Technical Note

Setup RLX-IFH24E modules

Modbus TCP (Client) to Modbus RTU (Slave)

Introduction

This document gives the details of the RLX-IFH24E setup to establish the communication between a Client Modbus TCP to a Slave Modbus RTU.

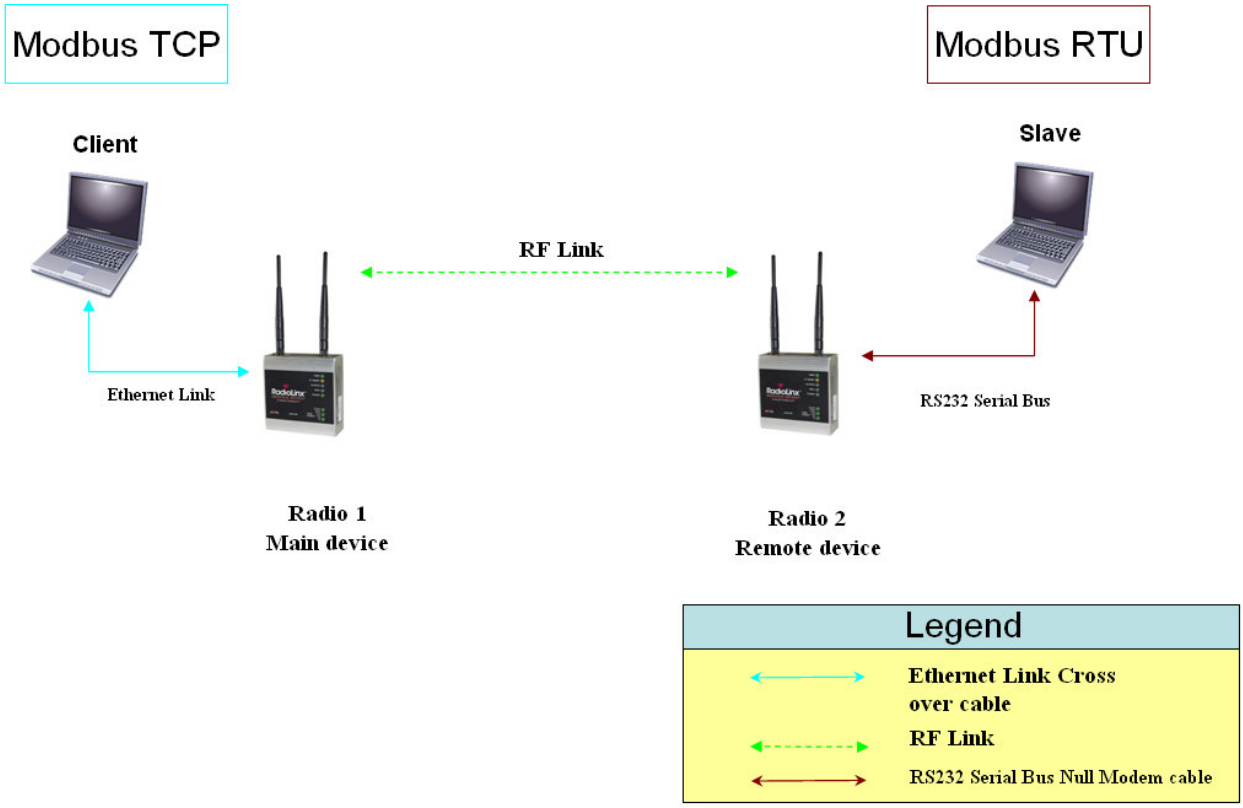
For the architecture of this implementation, the following equipments are required:

- 2 RLX-IFH24E modules
- 1 laptop or PC with Ethernet and serial capability and containing the following software:
  - RadioLinx ControlScape FH **V5.11.013**
  - ModScan32 (Client/Master Modbus simulator) **V4.C00-05**
  - ModSim32 (Server/Slave Modbus simulator) **V4.A00-02**

Author: NBlond
Date: June 1, 2009

Architecture

Below is the architecture of this implementation:



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Procedure

Note:
If your PC is not connected to a DHCP server or if it is directly connected via Ethernet to the radio module, **DO NOT FORGET TO ASIGN A FIXED IP ADDRESS** to the PC Ethernet card.
For this application the IP address of the laptop is 192.168.170.15.

Here are the basic steps needed to establish communications.

A. Plan the network

A.1. Install ControlScape FH Configuration Software:

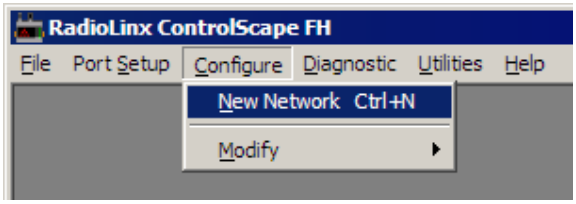
Download ControlScape FH Configuration from:
http://www.prosoft-technology.com/content/download/8317/112783/file
Then install the software on your PC.

A.2. Start ControlScape FH

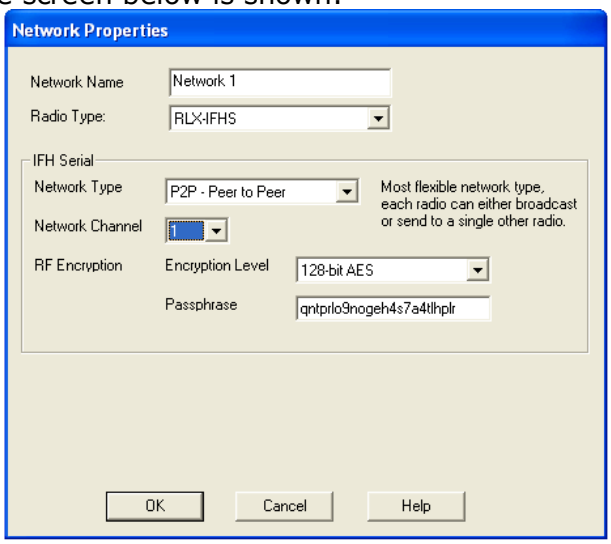
To start ControlScape:
Click the Start button, and then choose Programs
In the Programs menu, navigate to the RadioLinx folder, and then choose RadioLinx ControlScape FH.

A.3. Network Set Up

From the ControlScape FH **Main Menu,** select:
Configure New Network

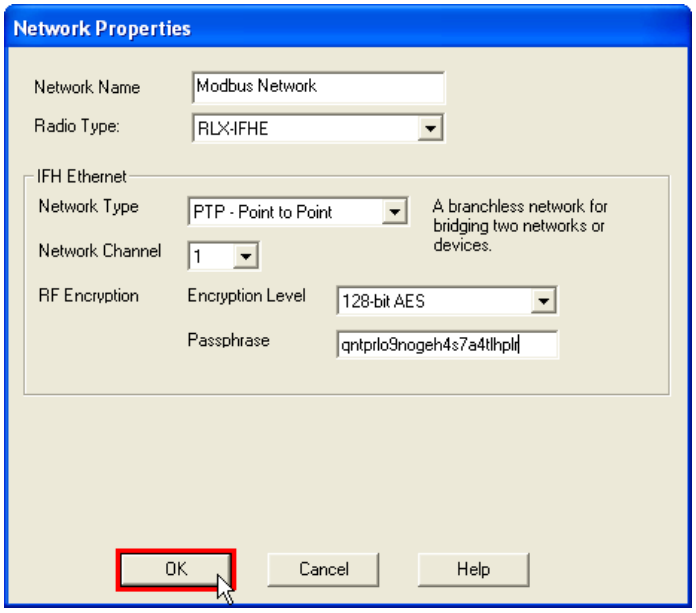


The screen below is shown:



From the Network Properties:

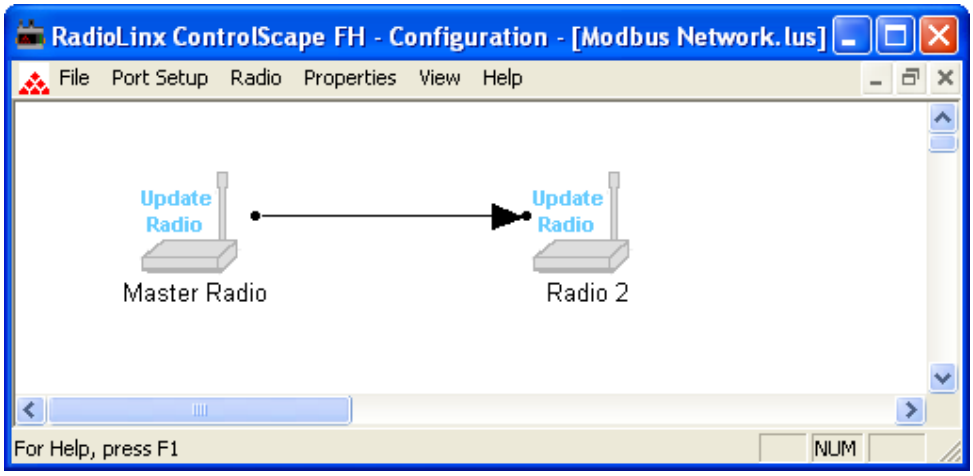
- Change the Network name to **Modbus Network**
- Change the radio type to **RLX-IFHE** for the RLX-IFH24E modules
- Change the Network Type to **PTP** (Point To Point)
- Leave the Network Channel value to the value chosen by the software (here **1**)
- Leave the Encryption Level and the Passphrase to the value chosen by the software (highest security level).



Click on *OK*.

