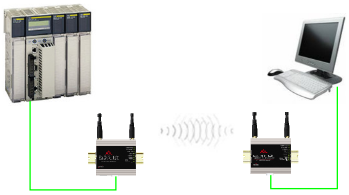
Technical Note

TN2008-07A-3.1

Implementing Modbus TCP over Wireless

RLX-IHW Industrial Hotspot 802.11abg Wireless Modbus TCP Client/Server



Introduction

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

For the architecture example of this implementation, we use a Schneider Electric Modicon QUANTUM PLC as client device and a PC running Modsim32 simulator as server device.

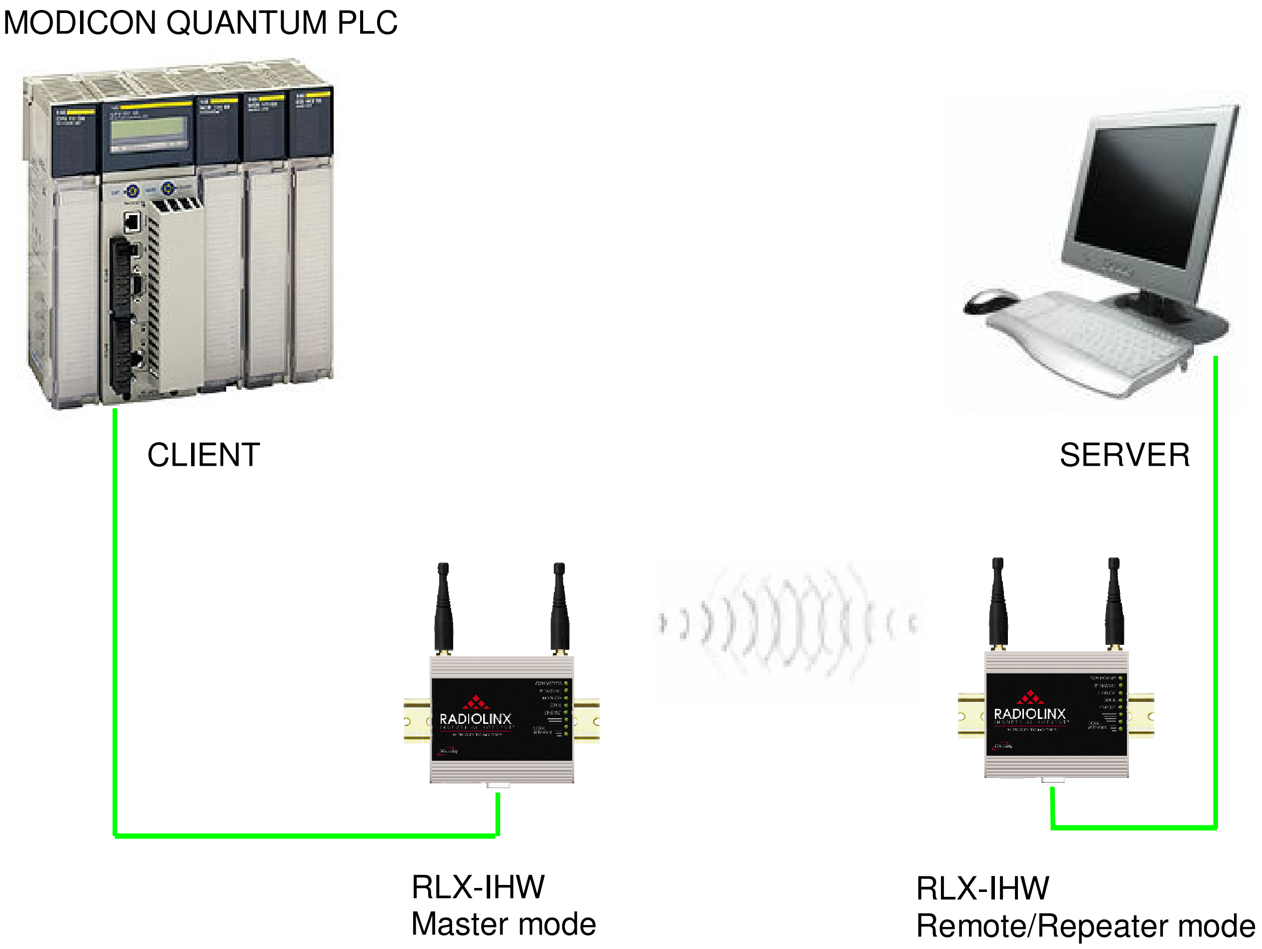
The client device could be another PLC (Quantum, M340, Premium...) or any other device that supports Modbus TCP client communication.

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 RLX-IHW-E RadioLinx Industrial Hotspot 802.11abg are used.

Author: Nicolas BLOND
Date: July 2008

Architecture



Software required for this architecture example:

- Unity Pro XL – From Schneider Electric
- RadioLinx Industrial Hotspot Browser – From ProSoft Technology
- ModSim32 – From WinTECH Software Design

Procedure

Here are the basic steps needed to establish communications:

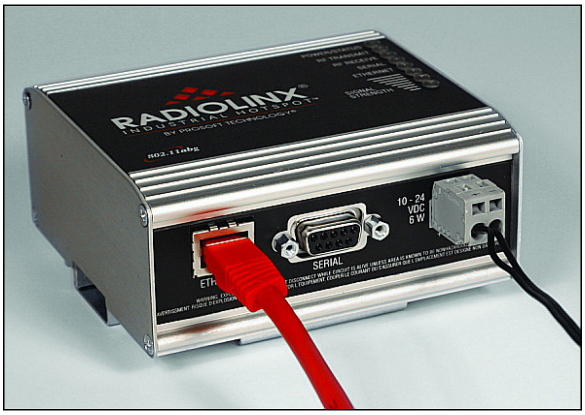
A. Setting of the master radio.

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 RLX-IHW:



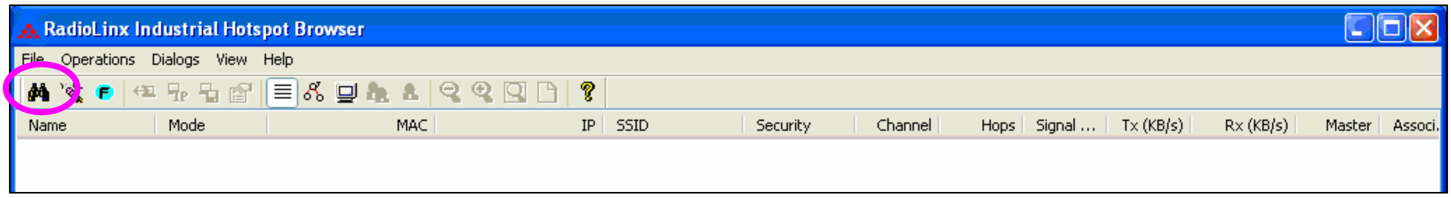
From left to right: Ethernet port, serial port and power connectors.

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.

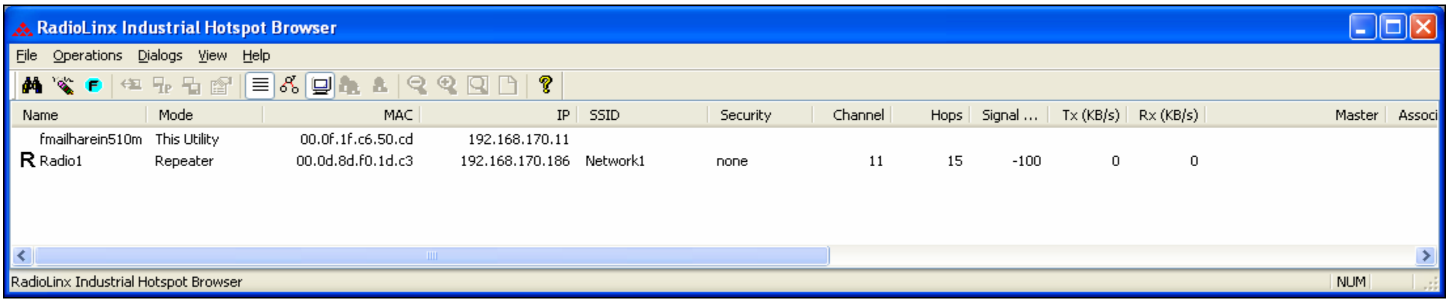
A.3. Launch RadioLinx IH browser:

Click on the binocular:


RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help

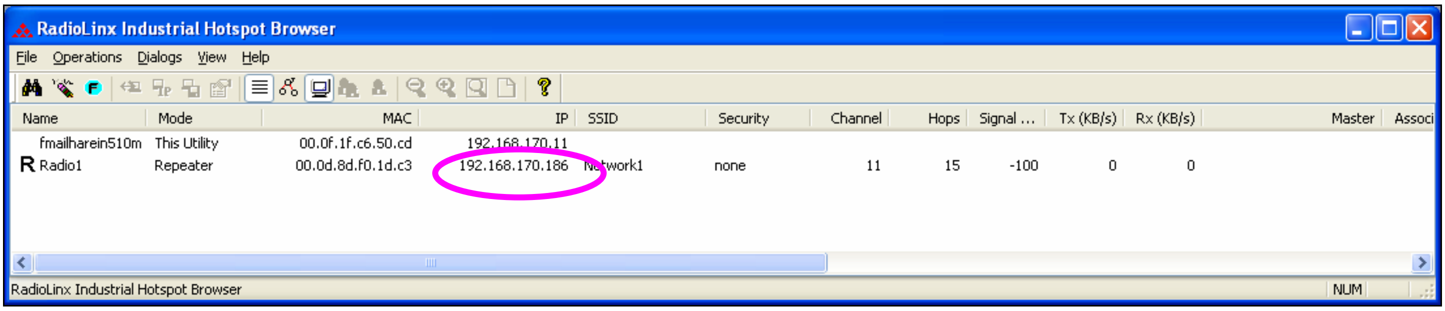
Name	Mode	MAC	IP	SSID	Security	Channel	Hops	Signal ...	Tx (KB/s)	Rx (KB/s)	Master	Associ.

The radio appears:


RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help
RadioLinx Industrial Hotspot Browser
NUM

Name	Mode	MAC	IP	SSID	Security	Channel	Hops	Signal ...	Tx (KB/s)	Rx (KB/s)	Master	Associ
fmailharein510m	This Utility	00.0f.1f.c6.50.cd	192.168.170.11									
R Radio1	Repeater	00.0d.8d.f0.1d.c3	192.168.170.186	Network1	none	11	15	-100	0	0		

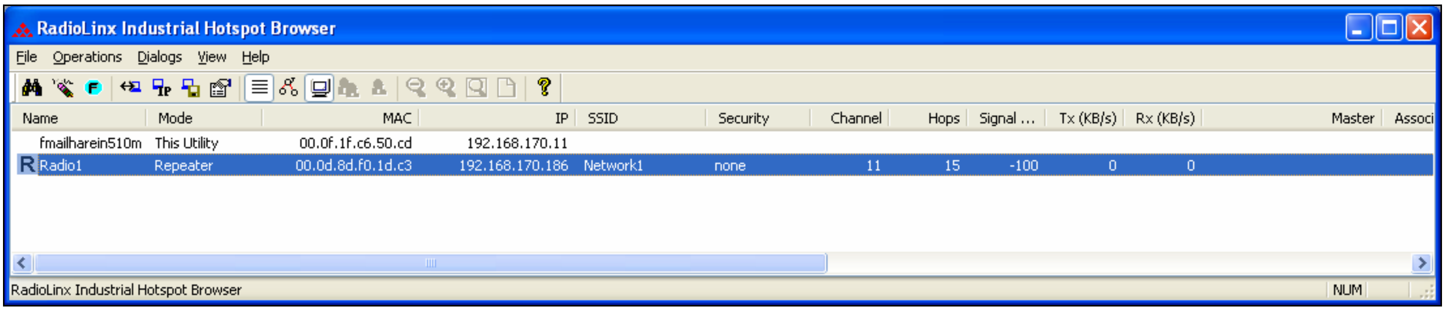
At this point the setting of the radio is the factory default.
If the radio is connected to a network with a DHCP server, the radio may already has an IP address assigned to it.


RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help
RadioLinx Industrial Hotspot Browser
NUM

Name	Mode	MAC	IP	SSID	Security	Channel	Hops	Signal ...	Tx (KB/s)	Rx (KB/s)	Master	Associ
fmailharein510m	This Utility	00.0f.1f.c6.50.cd	192.168.170.11									
R Radio1	Repeater	00.0d.8d.f0.1d.c3	192.168.170.186	Network1	none	11	15	-100	0	0		

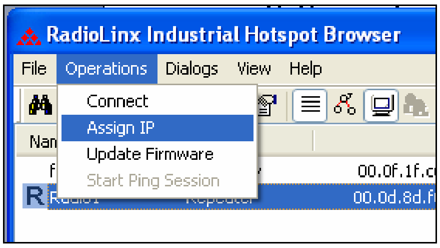
If no IP address appears:

- Select the Radio on the list

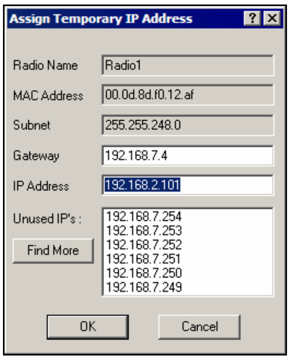

RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help
RadioLinx Industrial Hotspot Browser
NUM

Name	Mode	MAC	IP	SSID	Security	Channel	Hops	Signal ...	Tx (KB/s)	Rx (KB/s)	Master	Associ
fmailharein510m	This Utility	00.0f.1f.c6.50.cd	192.168.170.11									
Radio1	Repeater	00.0d.8d.f0.1d.c3	192.168.170.186	Network1	none	11	15	-100	0	0		

- Then from Operations menu, select Assign IP


RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help
Connect
Assign IP
Update Firmware
Start Ping Session

- The following window is displayed:



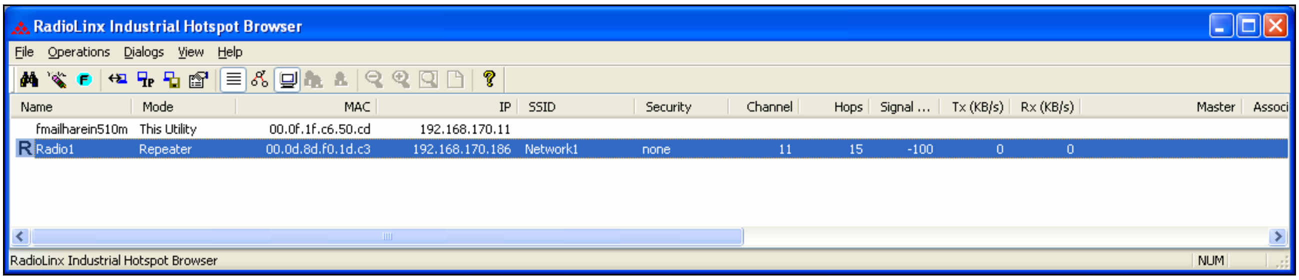
Radio Name: Radio1
MAC Address: 00.0d.8d.f0.12.af
Subnet: 255.255.248.0
Gateway: 192.168.7.4
IP Address: 192.168.2.101
Unused IP's :
192.168.7.254
192.168.7.253
192.168.7.252
192.168.7.251
192.168.7.250
192.168.7.249

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

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

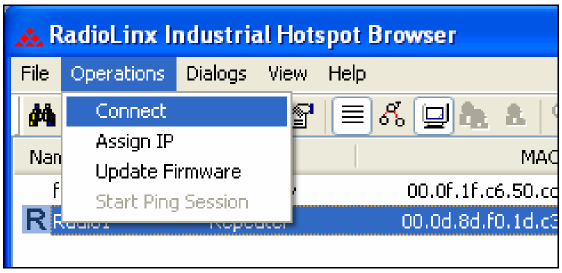
A.4. Go online with the RLX-IHW-E for configuration:

To go online to the RLX-IHW for configuration (or diagnostics), from the Browser select the Radio1:

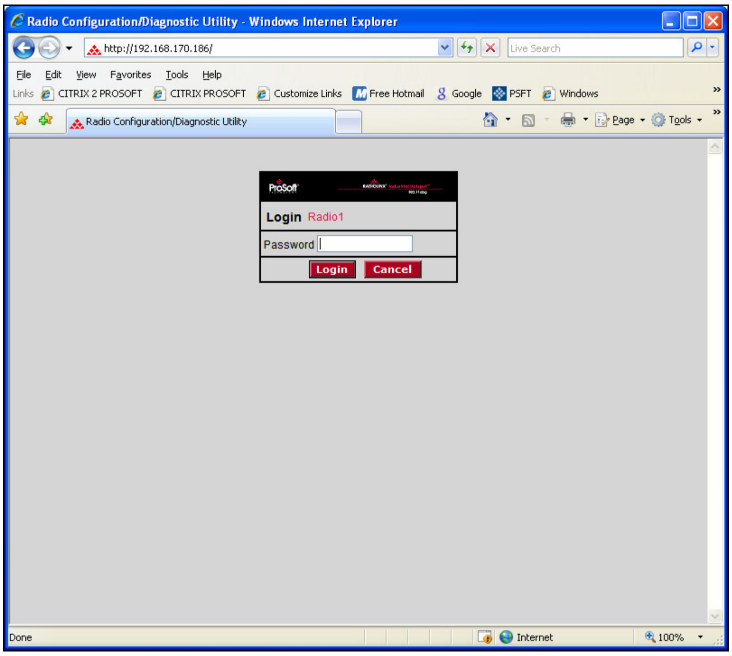

RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help
RadioLinx Industrial Hotspot Browser
NUM

Name	Mode	MAC	IP	SSID	Security	Channel	Hops	Signal ...	Tx (KB/s)	Rx (KB/s)	Master	Associ
fmailharein510m	This Utility	00.0f.1f.c6.50.cd	192.168.170.11									
Radio1	Repeater	00.0d.8d.f0.1d.c3	192.168.170.186	Network1	none	11	15	-100	0	0		

Select the Connect option in Operation menu.

