e-NET TCP/IP Converters

E-P132-X
Operation Manual
for
ARM-7 Series

First Edition, March 2005

KSH International CO., LTD.

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Introduction

KSH International Co., Ltd. is providing new ways of connecting legacy serial devices to a Local Area Network (LAN) or Wide Area Network (WAN). e-NET TCP/IP converters are designed to operate serial ports over 100Mbit/s Ethernet networks. The data is transmitted via TCP/IP protocol. Therefore control is available via Ethernet, Intranet and Internet. e-NET TCP/IP converters are packaged in a steel case well suited for industrial environments. All serial ports operate in common RS-232 mode , industrial RS-422 and RS-485 modes configuration.

e-NET TCP/IP converter series is a low-cost, high performance design. By careful selecting high quality with competitive prices components in the world, e-NET products made network connectivity possible with affordable cost for virtually all kinds of devices.

The ARM-7 Series of e-NET TCP/IP converters consists of 3 models: E-P132-X-M (Module) (1 port for RS-232; 1 port for RS-422/485), E-P132-X (1 port for RS-232; 1 port for RS-422/485), and E-P432 (2 ports for RS-232; 2 ports for RS-232/422/485). This operation manual will guide you step by step for the various functions of the e-NET TCP/IP converter.

The following topics are covered in this chapter:

- **Overview**
- **Package Checklist**
- **Block Diagram**
- **Product Features**
- **Product Specifications**

Overview

e-NET TCP/IP converters are designed to make your industrial serial devices Internet ready instantly. ARM-7 Series of e-NET TCP/IP converters makes them the ideal choice for connecting your RS-232 or RS-422/485 serial devices—such as PLCs, meters, and sensors—to an IP-based Ethernet LAN, making it possible for your software to access serial devices anywhere and anytime over a local LAN or the Internet.

ARM-7 Series converters ensure the compatibility of network software that uses a standard network API (Winsock or BSD Sockets) by providing TCP Server Mode, TCP Client Mode, and UDP Mode. And thanks to ARM-7 Series' Real COM/TTY drivers, software that works with COM/TTY ports can be set up to work over a TCP/IP network in no time. This excellent feature preserves your software investment and lets you enjoy the benefits of networking your serial devices instantly.

ARM-7 Series converters support manual configuration via the handy web browser console and many protocols including TCP, IP, UDP, HTTP, DHCP, ICMP, and ARP. They are the best solution to network your serial devices.

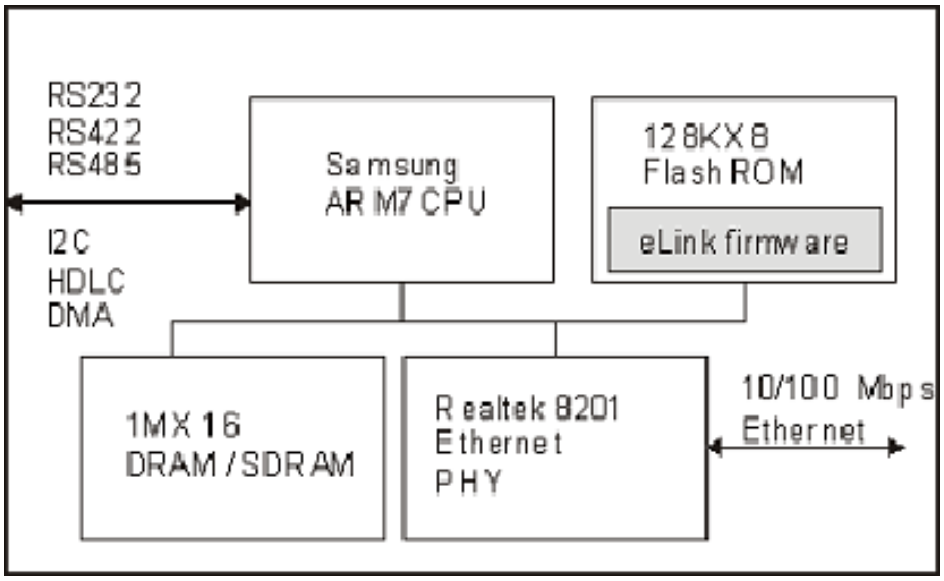
Package Checklist

ARM-7 Series products are shipped with the following items:

- 1 unit of e-NET TCP/IP converter
- 1 unit of Power Adaptor (9V DC, 500mA)
- Documentation & Software CD
- Quick Installation Guide

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

Block Diagram



Low-cost devices usually are equipped with low speed processors and limited memories. In reality, they are neither having the capability nor practicality to manage complicated network TCP/IP protocols. ARM-7 Series is a low cost while providing high performance network solution by converting data stream between network TCP/IP and popular serial port signals. In stead of processing TCP/IP packets directly, devices need only deal with those interface signals, which greatly simplifies the complexity of TCP/IP network in linkage.

Product Features

- **Data Conversion between RS-232/422/485 and Ethernet**

  Convert serial device (RS-232, RS-422, RS-485) data/signal into the TCP/IP package data/signal and send them out with the Ethernet DataStream; or convert the TCP/IP package data/signal into serial device data/signal.

- **Digital I/O Controlled Via Ethernet (For OEM only)**

  Convert the sensors' statuses (the sensors are connected to the ARM-7 Series converters) into the TCP/IP package data and send them out with the Ethernet DataStream; or use the TCP/IP package data to activate/deactivate the specified digital outputs.

Note: This function is for OEM only. Please contact your sales representative for further information.

- **Dynamic IP Configuration**

  Support DHCP client mode, simplifying network address configuration and management.

- **Dual LAN Speed**

  Support 10/100 Mbps Ethernet, auto-detected.

- **Server / Client Dual Modes**

  ARM-7 Series can be configured as network server or network client. In the client mode, it can be installed in network which is protected by NAT router or firewall, without the need of a real IP address.

- **Web-based Setup**

  Parameters setup is based on HTTP protocol by using standard browsers (IE and Netscape). No special software would be required.

- **Built-in Security Control**

  Protected by both setup password and access password to prevent intruders.

- **Remote updated**

  Firmware can be reprogrammed directly via Ethernet network to keep up with latest network standards.

Product Specifications

- CPU : 32-bits ARM-7 , 25 MHz
- RAM : 2 M Bytes (1 M * 16Bits)
- ROM : 128 K Bytes
- Ethernet
  - Port Type : RJ-45 Connector
  - Speed : 10 /100 M bps (Auto Detecting)
  - Protocol : ARP, IP, ICMP, UDP, TCP, HTTP, DHCP,
  - Mode : TCP Server/Client ; UDP
  - Setup : HTTP Browser Setup (IE & Netscape)
  - Security : Setup Password & Connecting Password
- Serial Port

No. of Ports : RS-232 * 1 Port / RS-422/RS-485 * 1 Port

  - Port Type : DB9 male
  - Built-in RS-422/RS-485 Terminal Resister (Surge Protection)
  - Speed : 300 bps～230.4k bps
  - Parity : None , Odd , Even, Mark, Space
  - Data Bit : 5 , 6 , 7 , 8
  - Stop Bit : 1 , 2
  - Flow Control : RTS/CTS (only for RS-232 port)
  - Socket Status/Control : DTR/DSR **(Only for RS-232 port)**
  - RS-232 Signals : Rx , Tx , GND , RTS , CTS , DTR , DSR , DCD
  - RS-422 Signals : Rx+ , Rx- , Tx+ , Tx- (Full-duplex)
  - RS-485 Signals : Data+ , Data- (Half-duplex)
- Digital I/O Port

  TTL Digital I/O * 7
- Throughput : 20 K bytes (Full-duplex / Half-duplex)
- Watch Dog Function

- Firmware On-line Updated Via Ethernet
- Power : DC 9 – 12 V , 500mA
- Led Lamp :

  E-P132-X series :

  SYS (red), LAN Tx (red), LAN Rx (green), LAN (green)
- Environment : Operating Temperature: 0℃～50℃

  Storage Temperature : -20℃～70℃
- Dimensions : E-P132-X : 110 * 68 * 27 mm (W * D * H)
- WEIGHT : E-P132-X : 140 gm
- Regulatory Approvals :

