

ZigBee to EthernetEX-9212-E

Operation Manual

First Edition, May 2011



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Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The illustrations, charts, sample programs and layout examples shown in this guide are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, *we* do not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Attention :

Risk of injury or equipment damage exists. Only personnel familiar with drive and power products and the associated equipments should plan or implement the installation, start-up, configuration, and subsequent maintenance of the product using a serial converter. Failure to comply may result in injury and/or equipment damage.

Preface

Related Documentation

Specification (Reference CD in the pack)

Quick Installation Guide (Reference CD in the pack)

User Manual (Reference CD in the pack)

CE/FCC

Related documents

Item :	Refer to :	Publication :
1	User Manual	
2	Quick Installation Guide	
3	Specification Sheet	
5	CE/FCC Approval Letter	

Notice :

Supporting documentation can be obtained from your local dealer or distributor. It can also be viewed on website.

Related Software and Firmware

Item :	Refer to :	Version :
1	Device Management Utility	
2	Firmware	

Notice :

Any version change or upgrade without notifies.

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Chapter1. Introduction

The ZigBee protocol was developed to provide low-power, wireless connectivity for a wide range of network applications concerned with monitoring and control. ZigBee is a worldwide open standard controlled by the ZigBee Alliance. The ZigBee standard builds on the established IEEE 802.15.4 standard for packet-based wireless transport. ZigBee enhances the functionality of IEEE 802.15.4 by providing flexible, extendable network topologies with integrated set-up and routing intelligence to facilitate easy installation and high resilience to failure.

ZigBee wireless connectivity means that it can be installed easily and cheaply, and its built-in intelligence and flexibility allow networks to be easily adapted to changing needs by adding, removing or moving network nodes. The protocol is designed such that nodes can appear in and disappear from the network, allowing some devices to be put into a power-saving mode when not active.

1.1 Overview

We provide new ways of wireless connecting legacy ZigBee devices to Serial as RS-232/422/485 port with D I/O of EX-9000/ EX9000-M series. The converters are designed to operate in serial signal over ZigBee wireless network. The ZigBee to Serial device is usually used as an end- device at the ZigBee network. The data can transmit via ZigBee 801.15.4 protocol. The device is packaged in a PVC or steel material (Depend on model) case well suited for industrial environments. This device provides one serial port of RS-232 or 422 or 485 (Auto Detection)and it can connect to D I/O of EX-9000/ EX9000-M series

The ZigBee wireless converter is a low-cost, high performance design. By careful selecting high quality with competitive prices components in the world, the products made network connectivity possible with affordable cost for virtually all kinds of devices.

The converters are designed to connect the device operating in serial signal over ZigBee wireless network.

This ZigBee wireless converter Series consists of three models: EX-9212-E is a TCP/IP Ethernet port to ZigBee converter device within one Ethernet 10/100Mbps of RJ-45 port. We also provide a series of ZigBee products as EX-9212-S, EX-9212-E, EX-9212-Z. EX-9212-S is a serial to ZigBee converter device within one serial port of RS-232/422/485 (Auto-Detection). EX-9212-Z is a bridge router device of wireless ZigBee which it is a multi-access device with routing function.

This user manual will guide you step by step for the various functions of this converter.

1.2 Package Checklist

Converter is shipped with the following items:

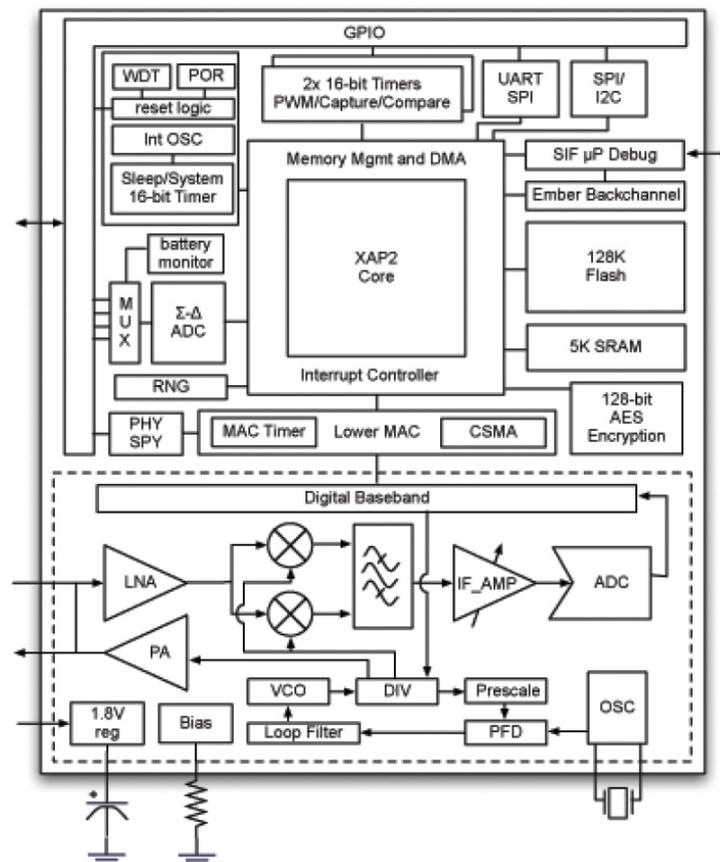
- ZigBee Device x 1
- User Manual CD x

Notice :

Notify your sales representative if any of the above items is missing or damaged.

1.3 Block Diagram

1.3.1 CPU Diagram



ZigBee module provides a cost-effective RF transceiver solution for 2.4GHz IEEE 802.15.4 data links and ZigBee wireless networks and is based on the Ember™ EM250 platform. The single-chip solution consists of an IEEE 802.15.4-compliant 2.4GHz RF transceiver with a 16-bit XAP2b microprocessor. It's designed to support point to point, point to multi-point, and mesh network applications.

The EM250 from Ember provides a ZigBee System-on-Chip that combines a 2.4GHz IEEE 802.15.4 compliant radio transceiver with a 16-bit microprocessor. The radio provides best-in-class RF performance with excellent sensitivity and transmits power for long range, and 802.11 immunity. A flexible RF interface minimizes external components in configurations with or without external LNA/PAs. Designed specifically for use with EmberZNet, Ember's ZigBee compliant embedded mesh networking software, the EM250 is optimized for designs requiring long battery life, low external component count, and a reliable, proven, industry-standard networking solution. Innovative

on-chip debugging (Insight Port) provides developers with the most advanced views into their application and network available in the industry.

1.3.2 General Features

- Ember™ EM250 platform
- 128KB Flash memory
- 5KB SRAM
- 16-bit XAP2b microprocessor
- 17 general purpose I/O ports
- DMA-SPI, I2C and UART interfaces
- Integrated 12-bit resolution ADC
- Designed for EmberZNet ZigBee Pro compliant networks
- Miniature footprint: 2cm x 3cm
- Integrated PCB trace antenna and U.FL external antenna connector
- 16 RF channels
- Over indoor 30m and outdoor visual contact 100m of range
- Non-intrusive debug interface (SIF)
- AES 128-bit encryption
- Low power consumption
- Constant RF out power over 2.1~3.6 V voltage range
- FCC certification in process
- RoHS compliant

1.4 Product Features

1.4.1 ZigBee Network Nodes

A wireless network comprises a set of nodes that can communicate with each other by means of radio transmissions, according to a set of routing rules (for passing messages between nodes). A ZigBee wireless network includes three types of node:

- **Coordinator Node:**

This is the first node to be started and is responsible for forming the network by allowing other nodes to join the network through it. Once the network is established, the coordinator has a routing role (is able to relay messages from one node to another) and is also able to send/receive data. Every network must have one and only one coordinator. EX-9212-E is usually played the role of coordinator and connects with host device.