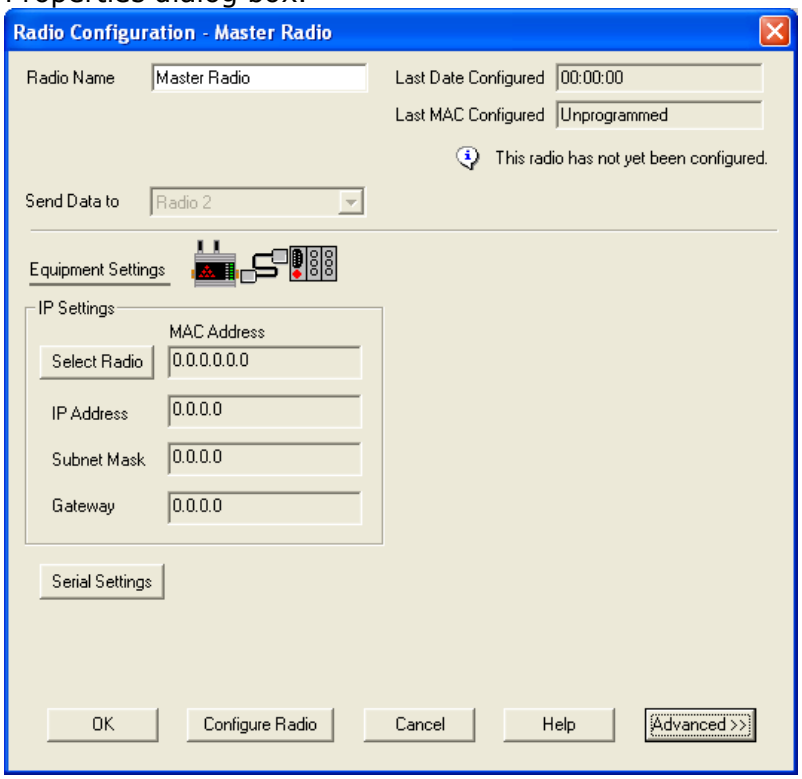
B. Setting of the Master Radio:

The screen below is shown:

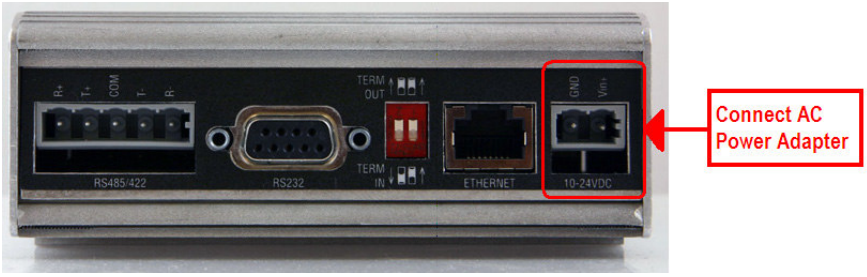


B.1. Ethernet settings:

Double-click the left mouse button on the Master Radio to open the Radio Properties dialog box.

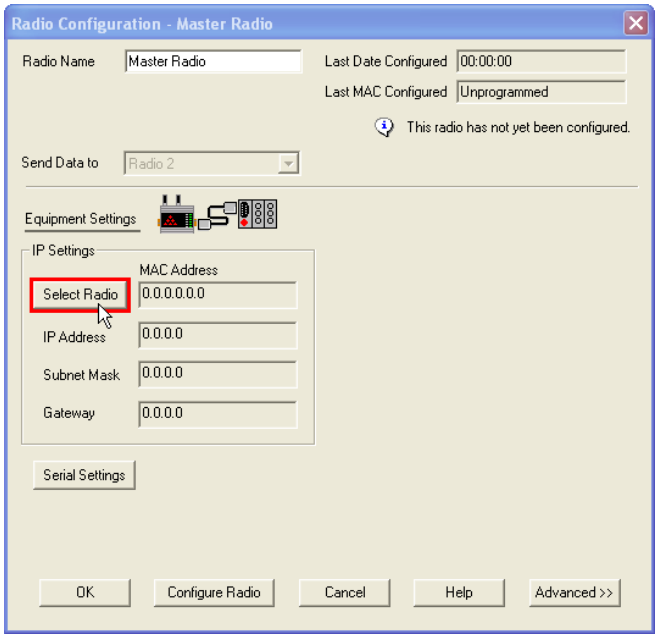


Connect the AC power adapter cord to the port labelled 10 - 24 VDC on the bottom of the radio, and then plug the power adapter into an electrical outlet.

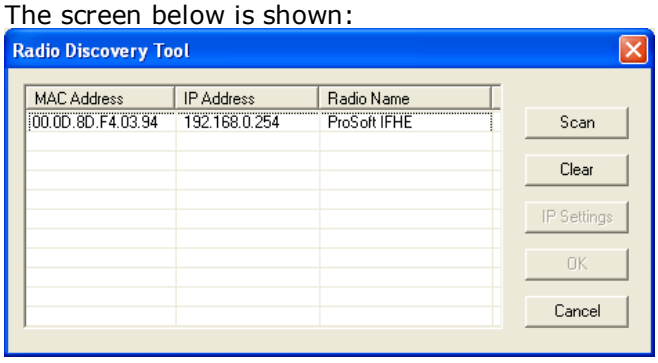


Connect the crossover (Red) cable Ethernet cable to the ETHERNET port on the bottom of the radio.
The Ethernet LED on the radio is switched on.

Now click on *Select Radio*:

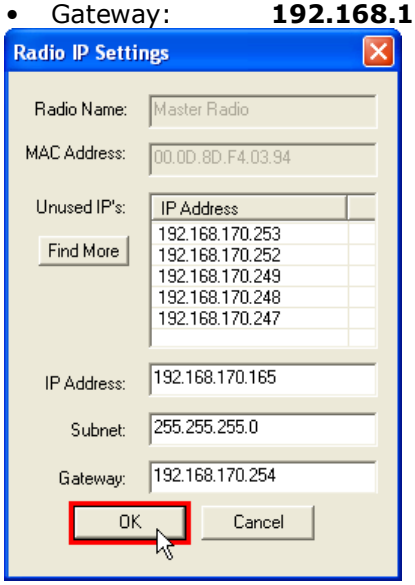


The screen below is shown:



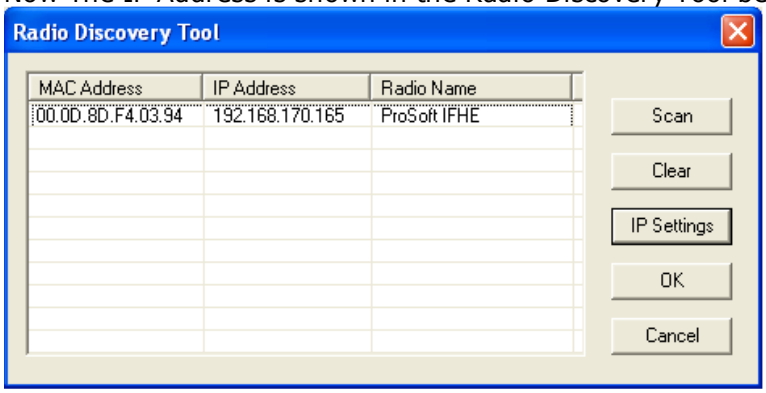
Select the Radio and then click *IP Settings*
The Radio IP Settings have to be as below:

- IP Address: **192.168.170.165**
- Subnet: **255.255.255.0**
- Gateway: **192.168.170.254**



Click on OK to validate the IP settings.

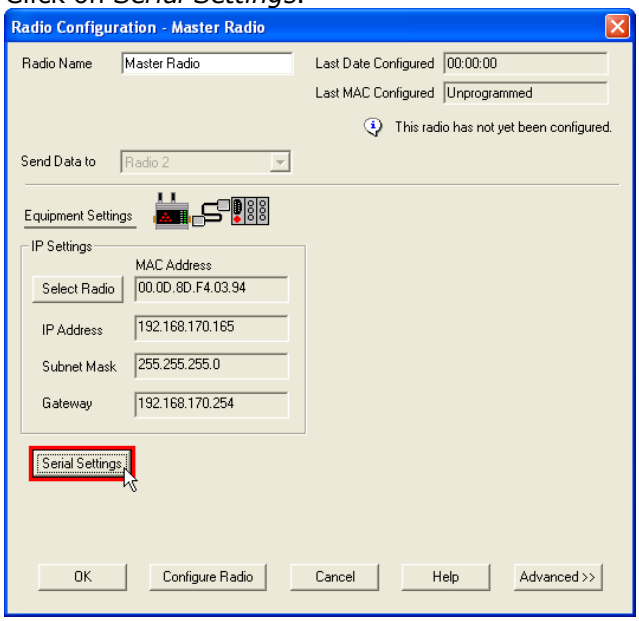
Now The IP Address is shown in the Radio Discovery Tool below:



Click on OK to validate the Radio IP Settings set above.

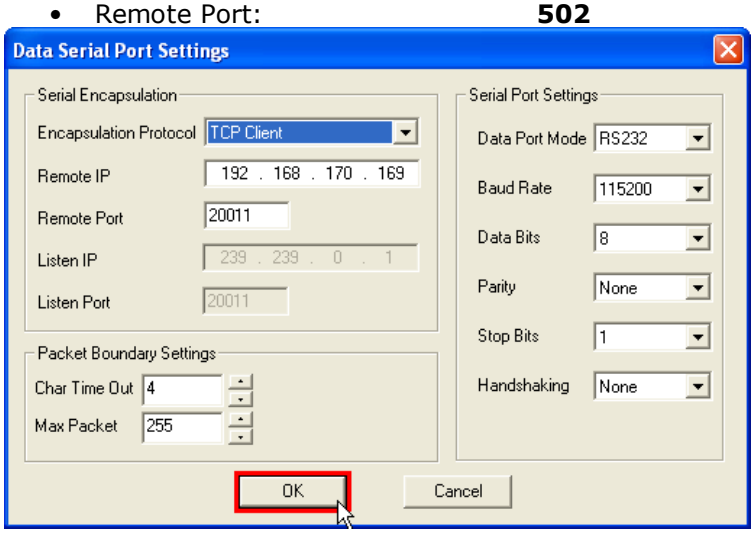
B.2. Serial settings:

The Screen below is shown.
Click on *Serial Settings*.