  EMC : FCC Class A, CE Class A

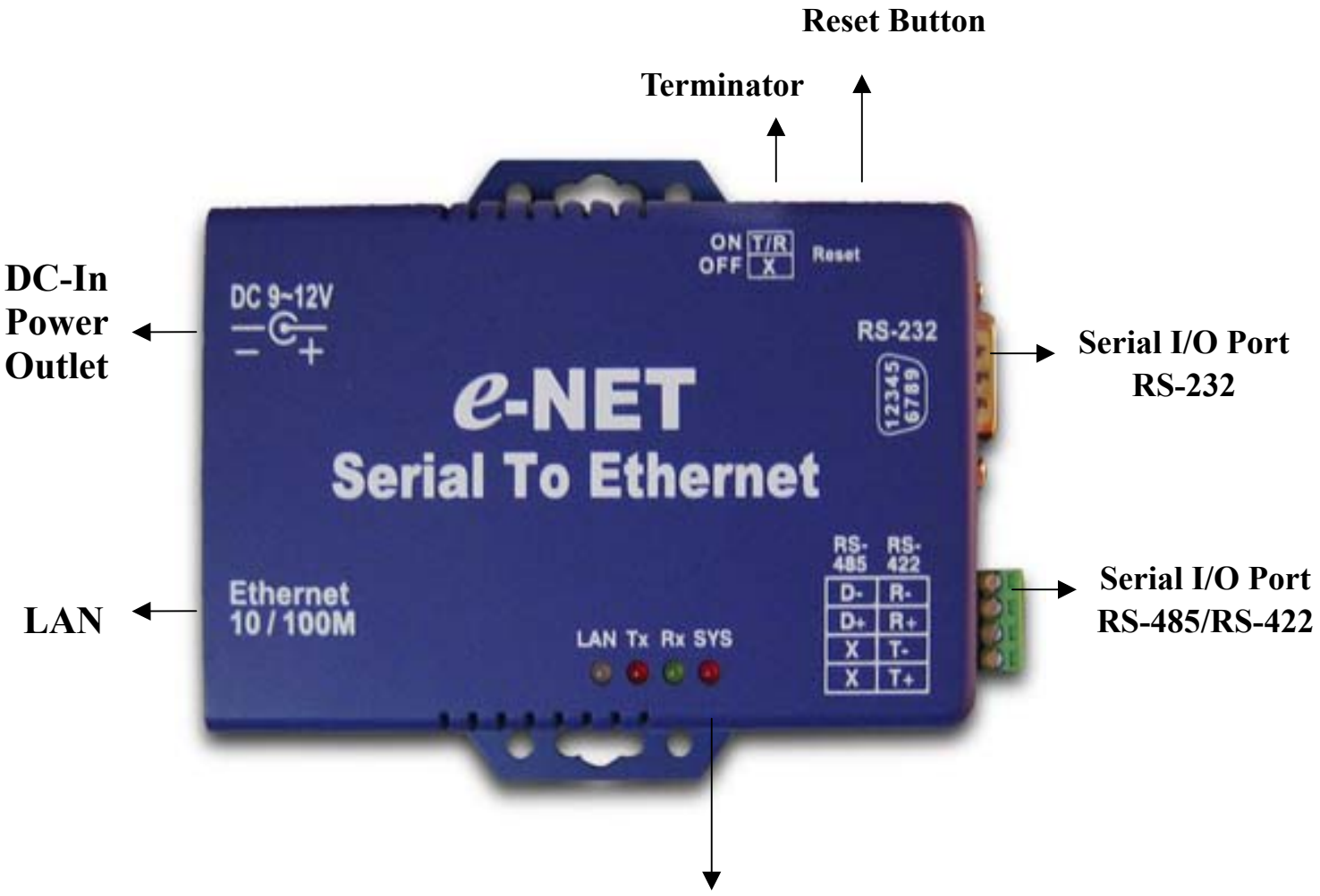
  WARRANTY : 1 year

2

Converter Description

Product Panel Views

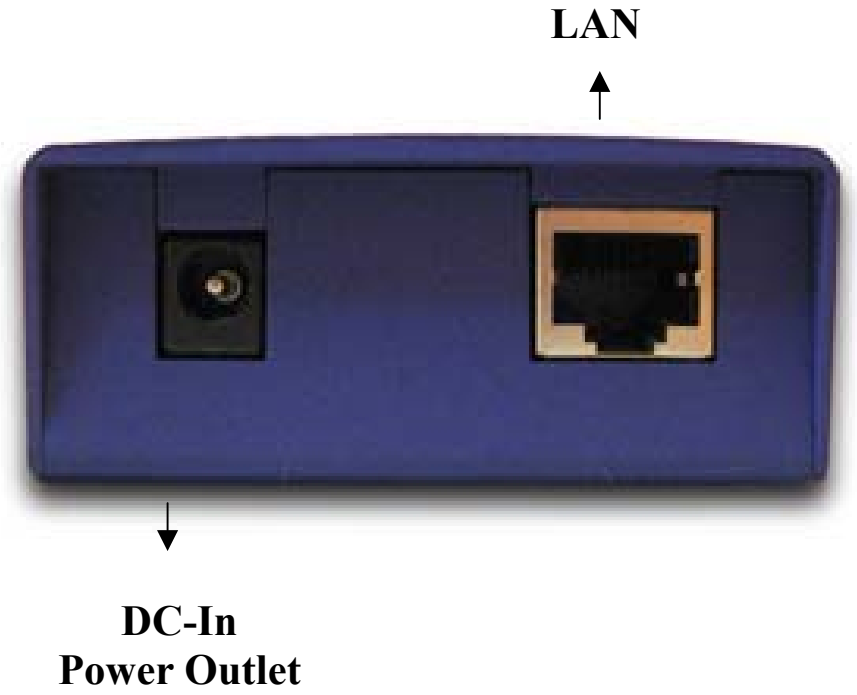
Top Side



Right Side

LAN Port

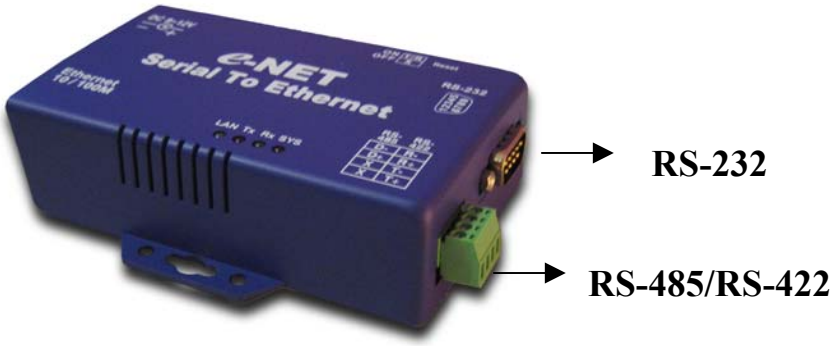
The connector for network is the usual RJ45. Simply connect it to your network switch or Hub. When the connection is made, the LAN LED indicator will light. When data traffic occurs on the network, red (Rx/Tx) indicator will blink during data transferring and receiving.



Power Supply

The e-Net TCP/IP converter is powered by a single 9～12V DC(Inner positive/outer negative) power supply and 500mA of current. A suitable power supply adapter is part of the packaging. Connect the power line to the power outlet at the right side of e-Net TCP/IP converter and put the adapter into the socket. If the power is properly supplied, the “SYS” green color LED will be on.

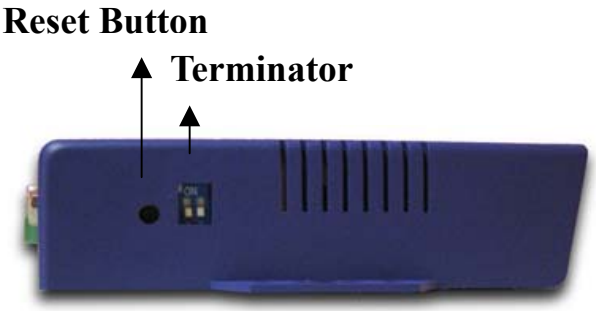
Left Side



Serial I/O Port of RS-232/RS-422/RS-485

Connect the serial data cable between the converter and the serial device. Follow the parameter setup procedures to configure the converter (see the following chapters).

