

## How to setup Wireless Modbus TCP M340 with NOE and Quantum with NOE

### RLXIB-IHW Industrial Hotspot 802.11abg



#### Introduction

This document gives the details of the implementation of Modbus TCP over a wireless connection between two devices (one client device and one Server device).

For the architecture example of this implementation, we use a Schneider Electric M340 PLC with an NOE card as a client device and a Schneider Electric QUANTUM PLC with a NOE card as a server device.

The client device could be another PLC (Quantum, M340, Premium...) or any other device that supports Modbus TCP client communication.

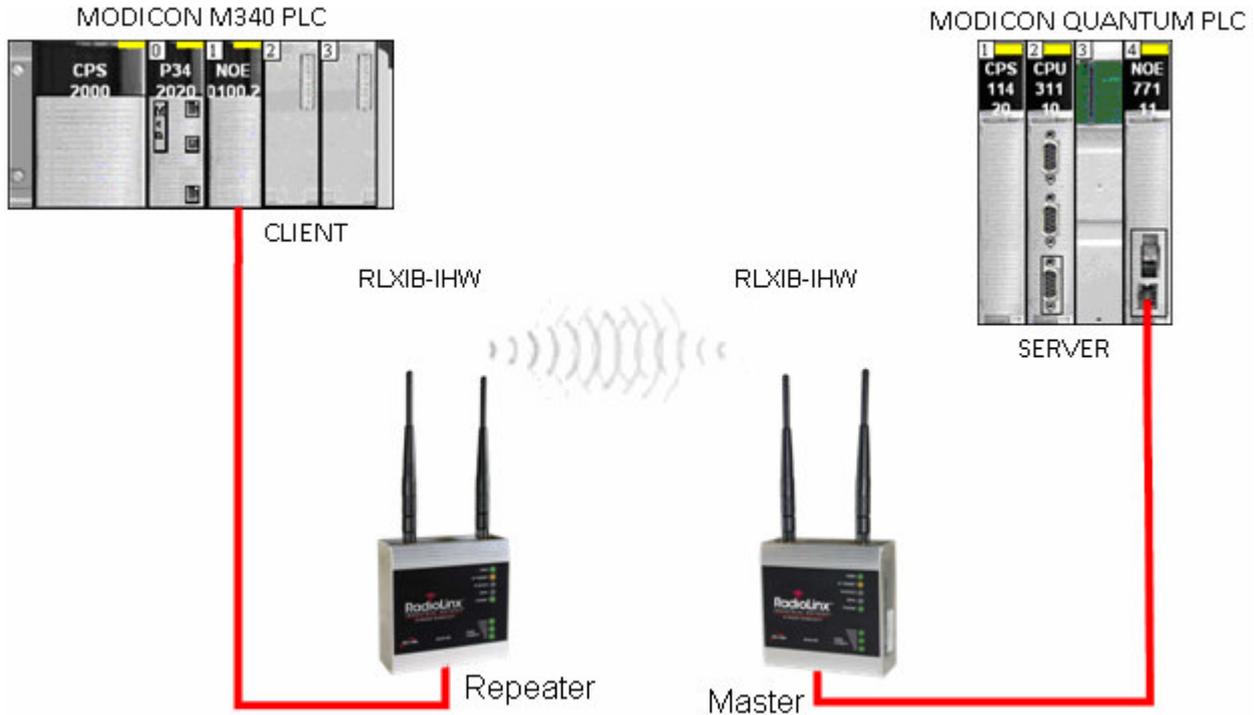
The server device could be another PLC (Quantum, M340, Premium...) or any other device that supports Modbus TCP server communication.

To carry out the wireless communication, two ProSoft Technology modules RLXIB-IHW-E RadioLinX Industrial Hotspot 802.11abg are used.

Note:

RLXIB-IHW-E has AP (Access Point) mode available (See the end of the technical note).

## Architecture



Software required for this architecture example:

- Unity Pro XL V4.0 – From Schneider Electric
- USB Driver for M340 – From Schneider Electric
- RadioLinX Industrial Hotspot Browser – From ProSoft Technology
- Internet Explorer 7 – To browse the RLXIB-IHW settings

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### Procedure

Remark:

If your PC is not connected to a DHCP server or is directly connected via Ethernet to the radio module, **DO NOT FORGET TO ASSIGN A FIXED IP ADDRESS** to the PC Ethernet card.

Here are the basic steps needed to establish communications:

#### A. Setting of the master radio

##### A.1. Install RadioLinx IH browser:

Download RLX-IH Browser from:

<http://www.prosoft-technology.com/content/download/12739/165690/file>

Then install the Browser on your PC.

##### A.2. Plug the cables to the RLXIB-IHW:



*From left to right: Power connector, serial port and Ethernet port.*

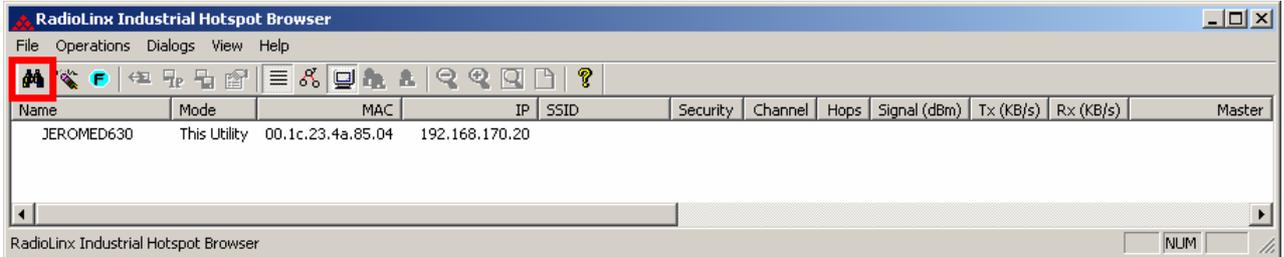
Plug the power cable.

For Ethernet connection:

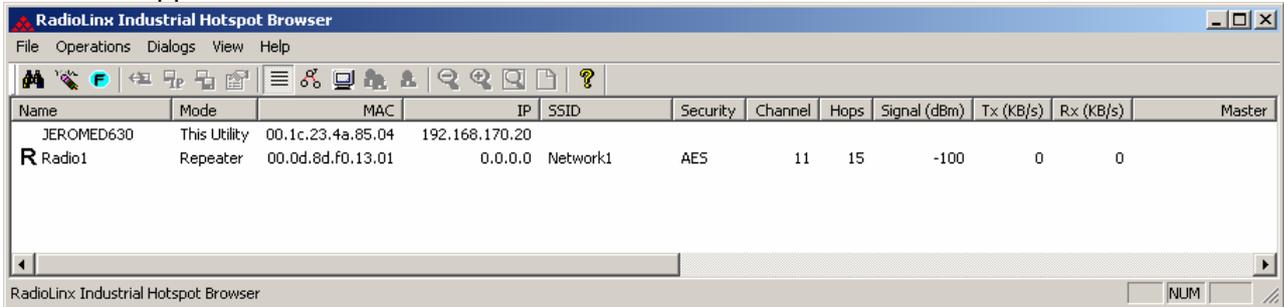
- If you are connecting to the radio through an Ethernet hub or switch, use the gray (straight-through) cable.
- If you are connecting to the radio directly from your PC without going through an Ethernet hub or switch, you must use the red (crossover) cable.

### A.3. Launch RadioLinx IH browser:

Click on the "binocular":



The radio appears:

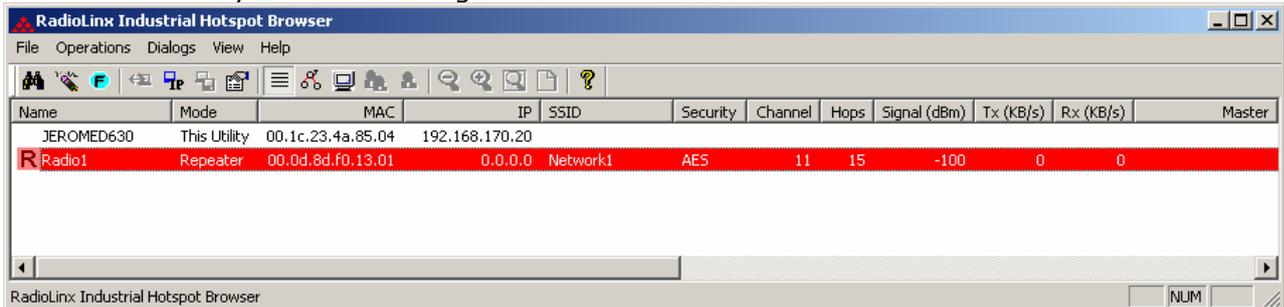


At this point the setting of the radio is the factory default.

If the radio is connected to a network with a DHCP server, the radio may already have an IP address assigned to it.

If no IP address appears (remains 0.0.0.0):

Select the Radio you want to assigned an IP address in the list

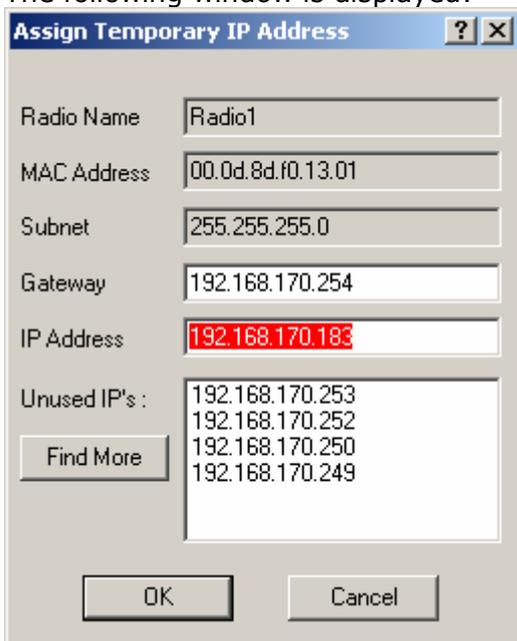




Then from "Operations" menu, select "Assign IP"



The following window is displayed:



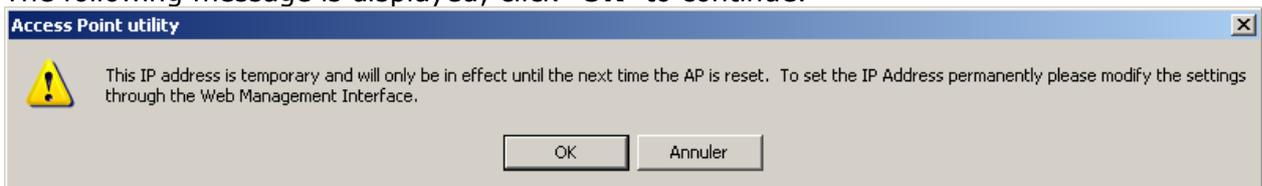
You can select an unused IP address from the list by double-clicking on it or change it in the IP address edit box.

**Note:**

The **IP address** of **NOE, Radio RLXIB-IHW** and server device must be at the same IP range and depending of your **Subnet mask**.

Click "OK" to accept the temporary IP address, subnet mask, and default gateway.

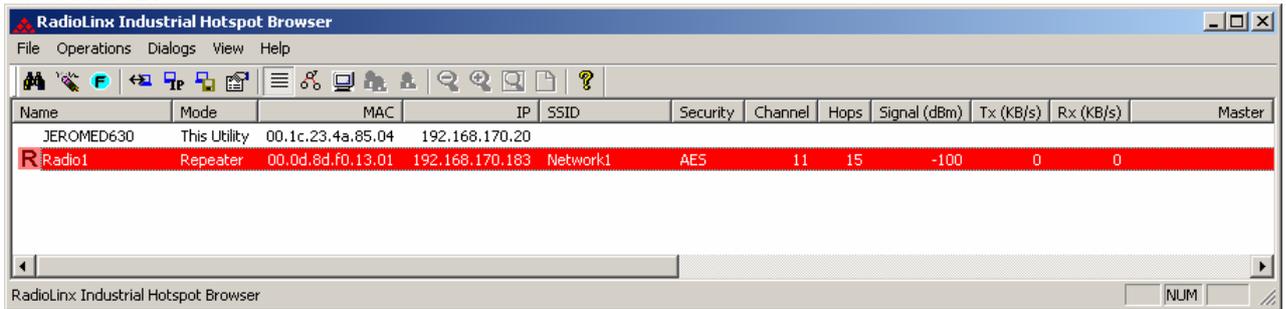
The following message is displayed; click "OK" to continue.



Now a temporary IP address is assigned to the RLXIB-IHW-E module.

### A.4. Go online with the RLXIB-IHW-E for configuration:

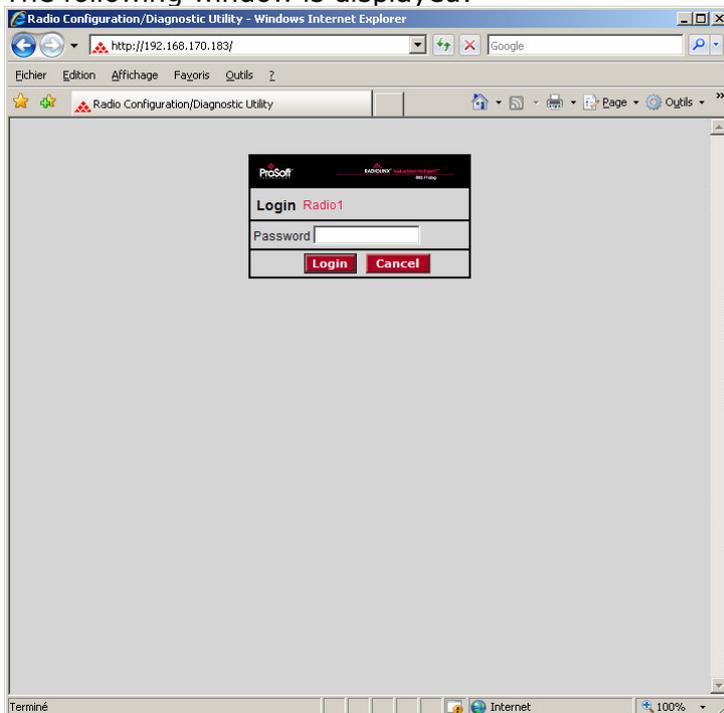
To go online with the RLXIB-IHW for configuration (or diagnostics) from the Browser select the Radio1:



Double-click on the radio or select the **"Connect"** option in **"Operations"** menu.



The following window is displayed:



Type your password to log into the radio (default is "password") and then click the **"Login"** button.

# Technical Note



## RLXIB-IHW Industrial Hotspot 802.11abg Wireless Modbus TCP - M340 with NOE & Quantum with NOE

The RLW-IHW-E configuration is protected by a login password.  
To prevent unauthorized access to the radio configuration, you should change the default password when you have finished your configuration.