The Serial encapsulation settings are:

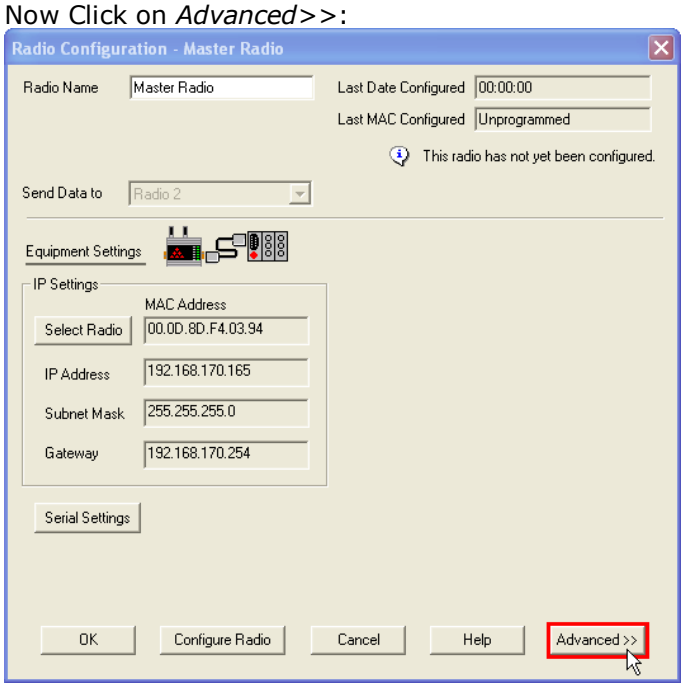
- Encapsulation Protocol: **TCP Client**
- Remote IP Address **192.168.170.169**
- Remote Port: **502**



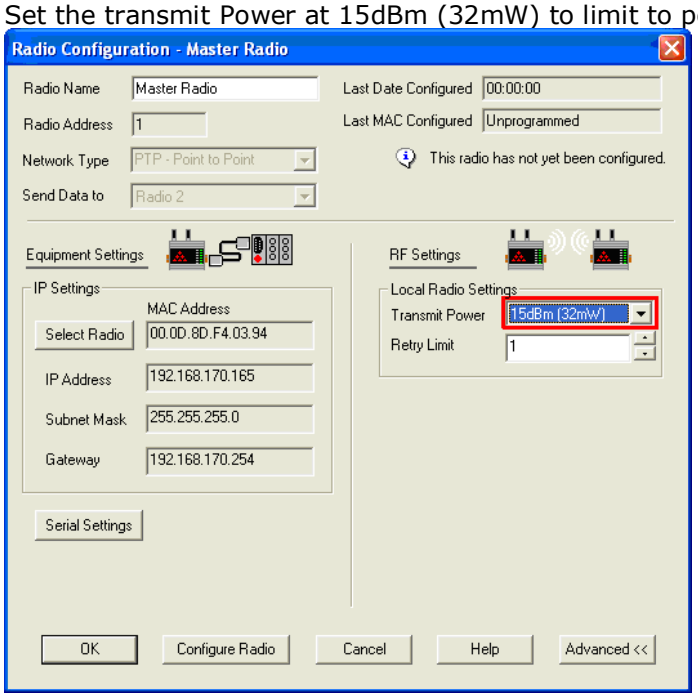
The Serial Port Settings can be left per default because the serial port is not used.
Click on *OK* to validate the configuration.

B.3. Power settings:

Now Click on *Advanced*>>:



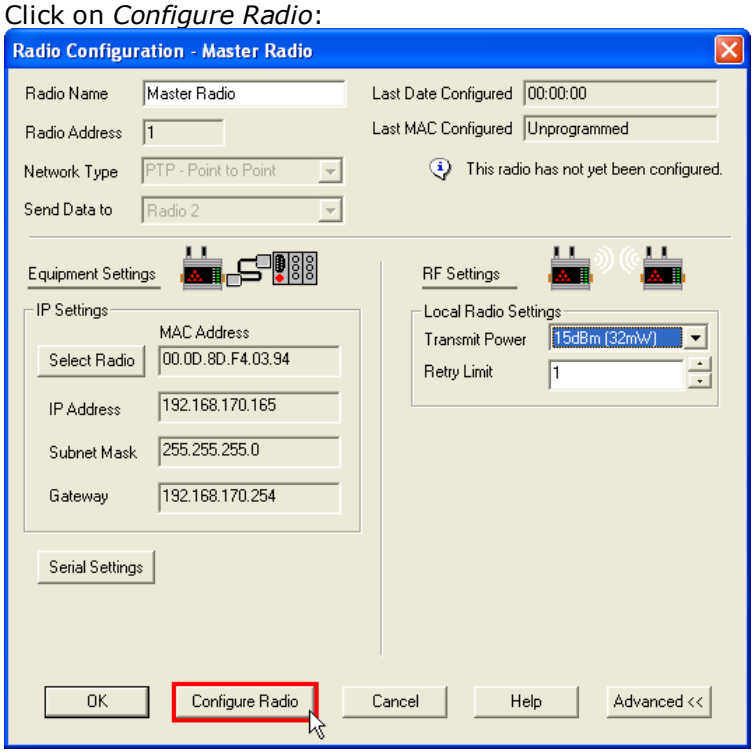
Set the transmit Power at 15dBm (32mW) to limit to power transmitted by the radio.



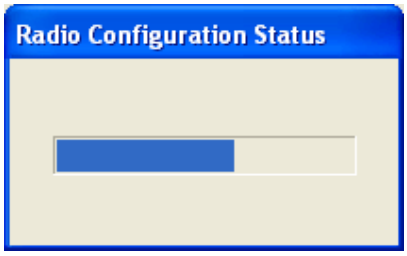
Click on *OK* to validate the configuration.

B.4. Program Download.

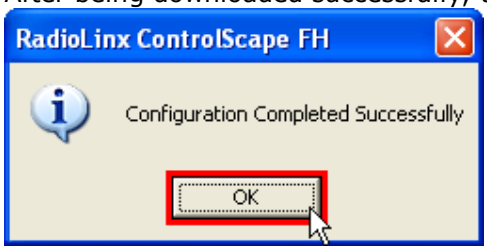
Click on *Configure Radio*:



The screen below is shown:

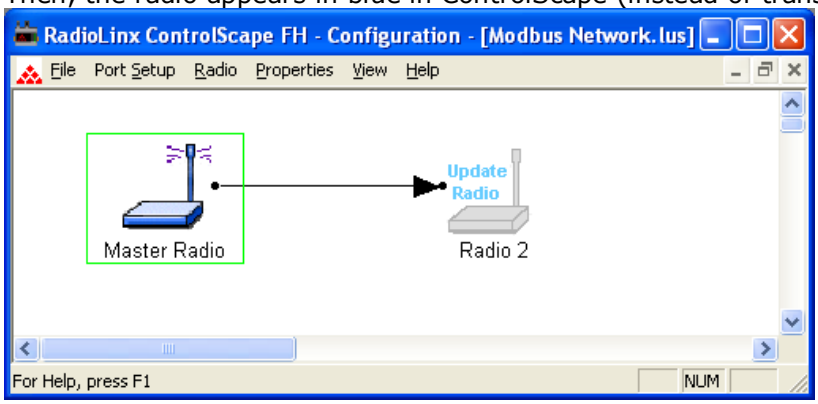


After being downloaded successfully, this screen appears.



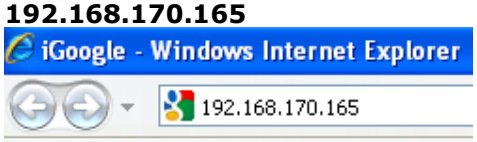
Click on *Ok.*

Then, the radio appears in blue in ControlScape (instead of transparent).

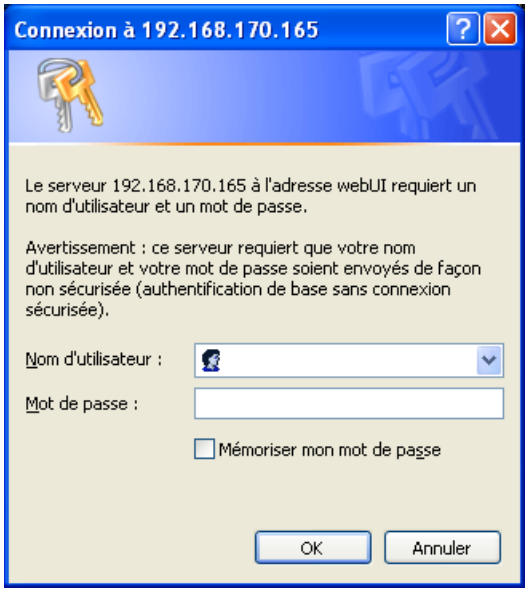


B.5. Online configuration of the Master module.