Rear Side



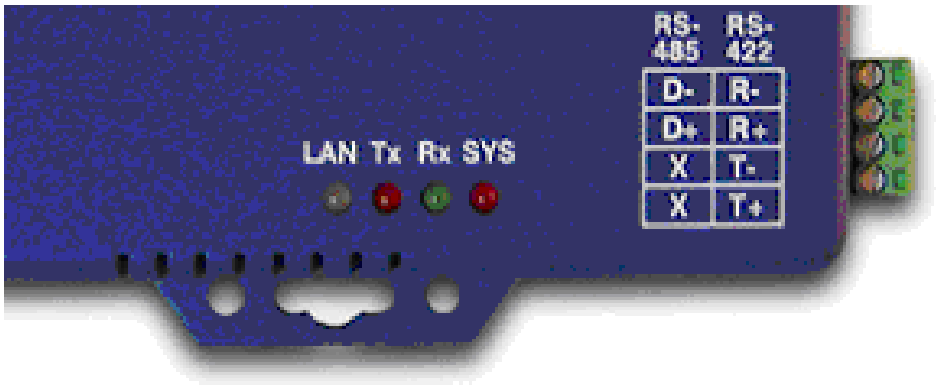
Reset Button

If by any chance, you forget the setup password, or have incorrect settings making e-Net TCP/IP converter inoperable. First, turn off the power. Second, use any point tip to push this button and hold it to turn on the power at the same time for 5 second. All the parameters will be reset to the factory default.

Terminator

The purpose is for compensating signal attenuation in long distance connection at RS-485/RS-422 I/O. If the switch 1 & 2 are set in “ON” position, the signal compensation will be activated. To disable the function, just push switch 1 & 2 to opposite position.

LED Indicators



SYS (Red)：

Power indicator (When the power is on, the LED will blink once per second.)

LAN (Green)：

Network signal indicator (When the LAN signal is detected, the LED will be on.)

TX (Red)：

Data sent indicator (When data are sent out to the network, the LED will be on.)

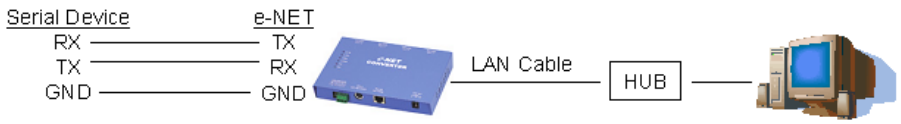
RX (Green)：

Data received indicator (When data are received from the network, the LED will be on.)

Wiring Architecture

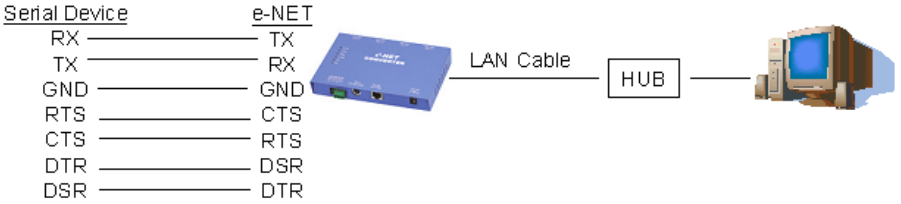
RS-232 Wiring Architecture

RS-232 Wiring



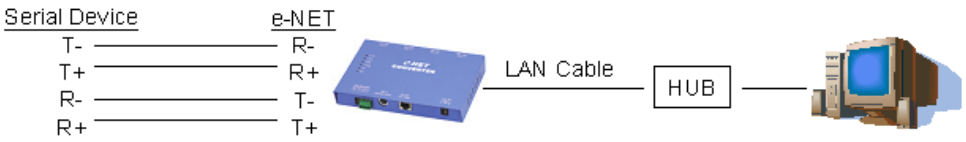
RS-232(RTS/CTS) Wiring

RS-232(RTS/CTS , DTR/DSR) Wiring

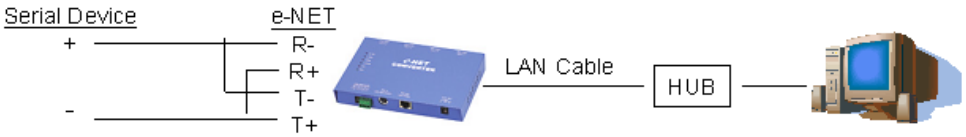


RS-422/RS-485 Wiring Architecture

RS-422 Wiring



RS-485 Wiring



When you finish the steps mentioned above and the LED indicators are as shown, the converter is installed correctly. You can use the Setup Tool “ETM.exe” to setup the IP Address.

To proceed the advanced parameter setup, please use a web browser (IE or Netscape) to continue the detailed settings.

3

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 "Web Console Configuration". in next sub section.

For quick and easy start , We suggest you to reference "Quick Installation Guide" manual.

The following topics are covered in this chapter:

- **Device Management Utility**
- **Menu "View"**
- **Menu "Config"**

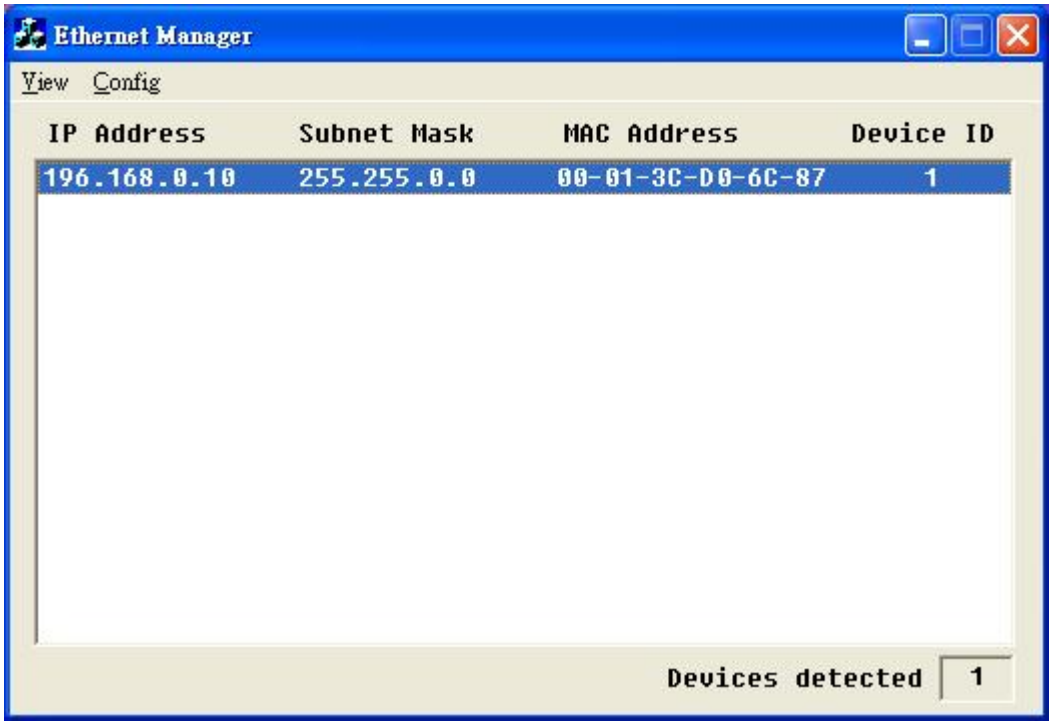
Device Management Utility

On PC we provide a Device Management Utility named ETM.exe which is an executable program in Windows 32 bit environments. ETM 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 ETM.exe can not detect the converter. Other similar issues, you may reference to Q&A in Appendix A.

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

- Broadcast packets aren't limited by subnet. Even if the IP address of the converters and the computer running ETM do not belong to the same subnet, it still works fine.
- Broadcast packets can not pass routers. ETM can only be used to monitor devices with computer running ETM in the same segment of local area network.