The following window is displayed:

The screenshot shows a web browser window displaying the configuration utility for a Radiolinx Industrial Hotspot 802.11abg. The interface is divided into several sections:

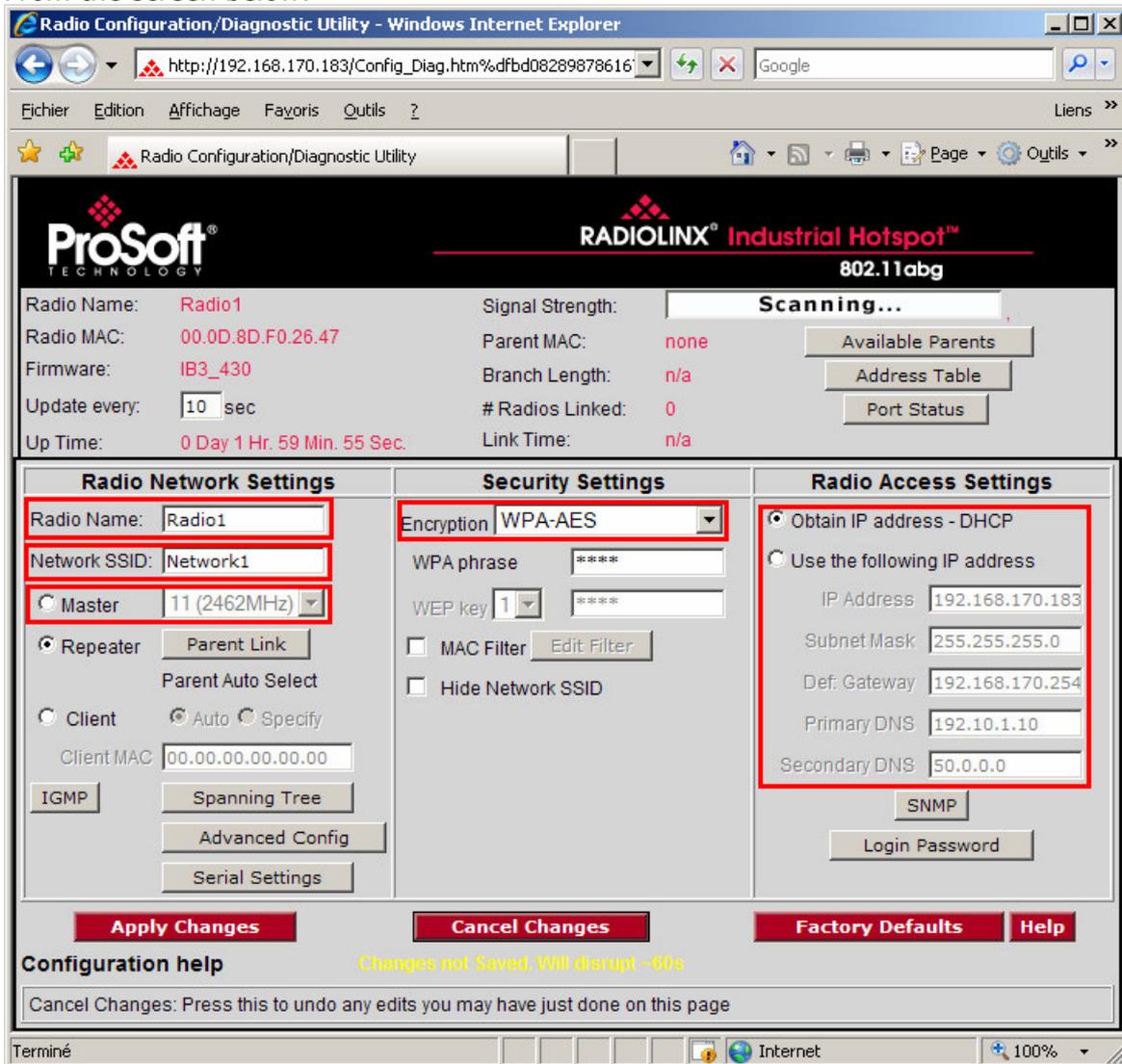
- Radio Information:** Radio Name: Radio1, Radio MAC: 00.0D.8D.F0.26.47, Firmware: IB3\_430, Update every: 10 sec, Up Time: 0 Day 1 Hr. 57 Min. 4 Sec. Signal Strength: Scanning... Parent MAC: none, Branch Length: n/a, # Radios Linked: 0, Link Time: n/a.
- Radio Network Settings:** Radio Name: Radio1, Network SSID: Network1, Mode: Repeater (Parent Link), Parent Auto Select, Client MAC: 00.00.00.00.00.00. Buttons: IGMP, Spanning Tree, Advanced Config, Serial Settings.
- Security Settings:** Encryption: WPA-AES, WPA phrase: \*\*\*\*, WEP key: 1, \*\*\*\*. Checkboxes: MAC Filter, Hide Network SSID. Button: Edit Filter.
- Radio Access Settings:** Obtain IP address - DHCP (selected), Use the following IP address (unselected). IP Address: 192.168.170.183, Subnet Mask: 255.255.255.0, Def. Gateway: 192.168.170.254, Primary DNS: 192.10.1.10, Secondary DNS: 50.0.0.0. Buttons: SNMP, Login Password.

At the bottom, there are buttons for **Apply Changes**, **Cancel Changes**, **Factory Defaults**, and **Help**. A yellow warning message states: "Changes not Saved. Will disrupt ~60s". A configuration help box at the bottom indicates: "Radio Name: 1 to 31 characters. For user's identification of radio only."

### A.5. Set up the RLXIB-IHW-E – Master mode

The master is the "root" or top-level radio in a network.  
You must have at least one master radio per network.  
For redundancy, you can assign more than one master to the network.

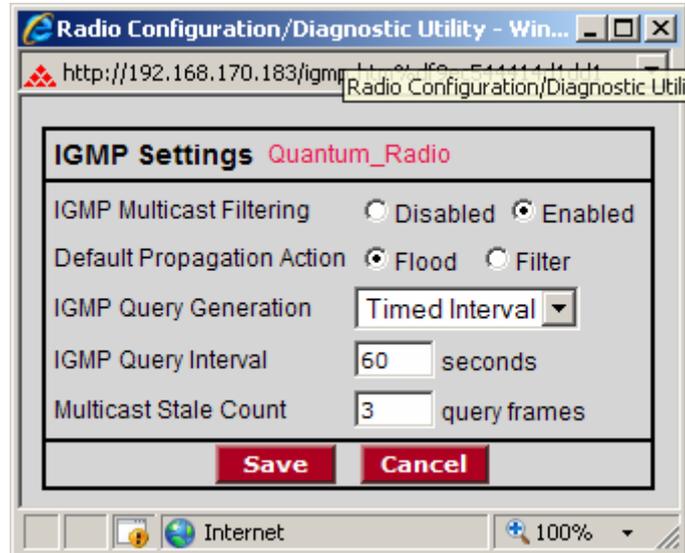
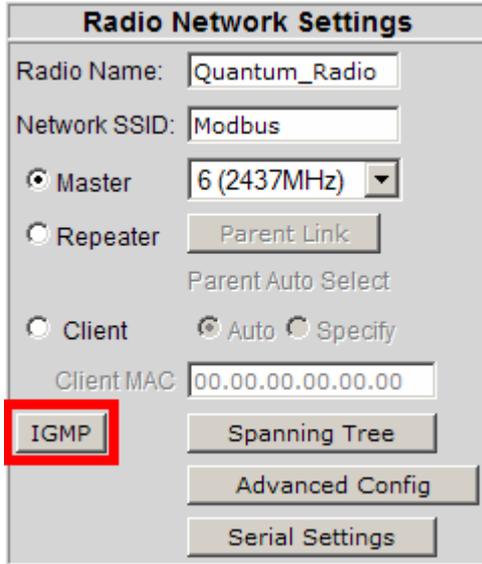
From the screen below:



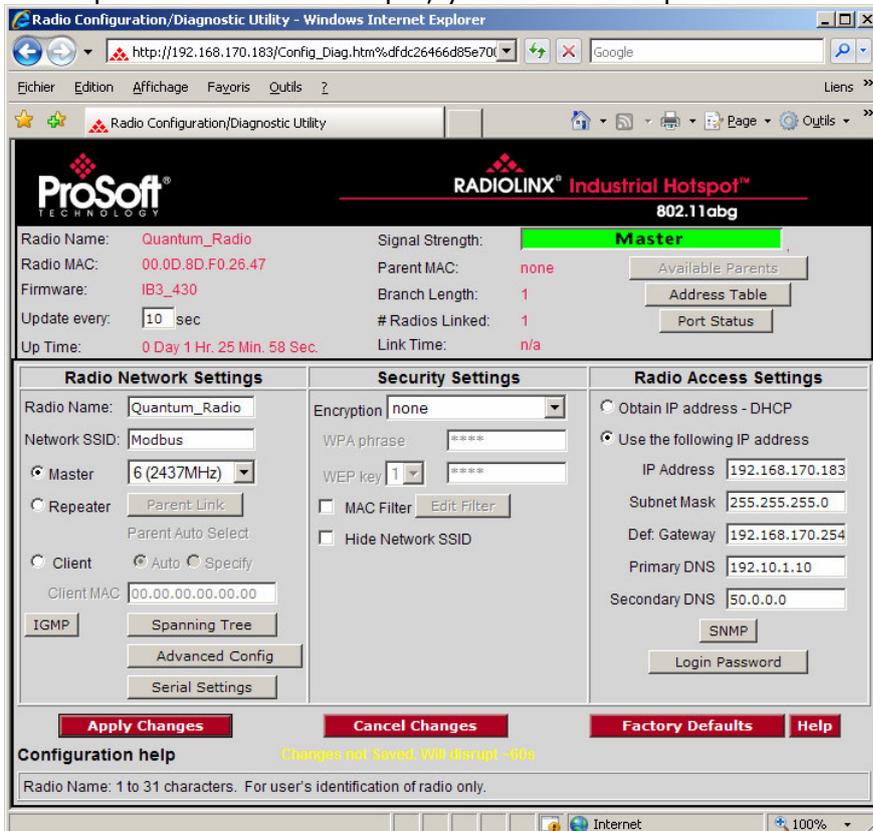
- Change the Radio Name from **Radio1** to **Quantum\_Radio**
- Change the **Network SSID** from **Network1** to **Modbus**
- Select **Master** and select the channel (default channel is 11)
- Select **Encryption** (WPA-AES for example) and enter your pass phrase
- Enter a valid **IP address** and **Subnet Mask**

**IMPORTANT:**

The use of Global Data needs the IGMP settings to be "Disabled" in both Master and Repeater RLXIB-IHW-E modules.



These parameters are example; you can set the parameters that fit your needs.



Now the new settings are ready, press "Apply Changes" to validate them.

# Technical Note

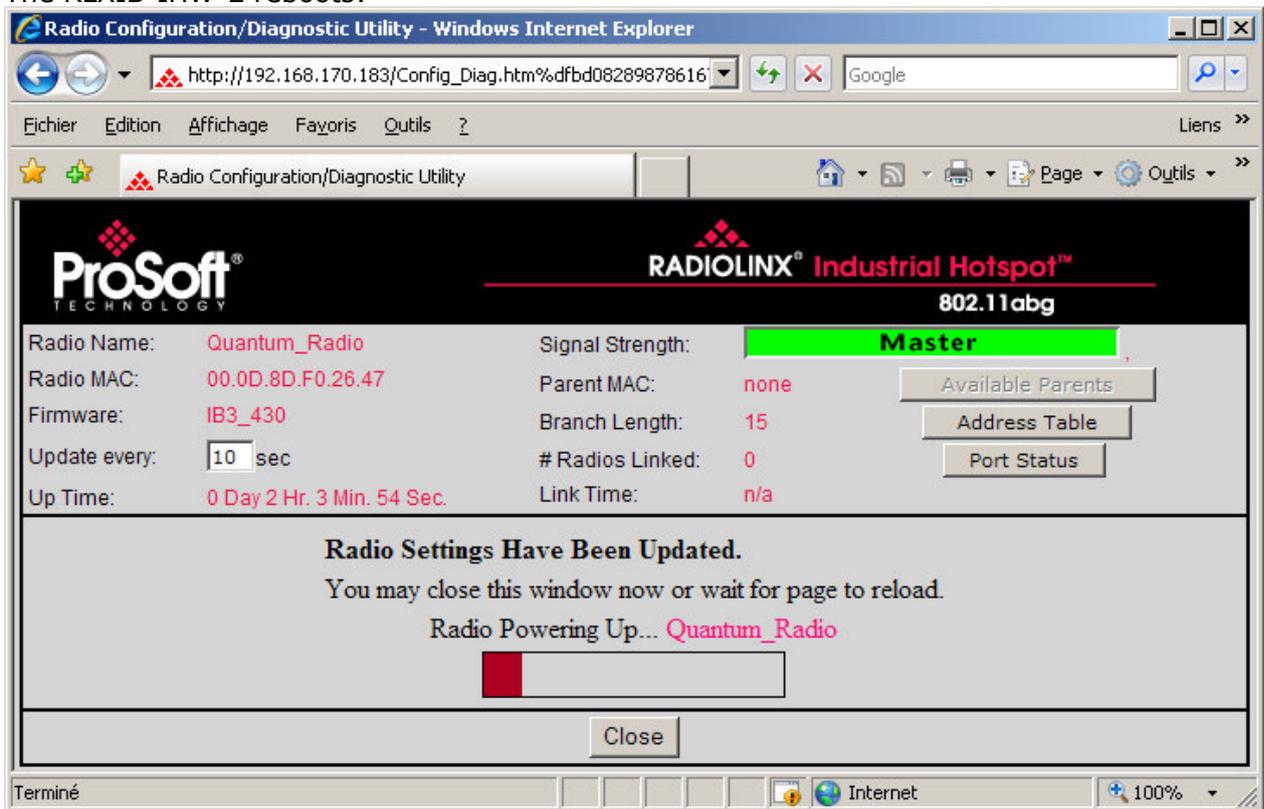


## RLXIB-IHW Industrial Hotspot 802.11abg Wireless Modbus TCP - M340 with NOE & Quantum with NOE

The following message may appear when pressing "**Apply changes**", click "**OK**".



The RLXIB-IHW-E reboots:



You can wait until the update is done or click on "**Close**", the following window is displayed:



Click "**Yes**".

### A.6. Settings verification:

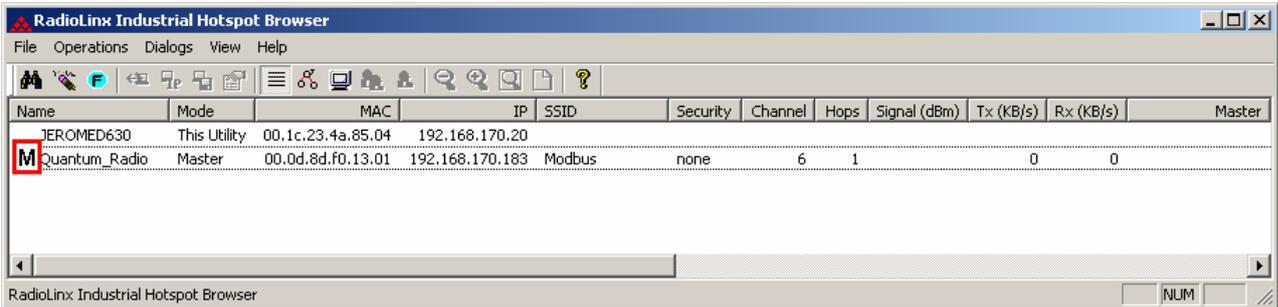
Select "Clear" to delete the current radio list



Select the "binocular" to refresh the screen and get an update radio list



When configured the name of the radio is preceded by an M (for Master) in the RLX-IH Browser.



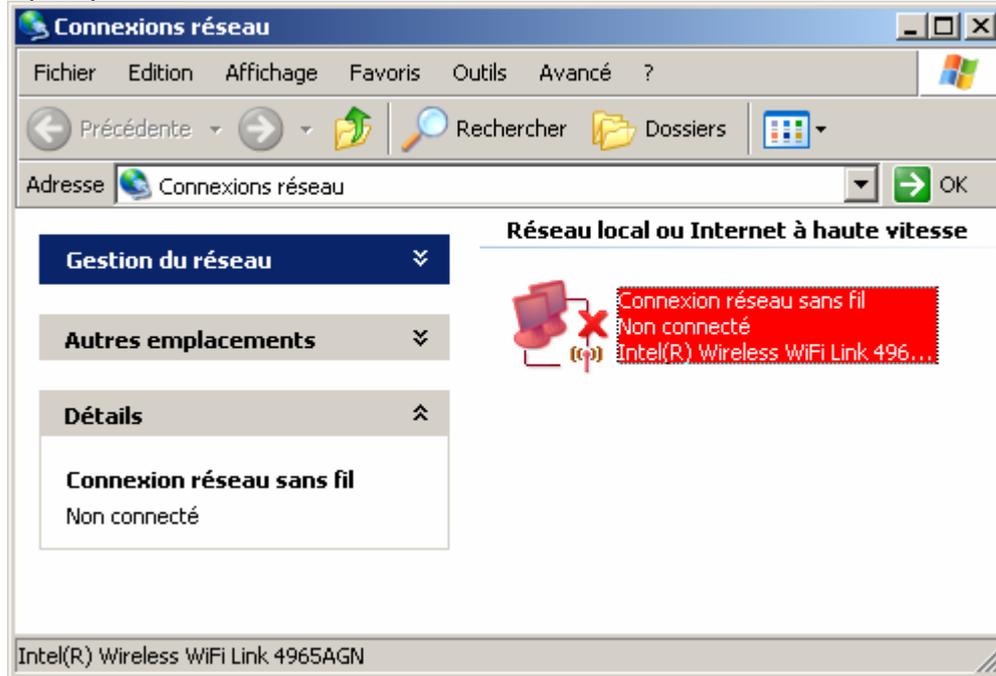
**The setting of the Master radio is completed.**

Disconnect the Ethernet cable from the radio.