Enter the following IP address within Internet Explorer:
192.168.170.165

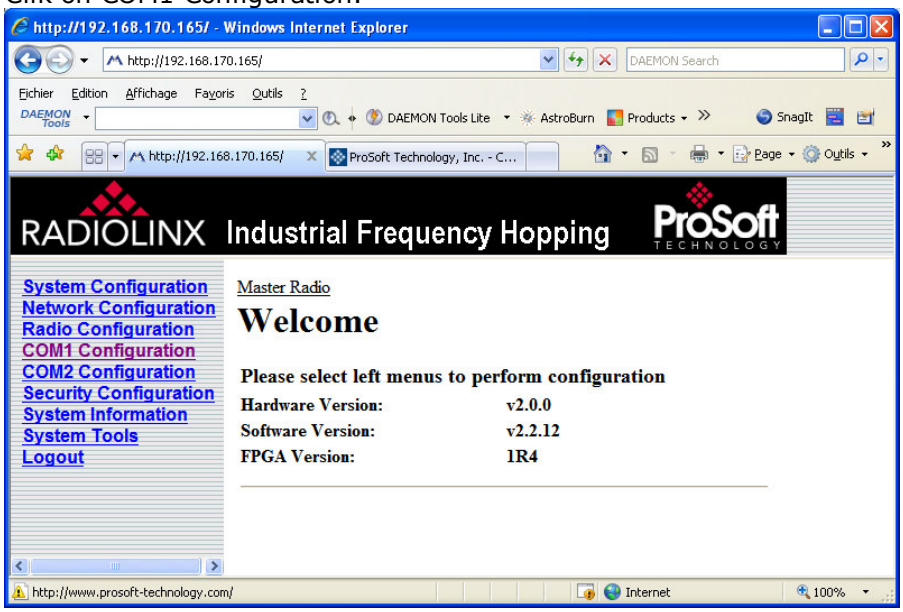


The screen below is shown:



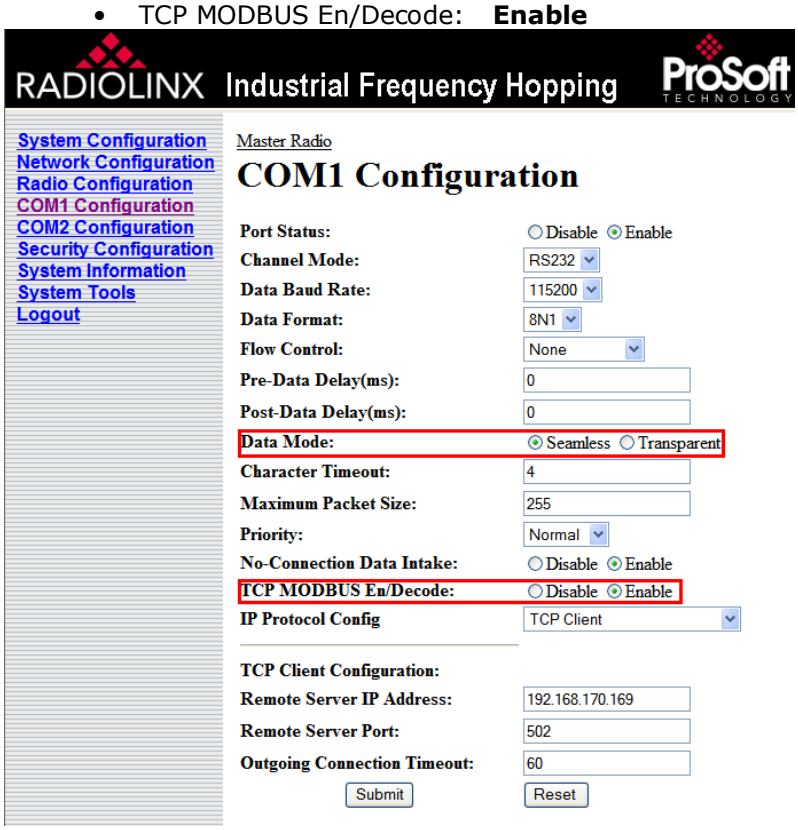
The User name is: **admin**
The password is: **admin**

The web page below is shown.
Clik on COM1 Configuration.

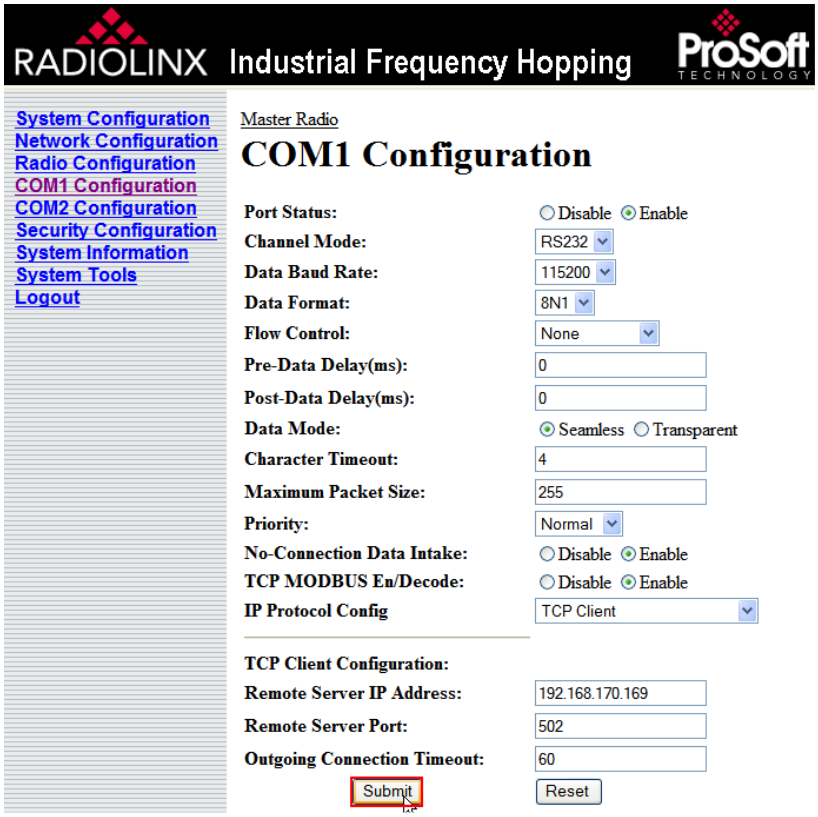


The settings below must be used:

- Data Mode: **Seamless**
- TCP MODBUS En/Decode: **Enable**



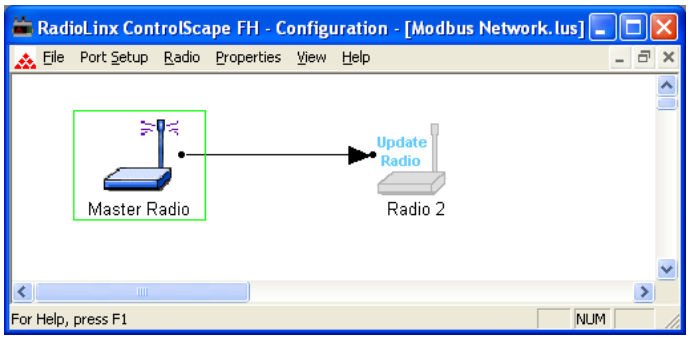
Then click on Submit to save the modification.



Close the web browser.
The settings of the Master radio are finished.
Disconnect the Ethernet cable from the ETHERNET port on the bottom of the radio.

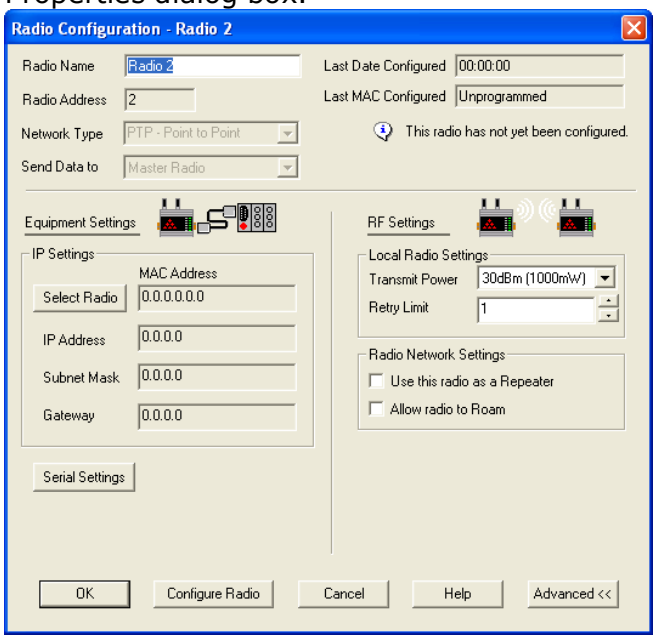
C. Setting of the remote radio:

The screen below is shown:

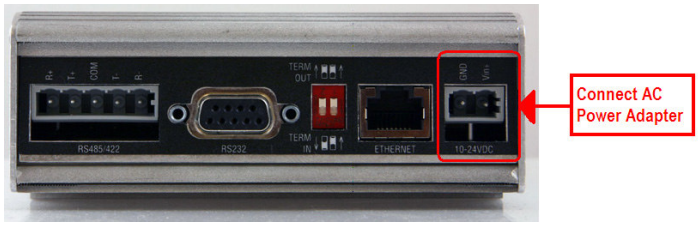


C.1. Ethernet settings:

Double-click the left mouse button on the Radio 2 to open the Radio Properties dialog box.

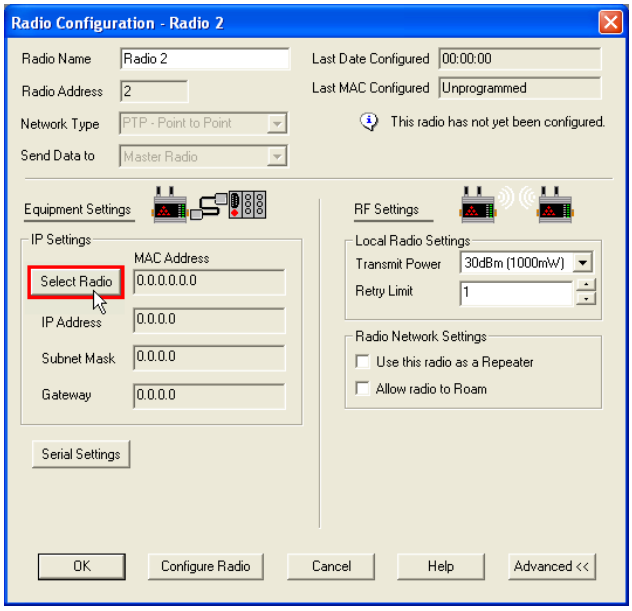


Connect the AC power adapter cord to the port labelled 10 - 24 VDC on the bottom of the radio, and then plug the power adapter into an electrical outlet.