- **Router Node:**

This is a node with a routing capability, and is also able to send/receive data. It also allows other nodes to join the network through it, so plays a role in extending the network. A network may have many Routers. There is only the EX-9212-Z to play a route node of ZigBee networks in EX-9212 series.

- **End Device Node:**

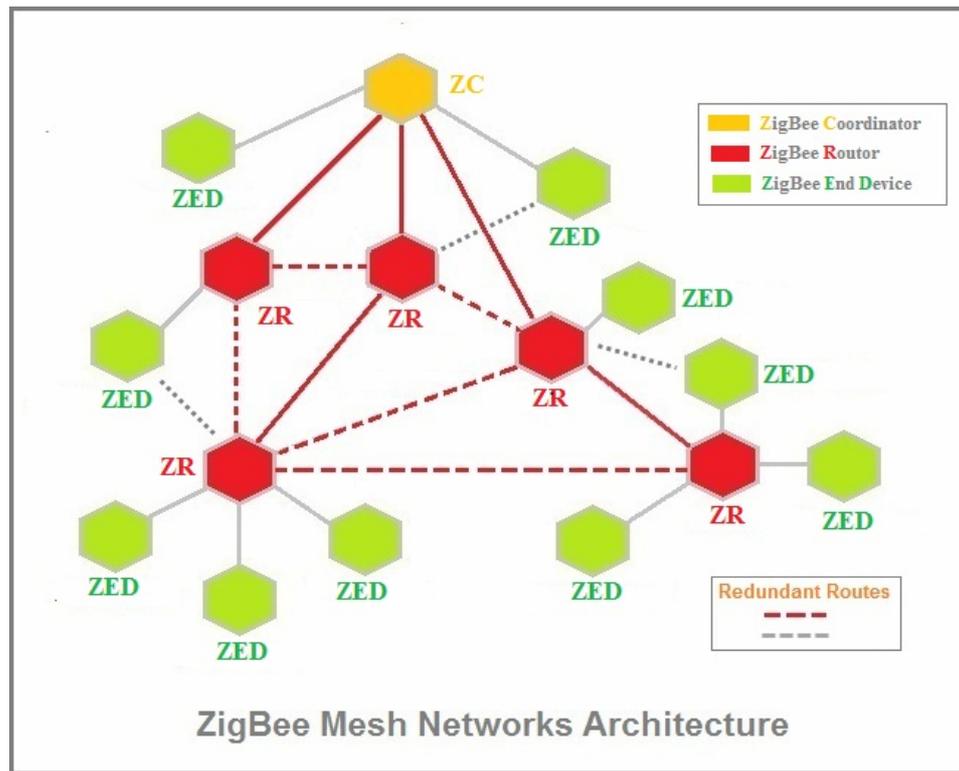
EX-9212-S are usually played the role of the end-device for collecting data from the serial device. This is a node which is only capable of sending and receiving data (It has no routing capability). A network may have many End Devices

1.4.2 ZigBee Network Topology

ZigBee facilitates a range of network topologies from the simplest Star topology, through the highly structured Tree topology to the flexible Mesh topology. ZigBee is designed primarily for Mesh networks. A Mesh network has little implicit structure. It is a collection of nodes comprising a coordinator and a number of Routers and/or End Devices, where:

- Each node, except the coordinator, is associated with a Router or the coordinator
 - this is the node through which it joined the network and is known as its 'parent'. Each parent may have a number of 'children'.
- An End Device can only communicate directly with its own parent.
- Each Router and the coordinator can communicate directly with any other router / coordinator within radio range.

It is the last property above that gives a Mesh network its flexibility and efficiency in terms of inter-node communication. A Mesh network is illustrated in the figure below.



1.4.3 Ideal Applications for ZigBee

ZigBee is suitable for a wide range of applications, covering both commercial and domestic use, which includes:

- Point-to-point cable replacement (e.g. wireless mouse, remote controls, toys)
- Security systems (e.g. fire and intruder)
- Environmental control (e.g. heating and air-conditioning)
- Hospital patient monitoring
- Lighting control
- Home automation (e.g. home entertainment, doors, gates, curtains and blinds)
- Automated meter reading (AMR)
- Industrial automation (e.g. plant monitoring and control)

ZigBee wireless communications also enable some applications to be developed that currently cannot be implemented with cabled systems. Examples are applications that involve mobility, which must be free of cabling (e.g. long-term health monitoring, asset tracking in warehouses). Existing applications (such as lighting control and industrial plant monitoring) that currently rely on cable-based systems can be implemented more cheaply as ZigBee reduces or removes cable installation costs. ZigBee can also be beneficial in environments where cable-based solutions can be difficult and expensive to install - for example, in home security systems, sensors need to be easy to install.

1.5 Product Specifications

Hardware

CPU : Ember™ EM250 16-bits CPU, 24 MHz

RAM : 5K Bytes SRAM

ROM : 128K Bytes Flash ROM

ZigBee

IEEE 802.15.4 compliant

Frequency: ISM band 2400 ~ 2480MHz

Receiver Sensitivity: -95dBm

RF Output Power: 3 dBm, (18dBm for High Power)

Sleep Current: 1uA (with active sleep timer)

TX current < 24 mA , RX current < 28 mA

Security processor (128 bits AES)

Operation Voltage: 2.1 V~ 3.6V

Antenna: SMA Type, 2 dBi, changeable

Distance: Up To 150~200 Meters in free space
(600~800 Meters for High Power)

Data Rate: 250K bps

Application Mode: Mesh, Star

Ethernet Port

No.of Port : Ethernet * 1 port,

Transmission Rate: 10/100Mbps (Auto Sensing)

Connector Type: RJ45

Protocol: ARP, IP, ICMP, UDP, TCP, HTTP, DHCP

Mode: TCP Server/Client; UDP

Setup: HTTP Browser Setup (IE & Netscape)

Security: Setup Password

Protection: Built-in 1.5KV Magnetic Isolation

Firmware

Updated Via COM Port

Power

DC 9 ~ 24 V / 150 mA@9V, 60 mA @ 24V

Over Current & Reverse Protection

LED Indicators

SYS (red), Pairing (green), Rx (red), Tx (green)

Environment

Operating Temperature : 0 ~ +75

Storage Temperature : -20 ~ +85

Dimensions

100 * 90 * 25 mm (W * D * H)

Weight

150 gm. (Not include power adapter)

Wall Mountable

Din-Rail (Optional)