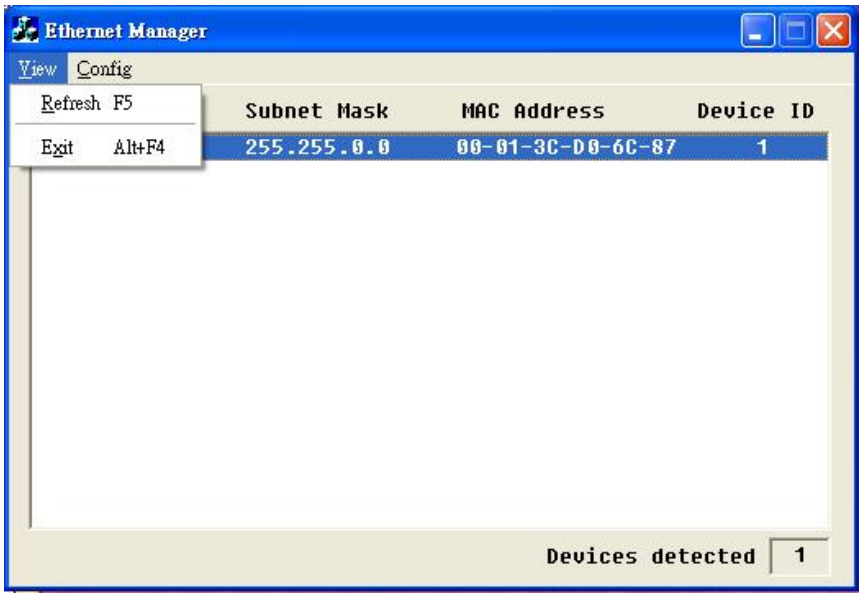
(Figure 3.1)

Menu “View”

- View -> Refresh F5

  Refresh the status. ETM will send another query to get updated information.(see Figure 3.2).

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



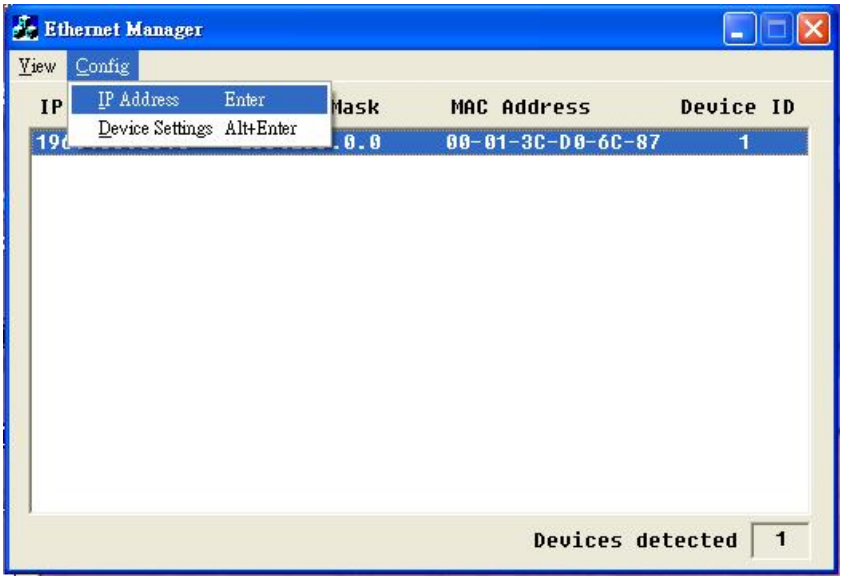
(Figure 3.2)

- View -> Exit Alt+F4

  Exit from the program (see Figure 3.2).

Menu “Config”

- Config -> IP Address (see Figure3.3)



(Figure 3.3)

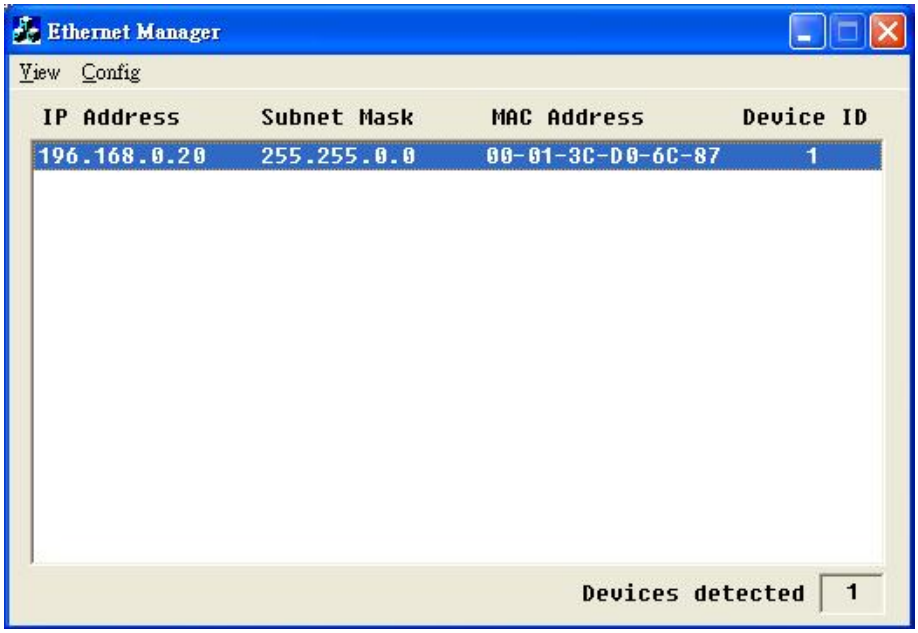
Press ENTER or select [IP Address] in the [Config] menu, a dialog will be shown (see Figure 3.4).

Note : Because ETM uses broadcast UDP packets, for the sake of security, it allows configuration **only when device's setup password is empty**.

(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 [Ok]** button, the IP address will be refreshed in 2~3 seconds. (see Figure 3.5).



(Figure 3.5)

Web Console Configuration

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. **Press [Alt]+[Enter] or select [Device Settings] in the [Config] menu, will open a new window in browser 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.

The following topics are covered in this chapter:

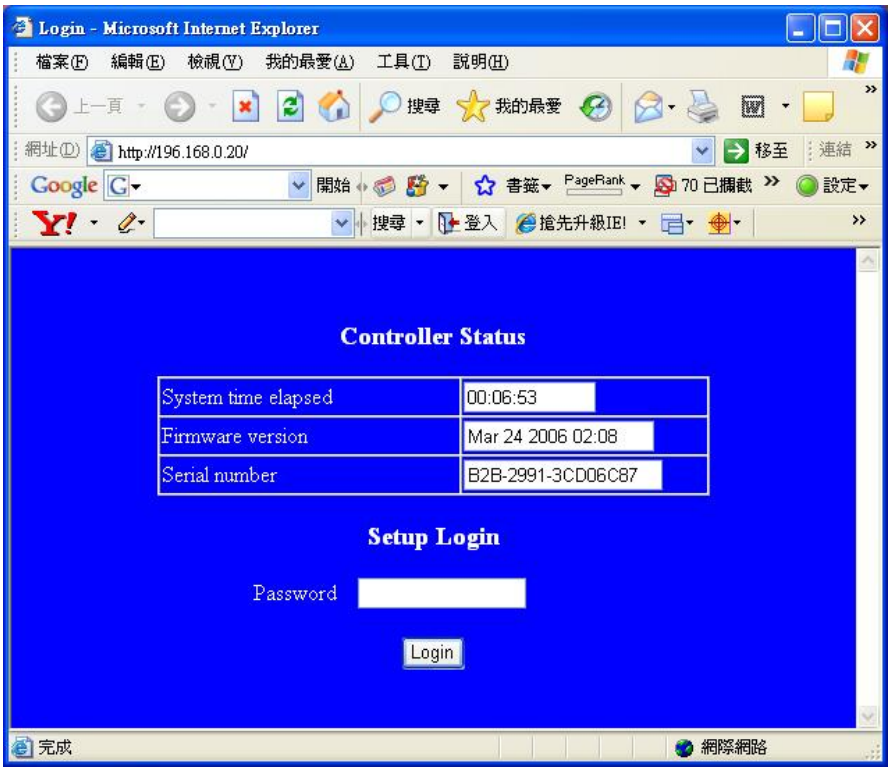
- **Controller Status**
  - **The Login Page**
  - **Field Description**
- **Controller Setup**
  - **The Setup Page**
  - **Field Description**
- **Controller Updated**
- **Factory Default Setting**

Controller Status

The Login Page

Setup of e-NET TCP/IP converter 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 "Controller Status" 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.)
- The "Controller Status" page will be shown (see Figure 3.6).