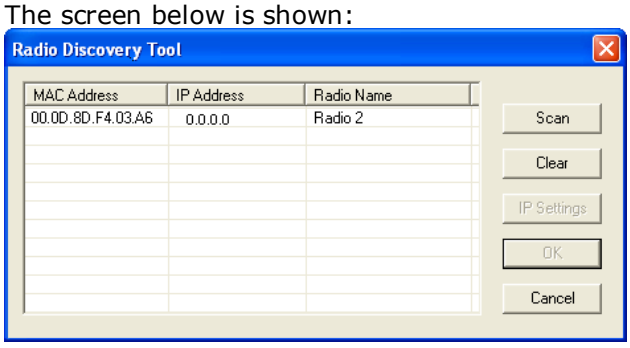


Connect the crossover (Red) cable Ethernet cable to the ETHERNET port on the bottom of the radio.
The Ethernet LED on the radio is switched on.

Now click on *Select Radio*:

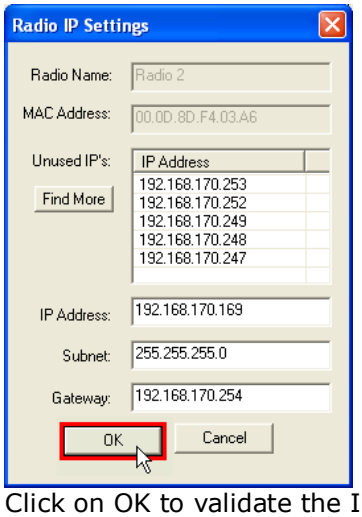


The screen below is shown:

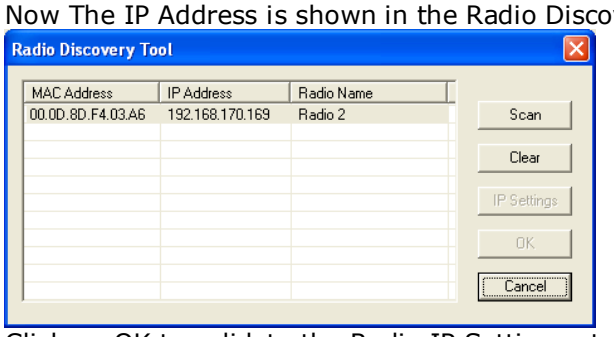


Select the Radio and then click **IP Settings**
The Radio IP Settings are as below:

- IP Address: **192.168.170.169**
- Subnet: **255.255.255.0**
- Gateway: **192.168.170.254**



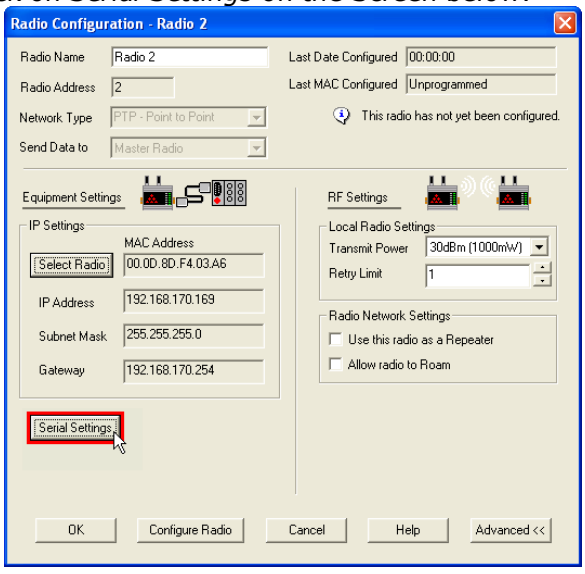
Click on OK to validate the IP Address (192.168.170.169).
Now The IP Address is shown in the Radio Discovery Tool.



Click on OK to validate the Radio IP Setting set above.

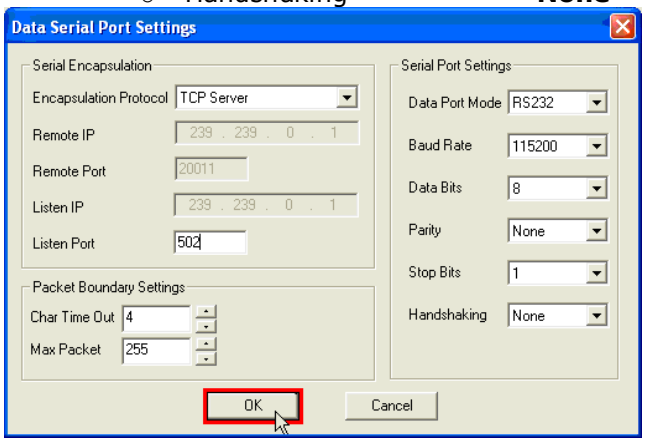
C.2. Serial settings:

Click on *Serial Settings* on the Screen below:



The Serial encapsulation settings are:

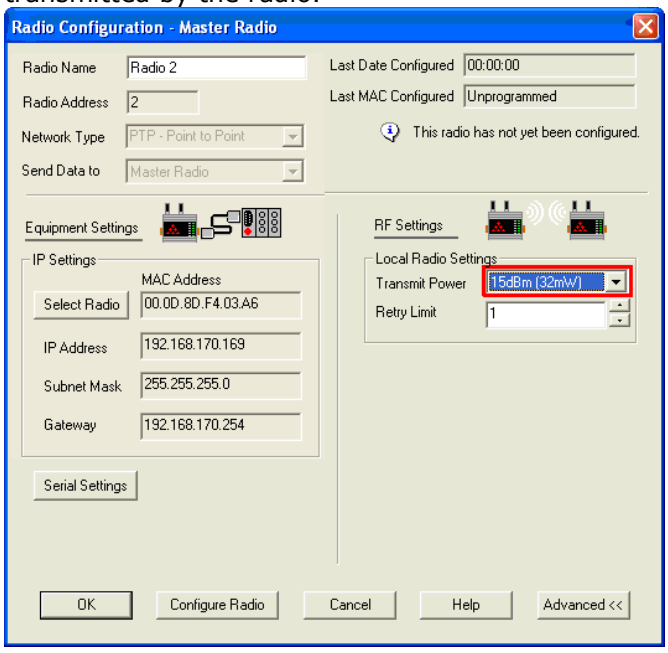
- Encapsulation Protocol: **TCP Server**
- Listen Port: **502**
- Serial port settings:
  - Data port Mode : **RS232**
  - Baud rate: **115200**
  - Data Bits**:** **8**
  - Parity**:** **None**
  - Stop Bits: **1**
  - Handshaking **None**



Click on *OK* to validate the configuration.

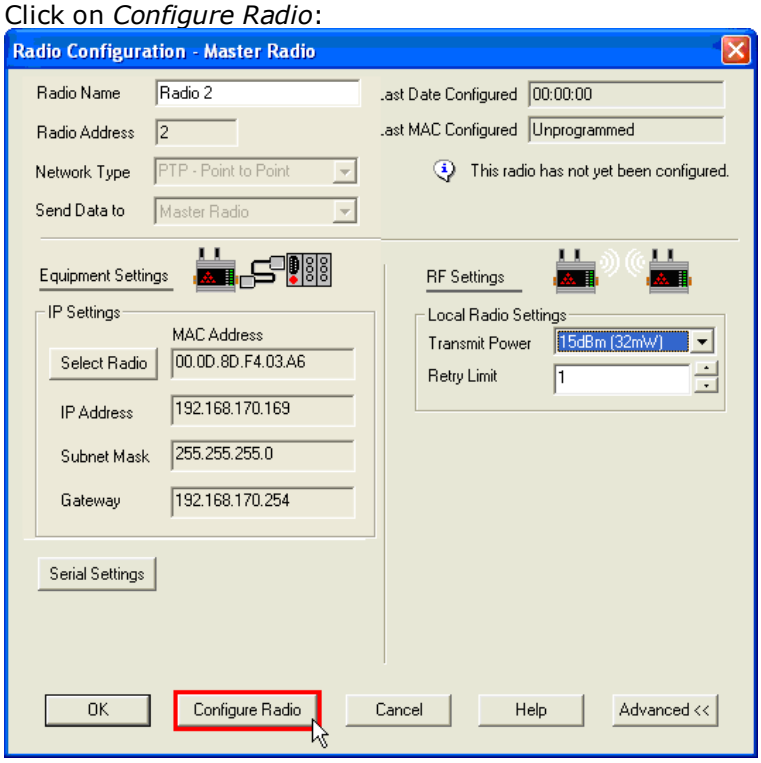
C.3. Power settings:

Now Click on *Advanced*>> and set the transmit Power at 15dBm (32mW) to limit to power transmitted by the radio.