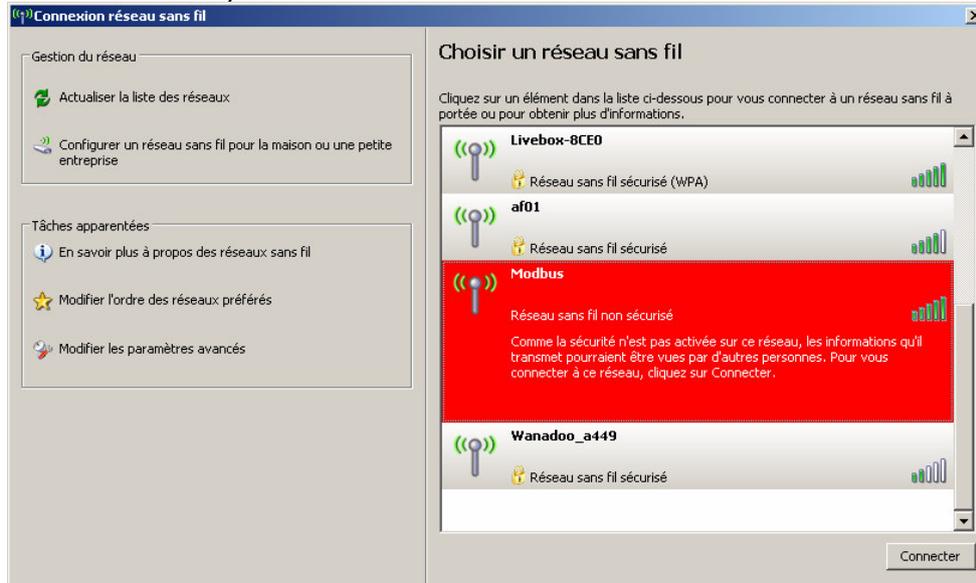


### A.7. RLXIB-IHW-E Access Point checking

Open your PC network connection and select the wireless card.



Double-click on your Wireless network to View Available Wireless Networks

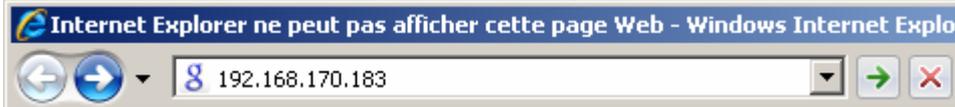


Within the list of the Wireless network available you should see the Modbus network. This is the **Network SSID** you setup previously within the RLXIB-IHW-E Master. Select the **Modbus** wireless network and click the "**Connect**" button.

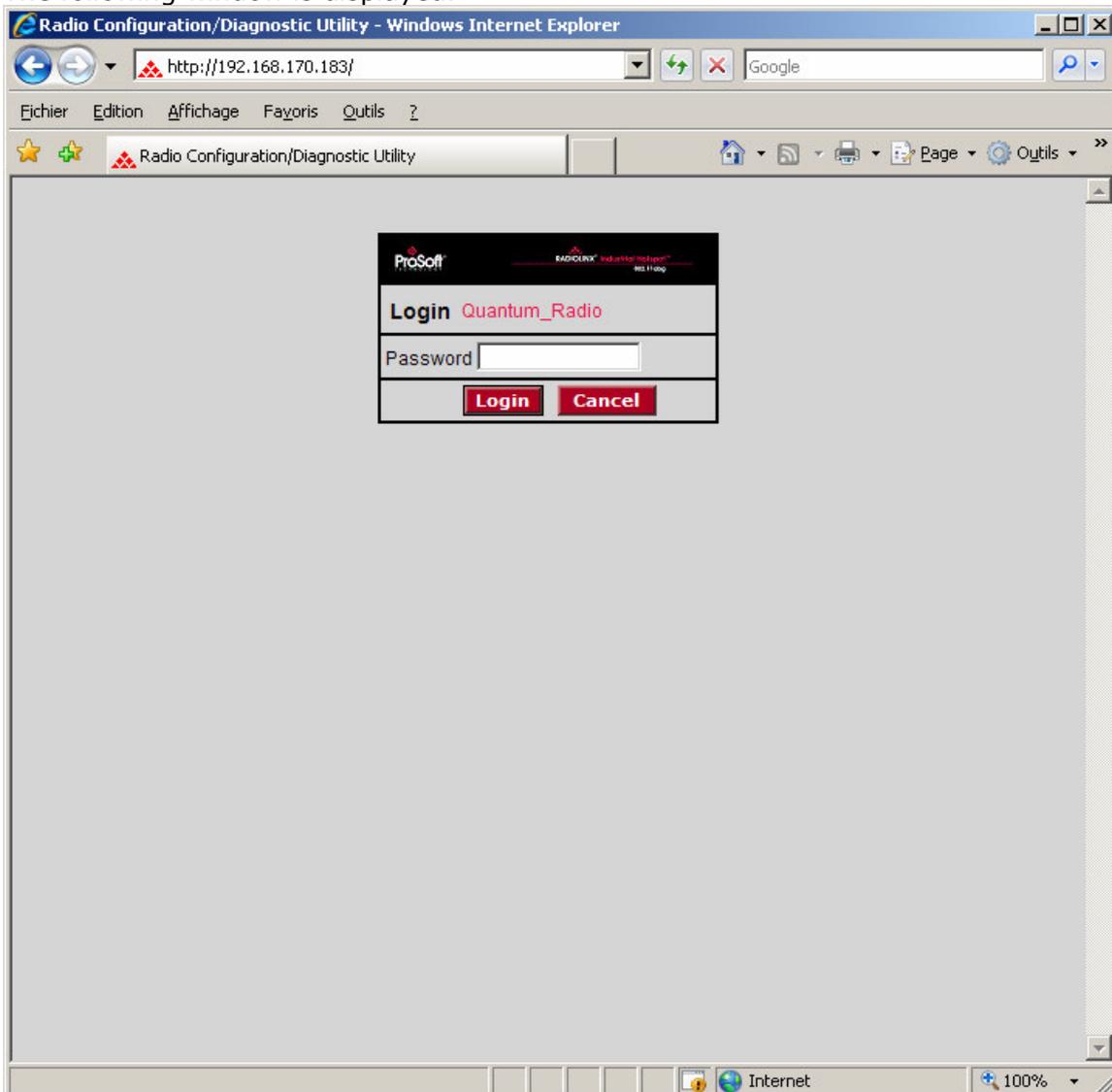
Now you will be able to monitor the radio with your internet browser via your wireless network:

Open your internet browser.

Enter the IP address of the RLXIB-IHW-E you want to access into the navigation bar.



The following window is displayed.



Type your password to log into the radio (default is "password") and then click the "**Login**" button.

# Technical Note



## RLXIB-IHW Industrial Hotspot 802.11abg Wireless Modbus TCP - M340 with NOE & Quantum with NOE

The following window is displayed:

Radio Configuration/Diagnostic Utility - Windows Internet Explorer  
http://192.168.170.183/Config\_Diag.htm%df5cae7fcae3e5

**ProSoft** TECHNOLOGY **RADIOLINX** Industrial Hotspot™ 802.11abg

Radio Name: **Quantum\_Radio** Signal Strength: **Master**  
Radio MAC: 00.0D.8D.F0.26.47 Parent MAC: none  
Firmware: IB3\_430 Branch Length: 1  
Update every: 10 sec # Radios Linked: 0  
Up Time: 0 Day 0 Hr. 0 Min. 38 Sec. Link Time: n/a

Radio Network Settings	Security Settings	Radio Access Settings
Radio Name: Quantum_Radio Network SSID: Modbus <input checked="" type="radio"/> Master 6 (2437MHz) <input type="radio"/> Repeater Parent Link <input type="radio"/> Client Auto Client MAC: 00.00.00.00.00.00 IGMP Spanning Tree Advanced Config Serial Settings	Encryption: none WPA phrase: ***** WEP key: 1 ***** <input type="checkbox"/> MAC Filter Edit Filter <input type="checkbox"/> Hide Network SSID	<input type="radio"/> Obtain IP address - DHCP <input checked="" type="radio"/> Use the following IP address IP Address: 192.168.170.183 Subnet Mask: 255.255.255.0 Def. Gateway: 192.168.170.254 Primary DNS: 192.10.1.10 Secondary DNS: 50.0.0.0 SNMP Login Password

**Apply Changes** **Cancel Changes** **Factory Defaults** **Help**

**Configuration help** Changes not Saved. Will disrupt ~60s  
Hide Network SSID: Check to hide SSID in rf beacons so WLAN card scans can not see this network SSID

## **B. Setting of the repeater radio**

### **B.1. Plug the cables to the other RLXIB-IHW**



*From left to right: Power connector, serial port and Ethernet port.*

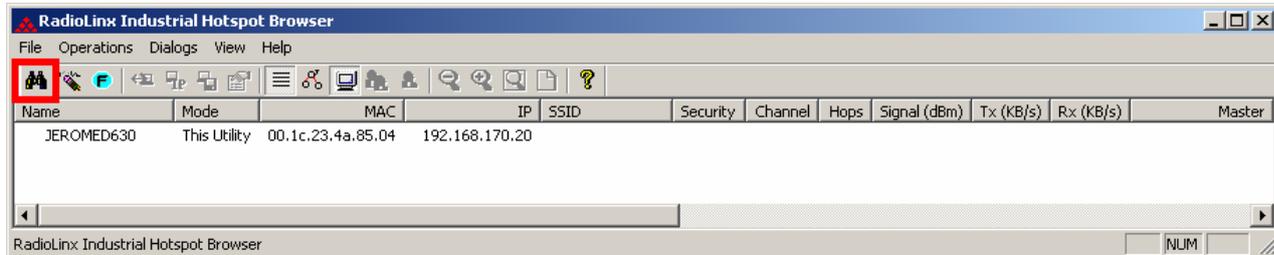
Plug the power cable.

For Ethernet connection:

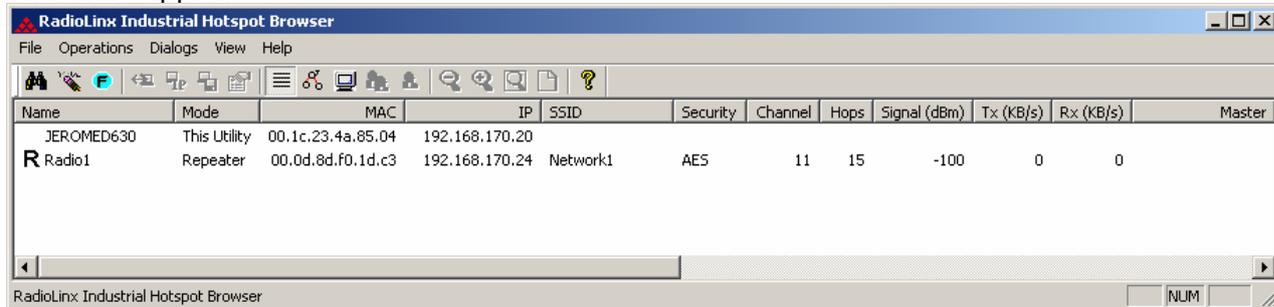
- If you are connecting to the radio through an Ethernet hub or switch, use the gray (straight-through) cable.
- If you are connecting to the radio directly from your PC without going through an Ethernet hub or switch, you must use the red (crossover) cable.

### B.2. Launch RadioLinx IH browser

Click on the "binocular"



The radio appears:

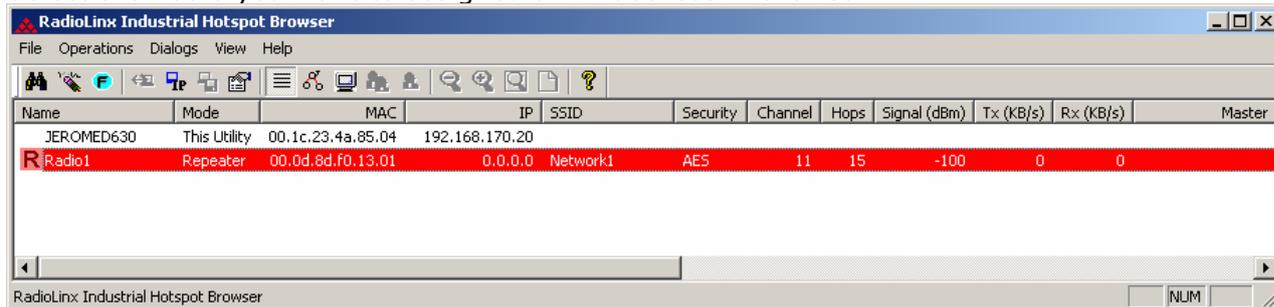


At this point the setting of the radio is the factory default.

If the radio is connected to a network with a DHCP server, the radio may already have an IP address assigned to it.

If no IP address appears (remains 0.0.0.0):

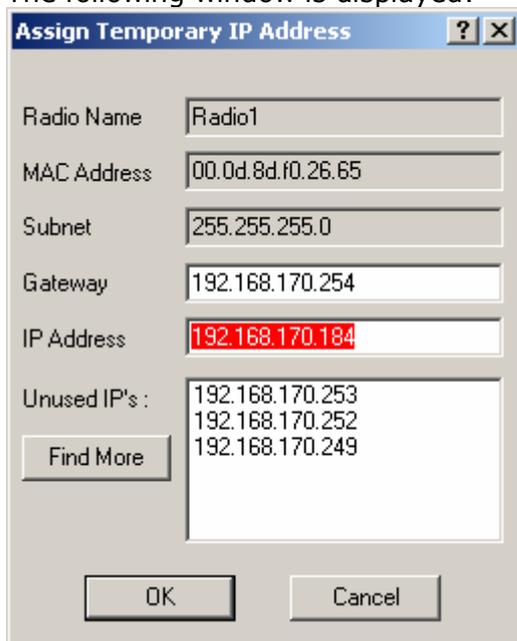
Select the Radio you want to assigned an IP address in the list



Then from "**Operations**" menu, select "**Assign IP**"



The following window is displayed:



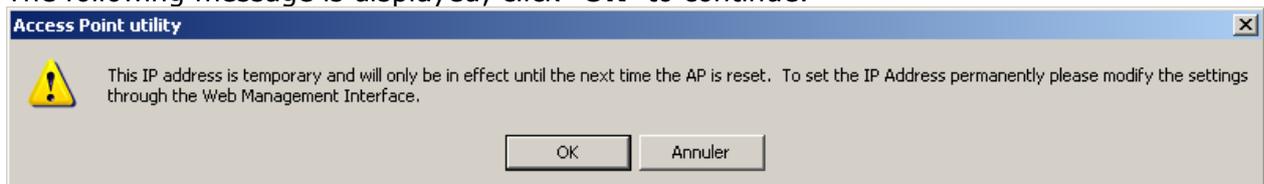
You can select an unused IP address from the list by double-clicking on it or change it in the IP address edit box.

### Note:

The **IP address** of **NOE, Radio RLXIB-IHW** and server device must be at the same IP range and depending of your **Subnet mask**.

Click "**OK**" to accept the temporary IP address, subnet mask, and default gateway.

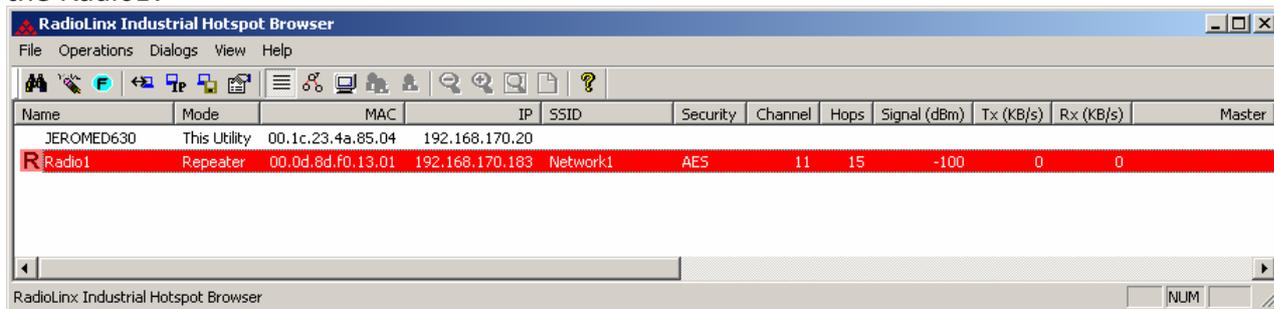
The following message is displayed; click "**OK**" to continue.



Now a temporary IP address is assigned to the RLXIB-IHW-E module.

### B.3. Go online with the RLXIB-IHW-E for configuration

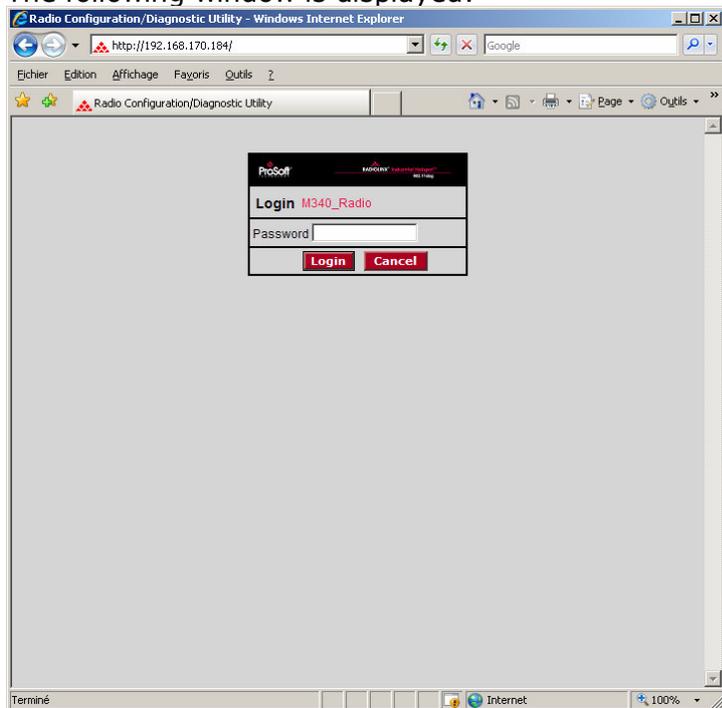
To go online with the RLXIB-IHW for configuration (or diagnostics) from the Browser select the Radio1:



Double-click on the radio or select the "Connect" option in "Operations" menu.



