logic IO
The M2M Enabler

Technical Manual for the WLAN-100 and ETH-100 add-on module

Version 2.13

WLAN-100

ETH-100

Introduction

The WLAN-100 / ETH-100 add-on module for RTCU X32 units allows connection to the RTCU Gateway Professional or almost any TCP/IP socket enabled device through either a standard LAN or through an increasing number of Wi-Fi hot-spots globally available. Using (W)LAN in many cases means that large amount of data can be transferred for FREE or at a very low cost.
The WLAN-100 / ETH-100 supplement GPRS and both communication methods can be used selectable under full control of the VPL application.

The WLAN-100 / ETH-100 products extend the RTCU X32 units with capability to establish a connection via wireless LAN or cable LAN to the RTCU GPRS Gateway.
New applications which incorporate either WLAN-100 or ETH-100 can reduce the costs of communication considerable, or in many cases to nothing!

The WLAN-100 / ETH-100 products will suit perfect in applications such as:

- ➢ Factory automation and control
- ➢ HVAC applications
- ➢ SCADA application
- ➢ Remote measuring, monitoring and control
- ➢ Security and alarm systems
- ➢ Vending and Ticketing
- ➢ General M2M applications.

The actual application for controlling the WLAN-100 or ETH-100 is implemented in the RTCU X32 units using easy-to-use high-level VPL functions. Please consult the RTCU-IDE for more information

Installing the modules on-site is easily done as it comes with an interface cable and an ethernet cable or antenna.
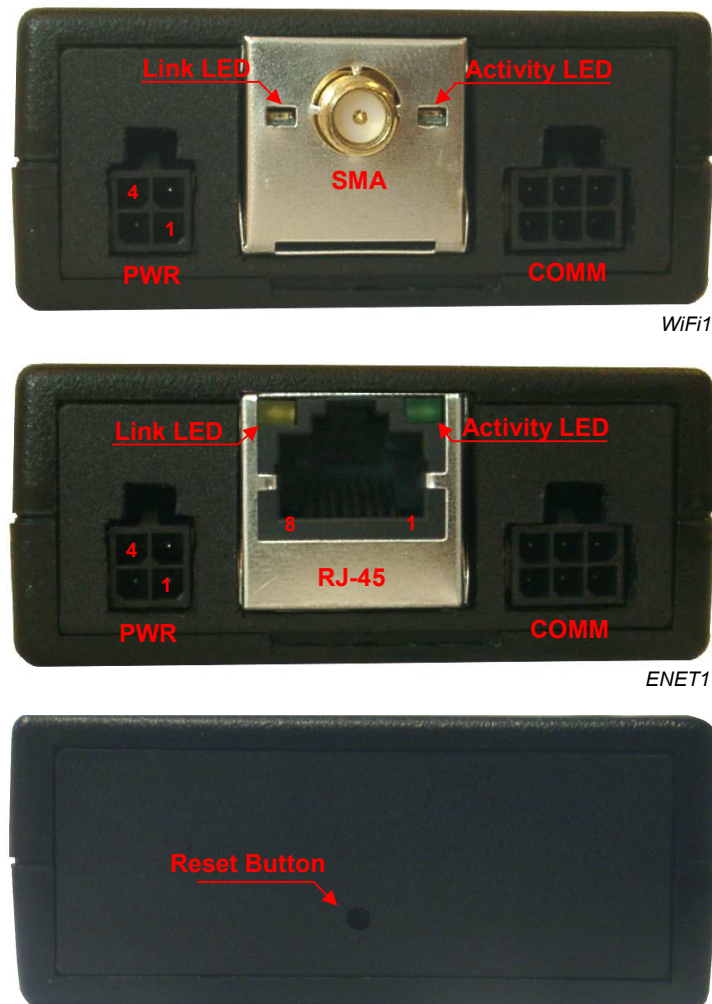
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Graphical view

External connections

Overview
Below is a detailed graphical overview of the two modules external connections, followed by a detailed description of each of the connectors.

WiFi1

ENET1

PWR connector
The WLAN-100 and ETH-100 must be supplied between 8...36VDC from an external DC power source connected to the PWR connector. (A standard MX2 PWR cable can be used)

- Positive power is applied to pin 1.
- Ground is applied to pin 4.

The modules are protected against wrong polarity. However if the module is polarized wrong while the connected RTCU X32 unit is correct polarized, and power is applied, the internal GND connection will be broken. It is therefore recommended to install a fuse on the positive supply for protection.

COMM connector
This connector interfaces to serial port 1 on the RTCU X32 unit using the cable supplied with the module.

Ethernet / WiFi interface
Connection to the ethernet cannot be easier.

The WLAN-100 module needs no wired ethernet network nearby. Simply screw on the supplied antenna on the SMA connector, and make sure that a reachable WiFi access point is within range.

The ETH-100 module is connected with a standard ethernet cable to an existing wired network. The module has an 8-way RJ-45 connector which meets the ISO8877 requirements for 10/100 BASE-T.

LED's
Two LED's are found on each module, these indicate serial activity (green) and link status (yellow). There is no difference on the Activity LED behavior on the two modules, the Link LED differs slightly in the pattern; see tables below for more information on this.

Activity LED (green)

Pattern	Description
Blinking	Serial data is received or transmitted.
Off	Serial channel is idle.

Link LED WLAN-100 (yellow)

Pattern	Description
On	Module is associated with an access point.
Blinking slow	Module is in ad hoc mode.
Blinking fast	Module is scanning for a network.