(Figure3.6)

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**

  Converter is consisted "Type Number (5 digits) and an unique MAC (Media Access Control) address used by Ethernet in octad format, 8 digits.

- **Password(Setup Login)**

  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".**

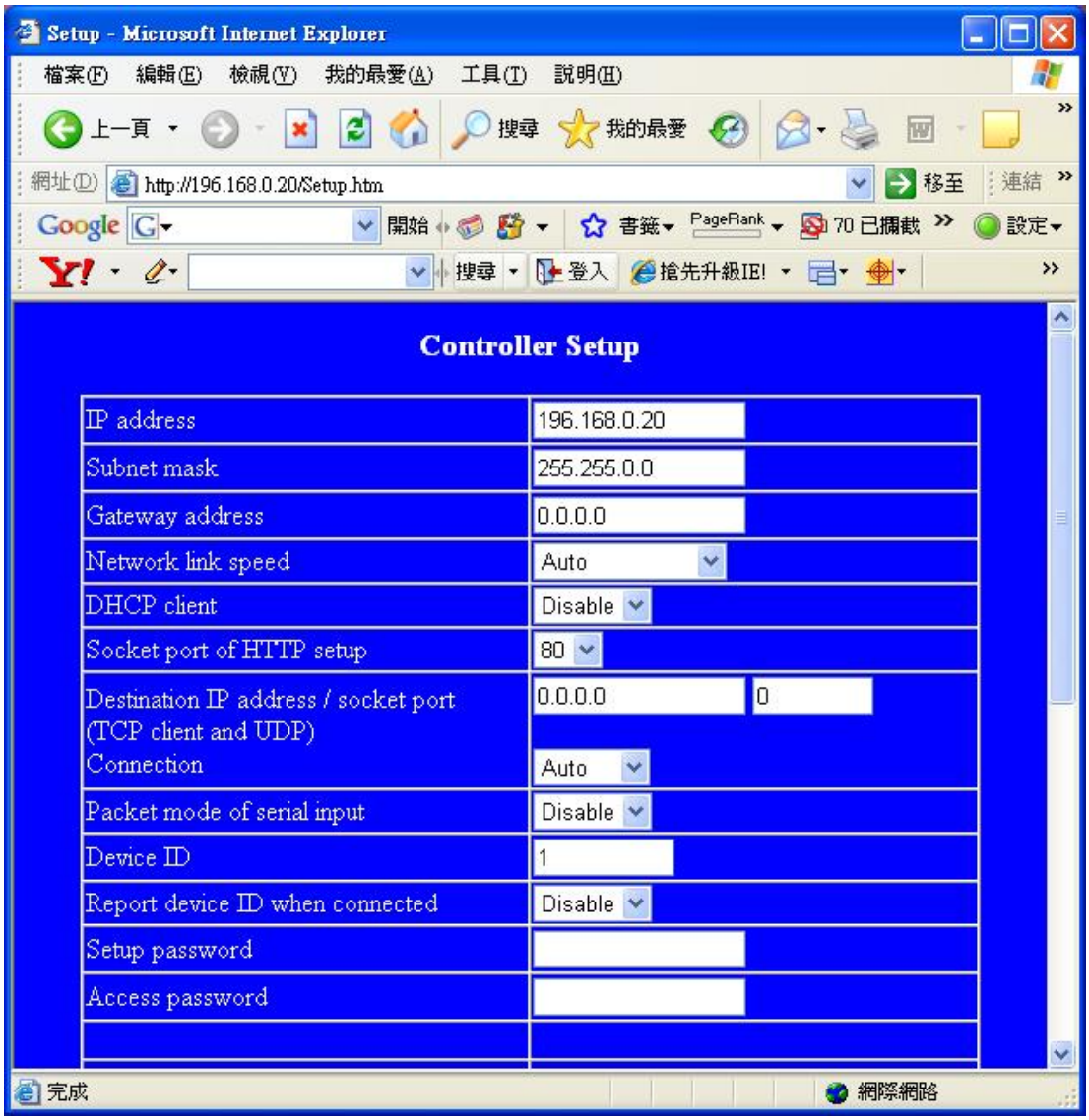
  e-Net TCP/IP converter uses the same password protection mechanism commonly used in Windows NT or UNIX. If there are more than **"3 consecutive failures"** in password check during login, the login function will be disabled for **"15 minutes"**. During this 15 minutes period, even if you supply correct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

Controller Setup

- The Setup Page

Type the correct password in the “Password” field and click the [Login] button in the “Controller Status” page, then the “Controller Setup” page will appear (see Figure 3.7).

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



(Figure 3.7)

Field Description

IP Address

The IP address of e-Net TCP/IP converter, 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 network e-Net TCP/IP converter 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.

Network link speed

Ethernet physical link speed. “Auto” means the speed is automatically selected by the converter. You can also specify “10M” or “100M” to match the speed of the HUB.

- **DHCP client**

  DHCP client mode could be enabled/disabled status. 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.

- **Socket port of HTTP setup**

  The socket port used to conduct the browser setup. Normally, HTTP protocol use TCP port “80” for communication. If the field is changed to “81”, the port “80” will be reserved for user's own Web.

  To enter the browser setup page, “http://x.x.x.x:81” should be typed for socket port “81” and “http://x.x.x.x” for socket port “80”, where “x.x.x.x” is the converter’s IP address..

- **Destination IP address**

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

- **Destination socket port**

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

- **Packet mode of serial input**

  Packet mode could be in enabled/disabled mode. If packet mode is enabled, the data input from UART will be deferred until the input buffer is full, or the converter detects a 10-character packet gap and no more character arrived. The block waiting time is extended to avoid the splitting of the complete packet.

- **Packet mode inter-packet timeout**

  Packet gap detection time constant, ranging from 10 to 1000 ms.

- **Device ID**

  User assigned ID number for the converter. Available ID is “0 ~ 65535”.

- **Report device ID when connected**

  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.

