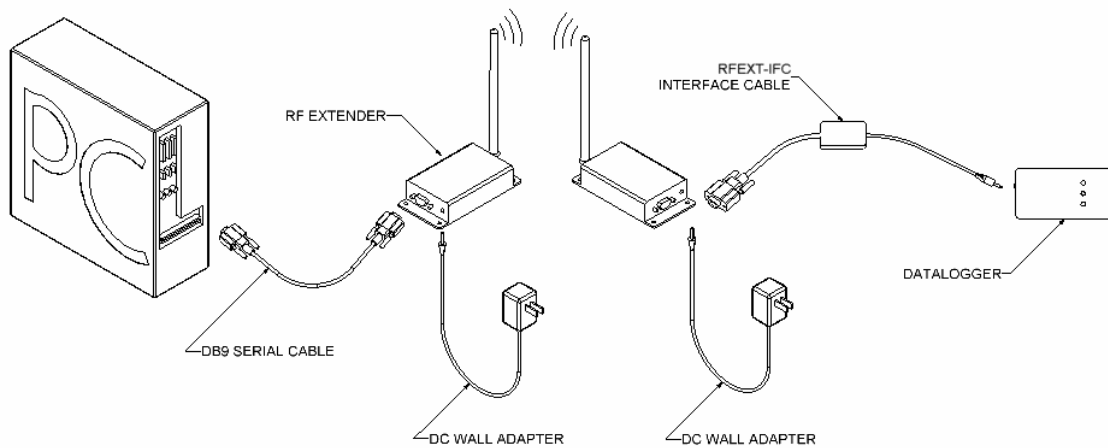


Figure 1. RFExtender as a wireless communication interface

MULTIPLE LOGGER SYSTEM SETUP

A multiple logger RFExtender system typically consists of one base module, and multiple remote modules and data loggers. This type of setup allows for multiplexing multiple devices on a single communications port and to wirelessly extend the range of the stand-alone Omega data loggers.

The setup of the multiple logger RFExtender system varies slightly from the setup of the single logger RFExtender system where each remote module must be configured differently from all other remote transceiver modules. Each remote transceiver must be configured to have the same baud rate of the data logger that will be connected to it and each remote module must have a unique Module Address.

Before installing the remote modules into the application, connect each remote module to the PC using the DB9 serial cable. Using the procedure described in 'Transceiver Module Setup', configure the remote module. Make sure to remember what Network Address and Module Address is set in each remote module. It may be useful to write the Module Address and Baud Rate on the label of the modules to differentiate between the remote modules.

When finished configuring the remote modules, they can be installed into the application where they will be used. For each remote module, connect an RFExt-IFC interface cable the remote module and to a logger with the same communication speed. A DC wall adapter will also need to be used to supply power to the wireless transmitter.

The base module can now be connected to the PC using the DB9 serial cable. The base module must be configured to have the same Module Address as the remote module it is trying to communicate with. In general, it may be safe to set the base module to the slowest baud rate of all remote modules if there are multiple units with different baud rates. However, it is recommended that the baud rate of the base module match the baud rate of the remote module. If the user is experiencing problems communicating with a remote



module, the user should set the baud rate of the base unit to match the baud rate of the remote module.

A typical application for a multiple data logger RFExtender system is shown in Figure 2. The base transceiver module is configured to communicate with one of the remote modules. Because the base module is always connected to the PC, the base module configuration may be changed to switch the Module Address to communicate with a different remote module. The base module can only communicate with one remote module at a time. All other remote modules will ignore any communication that is not on the same Module Address.