The following window is displayed:



Type your password to log into the radio (default is "password") and then click the "Login" button.

# Technical Note



## RLXIB-IHW Industrial Hotspot 802.11abg Wireless Modbus TCP - M340 with NOE & Quantum with NOE

The RLW-IHW-E configuration is protected by a login password.  
To prevent unauthorized access to the radio configuration, you should change the default password when you have finished your configuration.

The following window is displayed:

The screenshot displays the configuration interface for a ProSoft RADIOLINX Industrial Hotspot 802.11abg. The interface is viewed through a Windows Internet Explorer browser window. The main content area is divided into several sections:

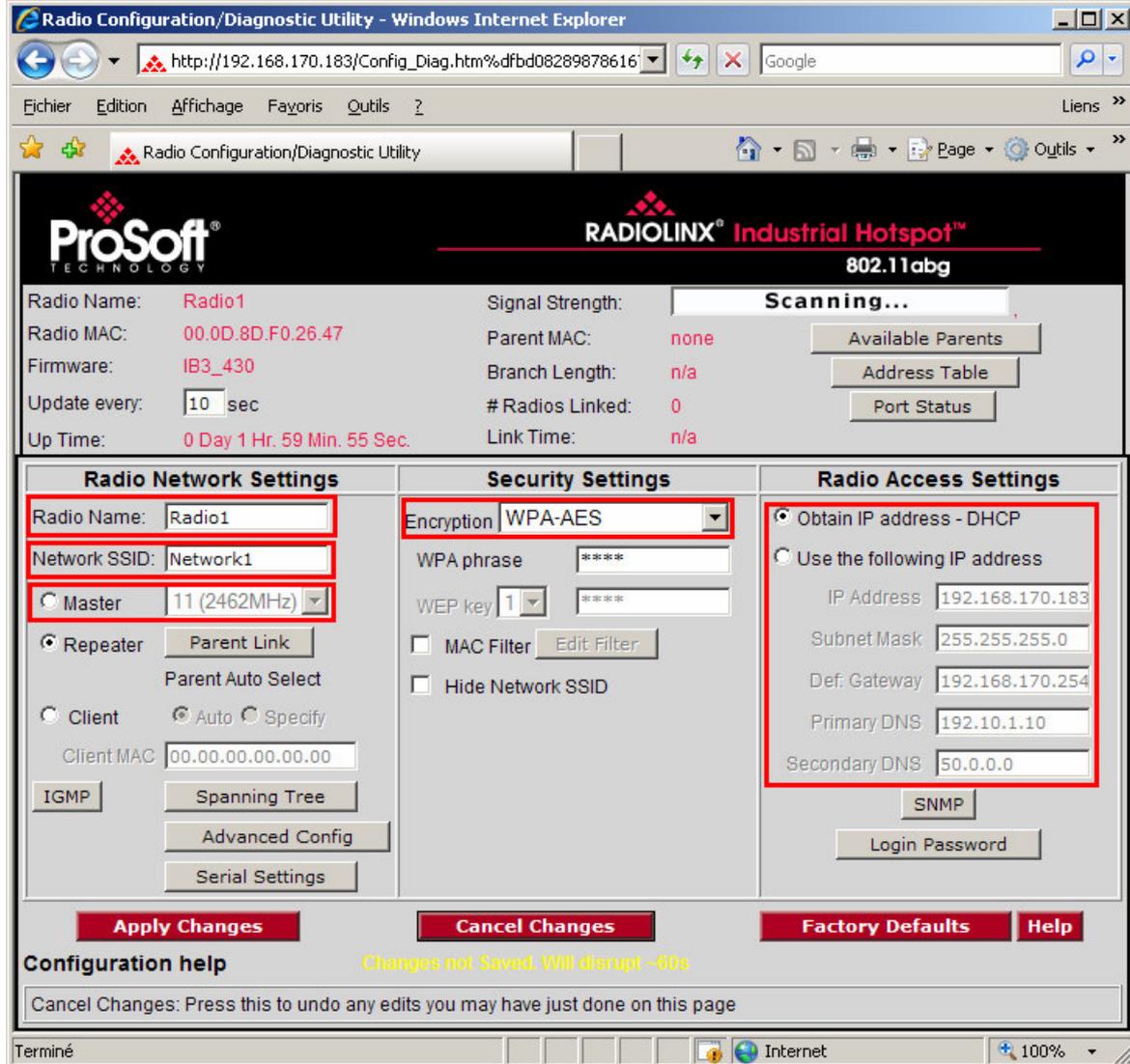
- Radio Information:** Radio Name: Radio1, Radio MAC: 00.0D.8D.F0.26.65, Firmware: IB3\_430, Update every: 10 sec, Up Time: 0 Day 0 Hr. 3 Min. 46 Sec.
- Signal and Linking:** Signal Strength: Scanning..., Parent MAC: none, Branch Length: n/a, # Radios Linked: 0, Link Time: n/a.
- Radio Network Settings:** Radio Name: Radio1, Network SSID: Network1, Mode: Repeater (Parent Link), Parent Auto Select, Client MAC: 00.00.00.00.00.00, IGMP, Spanning Tree, Advanced Config, Serial Settings.
- Security Settings:** Encryption: WPA-AES, WPA phrase: \*\*\*\*, WEP key: 1, \*\*\*\*, MAC Filter, Hide Network SSID.
- Radio Access Settings:** Obtain IP address - DHCP (selected), Use the following IP address (unselected), IP Address: 192.168.170.184, Subnet Mask: 255.255.255.0, Def. Gateway: 192.168.170.254, Primary DNS: 192.10.1.10, Secondary DNS: 50.0.0.0, SNMP, Login Password.

At the bottom of the configuration area, there are three buttons: **Apply Changes**, **Cancel Changes**, and **Factory Defaults**, along with a **Help** button. A yellow warning message reads: "Changes not Saved. Will disrupt ~60s". Below this, a "Configuration help" section provides a note: "Radio Name: 1 to 31 characters. For user's identification of radio only."

### B.4. Set up the RLXIB-IHW-E – Repeater mode

A RLXIB-IHW-E Remote/Repeater connects automatically to the best available parent radio on the network.

From the screen below:



The screenshot shows the configuration utility for the RADIOLINX Industrial Hotspot 802.11abg. The interface is divided into three main sections: Radio Network Settings, Security Settings, and Radio Access Settings. The Radio Network Settings section shows Radio Name: Radio1, Network SSID: Network1, and Mode: Master. The Security Settings section shows Encryption: WPA-AES. The Radio Access Settings section shows IP address configuration: Obtain IP address - DHCP. The interface also includes buttons for Apply Changes, Cancel Changes, Factory Defaults, and Help.

- Change the **Radio Name** from **Radio1** to **M340\_Radio**
- Change the **Network SSID** from **Network1** to **Modbus**
- Select **Repeater**
- Select **Encryption** (WPA-AES for example) and enter your pass phrase
- Enter a valid **IP address** and **Subnet Mask**

# Technical Note



## RLXIB-IHW Industrial Hotspot 802.11abg Wireless Modbus TCP - M340 with NOE & Quantum with NOE

These parameters are example; you can set the parameters that fit your needs.

The screenshot shows the configuration utility for the RADIOLINX Industrial Hotspot 802.11abg. The browser address bar shows the URL: http://192.168.170.184/Config\_Diag.htm%dfec0a62d20e1a. The utility is displayed in a Windows Internet Explorer window.

**Radio Configuration Summary:**

- Radio Name: Radio1
- Radio MAC: 00.0D.8D.F0.26.65
- Firmware: IB3\_430
- Update every: 10 sec
- Up Time: 0 Day 0 Hr. 4 Min. 26 Sec.
- Signal Strength: Scanning...
- Parent MAC: none
- Branch Length: n/a
- # Radios Linked: 0
- Link Time: n/a

**Configuration Tabs:**

- Radio Network Settings:** Radio Name: M340\_Radio, Network SSID: Modbus, Master/Repeater/Client selection, Parent Link, Parent Auto Select, Client MAC, IGMP, Spanning Tree, Advanced Config, Serial Settings.
- Security Settings:** Encryption: none, WPA phrase, WEP key, MAC Filter, Hide Network SSID.
- Radio Access Settings:** Obtain IP address - DHCP / Use the following IP address, IP Address: 192.168.170.184, Subnet Mask: 255.255.255.0, Def. Gateway: 192.168.170.254, Primary DNS: 192.10.1.10, Secondary DNS: 50.0.0.0, SNMP, Login Password.

**Buttons:** Apply Changes, Cancel Changes, Factory Defaults, Help.

**Configuration help:** Changes not Saved. Will disrupt ~60s. Cancel Changes: Press this to undo any edits you may have just done on this page.

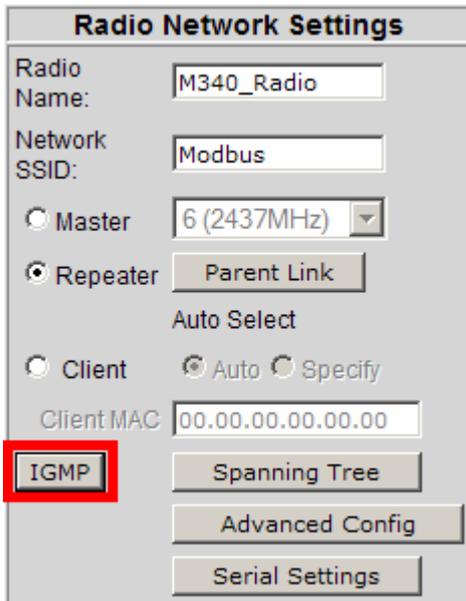
**Important: The Network SSID and WPA phrase are case sensitive.**

Use exactly the same combination of upper case and lower case letters you entered for the RLXIB-IHW-E Master mode, otherwise the Repeater radio will not be able to connect to the Master radio.

Now the new settings are ready, click "**Apply Changes**" to validate them.

**IMPORTANT:**

The use of Global Data needs the IGMP settings to be "Disabled" in both Master and Repeater RLXIB-IHW-E modules.



**Radio Network Settings**

Radio Name:

Network SSID:

Master

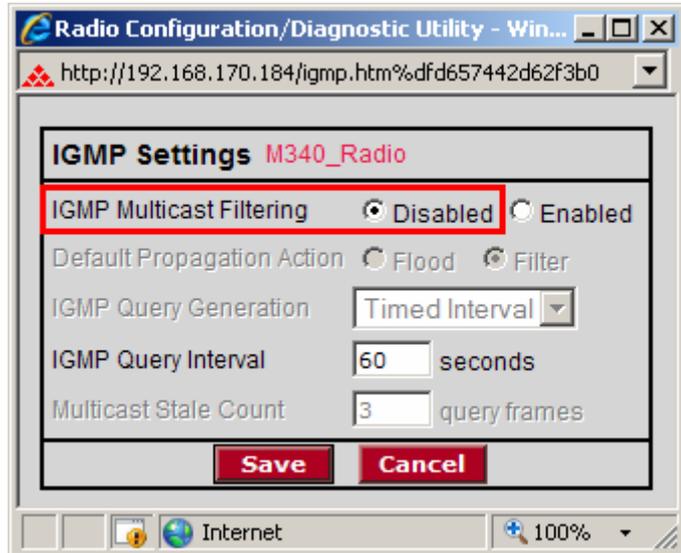
Repeater

Auto Select

Client  Auto  Specify

Client MAC:

**IGMP**



**Radio Configuration/Diagnostic Utility - Win...**

http://192.168.170.184/igmp.htm%dfd657442d62f3b0

**IGMP Settings M340\_Radio**

IGMP Multicast Filtering  Disabled  Enabled

Default Propagation Action  Flood  Filter

IGMP Query Generation

IGMP Query Interval  seconds

Multicast Stale Count  query frames

Now the new settings are ready, click "**Apply Changes**" to validate them.

# Technical Note

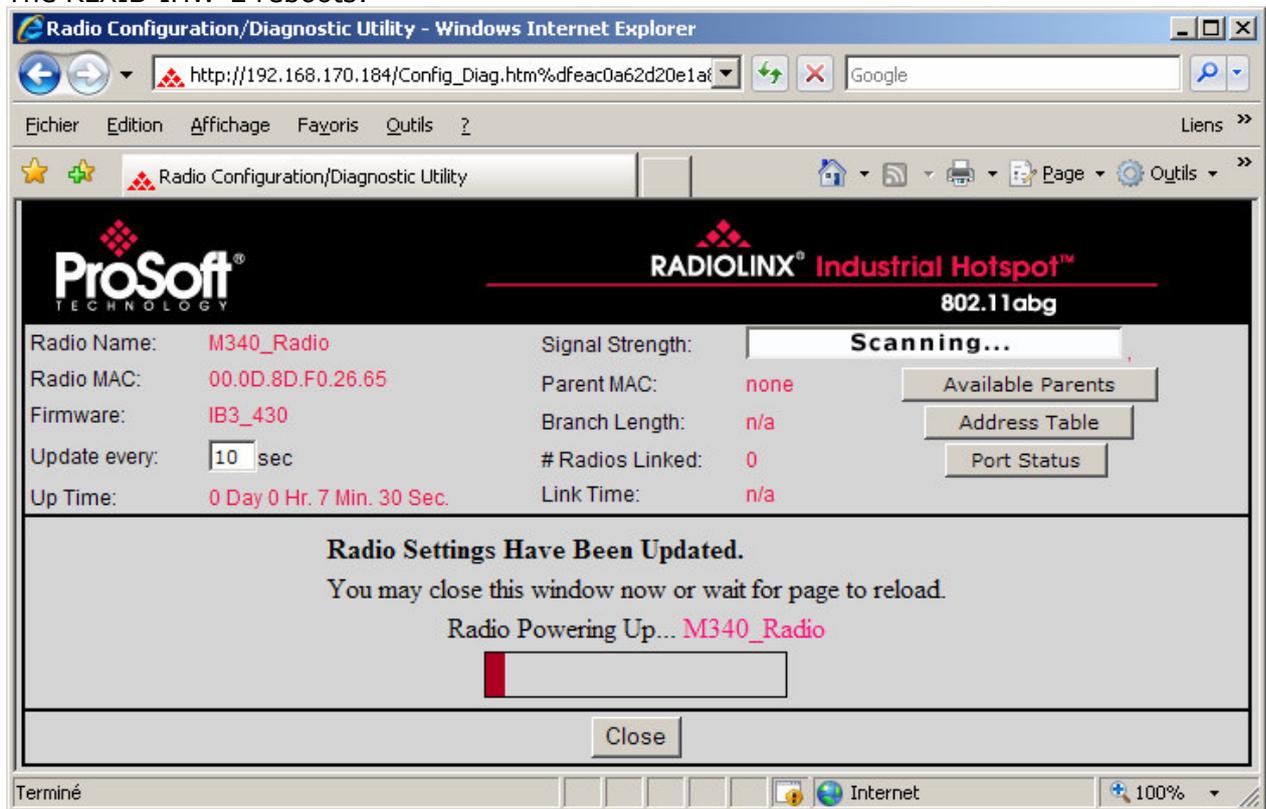


## RLXIB-IHW Industrial Hotspot 802.11abg Wireless Modbus TCP - M340 with NOE & Quantum with NOE

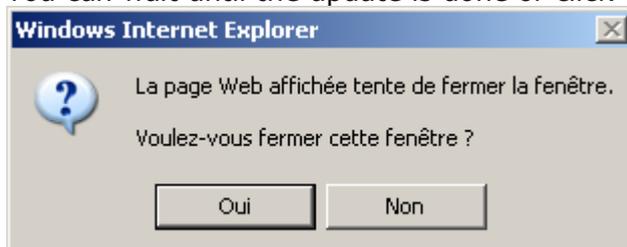
The following message may appear when pressing "Apply changes", click "OK".



The RLXIB-IHW-E reboots:



You can wait until the update is done or click on "Close", the following window is displayed:



Click "Yes".