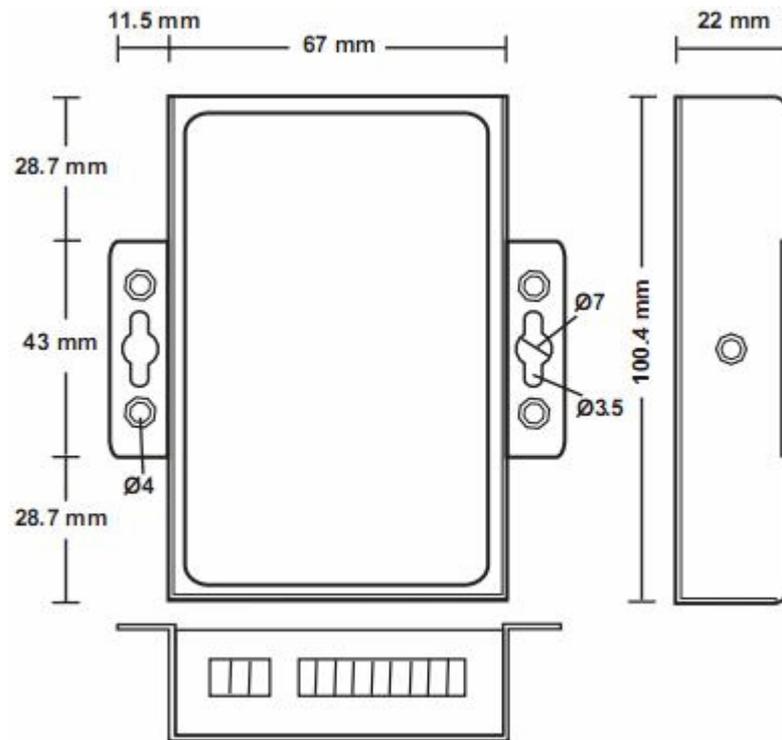
Regulatory Approvals

RoHS

Warranty

1 year

1.6 Product Dimension



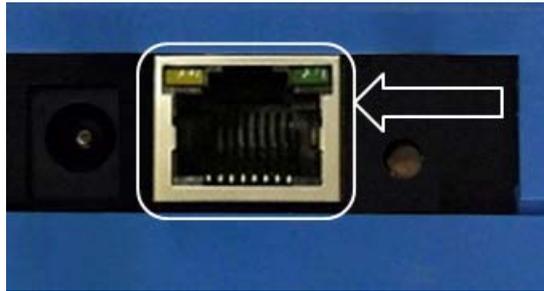
Chapter2. Hardware Introduction

2.1 Product Panel Overview



2.2 Port Description

2.2.1 Fast Ethernet Port

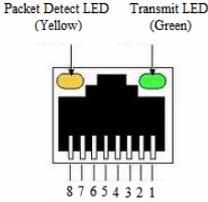


Ethernet is a media access method that is specified at the Data Link layer and uses specific Physical layer cabling and signaling techniques. It is important to be able to differentiate between the types of connectors that can be used to connect an Ethernet network together.

The connector is for network usual R-J45 and its baud rate supports 10 or 100 Mbps as auto-sensing. Simply connect to your network switch hub or host device. When connection made, when data traffic occurs on the network, Tx & Rx LED indicator will blink during data transferring and receiving.

Fast Ethernet is a collective term for a number of Ethernet standards that carry traffic at the nominal rate of 100 Mbit/s, against the original Ethernet speed of 10 Mbit/s. The 100 Mbit/s Ethernet standards 100baseTX is by far the most common and is supported by the vast majority of Ethernet hardware currently produced.

2.2.2 RJ-45 Jack



RJ-45 Pin Assignment

Pin	MDI-X Assignment (Port 1-8)	MDI Assignment (cascade Port 8)
1	Receive Data +	Transmit Data +
2	Receive Data -	Transmit Data -
3	Transmit Data +	Receive Data +
6	Transmit Data -	Receive Data -
4,5,7,8	Not Used	Not Used

The RJ-45 connector is clear so you can see the eight wires mentioned with different colors that connect to the connector & pins. All of these wires are twisted together into four pairs. Four wires carry the voltage and are considered tip. The other four wires are grounded and are called ring. The RJ-45 connector is crimped onto the end of the wire, and the pin locations of the connector are numbered from the left, 8 to 1.

LAN cables are generically called UTP (Unshielded Twisted Pair) and are identified with a category rating. When installing new cable, unless there is a very good reason not to, you should be using category 5e or 6 UTP which is rated for 10mb, 100mb or Gigabit LAN operation.

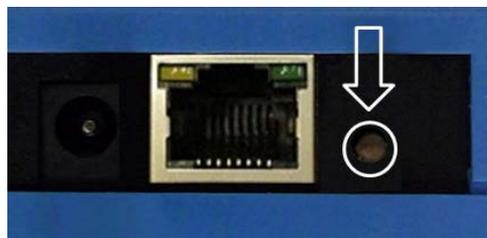
2.2.3 Antenna Jack



The connector of antenna is a standard reverse SMA jack. Simply connect it to a 2.0dBi (Standard) or 5.0dBi dipole antenna (Standard Rubber Duck) and it is 50 Ohms impedance and can support 2.4GHz frequency

2.2.4 Pair / Set Button

The “Pair/Set” button is for pairing the devices and use a pin to push the Pair/Set button for active it. For more detail information please see chapter 3.3 “The device’s pairing procedures”.



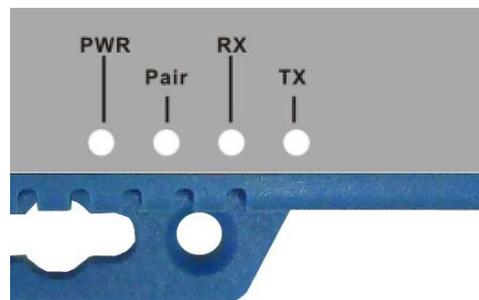
2.2.5 DC Power Jack



The ZigBee device has two DC power input for choice. One is powered by a single 9Vdc (inner positive/outer negative) power adapter and 500mA of current. A suitable power supply adapter is part of the packaging. DC-In power outlet is at the left side of ZigBee device and put the adapter into the socket. Other one is usually supplied DC +24 V in the computer center directly and you may use “DC power terminal block” for inputting the power. If the power is properly supplied, the “PWR” red color LED will be on.

2.3 LED Indicators

The LEDs indicate of the device status.



PWR Indicator:

It is a power indicator (When the power is on, the LED will be on.)

Pair Indicator:

It shows the device indicator of pairing status and when ZigBee End Device is operated in pair status then the LED will be blink every three seconds.

The pair LED indicator of ZigBee Coordinator is normally blinking once per 3 seconds and when active the pairing function within 60 seconds period that the pair LED indicator will be blinked once second.

Rx Indicator:

Data received indicator (When packet are receiving from the network, the LED will blink.)

Tx Indicator:

Data sent indicator (When packets are sending to the network, the LED will blink.)

Chapter3. Getting Start

Before Getting Started

Administrators should read this part of the manual carefully, especially during installation. Please verify that all the items in the Package Checklist are presented. Before initial installation and configuration the device, you will also need a PC or notebook PC within Ethernet port.

Step 1: Connect the power source

Please find a USB cable with A type and B type connectors in both sites which it is a part of the packaging. The ZigBee device is powered by connecting the peripheral device to provide a single 5V DC and 500mA power via the USB cable. To plug the USB cable of B type connector into the ZigBee device's USB B type port (Female) at the right side of ZigBee device and plug other site USB A type connector of cable into the computer peripheral device. If the power is properly supplied, the "PWR" LED will be on.

Step 2: Check the power status of the device

When power is connected and users can verify the LED indicator of "PWR" on the top panel. If the power is properly supplied, the "PWR" LED indicator will be on that if the power input fails, LED indicators will not be light up.

Step 3: Check the status of the device after connecting the power

When power is properly worked and the next step is to pairing both devices as Coordinator and End Device. To verify the LED indicator of "Pair", if the pair is successful that the "Pair" LED indicator will be blinking every three seconds.

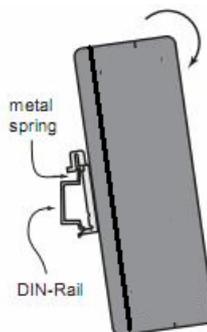
3.1 Hardware Installation

3.1.1 DIN-Rail Mounting

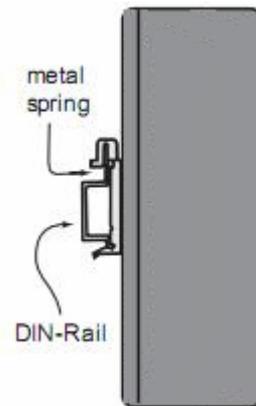
The aluminum DIN-Rail attachment plate is included in the package. If you need to reattach the DIN-Rail attachment plate to the converter, make sure the stiff metal spring is situated towards the top, as shown in the figures below.