Link LED ETH-100 (yellow)

| Pattern	Description
On	A link has been detected.
Off	No link has been detected.

Reset Button

The module can be soft reset or reset to factory default by using this reset button.

Typical Application

This is a quick start guide to the WLAN-100/ETH-100 module, and is about how to setup and connect the module to RTCU X32 units and wireless network for first time use.
With either one of the modules it's easy to install on location. As the modules to MX2/DX4 and AX9 are delivered with different cables the following sections will describe how to connect the modules to the their respective RTCU X32 units.

Installation on MX2i/DX4

The WLAN-100/ETH-100 modules are delivered with the same communications cable. The communications cable needs to be connected to the 6-poled serial port 1 (service port) connector. An example of connection to MX2i is shown in the drawing below.
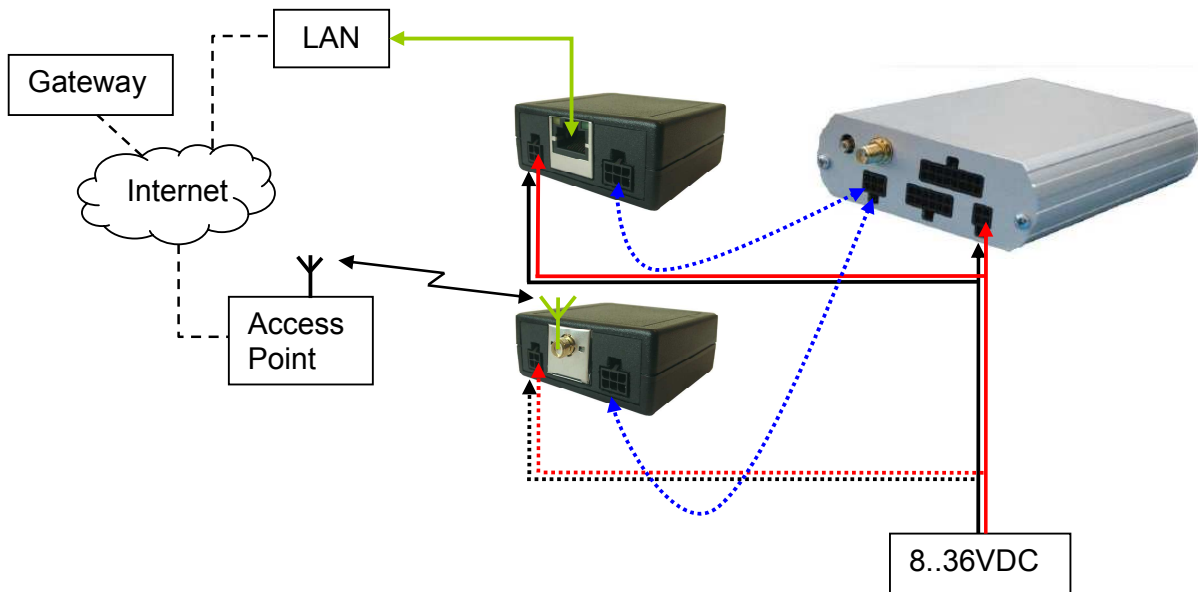

Note: Dotted line between MX2i PRO and WLAN-100 module indicates that only one module can be connected to an MX2i PRO.

1. Connect the antenna or an ethernet cable to the module.

2. Connect the module to the Serial Port1 of the MX2i/DX4 with the supplied interface cable.

3. Connect the power supply to the power connector. The modules requires 8..36VDC. The black wire is (**-**) and the red wire is (**+**). Note that the MX2/DX4 switches the module on and off. The module won't power on unless the MX2/DX4 is powered on and the application enables the module with an ethOpen() function call.

Installation on AX9

As there isn't attached a 6-poled tyco connector on the cable delivered with WLAN-100/ETH-100, 5 color coded cables need to be connected to the AX9 manually. Cables are color coded, and these colors will be used in the following description:
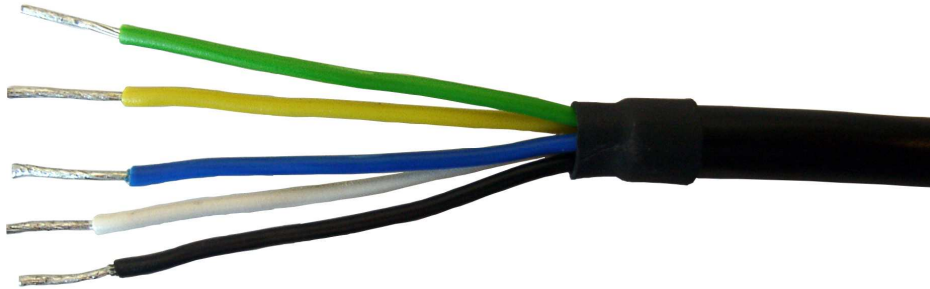
As seen on the above picture, there are 5 signals to be connected to the AX9 Pro. The cable colors and the signal names on the AX9 Pro are given in the following table:

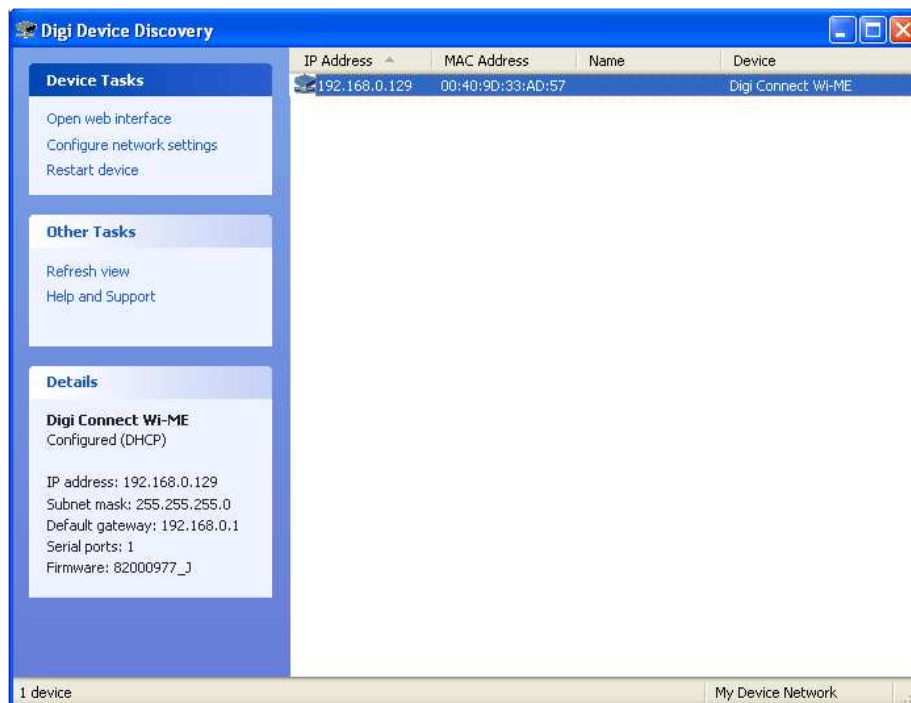| Color	Signal Name
Black	SGND
Green	SER1_TXD
Yellow	SER1_RXD
White	DEV_DET
Blue	DCOUT33

1. Connect the antenna or an ethernet cable to the module.
2. Connect the 5 colored cables to their respective labeled angled screw terminals as mentioned in the table in the previous page. Please refer to AX9 Pro Technical Manual to locate the terminals.
3. Connect the power supply to the power connector. The modules requires 8..36VDC. The black wire is (**-**) and the red wire is (**+**). Note that the AX9 switches the module on and off. The module won't power on unless the AX9 is powered on and the application enables the module with an ethOpen() function call.

Changing Settings

As default the modules uses DHCP to acquire an IP address, but can be setup to use a static IP address. And the security settings can be changed.
This is done in the "Discover Tool" which can be downloaded from the Logic IO web-page.
Below is a step-by-step guide to do this.

1. Make a simple application which includes the function ethOpen() in order to power up the module.

2. Wait for the module to connect to a network, the Link LED (yellow) will be permanent on when connected.
   - **WLAN-100 Note**: Make sure that the wireless network is unsecured, the modules Link LED will blink until connected to a wireless network. The module will connect to the SSID "Connect". If it cannot find the SSID it will search and connect to the unsecured network with highest signal level that it finds.

3. Use the Discover Tool to get the IP address for the module. The PC, which is running the Discover Tool, must be connected to the same LAN as the module is connected, in order to detect the module.