### B.5. Settings verification:

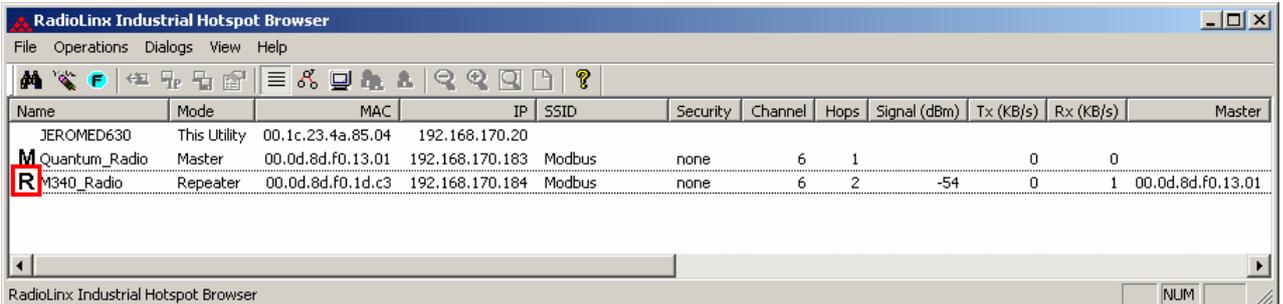
Select Clear to delete the current radio list



Select the binocular to refresh the screen and get an update radio list



When configured the name of the radio is preceded by an **R** (for Repeater) in the RLX-IH Browser.



Name	Mode	MAC	IP	SSID	Security	Channel	Hops	Signal (dBm)	Tx (KB/s)	Rx (KB/s)	Master
JEROMED630	This Utility	00.1c.23.4a.85.04	192.168.170.20								
<b>M</b> Quantum_Radio	Master	00.0d.8d.f0.13.01	192.168.170.183	Modbus	none	6	1		0	0	
<b>R</b> M340_Radio	Repeater	00.0d.8d.f0.1d.c3	192.168.170.184	Modbus	none	6	2	-54	0	1	00.0d.8d.f0.13.01

**The setting of the Repeater radio is finished.**

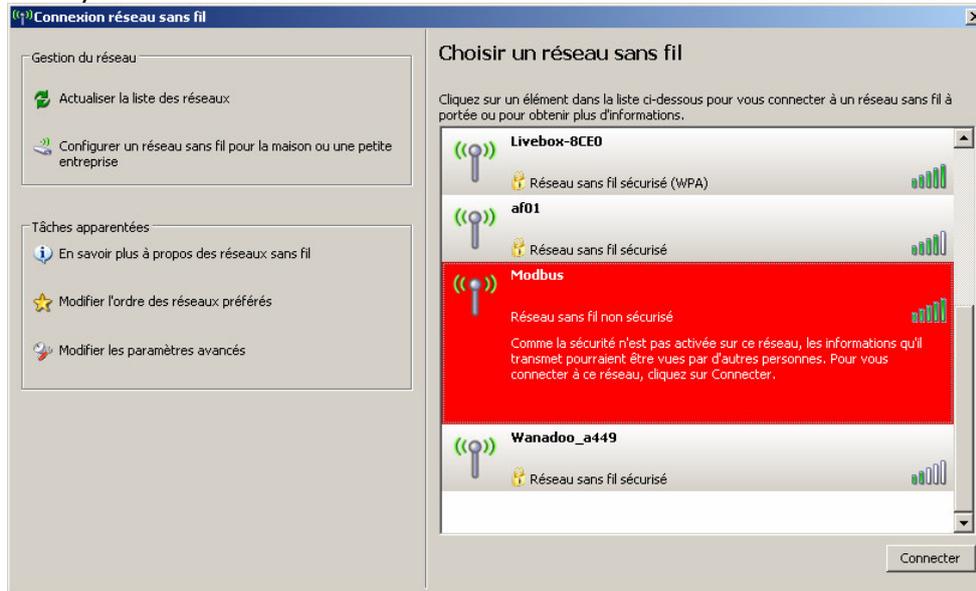
Disconnect the Ethernet cable from the radio.





### RLXIB-IHW-E Access Point checking

With you PC wireless access enabled and from the Available Wireless Network list



Choose the **Modbus** network.

This is the **Network SSID** you setup previously within the RLXIB-IHW-E Remote/Repeater mode.

# Technical Note

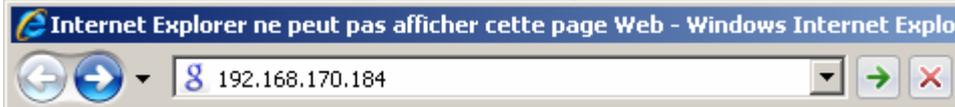


## RLXIB-IHW Industrial Hotspot 802.11abg Wireless Modbus TCP - M340 with NOE & Quantum with NOE

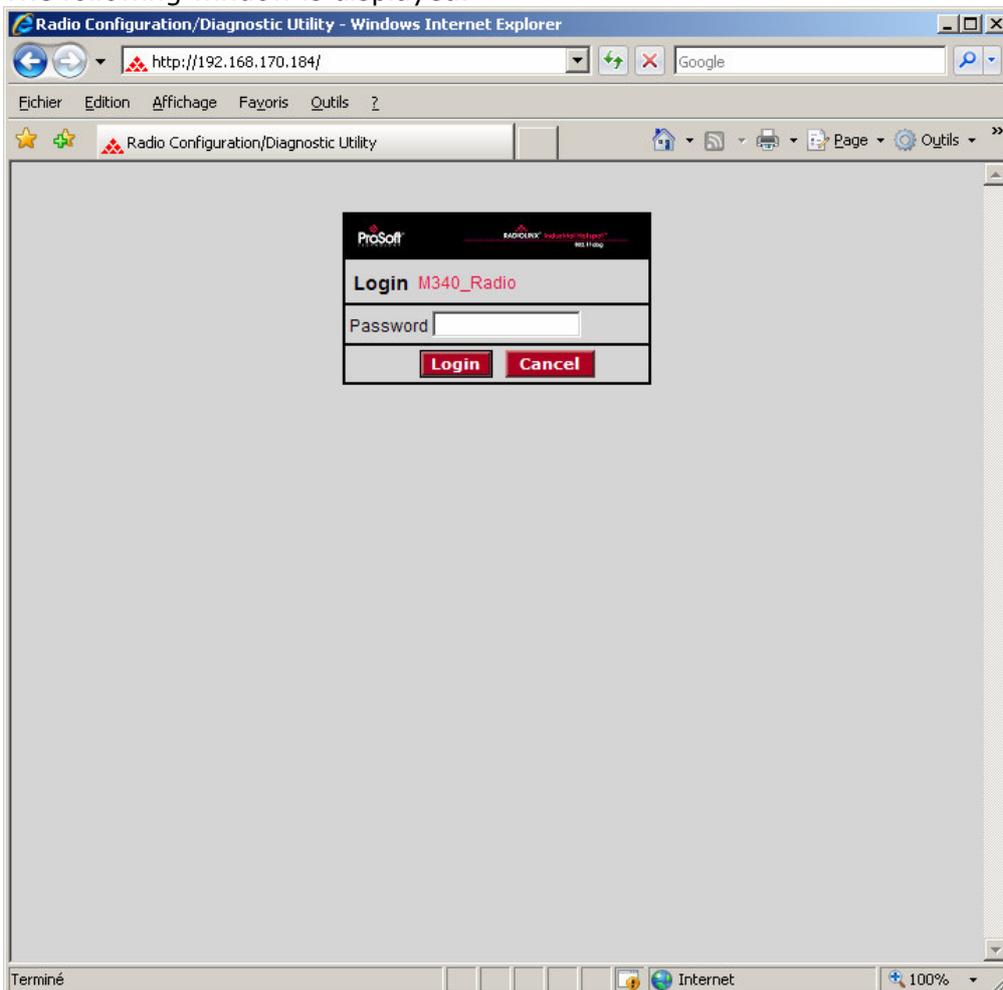
Now you will be able to monitor the radio with your internet browser via your wireless network:

Open your internet browser.

Enter the IP address of the RLXIB-IHW-E you want to access into the navigation bar.



The following window is displayed.



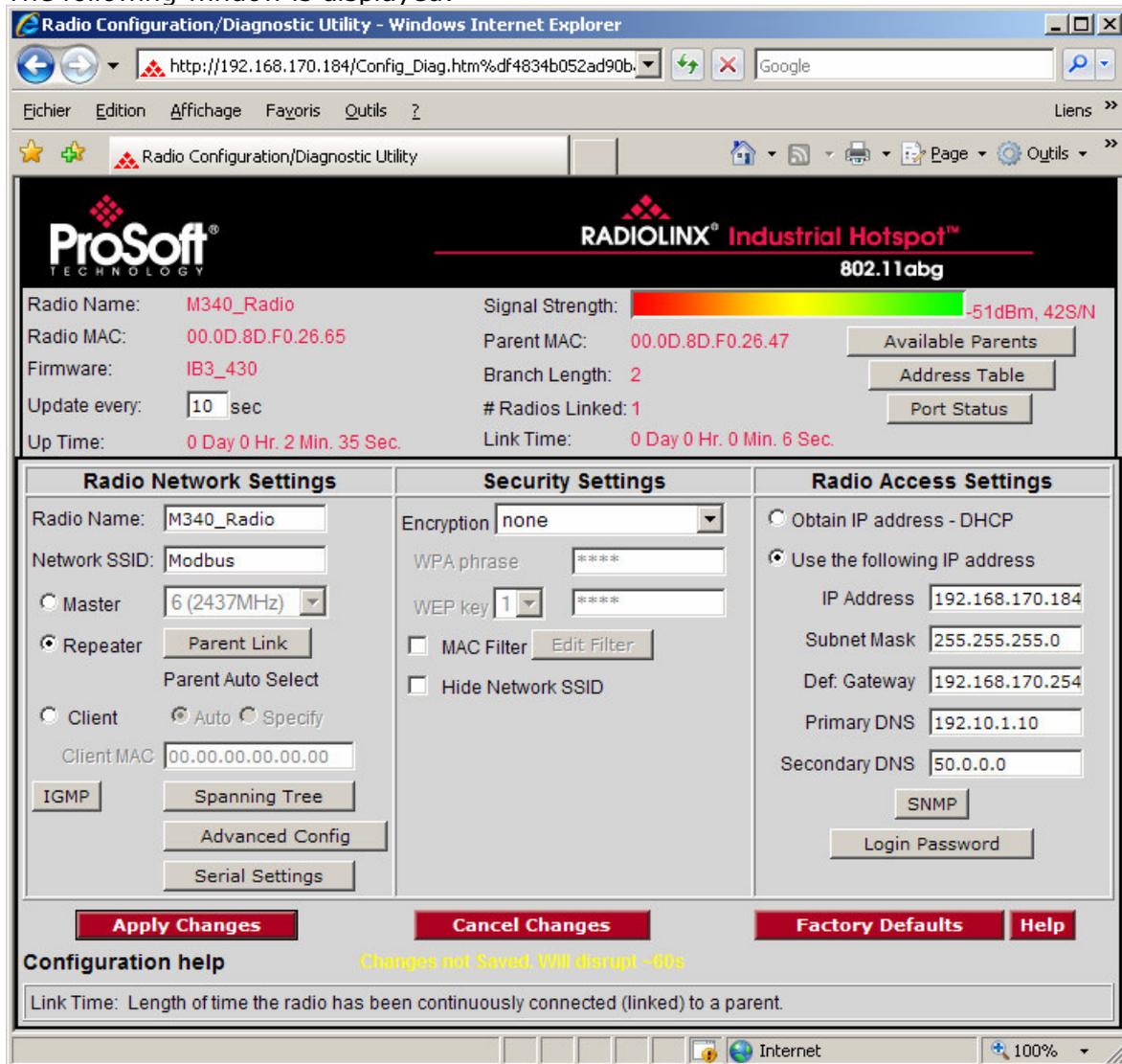
Type your password to log into the radio (default is "password") and then click the "**Login**" button.

# Technical Note



## RLXIB-IHW Industrial Hotspot 802.11abg Wireless Modbus TCP - M340 with NOE & Quantum with NOE

The following window is displayed:



### Signal quality:

Signal Strength shows you the quality of the signal between the RLXIB-IHW-E Master mode and RLXIB-IHW-E Remote/Repeater mode radios.

Poor Signal      Signal Strength: -81dBm, 16S/N

### Note:

Signal quality depends on distance between the antennas, free line of sight and correct antennas mounting.

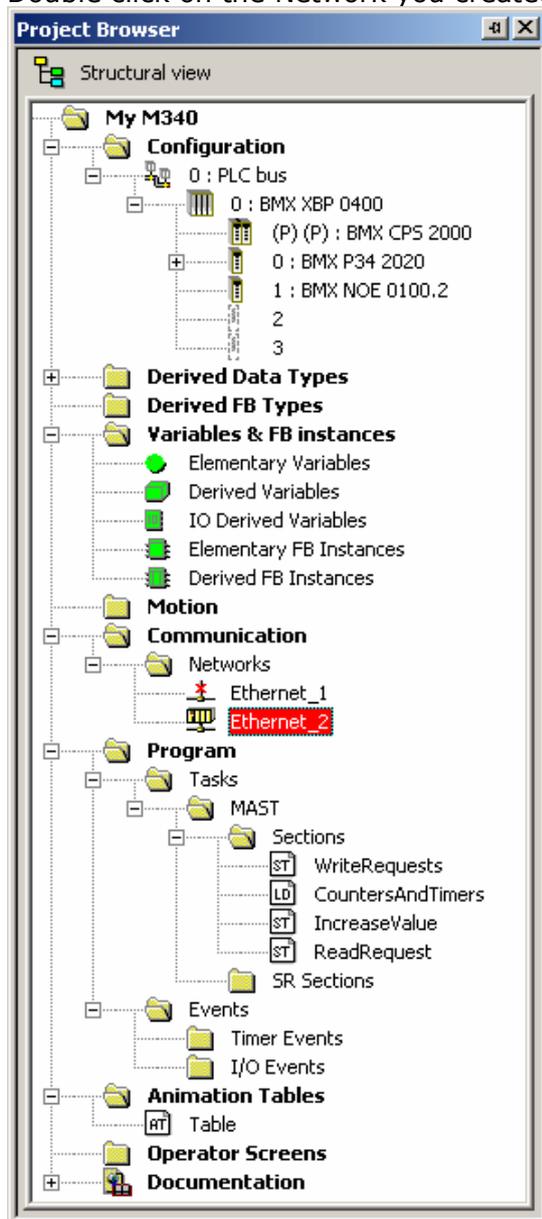
To have further information about the RLXIB-IHW-E please, download the User Manual from:  
<http://www.prosoft-technology.com/content/download/14036/181543/file>

### C. Setting of the Modbus TCP Client device

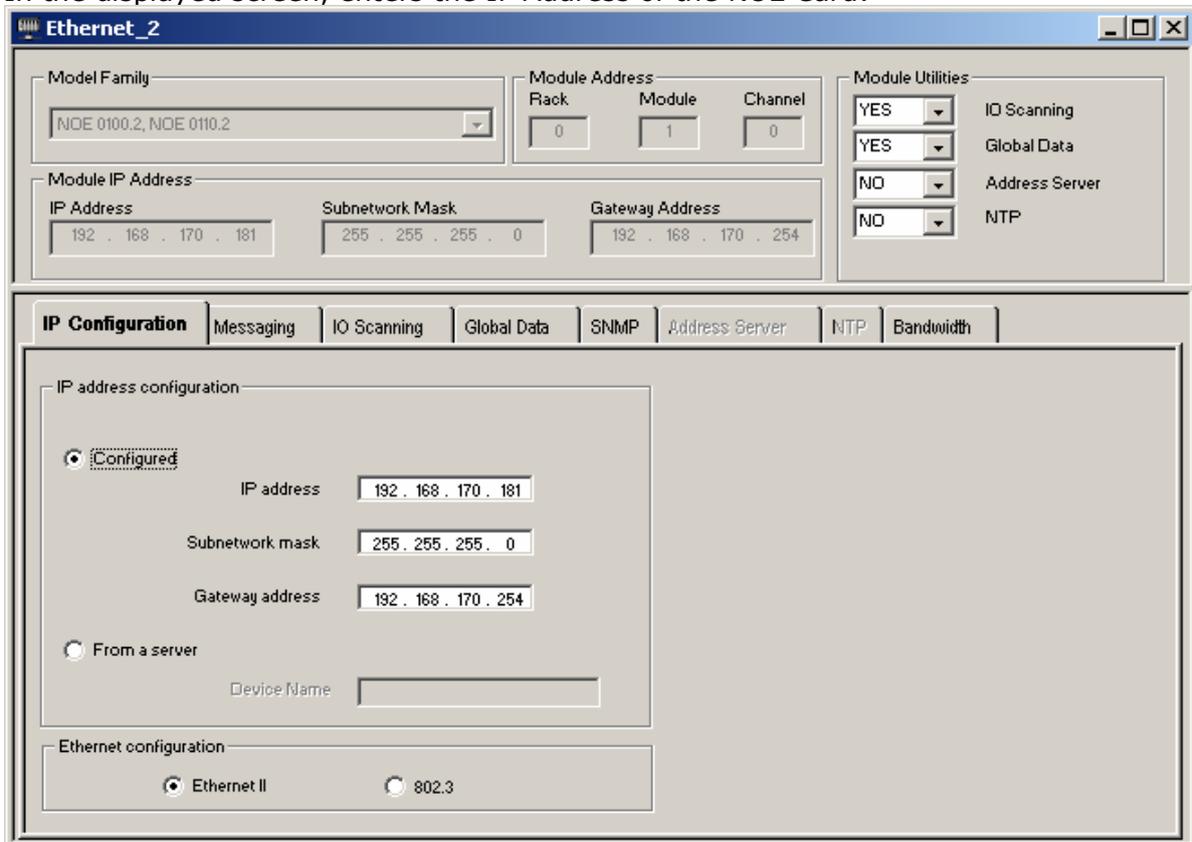
#### C.1. Launch Unity Pro XL

For this application we used a BMX P34 2020 and Ethernet Card BMX NOE 0100.2.  
Create a new project with your actual hardware configuration and create an Ethernet network.