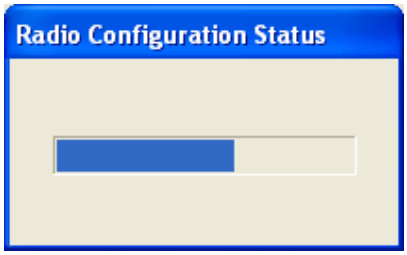


C.4. Program download

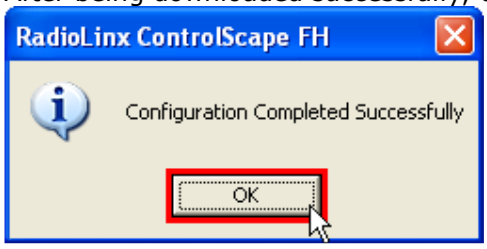
Click on *Configure Radio*:



The screen below is shown:

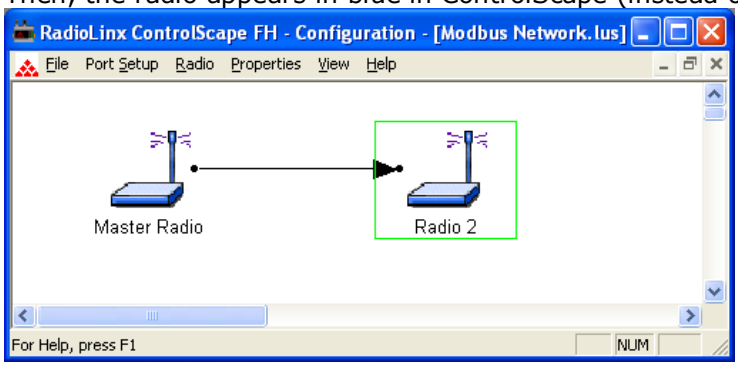


After being downloaded successfully, this screen appears.



Click on *Ok.*

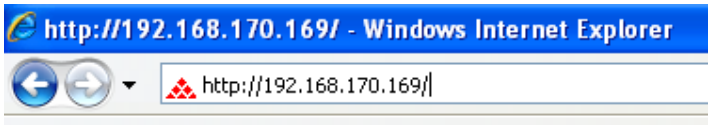
Then, the radio appears in blue in ControlScape (instead of transparent).



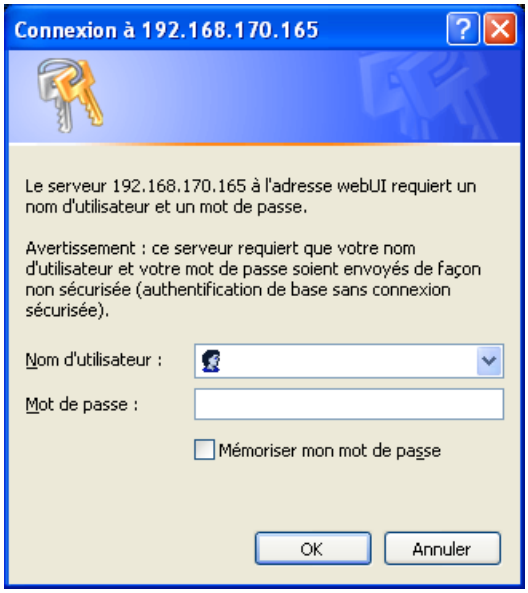
C.5. Online configuration of the remote module.

Enter the following IP address within Internet Explorer:

192.168.170.169

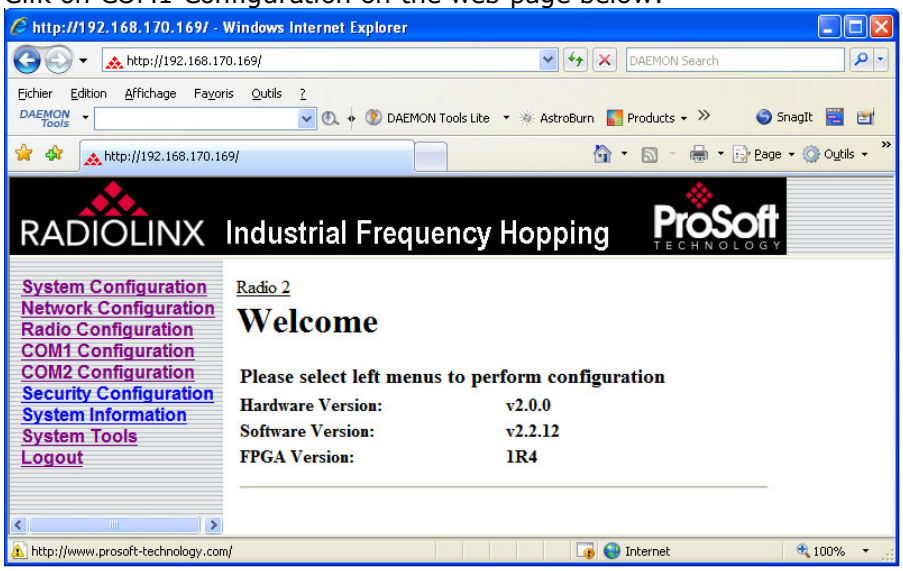


The screen below is shown:

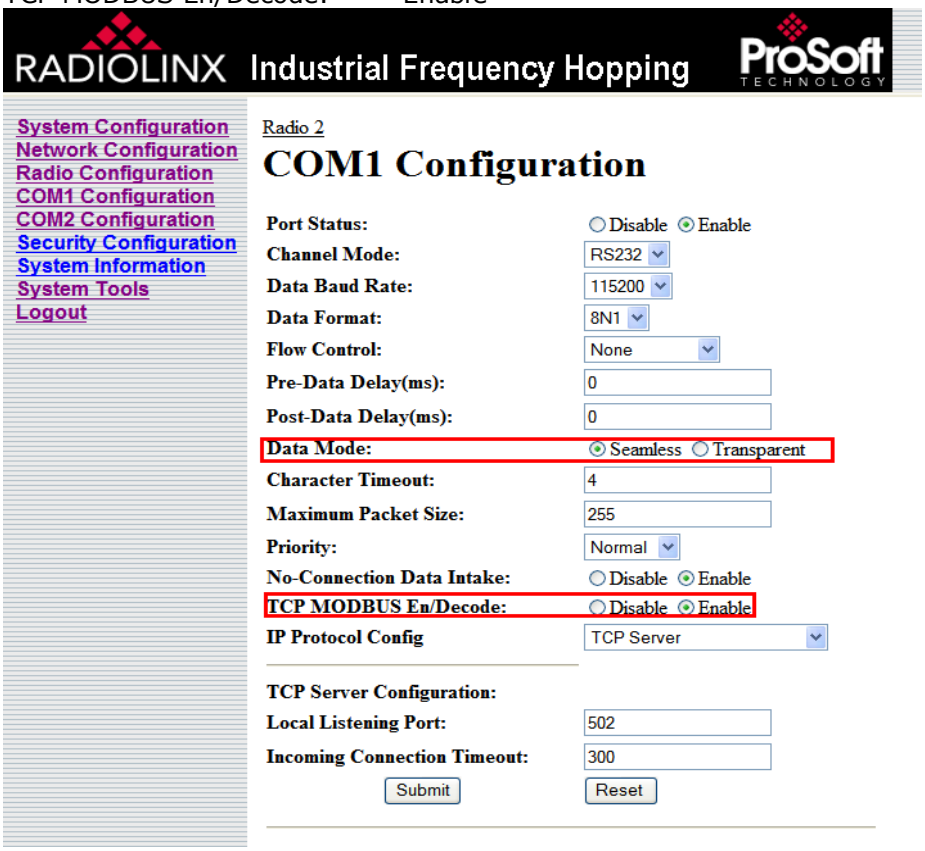


The User name is: **admin**
The password is: **admin**

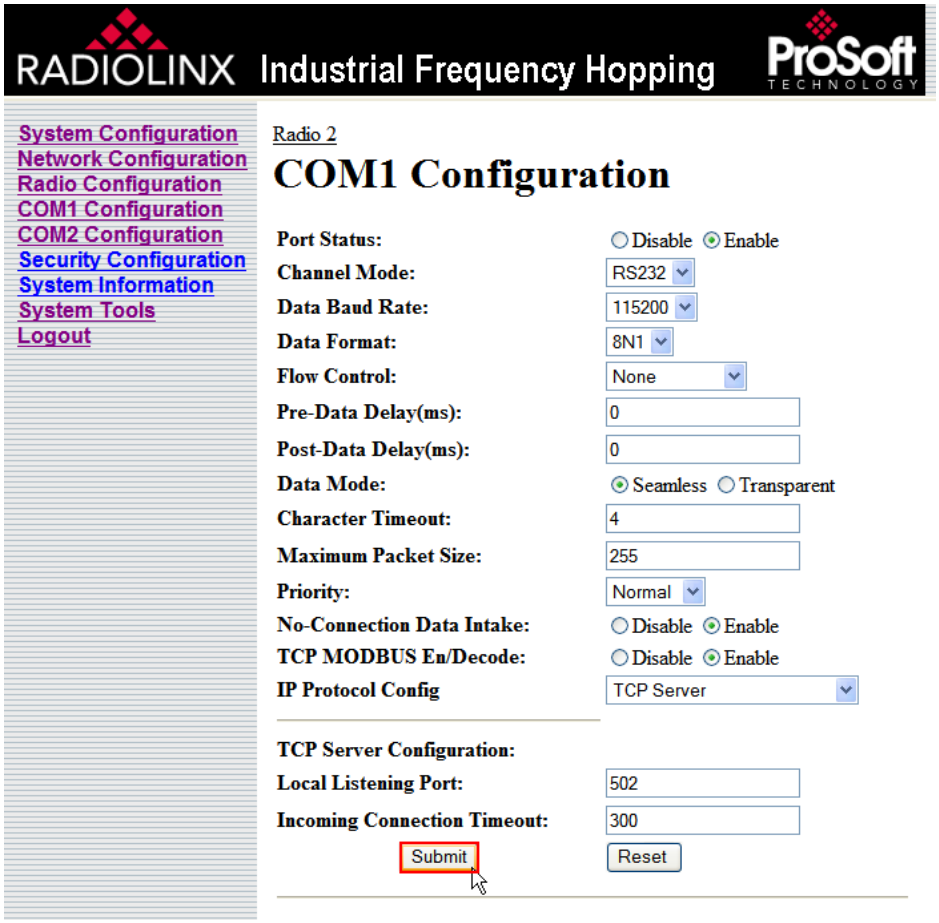
Clik on COM1 Configuration on the web page below:



The COM 1 Configuration screen below is shown.
The settings below must be changed:
Data Mode: Seamless
TCP MODBUS En/Decode: Enable



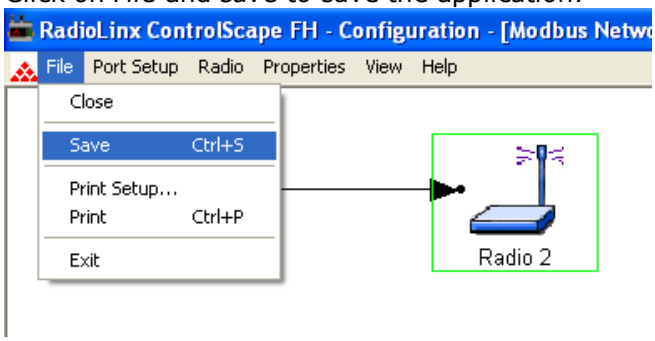
Then click on *Submit* to save the modification.



