

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

Version 2.13







### 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.



## **Table of Contents**

Introduction	2
Table of Contents	3
Graphical view	4
External connections	5
Overview	5
PWR connector	5
COMM connector	6
Ethernet / WiFi interface	6
LED's	6
Reset Button	7
Typical Application	
Installation on MX2i/DX4	
Installation on AX9	8
Changing Settings	9
Restoring Device Configuration To Factory Defaults1	
Configuring the Module After Reset1	
Specifications for the WLAN-100 / ETH-1001	



## 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.



#### **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)

Page 5 of 20

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- 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.

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

### Activity LED (green)

#### Link LED WLAN-100 (vellow)

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.

Page 6 of 20



Link LED ETH-100 (y	vellow)
Pattern	Description
On	A link has been detected.
Off	No link has been detected.

## Reset Button

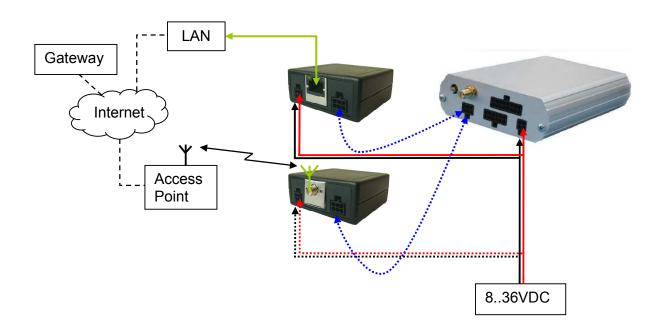
The module can be soft reset or reset to factory default by using this reset button.

## **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.

Page 7 of 20

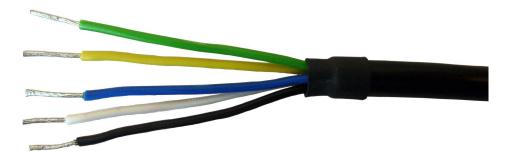
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- 1. Connect the antenna or an ethernet cable to the module.
- **2.** Connect the module to the Serial Port1 of the MX2i/DX4 with the supplied interface cable.
- **3.** Connect the power supply to the power connector. The modules requires 8..36VDC. 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	
Blue	DCOUT33

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

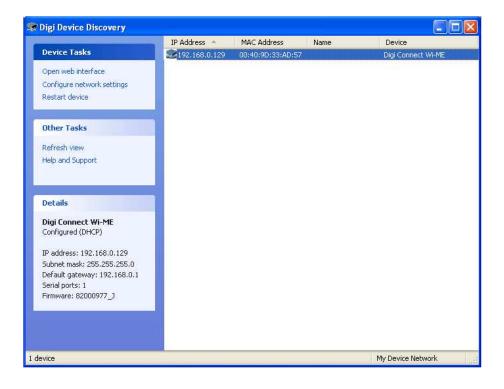


#### **Changing Settings**

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.



Page 9 of 20

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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. <u>http://192.168.0.102</u>). Or click "Open web interface" to the left. And the following web interface will show.

	E http://192.168.0.129/login.htm	💌 🗟 😽 🗙 🍉 Bing	2
Favorites	E Digi Connect Wi-ME Configuration and Management	🚵 🔹 🖾 👘 🖕 Bage + Safety +	Tools + 🔞 +
Co	Digi Connect W Management	/i-ME Configuration and	
	Login	Help	
	Welcome to the Configuration and Management interface of the Digi Connect Wi-ME Please specify the username and password to login to the web interface. See the User Guide and documentation	Username: Password: Login	
		iternational Inc. All rights reserved. .digi.com	

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.

Page 10 of 20



The following web page will be shown:

🔊 🗢 🖻 http://192.168.0.12	9/home.htm	8
Favorites Digi Connect Wi-ME	Configuration and Management	• 0
Connectware**	Digi Connect Wi-ME Configuration and Management	He
Home	Home	
Configuration Network	Getting Started	
Serial Ports GPIO	Tutorial Not sure what to do next? This Tutorial can help.	
Alarms	System Summary	
System Remote Management	Model: Digi Connect Wi-ME	
Users	WiFi MAC Address: 00:40:9D:33:AD:57	
Applications	WiFi IP Address: 192.168.0.129	
Ekahau Client	IPv6 Address: FE80::240:9DFF:FE33:AD57	
Management		
Serial Ports Connections	Description: None	
and all period and	Contact: None	
Administration File Management	Location: None	
Backup/Restore Update Firmware	Device ID: 0000000-0000000-00409DFF-FF33AD57	
Factory Default Settings System Information	User Interface	
Reboot	Web Interface (Default): Enabled	
Logout	Custom Interface: Launch Set as Default	
	Copyright © 1996-2007 Digi International Inc. All rights reserved. www.digi.com	

- 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.