Double click on the Network you created (**Ethernet\_2** in my project):



In the displayed screen, enters the IP Address of the NOE Card:



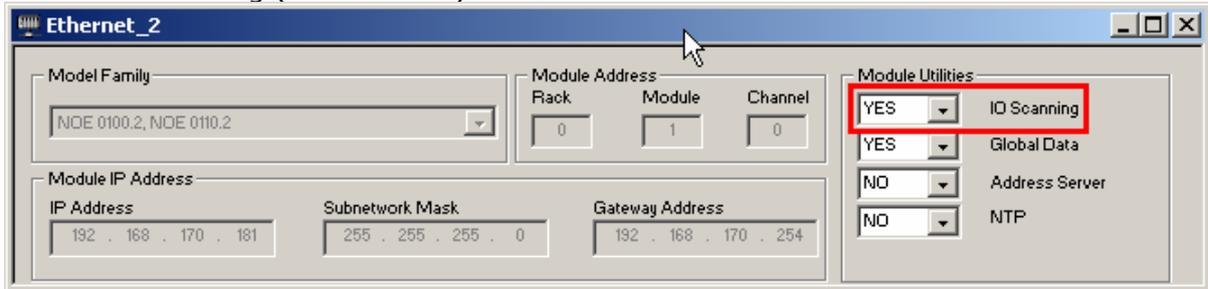
The screenshot shows the 'Ethernet\_2' configuration window. The 'Module Family' is set to 'NOE 0100.2, NOE 0110.2'. The 'Module Address' is set to Rack 0, Module 1, Channel 0. The 'Module IP Address' section shows the IP Address as 192.168.170.181, Subnetwork Mask as 255.255.255.0, and Gateway Address as 192.168.170.254. The 'Module Utilities' section has 'IO Scanning', 'Global Data', and 'Address Server' set to 'YES', and 'NTP' set to 'NO'. The 'IP Configuration' tab is selected, showing the 'IP address configuration' section with 'Configured' selected, and the same IP address, Subnetwork mask, and Gateway address as above. The 'Ethernet configuration' section has 'Ethernet II' selected and '802.3' unselected.

**Note:**

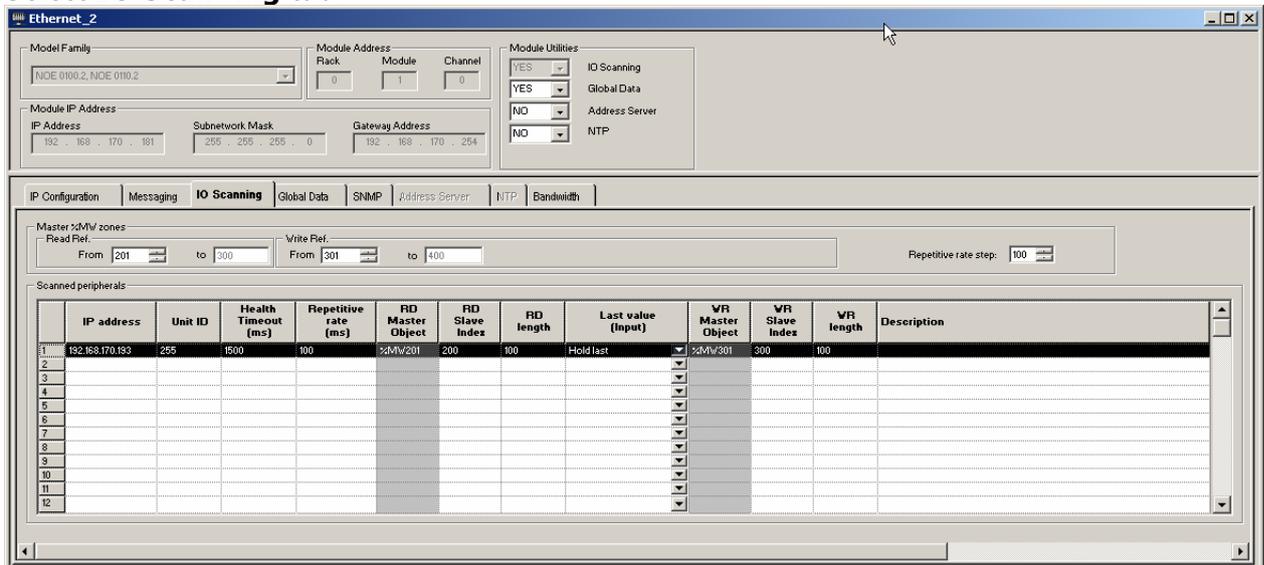
The **IP address** of **NOE, Radio RLXIB-IHW** and server device must be at the same IP range and depending of your **Subnet mask**.

### C.2. IO Scanning setting:

Enable IO scanning (set to "YES") in the Module's services window:



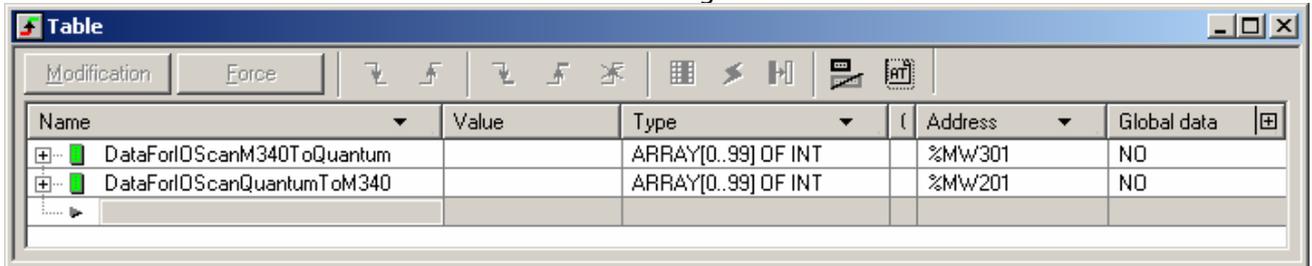
Select **IO Scanning** tab



Create IO Scanning exchanges as needed (see example below):

- **Server IP Address:** Address IP of the server device (192.168.170.193).
- **Unit ID:** Modbus Address of the server (1).
- **Timeout (ms):** (1500).
- **RD Master Object:** Client address where the data read are stored (%MW201).
- **RD Slave Index:** Offset for the first data read in slave (200).
- **RD length:** Number of data read (100).
- **WR Master Object:** Client address where data written are stored (%MW301).
- **WR Slave Index:** Offset for the first data read in slave (300).
- **WR length:** Number of data read (100).

Create variables which will contain the data exchanged between the client and the server:



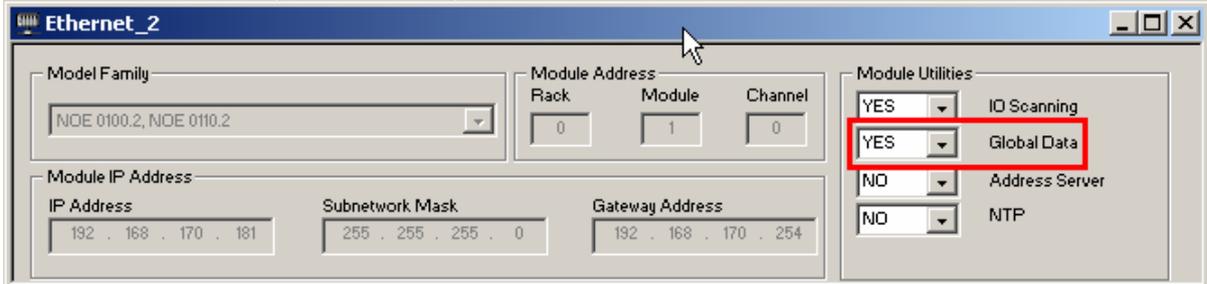
Name	Value	Type	Address	Global data
DataForIOScanM340ToQuantum		ARRAY[0..99] OF INT	%MW301	NO
DataForIOScanQuantumToM340		ARRAY[0..99] OF INT	%MW201	NO

I personally used a name that allows having the same name in both client and server devices. I mapped these variables to the addresses used for the IO Scanning (%MW201 to %MW399).

Once this is done, compile, download and run the project to the M340 processor.

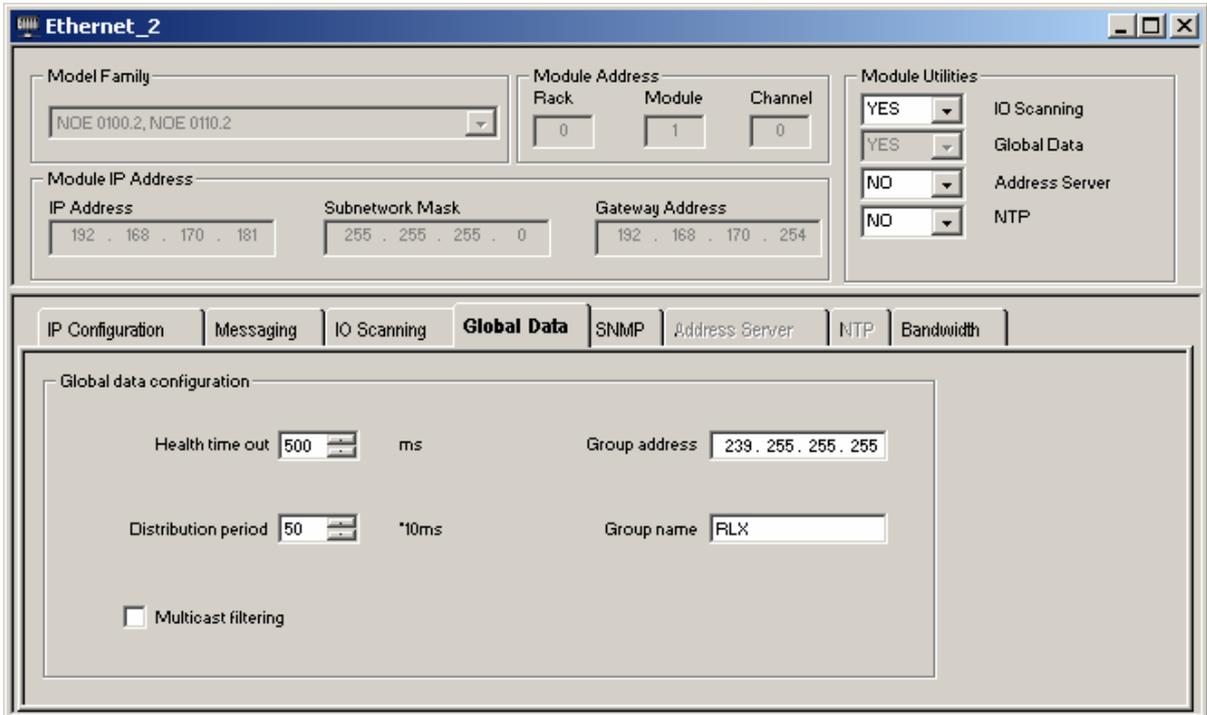
### C.3. Global Data setting:

Enable Global Data (set to "YES") in the Module's services window:



The screenshot shows the 'Ethernet\_2' configuration window. The 'Module Utilities' section contains several dropdown menus: 'IO Scanning' (YES), 'Global Data' (YES, highlighted with a red box), 'Address Server' (NO), and 'NTP' (NO). The 'Module Address' section shows Rack: 0, Module: 1, and Channel: 0. The 'Module IP Address' section shows IP Address: 192.168.170.181, Subnetwork Mask: 255.255.255.0, and Gateway Address: 192.168.170.254.

Select **Global Data** tab:

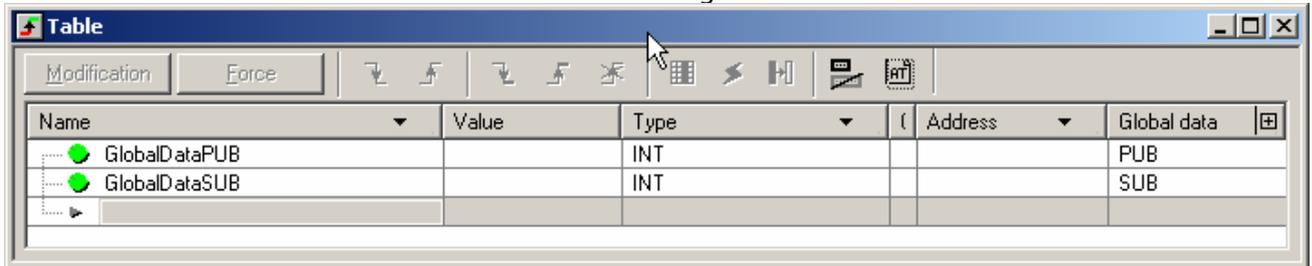


The screenshot shows the 'Ethernet\_2' configuration window with the 'Global Data' tab selected. The 'Global data configuration' section is visible, showing settings for Health time out (500 ms), Distribution period (50 \*10ms), Group address (239.255.255.255), and Group name (RLX). There is also a checkbox for 'Multicast filtering' which is unchecked.

Create Global Data exchange as needed (see example below):

- **Validity Timeout (ms):** (500).
- **Distribution period (\*10 ms):** (50).
- **Group address:** IP address used by the group (239.255.255.255).
- **Group name:** (RLX)

Create variables which will contain the data exchanged between the two devices:



Name	Value	Type	Address	Global data
GlobalDataPUB		INT		PUB
GlobalDataSUB		INT		SUB

I personally used a name that allows having the same name in both client and server devices.

Once this is done, compile, download and run the project to the M340 processor.

**IMPORTANT:**

The use of **Global Data** needs the **IGMP** settings to be "**Disabled**" in both **Master** and **Repeater** RLXIB-IHW-E modules.

### C.4. Modbus messaging setting:

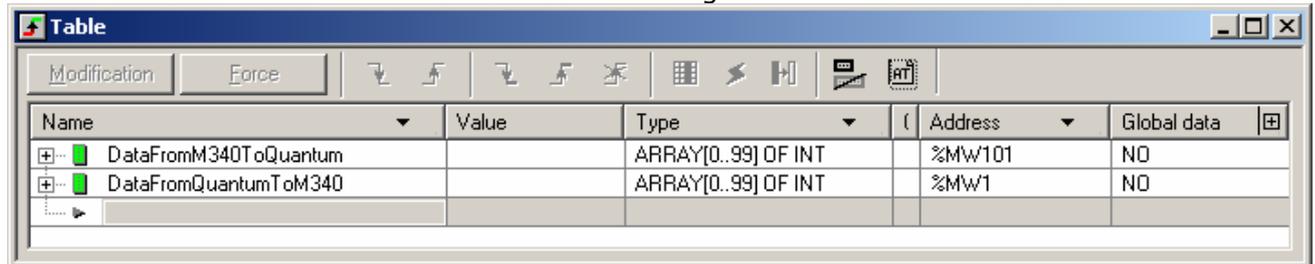
Multiple types of blocks or commands can be used to achieve Modbus TCP communication using messages.

I chose to use the **DATA\_EXCH** function in a Structured Text section.

The application I used is attached to this document

(**M340MODBUSTCPOVERRLXWITHNOE.XEF**)

Create variables which will contain the data exchanged between the client and the server:



Name	Value	Type	Address	Global data
DataFromM340ToQuantum		ARRAY[0..99] OF INT	%MW101	NO
DataFromQuantumToM340		ARRAY[0..99] OF INT	%MW1	NO

I personally used a name that allows having the same name in both client and server devices.