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4. Enter the Web Configuration and Management Interface by typing the IP address in a web browser on your PC (i.e. http://192.168.0.102). Or click "Open web interface" to the left. And the following web interface will show.
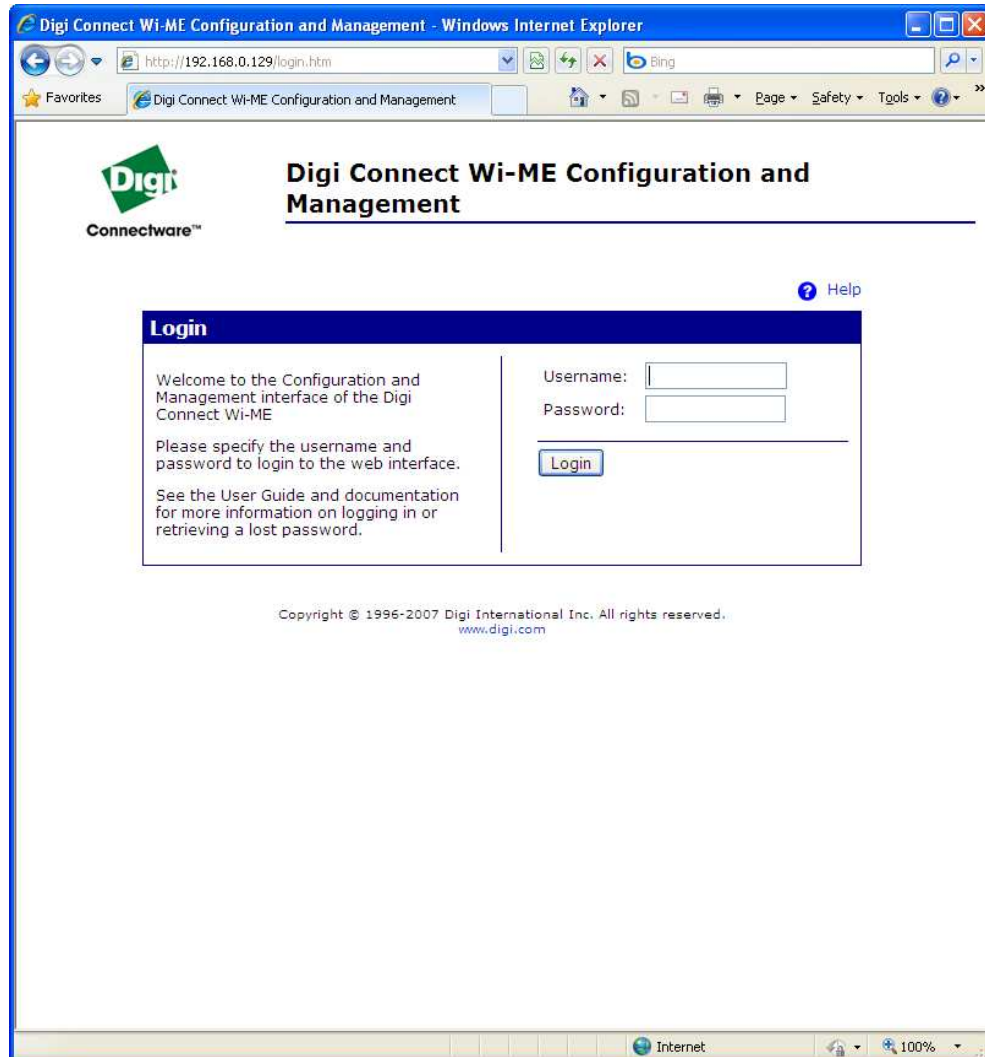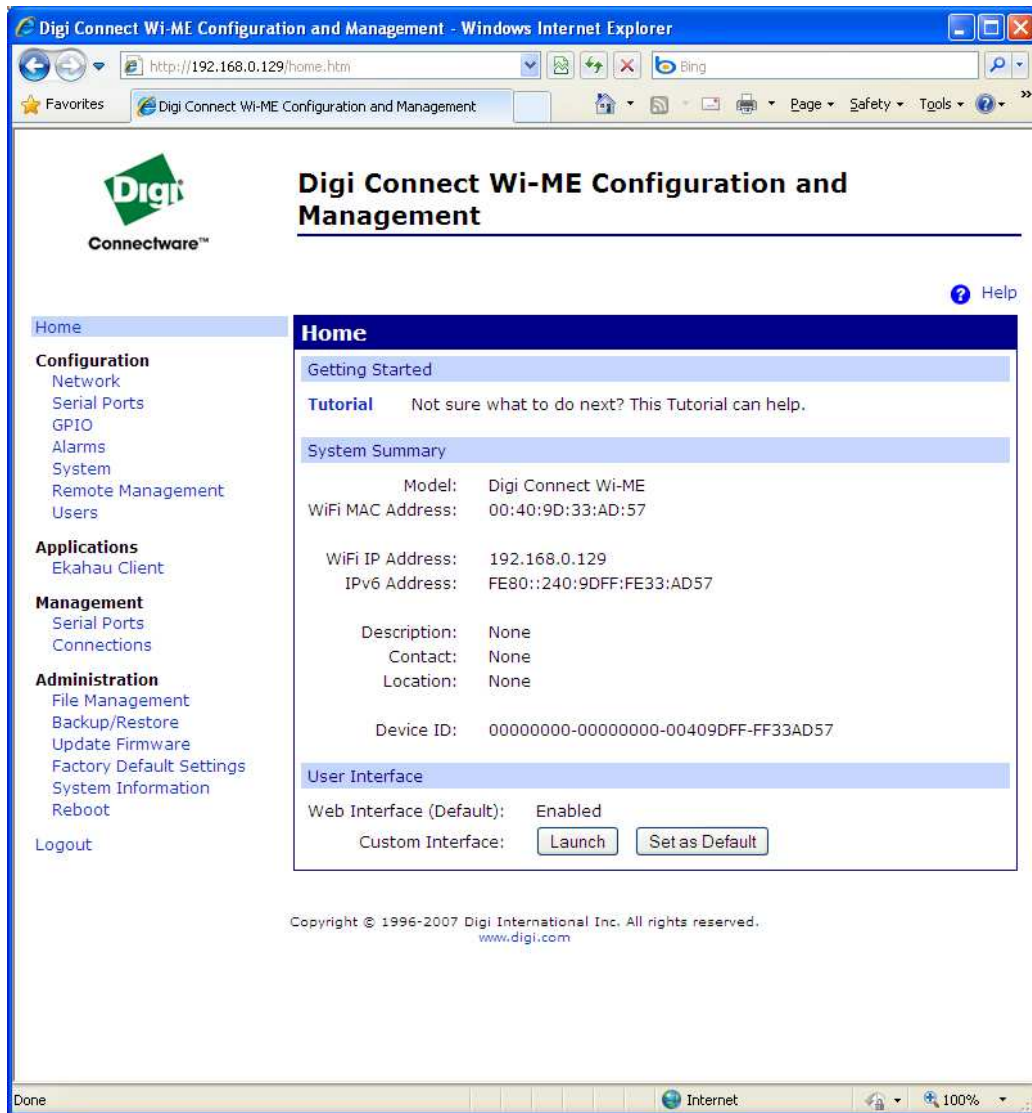

5. Login with the default username and password, which is:

Username : root
Password : dbps

Please Note: In the earlier Eth100/WLAN100 module firmwares the login screen won't appear.