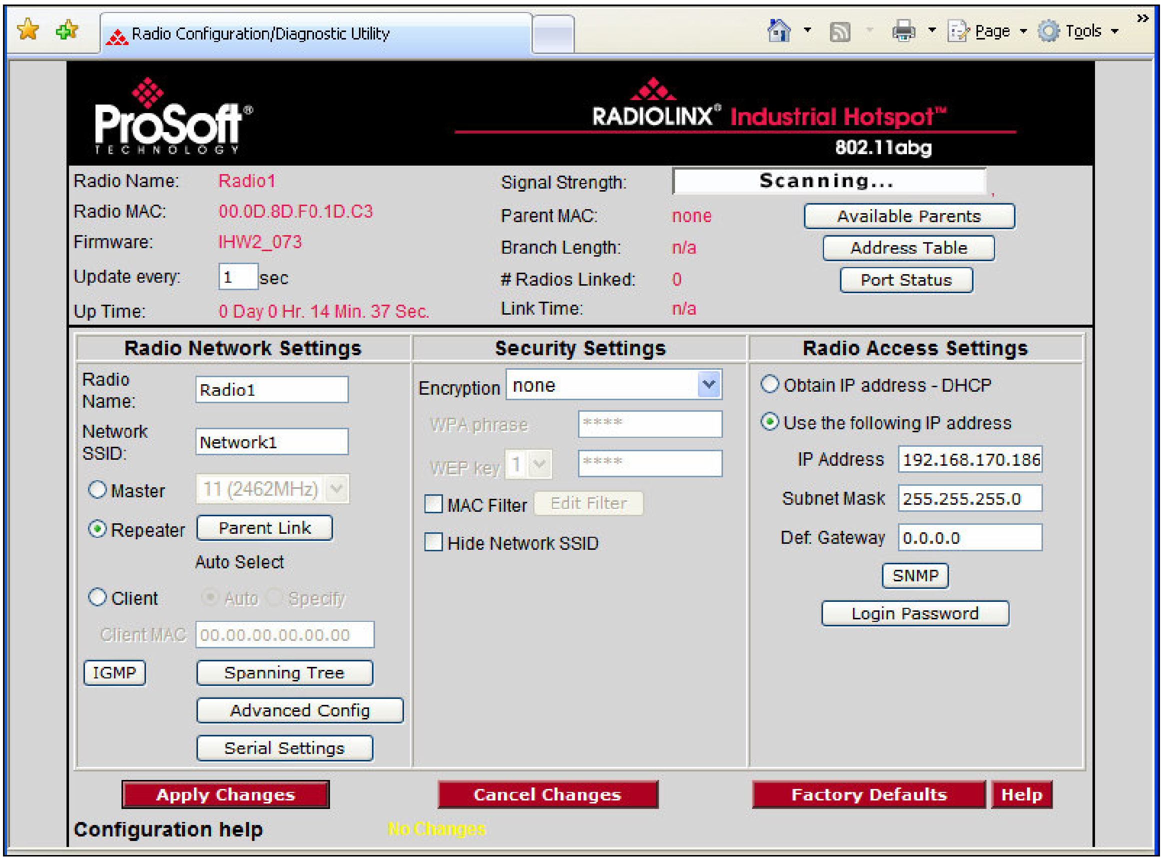


The following window is displayed:


Radio Configuration/Diagnostic Utility - Windows Internet Explorer
http://192.168.170.186/
Live Search
File Edit View Favorites Tools Help
Links CITRIX 2 PROSOFT CITRIX PROSOFT Customize Links Free Hotmail Google PSFT Windows
Radio Configuration/Diagnostic Utility
Page Tools
ProSoft
Login Radio1
Password
Login
Cancel
Done
Internet
100%

Enter your password to log in to the radio and then press **Login**.

The RLW-IHW-E configuration is protected by a login password.
The default password is **password** (lower case).
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:



Radio Name: Radio1
Radio MAC: 00.0D.8D.F0.1D.C3
Firmware: IHW2_073
Update every: 1 sec
Up Time: 0 Day 0 Hr. 14 Min. 37 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
○ Master 11 (2462MHz)
● Repeater
Auto Select
○ Client ● Auto ○ Specify
Client MAC 00.00.00.00.00.00

Security Settings

Encryption none
WPA phrase ****
WEP key 1 ****
□ MAC Filter
□ Hide Network SSID

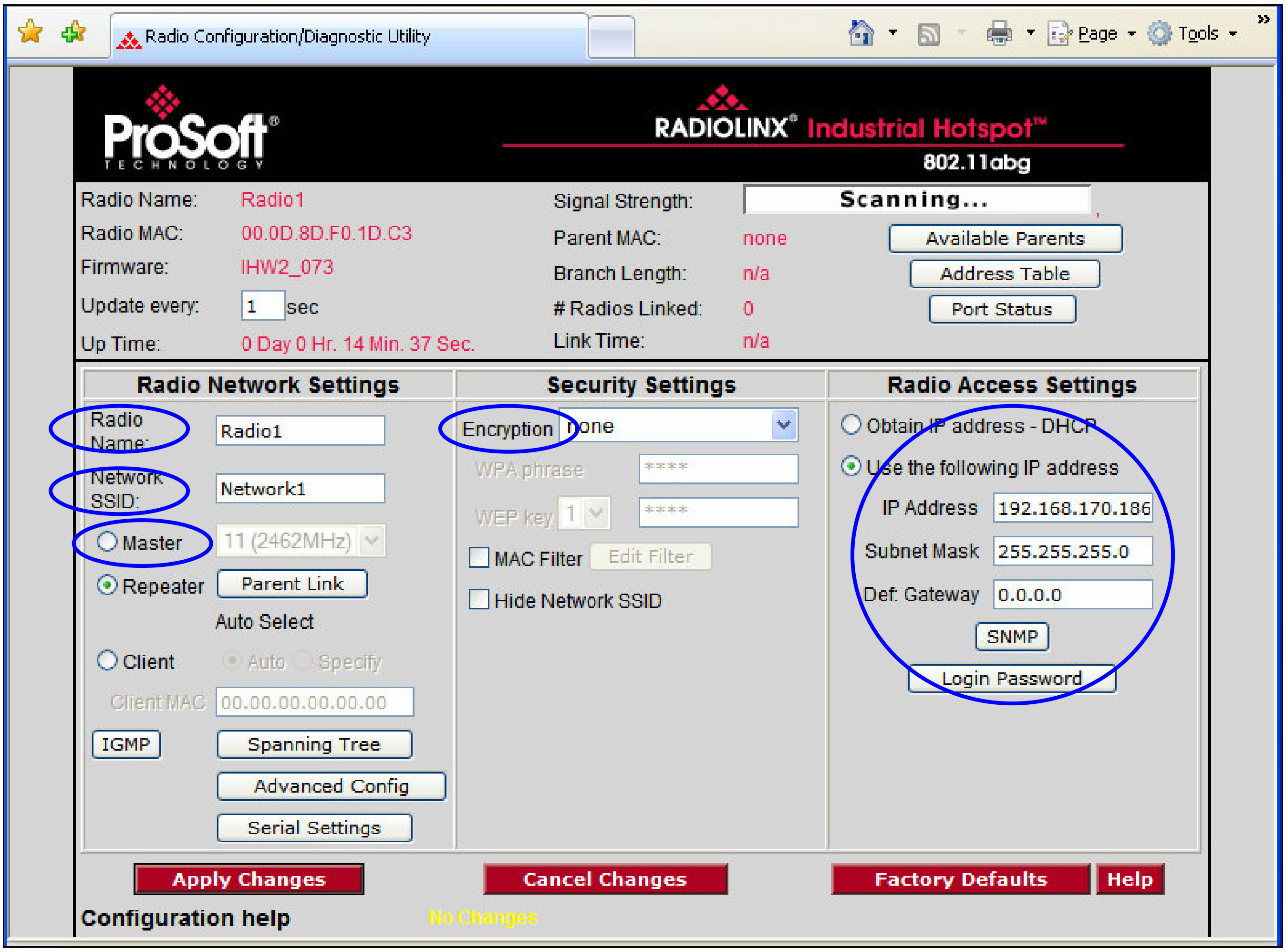
Radio Access Settings

○ Obtain IP address - DHCP
● Use the following IP address
IP Address 192.168.170.186
Subnet Mask 255.255.255.0
Def. Gateway 0.0.0.0

Configuration help No Changes

A.5. Set up the RLX-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:



Radio Configuration/Diagnostic Utility
Page
Tools
ProSoft TECHNOLOGY
RADIOLINX® Industrial Hotspot™
802.11abg

Radio Name: Radio1
Radio MAC: 00.0D.8D.F0.1D.C3
Firmware: IHW2_073
Update every: 1 sec
Up Time: 0 Day 0 Hr. 14 Min. 37 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
○ Master 11 (2462MHz)
● Repeater
○ Client ● Auto ○ Specify
Client MAC 00.00.00.00.00.00

Security Settings

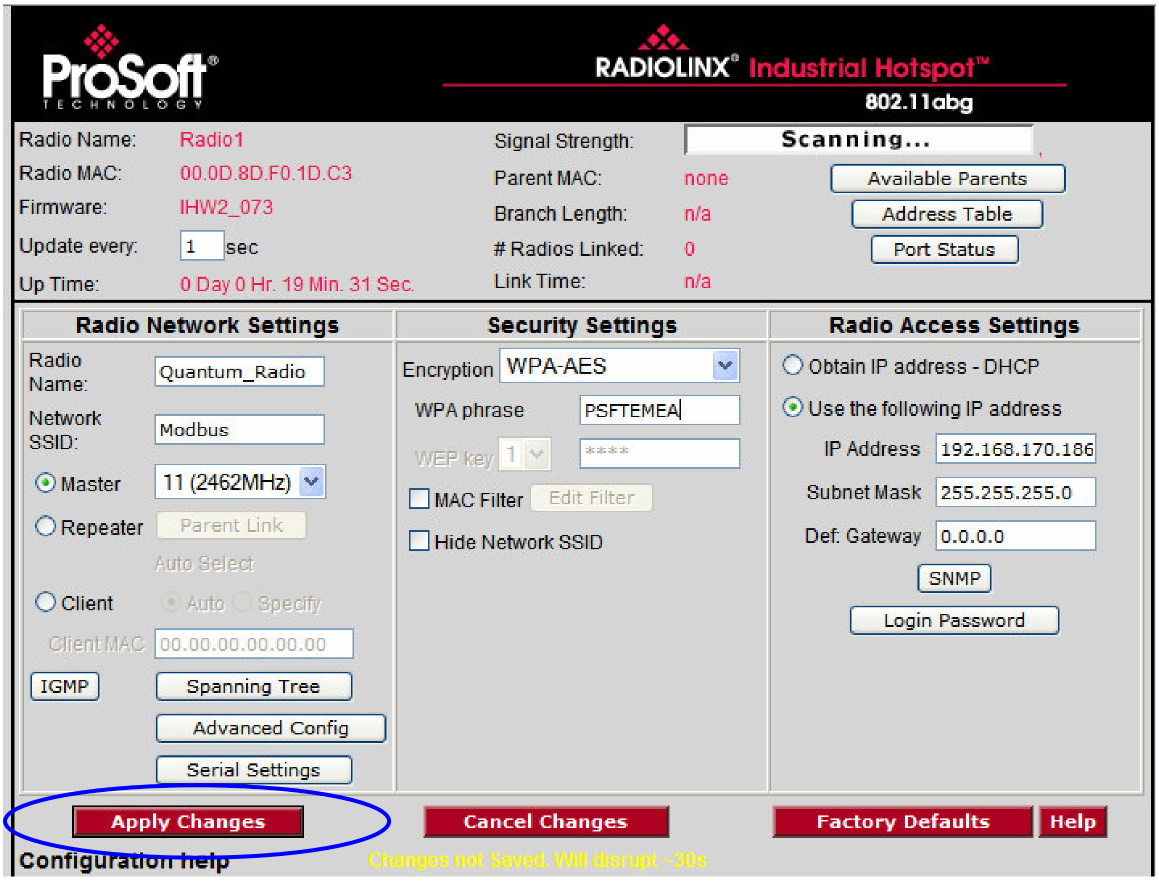
Encryption none
WPA phrase ****
WEP key 1 ****
□ MAC Filter
□ Hide Network SSID

Radio Access Settings

○ Obtain IP address - DHCP
● Use the following IP address
IP Address 192.168.170.186
Subnet Mask 255.255.255.0
Def. Gateway 0.0.0.0

Configuration help No Changes

- Change the name of the radio from **Radio1** to **Quantum_Radio**
- Change the SSID name from Network1 to Modbus
- Select **Master** and leave the channel per default (11)
- Encryption chose **WPA-AES** and enter your **WPA phrase**
- Enter a valid **IP address** and **Subnet Mask**



Radio Name: Radio1
Radio MAC: 00.0D.8D.F0.1D.C3
Firmware: IHW2_073
Update every: 1 sec
Up Time: 0 Day 0 Hr. 19 Min. 31 Sec.
Signal Strength: Scanning...
Parent MAC: none
Branch Length: n/a
Radios Linked: 0
Link Time: n/a

Radio Network Settings

Radio Name: Quantum_Radio
Network SSID: Modbus
● Master 11 (2462MHz)
○ Repeater Parent Link
Auto Select
○ Client ● Auto ○ Specify
Client MAC 00.00.00.00.00.00

Security Settings

Encryption WPA-AES
WPA phrase PSFTEMEA
WEP key 1 ****
□ MAC Filter Edit Filter
□ Hide Network SSID

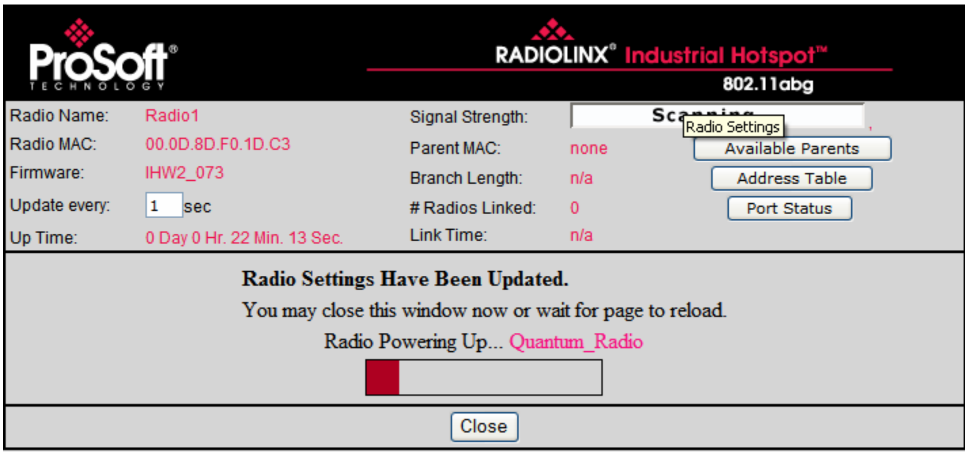
Radio Access Settings

○ Obtain IP address - DHCP
● Use the following IP address
IP Address 192.168.170.186
Subnet Mask 255.255.255.0
Def. Gateway 0.0.0.0

Changes not Saved. Will disrupt ~30s

Now the new settings are ready, press **Apply Changes** to valid them.