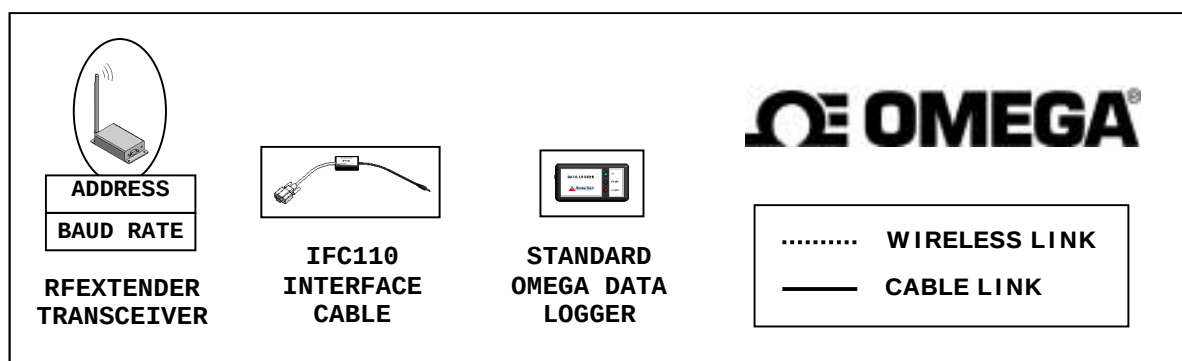
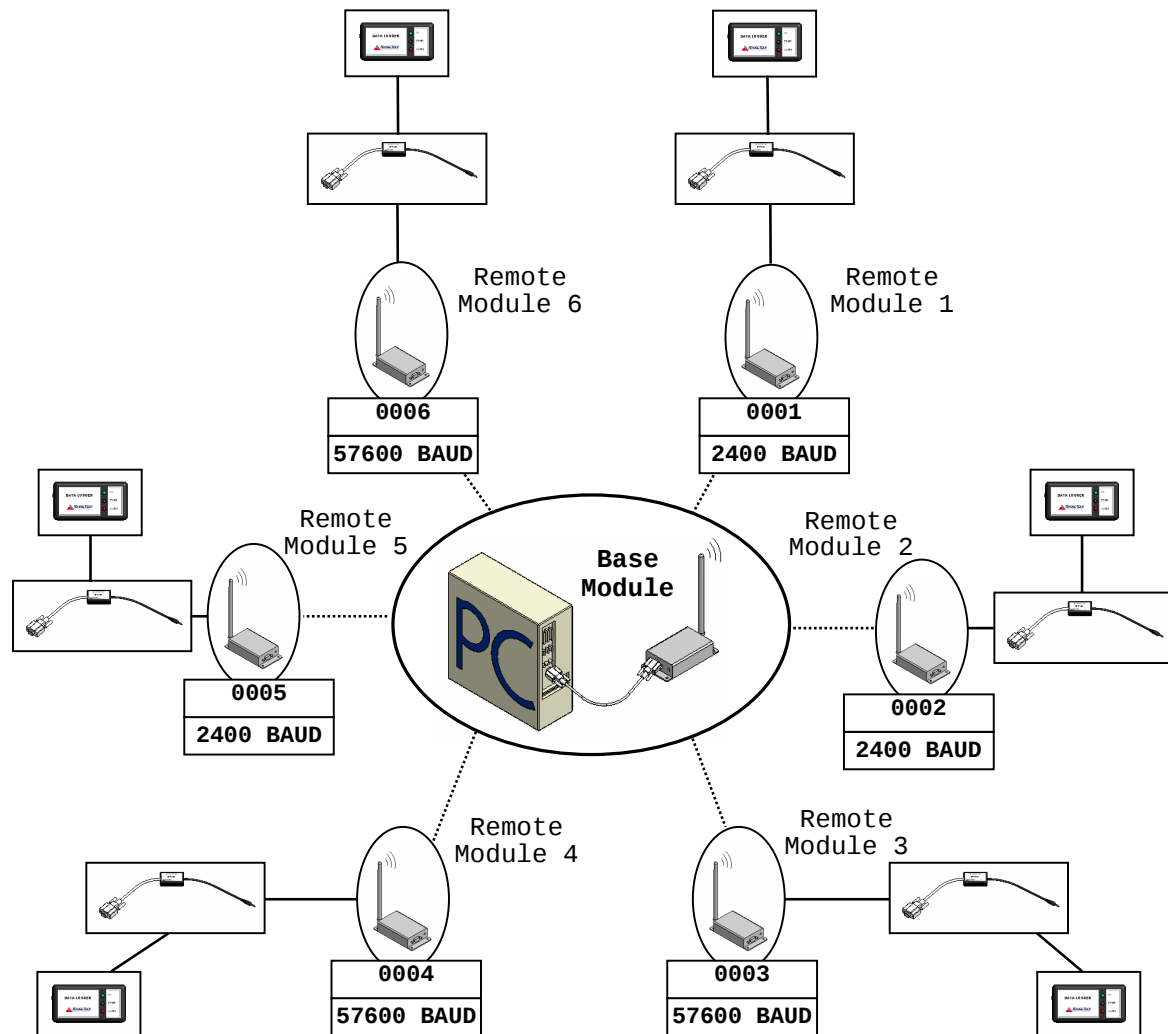


Figure 2. RFExtender used in a multiple logger wireless communication system



OPERATING ENVIRONMENT

The RFExtender transceiver modules are rated for operation from 0 to +70 °C and 10 to 90 %RH (non-condensing). Although the devices are fully functional over this range, the strength of the wireless output signal may vary with changes in environment. In particular, the signal strength may be reduced at the temperature extremes, in high humidity, or if humidity condenses inside the device.

SYSTEM PERFORMANCE AND RELIABILITY

Under ideal conditions, the RFExtender products can have a transmission distance up to 1 mile (1.6 km). Typical ranges are 1000 to 2000 feet (300 to 600 m) outdoors, and up to 300 feet (100 m) indoors. To achieve maximum distance for the wireless transmission, there are a number of guidelines that should be followed. Consider these points when setting up the system:

Transmitter location – Keep the remote transceivers as close to the base transceiver as possible. If either the remote transceiver or base transceiver must be in an enclosed area, try to keep the other inside the same area if possible. This is especially important if there would be metal walls, conduit, or wires between the units. In particular, attempting to transmit from inside of a freezer or refrigerator is not likely to be successful.

Line of sight – Try to keep the base and remote transceiver antennae along a direct line of sight from one to the other. Keep the number of corners or obstacles in between them to a minimum.

Nearby objects – Try to keep the base and remote transceiver antennae away from any foreign objects, especially those made of metal. Performance may be improved by moving the antenna away from the ground, ceiling, or nearby objects.

Antenna orientation – Keeping the base and remote transceiver antennae parallel with one another may improve performance.

Minimize interference – Keep external sources of radio frequency noise to a minimum. Locate the antenna and base transceiver as far from any other electrical or wireless devices as possible. If multiple transmitters are being used, set up the system to minimize interference between transmitters.

CONTACT INFORMATION

For further information on the products described in this manual, contact:

Omega Engineering, Inc.

One Omega Drive
Stamford, CT 06907-0047
P.O. Box 4047

Phone: (203)-359-1660
Fax: (203)-359-7700
Toll Free: (800)-848-4286
Web: <http://www.omega.com/>