

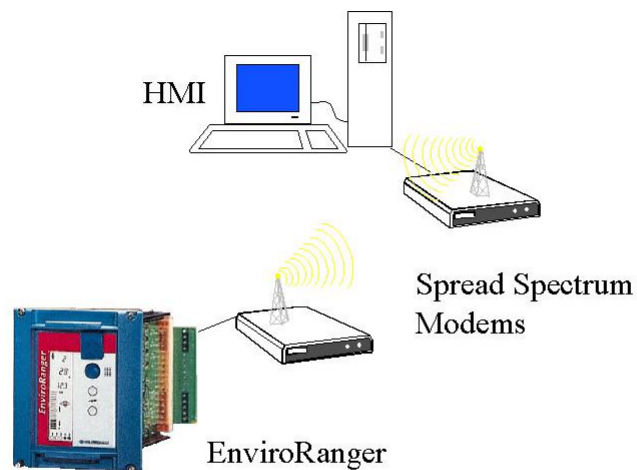
# Communicating to EnviroRanger

using the Data-Linc SRM6000 Spread Spectrum Radio Modem  
(version 5.39) and Wonderware InTouch 95 (version 7.0.1)

*This application guide describes how to setup the modems and drivers so that you can exchange information between a EnviroRanger and a host computer over a spread spectrum radio modem. A spread spectrum radio modem is a modem that uses a series of radio frequencies rather than one fixed frequency.*

This application had a computer running the Windows 95 operating system and the Human Machine Interface (HMI) program Wonderware InTouch. The HMI program comes with a Modbus RTU/ASCII driver. The spread spectrum modems we used were the SRM600 model made by the Data-Linc Group.

In this test, the HMI was polling one EnviroRanger. Figure 1 below shows a typical configuration.



**Figure 1 – Typical Configuration**

**Communicating  
to EnviroRanger**

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**Keywords:**

EnviroRanger, Data-Linc SRM6000, Spread Spectrum modem, SCADA, HMI, Wonderware InTouch 95, Modbus, remote communication.

# Details

## Modem at HMI Computer:

When ordering the modems from Data-Linc, the fact that they are for use with a Modbus RTU application has to be stated. The modems will then be pre-configure the factory. The modems come with a label on the back, one labeled Master (and a number) and the other labeled slave (and a number). There are also two cables that come with the modems. One straight through DB-9 to DB-9 serial cable and one DB-9 to open end.

The Modem labeled Master, and the straight through cable is used at the HMI end. There is an instruction sheet sent with the modems that outlines how you would configure the modem if needed. The basic method is to use a terminal emulation program (such as HyperTerminal found in Start menu / Programs / Accessories in Windows 95) set at 19,200 baud, 8 data bits, no parity, 1 stop bits. Connect the computer to the modem and use a straightened paper clip to press a small button on the front of the unit that is accessible via a small hole in unit. Once you press the button, the menu screen will appear on the terminal program.

```

MAIN MENU
Version 5.39 2-06-98
Standard Hop Table
Modem Serial Number 571-5577

(0) Set Operation Mode
(1) Set Baud Rate
(2) Edit Call Book
(3) Edit Radio Transmission Characteristics
(4) Show Radio Statistics
(5) Edit MultiPoint Parameters
(6) TDMA Menu
(Esc) Exit Setup

Enter Choice
    
```

The settings used were:

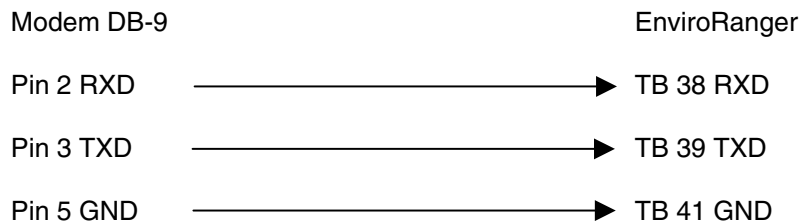
- Set Operation Mode: Point to point master (selection 0)
- Set Baud Rate: 19,200 (selection 5)
- Also under Set Baud Rate: Set Parity (0)
- Also under Set Baud Rate: Set Modbus (selection 1 for RTU)
- Edit call block: make sure that the number in the list is the number of the slave (written on the label on the back of the slave)
- Edit Radio Transmission Characteristics: The following settings were used: FreqKey 5, Max Packet Size 9, Min Packet Size 2, Xmit Rate 1, RF Data Rate 3, RF Xmit Power 9, Slave Security 0, RTS to CTS 0, Retry Time Out 255
- Edit MultiPoint Parameters: The following settings were used: Number Repeaters 0, Master Packet Repeat 3, Max Slave Retry 3, Retry Odds 3, DTR Connect 0, Repeater Frequency 0, NetWork ID 255, MultiMasterSync 0