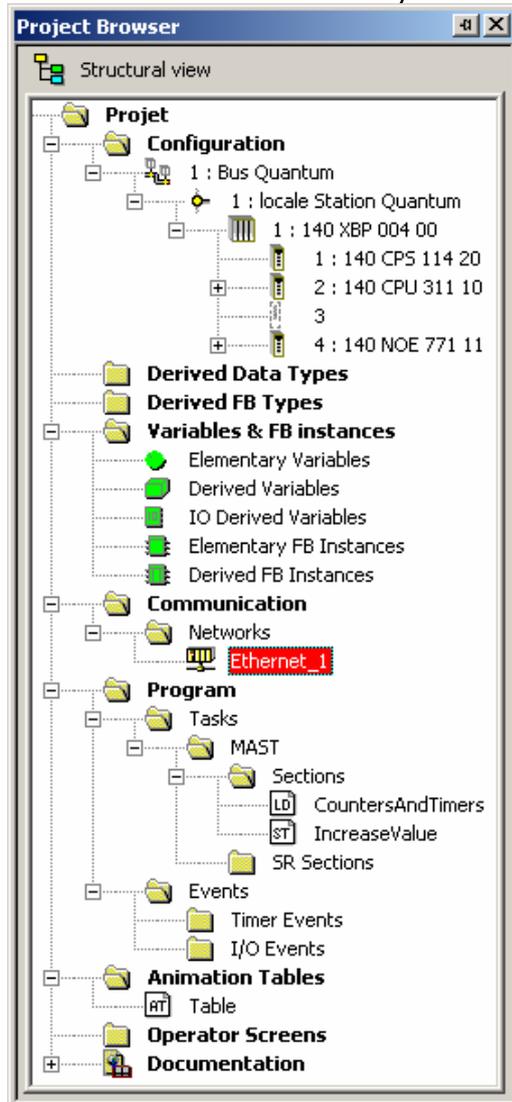
Once this is done, compile, download and run the project to the M340 processor.

### D. Setting of the Modbus TCP Server device.

#### D.1. Launch Unity Pro XL

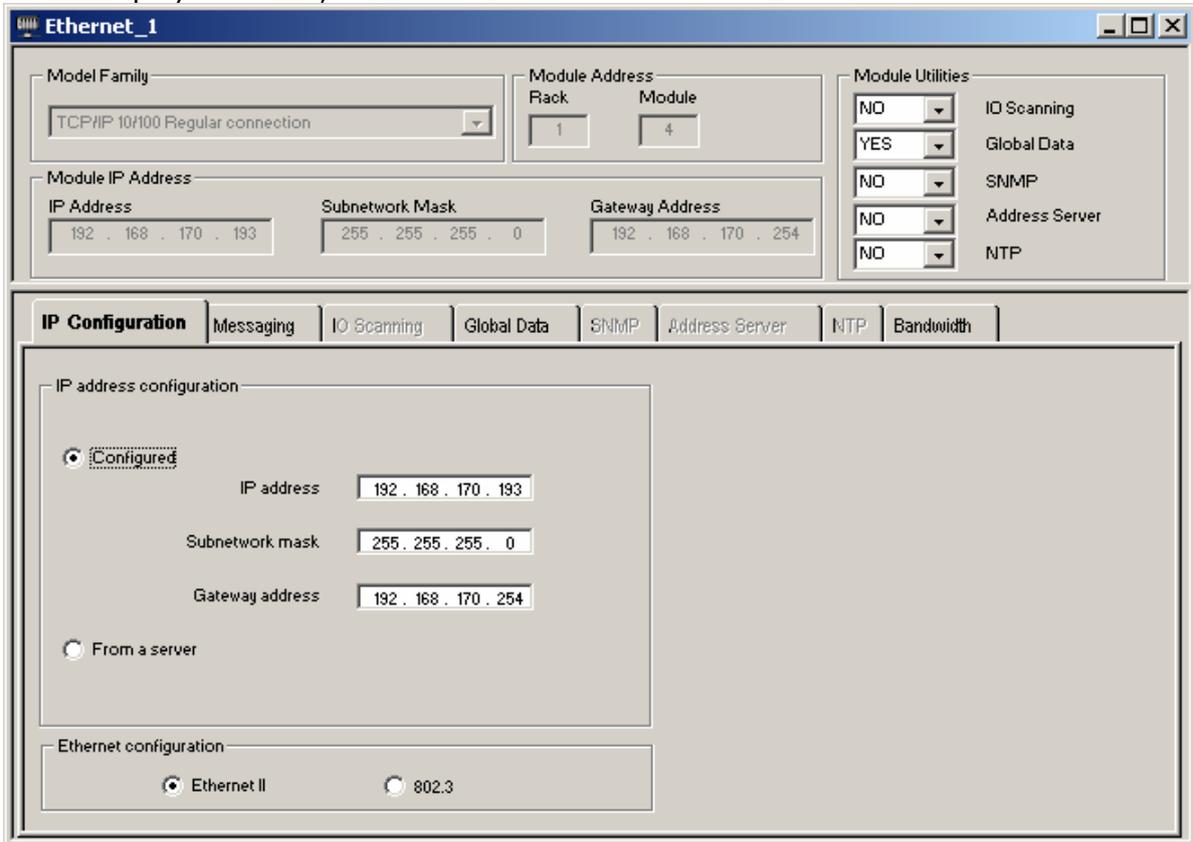
For this application we use a CPU 311 10 and Ethernet Card NOE 771 11.  
Create a new project with your actual hardware configuration and create an Ethernet network.

Double click on the Network you created (**Ethernet\_1** in my project):





In the displayed screen, enters the IP Address of the NOE Card:



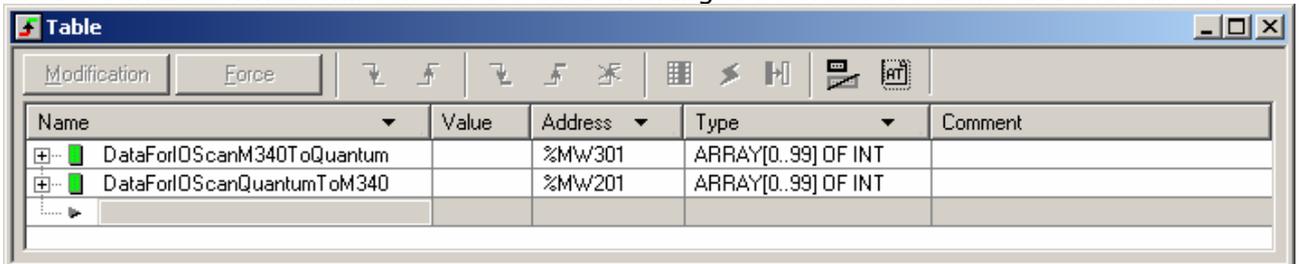
**Note:**

The **IP address** of **NOE, Radio RLXIB-IHW** and server device must be at the same IP range and depending of your **Subnet mask**.

**D.2. IO Scanning setting:**

It is not necessary here to enable IO scanning.

Create variables which will contain the data exchanged between the client and the server:



I personally used a name that allows having the same name in both client and server devices. I mapped these variables to the addresses used for the IO Scanning (%MW201 to %MW399).

Once this is done, compile, download and run the project to the M340 processor.

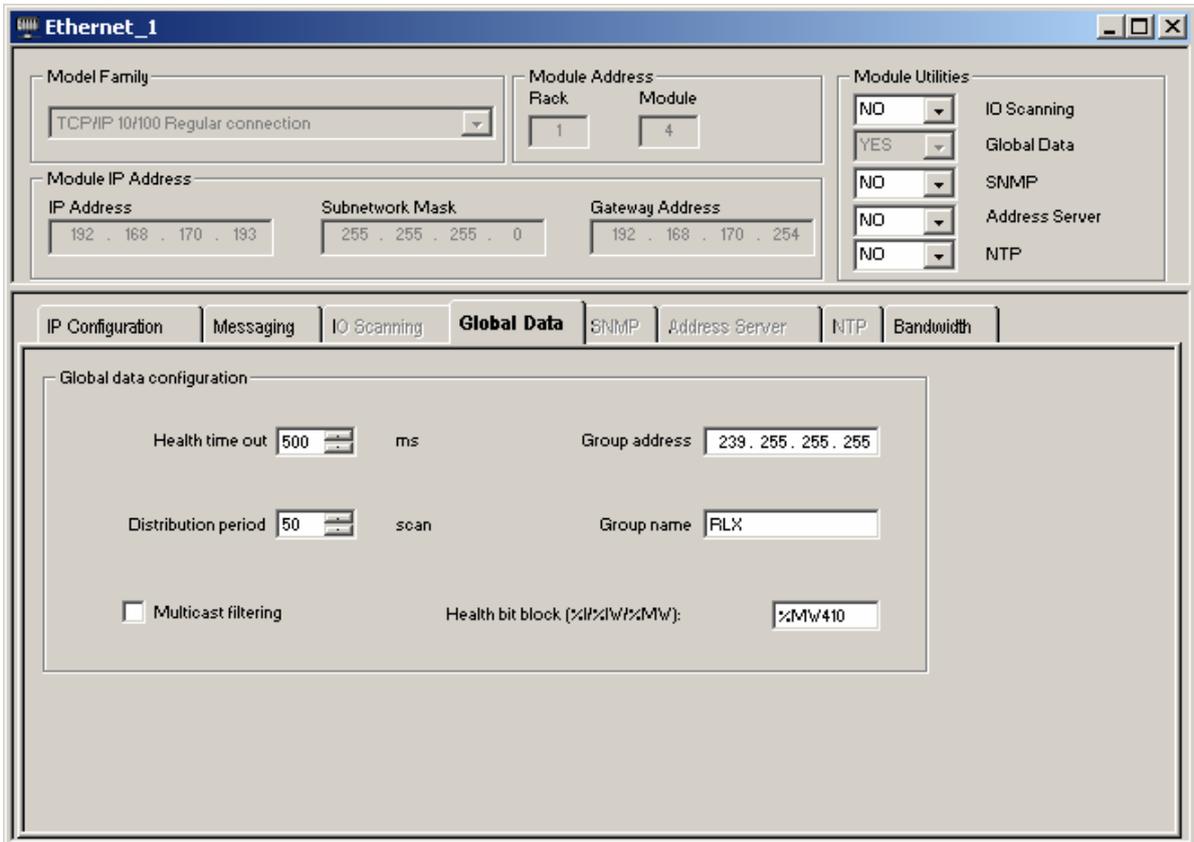
### D.3. Global Data setting:

Enable Global Data (set to "YES") in the Module's services window:



The screenshot shows the 'Ethernet\_1' configuration window. The 'Module Utilities' section on the right contains several dropdown menus: 'IO Scanning' (NO), 'Global Data' (YES, highlighted with a red box), 'SNMP' (NO), 'Address Server' (NO), and 'NTP' (NO). The 'Module Address' section shows Rack 1 and Module 4. The 'Module IP Address' section shows IP Address 192.168.170.193, Subnetwork Mask 255.255.255.0, and Gateway Address 192.168.170.254.

Select **Global Data** tab:



The screenshot shows the 'Ethernet\_1' configuration window with the 'Global Data' tab selected. The 'Global data configuration' section contains the following settings: 'Health time out' set to 500 ms, 'Distribution period' set to 50 scan, 'Group address' set to 239.255.255.255, 'Group name' set to RLX, and 'Multicast filtering' checked. The 'Health bit block' is set to %Mw410.

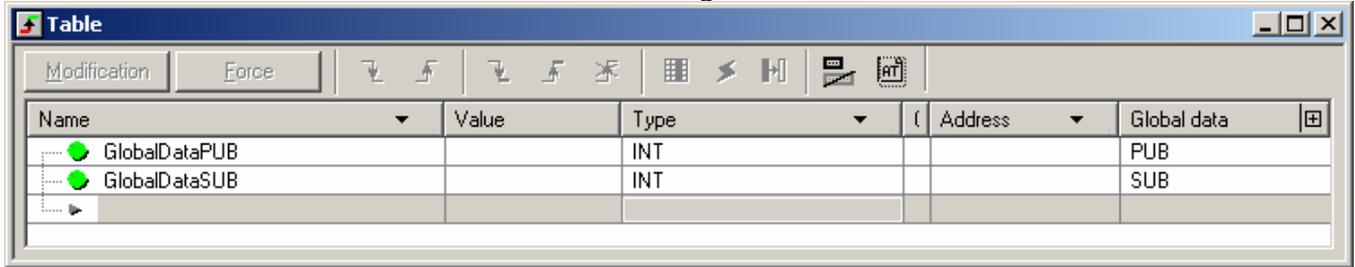
Create Global Data exchange as needed (see example below):

- **Validity Timeout (ms):** (500).
- **Distribution period (\*10 ms):** (50).
- **Group address:** IP address used by the group (239.255.255.255).
- **Group name:** (RLX)

#### Note:

**Group address** and **Group name** must match between the two PLCs.

Create variables which will contain the data exchanged between the two devices:



Name	Value	Type	Address	Global data
GlobalDataPUB		INT		PUB
GlobalDataSUB		INT		SUB

I personally used a name that allows having the same name in both client and server devices.

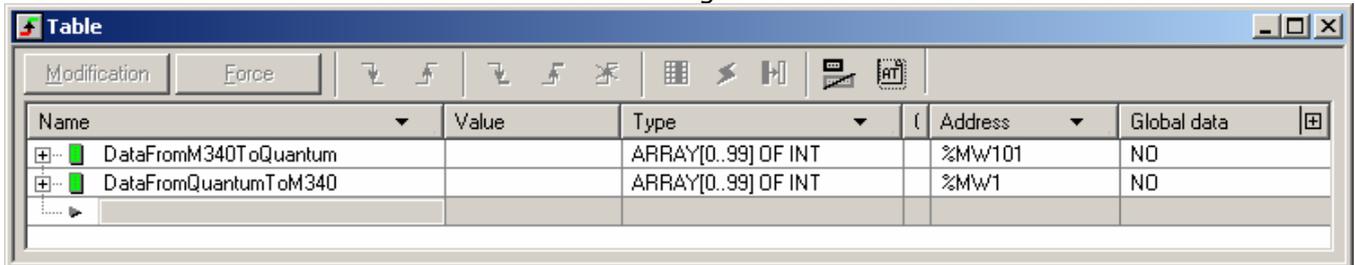
Once this is done, compile, download and run the project to the M340 processor.

### IMPORTANT:

The use of **Global Data** needs the **IGMP** settings to be "**Disabled**" in both **Master** and **Repeater** RLXIB-IHW-E modules.

### D.4. Modbus messaging setting:

Create variables which will contain the data exchanged between the client and the server:



Name	Value	Type	Address	Global data
DataFromM340ToQuantum		ARRAY[0..99] OF INT	%MW101	NO
DataFromQuantumToM340		ARRAY[0..99] OF INT	%MW1	NO

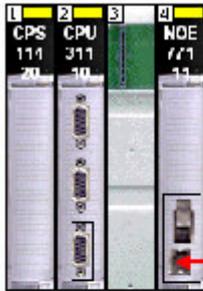
I personally used a name that allows having the same name in both client and server devices.

Once this is done, compile, download and run the project to the M340 processor.



### E. Test wired Modbus TCP communication

Connect the Quantum PLC, the M340 PLC and the PC as below:  
MODICON QUANTUM PLC



Ethernet Switch



Go online with the two PLCs.

To have dynamic data values we created a section that copies the value of a counter in the different data areas:

```
for i := 0 to 99 do
  DataForIOScanQuantumToM340[i] := FBI_1.CV;
  DataFromQuantumToM340[i] := FBI_1.CV;
  GlobalDataPub := FBI_1.CV;
end_for;
```



Access to the variables in the PLCs.