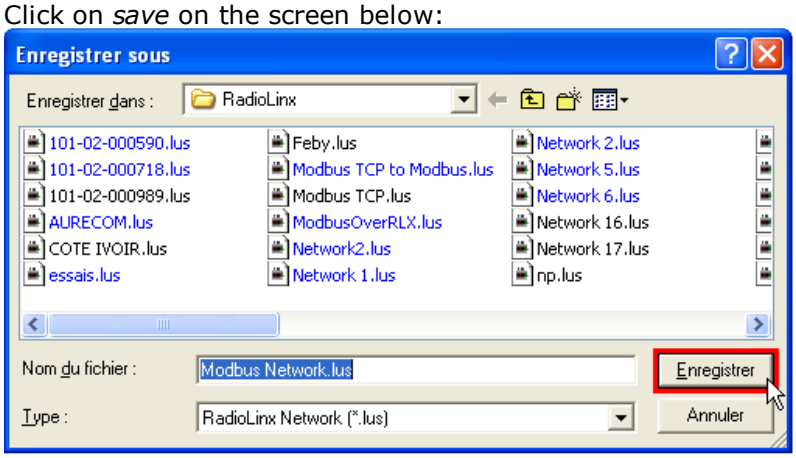
Disconnect the Ethernet cable from the ETHERNET port on the bottom of the radio (Radio2) and connect it back to the Master Radio.
Connect the RS232 serial port of the remote radio to the Laptop by using the serial cable shipped with the RLX-IFH24E radios.
NOW the Configuration of the RLX-IFH24E-E modules is finished.

D. Save File

Click on *File* and *save* to save the application.



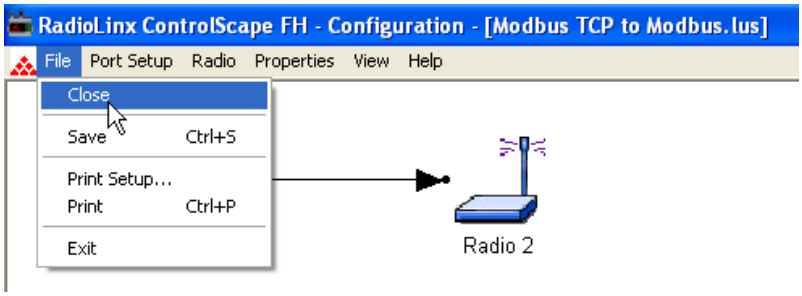
Click on *save* on the screen below:



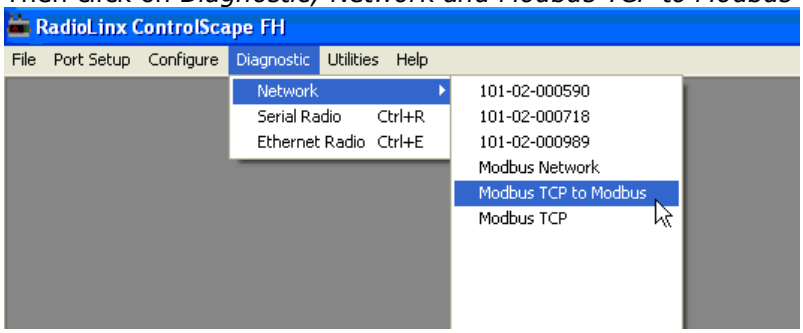
It is possible to set a password to restrict access to the configuration file.
As we will not use the password restriction we leave the Password box blank and Click on OK:

E. RF link testing.

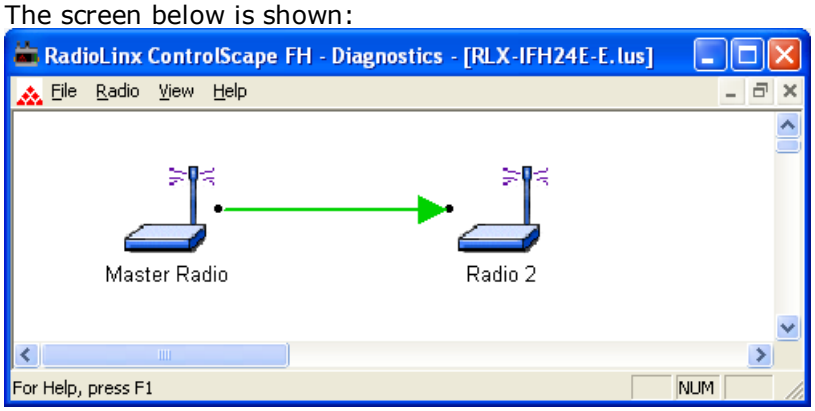
We will monitor the RF link to ensure that the two modules are well configured.
Connect the antennas on the ANTENNA port of the radios.
Click on *File and Close:*



Then click on *Diagnostic; Network and Modbus TCP to Modbus*



The screen below is shown:



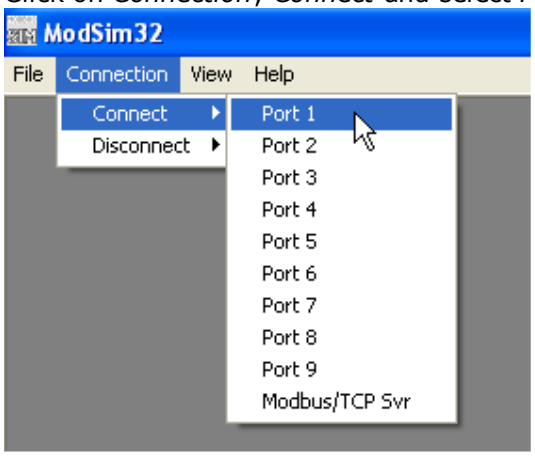
Now we know that the two modules are connected by wireless.

F. Slave Configuration (Modbus RTU device).

To emulate the slave device, ModSim32 is used.
To use this software thank you to click on the link below:
http://www.win-tech.com/

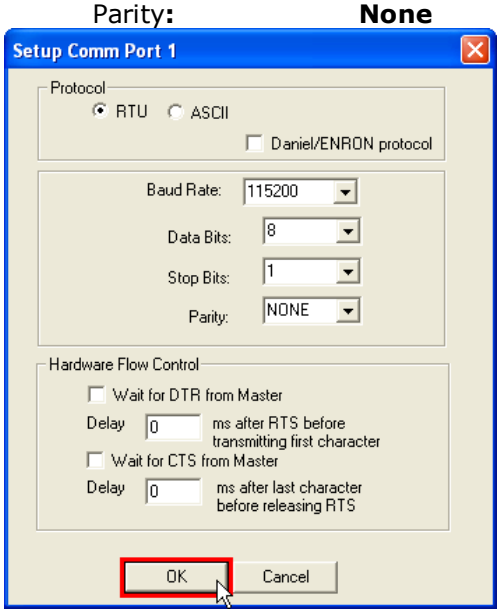
Launch the ModSim32 software.

Click on *Connection*; *Connect* and select *Port 1* (if the serial port of your computer is Port 1)



The screen below is shown.
Thank you to setup the communication port as below:

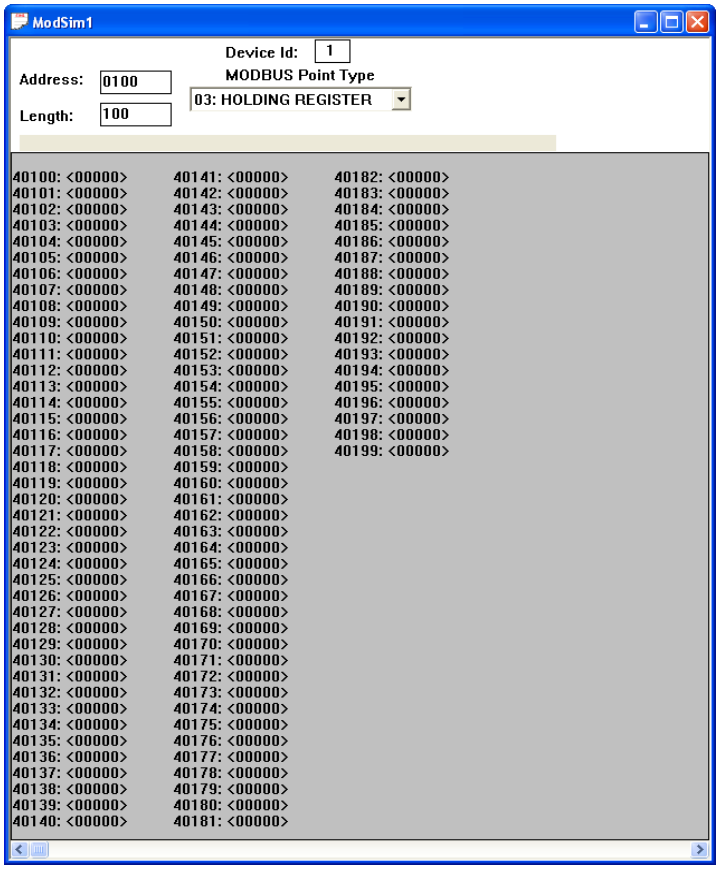
Baud rate:	**115200**
Data Bits**:**	**8**
Stop Bits:	**1**
Parity**:**	**None**



Click on OK to validate the configuration.