- **Setup password**

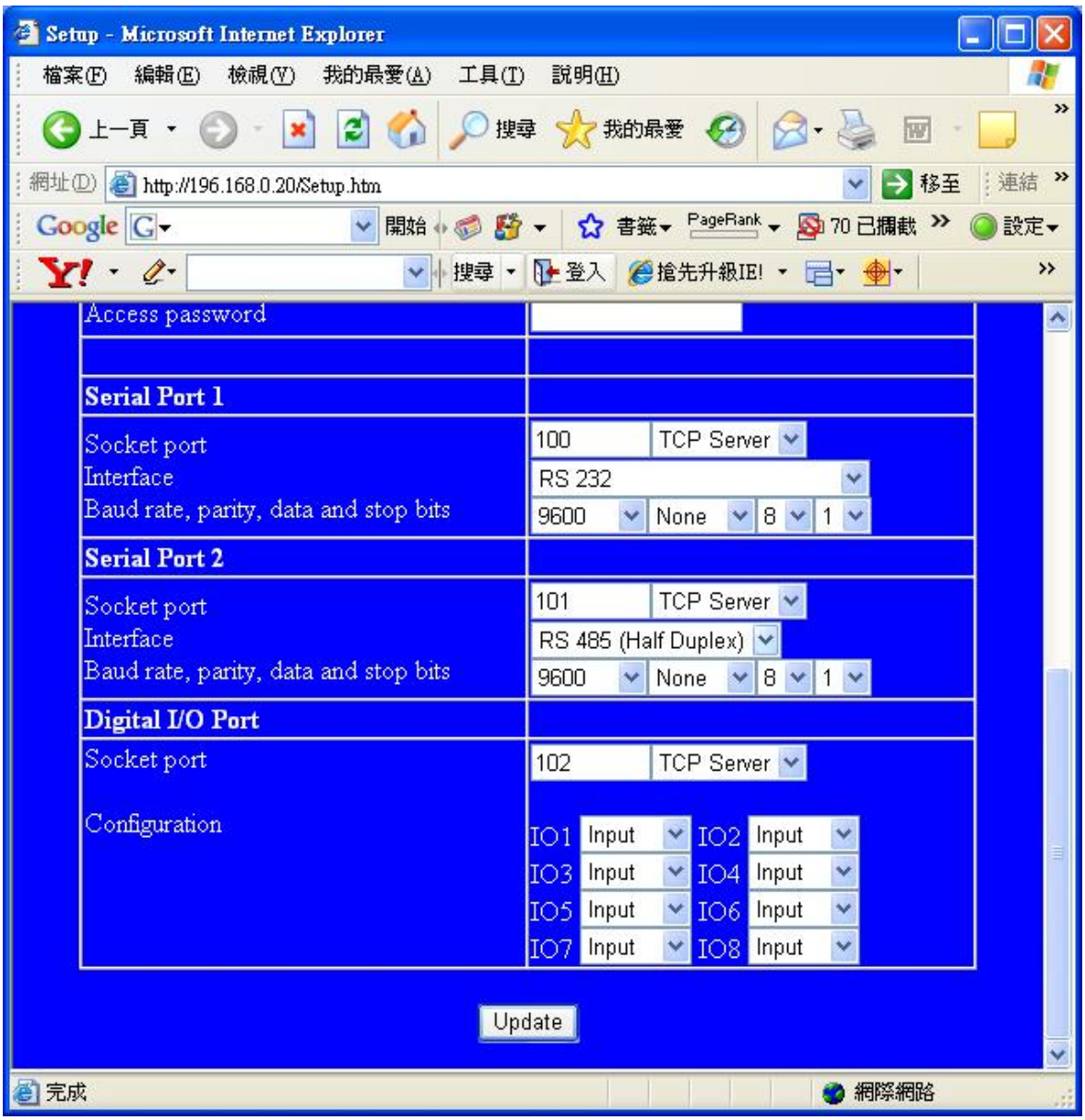
  Administration password used to login the “Controller Setup” page. It may be empty or up to 15 characters long.

- **Access password**

  During socket connection, Authentication password may be empty or up to 15 characters long. If “Access password” is empty, the authentication is disabled. Otherwise, the authentication will be conducted. If the authentication fails or no password is supplied within 10 seconds, the socket will be closed.

□ Serial Port 1

The first serial port of E-P132-X series is RS-232. (see Figure 3.8)



(Figure 3.8)

- **Socket port**

  - **Port number**

    A socket port assigned for the serial port. It's a 16-bit number , 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 1000. 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 client**s**.
    - TCP Client: TCP protocol, active open, connect to the TCP server.
    - UDP: UDP protocol, connectionless

- **Interface**
  - 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

- **Baud rate, parity, data bits, stop bits**
  - Baud Rate: 300 ~ 230400 bps
  - Parity: None, Even, Odd
  - Data Bits: 5, 6, 7, 8
  - Stop Bit: 1 or 2

- **Serial Port 2**

  The second serial port is RS-422/485. (see Figure 3.8)

- **Socket port**

  - **Port number**

    A socket port assigned for the serial port. It's a 16-bit number , 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 1000. 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: UDP protocol, connectionless

  - **Interface**

    - RS485 (Half duplex): Half duplex RS-485 interface, RTS for driver enable/disable
    - RS422 (Full duplex): Full duplex RS-422 interface

  - **Baud rate, parity, data bits, stop bits**

    - Baud Rate: 300 ~ 230400 bps
    - Parity: None, Even, Odd
    - Data Bits: 5, 6, 7, 8
    - Stop Bit: 1 or 2

- **Digital I/O Port**

  Digital I/O port setup screen, please see Figure 3.8

- **Socket port**

  - **Port number**

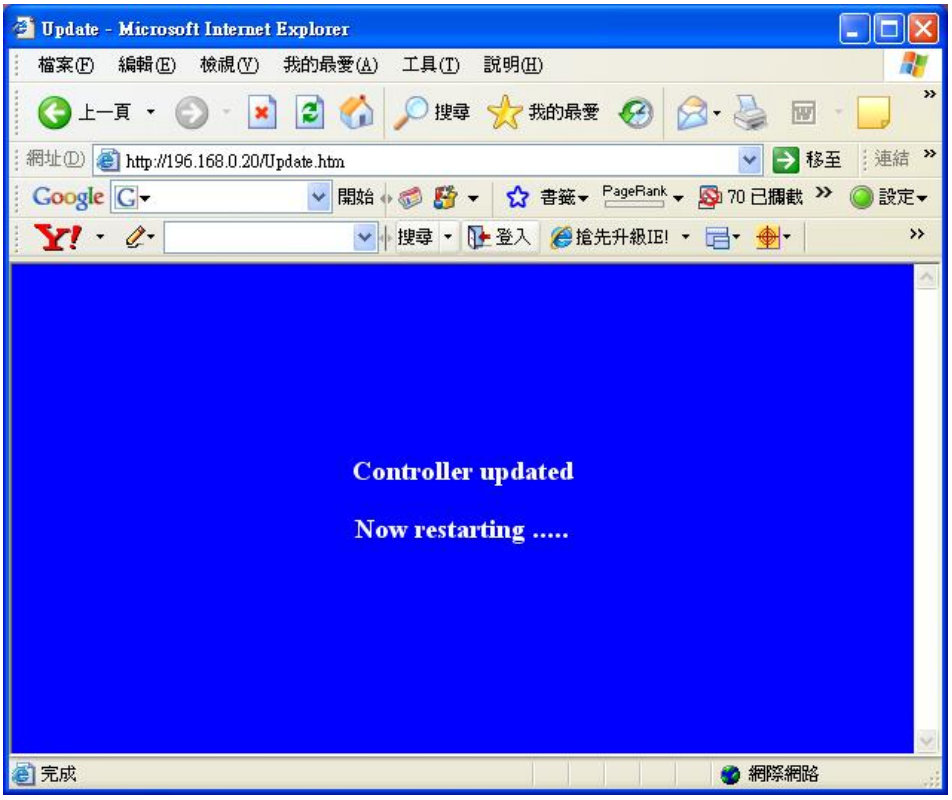
    A socket port assigned for the serial port. It's a 16-bit number , ranging from 1 to 65535. Because the numbers below 1000 are used for specific purposes (e.g. 80 is for HTTP protocol), we suggest you use the numbers larger than 1000. Generally the port number 4660 is used for the serial communication. 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 client**s**.
    - TCP Client: TCP protocol, active open, connect to the TCP server.
    - UDP: UDP protocol, connectionless

- **Configuration**
  - IO1～7: For transferring single in digital I/O port as Input or Output status.

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 3.9). It takes about 5 seconds to complete the whole process, and a new login page will be presented (see Figure 3.6).



(Figure 3.9)

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.

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:

1. 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**.**

B:

1. Turn off the power of the converter.
2. 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.
3. Turn on the power of the converter and wait 5 seconds and remove screwed driver or conductor.

4

Converter Self-Testing

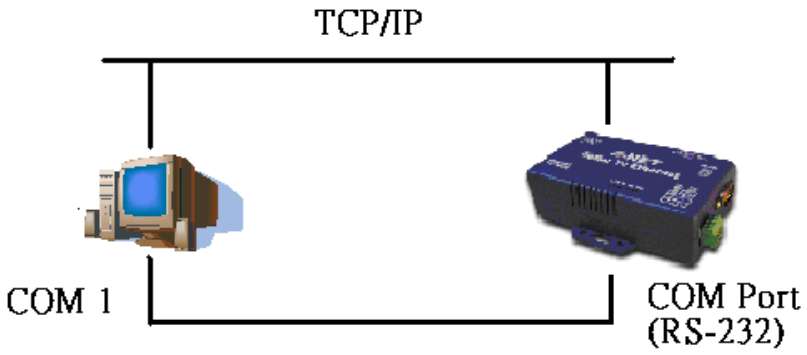
After completing the wiring and parameter setting, we should verify if the setting is correct or not. This chapter will introduce how to use a single computer to test if the converter behaves well.