Below is a screenshot of the table of variables in the Quantum PLC and from M340 PLC:

Quantum			M340		
DataFromQuantumToM340[0]	32121	%Mw1	DataFromQuantumToM340[0]	32121	%Mw1
DataFromQuantumToM340[1]	32121	%Mw2	DataFromQuantumToM340[1]	32121	%Mw2
DataFromQuantumToM340[2]	32121	%Mw3	DataFromQuantumToM340[2]	32121	%Mw3
DataFromQuantumToM340[3]	32121	%Mw4	DataFromQuantumToM340[3]	32121	%Mw4
DataFromQuantumToM340[4]	32121	%Mw5	DataFromQuantumToM340[4]	32121	%Mw5
DataFromQuantumToM340[5]	32121	%Mw6	DataFromQuantumToM340[5]	32121	%Mw6
DataFromQuantumToM340[6]	32121	%Mw7	DataFromQuantumToM340[6]	32121	%Mw7
DataFromQuantumToM340[7]	32121	%Mw8	DataFromQuantumToM340[7]	32121	%Mw8
DataFromQuantumToM340[8]	32121	%Mw9	DataFromQuantumToM340[8]	32121	%Mw9
DataFromQuantumToM340[9]	32121	%Mw10	DataFromQuantumToM340[9]	32121	%Mw10
DataFromM340ToQuantum[0]	25537	%Mw101	DataFromM340ToQuantum[0]	25537	%Mw101
DataFromM340ToQuantum[1]	25537	%Mw102	DataFromM340ToQuantum[1]	25537	%Mw102
DataFromM340ToQuantum[2]	25537	%Mw103	DataFromM340ToQuantum[2]	25537	%Mw103
DataFromM340ToQuantum[3]	25537	%Mw104	DataFromM340ToQuantum[3]	25537	%Mw104
DataFromM340ToQuantum[4]	25537	%Mw105	DataFromM340ToQuantum[4]	25537	%Mw105
DataFromM340ToQuantum[5]	25537	%Mw106	DataFromM340ToQuantum[5]	25537	%Mw106
DataFromM340ToQuantum[6]	25537	%Mw107	DataFromM340ToQuantum[6]	25537	%Mw107
DataFromM340ToQuantum[7]	25537	%Mw108	DataFromM340ToQuantum[7]	25537	%Mw108
DataFromM340ToQuantum[8]	25537	%Mw109	DataFromM340ToQuantum[8]	25537	%Mw109
DataFromM340ToQuantum[9]	25537	%Mw110	DataFromM340ToQuantum[9]	25537	%Mw110
DataForIOscanQuantumToM340[0]	32121	%Mw201	DataForIOscanQuantumToM340[0]	32121	%Mw201
DataForIOscanQuantumToM340[1]	32121	%Mw202	DataForIOscanQuantumToM340[1]	32121	%Mw202
DataForIOscanQuantumToM340[2]	32121	%Mw203	DataForIOscanQuantumToM340[2]	32121	%Mw203
DataForIOscanQuantumToM340[3]	32121	%Mw204	DataForIOscanQuantumToM340[3]	32121	%Mw204
DataForIOscanQuantumToM340[4]	32121	%Mw205	DataForIOscanQuantumToM340[4]	32121	%Mw205
DataForIOscanQuantumToM340[5]	32121	%Mw206	DataForIOscanQuantumToM340[5]	32121	%Mw206
DataForIOscanQuantumToM340[6]	32121	%Mw207	DataForIOscanQuantumToM340[6]	32121	%Mw207
DataForIOscanQuantumToM340[7]	32121	%Mw208	DataForIOscanQuantumToM340[7]	32121	%Mw208
DataForIOscanQuantumToM340[8]	32121	%Mw209	DataForIOscanQuantumToM340[8]	32121	%Mw209
DataForIOscanQuantumToM340[9]	32121	%Mw210	DataForIOscanQuantumToM340[9]	32121	%Mw210
DataForIOscanM340ToQuantum[0]	25537	%Mw301	DataForIOscanM340ToQuantum[0]	25537	%Mw301
DataForIOscanM340ToQuantum[1]	25537	%Mw302	DataForIOscanM340ToQuantum[1]	25537	%Mw302
DataForIOscanM340ToQuantum[2]	25537	%Mw303	DataForIOscanM340ToQuantum[2]	25537	%Mw303
DataForIOscanM340ToQuantum[3]	25537	%Mw304	DataForIOscanM340ToQuantum[3]	25537	%Mw304
DataForIOscanM340ToQuantum[4]	25537	%Mw305	DataForIOscanM340ToQuantum[4]	25537	%Mw305
DataForIOscanM340ToQuantum[5]	25537	%Mw306	DataForIOscanM340ToQuantum[5]	25537	%Mw306
DataForIOscanM340ToQuantum[6]	25537	%Mw307	DataForIOscanM340ToQuantum[6]	25537	%Mw307
DataForIOscanM340ToQuantum[7]	25537	%Mw308	DataForIOscanM340ToQuantum[7]	25537	%Mw308
DataForIOscanM340ToQuantum[8]	25537	%Mw309	DataForIOscanM340ToQuantum[8]	25537	%Mw309
DataForIOscanM340ToQuantum[9]	25537	%Mw310	DataForIOscanM340ToQuantum[9]	25537	%Mw310
GlobalDataPUB	32121		GlobalDataPUB	25537	
GlobalDataSUB	25536		GlobalDataSUB	32121	

You can see that all the values xxxFromM340ToQuantum and the GlobalDataSUB are identical in the table above.

Your Modbus TCP communication is up and running.

### F. Test wireless Modbus TCP communication

Note:

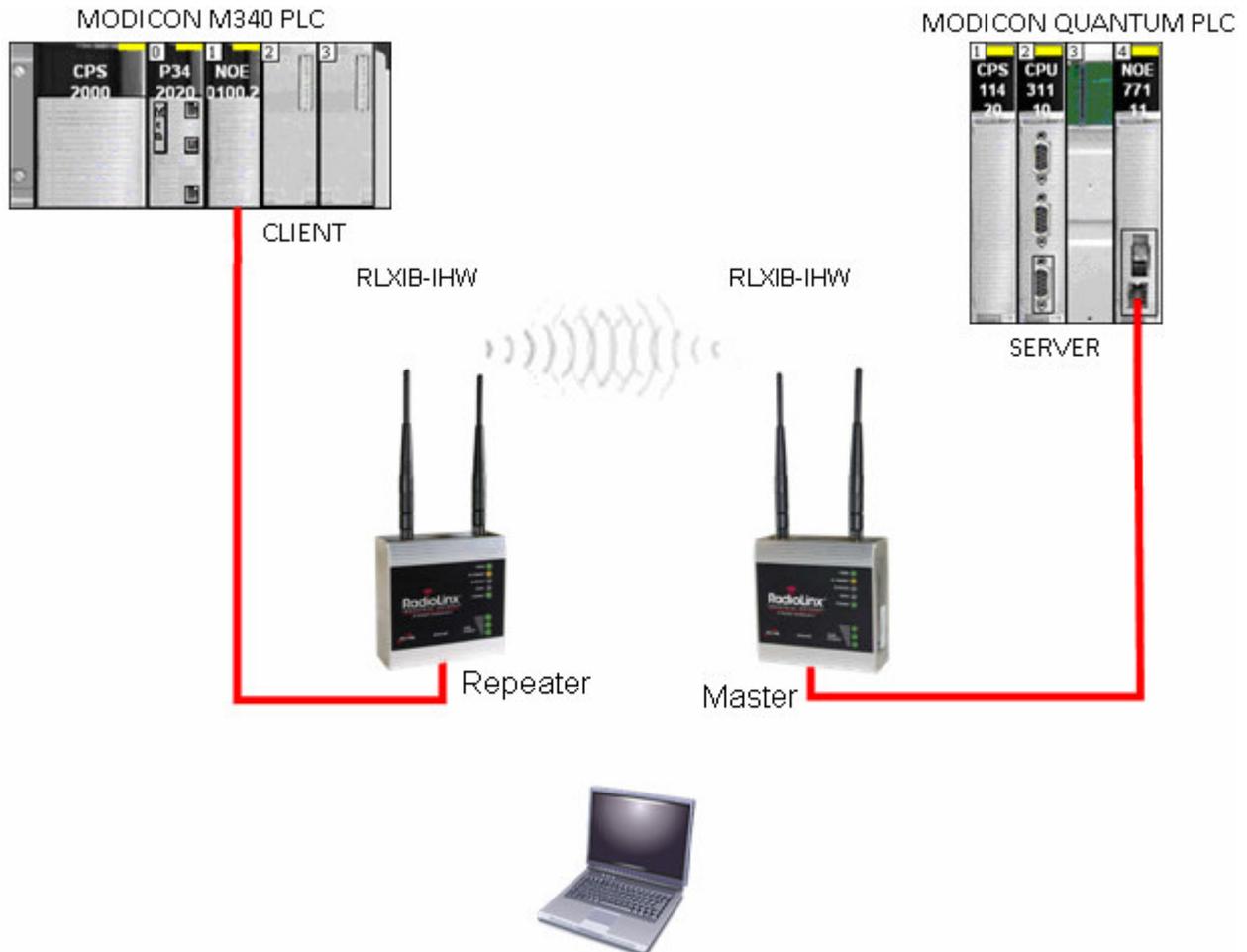
You have to setup a fixed IP address to the PC wireless card and this IP address must be compatible with the RadioLinX IP addresses previously setup.

In this application the PC wireless card IP address must be 192.168.170.20.

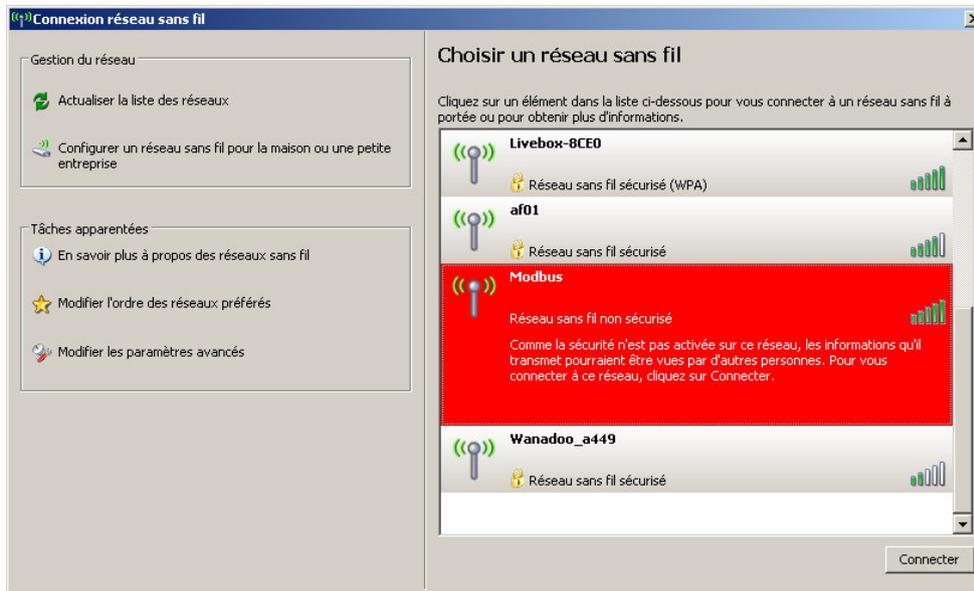
Insert the RLXIB-IHW modules as below to create the wireless network.

Using Ethernet crossover cables, connect directly to the RadioLinX modules:

- The M340 Modbus TCP Ethernet port
- The Quantum Modbus TCP Ethernet port



With you PC wireless access enabled and from the Available Wireless Network list



Choose the **Modbus** network (this is the **Network SSID** you setup previously). You are now connected to the wireless network with your PC using one the RLXIB-IHW-E module as an Access Point, The laptop will establish communication with the best Access Point.

Go online with the two PLCs.

To have dynamic data values we created a section that copies the value of a counter in the different data areas:

```

for i := 0 to 99 do
  DataForIOScanQuantumToM340[i] := FBI_1.CV;
  DataFromQuantumToM340[i] := FBI_1.CV;
  GlobalDataPub := FBI_1.CV;
end_for;
  
```

Access to the variables in the PLCs.

Below is a screenshot of the table of variables in the Quantum PLC and from M340 PLC:

Quantum			M340		
DataFromQuantumToM340[0]	32121	%Mw1	DataFromQuantumToM340[0]	32121	%Mw1
DataFromQuantumToM340[1]	32121	%Mw2	DataFromQuantumToM340[1]	32121	%Mw2
DataFromQuantumToM340[2]	32121	%Mw3	DataFromQuantumToM340[2]	32121	%Mw3
DataFromQuantumToM340[3]	32121	%Mw4	DataFromQuantumToM340[3]	32121	%Mw4
DataFromQuantumToM340[4]	32121	%Mw5	DataFromQuantumToM340[4]	32121	%Mw5
DataFromQuantumToM340[5]	32121	%Mw6	DataFromQuantumToM340[5]	32121	%Mw6
DataFromQuantumToM340[6]	32121	%Mw7	DataFromQuantumToM340[6]	32121	%Mw7
DataFromQuantumToM340[7]	32121	%Mw8	DataFromQuantumToM340[7]	32121	%Mw8
DataFromQuantumToM340[8]	32121	%Mw9	DataFromQuantumToM340[8]	32121	%Mw9
DataFromQuantumToM340[9]	32121	%Mw10	DataFromQuantumToM340[9]	32121	%Mw10
DataFromM340ToQuantum[0]	25537	%Mw101	DataFromM340ToQuantum[0]	25537	%Mw101
DataFromM340ToQuantum[1]	25537	%Mw102	DataFromM340ToQuantum[1]	25537	%Mw102
DataFromM340ToQuantum[2]	25537	%Mw103	DataFromM340ToQuantum[2]	25537	%Mw103
DataFromM340ToQuantum[3]	25537	%Mw104	DataFromM340ToQuantum[3]	25537	%Mw104
DataFromM340ToQuantum[4]	25537	%Mw105	DataFromM340ToQuantum[4]	25537	%Mw105
DataFromM340ToQuantum[5]	25537	%Mw106	DataFromM340ToQuantum[5]	25537	%Mw106
DataFromM340ToQuantum[6]	25537	%Mw107	DataFromM340ToQuantum[6]	25537	%Mw107
DataFromM340ToQuantum[7]	25537	%Mw108	DataFromM340ToQuantum[7]	25537	%Mw108
DataFromM340ToQuantum[8]	25537	%Mw109	DataFromM340ToQuantum[8]	25537	%Mw109
DataFromM340ToQuantum[9]	25537	%Mw110	DataFromM340ToQuantum[9]	25537	%Mw110
DataForIOScanQuantumToM340[0]	32121	%Mw201	DataForIOScanQuantumToM340[0]	32121	%Mw201
DataForIOScanQuantumToM340[1]	32121	%Mw202	DataForIOScanQuantumToM340[1]	32121	%Mw202
DataForIOScanQuantumToM340[2]	32121	%Mw203	DataForIOScanQuantumToM340[2]	32121	%Mw203
DataForIOScanQuantumToM340[3]	32121	%Mw204	DataForIOScanQuantumToM340[3]	32121	%Mw204
DataForIOScanQuantumToM340[4]	32121	%Mw205	DataForIOScanQuantumToM340[4]	32121	%Mw205
DataForIOScanQuantumToM340[5]	32121	%Mw206	DataForIOScanQuantumToM340[5]	32121	%Mw206
DataForIOScanQuantumToM340[6]	32121	%Mw207	DataForIOScanQuantumToM340[6]	32121	%Mw207
DataForIOScanQuantumToM340[7]	32121	%Mw208	DataForIOScanQuantumToM340[7]	32121	%Mw208
DataForIOScanQuantumToM340[8]	32121	%Mw209	DataForIOScanQuantumToM340[8]	32121	%Mw209
DataForIOScanQuantumToM340[9]	32121	%Mw210	DataForIOScanQuantumToM340[9]	32121	%Mw210
DataForIOScanM340ToQuantum[0]	25537	%Mw301	DataForIOScanM340ToQuantum[0]	25537	%Mw301
DataForIOScanM340ToQuantum[1]	25537	%Mw302	DataForIOScanM340ToQuantum[1]	25537	%Mw302
DataForIOScanM340ToQuantum[2]	25537	%Mw303	DataForIOScanM340ToQuantum[2]	25537	%Mw303
DataForIOScanM340ToQuantum[3]	25537	%Mw304	DataForIOScanM340ToQuantum[3]	25537	%Mw304
DataForIOScanM340ToQuantum[4]	25537	%Mw305	DataForIOScanM340ToQuantum[4]	25537	%Mw305
DataForIOScanM340ToQuantum[5]	25537	%Mw306	DataForIOScanM340ToQuantum[5]	25537	%Mw306
DataForIOScanM340ToQuantum[6]	25537	%Mw307	DataForIOScanM340ToQuantum[6]	25537	%Mw307
DataForIOScanM340ToQuantum[7]	25537	%Mw308	DataForIOScanM340ToQuantum[7]	25537	%Mw308
DataForIOScanM340ToQuantum[8]	25537	%Mw309	DataForIOScanM340ToQuantum[8]	25537	%Mw309
DataForIOScanM340ToQuantum[9]	25537	%Mw310	DataForIOScanM340ToQuantum[9]	25537	%Mw310
GlobalDataPUB	32121		GlobalDataPUB	25537	
GlobalDataSUB	25536		GlobalDataSUB	32121	

You can see that all the values xxxFromM340ToQuantum and the GlobalDataSUB are identical in the table above.

**Your Modbus TCP communication is  
up and running using the wireless  
connection**

**Congratulations**

## **G. Attachments**

### **G.1. Schneider Electric M340 Unity application**

This application includes all communication types that are described in the previous sections as well as short sections to make variables change.



M340MODBUSTCPOVERRLXWITHNOE.XEF

### **G.2. Schneider Electric Quantum Unity application**

This application includes variables and short sections to make variables change.



QUANTUMMODBUSTCPSERVER.XEF

# Technical Note

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