The RLX-IHW-E reboot:



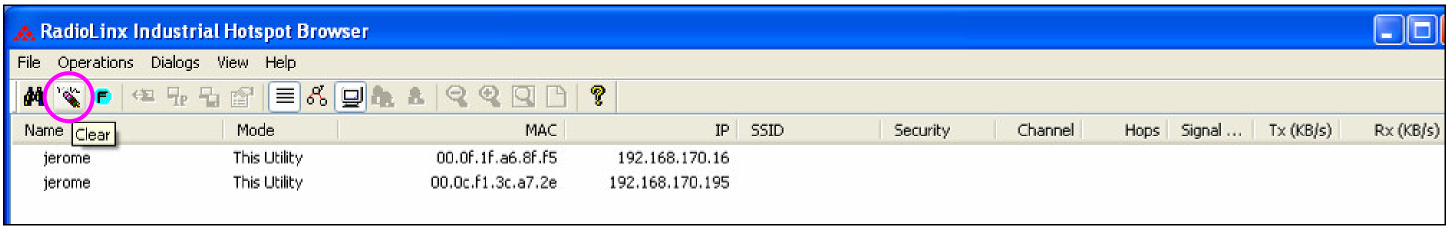
Radio Name: Radio1
Radio MAC: 00.0D.8D.F0.1D.C3
Firmware: IHW2_073
Update every: 1 sec
Up Time: 0 Day 0 Hr. 22 Min. 13 Sec.
Signal Strength: Scanning
Parent MAC: none
Branch Length: n/a
Radios Linked: 0
Link Time: n/a

Radio Settings Have Been Updated.
You may close this window now or wait for page to reload.
Radio Powering Up... Quantum_Radio

Press **Close** on this window.

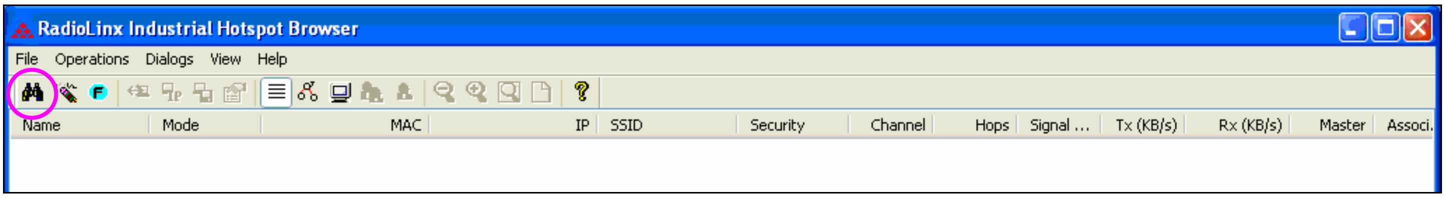
A.6. Settings verification:

- Select **Clear** to delete the current radio list


RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help
Clear

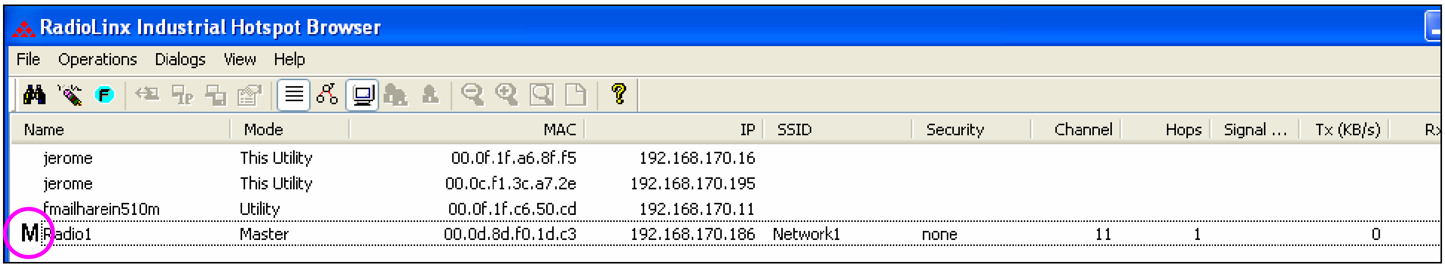
Name	Mode	MAC	IP	SSID	Security	Channel	Hops	Signal ...	Tx (KB/s)	Rx (KB/s)
jerome	This Utility	00.0f.1f.a6.8f.f5	192.168.170.16							
jerome	This Utility	00.0c.f1.3c.a7.2e	192.168.170.195							

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


RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help

Name	Mode	MAC	IP	SSID	Security	Channel	Hops	Signal ...	Tx (KB/s)	Rx (KB/s)	Master	Associ.

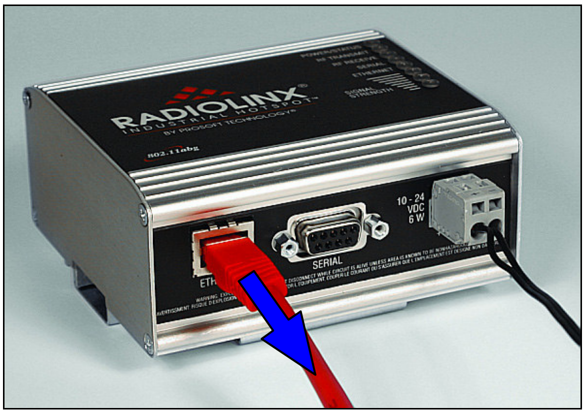
- When configured the name of the radio is preceded by an M (for Master) in the RLX-IH Browser.


RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help

Name	Mode	MAC	IP	SSID	Security	Channel	Hops	Signal ...	Tx (KB/s)	R
jerome	This Utility	00.0f.1f.a6.8f.f5	192.168.170.16							
jerome	This Utility	00.0c.f1.3c.a7.2e	192.168.170.195							
fmailharein510m	Utility	00.0f.1f.c6.50.cd	192.168.170.11							
M Radio1	Master	00.0d.8d.f0.1d.c3	192.168.170.186	Network1	none	11	1		0	

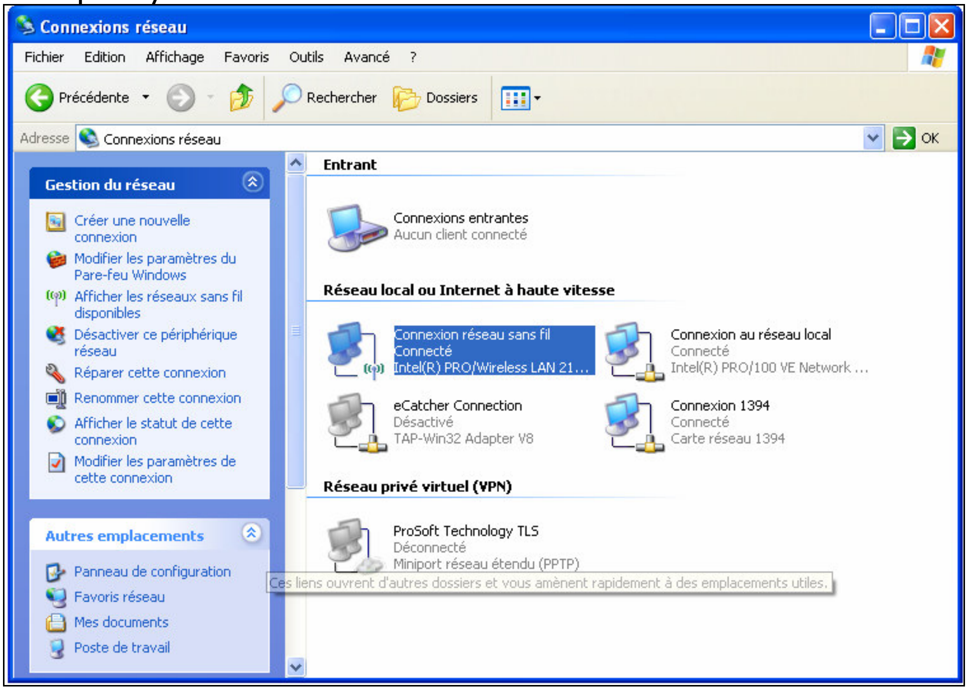
The setting of the Master radio is finished.

- Disconnect the Ethernet cable from the radio.



A.7. RLX-IHW-E Access Point checking

- Open your PC network connection and select the wireless card.



Gestion du réseau

- Créer une nouvelle connexion
- Modifier les paramètres du Pare-feu Windows
- Afficher les réseaux sans fil disponibles
- Désactiver ce périphérique réseau
- Réparer cette connexion
- Renommer cette connexion
- Afficher le statut de cette connexion
- Modifier les paramètres de cette connexion

Autres emplacements

- Panneau de configuration
- Favoris réseau
- Mes documents
- Poste de travail

Entrant

Connexions entrantes
Aucun client connecté

Réseau local ou Internet à haute vitesse

Connexion réseau sans fil
Connecté
Intel(R) PRO/Wireless LAN 21…

Connexion au réseau local
Connecté
Intel(R) PRO/100 VE Network …

eCatcher Connection
Désactivé
TAP-Win32 Adapter V8

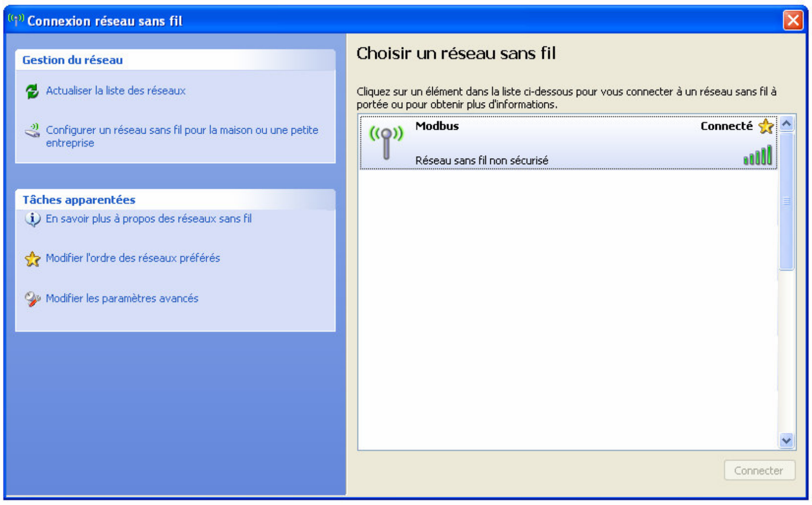
Connexion 1394
Connecté
Carte réseau 1394

Réseau privé virtuel (VPN)

ProSoft Technology TLS
Déconnecté
Miniport réseau étendu (PPTP)

Ces liens ouvrent d'autres dossiers et vous amènent rapidement à des emplacements utiles.

- Select to View Available Wireless Network



Gestion du réseau

- Actualiser la liste des réseaux
- Configurer un réseau sans fil pour la maison ou une petite entreprise

Tâches apparentées

- En savoir plus à propos des réseaux sans fil
- Modifier l'ordre des réseaux préférés
- Modifier les paramètres avancés

Choisir un réseau sans fil

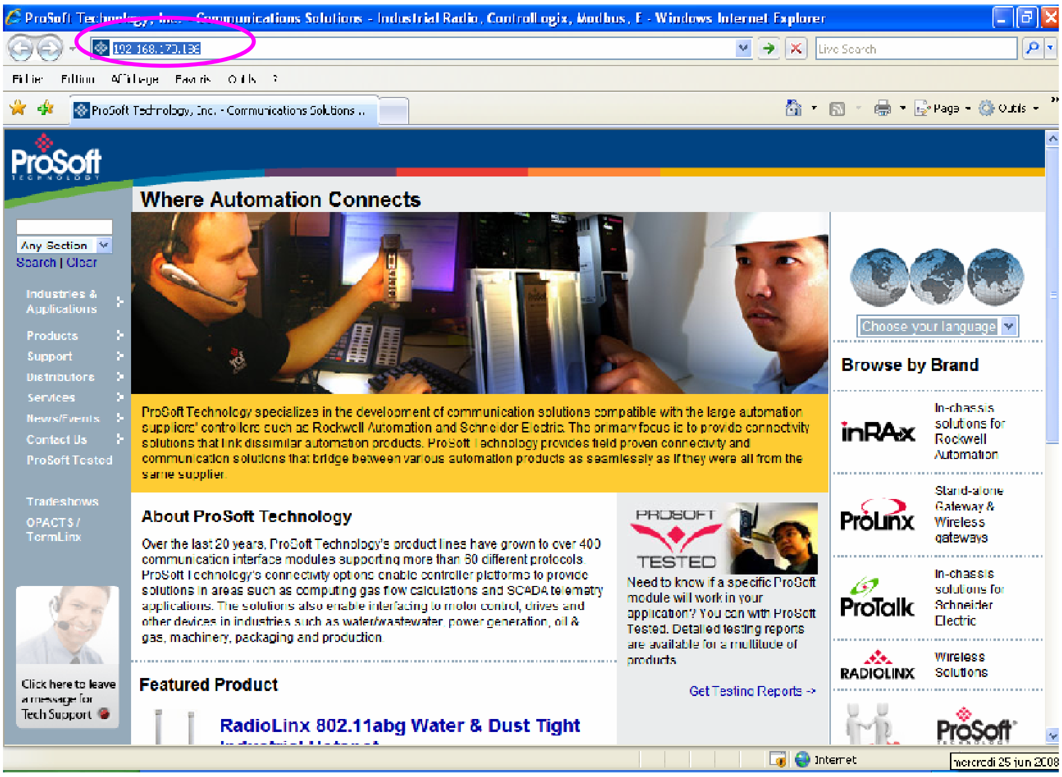
Cliquez sur un élément dans la liste ci-dessous pour vous connecter à un réseau sans fil à portée ou pour obtenir plus d'informations.

Modbus — Connecté
Réseau sans fil non sécurisé

- Within the list of the Wireless network available you should see the **Modbus** network. This is the Network SSID you setup previously within the RLX-IHW-E Master mode.
- Choose the **Modbus** Wireless network.

Now you will be able to monitoring the radio with internet explorer via wireless network:

- Open Internet explorer.
- Enter the IP address of the RLX-IHW-E you want to access into the navigation bar.


ProSoft Technology, Inc. - Communications Solutions - Industrial Radio, ControlLogix, Modbus, E - Windows Internet Explorer
192.168.170.138
Live Search
Fichier Edition Affichage Favoris Outils ?
ProSoft Technology, Inc. - Communications Solutions ...
Page
Outils
ProSoft
Where Automation Connects
Any Section
Search | Clear
Industries & Applications
Products
Support
Distributors
Services
News/Events
Contact Us
ProSoft Tested
Tradeshows
OPACTS / TermLinx
Click here to leave a message for Tech Support
Choose your language
Browse by Brand
inRAx
In-chassis solutions for Rockwell Automation
ProLinx
Stand-alone Gateway & Wireless gateways
ProTalk
In-chassis solutions for Schneider Electric
RADIOLINX
Wireless Solutions
ProSoft
PROSOFT TESTED
Get Testing Reports ->
Internet
mercredi 25 juin 2008

ProSoft Technology specializes in the development of communication solutions compatible with the large automation suppliers' controllers such as Rockwell Automation and Schneider Electric. The primary focus is to provide connectivity solutions that link dissimilar automation products. ProSoft Technology provides field proven connectivity and communication solutions that bridge between various automation products as seamlessly as if they were all from the same supplier.

About ProSoft Technology

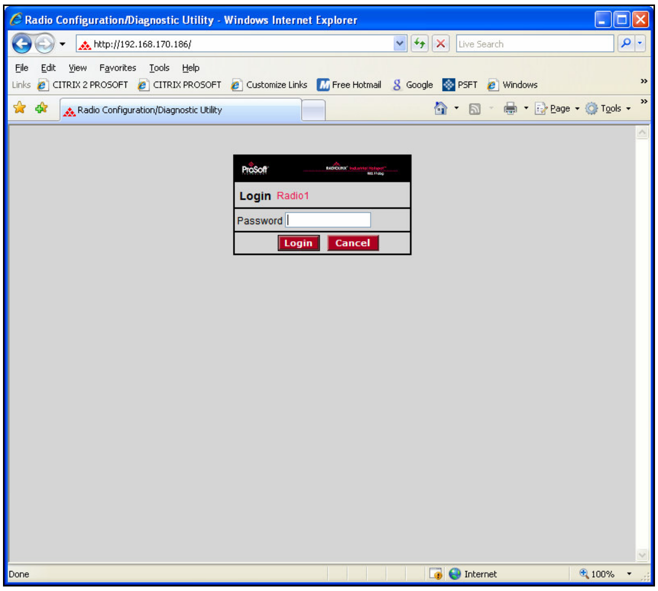
Over the last 20 years, ProSoft Technology's product lines have grown to over 400 communication interface modules supporting more than 60 different protocols. ProSoft Technology's connectivity options enable controller platforms to provide solutions in areas such as computing gas flow calculations and SCADA telemetry applications. The solutions also enable interfacing to motor control, drives and other devices in industries such as water/wastewater, power generation, oil & gas, machinery, packaging and production.