Click on *File and New* to generate a new slave device.

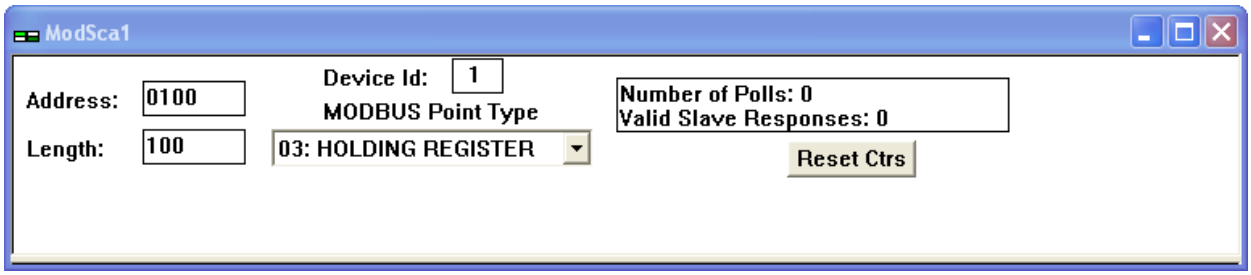
The screen below is shown:



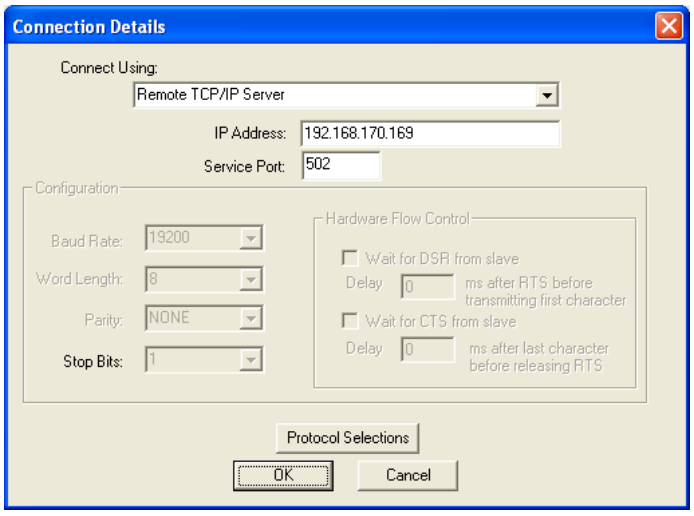
G. Client Configuration (Modbus TCP device).

To emulate the Client device, ModScan32 is used.
To use this software thank you to click on the link below:
http://www.win-tech.com/

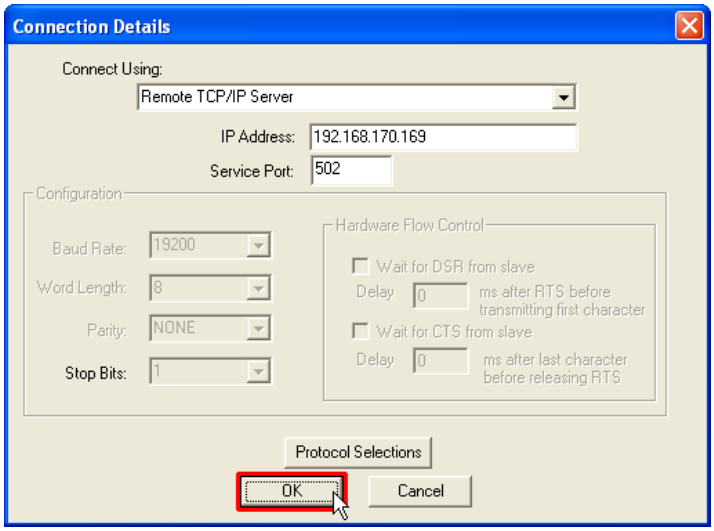
Launch the ModScan32 software and enter the flowing parameters:
Address: **0100**
Length**:** **100**
Modbus point Type **03: HOLDING REGISTER**



Click *Connection* and *Connect*.
The widow below is shown.
Thank you to use the following settings:
Connection Using: **Remote TCP/IP Server**
IP Address: **192.168.170.169**
Service Port: **502**

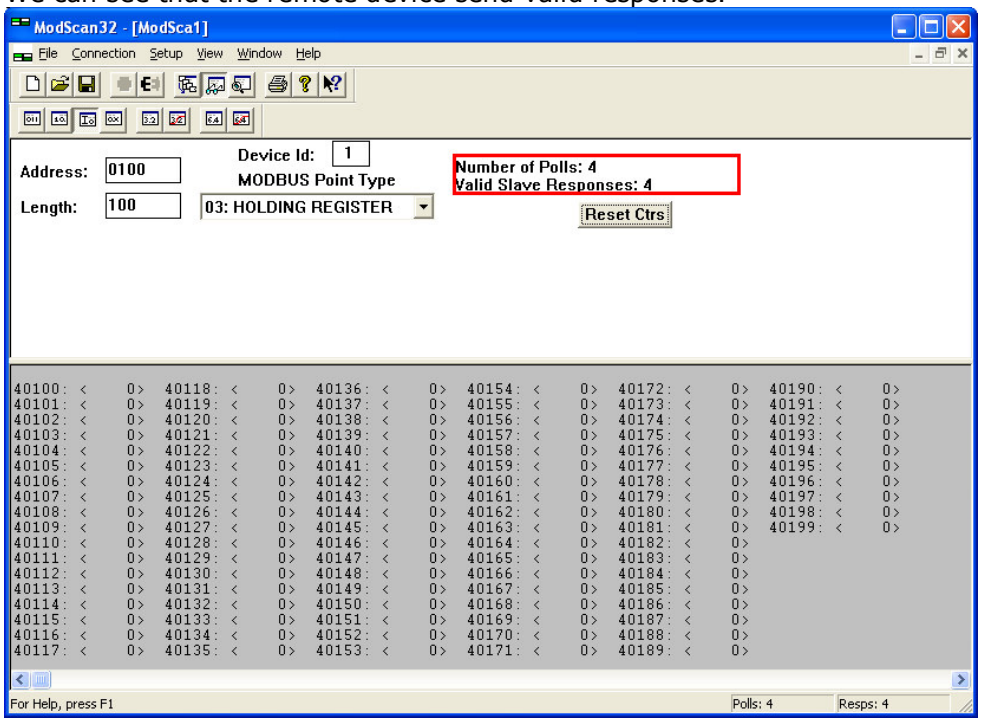


H. Communication test

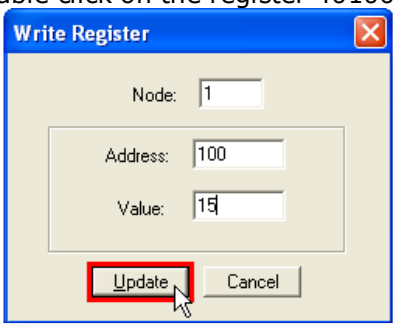


Click on ok to start the exchanges between the Client TCP and the Modbus slave.

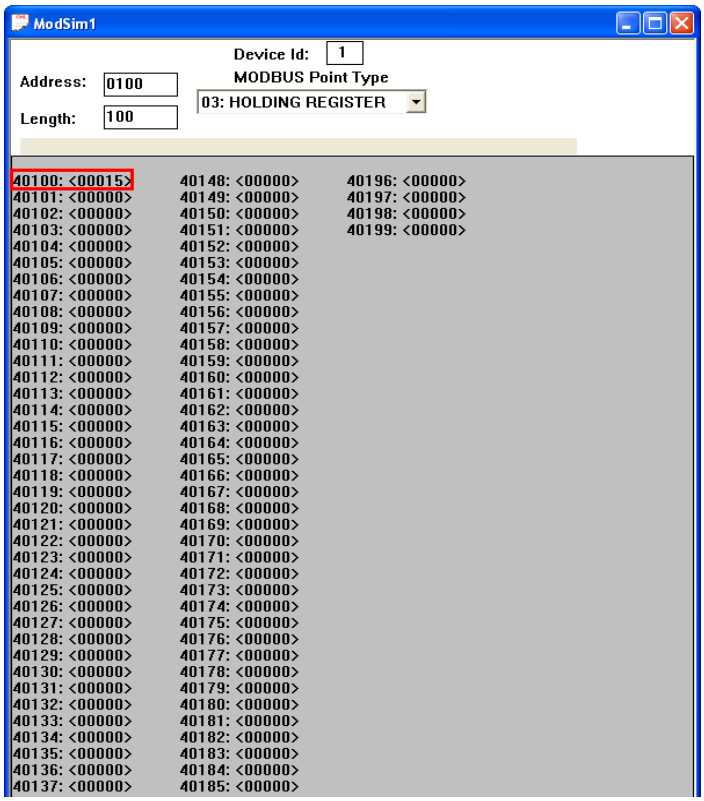
The screen below is shown.
We can see that the remote device send valid responses.



Double click on the register 40100 and change the value from **0** to **15.**



Click on Update to send this value to the Slave device.
Within ModSim32 software you can see that the register 40100 has been correctly updating:



The system is up and running and well configured.

Technical Note

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