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The following web page will be shown:

6. Make the necessary security and network changes.
   - Network tab: IP Settings, Wireless LAN Settings, Wireless Security Settings.
   - Security tab.
   - System tab: System settings.

7. The configuration is now finished.

8. Security parameters on the access point can now safely be restored, if a WLAN-100 module was configured.

Restoring Device Configuration To Factory Defaults

It is possible to restore the factory settings if the device doesn't response after unsuccessfully changes of the configuration. The following step-by-step guide describes how to restore factory defaults:

1. Power off the WLAN-100 / ETH-100 by unplugging the power cable
2. Use a non-conducive, small diameter tool (such as wood or plastic) with a blunt end to press gently and hold down the reset button placed at the opposite end of the connectors. The following figure helps you locate the reset button.

3. While holding the reset button, power up the module.
4. Hold the button for 20 seconds and then release it.

The default configuration is restored. When the restoration is complete, the module flashes a code on the Link LED (1-5-1).

Please note, that restoring the module to its factory default settings will clear all current configuration settings. That means, that the module must be configured, or else the RTCU unit will be unable to communicate with the module. The following section explains how to configure the module after a reset.
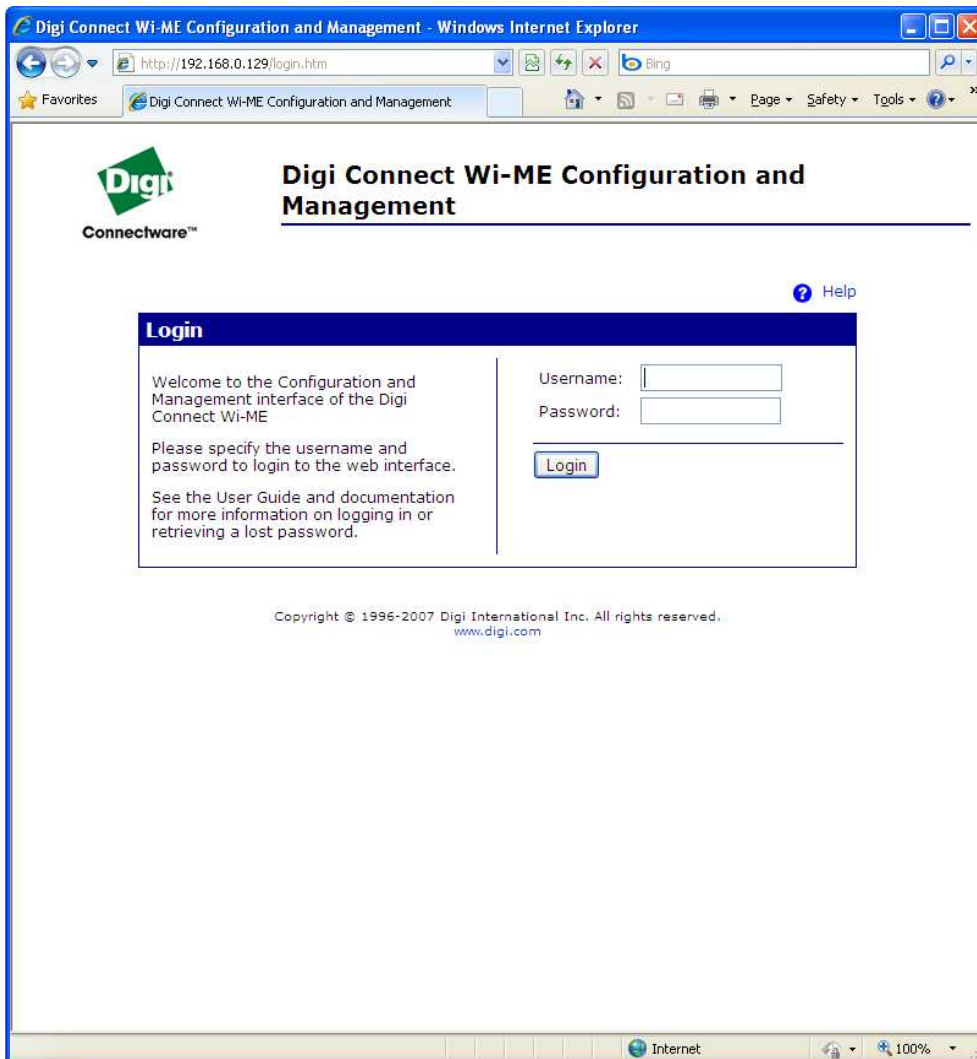
Configuring the Module After Reset

The module has to be configured after a reset to factory settings as following:

1. Start the Digi Device Discovery Tool and click on "Refresh view" on the "Other Tasks" panel until the information about the module appears on the right panel
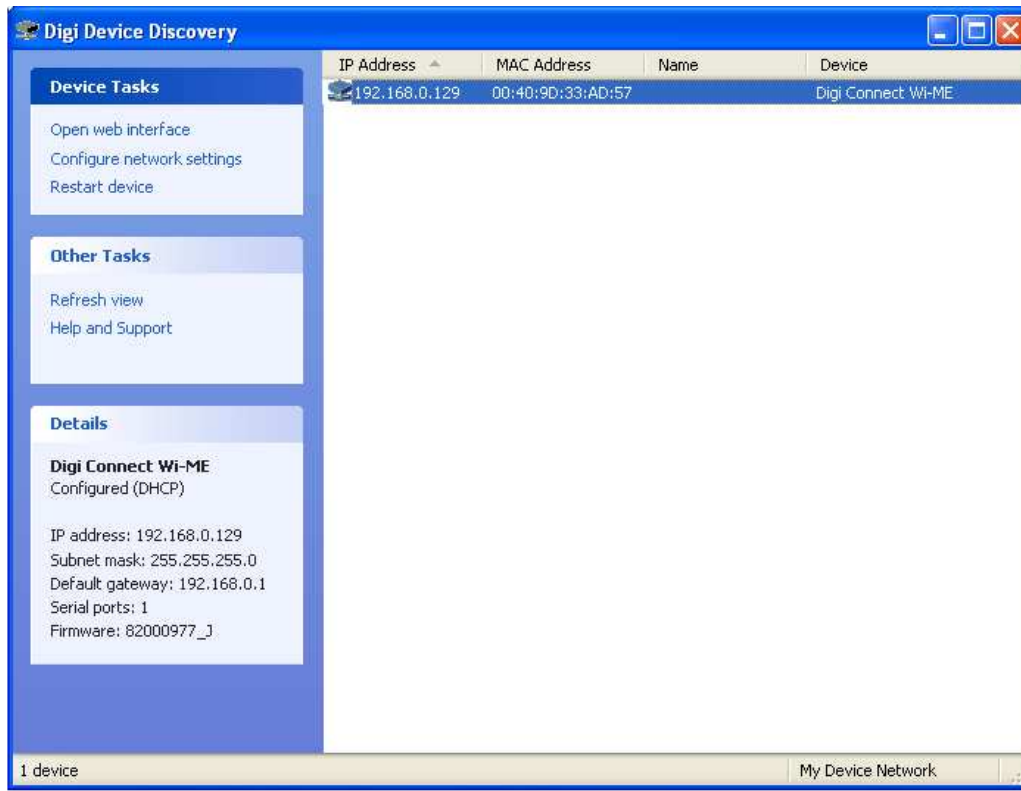
2. Click on the "Open web interface" on the "Device Tasks" panel. A web browser will open as in the following figure.

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Login with the default username **root** and password **dbps**

Please Note: In the earlier Eth100/WLAN100 module firmwares the login screen won't appear.