Need to know if a specific ProSoft module will work in your application? You can with ProSoft Tested. Detailed testing reports are available for a multitude of products.

Featured Product

RadioLinx 802.11abg Water & Dust Tight

- The following window is displayed.



Radio Configuration/Diagnostic Utility - Windows Internet Explorer

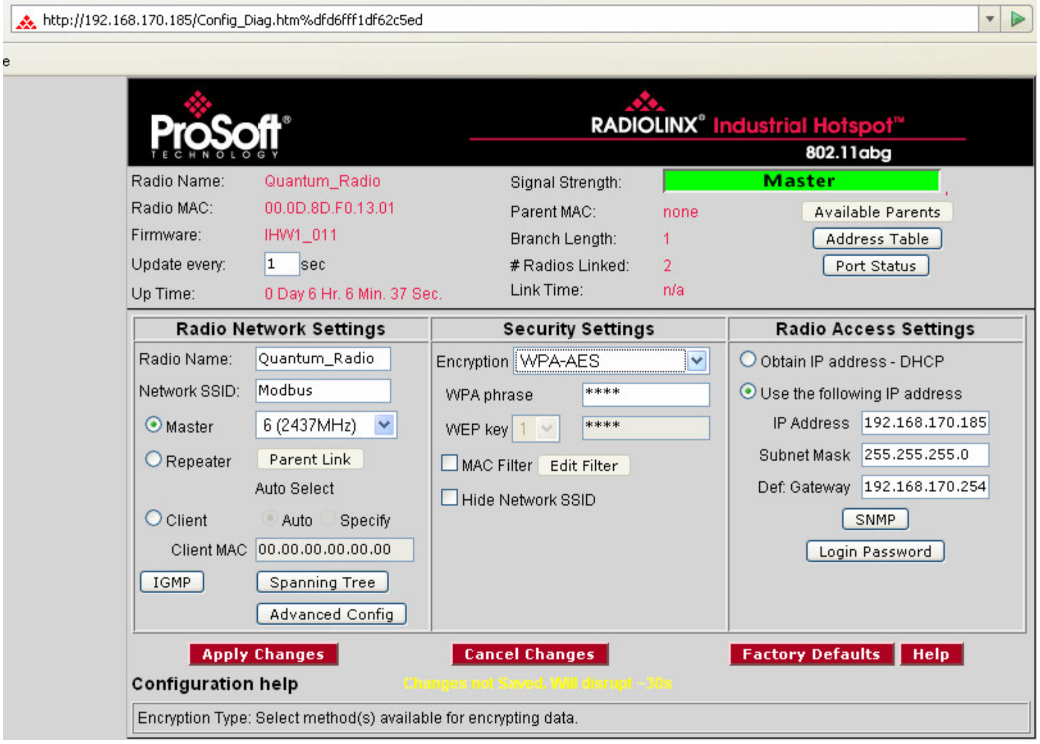
http://192.168.170.186/

Login Radio1

Password

File Edit View Favorites Tools Help
Links CITRIX 2 PROSOFT CITRIX PROSOFT Customize Links Free Hotmail Google PSFT Windows
Live Search
Radio Configuration/Diagnostic Utility
Page Tools
Login
Cancel
Done
Internet
100%

Enter your password to log in to the radio and then press **Login**.
The following window is displayed:



http://192.168.170.185/Config_Diag.htm%dfd6fff1df62c5ed

Radio Name: Quantum_Radio
Radio MAC: 00.0D.8D.F0.13.01
Firmware: IHW1_011
Update every: 1 sec
Up Time: 0 Day 6 Hr. 6 Min. 37 Sec.

Signal Strength: Master
Parent MAC: none
Branch Length: 1
Radios Linked: 2
Link Time: n/a

Radio Network Settings
Radio Name: Quantum_Radio
Network SSID: Modbus
● Master 6 (2437MHz)
○ Repeater
○ Client
Client MAC 00.00.00.00.00.00

Security Settings
Encryption WPA-AES
WPA phrase ****
WEP key 1 ****
□ MAC Filter
□ Hide Network SSID

Radio Access Settings
○ Obtain IP address - DHCP
● Use the following IP address
IP Address 192.168.170.185
Subnet Mask 255.255.255.0
Def. Gateway 192.168.170.254

Changes not Saved. Will disrupt ~30s

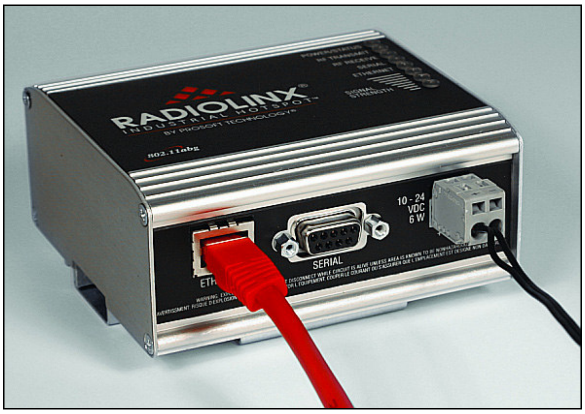
Configuration help

Encryption Type: Select method(s) available for encrypting data.

The RLX-IHW-E Master mode works fine.

B. Setting of the repeater radio

B.1. Plug the cables to the RLX-IHW



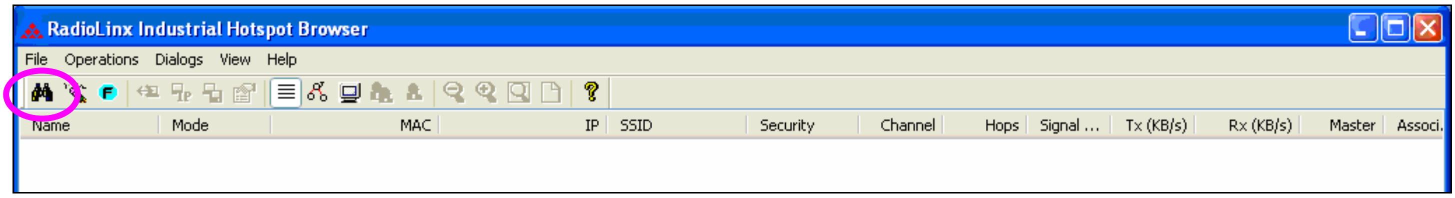
From left to right: Ethernet port, serial port and power connector.

Plug the power cable.
For Ethernet connection:

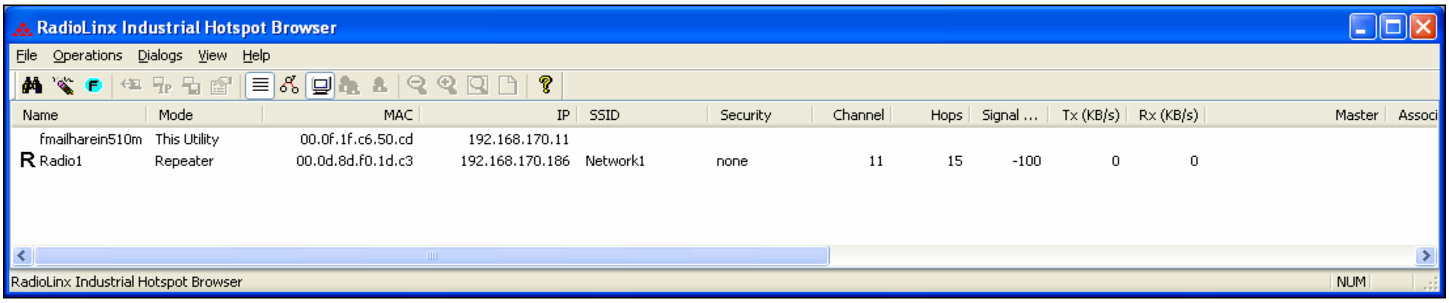
- If you are connecting to the radio through an Ethernet hub or switch, use the gray (straight-through) cable.
- If you are connecting to the radio directly from your PC without going through an Ethernet hub or switch, you must use the red (crossover) cable.

B.2. Launch RadioLinx IH browser

Click on the **binocular**


RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help
Name Mode MAC IP SSID Security Channel Hops Signal ... Tx (KB/s) Rx (KB/s) Master Associ.

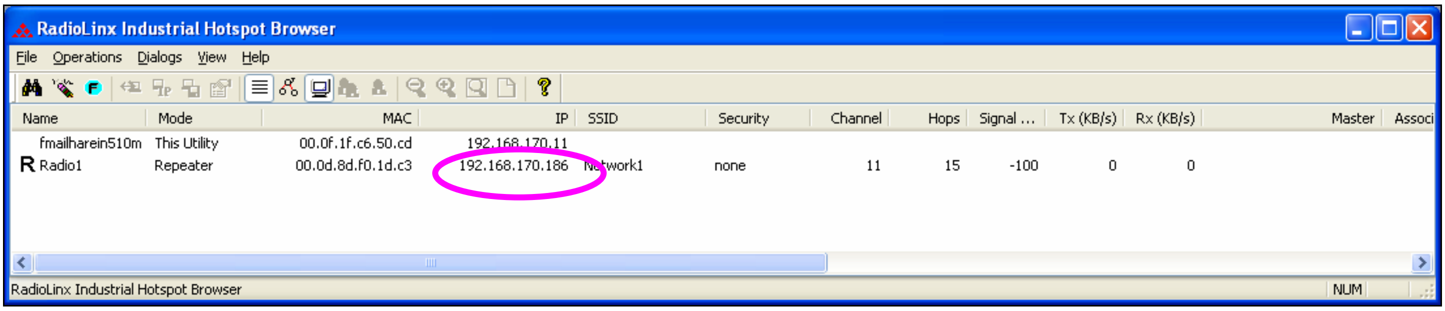
The radio appears:


RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help

Name	Mode	MAC	IP	SSID	Security	Channel	Hops	Signal ...	Tx (KB/s)	Rx (KB/s)	Master	Associ
fmailharein510m	This Utility	00.0f.1f.c6.50.cd	192.168.170.11									
R Radio1	Repeater	00.0d.8d.f0.1d.c3	192.168.170.186	Network1	none	11	15	-100	0	0		

RadioLinx Industrial Hotspot Browser
NUM

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 has an IP address assigned to it.

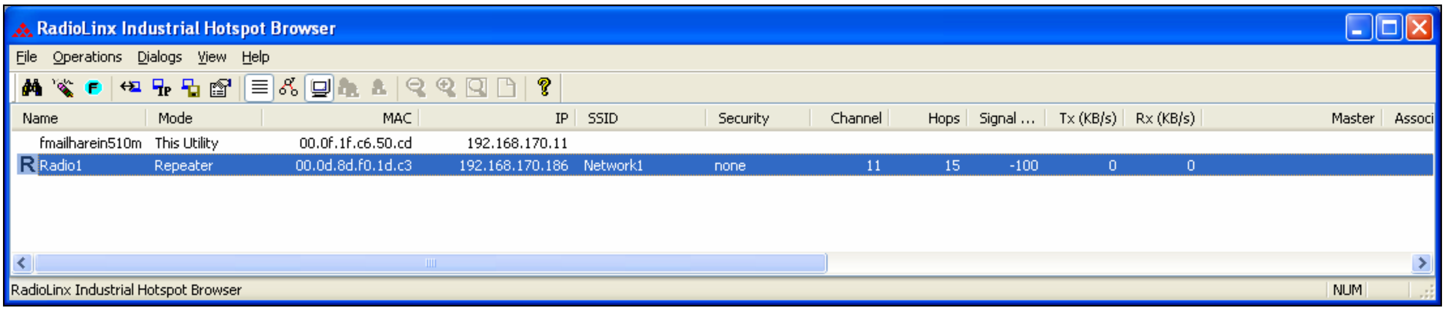

RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help

Name	Mode	MAC	IP	SSID	Security	Channel	Hops	Signal ...	Tx (KB/s)	Rx (KB/s)	Master	Associ
fmailharein510m	This Utility	00.0f.1f.c6.50.cd	192.168.170.11									
R Radio1	Repeater	00.0d.8d.f0.1d.c3	192.168.170.186	Network1	none	11	15	-100	0	0		

RadioLinx Industrial Hotspot Browser
NUM

If no IP address appears:

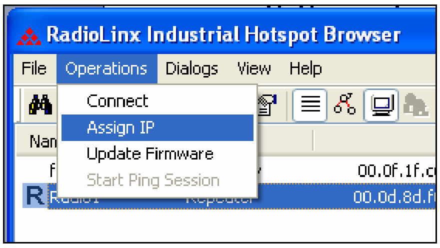
- Select the Radio on the list


RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help

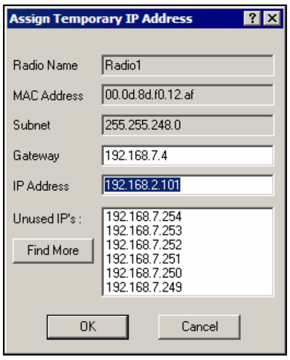
Name	Mode	MAC	IP	SSID	Security	Channel	Hops	Signal ...	Tx (KB/s)	Rx (KB/s)	Master	Associ
fmailharein510m	This Utility	00.0f.1f.c6.50.cd	192.168.170.11									
R Radio1	Repeater	00.0d.8d.f0.1d.c3	192.168.170.186	Network1	none	11	15	-100	0	0		

RadioLinx Industrial Hotspot Browser
NUM

- Then from Operations menu, select Assign IP


RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help
Connect
Assign IP
Update Firmware
Start Ping Session

- The following window is displayed:



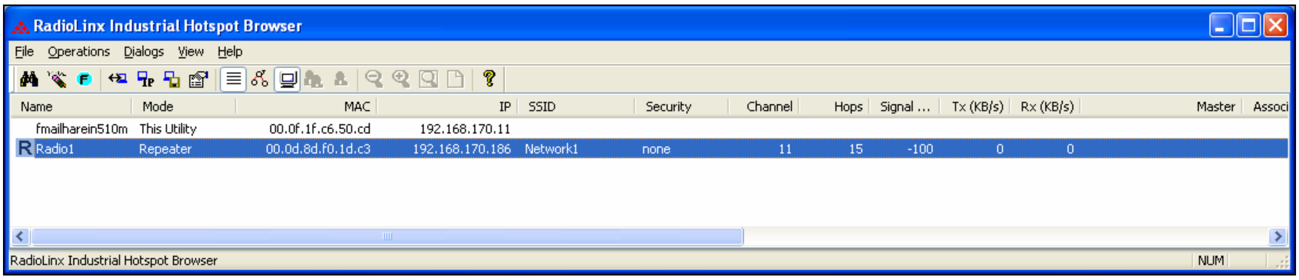
Radio Name: Radio1
MAC Address: 00.0d.8d.f0.12.af
Subnet: 255.255.248.0
Gateway: 192.168.7.4
IP Address: 192.168.2.101
Unused IP's :
192.168.7.254
192.168.7.253
192.168.7.252
192.168.7.251
192.168.7.250
192.168.7.249

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

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

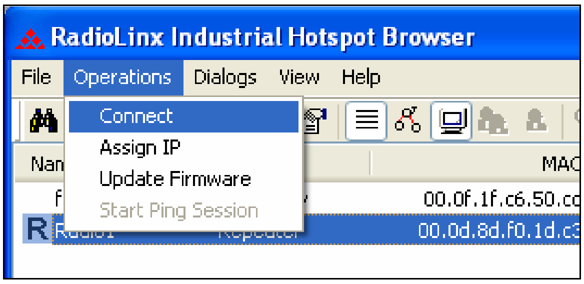
B.3. Go online with the RLX-IHW-E for configuration

To go online to the RLX-IHW for configuration (or diagnostics), from the Browser select the Radio1:

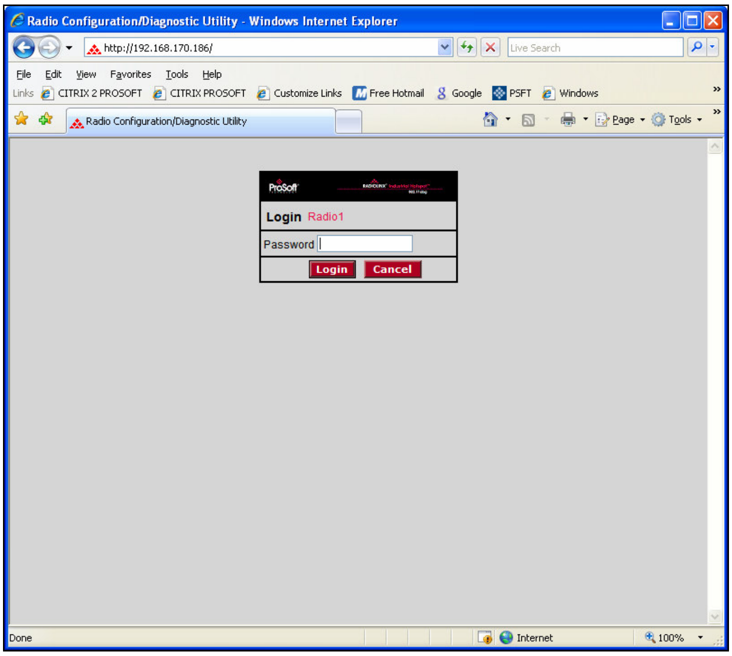

RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help
RadioLinx Industrial Hotspot Browser
NUM

Name	Mode	MAC	IP	SSID	Security	Channel	Hops	Signal ...	Tx (KB/s)	Rx (KB/s)	Master	Associ
fmailharein510m	This Utility	00.0f.1f.c6.50.cd	192.168.170.11									
Radio1	Repeater	00.0d.8d.f0.1d.c3	192.168.170.186	Network1	none	11	15	-100	0	0		

Select the Connect option in Operation menu.