The DIN-Rail attachment plate should already be attached to the back panel of the converter device. If you need to reattach the plate, make sure the metal spring is situated towards the top, as shown in the figures below.

STEP 1: Insert the top of the DIN-Rail into the slot just below the metal spring.



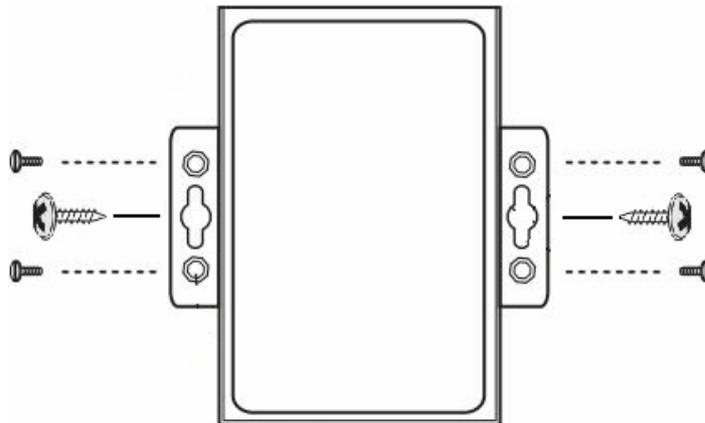
STEP 2: The unit will snap into place as shown below.



3.1.2 Wall Mounting

Step 1 :

There are two brackets on both sites of the converter device and it come standard with the converter. They are used to attach the converter to a wall, or the inside of a cabinet. Use two screws per bracket to attach the converter to a wall (Figure 3.8).



Step 2 :

The heads of the screws should be less than 6.0 mm in diameter, and the shafts should be less than 3.5 mm in diameter, as shown in the figure 3.8 at the up .Do not screw the screws in all the way—leave a space of about 2 mm to allow room for sliding the wall mount panel between the wall and the screw heads.

3.2 Ethernet Port Wiring Architecture

100BASE-T is the predominant form of Fast Ethernet, and runs over two pairs of category 5 or above cable (a typical category 5 cable contains 4 pairs and can therefore support two 100BASE-TX links). Like 10BASE-T, the proper pairs are the orange and green pairs (canonical second and third pairs) in TIA/EIA-568-B's termination standards, T568A or T568B. These pairs use pins 1, 2, 3 and 6. In T568A and T568B, wires are in the order 1, 2, 3, 6, 4, 5, 7, 8 on the modular jack at each end. The color-order would be green/white, green, orange/white, blue, blue/white, orange, brown/white and brown for T568A, and orange/white, orange, green/white, blue, blue/white, green, brown/white, brown for T568B. Each network segment can have a maximum distance of 100 meters (330 ft.). In its typical configuration, 100BASE-TX uses one pair of twisted wires in each direction, providing 100 Mbit/s of throughput in each direction (full-duplex). See IEEE 802.3 for more details. The configuration of 100BASE-TX networks is very similar to 10BASE-T. When used to build a local area network, the devices on the network (computers, printers etc.) are typically connected to a hub or switch, creating a star network. Alternatively it is possible to connect two devices directly using a crossover cable.

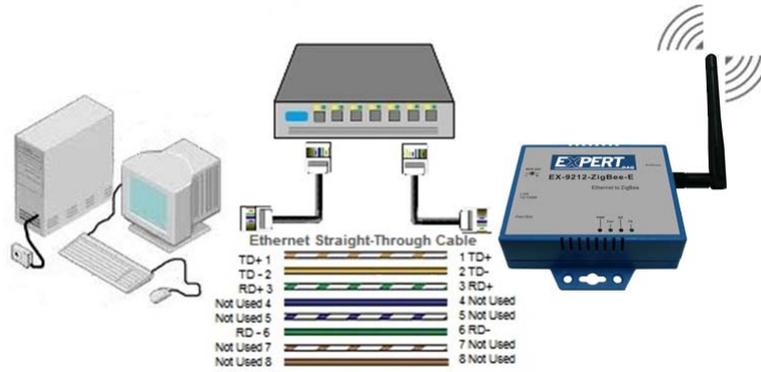
3.2.1 Wiring Detail Description

It's important to understand the difference between the media access speeds Ethernet provides in computer cabling systems. However, it's also important to understand the connector requirements for each implementation before making any decision. The Electronic Industries Association and the newer Telecommunications Industry Association (EIA/TIA) is the standards body that creates the Physical layer specifications for Ethernet. The EIA/TIA specifies that Ethernet use a registered jack connector with a category 5 cables (4 pair) wiring sequence on unshielded twisted-pair cabling (RJ-45)

RJ-45 Wiring (TIA/EIA-568-B)

Pin	Pair	Wire	Color
1	2	1	 white/orange
2	2	2	 orange
3	3	1	 white/green
4	1	2	 blue
5	1	1	 white/blue
6	3	2	 green
7	4	1	 white/brown
8	4	2	 brown

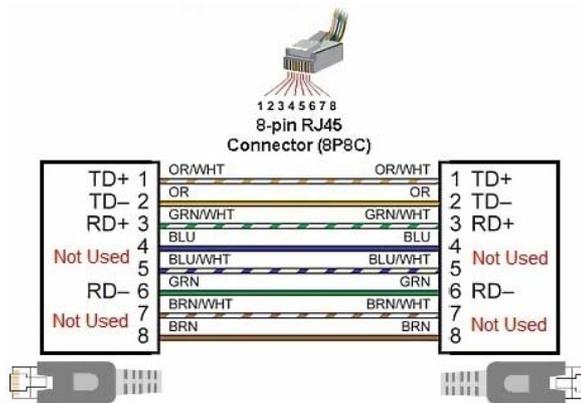
Twisted wires inside UTP cable eliminate cross talk noise. Unshielded cable can be used since digital signal protection comes from the twists in the wire. The more twists per inch, the farther the digital signal can supposedly travel without interference. When working with 100M LANs you CAN use 100base-TX wiring with a 10base-T network (but not always the other way round). In general ALWAYS use 100baseTX wiring standards. If you are using category 5, 5e or 6 wiring EVERYWHERE in a 100M LAN you can use the 100base-TX standard (this only uses 2 pairs, 4 conductors).



EX9212-E Ethernet Wiring Pin Assignment

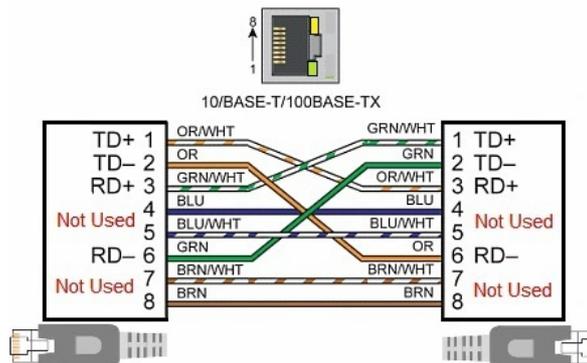
3.2.2 Ethernet Cable Detail Description

Straight-Through Cable



The straight cable is a through cable, and it connects to the switch or hub. These cables function as the patch cords in an Ethernet connection. Both ends of these wires are the same. The TIA/EIA 568A standard has been replaced by TIA/EIA 568B. However, both cable standards are still used. They are similar, but are not the same. Both standards use unshielded twisted pair cables.