The operating system can be Windows 95, 98, ME, XP, 2000. The "Hyper Terminal" utility should be installed on your PC (see Figure 4.1). It can be found in your Windows installation CD.

The wiring architecture is similar to "RS-232 Wiring" in chapter 2, and the "Serial Device" is replaced by the PC's COM 1. The same PC also plays the roll of the Remote Host.

The following topics are covered in this chapter:

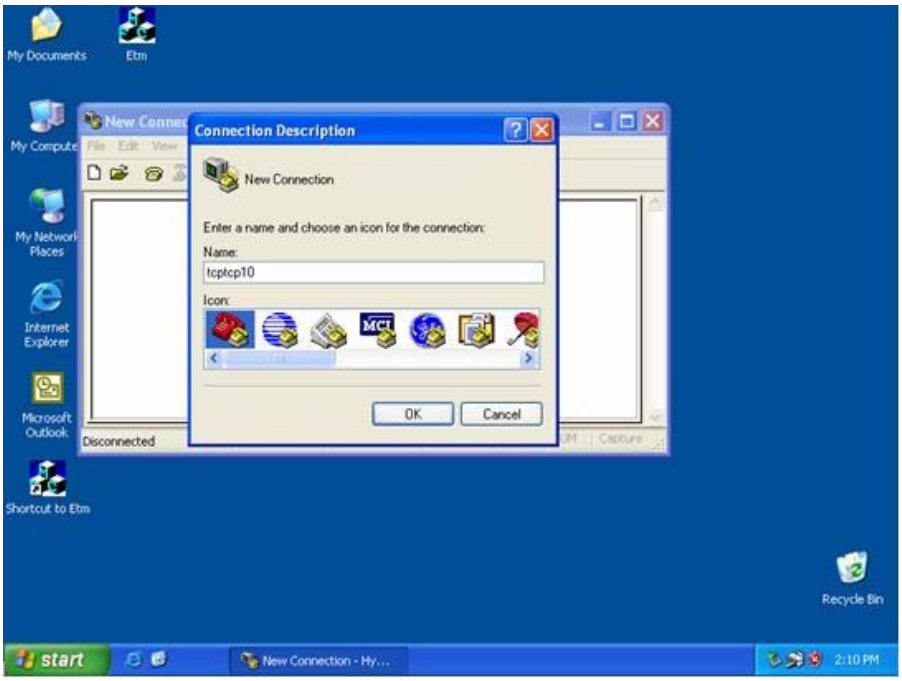
- **Hyper Terminal for TCP/IP WinSock**
- **Hyper Terminal for COM Port**
- **Data Transmission**



Hyper Terminal for TCP/IP WinSock

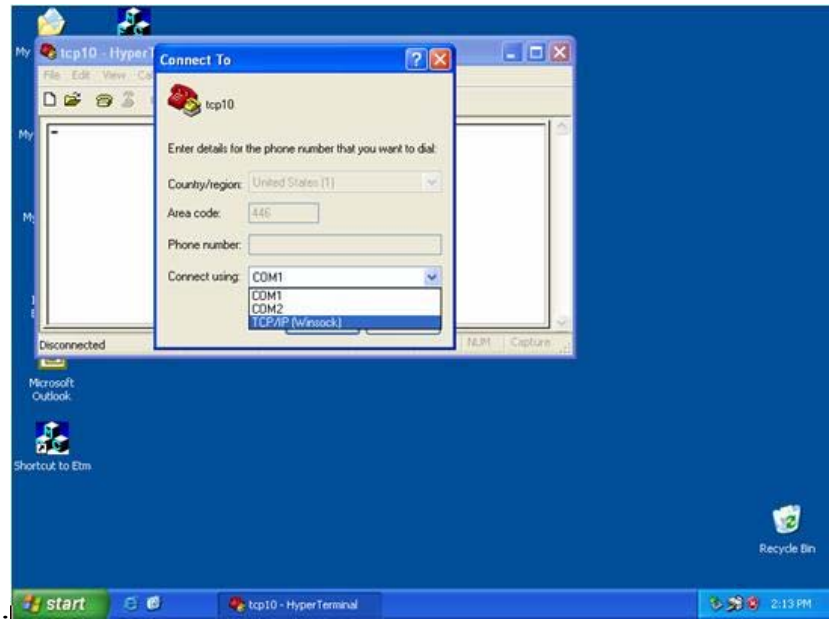
Initiate a Hyper Terminal from the Start Menu in Windows (see Figure 4.1), give a terminal name, choose an icon, and press “OK” button (see Figure 4.2).

(Figure 4.1)



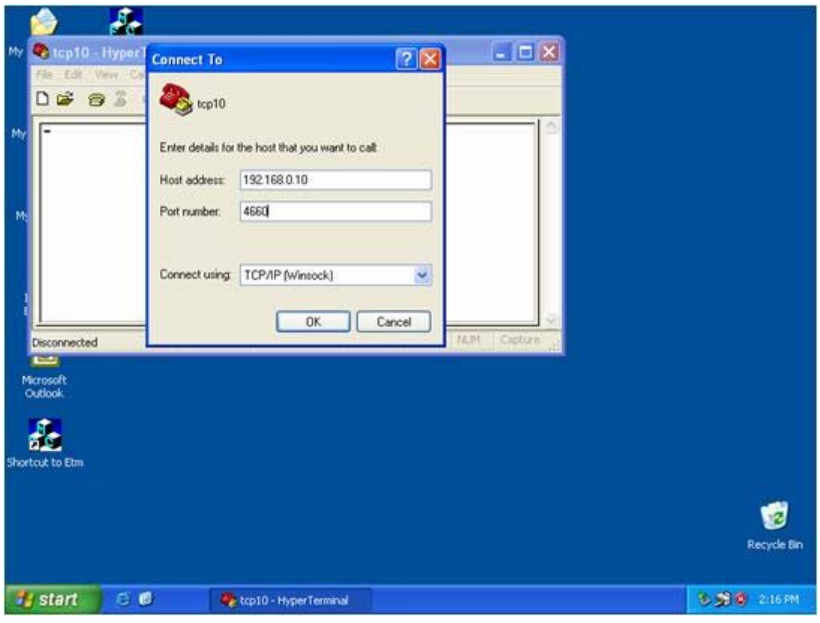
(Figure 4.2)

Select “TCP/IP(Winsock)” option at the “Connect using:” field (see Figure 4.3)



(Figure 4.3)

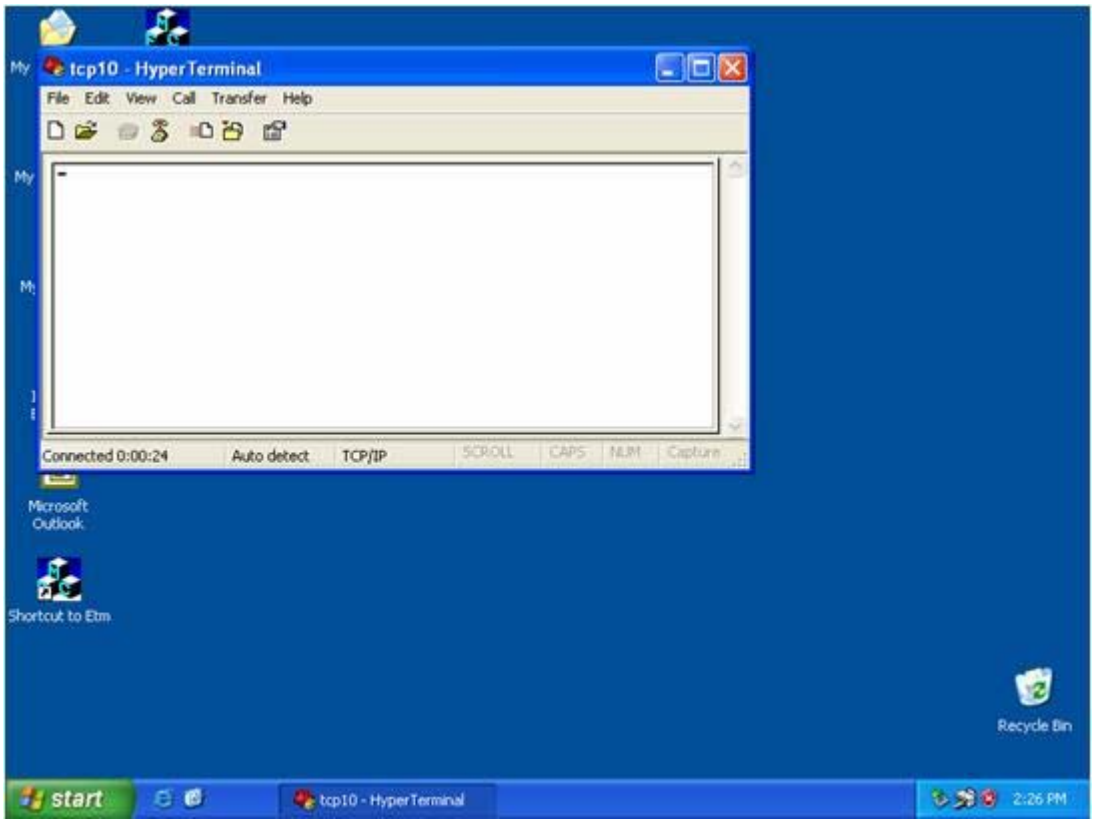
After "OK" button is pressed, Figure 4.4 appears. Enter the converter's IP address (e.g. 192.168.0.10) at the "Host address:" field, and the Socket port number set for the Serial Port 1 at the "Port number:" field (e.g 4660). (The Socket type of the Serial Port 1 should be "TCP Server".)