3. Click on the "Serial port" in configuration menu.

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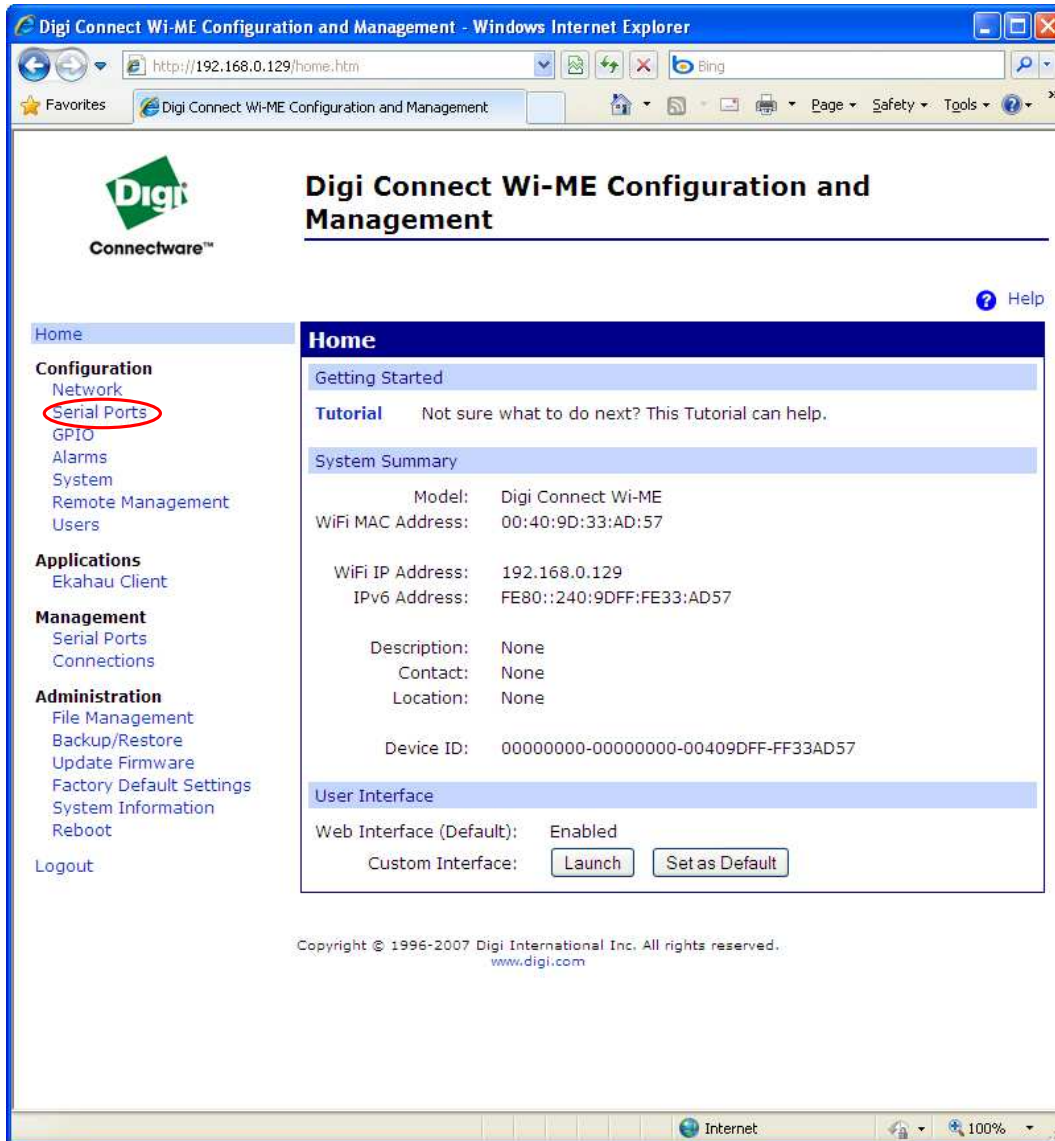
4. Click on the Port 1 on the following screen
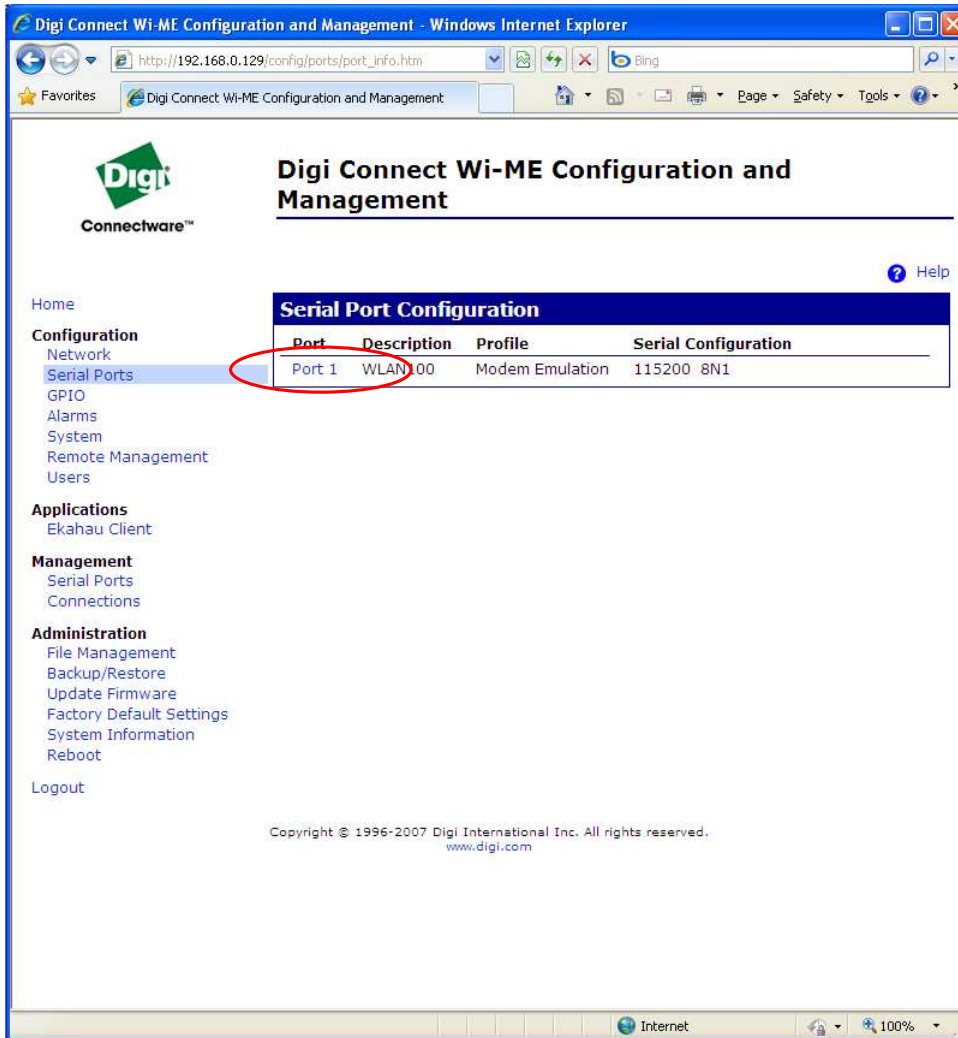
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Please Note: In the earlier Eth100/WLAN100 module firmwares this screen won't appear.
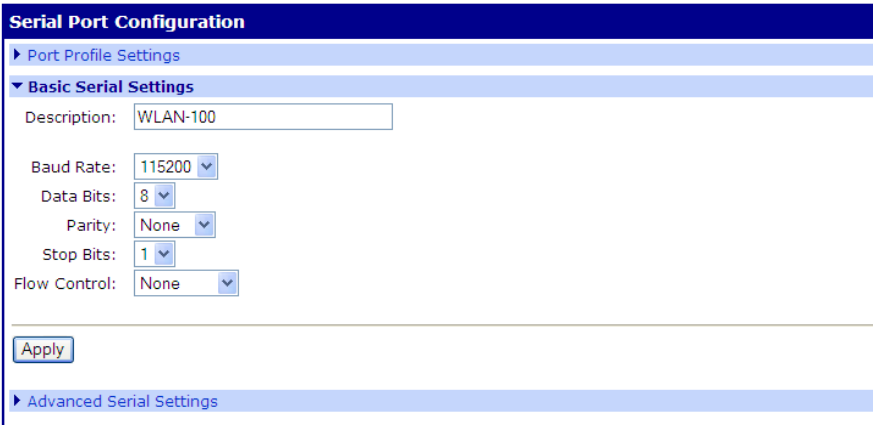
5. Choose "Modem Emulation" as serial port profile, then apply