Crossover Cable

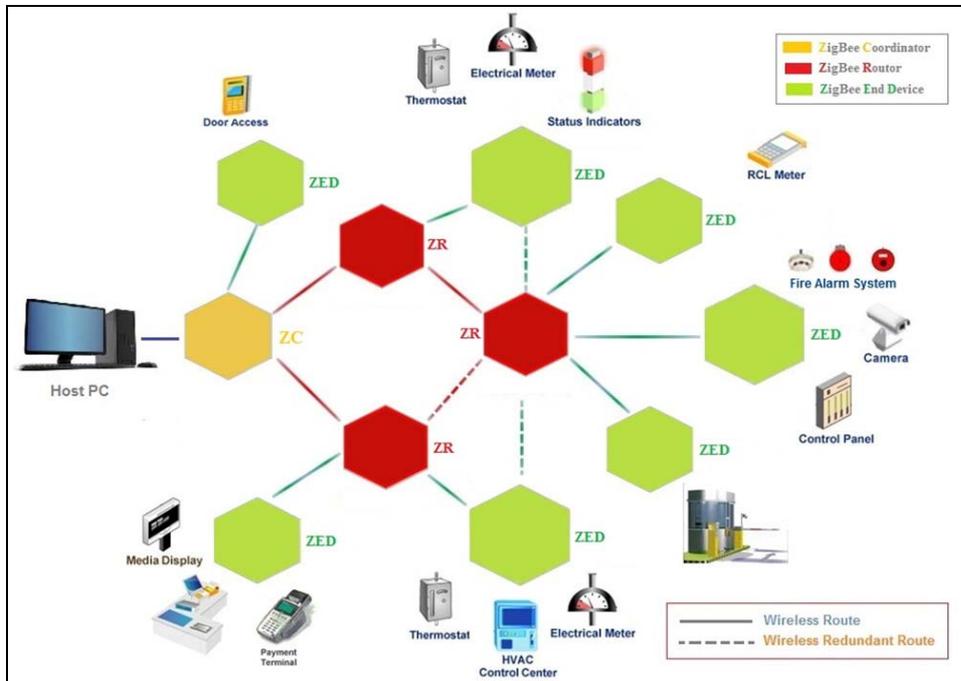


The crossover cable formation can be used without a hub or switch. It is used in a peer-to-peer connection. It is used when one needs to connect two Ethernet devices together without a hub or switch. It can also be used to connect two hubs to each other. The simplest way to achieve this is to use the 568 A at one end and the 568B at the other end of the RJ45 plug.

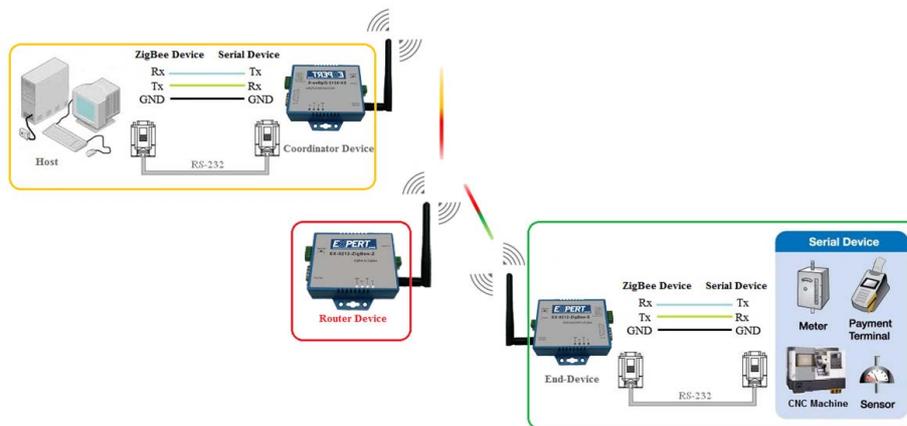
3.2.3 ZigBee Network Architecture

ZigBee technology is slower than 802.11b (11 Mbps) and Bluetooth (1 Mbps) but it consumes significantly less power. The ZigBee specification is a combination of Home RF Lite and the 802.15.4 specification. The spec operates in the 2.4GHz (ISM) radio band - the same band as 802.11b standard, Bluetooth, microwaves and some other devices. It is capable of connecting 255 devices per network but when you deploy that we suggest around 30 sets of ZigBee device in each the network. The specification supports data transmission rates of up to 250 Kbps at a range of up to 30 meters (Depend on environment). For higher reliability, we suggest the data transmission rate is around 20 Kbps and distance can be reached over 100 meters (Outdoor). All of models can be added with high transmission power (18dBm) function of RF and model number adds “-h”, for example: EX-9212-E-h. The transmission distance will be extended over 700 meters. High power transmission, temperature and humidity sensors, all functions are optional and during place your order to add these option functions.

ZigBee Application Architecture



ZigBee EX-9212-E End-Device Architecture



3.3 The device's pairing procedure



- a. After power on **ZigBee Coordinator** device and check if the Pair LED blinks once per 3 seconds.
- b. Check if Pair LED of **ZigBee End Device** is eternally on. If it is on eternally, it means ZigBee End Device is not paired yet.
- c. Use a pin to push the Pair/Set button of Coordinator device on left site.
 - Pair LED starts to flash about 60 seconds (waiting ZigBee End Device to join).
 - If no ZigBee End Device joins, ZigBee Coordinator changes to blinks per 3 seconds.
- d. Use a pin to push the Pair/Set button until ZigBee End Device starts to flash (This action must be completed during the 60 seconds that ZigBee coordinator flashes for). When ZigBee End Device starts to flash, it means ZigBee End Device has been joined the ZigBee Coordinator network.
- e. PS. Above steps is the default setting before shipment, inapplicable to end user.
- f. ZigBee has been paired during the test process before shipment, so above steps is required only when ZigBee needs to joins other network.
- g. Above steps is for ZigBee hardware set up.
- h. And then you will need to use AT Command Mode Paring Procedure to paring Data Link Layer between ZigBee Coordinator and ZigBee End Device.
- i. Please refer to AT Command instruction guide for more details.

Chapter4. Converter Configuration

Initial IP Configuration

When setting up your converter for the first time, the first thing you should do is configure the IP address. This chapter introduces the method to configure the device server's IP address. For more details about network settings, see the Network Settings section in Chapter3, "Web Console Configuration".

The following topics are covered in this chapter:

- Device Management Utility
- EXBrowser "View"
- EXBrowser "Modify IP"
- EXBrowser "Modify MAC"

4.1 Device Management Utility

On PC we provide a Device Management Utility named "EXBrowser.exe" which is an executable program in Windows 32 bit environments. EXBrowser setup tool is used to detect and setup the installed converters. It uses UDP broadcast packets to query and configure converters on the network.

When you activate the tool, it will detect the existence of the installed converters and depict the converters' status such as IP address, Subnet Mask, MAC Address, and Device ID (see Figure 3.1). The Setup Tool only can setup one converter at a time. Thus if there are more than one converter on the network, please shut down or disconnect other converters. Otherwise the EXBrowser.exe can not detect the converter.

Due to the nature of broadcast UDP packets, EXBrowser has following characteristics:

- Broadcast packets are not limited by subnet. Even if the IP address of the converters and the computer running EXBrowser do not belong to the same subnet, it still works fine.



- Broadcast packets can not pass routers. EXBrowser can only be used to monitor devices with computer running EXBrowser in the same segment of local area network.



(Figure 3.1)

4.2 EXBrowser “View”

□ View -> Refresh

There are two ways for refreshing the status of existing devices. You may select the item “View” to refresh the status of existing devices on LAN. Other one is to click the icon as red color remark as below. EXBrowser will send another query to get updated information.(see Figure 3.2).

Note: Always run the “Refresh” after any data change.



(Figure 3.2)

□ File -> Exit Alt+F4

Exit from the program (see Figure 3.3).