(Figure 4.4)

After "OK" button is pressed, Figure 4.5 appears. If the Hyper Terminal connects with the converter successfully, the time clock at the "left lower" corner "Connected

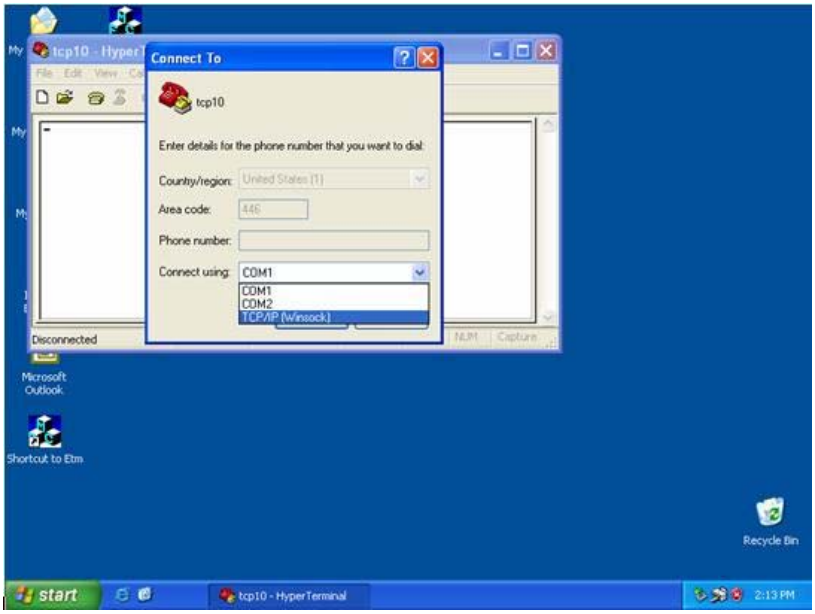
hh:mm:ss” will start counting.



(Figure 4.5)

Hyper Terminal for COM Port

Initiate another Hyper Terminal as a COM Port Terminal (in Figure 4.3, select COM 1 or other COM port instead of "TCP/IP (Winsock)"). Set the COM port Properties to be the same as those set for the Serial Port of the converter.



(Figure 4.3)

Data Transmission

When all steps described above are finished, type any characters on the COM Port Terminal and check if the typed characters are also displayed on the TCP/IP Winsock Terminal. Alternatively, check if the characters typed on the TCP/IP Winsock Terminal are also displayed on the COM Port Terminal. If yes, then all settings are correct and the converter can operate properly.

Appendix A

FAQ

Q. Why can't the ETM.exe detect the converter on the network?

A. Please check

- if the power is properly plugged to the converter.
- if the network cable is properly connected between the converter and the Hub.
- If your computer OS is Windows XP version which means "WINDOWS Firewall" function in OS is activated. However ETM.exe wouldn't detect the converter's IP address, therefore, You have to temperately disable "WINDOWS Firewall" function. After finishing the parameters settings, You can restart "WINDOWS Firewall" function.

Refer to the "Hardware Installation" steps in Chapter 3.

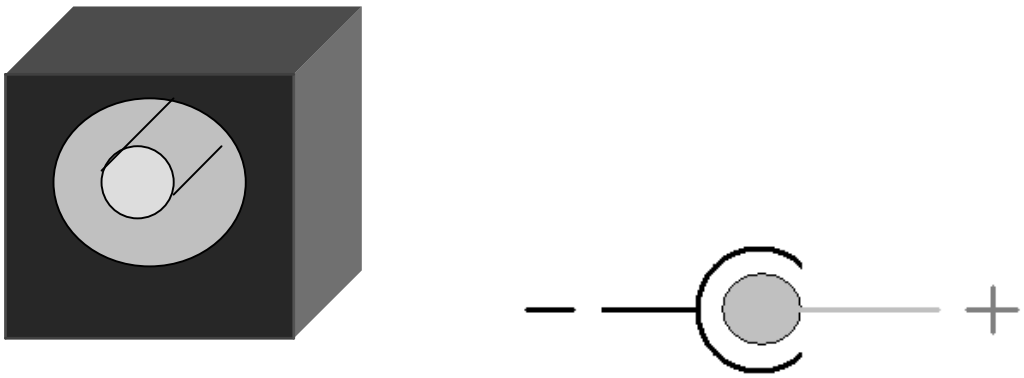
Q. Why can't I use IE to setup the converter?

A. Please check if the network domain of your PC is the same as that of the converter.

Appendix B

Pin outs and Cable Wiring

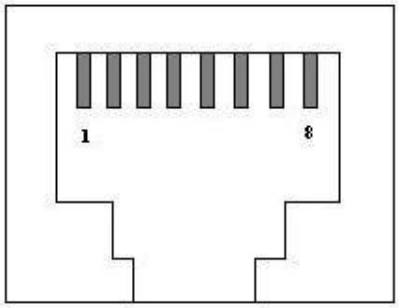
- **DC Power outlet**



- **RJ-45 Pin Assignment**

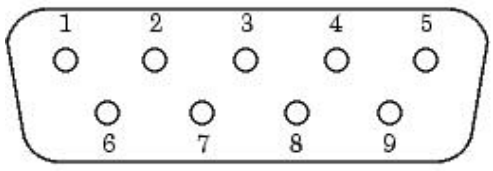
RJ45 Port

Pin	Signal
1	Tx+
2	Tx-
3	Rx+
6	Rx



- **RS-232 Pin Assignment**

The pin assignment scheme for a 9-pin male connector on a DTE is given below.



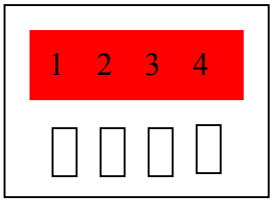
PIN 1 : DCD PIN 2 : RXD PIN 3 : TXD PIN 4 : DTR
PIN 5 : GND PIN 6 : DSR PIN 7 : RTS PIN 8 : CTS
PIN 9 : DC 5V

RS-232 Wiring Diagram

Serial Device		e-NET Converter		
2	RX	3	TX	
3	TX	2	RX	
5	GND	5	GND	
7	RTS	8	CTS	(Flow Control)
8	CTS	7	RTS	(Flow Control)

RS-422 Pin Assignment

The pin assignment scheme for a 4-pin RS-422 is given below.



PIN 1 : R- PIN 2 : R+ PIN 3 : T- PIN 4 : T+

RS-422 Wiring Diagram

Serial Device		e-NET TCP/IP Converter	
R-		3	T-
R+		4	T+
T-		1	R-
T+		2	R+

RS-485 Wiring Diagram

Serial Device		e-NET Converter	
D-		1	D-
D+		2	D+