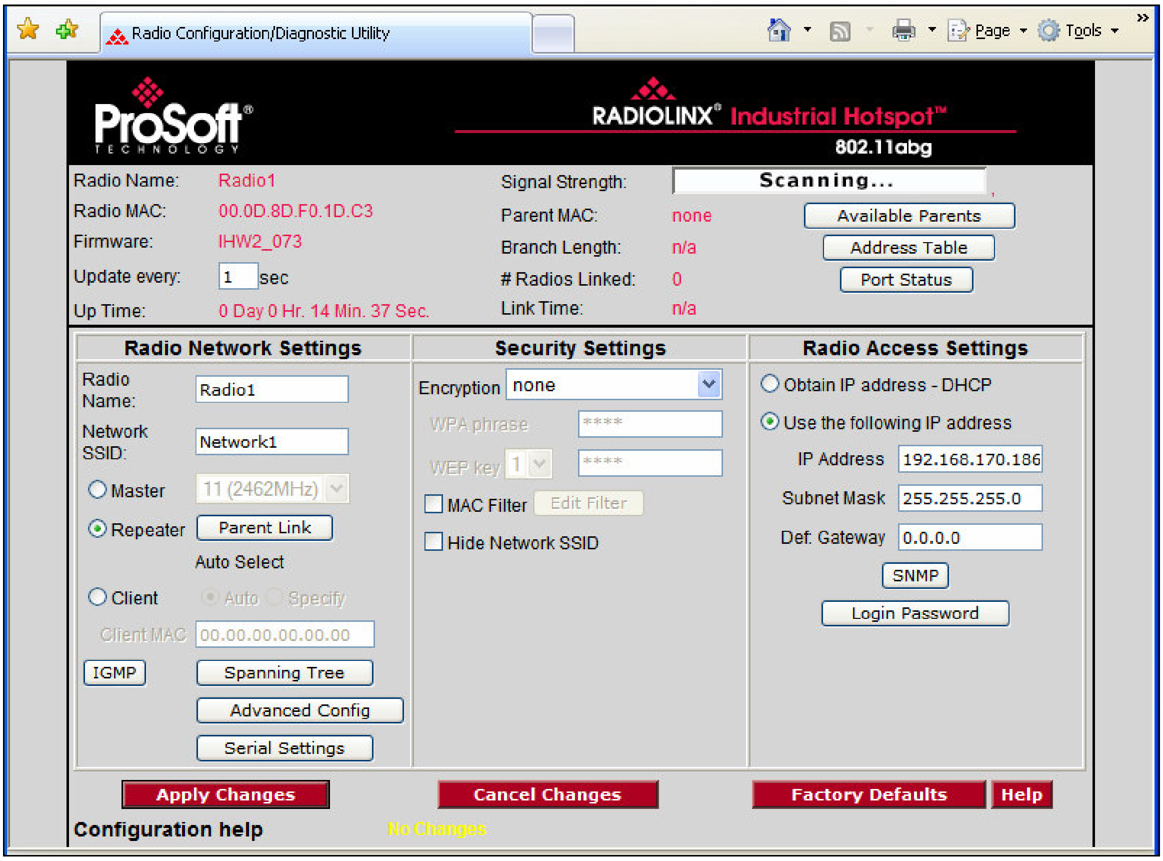

RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help
Connect
Assign IP
Update Firmware
Start Ping Session

The following window is displayed:


Radio Configuration/Diagnostic Utility - Windows Internet Explorer
http://192.168.170.186/
Live Search
File Edit View Favorites Tools Help
Links CITRIX 2 PROSOFT CITRIX PROSOFT Customize Links Free Hotmail Google PSFT Windows
Radio Configuration/Diagnostic Utility
Page Tools
ProSoft
Login Radio1
Password
Login
Cancel
Done
Internet
100%

Enter your password to log in to the radio and then press **Login**.

The RLW-IHW-E configuration is protected by a login password.
The default password is **password** (lower case).
To prevent unauthorized access to the radio configuration, you should change the password when you have finished the initial configuration.
The following window is displayed:


Radio Configuration/Diagnostic Utility
Page
Tools
ProSoft TECHNOLOGY
RADIOLINX® Industrial Hotspot™
802.11abg

Radio Name: Radio1
Radio MAC: 00.0D.8D.F0.1D.C3
Firmware: IHW2_073
Update every: 1 sec
Up Time: 0 Day 0 Hr. 14 Min. 37 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
○ Master 11 (2462MHz)
● Repeater Parent Link
Auto Select
○ Client ● Auto ○ Specify
Client MAC 00.00.00.00.00.00

Security Settings

Encryption none
WPA phrase ****
WEP key 1 ****
□ MAC Filter Edit Filter
□ Hide Network SSID

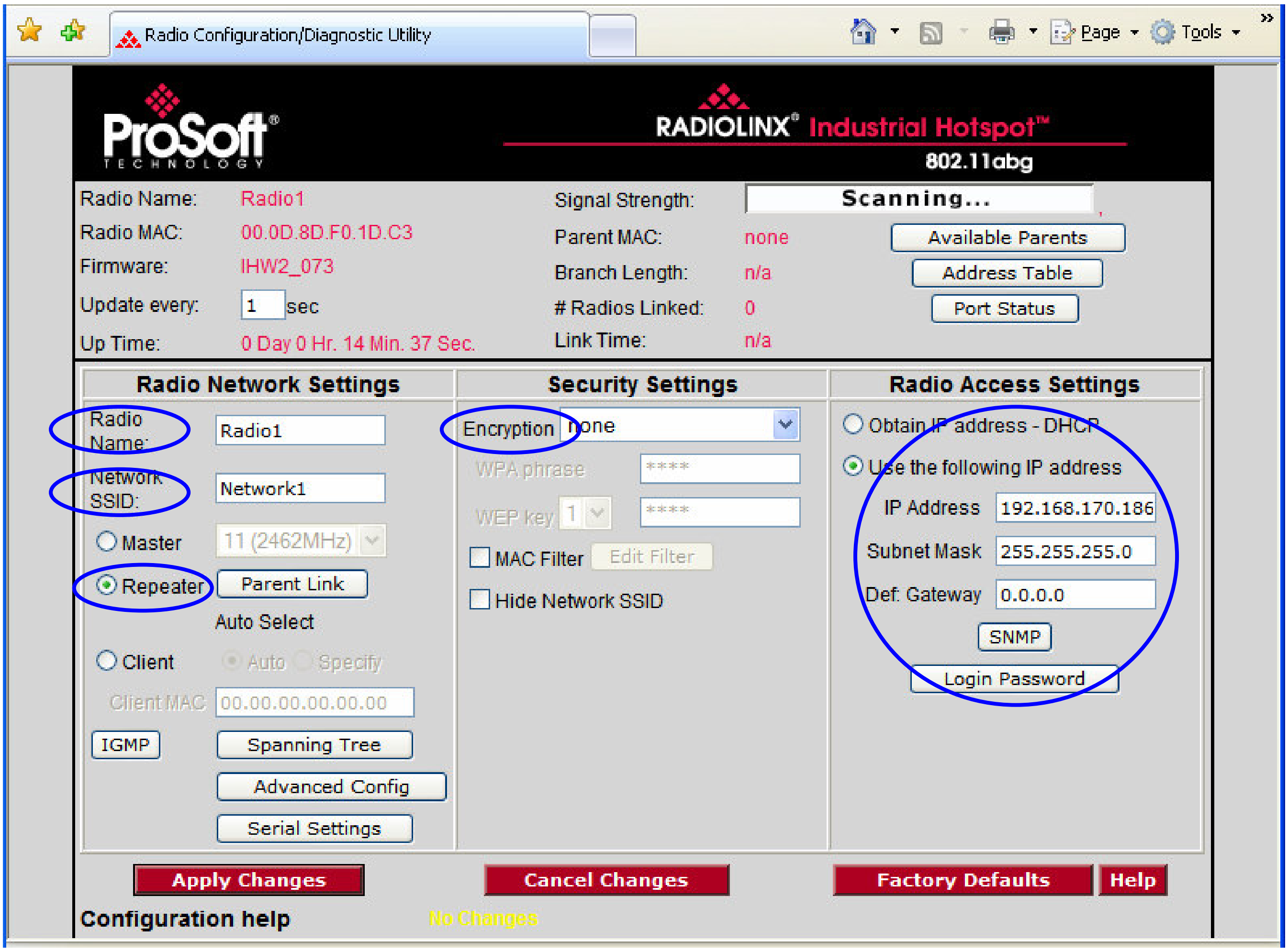
Radio Access Settings

○ Obtain IP address - DHCP
● Use the following IP address
IP Address 192.168.170.186
Subnet Mask 255.255.255.0
Def. Gateway 0.0.0.0

Configuration help No Changes

B.4. Set up the RLX-IHW-E – Remote/Repeater mode

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



Radio Name: Radio1
Radio MAC: 00.0D.8D.F0.1D.C3
Firmware: IHW2_073
Update every: 1 sec
Up Time: 0 Day 0 Hr. 14 Min. 37 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
○ Master 11 (2462MHz)
● Repeater
Auto Select
○ Client ○ Auto ○ Specify
Client MAC 00.00.00.00.00.00

Security Settings

Encryption none
WPA phrase ****
WEP key 1 ****
□ MAC Filter
□ Hide Network SSID

Radio Access Settings

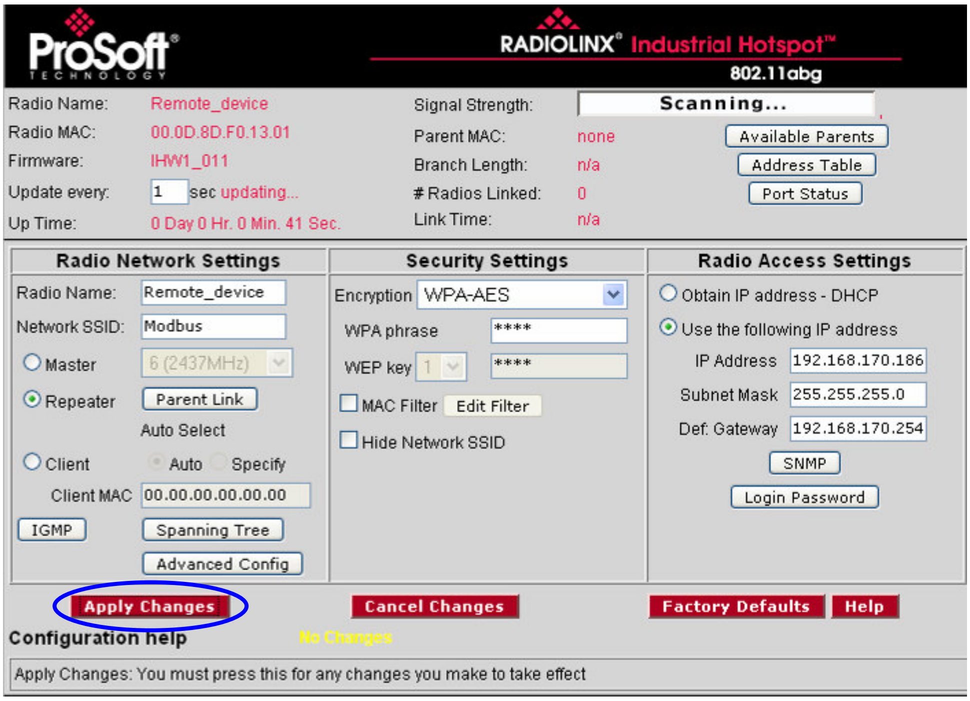
○ Obtain IP address - DHCP
● Use the following IP address
IP Address 192.168.170.186
Subnet Mask 255.255.255.0
Def. Gateway 0.0.0.0

Configuration help No Changes

- ❖ Change the name of the radio from **Radio1** to **Remote_device**
- ❖ Change the SSID name from **Network1** to **Modbus**
- ❖ Select **Repeater**
- ❖ Encryption chose **WPA-AES** and enter your **WPA phrase**
- ❖ Enter a valid **IP address** and **Subnet Mask**.

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 RLX-IHW-E Master mode, otherwise the Repeater radio will not be able to connect to the Master radio.



Radio Name: Remote_device
Radio MAC: 00.0D.8D.F0.13.01
Firmware: IHW1_011
Update every: 1 sec updating...
Up Time: 0 Day 0 Hr. 0 Min. 41 Sec.
Signal Strength: Scanning...
Parent MAC: none
Branch Length: n/a
Radios Linked: 0
Link Time: n/a

Radio Network Settings

Radio Name: Remote_device
Network SSID: Modbus
○ Master 6 (2437MHz)
● Repeater
Auto Select
○ Client ○ Auto ○ Specify
Client MAC 00.00.00.00.00.00

Security Settings

Encryption WPA-AES
WPA phrase ****
WEP key 1 ****
□ MAC Filter
□ Hide Network SSID

Radio Access Settings

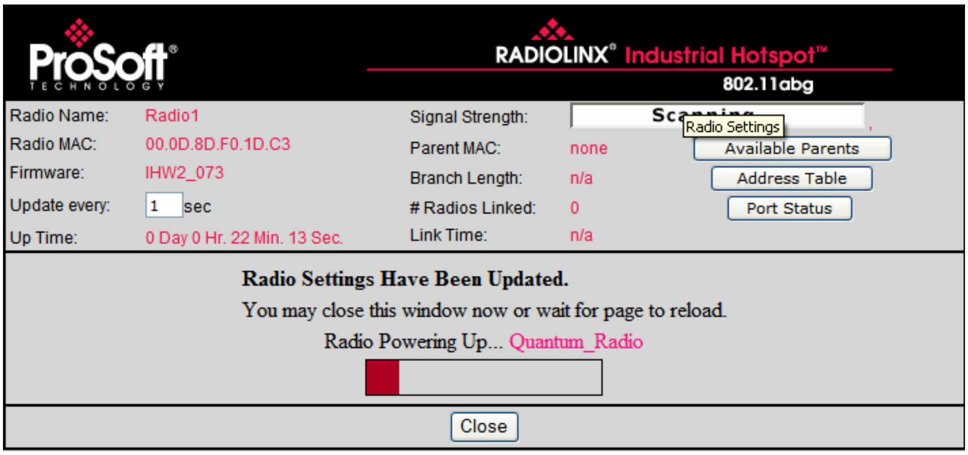
○ Obtain IP address - DHCP
● Use the following IP address
IP Address 192.168.170.186
Subnet Mask 255.255.255.0
Def. Gateway 192.168.170.254

Configuration help No Changes

Apply Changes: You must press this for any changes you make to take effect

Now the new settings are ready, press **Apply Changes** to valid them

The RLX-IHW-E reboot:



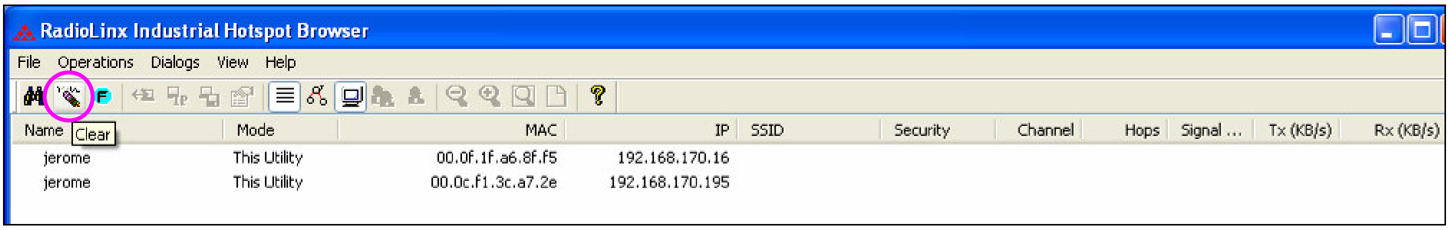
Radio Name: Radio1
Radio MAC: 00.0D.8D.F0.1D.C3
Firmware: IHW2_073
Update every: 1 sec
Up Time: 0 Day 0 Hr. 22 Min. 13 Sec.
Signal Strength: Scanning
Parent MAC: none
Branch Length: n/a
Radios Linked: 0
Link Time: n/a

Radio Settings Have Been Updated.
You may close this window now or wait for page to reload.
Radio Powering Up... Quantum_Radio

Press **Close** on this window.