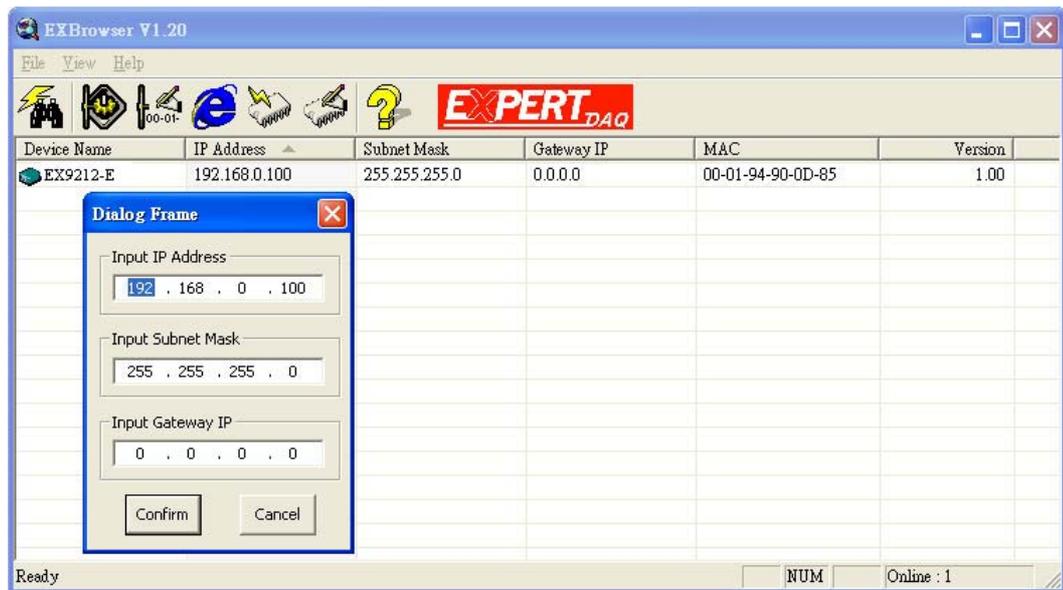


(Figure 3.3)

4.3 EXBrowser “Modify IP”

□ Modify IP -> Dialog Frame

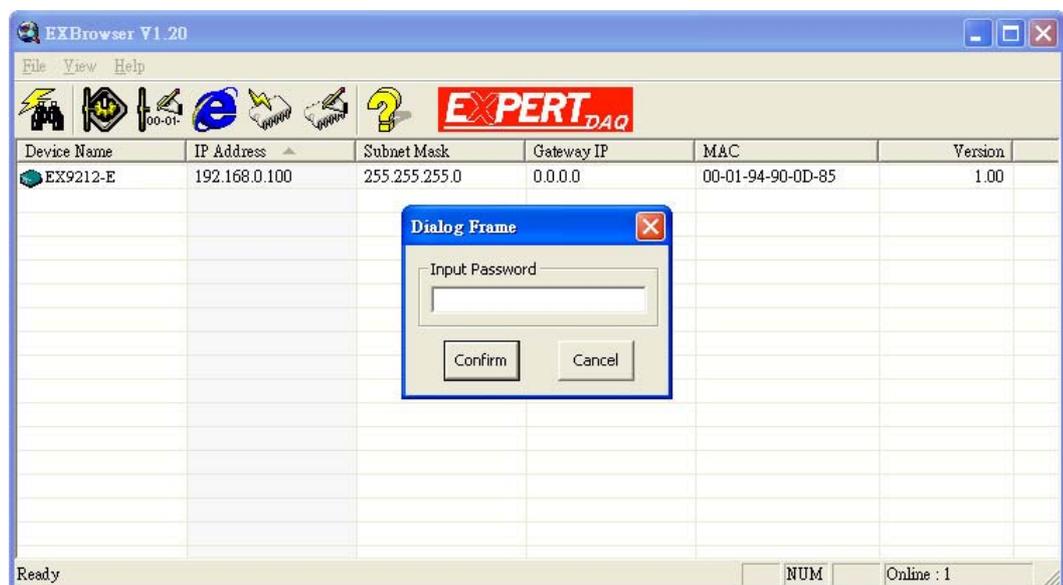
To click the device on the existing devices list in the EXBrowser table and then the function bar will be enable. To press second icon of “Modify IP” on function bar and a dialog frame table will be shown (see Figure 3.4).



(Figure 3.4)

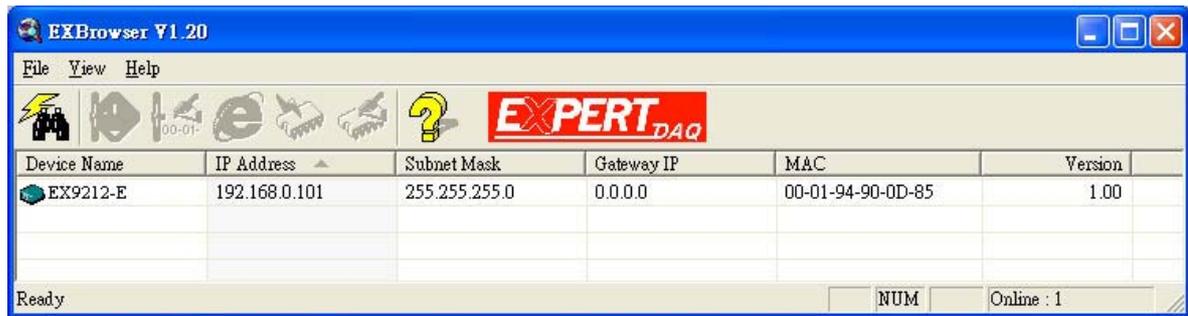
Assign an IP Address with the same Subnet Mask of your computer, avoiding any IP conflict with other network devices.

When you press “Confirm” button, the IP address will be refreshed in 2~3 seconds.



(Figure 3.5)

After click “Confirm” button and then “Input Password” request will be pop-up on screen(see Figure 3.5). You just press “Confirm” button and the new device’s IP will be changed and save in table, if you changed it.

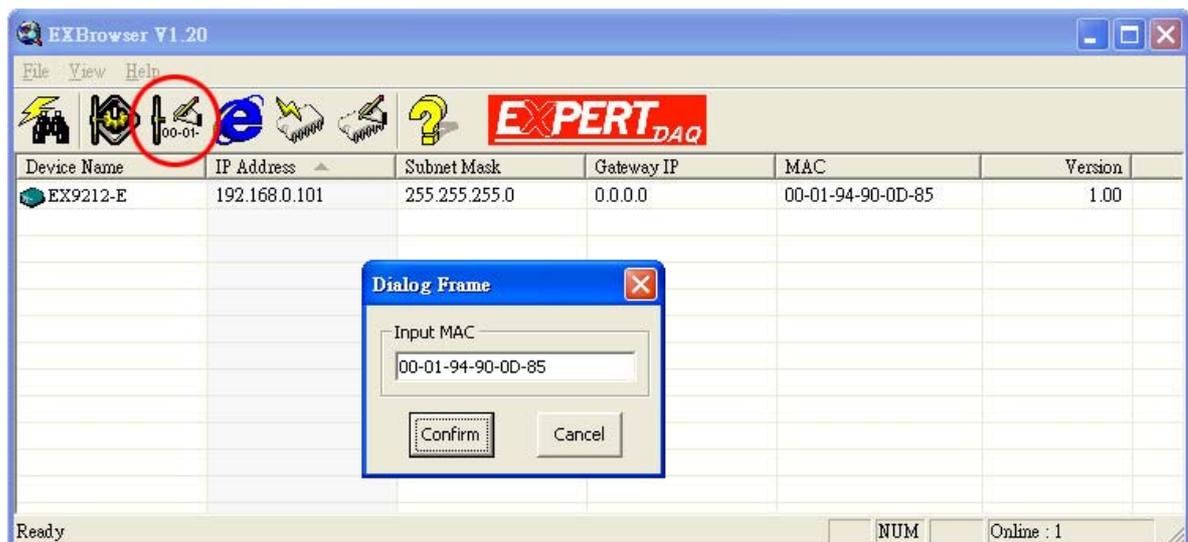


(Figure 3.6)