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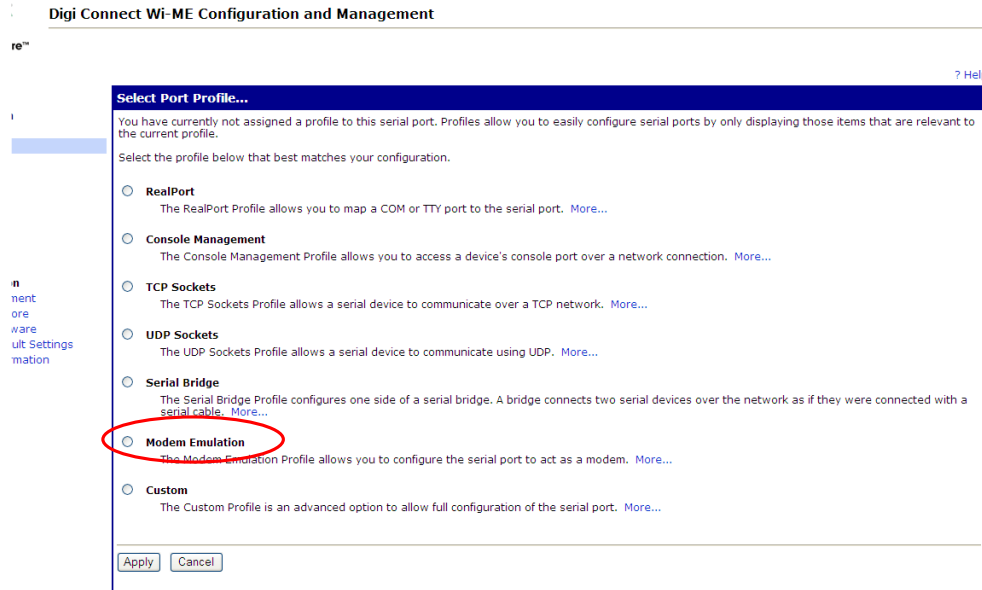
6. Click on "Basic Serial Settings" and fill in the form as illustrated in the next figure, and apply. Note that "Description" is optional and may be changed.

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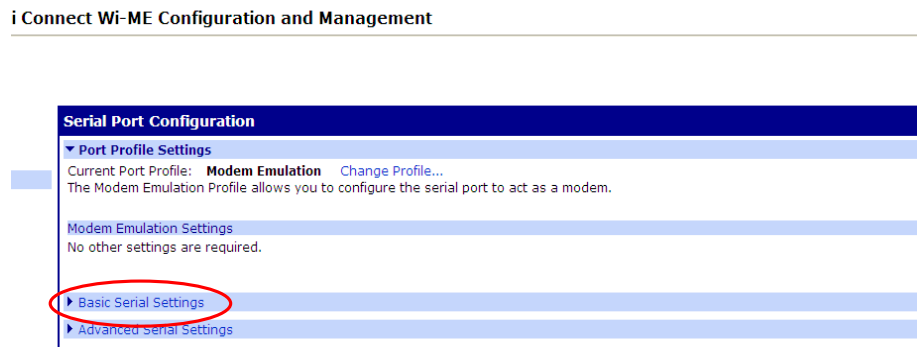
gi Connect Wi-ME Configuration and Management

Serial Port Configuration
▶ Port Profile Settings
▼ Basic Serial Settings

Description: WLAN-100

Baud Rate: 115200
Data Bits: 8
Parity: None
Stop Bits: 1
Flow Control: None

[Apply]

▶ Advanced Serial Settings

7. Configuration is done. The module is ready to use.

Specifications for the WLAN-100 / ETH-100

Power supply	Min	Typ	Max		
Operating Voltage	8	-	36	VDC	Protected against wrong polarity.
WLAN-100 Unit OFF Unit Active, No Link Unit Active, Link established **ETH-100** Unit OFF Unit Active, No Link Unit Active Link established		< 1 90 120 < 1 75 85	 150 110	mA mA mA mA mA mA	*All measurements @ 12 VDC Supply.*
Storage temperature	-40	-	+90	℃	External interfaces:
Operating temperature	-25	-	+60	℃	• TYCO 'Mate'n'Lock' connector for power and MX2i PRO interface.
Weight	60 *(WLAN-100)* 50 *(ETH-100)*			g	• SMA-Female connector for WLAN antenna • RJ-45 connector for LAN. All interfaces are externally accessible.
External dimensions	W 61 x H 26 x D 57 mm				without SMA

Specifications for the ETH-100:
- Standard: IEEE 802.3
- Physical Layer: 10/100Base-T
- Data Rate: 10/100Mbps
- Mode: Half-duplex and full duplex support (auto-sensing)
- Connector: RJ-45
- Web-based configuration supported

Specifications for the WLAN-100:
- Standard: IEEE 802.11b
- Frequency: 2.4GHz
- Data Rate: Up to 11Mbps with automatic fallback
- Modulation: CCK, DQPSK, DBPSK
- Transmit Power: 16dBm typical
- Receive Sensitivity:
  - 1 Mbps: -92dBm
  - 2 Mbps: -89dBm
  - 5.5 Mbps: -87dBm
  - 11 Mbps: -82dBm
- Security: WEP,WPA,WPA2,802.11i
- Connector: SMA
- Web-based configuration supported