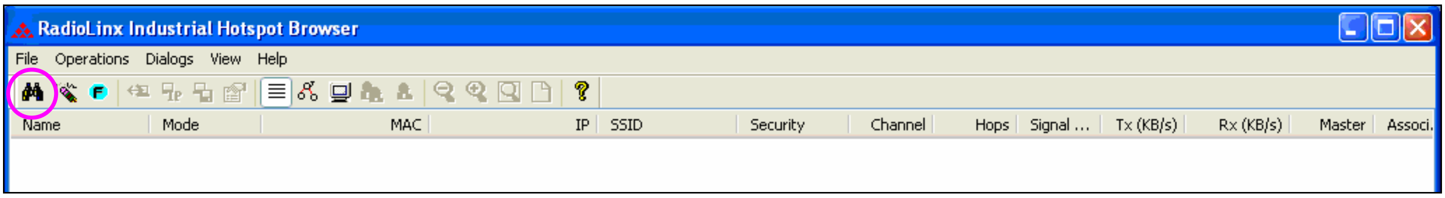
B.5. Settings verification

- Select **Clear** to delete the current radio list


RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help
Clear

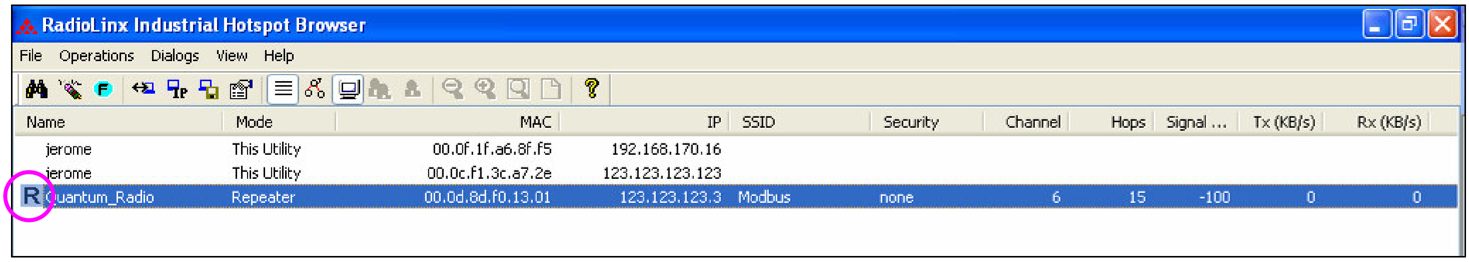
Name	Mode	MAC	IP	SSID	Security	Channel	Hops	Signal ...	Tx (KB/s)	Rx (KB/s)
jerome	This Utility	00.0f.1f.a6.8f.f5	192.168.170.16							
jerome	This Utility	00.0c.f1.3c.a7.2e	192.168.170.195							

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


RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help

Name	Mode	MAC	IP	SSID	Security	Channel	Hops	Signal ...	Tx (KB/s)	Rx (KB/s)	Master	Associ.

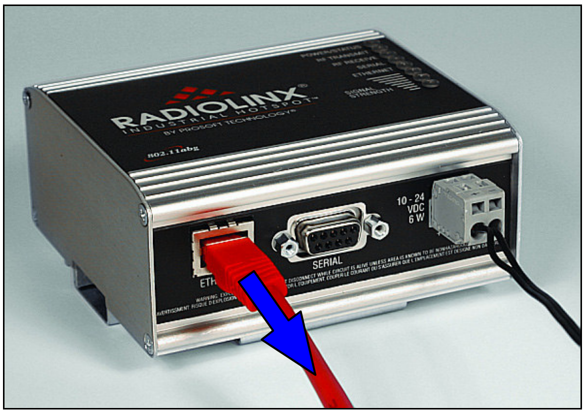
- When configured the name of the radio is preceded by an R (for Repeater) in the RLX-IH Browser.


RadioLinx Industrial Hotspot Browser
File Operations Dialogs View Help

Name	Mode	MAC	IP	SSID	Security	Channel	Hops	Signal ...	Tx (KB/s)	Rx (KB/s)
jerome	This Utility	00.0f.1f.a6.8f.f5	192.168.170.16							
jerome	This Utility	00.0c.f1.3c.a7.2e	123.123.123.123							
R Quantum_Radio	Repeater	00.0d.8d.f0.13.01	123.123.123.3	Modbus	none	6	15	-100	0	0

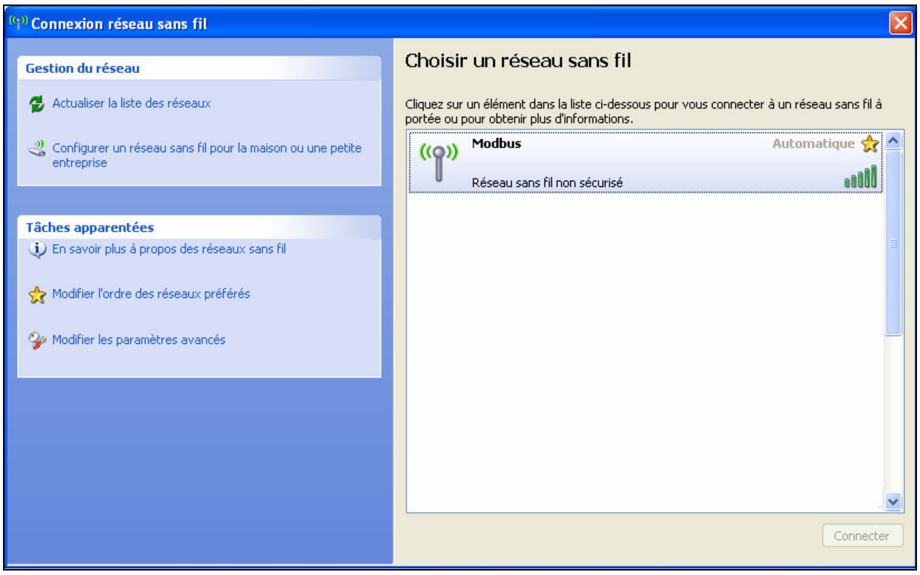
The setting of the Repeater radio is finished.

- Disconnect the Ethernet cable from the radio.



B.6. RLX-IHW-E Access Point checking

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



Connexion réseau sans fil

Choisir un réseau sans fil

Cliquez sur un élément dans la liste ci-dessous pour vous connecter à un réseau sans fil à portée ou pour obtenir plus d'informations.

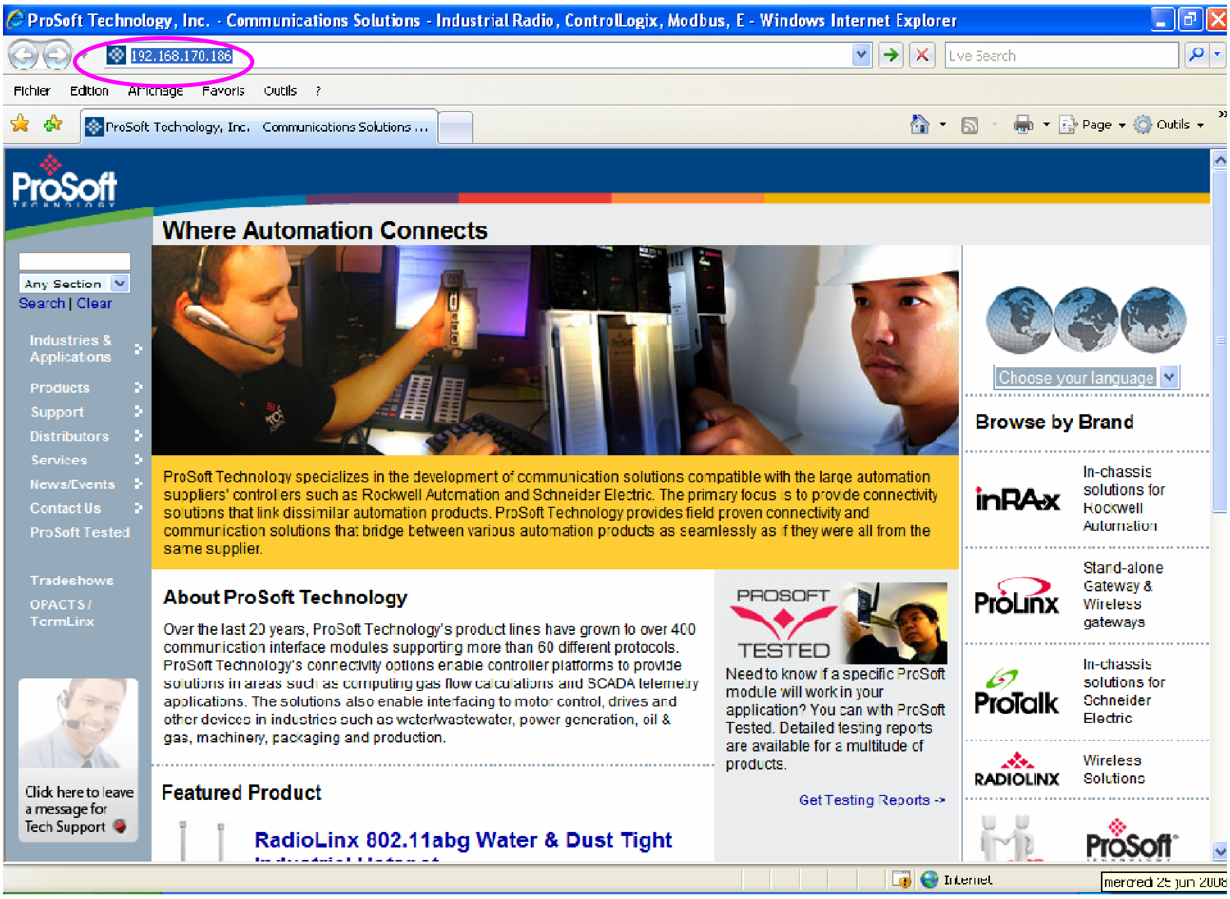
Modbus — Automatique
Réseau sans fil non sécurisé

Gestion du réseau
Actualiser la liste des réseaux
Configurer un réseau sans fil pour la maison ou une petite entreprise
Tâches apparentées
En savoir plus à propos des réseaux sans fil
Modifier l'ordre des réseaux préférés
Modifier les paramètres avancés
Connecter

- Choose the **Modbus** network. This is the Network SSID you setup previously within the RLX-IHW-E Remote/Repeater mode.

Now you will be able to monitoring the radio with internet explorer via wireless network:

- Open internet explorer.
- Enter the IP address of the RLX-IHW-E you want to access into the navigation bar.



Where Automation Connects

ProSoft Technology specializes in the development of communication solutions compatible with the large automation suppliers' controllers such as Rockwell Automation and Schneider Electric. The primary focus is to provide connectivity solutions that link dissimilar automation products. ProSoft Technology provides field proven connectivity and communication solutions that bridge between various automation products as seamlessly as if they were all from the same supplier.

About ProSoft Technology

Over the last 20 years, ProSoft Technology's product lines have grown to over 400 communication interface modules supporting more than 60 different protocols. ProSoft Technology's connectivity options enable controller platforms to provide solutions in areas such as computing gas flow calculations and SCADA telemetry applications. The solutions also enable interfacing to motor control, drives and other devices in industries such as water/wastewater, power generation, oil & gas, machinery, packaging and production.

PROSOFT TESTED

Need to know if a specific ProSoft module will work in your application? You can with ProSoft Tested. Detailed testing reports are available for a multitude of products.

Get Testing Reports ->

Featured Product

RadioLinx 802.11abg Water & Dust Tight Industrial Hotspot

Browse by Brand

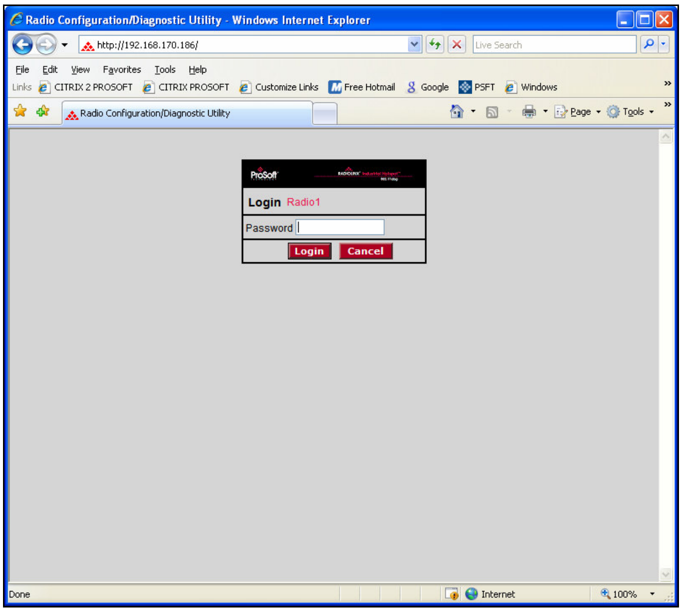
inRAx — In-chassis solutions for Rockwell Automation

ProLinx — Stand-alone Gateway & Wireless gateways

ProTalk — In-chassis solutions for Schneider Electric

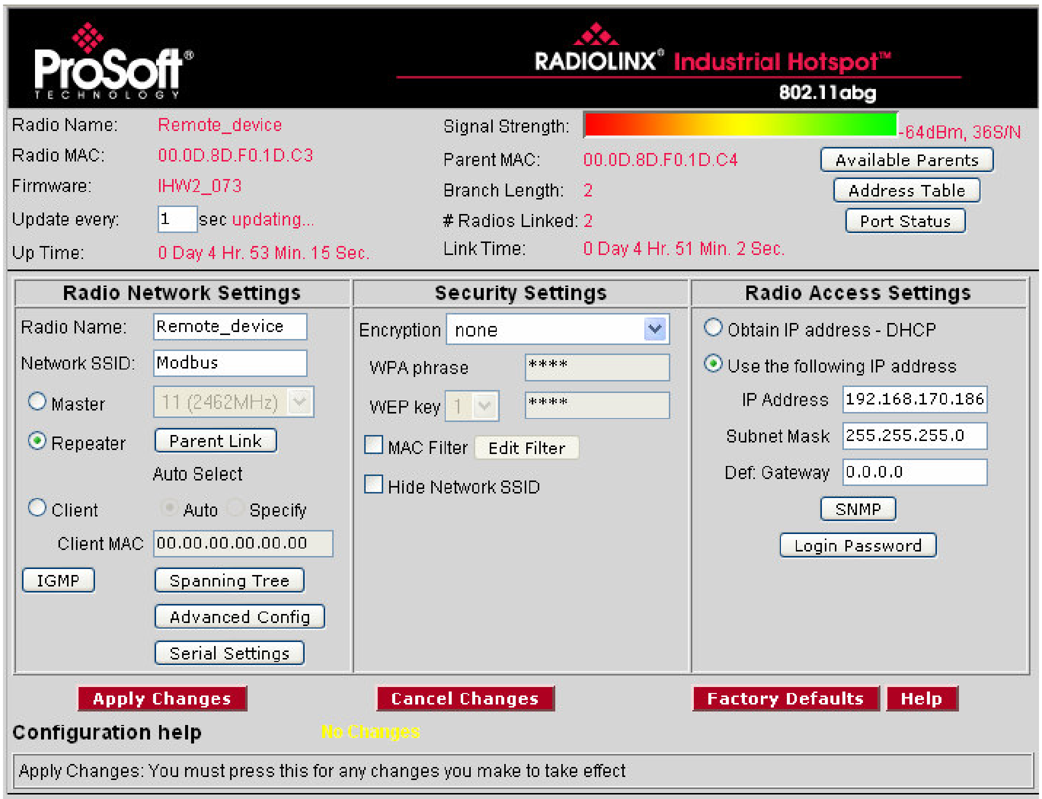
RADIOLINX — Wireless Solutions

- The following window is displayed.