Page 11 of 20



#### **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

Page 12 of 20

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Other Tasks Refresh view Help and Support Details Digi Connect Wi-ME Configured (DHCP) IP address: 192.168.0.129 Subnet mask: 255.255.0 Default gateway: 192.168.0.1 Serial ports: 1	Digi Connect Wi-ME
Configure network settings Restart device Other Tasks Refresh view Help and Support Details Digi Connect Wi-ME Configured (DHCP) IP address: 192.168.0.129 Subnet mask: 255.255.0 Default gateway: 192.168.0.1 Serial ports: 1	
Restart device Other Tasks Refresh view Help and Support Details Digi Connect Wi-ME Configured (DHCP) IP address: 192.168.0.129 Subnet mask: 255.255.0 Default gateway: 192.168.0.1 Serial ports: 1	
Help and Support Details Digi Connect Wi-ME Configured (DHCP) IP address: 192.168.0.129 Subnet mask: 255.255.0 Default gateway: 192.168.0.1 Serial ports: 1	
Refresh view Help and Support Details Digi Connect Wi-ME Configured (DHCP) IP address: 192.168.0.129 Subnet mask: 255.255.0 Default gateway: 192.168.0.1 Serial ports: 1	
Digi Connect Wi-ME Configured (DHCP) IP address: 192.168.0.129 Subnet mask: 255.255.0 Default gateway: 192.168.0.1 Serial ports: 1	
Details Digi Connect Wi-ME Configured (DHCP) IP address: 192.168.0.129 Subnet mask: 255.255.05 Default gateway: 192.168.0.1 Serial ports: 1	
Details Digi Connect Wi-ME Configured (DHCP) IP address: 192.168.0.129 Subnet mask: 255.255.255.0 Default gateway: 192.168.0.1 Serial ports: 1 Firmware: 82000977_J	
Configured (DHCP) IP address: 192.168.0.129 Subnet mask: 255.255.055.055.055.055.055.055.055.055.	
IP address: 192.168.0.129 Subnet mask: 255.255.055.055.0 Default gateway: 192.168.0.1 Serial ports: 1	
Subnet mask: 255.255.255.0 Default gateway: 192.168.0.1 Serial ports: 1	
Default gateway: 192.168.0.1 Serial ports: 1	
Serial ports: 1	
Prmware: 62000977_3	

**2.** Click on the "Open web interface" on the "Device Tasks" panel. A web browser will open as in the following figure.





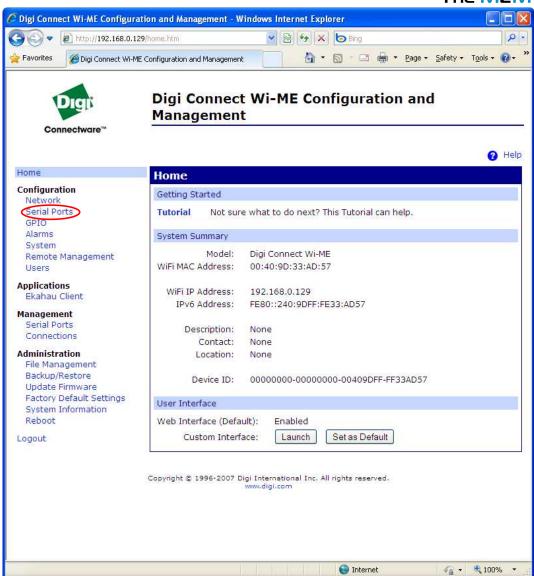
Login with the default username root and password dbps

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

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

Page 14 of 20





4. Click on the Port 1 on the following screen



	🔊 http://192.168.0.1	29/config/ports/p	ort_info.htm	👱 🗠 😽 🗙 🕻	Bing	
Favorites	🖉 Digi Connect Wi-M	E Configuration a	and Management	- 6	) - 🗔 👼 - Page - Sa	fety + T <u>o</u> ols + 🔞
Con	Digi nectware™		Connect gement	Wi-ME Confi	guration and	Ø F
ome		Serial	Port Config	juration		
onfigurat Network	ion	Port	Description	Profile	Serial Configuration	
Users pplicatior Ekahau C lanageme Serial Poo Connection dministra File Mana Backup/R Update F Factory D	Management 15 Client ent rts ons tion agement iestore	Port 1	WLAN 00	Modem Emulation	115200 8N1	
		Copyright ©		International Inc. All rig w.digi.com	hts reserved.	

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

5. Choose "Modem Emulation" as serial port profile, then apply



Digi Connect Wi-ME Configuration and Management

re™	
	? Help
	Select Port Profile
1	You have currently not assigned a profile to this serial port. Profiles allow you to easily configure serial ports by only displaying those items that are relevant to the current profile.
	Select the profile below that best matches your configuration.
	RealPort     The RealPort Profile allows you to map a COM or TTY port to the serial port. More     Console Management
	The Console Management Profile allows you to access a device's console port over a network connection. More
n nent ore	<ul> <li>TCP Sockets</li> <li>The TCP Sockets Profile allows a serial device to communicate over a TCP network. More</li> </ul>
ware ult Settings mation	<ul> <li>UDP Sockets         The UDP Sockets Profile allows a serial device to communicate using UDP. More     </li> </ul>
	Serial Bridge The Serial Bridge Profile configures one side of a serial bridge. A bridge connects two serial devices over the network as if they were connected with a serial cable. More
(	Modem Emulation     The Modem Emulation Profile allows you to configure the serial port to act as a modem. More
	<ul> <li>Custom</li> <li>The Custom Profile is an advanced option to allow full configuration of the serial port. More</li> </ul>
	Apply Cancel

**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.

Serial Port Con	figuration		
▼ Port Profile Set	2		
Current Port Profil	e: Modem Emulation	Change Profile o configure the serial port to act as a modem.	
Modem Emulation	Settings		
No other settings	are required.		

Page 17 of 20



gi Connect Wi-ME Configuration and Management

Port Profile 9	settings
<ul> <li>Basic Serial</li> </ul>	Settings
Description:	WLAN-100
Baud Rate:	115200 👻
Data Bits:	8 🗸
Parity:	None 💌
Stop Bits:	1 🗸
Flow Control:	None 💌
Apply	

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

Page 18 of 20



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

## Specifications for the WLAN-100 / ETH-100

Page 19 of 20

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#### **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:**

- ifica.. Standard: Frequency: רבי היבי • Standard: IEEE 802.11b
- 2.4GHz •
- Data Rate: Up to 11Mbps with automatic fallback
- CCK, DQPSK, DBPSK Modulation:
- 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