## Modem at EnviroRanger Unit:

At this end, the Modem labeled Slave was used with the following settings:

- Set Operation Mode: Point to point slave (selection 1)
- Set Baud Rate: 19,200 (selection 5)
- Also under Set Baud Rate: Set Parity (0)
- Also under Set Baud Rate: Set Modbus (selection 1 for RTU)
- Edit call block: make sure that the number in the list is the number of the master (written on the label on the back of the master)
- Edit Radio Transmission Characteristics: The following settings were used: FreqKey 5, Max Packet Size 9, Min Packet Size 2, Xmit Rate 1, RF Data Rate 3, RF Xmit Power 9, Slave Security 0, RTS to CTS 0, Retry Time Out 255
- Edit MultiPoint Parameters: The following settings were used: Number Repeaters 0, Master Packet Repeat 3, Max Slave Retry 3, Retry Odds 3, DTR Connect 0, Repeater Frequency 0, NetWork ID 255, MultiMasterSync 0

The cable that had one end with no connector on it was used and connected it using the following:



Also, the shield was not used since the cable length was very short (1/2 meter).

## Modbus Driver:

The driver used was the Modbus driver that came with Wonderware.

It was set up to use COM1 with the following settings under the Configure/ Comm Port Settings... menu:

Com Port: COM1  
Reply Timeout: 5 secs  
Baud Rate: 19200  
Data Bits: 8  
Stop Bits: 1  
Parity: None  
Protocol: RTU

Under Configure/Topic Definition... menu the following settings were used:

Topic: any name you want (max. 8 characters long)  
Com Port: Com1  
Slave ID: 1  
Slave Device Type: 584/984 PLC  
String Variable Style: select 'Full length (padded with spaces on the end)'  
Register Type: Binary  
Block I/O Sizes  
    Coil Read: 8  
    Coil Write: 8  
    Register Read: 100  
    Register Write: 100  
Update Interval: 1000 (may need to increase this to 2000 or more)

Note: The topic name must be the same as the topic name that is used in Wonderware. The name can be anything but it should reflect what is being communicating to. For example, STATION1, would be a good name.

Under Configure/DDE Server Settings... the defaults were used.

## Wonderware InTouch 95:

Please consult your Wonderware InTouch manual for details on its use. The following are some useful hints and some details that are hard to find.

1. For this application, some display screens and tagnames were set up to allow access to required information in the EnviroRanger:
  - The tagnames were defined as I/O Integer.
  - The Topic was the same one defined in the driver.
  - The item was the register number with nothing in front of it. For example, because level is contained in register 41,011, so the Item is set to '41011'.
  - For the double precision integers, the range of the variable was changed from 32767 to 2147483647. The item was defined with a space L after the number. For example, the pumped hours for pump 1 had an item defined as '41450 L'
2. With InTouch, bit information that is referenced in registers as "I/O discrete" can be read, but cannot be written to.

To be able to write to I/O discrete registers, use one tagname for the entire register, and then reference the bits in the tagname. (Please see Milltronics Application Guide 99001, "Communicating to EnviroRanger & BW500 Using Wonderware Version 7.0.1").

## EnviroRanger:

In the EnviroRanger, the following parameters were set:

P770, index 2:	3	(Modbus RTU slave)
P771, index 2:	1	(network address)
P772, index 2:	19.2	(19200 baud)
P773, index 2:	0	(No Parity)
P774, index 2:	8	(8 data bits)
P775, index 2:	1	(1 stop bit)
P776, index 2:	0	(No flow control)
P777, index 2:	0	(no key-up delay)
P778, index 2:	1	(modem connected)
P779, index 2:	300	(modem inactivity timeout = 300 seconds)

**Note:** The information in this document is intended as a “guide” only. Milltronics assumes no responsibility for its application.