Enter your password to log in to the radio and then press **Login**.

The following window is displayed:



ProSoft TECHNOLOGY — RADIOLINX® Industrial Hotspot™ 802.11abg

Radio Name: Remote_device
Radio MAC: 00.0D.8D.F0.1D.C3
Firmware: IHW2_073
Update every: 1 sec updating...
Up Time: 0 Day 4 Hr. 53 Min. 15 Sec.

Signal Strength: -64dBm, 36S/N
Parent MAC: 00.0D.8D.F0.1D.C4
Branch Length: 2
Radios Linked: 2
Link Time: 0 Day 4 Hr. 51 Min. 2 Sec.

Radio Network Settings
Radio Name: Remote_device
Network SSID: Modbus
○ Master 11 (2462MHz)
● Repeater
Auto Select
○ Client ○ Auto ○ Specify
Client MAC 00.00.00.00.00.00

Security Settings
Encryption none
WPA phrase ****
WEP key 1 ****
□ MAC Filter
□ Hide Network SSID

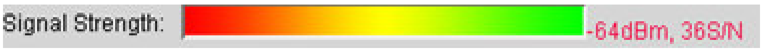
Radio Access Settings
○ Obtain IP address - DHCP
● Use the following IP address
IP Address 192.168.170.186
Subnet Mask 255.255.255.0
Def. Gateway 0.0.0.0

Configuration help No Changes
Apply Changes: You must press this for any changes you make to take effect

- Signal quality:

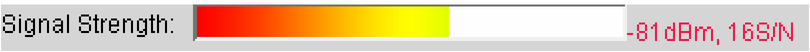
  Signal Strength shows you the quality of the signal between the RLX-IHW-E Master mode and RLX-IHW-E Remote/Repeater mode radios.

  Good Signal



Signal Strength: -64dBm, 36S/N

  Poor Signal



Signal Strength: -81dBm, 16S/N

Note:

Signal quality depending of:

- Distance between the antennas.
- Free line of sight.
- Antennas correctly mounted.

To have further information about RLX-IHW-E please, download the User Manual from:

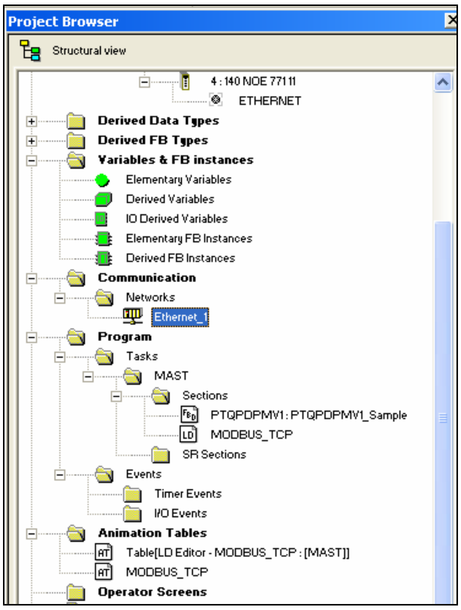
http://www.prosoft-technology.com/content/download/12698/165429/file

C. Setting of the Modbus TCP Client device.

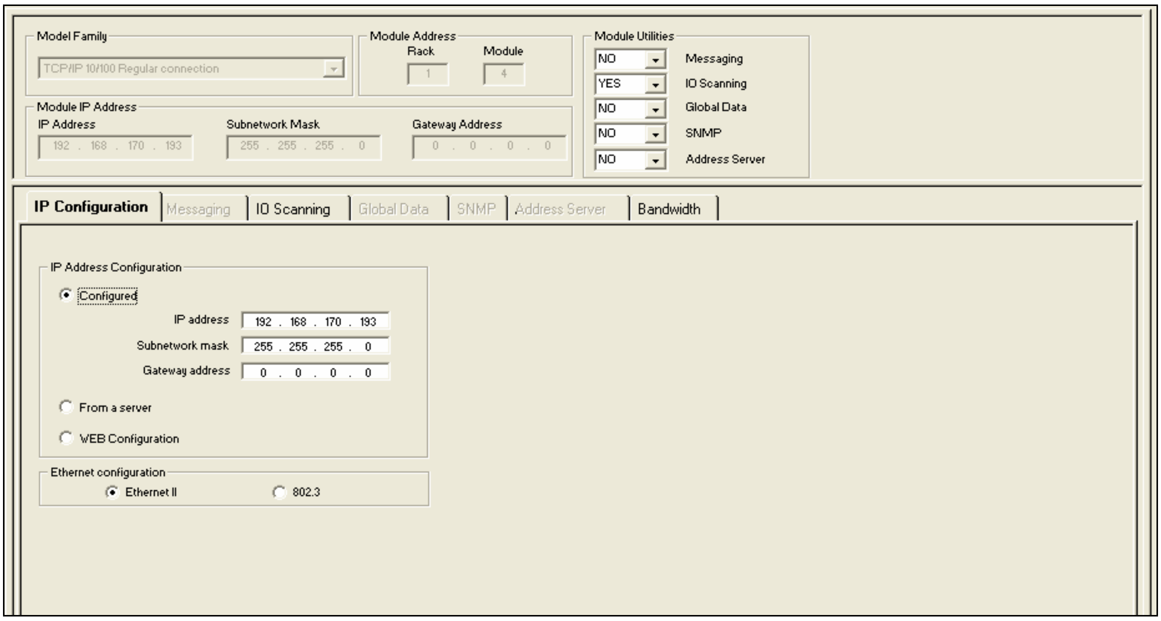
C.1. Launch Unity Pro XL

For this application we use a CPU 31110 and Ethernet Card NOE77111.

- After creating your material configuration select in the project browser ETHERNET_1:



- In the displayed screen, enters the IP Address of the NOE77111 Card in the project browser:



Model Family: TCP/IP 10/100 Regular connection

Module Address: Rack 1, Module 4

Module Utilities:

NO	Messaging
YES	IO Scanning
NO	Global Data
NO	SNMP
NO	Address Server

Module IP Address: IP Address 192 . 168 . 170 . 193, Subnetwork Mask 255 . 255 . 255 . 0, Gateway Address 0 . 0 . 0 . 0

IP Address Configuration

● Configured

IP address 192 . 168 . 170 . 193

Subnetwork mask 255 . 255 . 255 . 0

Gateway address 0 . 0 . 0 . 0

○ From a server

○ WEB Configuration

Ethernet configuration

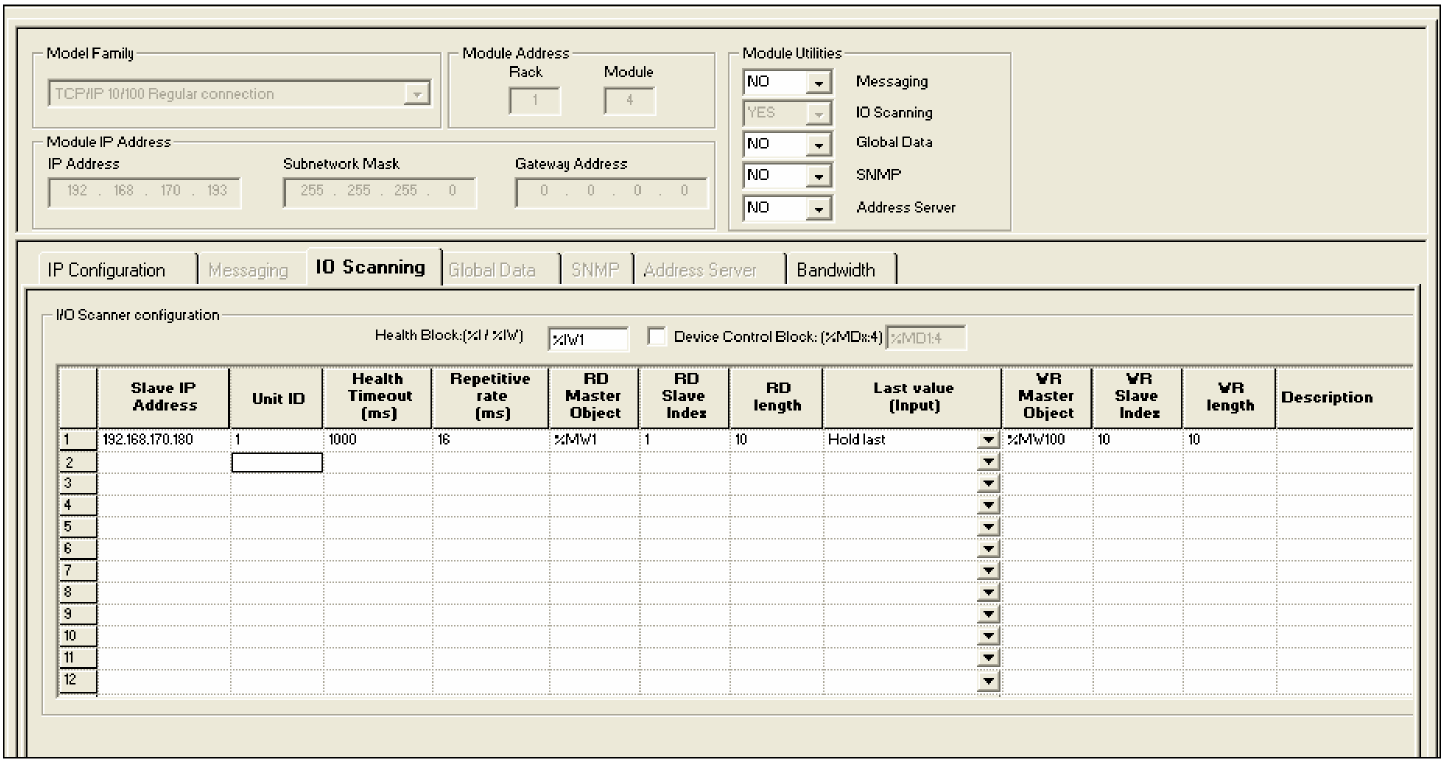
● Ethernet II ○ 802.3

Note:

- The IP address of NOE77111, Radio RLX-IHW and laptop must be at the same IP range and depending of your Subnet mask.

C.2. IO Scanning setting:

- Select IO Scanning tab



Model Family: TCP/IP 10/100 Regular connection

Module Address: Rack 1, Module 4

Module Utilities: NO Messaging; YES IO Scanning; NO Global Data; NO SNMP; NO Address Server

Module IP Address: IP Address 192 . 168 . 170 . 193; Subnetwork Mask 255 . 255 . 255 . 0; Gateway Address 0 . 0 . 0 . 0

I/O Scanner configuration

Health Block:(%I / %IW) %IW1 ☐ Device Control Block: (%MD::4) %MD1:4

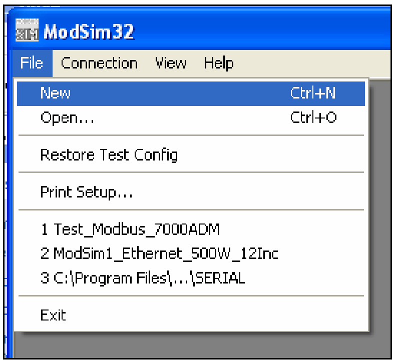
	Slave IP Address	Unit ID	Health Timeout (ms)	Repetitive rate (ms)	RD Master Object	RD Slave Index	RD length	Last value (Input)	WR Master Object	WR Slave Index	WR length	Description
1	192.168.170.180	1	1000	16	%MW1	1	10	Hold last	%MW100	10	10	
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

- **Server IP Address:** Address IP of your Laptop (192.168.170.180).
- **Unit ID:** Modbus Address of the server (1).
- **Timeout (ms):** need to be set a 1 sec (1000).
- **RD Master Objet:** Master Address where the data read are stocked (%MW1).
- **RD Slave Index:** Offset for the first data read in slave (1).
- **RD length:** Number of data read (10).
- **WR Master Objet:** Master Address where write data reads are stocked (%MW100).
- **WR Slave Index:** Offset for the first data read in slave (10).
- **WR length:** Number of data read (10).

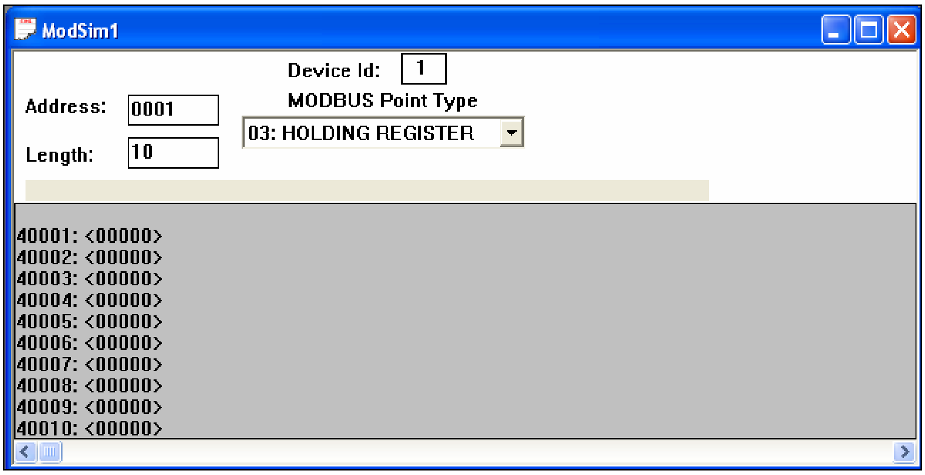
D. Setting of the Modbus TCP Server device.

Modsim32:

- Launch Modsim32.
- Create a new File.



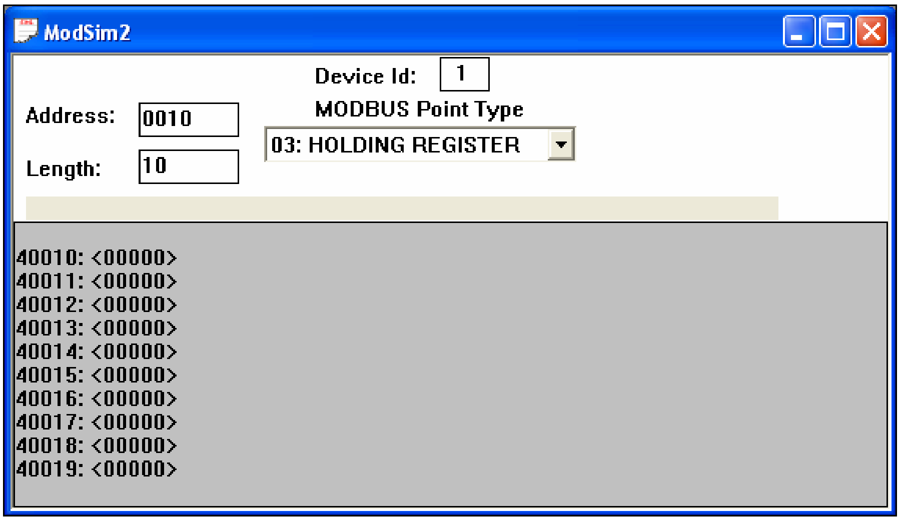
- Select the data Read area.



Device Id: 1
Address: 0001
MODBUS Point Type
03: HOLDING REGISTER
Length: 10

```
40001: <00000>
40002: <00000>
40003: <00000>
40004: <00000>
40005: <00000>
40006: <00000>
40007: <00000>
40008: <00000>
40009: <00000>
40010: <00000>
```

- Create a new File and select data write area.