4.1.4 EXBrowser “Modify MAC”

- Modify MAC -> Dialog Frame

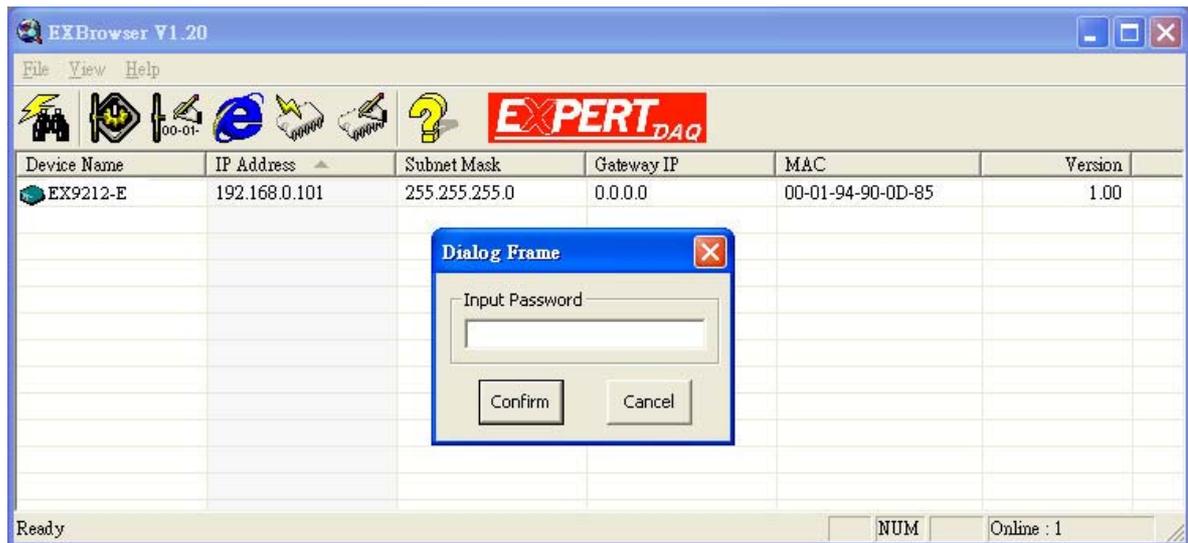
To click the device on the existing devices list in the EXBrowser table and then the function bar will be enable. To press Third icon of “Modify MAC” on function bar and a dialog frame table will be shown (see Figure 3.7).



(Figure 3.7)

- Input Password -> Dialog Frame

After click “Confirm” button and then “Input Password” request will be pop-up on screen (see Figure 3.8). You just press “Confirm” button and the new device’s MAC will be changed and save in table, if you changed it.



(Figure 3.8)

Web Browser Configuration

The following topics are covered in this chapter:

- Serial To Ethernet Converter Setup
- Login Setting
- Login Setting Page Field Description
- Parameter Setting
- Parameter Setting Page Field Description

Login Setting

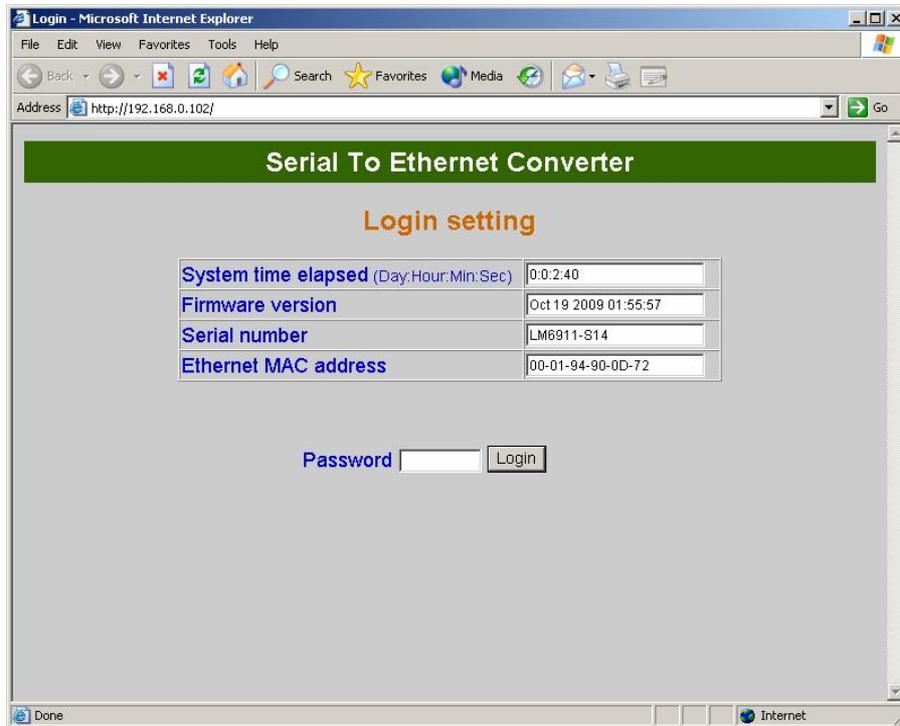
In addition to basic IP address and subnet mask, specific device settings can be set through HTTP protocol with popular browsers, e.g. Internet Explorer, Netscape, etc. Setup of the converters is as easy as surfing on WWW, no special software will be required.

Setup converter device is as easy as surfing on WWW, no special software will be required. Popular Browsers, such as IE, or Netscape, can easily do the setup process. In the browser URL field, set the IP address of device directly, to enter the “Login Setting” page, please follow the steps below.

- Open your browser. This chapter will use IE as an example.
 - In the browser URL field, type the IP address of the converter directly and press ENTER. (The IP address is what you set using the Device Management Utility as EXBrowser.)
 - To press fourth icon of “**Web Browser**” on function bar and a “**Login Setting**” Screen will be shown (see Figure 3.9) to login into the device.

Alternatively, if the IP address of the converter is already

known, you can connect to the converter directly by providing its IP address in the URL field of browsers.



(Figure 3.9)

Login Setting Page Field Description

- System time elapsed
The time elapsed since start of this device in [Day Hour : Minute : Second] format. This information can be useful in identifying the reliability of system.
- Firmware version
Converter firmware is identified by date code. This information will be required in looking for technical support.
- Serial number
It is a product serial number code in the converter device and has been provided by factory.
- Ethernet MAC Address
Converter is an unique MAC (Media Access Control) address used by Ethernet in 6 digits.

□ Password

This field is the administration password for authentication. Factory default is “empty”. However, it is not recommended to leave it empty in field operation. If you could not login, it means you have to key in the password. If you do not know the password you can turn off the power and then use any point tip to push “Reset” button and hold it to turn on the power at the same time for 5 seconds. The password will be reset to the factory default as “empty”.

Converter device uses the same password protection mechanism commonly used in Windows NT or UNIX. If there are more than “3 consecutive failures” in password check during login, the login function will be disabled for “15 minutes”. During this 15 minutes period, even if you supply correct password, login will not proceed. This prevents intruders from finding the password by computer generated program.

Chapter5. Parameter Setting Page

□ The Parameter Setting Page

Type the correct password in the “**Password**” field and click the “**Confirm**” button in the “**Login Setting**” page, then the “**Parameter Setting**” page will be shown (see Figure 3.10).

Note: If you forget the password or can't login successfully, please contact the manufacturer directly.