ModSim2

Device Id: 1

MODBUS Point Type

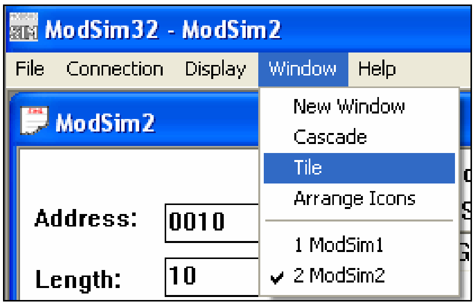
Address: 0010

03: HOLDING REGISTER

Length: 10

```
40010: <00000>
40011: <00000>
40012: <00000>
40013: <00000>
40014: <00000>
40015: <00000>
40016: <00000>
40017: <00000>
40018: <00000>
40019: <00000>
```

- Select Tile in Window menu.

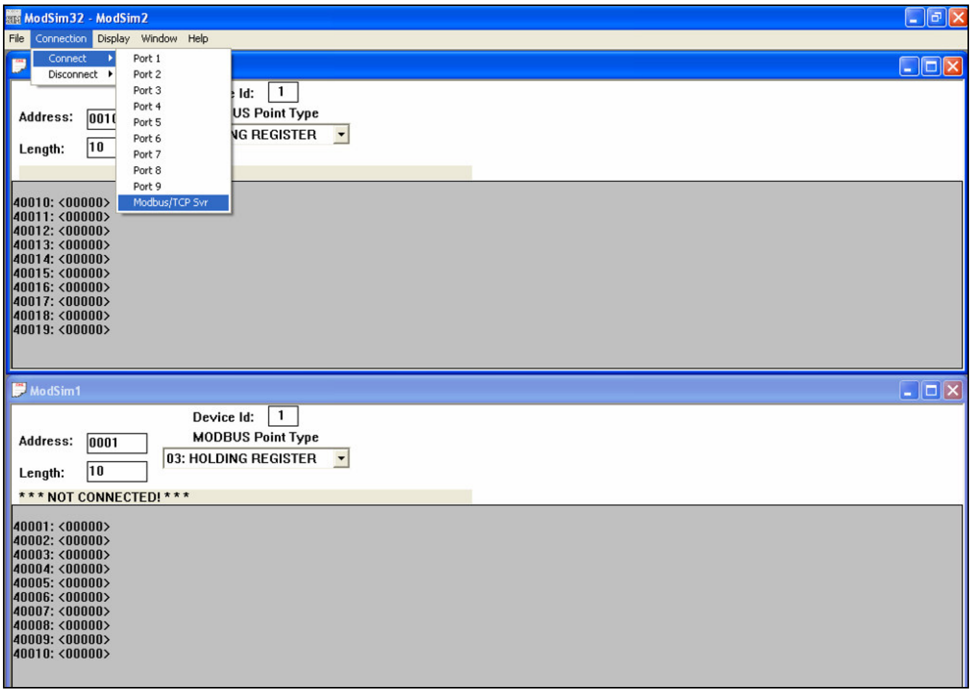


ModSim32 - ModSim2

Address: 0010

Length: 10

- Connect Modsim32 on Modbus TCP as shown below.



Id: 1
US Point Type
NG REGISTER

Address: 001(
Length: 10

```
40010: <00000>
40011: <00000>
40012: <00000>
40013: <00000>
40014: <00000>
40015: <00000>
40016: <00000>
40017: <00000>
40018: <00000>
40019: <00000>
```

ModSim1

Device Id: 1
MODBUS Point Type
03: HOLDING REGISTER

Address: 0001
Length: 10

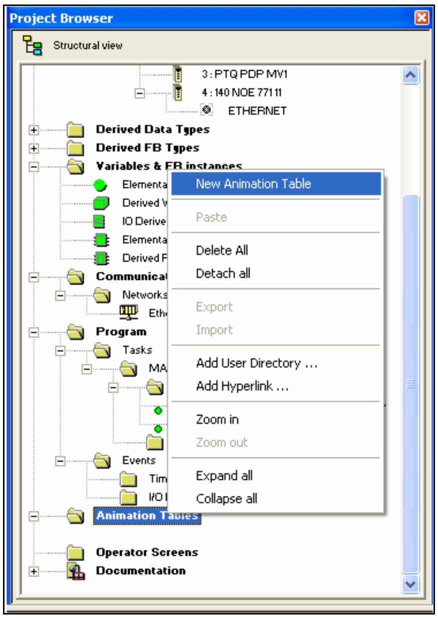
*** NOT CONNECTED! ***

```
40001: <00000>
40002: <00000>
40003: <00000>
40004: <00000>
40005: <00000>
40006: <00000>
40007: <00000>
40008: <00000>
40009: <00000>
40010: <00000>
```

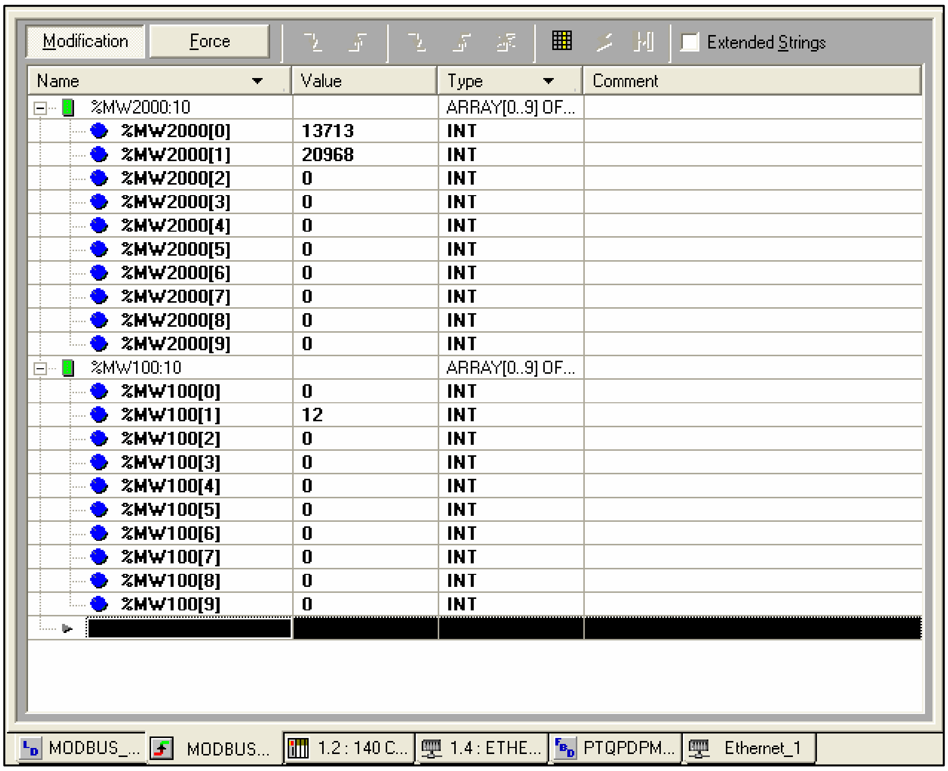
E. Communication checking

Now the communication between the Client and the server is established.

- Create a new Modbus TCP animation table:



❖ The data mapping of the animation table must be the same that the area memory selected in IO Scanning.



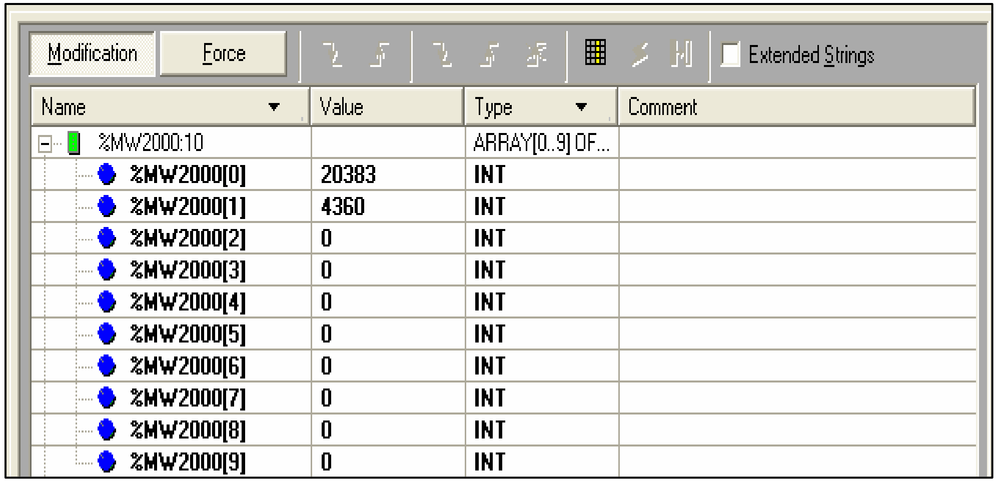
Name	Value	Type	Comment
%MW2000:10		ARRAY[0..9] OF...	
%MW2000[0]	13713	INT	
%MW2000[1]	20968	INT	
%MW2000[2]	0	INT	
%MW2000[3]	0	INT	
%MW2000[4]	0	INT	
%MW2000[5]	0	INT	
%MW2000[6]	0	INT	
%MW2000[7]	0	INT	
%MW2000[8]	0	INT	
%MW2000[9]	0	INT	
%MW100:10		ARRAY[0..9] OF...	
%MW100[0]	0	INT	
%MW100[1]	12	INT	
%MW100[2]	0	INT	
%MW100[3]	0	INT	
%MW100[4]	0	INT	
%MW100[5]	0	INT	
%MW100[6]	0	INT	
%MW100[7]	0	INT	
%MW100[8]	0	INT	
%MW100[9]	0	INT	

- Communication testing Reading data

The value of data which is changing in Modsim32 is updating in the Client PLC's memory.

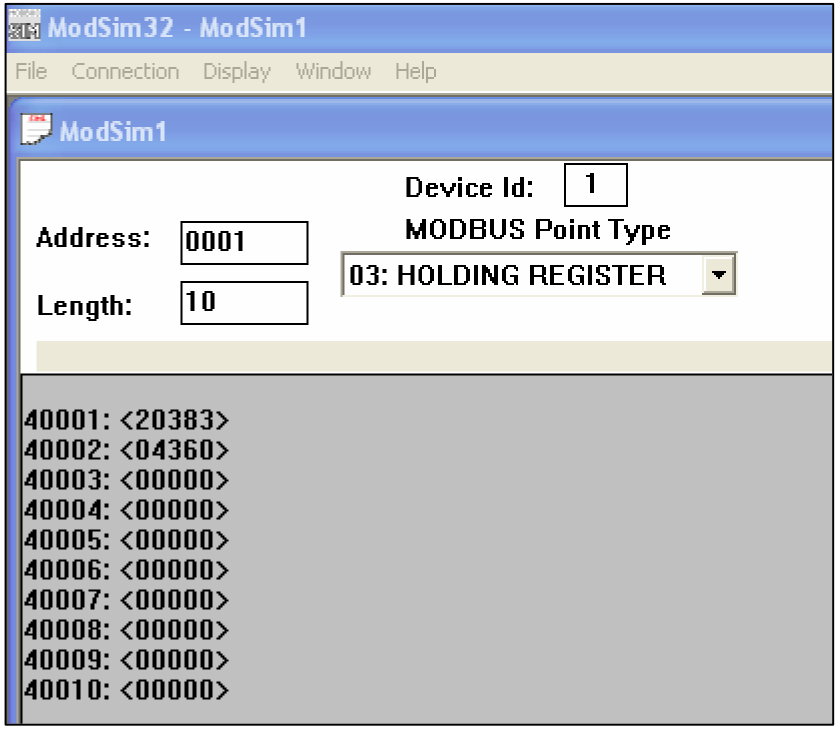
Client Memory **Server Memory**

-



Name	Value	Type	Comment
%MW2000:10		ARRAY[0..9] OF...	
%MW2000[0]	20383	INT	
%MW2000[1]	4360	INT	
%MW2000[2]	0	INT	
%MW2000[3]	0	INT	
%MW2000[4]	0	INT	
%MW2000[5]	0	INT	
%MW2000[6]	0	INT	
%MW2000[7]	0	INT	
%MW2000[8]	0	INT	
%MW2000[9]	0	INT	

DATA READ



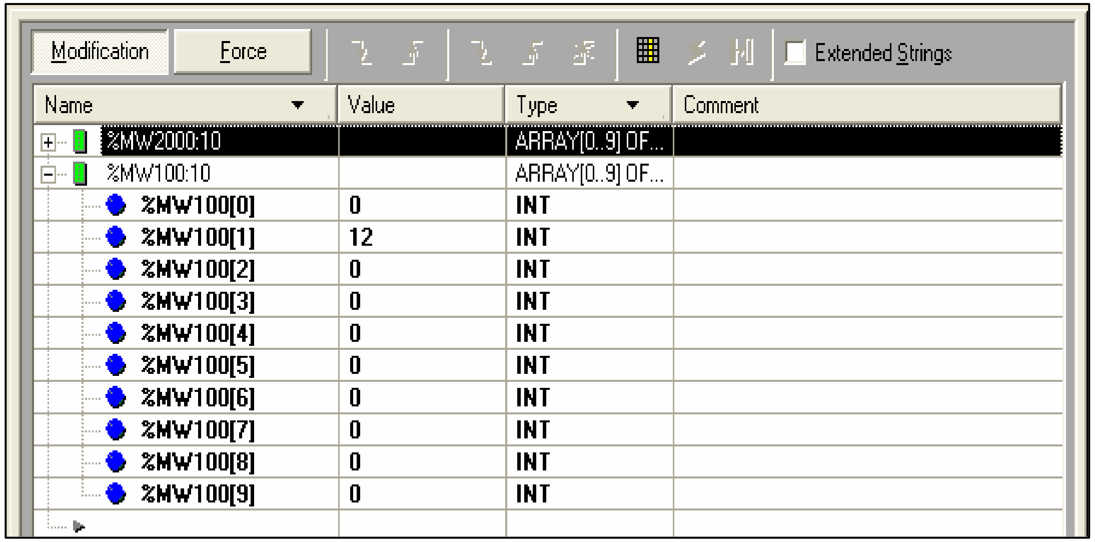
Device Id: 1
MODBUS Point Type: 03: HOLDING REGISTER
Address: 0001
Length: 10

```
40001: <20383>
40002: <04360>
40003: <00000>
40004: <00000>
40005: <00000>
40006: <00000>
40007: <00000>
40008: <00000>
40009: <00000>
40010: <00000>
```

Communication testing Writing of data
The data value into the client PLC's memory is written into server's memory.

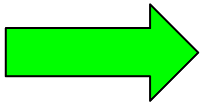
Client Memory

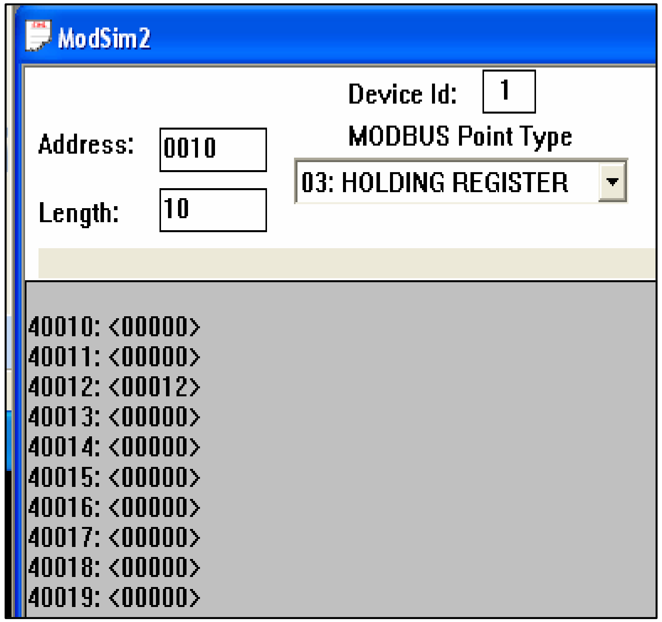
Server Memory



Name	Value	Type	Comment
⊞ %MW2000:10		ARRAY[0..9] OF...	
⊟ %MW100:10		ARRAY[0..9] OF...	
%MW100[0]	0	INT	
%MW100[1]	12	INT	
%MW100[2]	0	INT	
%MW100[3]	0	INT	
%MW100[4]	0	INT	
%MW100[5]	0	INT	
%MW100[6]	0	INT	
%MW100[7]	0	INT	
%MW100[8]	0	INT	
%MW100[9]	0	INT	

DATA WRITE





Device Id: 1

Address: 0010

Length: 10

MODBUS Point Type: 03: HOLDING REGISTER

```
40010: <00000>
40011: <00000>
40012: <00012>
40013: <00000>
40014: <00000>
40015: <00000>
40016: <00000>
40017: <00000>
40018: <00000>
40019: <00000>
```

F. Contact details

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