The screenshot shows a web interface titled "Parameter setting" with the following fields and values:

IP address	192.168.0.102
Subnet mask	255.255.255.0
Gateway IP	0.0.0.0
DHCP Client	Disable
Auto Reset (No data input)	0 (Hours)
Device ID	EX9212-E
Login password	
Serial I/O Port 1	0
Local port,Socket mode	100 TCP Server
Remote IP,Port (TCP Client/UDP)	0.0.0.0 0
Interface	RS232
Baudrate	9600
Parity,Data bit,Stop bit	None 8 1
Force off-line time (No data input)	0 (Minute)
Packet collect time	Tx 0 Rx 0 (mSec)
Serial I/O Port 2	0
Local port,Socket mode	101 TCP Server
Remote IP,Port (TCP Client/UDP)	0.0.0.0 0
Interface	Auto Detect
Baudrate	9600

(Figure 3.10)

□5.1 Parameter Setting Page Field Description

□ IP Address

The IP address of converter device, 4 digits separated by '.' Don't let it conflict with the other devices on the network.

If DHCP client mode is enabled and there's a DHCP server on the network, this field will be assigned by DHCP server automatically.

□ Subnet mask

Subnet mask of the converter device has connected to. “255.255.255.0” is usually used for small network, “255.255.0.0” for larger network, 4 digits separated by '.'

If your IP address is provided by an ISP or the internal network administrator, please inquire of them that information and type it correctly.

If DHCP client mode is enabled and there's a DHCP server on the network, this field will be assigned by DHCP server automatically.

Gateway address

Gateway or Router IP address. 'Gateway' is a device which connects local network to external network. If you need to communicate with other networks or your device owns a real IP address on the internet, please inquire of them that information and type it correctly. If there's no gateway on the network, just leave it as "0.0.0.0".

If DHCP client mode is enabled and there's a DHCP server on the network, this field will be assigned by DHCP server automatically.

DHCP client

DHCP client mode could be enabled/disabled statuses. If DHCP is enabled, there should be a DHCP server on the network. If DHCP is disabled, [IP address], [Subnet mask], and Gateway address] should be manually assigned.

Auto Reset

It is for setting when the device has been disconnected or some reasons, the data did not transmit a while. You can prevent it and restart the device after waiting a while (1 ~ 99 hours) as your settings.

Device ID Report ??

You may "Enable" or "Disable" for collecting the device ID report and assigne ID number for the converter devices. Available ID is "0 ~ 65535".In TCP mode, if this parameter is enabled, every time when the socket is connected, e-Net TCP/IP converter will immediately report its device ID in the following formats:

Serial #1	nnnnnA[LF][CR]
Serial #2	nnnnnB[LF][CR]
Digital I/O	nnnnnC[LF][CR]

The total length is 8 bytes, where “nnnnn” is a 5-digit device ID assigned by the user; [LF] is decimal 10; [CR] is decimal 13.

- Login Password

For security and management issues, you may setup the “Login Password”. This administration password uses to login converter parameter setting pages. It may be empty or up to 15 characters long.

- Serial I / O Port 1 (RS-232)

This converter device model is provided one serial port as RS-232 interface for connecting the extension serial device.

- Local Port/Socket Mode/Remote IP & Port

This converter device is provided 4 socket connections port.

- Port number

A socket port assigned for the serial port. It's a 16-bit numbers, ranging from 1 to 65535. Because the numbers below 1000 are used for specific purposes (e.g. 80 is for HTTP protocol), we suggest you use the numbers larger than 100. Generally the port number 4660 is used for the serial communication. However you should specify different port number for each serial port.

- Socket type

-TCP Server: TCP protocol, passive open, to be connected from the TCP clients.

-TCP Client: TCP protocol, active open, connect to the TCP server.

-UDP Client: UDP protocol, connectionless

- Remote IP address

The server IP address and socket port would be connected in TCP Server, TCP Client and UDP Client mode for a certain serial port.

- Remote socket port

The server socket port would be connected in TCP Client and UDP Client mode for a certain serial port.

- Interface of serial I/O

RS232 : TxD, RxD for data stream, no flow control

RS232 (RTS/CTS) : TxD, RxD for data stream, RTS/CTS for flow control.

- Baudrate

Baud Rate: 300 ~ 460800 bps

- Parity, Data bits, Stop bit

Parity: None, Even, Odd, Space, Mark.

Data Bits: 5, 6, 7, 8.

Stop Bit: 1 or 2.

- Force off-line time

It is for setting how long the off-line time of device will be taken when there is no data input. The parameter can be from “0 to 99” and the time unit is “Minute”.

- Packet Collect Time

It is for setting a packet collecting period of the device serial port’s Tx and Rx. The parameter can be from “0 to 999” and the time unit is “mSec”.

- Serial I / O Port 2 (RS-422/485)

This converter device model is provided second serial port as RS-422/485 (Auto-Detective) interfaces for connecting the extension serial device.

- Local Port/Socket Mode/Remote IP & Port

This converter device is provided 1 socket connections port.

- Port number

A socket port assigned for the serial port. It’s a 16-bit numbers, ranging from 1 to 65535. Because the numbers below 1000 are used for specific purposes (e.g. 80 is for HTTP protocol), we suggest you use the numbers larger than 100. Generally the port number 4660 is used for the serial communication. However you should specify different port number for each serial port.

- Socket type

-TCP Server: TCP protocol, passive open, to be connected from the TCP clients.

-TCP Client: TCP protocol, active open, connect to the TCP server.

-UDP Client: UDP protocol, connectionless

- Remote IP address

The server IP address and socket port would be connected in TCP Client and UDP Client mode for a certain serial port.

- Remote socket port

The server socket port would be connected in TCP Server, TCP Client and UDP Client mode for a certain serial port.

- Interface of serial I/O

It is provided a “Auto Detect” function and just depend on the connected serial device’s interface as RS-422 or RS-485.

- Baudrate

Baud Rate: 300 ~ 115200 bps

- Parity, Data bits, Stop bit

Parity: None, Even, Odd, Space, Mark.

Data Bits: 5, 6, 7, 8.

Stop Bit: 1 or 2.

- Force off-line time

It is for setting how long the off-line time of device will be taken when there is no data input. The parameter can be from “0 to 99” and the time unit is “Minute”.

- Packet Collect Time

It is for setting a packet collecting period of the device serial port’s Tx and Rx. The parameter can be from “0 to 999” and the time unit is “mSec”.

- Interface of serial I/O

- RS232: TxD, RxD for data stream, no flow control

- RS232 (RTS/CTS): TxD, RxD for data stream, RTS/CTS for flow control

- RS232 (RTS/CTS, DTR/DSR): TxD, RxD for data stream, RTS/CTS for flow control. DTR for socket status, DSR for socket open/close control

- RS485 (Half duplex): Half duplex RS-485 interface, RTS for driver enable/disable

- RS422 (Full duplex): Full duplex RS-422 interface

5.2 Controller Updated

Press “Update”] Button After you finish the detailed parameter setting. The converter will save all parameters into internal non-volatile memory and then reboot (see Figure 5.3). It takes about 5 seconds to complete the whole process, and a new login page will be presented (see Figure 5.1).



(Figure 5.3)

You can re-login and check if all parameters have been correctly saved. If everything is ok, you can close the browser now.

Note : If the domain of the converter is different from that of the computer running the browser, the login page won't appear unless the converter's "Gateway Address" has been correctly set.

5.3 Factory Default Setting

If by chance, you forget the setup password, or have incorrect settings making the converter inoperable, there are two ways to reset the setting and the following procedures can be used to reset all settings to factory default:

A:

you can turn off the power and then use any point tip to push “Reset” button and hold it to turn on the power at the same time for 5 seconds. The password will be reset to the factory default as “empty”.

B:

Turn off the power of the converter.

Use a pin or any point tip to push the screw driver or any conductor to short DTR and CTS (pin 4 and pin 8 in DB9) of RS232 connector.

Turn on the power of the converter.

Remove screwed driver or conductor.